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ABSTRACT

The experimental 1973-74 edition of Unit V consists of 35 life science curriculum activities intended for 13- to 16-year-old educable mentally handicapped adolescents. The role of the teacher in continuing field trials is noted and environmental themes and elements, inquiry skills, problem solving skills, and applicational behaviors and attitudes are stressed. Directions for using the student records-or-progress and tallysheets are provided for the teachers. The seven cores of activities are preceded by suggestions of general aims (e.g., student development of a success syndrome and development of some control over the environment), specific goals, objectives and a planning guide listing materials needed for each activity. Cores A through D--which focus on needs, sources, processes and management associated with water--contain 21 activities with titles such as (1) Living Things Are Mostly Water; (2) A Trip to the Water Plant; and (3) Microbes in Water. Titles for the 14 activities contained in cores E through G--on components, change agents and additives in air--include: (2) Testing for Carbon Dioxide and Oxygen; (2) Weather and Air; and (3) Do We Need a Filter On Our Town? Activities are organized in terms of materials, teaching strategies, and anticipated student behavior. An evaluation/feedback form accompanies each activity. (MC/SM)

ED 087189

LIFE SCIENCES

A SPECIAL EDUCATION

EXPERIMENTAL EDITION

UNIT V
**Air And Water
In My Environment**



Biological Sciences Curriculum Study

LIFE SCIENCES:

A SPECIAL EDUCATION PROGRAM

EXPERIMENTAL EDITION 1973-74

UNIT V

Air And Water In My Environment

U.S. DEPARTMENT OF HEALTH,
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INTRODUCTION

The project to develop a life science curriculum for the educable mentally handicapped (EMH) was originally funded in the summer of 1969 by the Division of Research, Bureau of Education for the Handicapped, United States Office of Education. The project is charged with writing, field testing, evaluating, and disseminating materials dealing with topics in life sciences for the EMH population in our schools.

ME NOW, the BSCS model life science program for educable mentally handicapped youngsters in the 11- through 13-year

age-group, has been developed by the Company of Northbrook, Illinois.

On the basis of a grant from the State of Illinois, the project is charged with writing, field testing, evaluating, and disseminating materials dealing with topics in life sciences for the EMH population in our schools. The project is charged with writing, field testing, evaluating, and disseminating materials dealing with topics in life sciences for the EMH population in our schools. The project is charged with writing, field testing, evaluating, and disseminating materials dealing with topics in life sciences for the EMH population in our schools.

DEVELOPMENT

Summer, 1971 - Initial writing conference

Academic year, 1971-72 - Initial testing

Summer, 1972 - Revision

Academic year, 1972-73 - Large-scale field test

Summer, 1973 - Revision

Academic year, 1973-74 - Conclusion of field test

Fall, 1973 - Unit development

Spring, 1974 - Unit development

Fall, 1974 - Unit development

Spring, 1975 - Unit development
Environment

Fall, 1975 - Unit development

Spring, 1976 - Unit development

INTRODUCTION



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age-group, has been released and is available from Hubbard Scientific Company of Northbrook, Illinois.

On the basis of the success of the ME NOW program, and in anticipation of meeting further student and instructor needs, the Bureau of Education for the Handicapped has provided the BSCS with a three-year continuation grant to develop model materials for 13- to 16-year old EMH students. Recognition by the educational community of the need for special emphasis on matters of environmental concern led the BSCS staff to decide early in the project that a portion of the materials for EMH students should focus on environmental studies. The time line for developing this new curriculum, which is entitled ME AND MY ENVIRONMENT, is shown below.

COMMERCIAL RELEASE

Fall, 1973 - Unit I, Exploring My Environment

Spring, 1974 - Unit II, Me As An Environment

Fall, 1974 - Unit III, Energy Relationships In My Environment

Spring, 1975 - Unit IV, Transfer And Cycling Of Materials In My Environment

Fall, 1975 - Unit V, Air And Water In My Environment

Spring, 1976 - Unit VI, Populations And Societies



Me and my Environment

THE ROLE OF THE TEACHER IN THIS EXPERIMENTAL EDITION

This curriculum has been written for and by teachers; it was tested and modified by teachers. enthusiastic teachers for this development, testing, and modification. Twelve of these teachers Thirty-nine more were selected as experimental teachers to provide the best possible field test providing feedback for the revision depended heavily upon the resourcefulness of these teachers

In the continuing field trials, teachers have several responsibilities, including:

1. Implementing the strategies and activities exactly as they are written. Only when all test analysis of results be depended upon to reveal strengths and weaknesses of the program.
2. Developing a feel for the inquiry strategy, the flow of activities, and the ultimate study around. Through their understanding of this rationale, the test teachers can make an inventory some activities, the modification of others, and the invention of new ones that will enable
3. Providing timely, accurate, and detailed feedback that specifies strengths and weaknesses for each activity.

The following outline will provide you with an overview of the six major components of the program

1. UNITS IN ME AND MY ENVIRONMENT

UNIT I. EXPLORING MY ENVIRONMENT	UNIT II. ME AS AN ENVIRONMENT	UNIT III. ENERGY RELATIONSHIPS IN MY ENVIRONMENT	UNIT IV. TRANSFER CYCLING MATERIALS IN MY ENVIRONMENT
Investigating the Visible Environment	Microbes and Me	Introduction to Energy	Energy and Material Transfer
Landmarks in the Visible Environment	Disease in People Environments	Energy in Food	Decomposers in My Environment
Sensing the Invisible Environment	Environmental Choices and Chances (Drugs, Alcohol, Smoking)	Energy Flow through Food Chains and Webs	Garbage and My Environment
Looking at the Invisible Environment		Food Making in Plants	



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it was tested and modified by teachers. The BSCS has found highly skilled, flexible, and and modification. Twelve of these teachers served as writers to help create the materials. ers to provide the best possible field test of the curriculum. The success of these tests in upon the resourcefulness of these teachers.

responsibilities, including:

ly as they are written. Only when all teachers use the curriculum as prescribed can the strengths and weaknesses of the program.

Flow of activities, and the ultimate student behaviors that the curriculum is organized onale, the test teachers can make an invaluable contribution by suggesting the extension of the invention of new ones that will enable their students to achieve the objectives.

t that specifies strengths and weaknesses, modifications, alternatives, and student responses

ew of the six major components of the program:

UNIT III. ENERGY RELATIONSHIPS IN MY ENVIRONMENT	UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT	UNIT V. AIR AND WATER IN MY ENVIRONMENT	UNIT VI. POPULATIONS AND SOCIETIES
roduction to Energy ergy in Food ergy Flow through ood Chains and Webs d Making in Plants	Energy and Material Transfer Decomposers in My Environment Garbage and My Environment	Uses of Water Sources of Water Preparation of Usable Water Water Management Components of Air Changes in the Air Additives in Our Air	Interactions within a Population Population Size and Complexity Effects of Overpopulation Population Control



Me and my Environment

2. ENVIRONMENTAL THEMES

Interrelationships of
Environmental Components

Diversity and Patterns

Complementarity of
Organisms and
Environment

Flow of Energy

Cyclic Nature of
Processes

Finiteness of Resources

Ecological Trade-Offs

Interrelationships of
Environmental
Components

Population Dynamics

3. ENVIRONMENTAL ELEMENTS

Space

Shelter

Living Things
(Plants)
(Animals)
(Microorganisms)

Energy
(Food Chains)

Air

Water

Man

4. INQUIRY SKILLS according to difficulty

Observing

Identifying

Associating

Describing

Comparing

Translating

Inferring

Applying

Predicting

Speculating

Value Judgment

Comparing



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MENTAL ELEMENTS

4. INQUIRY SKILLS (Ordered according to assumed difficulty level)

Observing

Identifying

Associating

Describing

Comparing

Translating

Inferring

Applying

Predicting

Speculating

Value Judging

Comparing

5. PROBLEM-SOLVING SKILLS

Experimenting

Knowing What the Problem Is and What to Do to Solve It

Recording Data

Discussion and Treatment Of Group Data

Organizing Data

Explaining, Defending, Answering Why Questions

Asking Questions

Identifying Variables

Identifying Controls

Interpreting Results

Drawing Conclusions

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Me and my Environment

6. APPLICATIONAL BEHAVIORS AND ATTITUDES (No order of importance is intended)

The student develops:

- vocabulary skills.
- a success syndrome.
- skills of observation.
- an attitude of inquiry.
- a sense of self-identity.
- skills in conserving water.
- skills in the hygienic care of his own body.
- skills in participating in group discussions.
- the ability to manipulate water treatment systems.
- skills in applying science experiences to everyday life.
- skills in the selection, preparation, and storage of food.
- a recognition of his own role in creating an acceptable life style.
- an ability to distinguish between healthful and unhealthful environments.
- an appreciation of the community service provided by public utility systems.
- an understanding of the interrelationships between environmental components.
- skills in functional, receptive, and expressive communication about his environment
- skills in employing systematic problem-solving techniques to persistent problems of
- skills in recognizing environmental landmarks and utilizing these for orientation a
- a recognition of his social dependence on others and his biological dependence on t



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Me and my Environment

In May 1971, a planning conference was held to prepare guidelines for the development of ME AND MY ENVIRONMENT. The conference was attended by the five members of the advisory committee, four of whom are in the field of special education and the fifth in biology; by the project writing team, consisting of five special education teachers and five biology teachers; and by the BSCS project staff. Conferees developed guidelines covering areas of environmental concern and utility for the target population of children, the characteristics of this population, and the needs of these children that might be met through environmental studies. A multidimensional model incorporating the science content, cognitive and affective behaviors, environmental themes, contextual focus, and needs of the children resulted from the planning conference. Following the conference, the BSCS project staff prepared a proposed content and objective outline for the curriculum. A thorough study was made of the existing literature covering the physical, social, and psychological needs of handicapped adults; the staff then attempted to identify which of those needs might be met by ME AND MY ENVIRONMENT.

SOME GENERAL OBJECTIVES

The identification of needs led to a statement of general objectives. The first four were adopted as a broad benchmark against which all activities were judged.

1. To help the mentally handicapped child develop interests, skills, and positive attitudes through experiences with scientific - especially biological - concepts.
2. To provide the mentally handicapped child with challenging intellectual activity at a level commensurate with his ability to respond effectively.

3. To aid the child in developing a heightened observation and a realistic measure of self in relation to his environment.
4. To contribute to the child's social maturity, vocational preparation, self-expression, and self-fulfillment.
5. To develop in the child a sense of responsibility for his environment, and to help him perform the tasks of everyday living.
6. To contribute to the child's understanding of his own strengths and limitations, and to help him develop effective strategies for dealing with them.

BASIC ASSUMPTIONS UNDERLYING THE CURRICULUM

In the initial development of the curriculum, the following basic assumptions were identified. These assumptions were tested during the testing of ME NOW, and the results of the testing of ME AND MY ENVIRONMENT are discussed in the following pages.

1. Ideas must be developed in the child's own words, and the student must be able to explain them in his own words.
2. Vocabulary, when used in a *technical* language, may be useful to the child in understanding the world around him.



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3. To aid the child in establishing functional modes of living through heightened observation, a well-developed curiosity, an increased measure of self-confidence, and a sense of responsibility to and for his environment.
4. To contribute to the development in the child of a higher level of social maturity and emotional stability that can lead to increased vocational proficiency, realistic self-concept, creative self-expression, and more effective assimilation into the community.
5. To develop in the child a knowledge of himself in relation to his environment, along with a tendency to apply this knowledge to the tasks of everyday living.
6. To contribute to increased knowledge about the learning characteristics and limitations of the educable mentally handicapped pupil, and about effective strategies for instruction.

BASIC ASSUMPTIONS UNDERLYING THE DESIGN FOR THE CURRICULUM MATERIALS

In the initial discussions with the special education community, some basic assumptions for the development of the life science materials were identified. These were revised somewhat, based on the development and testing of ME NOW, to form the underlying assumptions for the development of ME AND MY ENVIRONMENT.

1. Ideas must be developed with a minimum of reading on the part of the student.
2. Vocabulary, where possible, should involve *functional* rather than *technical* language, although technical names are taught when these may be useful to the student.

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Me and my Environment

3. Entry points should be concerned with concrete, tangible "things," rather than with abstract, intangible ideas or concepts.
4. The classroom environment and the materials should not be cluttered with distractors; however, a variety of perceptual modes and instructional media should be used (e.g., sight, touch, smell, etc.).
5. Activities should be developed in small, discrete units that build on or reinforce a concept or skill.
6. Learning, for the EMH student, requires slower pacing, greater redundancy, and time for participation by each student. The instructional materials should be student-doing rather than student-watching.
7. An activity must involve the student in ways of applying the desired behavior; transfer cannot be assumed.
8. EMH children need, and can respond effectively to, an activity-oriented instructional approach.
9. The curriculum should be designed to provide students with an experience in science as inquiry, through the exploration of their environment.
10. Most teachers of the Educable Mentally Handicapped will need specific directions in using inquiry strategies for teaching science concepts.
11. The teachers of the Educable Mentally Handicapped, for the most part, are not science-oriented; therefore, the materials should be specific with regard to science techniques.
12. The materials and methods must permit or provide attention to individual differences and to specific learning characteristics of the population.

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13. To achieve the objectives, designers of the materials should attempt to create a balance between detail and motivation; that is, the amount of minute and abstract detail that can be learned is probably a function of the interest and motivation that can be established to deal with it.

MAJOR AIMS FOR ME AND MY ENVIRONMENT, A JUNIOR HIGH EMH SCIENCE CURRICULUM

The curriculum includes instruction related to the personal well-being, self-worth, confidence, and successful coping of each person to meet persistent daily life problems. The major aims are:

1. Development in each child of a sense of identity as a person who has some degree of control over and can act on his environment. This will lead to a degree of self-determination based on a rational coping with situations rather than on a passive compliance or an impulsive response to problems.
2. Development in each child of a success syndrome. More than anything else, each activity is intended to be a success experience for each child. It is the teacher's responsibility - almost obligation - to see that each child succeeds at a level that is challenging to his abilities and that preserves his self-respect. It is a further responsibility of the teacher to point out his achievement. As a group, the students should help each individual fit what he has done into a pattern of accomplishment.

The curriculum is intended to be intellectually stimulating, and exploratory for each student, and to induce him to become actively involved. It should encourage the following outcome:

3. Development in each child of an interest that could become a hobby or avocation over a lifetime (through an exposure to an array of experiences in science). It is hoped that many children will find some



Me and my Environment

area - perhaps growing plants, caring for animals, identifying flowers, collecting things, or simply enjoying outings into the country - that they feel strongly about and can develop some competence or knowledge in. This would provide a means of self-expression, and (perhaps) allow some degree of sharing or involvement with others.

The curriculum is organized around eight ecological themes. There are some specific content objectives related to these. The ultimate objectives are:

4. Development in each child of a sense of relationship and empathy with other living things. It is hoped this will lead to a positive regard and caring about what affects them as individuals and as a group, because what affects them affects the community of man.
5. Development in each child of an understanding of environmental conditions that will lead to a sense of responsibility for the environment and actions that protect or improve it.

These are the five overriding aims that should serve as reference points for teachers and guide much of what they plan to do in the classroom. One of the older junior high students in a first-year test class expressed his feelings about the class and himself in this way: "I just feel that if we want these kids to improve, and that's the whole idea of it, you have to bring these kids a certain amount of happiness. You have got to make them feel that they are really wanted. If they are wanted, they will try a little harder. That sounds kind of childish, I suppose, but it works...Another thing...always inspire: 'Come on, put your best foot down - try it again.' You know, things like that. I mean, to me, just the tone of voice makes the difference to me about going out or staying in the class. I just feel that they don't want me - and they don't, (when their tone says) 'Oh, Eddie! Why did he have to come today?' "

Since the origin of MY ENVIRONMENT, eight of the major ideas and curriculum development themes. These themes are brought to be a prerequisite for society's environmental education of as unifying themes.

1. INTERRELATIONS

When we try to do everything else

Life is entirely dependent on the supplies: air, water, temperature and humidity. Scavengers (animals and fungi) obtain their food. Green plants depend on their environment and form the basis of food chains and

Organisms interact in a variety of ways in food webs. Plants compete for growing space and shelter. Other organisms interact.

The important thing is singular, nor do the



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ENVIRONMENTAL THEMES

Since the original planning conference for the development of ME AND MY ENVIRONMENT, eight ecological themes have emerged which seem to encompass the major ideas and concepts (i.e., the science concept) that the curriculum development team sees as appropriate for this student population. These themes are broad generalizations, some understanding of which appears to be a prerequisite for coping with one's own environment as well as with society's environmental problems. The themes are probably best thought of as unifying threads which run throughout the curriculum.

1. INTERRELATIONSHIPS OF ENVIRONMENTAL COMPONENTS

When we try to pick out anything by itself, we find it hitched to everything else in the universe. John Muir

Life is entirely dependent upon the things that the environment supplies: air, water, food, shelter, and subtle things such as a suitable temperature and humidity. Animals depend upon other animals or plants for food. Scavengers (carrion and detritus feeders) and decomposers (bacteria and fungi) obtain their nutrition from the remains of living organisms. Green plants depend upon sunlight, air, water, and minerals from their environment and form the base upon which all organisms are interconnected by food chains and complex food webs.

Organisms interact with each other, and with the environment, in a variety of ways in addition to the eater-eaten relationships of food chains or webs. Plants compete with each other for light, water, soil nutrients, and growing space. Animals compete for available food resources, space, and shelter. Other relationships include parasite-host and pathogen-host interactions.

The important consequence of this theme is that actions are not singular, nor do they have singular impact. Man's competitive interactions



Me and my Environment

have far-reaching, often unknown consequences. For example, clearing land for raising agricultural crops destroys the habitat for plants and animals and disrupts certain food webs, while establishing a suitable habitat for agricultural species. The resulting monocultures are often vulnerable to attack by pests because populations of natural predators have been removed. Attempts to control these competitive organisms through applications of pesticides may simply aggravate the situation by killing nontarget organisms such as predators, scavengers, and decomposers which are actually beneficial. Similarly, herbicides used in control of weeds which are competing with crops may destroy habitats for natural predators, making additional applications of insecticides necessary; these in turn may kill more nontarget beneficial organisms. Numerous studies have shown that large-scale, indiscriminate use of pesticides may, in the long run, actually decrease agricultural productivity. In addition, manufacture, transport, and application of pesticides and fertilizers contribute to air and water pollution, thereby adding to the degradation of vital resources upon which all life depends. This is but one simple example of a myriad of possibilities. If we expect students to start thinking in terms of consequences, it is imperative that they realize and appreciate that life depends upon interrelationships and that apparently simple actions may have far-reaching implications.

2. DIVERSITY AND PATTERNS

There is great diversity in the environment. Differences in climate and topography lead to different environments with different communities of plants and animals. The plants and animals differ as they have become adapted to do somewhat different things, or even to do similar things but in different environments. Even within one species there is diversity. But it is possible to find patterns within all this diversity. Recognizing patterns helps one get his head around a bewildering variety of things. All environments have

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If one looks at the organisms in any habitat, he discovers a variety of sizes, shapes, and colors. Further examination will reveal groups of organisms that are related in various ways; e.g., some produce food (producers) while others feed upon these producers (consumers). We find that the organisms are all related in a pattern forming a food web.

Diversity is thought to enhance the stability of a system, for it provides alternate channels of energy or materials flow if part of the system is lost or overburdened. For example, consider a single food chain: plants, grasshoppers, frogs, snakes. If one link in the chain is lost - e.g., the grasshoppers are wiped out by insecticides - all links beyond that one will also be lost if they have no alternative sources of food. In a complex food web, however, a link may be lost without destroying the system; links beyond the missing one may turn to another channel for food - and in the example, the frogs may exploit another type of insect food resource. Thus, preserving diversity may be necessary in preserving the stability of the life-support system of the biosphere. Man cannot exist alone.

It is often said that variety is the spice of life. Diversity makes the environment less monotonous and more interesting. This aesthetic component should receive emphasis in the curriculum.

3. COMPLEMENTARITY OF ORGANISMS AND ENVIRONMENT

A complement is something that completes or fills out another thing. Complementarity in this context refers to the completion each part brings to the other, when each is dependent upon the other. Some interdependent relationships have two components; others three, four, ten, or even a hundred or more. A few examples should clarify the meaning of the theme.



Me and my Environment

Organisms use material things from the environment and, in turn, recycle things back to the environment, where they may be used by other organisms. Thus, the presence of organisms modifies the environment in various ways, some of which make the environment more suitable for other organisms. Plants use carbon dioxide and release more oxygen than they use. Consumer organisms (animals, decomposers) use oxygen and release carbon dioxide. Both the producers and consumers are dependent upon the environment for these resources, and the balance of these materials in the environment is likewise dependent upon both groups of organisms.

Without scavengers and decomposers there would be a prodigious accumulation of the remains of once-living organisms cluttering up the environment. Probably all of the available carbon, oxygen, and other essential elements would be tied up in these dead remains. Life would have come to a screeching halt a long time ago!

The presence of plants improves the water-holding capacity of a watershed and helps prevent erosion of the soil by wind and water. Plants reduce the rate of evaporation of soil water but at the same time release it to the atmosphere. Thus, plants play a vital role in the water cycle and influence local climates through the regulated flow.

Plant succession is a classic example of complementarity. An abandoned field, new roadside, or similar disturbed area is quickly invaded by hardy pioneer plants which we usually think of as weeds. As these grow, die, and decay, they modify the immediate environment and are replaced by plants which are better adapted to the new conditions. These, in turn, cause further modifications and are replaced by other populations; finally a relatively stable community exists that is able to replace itself and that is in dynamic equilibrium with the environment. Such communities are usually referred to as climax communities.

4. FLOW OF ENERGY

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4. FLOW OF ENERGY

The biotic stream is capable of flowing in long or short circuits, rapidly or slowly, uniformly or in spurts, in declining or ascending volume. Ecology calls this sequence of stages in the transmission of energy a food chain, but it can be more accurately envisioned as a pipe line... (which) leaks at every joint. Aldo Leopold

Energy is required to do work; that is, to cause movement requires energy. Indeed, to do anything requires energy. Life depends upon this continuous flow which is initiated by a constant input of energy from the sun, its photosynthetic transformation from light to chemical energy by the producer organisms (green plants), its passage from organism to organism along various food chains (in their more complex food webs), and its eventual loss as radiant heat to outer space. Each time that energy is converted or transformed, at each step along the way, some of it is lost from the system and is no longer available to do useful work. This, in simple terms, is the second law of thermodynamics. Green plants are able to fix photosynthetically only a portion of the sun's energy that they intercept. In turn, some of the energy which they trap and store is used by the plants for such things as growth, reproduction, and the movement of materials. Thus, only a portion of that original stored energy is available to the organisms which eat the plants. These organisms likewise use energy in their various life processes so that only a small portion of the energy which they received from eating plants is available to their predators. As a consequence, only about one-tenth of the energy at any step in a food chain is available to the next level. An acre of agricultural land will provide enough food energy for about 1.5 persons for a year if planted in wheat, but will feed only 0.1 person if used to raise beef cattle!

Society's use of fossil fuels is simply a utilization of energy captured and stored over millions of years by green plants. As such, this source of energy is in finite supply and is a nonrenewable resource.



Me and my Environment

Electricity generated by fossil fuel-burning plants can similarly be traced to the sun. Hydroelectric plants offer a limited alternative source of electricity. This source is also finite because of the limited number of adequate sites. The planned use of nuclear fusion reactors (which are simply a duplication on earth of the natural processes taking place on the sun to release energy) offers an alternative source of energy (again sought as electrical energy) for society; this source, however, as with all others, is governed by the laws of thermodynamics. The energy, once released, flows through the system and is eventually lost to space as heat. Hence this source is also finite, but it is a very large source. The exploitation of nuclear energy is fraught with unanswered questions and problems. How can we safely contain and shield the radioactive processes of fusion? How can we safely dispose of the radioactive wastes from the "temporary" fission reactors being used until fusion reactors, which produce little waste, are perfected? Can the earth dissipate the huge amounts of waste heat generated? What effects will this heat have on climates, ecosystems, and organisms?

It should be emphasized that nuclear energy offers little hope, at present, of replacing the sun as a life-supporting source of energy. In the foreseeable future, man's only source of food energy will be the sun, through photosynthesis of green plants.

5. CYCLIC NATURE OF PROCESSES

All the rivers run into the sea, yet the sea is not full. King Solomon

In contrast to energy, materials (matter) are continuously recycled from living to nonliving systems and back to living systems again. Materials necessary for life are in finite supply, and if they were not constantly cycled, life would simply run out of resources and cease. Some examples include the water cycle, the carbon dioxide-oxygen cycle, the nitrogen cycle, and the cycling of various essential minerals such as

calcium, potassium, and iron. The most vital role of these elements has been incorporated into the cycle available to other organisms.

Man's present activities upset these natural nonbiodegradable cycles. The natural cycle of the exhaustion of fossil fuels in the atmosphere, with the water through pollution of organisms which are

6. FINITENESS OF RESOURCES

Everything that we use on earth is a spaceship because much as life depends on it, it must be used over and over until it is exhausted. Technological societies have used resources and, at the end, resources unavailable that we will have no more metal resources except

Through photosynthesis, natural cycles are as long as environmental conditions. But, the amount of resources is finite! There is a limit that can be inter-upted when resources are available.



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calcium, potassium, sulfur, and magnesium. Decomposer organisms play a most vital role in many of these cycles, releasing materials which have been incorporated into living organisms so that they are once again available to other organisms in the environment.

Man's present exploitation of consumable resources, in most cases, upsets these natural cycles. The manufacture and ultimate discarding of nonbiodegradable products removes important elements and compounds from the natural cyclic processes of the ecosphere and could ultimately lead to the exhaustion of such resources for the life-support system. Burning of fossil fuels is changing the natural balance of carbon dioxide in the atmosphere, with the consequences largely unknown. Degradation of air and water through pollution and the application of pesticides destroys organisms which are vital to cyclic processes.

6. FINITENESS OF RESOURCES

Everything has to come from somewhere. The earth has been likened to a spaceship because of its finite supply of all material resources. Inasmuch as life depends upon a continued supply of resources, things have to be used over and over. Continued exploitation of any resource will lead to its exhaustion unless that resource is recycled. The demands of today's technological societies are placing tremendous burdens on the earth's resources and, at the same time, the wastes generated are making other resources unavailable or unfit for supporting life. Projections indicate that we will have depleted our supply of fossil fuels and several important metal resources early in the next century.

Through photosynthesis, food is a renewable resource so long as the natural cycles are able to resupply the raw materials necessary, and so long as environmental conditions necessary for plant life are maintained. But, the amount of food that can be produced on the earth at any one time is finite! There is only so much area available, only so much sunlight that can be intercepted, and only so much of the required raw materials available.



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The consequence of this theme is that an indefinite continuation of growth and an increasing use of resources is impossible when the supply of all resources is finite. This is true of population, food consumption, resource utilization, technology, gross national product, or any other parameter which one chooses to measure. And all noteworthy predictions indicate that we are very rapidly reaching the limits of growth. Most of us will probably experience the dire consequences!

7. POPULATION DYNAMICS

A population refers to a collection of individuals of the same species occupying a given space at a given time. The size of living populations is determined by four factors: rate of birth, rate of death, rate of immigration, and rate of emigration. Populations tend to grow geometrically (e.g., 2, 4, 8, 16, 32, ...) to the limit (carrying capacity) of their environment as determined by the available food, space, predation, and disease. They then either level off and exist in some fluctuating equilibrium with other populations, or they crash back to some low level. A common misconception is that all biological populations tend to follow the first pattern: growth which is described by an S-shaped curve up to the carrying capacity, followed by a fluctuating equilibrium. There are, however, many biological populations which dramatically overshoot the carrying capacity of their environment and, as resources are rapidly depleted crash back to a low population level. A blowfly population is a good example of the latter. Upon arrival at a carcass, the population increases rapidly, completely overshooting the carrying capacity or the environment's capacity to sustain the population for any appreciable length of time. As the food resource is quickly depleted, the population crashes back to the low level of a few adult flies who are searching out a new carcass to feed upon.

The strategy is simple - exploit the environment for all it's worth while it is here and hope that a few of the many adults produced in the process will survive long enough to make it to the next carcass. There

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is evidence that the characteristics of human population growth are similar to those described for the blowfly, and our present exploitation of the earth's resources is certainly analogous to the strategy employed by the blowfly. Such a strategy can only be disastrous for mankind. The earth is the only carcass we have.

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Since resources are finite, no population can continue to grow forever. The human population has grown geometrically over the past few centuries. Doubling time of the human population is currently less than 35 years, and the most optimistic estimates indicate that this population will exceed the carrying capacity of Earth within a century (some suggest that we have already passed the carrying capacity and many demographers and ecologists have predicted a crash in the human population prior to the year 2020). *Population control and zero population growth will be accomplished, either by self-imposed means or by natural means. If the latter, it will occur through starvation, disease, war, or lower fecundity - or a combination of these. There is no plausible alternative!*

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Perhaps the greatest service that this curriculum could hope to perform is to help this population of youngsters understand the implications of population growth and the necessity for limiting family size. But, to achieve the desired end, the curriculum must provide the students with an understanding of the ways and means by which family size may be controlled. This is one area where individuals can make decisions, can have an influence, and can contribute to the solution of what may be mankind's most pressing problem!

8. ECOLOGICAL TRADE-OFFS

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As we have seen, all environmental components are interrelated in intricate, complex ways. No action has singular impact, and thus any course of action must be carefully weighed and alternatives considered. Any course of action involves ecological trade-offs.



Me and my Environment

For example, consider society's use of electricity. Many of us enjoy a life style which is very closely tied to the conveniences and labor-saving devices powered by electricity. The generation of that electricity is a major factor in environmental degradation. By and large, we have made the decision to forego a certain amount of environmental quality to enjoy the leisure and convenience of electrical appliances. Projections indicate that increases in demand for electrical power will require strip mining vast areas of Wyoming and Montana, exploiting oil shale reserves of Colorado, depleting the petroleum reserves of the Alaskan north slope (with the inherent dangers to the arctic tundra), and constructing large numbers of nuclear power plants. In all of these activities, we will trade off various amounts of environmental quality.

INQUIRY PHILOSOPHY

We do not view science as a collection of facts, but as a process by which facts are gathered, interpreted, and organized into conceptual schemes. We have included facts, and activities structured to generate facts, not for their intrinsic value but to provide the means by which concepts and generalizations are developed through an inquiry strategy.

Inquiry, simply defined, is finding out why. Inquiry may be defined as a process of questioning, or seeking information, of discovering. For EMH students, as for others, the excitement of discovery adds meaning to learning. Inquiry allows the student a natural avenue for satisfying his curiosity about his world. An inquiry strategy is one which poses a question or problem and then guides students through *inquiring kinds* of behaviors such as observing, describing, identifying, comparing, associating, inferring, applying, predicting, translating, guessing, speculating, creative thinking (divergent production), and value judging.

There are degrees of inquiry. On one end of the scale, a question is posed and the student, after analyzing the question and applying his

experiences and background, arrives at an answer. On the other extreme, the student is given a problem, and is required to design an experiment, collect data, and analyze the results.

All degrees of inquiry are given, but is arranged in a way relevant to the question. The strategies the questioner uses are the key.

If knowledge of a strategy, then the student is given further information. The student will be more able to acquire and integrate information.

INQUIRY SKILLS

1. OBSERVING is the first step in the inquiry process. It is the gathering of information through the senses. We see, hear, touch, taste, and smell. The curriculum should provide concrete experiences that require accuracy in observation. The student should be encouraged to observe details, extra details, and to interpret, and to predict.
2. IDENTIFYING is the second step in the inquiry process. It is the recognition of certain properties of an object. Included in this step is the labeling of an object with an objective label from previous experiences.



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experiences and background information, answers the question. At the other extreme, the student poses the question after being given a certain amount of background information, and then proceeds to answer the question by designing an experiment, conducting the experiment, and interpreting the results.

All degrees of inquiry have a common ingredient: the answer is not given, but is arrived at by the individual after he has analyzed information relevant to the question. The distinction is obvious - in inquiry strategies the questions are answered by the students and not the instructor.

If knowledge is acquired, at least in part, through an inquiry strategy, then the student should be able to use that strategy in acquiring further information and solving future problems as they arise. He will be more able to seek answers to other questions through his ability to acquire and interpret information.

INQUIRY SKILLS

1. **OBSERVING** is a fundamental activity of scientists. The accumulation of information which may lead to knowledge comes primarily from what we see, hear, taste, smell, or touch. A major function of this curriculum should be to offer a rich and varied environment of concrete experiences for the students. As students gain experience, accuracy in observing and recording the details of their findings should be increased. Observing should frequently include an element of divergent production by asking the students to heed all of the details, extraneous and otherwise, that they can. Opinion, interpretation, and speculation are not, of course, a part of observing.
2. **IDENTIFYING** involves the recognition of what something is or of certain properties that make it possible to categorize the thing. Included in identifying is the matching of a name or definition with an object, the use of a key or guide, and the recall of a label from previous experience.



Me and my Environment

3. ASSOCIATING involves seeing what things go together - seeing relationships or recognizing common properties. Associating may be thought of as a prerequisite to classifying, or organizing data or information for some purpose. Grouping (classifying), through associating, may enhance conceptualizing.
 4. DESCRIBING involves writing or relating orally all of the relevant observations about a thing so that another individual would be able to use the description to identify the object or share in an event he did not actually experience. Emphasizing description should enhance development of observational skills.
 5. COMPARING involves the inspection of two or more objects (events) to note similarities and differences. It is closely related to the student's ability to distinguish between critical differences and to generalize recognizable similarities. This skill could involve the use of referents other than the things compared. It is necessary that one have an understanding of such comparatives as hotter-colder and smaller-larger, as well as a comprehension of their related values, e.g., warmer-cooler and littler-bigger.
 6. TRANSLATING is the skill in which recorded observations are expressed in another symbolic form. The conversion of tabular information into a graph or of a verbal description into a drawing exemplifies this.
 7. INFERRING involves going beyond the information or evidence at hand to presume a cause or an effect, or to answer a question. It requires extrapolation, may or may not be based on implication, and is closely related to two of the problem-solving skills: interpreting results and drawing conclusions.
 8. APPLYING involves the use of a learned task or skill in a situation other than that in which it was originally learned. For example,
- if a child has application work
9. GUESSING is the situation. The involved in making
 10. SPECULATING is of a hypothetical it may be reasonable a great deal is the particular
 11. PREDICTING is to happen in a given the situation a
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- PROBLEM-SOLVING SKILL
- Inquiry is the whereby this is according science curriculum in student, through such that the experiences and solve the problem



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if a child has learned to orient the top of one map with north, an application would be to orient another map with respect to north.

9. GUESSING is the generation of ideas about outcomes in a data-poor situation. The limited evidence, common sense and hunches are all involved in making the most informed judgment one can.
10. SPECULATING is the generation of ideas about the nature or outcome of a hypothetical situation. Even though the situation is unobserved, it may be reasonable to consider based on past experiences. Possibly a great deal is known about the subject - but without having observed the particular event, one must describe it from imagination.
11. PREDICTING is the skill of making informed estimates of what should happen in a given situation, based on knowledge of what enters into the situation and previous experience.
12. DIVERGENT PRODUCTION refers to the process of generating as many ideas about something as possible.
13. VALUE JUDGING involves more than simply expressing opinions or preferences. It is the comparison of things and the assignment of relative value to them, based upon some set of criteria. In this curriculum, the WHY of valuing should be sought.

PROBLEM-SOLVING SKILLS

Inquiry is the cognitive process of finding out WHY. The mechanism whereby this is accomplished is problem solving. The ME AND MY ENVIRONMENT science curriculum is a structured sequence of activities that enables the student, through success, to learn to seek the answers to WHY. It is hoped that the experiences provided in the curriculum will help the student face and solve the problems of everyday life, both now and later.



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There are at least three levels of mastery of problem-solving skills. The minimum level is an *awareness* of the skills. The second level is the functional ability to perform them. The highest level is the ability to design an original experiment and carry it to completion. It should be borne in mind that problem-solving behavior is a complex package involving past experience, motivation, cognitive development, and other factors. The development of problem-solving skills should be closely related to the appropriate inquiry skills, concepts, and other organizers of the curriculum.

A brief description of the intended interpretation of the problem-solving skills follows in what we consider to be a hierarchy of easiest to most difficult.

1. **EXPERIMENTING**, or doing something to see what happens. This skill represents the use made of the opportunity to "mess around" with a given piece of apparatus or set of materials, to pursue individual curiosity or interest, to follow a suggested line of inquiry, and in general, to find things out.

Some examples of experimenting include: investigating the properties of environmental objects (e.g., which ones will float, which ones can be burned, which are natural and which are man-made), having the opportunity to use thermometers or balances, raising a classroom pet or plants, burning things under a pinwheel, comparing objects as sensed by touch and by eyesight, and so on.

It is important to distinguish between experimenting as we have defined it and the formal aspects of experiment and experimental design. Note that the formal aspects are dealt with as a separate category and that designing experiments is thought to be the most difficult of the problem-solving skills.

To encourage experimenting, "Give the student balances." "Cap and handle the p

2. **KNOWING** what the problem-solving problem requires (it has been Number 12). (or the definition difficult, recognizing and in understanding skill must the logical must know the methods materials science is subtle differences (e.g., "To stating it differences and to try

3. **RECORDING** Designation and collection of observations to recall the



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To encourage development of the beginning skill of exploration or experimenting, instructions are frequently given in the following form: "Give the students an opportunity to manipulate and experiment with the balances." "Capitalize on student interest by letting everyone observe and handle the pets," and so on.

2. KNOWING what the problem is and what to do to solve it. Defining the problem and its parts clearly is an important first step in any problem-solving situation. Yet the recognition and definition of a problem represents a difficult task for this student population, and it has been placed high in the problem-solving skill hierarchy (see Number 12). Knowing or recognizing the problem *given guidance* (or the defining events and clues for everyday problems) is not as difficult, and students are assisted through many experiences in recognizing that a problem exists, in thinking about that problem, and in understanding how answers to it might be obtained. This skill must be emphasized (that is, understanding the problem) for the logical development of those skills which follow. The student must know the question under investigation and clearly comprehend the methods to be used in attempting to answer that question. The materials should emphasize (for both teachers and students) that science is a process of finding answers to questions. There is a subtle difference between stating a question to suggest its answer (e.g., "To see if it is warmer in the sun or in the shade") and stating it as a problem to investigate (e.g., "To see if there are differences in the temperature of different parts of the environment, and to try to find out why if there are").
3. RECORDING DATA Questions of science are answerable through observation and collection of data pertinent to the question. Recording of observations is a necessary skill to enable the investigator to recall the observations and discuss and interpret them in view



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of the questions. Included here is the collection and transcription of information called for by the question: making sketches, notes, taking pictures, recording sounds, and recording measurements.

4. **DISCUSSION AND TREATMENT OF GROUP DATA - COMPARING RESULTS** A look at the outcomes of each student's or student group's investigation, and a discussion of why one result may differ from another, should emphasize the dynamics of group discussion and dialog rather than recitation and monolog. Discussion of variability of results should assist students in the identification of variables which may influence outcomes. The ability to express or talk about what was done is the skill involved here, with students operating primarily at the observing, identifying, describing, and comparing levels of cognition. Discussion of individual or group results provides the teacher with an opportunity to assess student understanding of the investigation and to recognize possibilities for further investigation, alternative activities to re-emphasize particular concepts, or review.
5. **ORGANIZING DATA** The ordering and grouping of recorded information makes it easier to interpret and see relationships. Included in this category are tabulation of data, averaging or deciding on best estimates, any visual representation such as line or bar graphs, and pictures or schematic representations. This is the most difficult of the skills directly related to data. For students to become proficient in organizing data often involves the inquiry skill of translating information into a different symbolic form.
6. **EXPLAINING, DEFENDING, AND ANSWERING WHY QUESTIONS** Here discussion is at a more sophisticated level than that previously considered. Explaining should assist in the development of the idea of cause and effect. It implies the students' understanding

of the question results. Deferring interpretation until after a good understanding will analyze the "WHERE DID THE ARE YOU TAKING this category. operate at the

Specific examples in the *Manual*. It seems possible that individuals or groups operating at this level of investigation. In questioning strategy small groups is an immediate feedback.

7. **ASKING QUESTIONS** Questions are raised as students are experimenting. Questions that students be dealt with.
8. **IDENTIFYING VARIABLES** Factors that influence the understanding of the appraisal of its results that many factors identify some about what affects predicting.



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of the question, the procedures, and some ability to interpret results. Defending encourages confidence in one's procedures and interpretation of outcomes. Answering *why* questions requires an understanding of the questions and the tasks and ensures that students will analyze their data and make interpretations. Such questions as "WHERE DID THE HEAT ENERGY COME FROM?" "HOW DO YOU KNOW?" and "WHY ARE YOU TAKING THE TEMPERATURE OF ALL THREE CONTAINERS?" fall into this category. To answer such questions, the students must often operate at the inference level of cognition.

Specific examples of such questions are included in the *Teacher's Manual*. It seems particularly appropriate for the teacher to be asking individuals or groups these kinds of questions as they proceed with an investigation. In preparing the manual we emphasize, by providing questioning strategies, that discussion of this sort with individuals and small groups is an effective method of instruction which provides immediate feedback to the teacher.

7. ASKING QUESTIONS This category refers to student questions which are raised as a result of their observations, experiences, and experimenting. Teachers are given examples of the kinds of questions that students may raise and suggestions of how such questions should be dealt with.
8. IDENTIFYING VARIABLES Identification of those variables which may influence the outcome of an investigation is necessary if one is to understand the concept of a controlled experiment, make any sort of an appraisal of its design, and make an intelligent interpretation of its results. The first step toward these goals is to realize that many factors may influence an outcome, and to recognize and identify some of these factors. Students can learn much by asking about what affected the results. This skill is closely related to predicting.



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9. **IDENTIFYING CONTROLS** Once the students are able to identify variables that may influence an outcome, the idea that all variables except the one under investigation must be held constant can be developed.
10. **INTERPRETING RESULTS** This is perhaps the most important of the problem-solving skills, and may be the most difficult to develop. Explicit models for teachers and students are provided. They deal with the data collected and interpret it in terms of the question asked. Emphasis is placed on recognizing the limitations of data and that the data may or may not have answered the question; on not going beyond the data; and on recognizing the need for further investigation if the need exists. Teachers are cautioned to avoid the temptation to ignore the data and simply provide "the answer."
11. **DRAWING CONCLUSIONS** Interpretation of results may warrant drawing conclusions. The emphasis here is on drawing only those conclusions that are supported by the data collected. Some forced conclusions are inevitable because of the difficulty of providing experimental evidence; however, great care is exercised to avoid forced conclusions for experiments that have provided all their own relevant data.
12. **RECOGNIZING PROBLEMS AND FORMULATING QUESTIONS** This skill is a necessary prerequisite for the general application of the other problem-solving skills outside the classroom situation. In other words, if we expect students to apply the problem-solving skills to their daily problems, it seems necessary that they be able to recognize that a problem exists and to state an appropriate question. To develop this skill, they are engaged and involved with events or phenomena that present an identifiable problem, and are given the opportunity to define that problem.

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13. DESIGNING EXPERIMENTS Once the students are able to recognize a problem and formulate a question, an experiment to answer that question may be designed. The design should include identification of variables and controls, methods for observation, gathering data, organizing and presenting data, and so on. It is assumed that this student population will be able to develop this skill only after a great deal of experience with the preceding ones.

SPECIFYING STRATEGIES FOR INSTRUCTION

The model for inquiry used in these materials specifies without exception a classroom climate in which the teacher is a catalyst and observer, and the students the active center of everything going on. Individually or in small groups the students are engaged in learning with the materials and activities of this program, and the teacher is pivotal in organizing, coordinating, *questioning and eliciting*, and observing - but not in telling. The teacher must be totally conscious of a role in providing the stimulus, while the student is generally unaware that he is being manipulated by strategy. The elicited student behavior may be *attitudinal, cognitive, or psychomotor: verbal or nonverbal.*

To communicate effectively with the teacher, we feel we must carefully describe as much as possible of the *pattern of interaction* upon which the anticipated results depend. The whole intent of this curriculum would be defeated if this pattern is not understood and implemented. We know, for example, that teachers often do not provide children the opportunity or the time to think for themselves when a problem is posed. They also frequently impose their experience, observations, and interpretations on children rather than allow the children to express *their own* views of things observed. We hope, therefore, to provide for teachers a model of strategy in these materials that will - if initially studied and used - demonstrate the benefits we describe for it in terms of student response and learning behavior.



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We do *not* anticipate that we can predict all that will occur with individual students in the classroom. We hope that we can, however, provide enough reminders to help the teacher deal with unexpected or unpredicted events in the same mode in which the materials are written.

LEVELS OF GOALS AND OBJECTIVES

Unit Goals

Unit goals are broad general statements that define long-term goals of a major portion of the unit. An initial statement, "The student will," is understood in each of the goals. They are defined as statements that capture the intent and emphasis of the curriculum. They also serve the function of organizers toward which the core objectives are directed.

Core Objectives

The core objectives (stated in student behaviors) refer to the desired outcomes for sequences of activities. The role of these objectives is to summarize what the student will be able to do as a consequence of each of the activity sequences. The core objectives provide a cognitive map for the teacher to extend or elaborate on. These core objectives may also serve as evaluative guides to assess short-term progress and attainment of students.

Activity Objectives

Activity objectives are enabling or performance objectives that relate to the specific activity. Such objectives appear at both the beginning and the end of each activity. They identify the actions to be taken and the behaviors to be acquired by students to insure their success in achieving the broader objectives of the curriculum.

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The role of the activity objective is to provide the teacher with specific instructional landmarks both to plot the course and to chart student progress. The objectives include information which the student has repeated or restated, experiences he has had, actions he has performed, and products he has made. Particular note should be paid to the minimum objectives as stated at the conclusion of the activity. The successful accomplishment of the succeeding activities is largely dependent on each student meeting these stated minimums. Some care should, therefore, be taken in making sure that the minimums are met before moving on to the next activity.

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Anticipated Student Response Behaviors

Within an activity the anticipated behaviors are all the actions or interactions occurring during instruction. As listed for each activity, they describe what we predict students will do or say in response to some specific strategy.

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TEACHING THE MATERIALS

It is often said that man is a curious animal and that the process and knowledge of science is a vehicle to capitalize on this phenomenon.

Science, then, for the EMH student, capitalizes on the student's natural curiosity about himself. Science is exciting, and ME AND MY ENVIRONMENT relies on this excitement. This science program has been designed to fit into the already existing curriculum framework and within modern teaching philosophies.

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The amount of time spent on each activity can be tailored to fit the mood of the class and its teacher - that is, of you and your students. An average of 45 minutes may be required for all activities. Some activities will require extensive time, perhaps several days. The main point in teaching ME AND MY ENVIRONMENT is not to hurry - to allow sufficient time for inquiry to occur.



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The ME AND MY ENVIRONMENT sequence may span three years, or it may take less time. Make all the allowances you need to for your students, in setting the pace from activity to activity.

Particular attention has been given to articulating the science curriculum with the other parts of the instructional program. Sight vocabulary is included in many of the activities, and suggestions given for using these words in spelling and vocabulary lessons. Math skills are an integral part of science, and the lessons provide application of the student's math skills.

Planning Guide

A planning guide is included in the introductory material to each core. Teaching the materials for the first time will require preparation time. Less time will be required after that. The teacher's planning guide will help you prepare materials in advance. For example, if a film is to be ordered, the planning guide will remind you when. The guide should be followed closely to initiate an activity.

Overviews

Each unit and core of ME AND MY ENVIRONMENT is provided with a beginning "roadmap" to give you as the teacher an insight into the direction or groupings of activities.

Rationale

Each unit and core is provided with a section to provide background into the *why* of the particular teaching content and physical materials used. These rationales should be read, thought about, and continually referred back to, in order for you to focus on and subsequently provide a consistent *why* philosophy in interactions with students.

Background Information

Some pertinent curriculum itself have been incorporated beginning of each

Clues To Success

A portion of ME AND MY ENVIRONMENT formance tasks. information about data about the student tests, nor were

Because the student population incorporated into was made, and its edition of activities tallysheets give and instruction. the unique opportunity for the next activity review of certain

Further discussion in the expendable of Progress.



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Background Information

Some pertinent points which are not necessarily developed in the curriculum itself, but which will provide you with useful information, have been incorporated in the Background Information section at the beginning of each core.

Clues To Success

A portion of the evaluation program during the field testing of ME AND MY ENVIRONMENT involved the use of objective questions and performance tasks. The items used were specifically designed to secure information about students' background knowledge as well as to secure data about the success of the materials. They were not intended as tests, nor were they used in that way to evaluate the youngsters.

Because the design of these items proved highly effective with this student population, many of the questions and situational tasks were incorporated into the second experimental edition. Further refinement was made, and it has resulted in the inclusion throughout this commercial edition of activities titled Clues To Success. These along with their tallysheets give you immediate feedback on the effectiveness of materials and instruction. At the point of use of each of these activities, you have the unique opportunity to determine whether or not your students are ready for the next activity or whether a modification, repetition, extension, or review of certain activities is necessary before proceeding.

Further discussion of the uses of the Clues To Success are included in the expendable section of this introduction entitled Student Record of Progress.



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Worksheets

The worksheets in the program are used in a variety of ways: a) as reinforcement to general or specific objectives; b) to introduce new information and to record data; c) to enhance the interest in an activity; d) as a culminating activity to review what has been covered in previous lessons. Difficult worksheets are duplicated on daylight slides (which may be projected on the chalkboard and written on there, during discussions). Worksheets may be introduced on the chalkboard before they are attempted by the individual students.

35 mm Slides

A colorful visual medium broadens instructional opportunities, especially during inquiry activities. The projected images of the slides should be used both by you and by most students during instruction. The teaching strategies give specific instructions.

Some of the slides, as noted, are duplications of various worksheets. They are specially processed for daylight projection: you need not completely darken your classroom. Students should be able to write or read at their desks or move from their desks to the chalkboard to write directly on the image with chalk while a slide is being shown. You should, however, turn off any lights or shade any windows whose light is reflected directly from the chalkboard. For adequate projection, use a 500-watt bulb.

For other slides, which are photographic scenes and for which there is no necessity to write on the projected image darken your classroom. These slides should be projected on a regular screen.

The largest possible image is usually best for the students to see clearly. Therefore, place the slide projector as far as possible from the chalkboard or screen, but not so far that the image projected extends above or below the edges of the board or screen.

Be sure that the Carousel Projector is set up for insertion and use.

Filmstrips

For activities that promote one objective, use filmstrips or Ektagraphics. For the slides, we recommend the Carousel Projector Adapter. It is used in the projector.

Games

Perhaps the most effective way to promote certain objectives is through games, providing variations, dramatizing some of the objectives, and giving experience in using them.

Booklets

This medium is useful for providing a somewhat detailed and varied experience.

* Except the Kodak Carousel Projector systems are not covered.



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Be sure that you are familiar with the operating instructions for the Carousel Projector and that you observe the manufacturer's cautions for insertion and projection of slides, trays, bulbs, and lenses.

Filmstrips

For activities in which an entire series of slides will be used to promote one objective, a filmstrip has been made. If a Kodak Carousel* or Ektagraphic projector is the type to be used for the projection of the slides, we recommend the purchase of the Kodak Ektagraphic Filmstrip Adapter. It is inexpensive and will preclude the use of a second projector.

Games

Perhaps the most ambitious of the endeavors has been to promote certain objectives through the use of games and game theory. Besides providing variation to the instructional mode, the games are used to dramatize some of the major concepts in the curriculum, as well as to give experience in cooperation and taking turns.

Booklets

This medium is used as a variation to the worksheets and 35 mm slides. It combines a minimum of reading with cartooned illustrations to present somewhat detailed factual information.

* Except the Kodak Carousel Sand S and S-AV projectors. The optional systems are not compatible.



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Posters

When something is referred to often enough, it is sometimes advisable to present it in a large format. In these instances a 24" X 36" poster has been developed for convenient posting and frequent inspection.

Study Cards

Thirty-two photographic study cards have been prepared to provide further variation in the mode of presentation. They are designed for use with specific activities and to form the nucleus for a collection of photographs for bulletin board displays.

Polaroid Camera

To increase the opportunities for involving all students in the activities, a Polaroid camera is suggested as an optional part of the instructional materials. An activity designed to introduce your students to this camera is included as the first Change Of Pacer in the back of this *Teacher's Manual*. The camera was provided through the courtesy of the Polaroid Corporation during the field testing, but it cannot be supplied on this basis in quantity.

In most instances, in the field tests, the camera in the classroom served as a valuable motivational device for the students, as well as a help in prolonging their ever-so-short interest spans. Because of these successes, a Polaroid camera is strongly recommended. It has not been included as an integral portion of the basic kit, because of the potential cost of film and flashcubes.

Camera Log Book

An excellent means of recording and preserving class activities and student experiences is through the development of a class log

book. To keep a class log, you may share the responsibility of titling each cluster with a drawing or short poem to go with it.

The log book can be used to browse through the class log to see what they accomplished. The teacher may use the log to review specific class activities, written and verbal reports.

Change Of Pacers

At the back of the manual is a section called Change Of Pacers. It is offered for those times when the schedule is interrupted following a vacation, storms or cold weather epidemics, assemblies, or other extensions that occur. These are called activities, then, and are called breathers to give students a chance to offset those occurrences.

Student Folders

A set of folders are to be placed in your students' folders. It is often made to work at various points in the class with an efficient means of science activities.



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book. To keep a log book, either make or purchase a photo album. Students may share the responsibility of collecting and mounting snapshots, titling each cluster of pictures, and writing a descriptive sentence or short poem to recollect what occurred in a particular picture.

The log book helps to build student ego and class morale. Students can browse through it periodically to recall what they looked like and what they accomplished alone and with other students in previous months. The teacher may use it as a change of pacer to help students recall and review specific concepts and activities, and to provide practice in written and verbal communication skills.

Change Of Pacers

At the back of this *Teacher's Manual* you will find the section called Change Of Pacers. There, numerous examples and suggestions are offered for those days when it is difficult to adhere to your regular schedule. These probably include days just prior to or immediately following a vacation, other days during the occurrence of severe snow storms or cold weather, and periods of high absenteeism due to epidemics, assembly programs, and so forth. So that these days will not be wasted, we have suggested a variety of enrichments, reviews, or extensions that complement and add to this curriculum. Use these activities, then, as the name implies, to provide those refreshing breathers to give your program the added zip that is necessary to offset those occurrences in scheduling over which you have no control.

Student Folders

A set of decals has been included with your *Teacher's Manual*. These are to be placed on the cover of a three ring binder or folder in which your students will keep their worksheets as they are completed. Reference is often made to worksheets already completed, and they are necessary at various points in the program. The folder provides you and the students with an efficient and convenient mechanism for maintaining their own files of science activities.



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Team Size And Science Materials

The quantities of materials provided in the kit are based on a class size of sixteen students, or four teams of four each, or eight teams of two each. In the case of smaller numbers of students, you may find it advantageous to reduce the number of students working in a team. Likewise, in cases of larger numbers of students, the teams should be enlarged, or additional materials ordered.



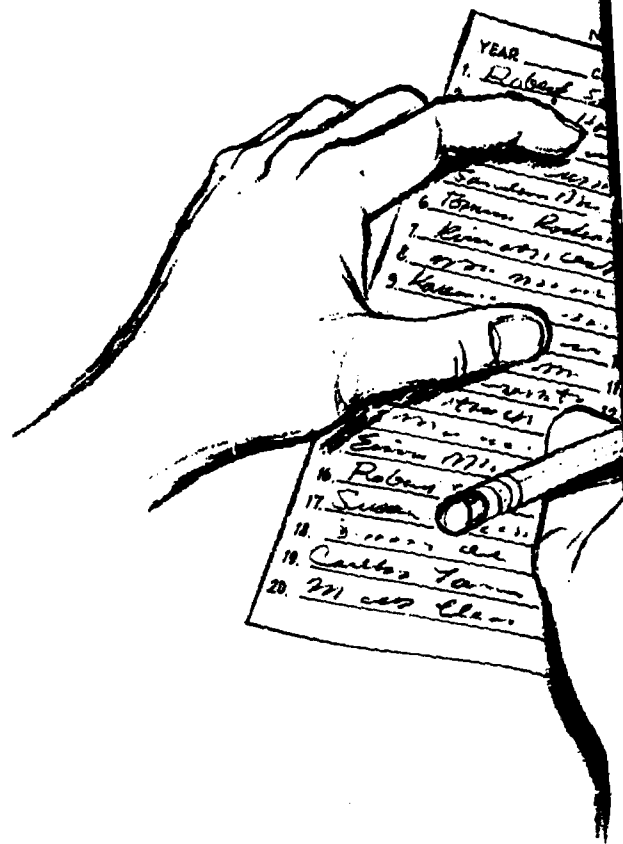
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DIRECTIONS FOR



DIRECTIONS FOR USING THE STUDENT RECORD OF PROGRESS

UNIT 5 Exploring

STUDENT RECORD OF PROGRESS BACKGROUND AND DEVELOPMENT SECTION

YEAR	CLASS	1	2	3	4	5	6	7	8	9	10	11	12
1.	Robert Small	(YES) NO	(YES) NO	(YES) NO	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)
2.	John	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)
3.	Stanley	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)	YES (NO)
4.	Thomas	(YES) NO	(YES) NO	(YES) NO	(YES) NO	(YES) NO	(YES) NO	(YES) NO	(YES) NO	(YES) NO	(YES) NO	(YES) NO	(YES) NO
5.	Robert	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
6.	Kim	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
7.	John	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
8.	John	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
9.	John	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
10.	John	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
11.	John	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
12.	John	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
13.	John	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
14.	John	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
15.	John	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
16.	John	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
17.	John	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
18.	John	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
19.	John	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
20.	John	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO



Me and my Environment

UNIT V STUDENT RECORD OF PROGRESS INTRODUCTION

USES OF RECORD

Throughout each unit of ME AND MY ENVIRONMENT are Clues to Success activities which provide immediate feedback on the effectiveness of the materials and instruction. The Student Record of Progress helps you organize this information. This record will allow you to judge the effectiveness of instruction for your class at many points in the curriculum. It will also allow you to monitor the individual progress of students and set different standards of success for different children.

The Clues to Success activities and this Record are not intended for use as a grading system. Use it to make decisions, repeat or extend instruction, or to decide when to move on to the next activity. Use it to decide how to divide the class into teams for specific activities, and to assure the success of every student.

The two most important functions of the Student Record of Progress are:

1. To assess background and understanding: It rejects the notion that a single measure, like an IQ test, can tell what a child is able to do for all time. Instead, it enables the teacher to identify the level of skills and understandings related to each core of activities.
2. To assure success: It rejects the idea of sorting children into those who know or can do and those who can't. Instead, it provides a way for the teacher to direct his or her efforts toward the students needing greatest support in specific skills or concepts, so those students can achieve success.

The Student Record of Progress contains five main sections: Background and Development, Understanding, Participation, Summary of Progress, and Tallysheets for the Clues to Success activities.

BACKGROUND AND DEVELOPMENT

A child's success of experiences with those central to success with the ability to recognize Following directions, work important skills. You will but quite good in others. are provided to identify attention and support to recording these assessments

The assessments of B where your students are v results will suggest what the materials. If a student a more able student, he n the activities.

No student is uniform go through spurts of development. They serve to competencies and experiential developmental skills are. The Overview page following assessed at various points

Progress in Following and Development Section. success on activities and control over one's environment and follow their progress

UNIT V
STUDENT RECORD OF PROGRESS
INTRODUCTION



BSCS

BACKGROUND AND DEVELOPMENT SECTION

A child's success on each core of activities is dependent on his background of experiences with those particular concepts. Some basic skills are also central to success with these materials, especially problem-solving skills, the ability to recognize what the question is and what might lead to an answer. Following directions, working with one's hands, and categorizing are also important skills. You will find that some students will be weak in some areas but quite good in others. As the materials demand specific skills, assessments are provided to identify students who are low in these areas and will need extra attention and support to achieve success. This section provides a means of recording these assessments to develop a profile for each student.

The assessments of Background can be thought of as pretests measuring where your students are when instruction in certain areas is introduced. The results will suggest what responses are reasonable to expect when you teach the materials. If a student who is less able in those skills is teamed with a more able student, he might be more successful and less frustrated in doing the activities.

No student is uniformly low (or high) in all skills and experiences. Some go through spurts of development. Background assessments help avoid prejudging children. They serve to correct underestimates and overestimates of initial competencies and experience. Assessments of the most important background and developmental skills are periodically interspersed throughout the materials. The Overview page following this introduction indicates which skills are assessed at various points in the year.

Progress in Following Directions is the first record page in the Background and Development Section. Ability to follow directions is essential for maximum success on activities and for building a personal sense of competence in and control over one's environment. Identify those students in need of special help and follow their progress.



Me and my Environment

UNIT V STUDENT RECORD OF PROGRESS INTRODUCTION (continued)

BACKGROUND AND DEVELOPMENT SECTION (continued)

At four points in Unit V you are asked to rate your student's ability to follow directions. Clues to Success activities at these points provide an objective measure of students' abilities. Combining these two sources of information should reveal which students need closest supervision and support in order to achieve success.

Development in Reasoning is the second record in this section. The skills on this page are closely related to some of the higher inquiry skills. Because of a lack of experiences and a different rate of maturation, some children will be several developmental steps away from the ability to think abstractly or to reason logically and systematically. The materials are designed to support the development of these abilities, by providing as many concrete, "doing" activities as possible. Such abilities cannot be directly taught, however. They are developmental and require months and many experiences to achieve.

The developmental skills that receive special emphasis in Unit V are the grouping and classifying things and the conservation of quantity. A child who can conserve understands that the quantity of something remains the same (is conserved) when its shape is changed (broken into pieces or placed in a different container). If students lack these skills, they may not be able to imagine a situation and think through various outcomes "in their head." They need to work with concrete objects and have many experiences to develop the ability to reason logically and in abstract terms.

Development of Experience is the third record page in the Background and Development Section. The fundamental inquiry skills of observing and describing which are basic to many activities throughout this curriculum are the focus of this part of the Student Record of Progress. As students develop the ability to concentrate

on a task and recognize descriptive terms, the materials. Such skill for success in the wo

UNDERSTANDING SECTION

A sense of progress realize. This record log of student performance as of individual students in the class, tallysheet. These tallysheets can

Several aspects and most important, the success in instruction. are unsuccessful. So it may be that these students. This log of and progress to parents. Section may reveal student should provide additional placement of students

PARTICIPATION

The four major areas learning of specific a sense of self-worth, relationships with others. This section of the Student Record and encouraging the de

UNIT V
STUDENT RECORD OF PROGRESS
INTRODUCTION (continued)



BSCS

our student's
ities at these
ities. Combin-
ich students
ave success.

on a task and recognize salient details, and as they acquire a vocabulary of descriptive terms, they will experience greater success with the science materials. Such skills are also a useful complement to other vocational skills for success in the world of work.

UNDERSTANDING SECTION

this section.
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elopmental
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any concrete,
t be directly
months and

A sense of progress and achievement is something students need help to realize. This record is one way you can show students they are learning. A log of student performance also lets you see the progress of the class as well as of individual students. To help identify strengths and weaknesses of groups in the class, tallysheets are included for some Clues to Success activities. These tallysheets can be found at the end of the Student Record of Progress.

phasis in
e conservation
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ract terms.

Several aspects of accountability are provided by this section. First, and most important, the teacher has an accounting of his or her own effectiveness in instruction. Over a period of time there should be fewer students who are unsuccessful. Should many in the class show a consistent lack of success, it may be that these materials are inappropriate for that particular group of students. This log of student performance can also provide evidence of learning and progress to parents and the school. Finally, the Summary of Progress Section may reveal students who are inappropriately placed. It certainly should provide additional information to consider in any review of the placement of students in special education classes.

PARTICIPATION

ve in the
nquiry skills
activities
of the Student
to concentrate

The four major aims of ME AND MY ENVIRONMENT involve far more than the learning of specific information and skills. They include the development of a sense of self-worth, successful behaviors for daily life, attitudes, relationships with others, and the ability to assume various responsibilities. This section of the Student Record of Progress provides a means of following and encouraging the development of some of these behaviors.



Me and my Environment

UNIT V STUDENT RECORD OF PROGRESS INTRODUCTION (continued)

PARTICIPATION (continued)

Responsibility and Involvement is the first record page in this section. Students need many opportunities to assume responsibility and to carry things out on their own. Of course this is tremendously important in every day experiences. Use this page as a planning guide to see that each child gets the chance to do such things as care for plants and animals, set up and operate audio-visual equipment, distribute and clean up science equipment, prepare bulletin boards, etc. Use this section also to note students who have difficulty following through on responsibilities. Plan additional opportunities for these children (not as penalties) and provide the support needed for them to successfully accomplish their task.

Sometimes students' attitudes and involvement shift during the year. You may not be conscious of the shift without purposely reviewing students' actions. As a major aim of the curriculum is to develop certain attitudes and interests, it is useful to consider this dimension several times during the year. To assist you in this review, the page provides space to record ratings of student attitudes and participation.

Cooperation and Persistence is the second page of this section. Closely related to the assumption of responsibilities and involvement in activities is the day-to-day participation of students. Sometimes personal behavior problems prevent success or interfere with the work of the class. A page in the Accomplishments Section is provided to record cooperative social behavior and completion of daily work in science. Students often need help to recognize problems which interfere with their learning. It is sometimes effective to have students who are encountering difficulties assist in rating their own daily performance.

Students also need persistence, or extra students who have put in. Such behavior should be

SUMMARY OF PROGRESS

In order to obtain has been developed for and across all of the r this system are describ

TALLYSHEET SECTION

When reference is tallysheet, find the ap Record of Progress. Th interpreting student wo for revealing strengths group. They also simpl Progress

USE OF CLASS LIST

On page 26 you will in the Student Record o your student's names mo

UNIT V
STUDENT RECORD OF PROGRESS
INTRODUCTION (continued)



BSCS

Students also need recognition and praise for showing initiative, perseverance, or extra effort. This record may be used to identify those students who have put forth extra effort or have been involved in activities. Such behavior should be reinforced by the teacher.

SUMMARY OF PROGRESS

In order to obtain a comprehensive view of each child's progress, a system has been developed for comparing results from one point in time to another and across all of the records of skills and understandings. Steps to apply this system are described in the last activity in the unit.

TALLYSHEET SECTION

When reference is made in a Clues to Success activity to the use of a tallysheet, find the appropriate one in the last section of the Student Record of Progress. The tallysheets contain guidelines for scoring and interpreting student work. They organize the results in a convenient way for revealing strengths and weaknesses in understanding for the class as a group. They also simplify recording results in the Student Record of Progress.

USE OF CLASS LIST

On page 26 you will find a Class List card for use in making entries in the Student Record of Progress. This card eliminates the need to list your student's names more than once.

STUDENT RECORD OF PROGRESS

UNIT V OVERVIEW

	Pages of Record when results are recorded	Background, Understandings, and Participation Samples	CORE A Act. 5-0 - 5-6	CORE B 5-7 - 5-10	CORE C 5-11 -
BACKGROUND AND DEVELOPMENT SECTION	Progress in Following Directions	Following Directions	5-0 5-2	5-10	
	Development in Reasoning	Conservation Grouping	Test 5-2 5-0 5-5		
	Development of Experience	Orientation in Space Observing Describing	5-0	5-10	
			5-0	5-10	
UNDERSTANDING SECTION	Numbers and Measurements	Using a Balance Calculations Reading a Graph Measurements	5-0 5-3 5-3 5-6 5-0	5-10	
	Concepts	Concepts		5-10	
	Problem-Solving	Knowing the Question What Varies Outcomes (Results and Implications)			
PARTICIPATION SECTION	Responsibility and Involvement	Involvement Responsibilities	WEEKLY RECORD	5-10	
	Cooperation and Perseverance	Social Behavior Task Behavior	RECORD FOR EACH ACTIVITY RECORD FOR EACH ACTIVITY		

STUDENT RECORD OF PROGRESS

UNIT V OVERVIEW

	CORE A	CORE B	CORE C	CORE D	CORE E	CORE F	CORE G
	Act. 5-0 - 5-6	5-7 - 5-10	5-11 - 5-16	5-17 - 5-21	5-22 - 5-26	5-27 - 5-29	5-30 - 5-35
	5-0 5-2	5-10			5-26		5-34
	Test 5-2 5-0 5-5						5-31
	5-0 5-0	5-10 5-10					5-31
	5-0 5-3 5-3 5-6 5-0	5-10		5-21 5-21			5-34
		5-10	5-16	5-21	5-26	5-27	5-34 5-35
				5-21 5-21 5-21 5-21			5-34 5-34
ns)		5-10		5-21			5-34 5-35
	WEEKLY RECORD						
RECORD FOR EACH ACTIVITY							
RECORD FOR EACH ACTIVITY			5-16				

UNIT V
STUDENT RECORD OF PROGRESS
BACKGROUND AND DEVELOPMENT SECTION
PROGRESS IN FOLLOWING DIRECTIONS

Teacher Rating:

Prior to each activity assessing the ability to follow directions, rate each child's ability to follow directions by circling a number from 0 to 5. The higher the number circled, the more able you believe the child is to carry out a task or sequence of activities with little supervision. For Activity 5-26, circle the number of directions which you feel each child will be able to follow.

Activity Scores:

Follow the guidelines in the Clues to Success Activities 5-2, 5-10, 5-26, and 5-34 to obtain a "following directions" score for each student. Combine your rating with this score to determine who needs help most. Provide close supervision and support to help these students be successful. Team them with more able students. Plan special opportunities for them to practice following directions.

STUDENT NUMBER	TCHR. RATING START OF ACT. 5-0					ACT. 5-0 5-0A WORKSHEET SCORE	TCHR. RATING START OF ACT. 5-2					ACT. SCORE			
	LOW		HIGH				LOW		HIGH						
1.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
2.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
3.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
4.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
5.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
6.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
7.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
8.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
9.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
10.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
11.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
12.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
13.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
14.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
15.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
16.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
17.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
18.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
19.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2
20.	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2

Teacher _____

Year _____

UNIT V

STUDENT RECORD OF PROGRESS

BACKGROUND AND DEVELOPMENT SECTION

PROGRESS IN FOLLOWING DIRECTIONS

RATING T OF 5-0 HIGH	ACT. 5-0 5-0A WORKSHEET SCORE	TCHR. RATING START OF ACT. 5-2		ACT. 5-2 SCORE	WHO NEEDS HELP MOST?	TCHR. RATING START OF ACT. 5-10		ACT. 5-10 SCORE YES PART NO	WHO NEEDS HELP MOST?
		LOW	HIGH			LOW	HIGH		
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____
3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	_____

UNIT V
 STUDENT RECORD OF PROGRESS
 BACKGROUND AND DEVELOPMENT SECTION
 PROGRESS IN FOLLOWING DIRECTIONS (continued)

STUDENT NUMBER	TCHR. RATING START OF ACT. 5-26	ACT. 5-26 SCORE	WHO NEEDS HELP MOST?	TCHR. RATING START OF ACT. 5-34 LOW HIGH	ACT. 5 SCORE YES
	1.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5
2.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
3.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
4.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
5.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
6.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
7.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
8.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
9.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
10.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
11.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
12.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
13.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
14.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
15.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
16.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
17.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
18.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
19.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES
20.	0 1 2 3	0 1 2 3	_____	0 1 2 3 4 5	YES

Teacher _____
 Year _____

UNIT V

STUDENT RECORD OF PROGRESS

BACKGROUND AND DEVELOPMENT SECTION

PROGRESS IN FOLLOWING DIRECTIONS (continued)

ACT. 5-26 SCORE	WHO NEEDS HELP MOST?	TCHR. RATING START OF ACT. 5-34		ACT. 5-34 SCORE		STUDENT PROGRESS IN UNIT V		
		LOW	HIGH	YES	NO	HIGH	GROWTH	LOW
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____
0 1 2 3	_____	0 1 2 3 4 5		YES	NO	_____	_____	_____

UNIT V
STUDENT RECORD OF PROGRESS
BACKGROUND AND DEVELOPMENT SECTION
DEVELOPMENT IN REASONING

Setting Standards For Success:

Those students who are successful with tasks recorded on this page are likely to be able to reason abstractly; they can think things through in their heads.

Those who are relatively unsuccessful with these tasks may still be responding intuitively rather than logically. They will need to try things out physically with real objects. Much manipulation and doing is appropriate.

Remember that the brief sample of behavior recorded on these pages never totally describes a student. This record does provide enough information to set criteria for success. Those who cannot group and conserve are probably unable to generalize, interpret and synthesize information.

STUDENT NUMBER

	CD/PS QUESTION BOOKLET - SPRING 1973					ACTIVITY 5-0			A
	Conserving	Problem Solving	Abstract Thinking	Who Can Help Others?	Who Needs Help Most?	Grouping	Who Needs Help Most?		
1.	YES NO	YES NO	YES NO			HIGH SOME LOW			
2.	YES NO	YES NO	YES NO			HIGH SOME LOW			
3.	YES NO	YES NO	YES NO			HIGH SOME LOW			
4.	YES NO	YES NO	YES NO			HIGH SOME LOW			
5.	YES NO	YES NO	YES NO			HIGH SOME LOW			
6.	YES NO	YES NO	YES NO			HIGH SOME LOW			
7.	YES NO	YES NO	YES NO			HIGH SOME LOW			
8.	YES NO	YES NO	YES NO			HIGH SOME LOW			
9.	YES NO	YES NO	YES NO			HIGH SOME LOW			
10.	YES NO	YES NO	YES NO			HIGH SOME LOW			
11.	YES NO	YES NO	YES NO			HIGH SOME LOW			
12.	YES NO	YES NO	YES NO			HIGH SOME LOW			
13.	YES NO	YES NO	YES NO			HIGH SOME LOW			
14.	YES NO	YES NO	YES NO			HIGH SOME LOW			
15.	YES NO	YES NO	YES NO			HIGH SOME LOW			
16.	YES NO	YES NO	YES NO			HIGH SOME LOW			
17.	YES NO	YES NO	YES NO			HIGH SOME LOW			
18.	YES NO	YES NO	YES NO			HIGH SOME LOW			
19.	YES NO	YES NO	YES NO			HIGH SOME LOW			
20.	YES NO	YES NO	YES NO			HIGH SOME LOW			
NOTES:						NOTES:			

Teacher _____
 Year _____

UNIT V
 STUDENT RECORD OF PROGRESS
 BACKGROUND AND DEVELOPMENT SECTION
 DEVELOPMENT IN REASONING

JAN - SPRING 1973		ACTIVITY 5-0		ACT. 5-2		ACTIVITY 5-5		ACT. 5-31		Student Progress In Unit V	
Blanking	Who Can Help Others?	Who Needs Help Most?	Grouping	Who Needs Help Most?	Conservation	Who Needs Help Most?	Grouping	Who Needs Help Most?	Grouping	Student Progress In Unit V	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
S NO			HIGH SOME LOW		YES NO		HIGH SOME LOW		YES NO	HIGH GROWTH LOW	
			NOTES :				NOTES :				NOTES :



UNIT V
STUDENT RECORD OF PROGRESS
BACKGROUND AND DEVELOPMENT SECTION
DEVELOPMENT OF EXPERIENCE

Surveying Awareness:

Some of your students will be quite alert to details and changes in their environment. They will recognize subtleties in what goes on around them and be able to see below the surface of things. They may be quite worldly and wise to the ways of the streets.

Other students may seem lethargic and unobserving. They may simply take things at face value and be quite gullible.

This difference in awareness calls for different expectations and standards of performance.

Abilities to observe and describe can be taught. You should note development of these skills over the course of this unit.

	ACT. 5-0	ACT. 5-0	ACT. 5-0		ACTIVITY 5-0	ACT. 5
	Left-Right	Compass Directions	Inter-sections	Who Needs Help Most?	Observation	Orientation In Space
1.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
2.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
3.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
4.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
5.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
6.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
7.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
8.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
9.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
10.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
11.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
12.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
13.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
14.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
15.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
16.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
17.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
18.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
19.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO
20.	YES NO	YES NO	HIGH LOW	_____	HIGH SOME LOW	YES NO

UNIT V
STUDENT RECORD OF PROGRESS
BACKGROUND AND DEVELOPMENT SECTION
DEVELOPMENT OF EXPERIENCE

ACT. 5-0	Who Needs Help Most?	ACTIVITY 5-0 Observation	ACT. 5-10 Orienta- tion In Space	ACTIVITY 5-10 Descriptions	ACT. 5-31 Order	ACTIVITY 5-31 Describe	Student Progress In Unit V
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW
HIGH LOW	_____	HIGH SOME LOW	YES NO	HIGH SOME LOW	YES NO	HIGH SOME LOW	HIGH GROWTH LOW

UNIT V
STUDENT RECORD OF PROGRESS
UNDERSTANDING SECTION
NUMBERS AND MEASUREMENTS

STUDENT NUMBER	ACTIVITY 5-0			Who Needs Help Most?	ACTIVITY 5-3		Who Needs Help Most?	ACT. 5-6	ACT. 5-	
	Temp.	Length	Weight		Weighting	Weight Loss		Totals	Usin A Bal-anc	
<p>The Numbers and Measurements page provides an opportunity to record a student's knowledge of facts and skills basic to the activities of this unit. Students who lack this background may have difficulty and need extra attention.</p> <p>Students should show growth in these skills throughout the unit. It may be necessary to extend instruction into other subject areas to further develop or reinforce these understandings.</p> <p>Share this information with other subject area teachers as appropriate to your teaching situation.</p>	1.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	2.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	3.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	4.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	5.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	6.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	7.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	8.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	9.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	10.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	11.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	12.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	13.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	14.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	15.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	16.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	17.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	18.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	19.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES
	20.	YES NO	YES NO	YES NO	_____	YES NO	YES NO	_____	YES NO	YES

Teacher _____
Year _____

UNIT V
STUDENT RECORD OF PROGRESS
UNDERSTANDING SECTION
NUMBERS AND MEASUREMENTS

Who Needs Help Most?	ACTIVITY 5-3		Who Needs Help Most?	ACT. 5-6	ACT. 5-10	Who Needs Help Most?	ACTIVITY 5-21 USING A GRAPH		ACTIVITY 5-34		Student Progress In Unit V HIGH GROWTH LOW
	Weighing	Weight Loss		Totals	Using A Balance		Number	Date	Reading A Graph	Translating Data	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	
	YES NO	YES NO		YES NO	YES NO		YES NO	YES NO	YES NO	YES NO	

UNIT V
STUDENT RECORD OF PROGRESS
UNDERSTANDING SECTION
CONCEPTS

STUDENT NUMBER	ACTIVITY 5-10						ACT. 5-16			ACTIVI			
	Water In Plants		Water Use		Water Treatment		Core B Concepts Who Is:		Water Cycle			Pollution	
1.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
2.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
3.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
4.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
5.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
6.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
7.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
8.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
9.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
10.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
11.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
12.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
13.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
14.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
15.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
16.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
17.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
18.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
19.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO
20.	YES	NO	YES	NO	YES	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO

This record reveals as much about your instruction as it does about your students understanding of these concepts. If you note that the same students have difficulty grouping ideas throughout the unit, aim your instruction at them. This could result in all achieving success.

This record also provides an indication of retention of ideas over a larger period of time.

Teacher _____
 Year _____

UNIT V
 STUDENT RECORD OF PROGRESS
 UNDERSTANDING SECTION
 CONCEPTS

Student Treatment	Core B Concepts Who Is:		ACT. 5-16 Water Cycle		ACTIVITY 5-21 Pollution		Water Conservation		Core D Concepts Who Is:		ACTIVITY 5-26 Carbon Dioxide		Oxygen		Inter- depend- ence		Control			
	NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO
NO	HIGH	LOW	HIGH	SOME	LOW	YES	NO	HIGH	SOME	LOW	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO

UNIT V
STUDENT RECORD OF PROGRESS
UNDERSTANDING SECTION
CONCEPTS (continued)

STUDENT NUMBER	CORE E CONCEPTS		ACT. 5-27		ACTIVITY 5-34				ACTIVITY					
	Who Is:		Pressure		Fumes Dangerous To Living Things		Fumes Dangerous To Man		Water Content		Water Use		Saving Water	
1.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
2.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
3.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
4.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
5.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
6.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
7.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
8.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
9.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
10.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
11.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
12.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
13.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
14.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
15.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
16.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
17.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
18.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
19.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
20.	HIGH	LOW	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO

UNIT V
STUDENT RECORD OF PROGRESS
UNDERSTANDING SECTION
CONCEPTS (continued)

TY 5-34		ACTIVITY 5-35 CONCEPT REVIEW QUESTIONS													
Fumes Dangerous To Man		Water Content		Water Use		Saving Water		Water Source		Water Treatment		Water Cycle		Fate Of The River	
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	HIGH	SOME	LOW	HIGH	SOME	LOW

UNIT V
STUDENT RECORD OF PROGRESS
UNDERSTANDING SECTION
CONCEPTS(continued)

STUDENT NUMBER	ACTIVITY 5-35 CONCEPT REVIEW QUESTIONS									CORE G CONCEPTS	
	Population And Water			Oxygen	Oxygen And Carbon Dioxide	Air And Weather	Wind And Water	Things In Air	Air Pollution	Who Is:	
1.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
2.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
3.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
4.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
5.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
6.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
7.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
8.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
9.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
10.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
11.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
12.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
13.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
14.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
15.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
16.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
17.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
18.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
19.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW
20.	HIGH	SOME	LOW	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	HIGH	LOW

Teacher _____
 Year _____

UNIT V
 STUDENT RECORD OF PROGRESS
 UNDERSTANDING SECTION
 CONCEPTS(continued)

NEW QUESTIONS			CORE G CONCEPTS		STUDENT PROGRESS				NOTES
Wind And Water	Things In Air	Air Pollution	Who Is:		HIGH	GROWTH	LOSS	LOW	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	
YES NO	YES NO	YES NO	HIGH	LOW	_____	_____	_____	_____	

UNIT V
STUDENT RECORD OF PROGRESS
UNDERSTANDING SECTION
PROBLEM SOLVING

This page of the Student Record of Progress provides the opportunity to record information regarding a student's ability to engage in problem-solving behaviors. Problem-solving, like reasoning, is one of the higher inquiry skills which requires both time and a variety of experience to develop.

The activities upon which this page is based require the student to be able to identify the question, set up an experiment, identify and control variables, and predict outcomes. Each of these is a difficult task.

Many students will not have been expected to engage in problem-solving in the past. Therefore, their limited background will, likewise, limit their present performance.

As with each of the other skills and abilities which you are attempting to develop, the development of problem-solving will require giving students many experiences with manipulating experiments and data.

ACTIVITY 5-21					
Knowing The Question	What Varies	Outcomes	Who Needs Help Most?	Con Va	
1.	YES NO	YES NO	HIGH SOME LOW	_____	Y
2.	YES NO	YES NO	HIGH SOME LOW	_____	Y
3.	YES NO	YES NO	HIGH SOME LOW	_____	Y
4.	YES NO	YES NO	HIGH SOME LOW	_____	Y
5.	YES NO	YES NO	HIGH SCME LOW	_____	Y
6.	YES NO	YES NO	HIGH SOME LOW	_____	Y
7.	YES NO	YES NO	HIGH SOME LOW	_____	Y
8.	YES NO	YES NO	HIGH SOME LOW	_____	Y
9.	YES NO	YES NO	HIGH SOME LOW	_____	Y
10.	YES NO	YFS NO	HIGH SOME LOW	_____	Y
11.	YES NO	YES NO	HIGH SOME LOW	_____	Y
12.	YES NO	YES NO	HIGH SOME LOW	_____	Y
13.	YES NO	YES NO	HIGH SOME LOW	_____	Y
14.	YES NO	YES NO	HIGH SOME LOW	_____	Y
15.	YES NO	YES NO	HIGH SOME LOW	_____	Y
16.	YES NO	YES NO	HIGH SOME LOW	_____	Y
17.	YES NO	YES NO	HIGH SOME LOW	_____	Y
18.	YES NO	YES NO	HIGH SOME LOW	_____	Y
19.	YES NO	YES NO	HIGH SOME LOW	_____	Y
20.	YES NO	YES NO	HIGH SOME LOW	_____	Y

Teacher _____
 Year _____

UNIT V
 STUDENT RECORD OF PROGRESS
 UNDERSTANDING SECTION
 PROBLEM SOLVING

ACTIVITY 5-21			ACTIVITY 5-34		
What Varies	Outcomes	Who Needs Help Most?	Controlling Variables	Setting Up An Experiment	Student Progress In Unit V HIGH SOME LOW
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____
YES NO	HIGH SOME LOW	_____	YES NO	YES NO	_____

**STUDENT RECORD OF PROGRESS
PARTICIPATION SECTION
RESPONSIBILITY AND INVOLVEMENT**

ASSIGNMENT OF RESPONSIBILITIES

Many tasks should be shared by students. Use this log to assign responsibilities by the week (or other time period). Some tasks and codes for them are listed; add others of your own:

AV--set up and operate audio-visual equipment
(projector, recorder, etc.)

P --care for plants

A --care for animal pet

T --care for terraria plants and animals

F --care for fish and pond

E --get out, clean, and put away science equipment

BB--prepare bulletin board

Enough space is provided to enter a date for a second chance to do various tasks as time permits. There is also enough space to record whether the student completed the task:

O = on his own without reminders or assistance

R = on his own after reminding

H = with someone's help

RATING OF INVOLVEMENT

At four points in the course of Unit V, rate each student's involvement and interest in science activities by circling a number from 0 to 5 in the appropriate column. Rate students 0 if they are completely uninterested or apathetic; rate them 5 if they are extremely excited and involved in doing things in science.

STUDENT NUMBER	TASK	ASSIGNMENT					
		AV	P	A	T	F	E
1.	DATE & SUCCESS						
2.	DATE & SUCCESS						
3.	DATE & SUCCESS						
4.	DATE & SUCCESS						
5.	DATE & SUCCESS						
6.	DATE & SUCCESS						
7.	DATE & SUCCESS						
8.	DATE & SUCCESS						
9.	DATE & SUCCESS						
10.	DATE & SUCCESS						
11.	DATE & SUCCESS						
12.	DATE & SUCCESS						
13.	DATE & SUCCESS						
14.	DATE & SUCCESS						
15.	DATE & SUCCESS						
16.	DATE & SUCCESS						
17.	DATE & SUCCESS						
18.	DATE & SUCCESS						
19.	DATE & SUCCESS						
20.	DATE & SUCCESS						

Teacher _____
 Year _____

**STUDENT RECORD OF PROGRESS
 PARTICIPATION SECTION
 RESPONSIBILITY AND INVOLVEMENT**

ASSIGNMENT OF RESPONSIBILITIES

STUDENT NUMBER	TASK	AV	P	A	T	F	E	BB	ASSIGNMENT OF RESPONSIBILITIES					
									—	—	—	—	—	
1.	DATE & SUCCESS													
2.	DATE & SUCCESS													
3.	DATE & SUCCESS													
4.	DATE & SUCCESS													
5.	DATE & SUCCESS													
6.	DATE & SUCCESS													
7.	DATE & SUCCESS													
8.	DATE & SUCCESS													
9.	DATE & SUCCESS													
10.	DATE & SUCCESS													
11.	DATE & SUCCESS													
12.	DATE & SUCCESS													
13.	DATE & SUCCESS													
14.	DATE & SUCCESS													
15.	DATE & SUCCESS													
16.	DATE & SUCCESS													
17.	DATE & SUCCESS													
18.	DATE & SUCCESS													
19.	DATE & SUCCESS													
20.	DATE & SUCCESS													

**STUDENT RECORD OF PROGRESS
PARTICIPATION SECTION
RESPONSIBILITY AND INVOLVEMENT (continued)**

STUDENT NUMBER	RATING OF INVOLVEMENT				HIGH RESP. INVOLV.	
	AFTER ACT. 5-10	AFTER ACT. 5-21	AFTER ACT. 5-34	AFTER ACT. 5-35		
1.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
2.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
3.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
4.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
5.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
6.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
7.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
8.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
9.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
10.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
11.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
12.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
13.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
14.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
15.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
16.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
17.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
18.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
19.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
20.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	

STUDENT RECORD OF PROGRESS
PARTICIPATION SECTION

Teacher _____
Year _____

RESPONSIBILITY AND INVOLVEMENT (continued)

RATING OF INVOLVEMENT					STUDENT PROGRESS IN UNIT V														
AFTER ACT. 5-21					AFTER ACT. 5-34					AFTER ACT. 5-35					HIGH RESP. INVOLV.	ADEQUATE RESP. INVOLV.	LOW RESP. INVOLV.		
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			
1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5			

STUDENT RECORD OF PROGRESS
PARTICIPATION SECTION
COOPERATION AND PERSEVERANCE

A record sometimes helps clarify persistent learning problems. Sometimes students can gain in self-awareness by assisting in recording their own daily performance. In this way they become aware of the frequency with which problems occur.

To make an entry in the record, simply make a minus or plus mark (-, +) to indicate a problem or positive behavior. Much white space (lack of entries) for a student would denote generally good social and task-related behaviors.

Two columns under each activity allow you to record several types of behavior. For either category, you should decide on the items of behavior to include. If some of the behaviors below are appropriate, check them off, or write in your own.

S --Social behavior might include:

- non cooperation with a team
- aggressiveness toward others
- nonparticipation
- outbursts

T --Task-related behavior might include:

- not completing the work for an activity
- forgetting to bring necessary things
- not carrying out responsibilities
- doing things not related to the task

Compare this record with the students' success and functional abilities to see if any patterns are apparent. Remember that different relationships may exist for different students.

STUDENT
NUMBER

1.
2.
3.
4.
5.
6.
7.
8.
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ACTIVITIES					
1		2		3	
S	T	S	T	S	T

NOTES:

Teacher _____
 Year _____

STUDENT RECORD OF PROGRESS
 PARTICIPATION SECTION
 COOPERATION AND PERSEVERANCE

STUDENT NUMBER	ACTIVITIES																									
	1		2		3		4		5		6		7		8		9		10		11		12		13	
	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T
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19.																										
20.																										

NOTES:

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STUDENT RECORD OF PROGRESS
 PARTICIPATION SECTION
 COOPERATION AND PERSEVERANCE (continued)

STUDENT NUMBER	ACTIVITIES																											
	14		15		16		17		18		19		20		21		22		23		24		25		26		27	
	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T
1.																												
2.																												
3.																												
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NOTES:

STUDENT RECORD OF PROGRESS
PARTICIPATION SECTION
ATTENTION AND PERSEVERANCE (continued)

	22		23		24		25		26		27		28		29		30		31		32		33		34		35	
T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T

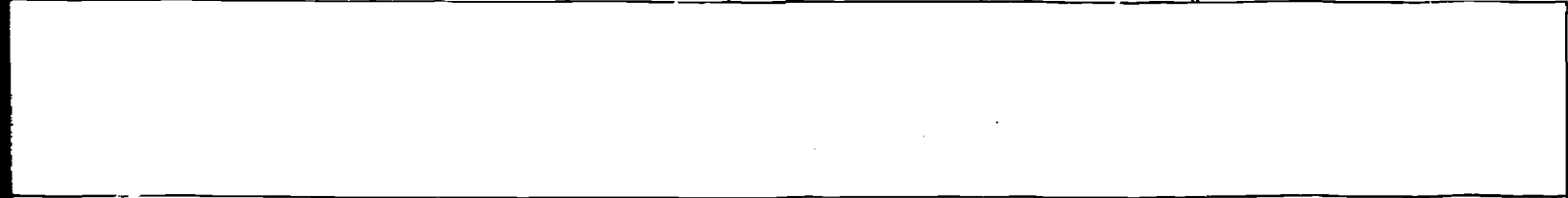
STUDENT RECORD OF PROGRESS
SUMMARY OF STUDENT PROGRESS IN UN

<p>From your summaries of each page, list the students with the <u>LEAST</u> Background, Understanding, and Accomplishments in Unit V. For those whose names appear in many columns, make special plans to insure their future success.</p>	LOW IN BACKGROUND AND DEVELOPMENT			LOW IN UNDERSTANDING		
	DIRECTIONS	REASONING	EXPERIENCE	MEASUREMENT	ORIENTATION	CONCEPTS
NOTES:						
<p>From your summaries of each page, list the students with the <u>MOST</u> Background, Understanding, and Accomplishments in Unit V. Review their work in other subjects and the appropriateness of their placement in this class.</p>	HIGH IN BACKGROUND AND DEVELOPMENT			HIGH IN UNDERSTANDING		
	DIRECTIONS	REASONING	EXPERIENCE	MEASUREMENT	ORIENTATION	CONCEPTS
NOTES:						

STUDENT RECORD OF PROGRESS
SUMMARY OF STUDENT PROGRESS IN UNIT V

Teacher _____
Year _____

DEVELOPMENT EXPERIENCE	LOW IN UNDERSTANDING			LOW IN PARTICIPATION		WHO NEEDS HELP TO SUCCEED IN UNIT V?
	MEASUREMENT	ORIENTATION	CONCEPTS	RESPONSIBILITY	COOPERATION	



DEVELOPMENT EXPERIENCE	HIGH IN UNDERSTANDING			HIGH IN PARTICIPATION		WHO SHOULD BE REVIEWED FOR PLACEMENT IN REGULAR CLASS?
	MEASUREMENT	ORIENTATION	CONCEPTS	RESPONSIBILITY	COOPERATION	

Teacher Rating. Prior to this activity, rate each student's ability to follow directions by circling a number from 0 to 5. The higher the number circled, the more able the student is to carry out a task or sequence of activities with little supervision.

Following Directions. Rate each student's ability to follow directions during this activity, allowing one point for each direction outlined in Activity 5-2. Circle the number of directions followed. The higher the number circled, the more able the student is to carry out a task with little supervision.

Student Developmental Level. Both items on Worksheet 5-2 assess the ability to conserve quantity (refer to Activity 5-2). Circle the response for each student for Items 1 and 2. For a student to be considered as having the ability to conserve, he must have answered both items correctly. Circle YES or NO in the "Conserver" column to indicate whether the student can conserve (i.e., answered both questions correctly). Children who are conservers are beginning to develop the ability to think abstractly.

When you have completed rating each student, put group totals in the space provided. This will help you with an overall picture of the class.

KEY	DIRECTIONS PAGE										Co		
	Teacher Rating On Directions					Score On Directions							
	5	4	3	2	1	0	5	4	3	2	1	0	A
1.	5	4	3	2	1	0	5	4	3	2	1	0	A
2.	5	4	3	2	1	0	5	4	3	2	1	0	A
3.	5	4	3	2	1	0	5	4	3	2	1	0	A
4.	5	4	3	2	1	0	5	4	3	2	1	0	A
5.	5	4	3	2	1	0	5	4	3	2	1	0	A
6.	5	4	3	2	1	0	5	4	3	2	1	0	A
7.	5	4	3	2	1	0	5	4	3	2	1	0	A
8.	5	4	3	2	1	0	5	4	3	2	1	0	A
9.	5	4	3	2	1	0	5	4	3	2	1	0	A
10.	5	4	3	2	1	0	5	4	3	2	1	0	A
11.	5	4	3	2	1	0	5	4	3	2	1	0	A
12.	5	4	3	2	1	0	5	4	3	2	1	0	A
13.	5	4	3	2	1	0	5	4	3	2	1	0	A
14.	5	4	3	2	1	0	5	4	3	2	1	0	A
15.	5	4	3	2	1	0	5	4	3	2	1	0	A
16.	5	4	3	2	1	0	5	4	3	2	1	0	A
17.	5	4	3	2	1	0	5	4	3	2	1	0	A
18.	5	4	3	2	1	0	5	4	3	2	1	0	A
19.	5	4	3	2	1	0	5	4	3	2	1	0	A
20.	5	4	3	2	1	0	5	4	3	2	1	0	A

TOTALS

Does this review give an accurate

If not, what other evidence do

TALLYSHEET 5-1
Activity 5-2 (Worksheet 5-1)

KEY	DIRECTIONS PAGE						REASONING PAGE													
	Teacher Rating			Score On			Conserve			Conserve			Conserver							
	On Directions			Directions			#1			#2			YES	NO						
	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
1.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
2.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
3.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
4.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
5.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
6.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
7.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
8.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
9.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
10.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
11.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
12.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
13.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
14.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
15.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
16.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
17.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
18.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
19.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO
20.	5	4	3	2	1	0	5	4	3	2	1	0	A	B	C	A	B	C	YES	NO

TOTALS _____

Does this review give an accurate indication of student understanding? YES NO

If not, what other evidence do you have of student learning?

Puzzle Completion. For each student, circle the appropriate rating. Circle YES if he was able to complete the puzzle without help. Circle HELP if he needed assistance in putting the puzzle together. Circle NO if he was unable to complete the puzzle. If a student experienced difficulty, he may be experiencing problems in perception and need further observation to determine the existence or scope of the problem.

Sorting Into Two Groups. If a student was able to sort all the pictures into two logical groups without help, circle YES. Circle HELP if he was able to sort the pictures on his own after being told the names of two possible groups. Circle NO if he was unable to sort the pictures into two logical groups.

Naming Three Groups. Circle the maximum number of groups the student was able to appropriately name after putting the puzzle together. Refer to his written responses and accept any reasonable labels.

Now turn to the Background and Development Section of the Student Record of Progress and find the page on development in reasoning. In the column headed "Activity 5-5, Grouping," circle HIGH if the student completed the puzzle and sorted the groups without help and was able to name the three groups. Circle LOW if the student could name less than two groups and NO or HELP was circled for the other two tasks. Rate the remaining students as having SOME ability to group and classify things.

Children rated low will require many experiences to acquire the ability to categorize. Provide informal opportunities to group things for such student periodically throughout the year.

After circling individual responses, write the totals for each column in the space provided.

		PUZZLE COM	
		1	
		YES	HELP
STUDMBER	1.	YES	HELP
	2.	YES	HELP
	3.	YES	HELP
	4.	YES	HELP
	5.	YES	HELP
	6.	YES	HELP
	7.	YES	HELP
	8.	YES	HELP
	9.	YES	HELP
	10.	YES	HELP
	11.	YES	HELP
	12.	YES	HELP
	13.	YES	HELP
	14.	YES	HELP
	15.	YES	HELP
	16.	YES	HELP
	17.	YES	HELP
	18.	YES	HELP
	19.	YES	HELP
	20.	YES	HELP

TOTALS _____

Does this understand

If not, wha

TALLYSHEET 5-2
Activity 5-5 (Worksheet 5-3)

Appropriate
puzzle
in
unable to
difficulty,
need
scope of

to sort all
circle
ures on his
ups.
to two

groups
putting the
and accept

of the
development
Grouping,"
and sorted
three groups.
groups and
ate the
and classify

to acquire
tunities to
out the

		DEVELOPMENT IN REASONING PAGE									
		PUZZLE COMPLETION			SORTING 2 GROUPS			NAMING 3 GROUPS			
		1			2			3			
KEY	STUDMBER	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	1.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	2.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	3.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	4.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	5.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	6.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	7.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	8.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	9.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	10.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	11.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	12.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	13.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	14.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	15.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	16.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	17.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	18.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	19.	YES	HELP	NO	YES	HELP	NO	3	2	1	0
	20.	YES	HELP	NO	YES	HELP	NO	3	2	1	0

TOTALS _____

Does this review give an accurate indication of student understanding? YES NO

If not, what other evidence do you have of student learning?

NUMBER AND MEASUREMENT PAGE		CO				
USE OF BALANCE		WATER CONTENT		WATER USES		
#1	#2	#3		#4		
Before A B C D	After A B C D	Over 1/2 A B C D		Water Use 3 2 1 0		
KEY					Save 3 2	
1.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
2.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
3.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
4.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
5.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
6.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
7.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
8.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
9.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
10.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
11.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
12.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
13.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
14.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
15.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
16.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
17.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
18.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
19.	A B C D	A B C D	A B C D	3 2 1 0	3 2	
20.	A B C D	A B C D	A B C D	3 2 1 0	3 2	

Directions for Scoring:

Questions 1, 2, 3, and 10:
Circle the letter which the student has marked.

Questions 4 and 5: Circle the number of correct responses the student listed.

Question 6A: Circle YES if the student ordered the steps correctly.

Question 6B: Circle YES if the student correctly matched what happens with the name of the step.

Question 9: Circle YES if the student listed the river as the town's water source.

See the Guidelines and Interpretation Section of Activity 5-10 for instructions for recording results in the Student Record of Progress.

TOTALS

Does this review give an accurate indication of student learning?

If not, what other evidence do you have of student learning?

TALLYSHEET 5-3
Activity 5-10 (Worksheet 5-6 and 5-7)

R AND ENT PAGE	CONCEPTS PAGE						
	BALANCE #2	WATER CONTENT #3	WATER USES		WATER TREATMENT		
			#4	#5	#6A	#6B	#9
After A B C D	Over 1/2 A B C D	Water Use 3 2 1 0	Save Water 3 2 1 0	Order Of Steps	What Happens	Source	False Items A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E
A B C D	A B C D	3 2 1 0	3 2 1 0	YES NO	YES NO	YES NO	A B C D E

review give an accurate indication of student understanding? YES NO

ERIC evidence do you have of student learning?

Rate each student's picture chart, marking YES or NO to indicate inclusion of each of the four components:

1. Evaporation: a lake, river, ocean, pool, pond, waterfall, dam, reservoir, wet clothes, barrel of water, stream, or any other picture showing a body or collection of water.
2. Condensation: a cloud, fog, drops on the outside of a cold glass.
3. Precipitation: rain, snow falling, snow on the ground, sleet, hail, thunder, lightening, puddles or rain water, or any other picture suggesting precipitation.
4. Cycle: arrows should be drawn connecting all parts of the cycle. An arrow should be shown going from evaporation to condensation, from condensation to precipitation, and from precipitation back to evaporation. If a picture of land or people was included, the arrow from precipitation should go to the land or people and then to evaporation.

If additional features are included, note them. Then use the following criteria to enter a judgment of student understanding of the water cycle concept on the "Concepts" page of the Student Record of Progress:

HIGH--Included all four components on chart.

SOME--Omitted one step in the cycle, or arrows incorrectly placed.

LOW---Picture chart includes less than three of the four components.

Next turn to the Participation Section of the Student Record of Progress. On the Cooperation and Perseverance page, find the Task (T) column for Activity 5-16, and instead of using +'s and -'s, rate each student on the following categories:

N = No assistance needed. Completed picture on own.

S = Some assistance or encouragement needed, but close supervision not required.

M = Much assistance or supervision required. Could not select pictures or decide what to do without help.

	Source of Evaporation	Cooperation
	1	
KEY	YES NO	YE
1.	YES NO	YE
2.	YES NO	YE
3.	YES NO	YE
4.	YES NO	YE
5.	YES NO	YE
6.	YES NO	YE
7.	YES NO	YE
8.	YES NO	YE
9.	YES NO	YE
10.	YES NO	YE
11.	YES NO	YE
12.	YES NO	YE
13.	YES NO	YE
14.	YES NO	YE
15.	YES NO	YE
16.	YES NO	YE
17.	YES NO	YE
18.	YES NO	YE
19.	YES NO	YE
20.	YES NO	YE

TOTALS

Does this r
understandi

If not, wha

TALLYSHEET 5-4

Activity 5-16 (Picture Chart Ratings)

0 to indicate

d, waterfall,
stream, or
of water.

side of a

he ground,
rain water,

parts of the
vaporation to
ion, and from
ure of land
itiation should
ion.

en use the
nderstanding
f the Student

of the

nt Record of
e, find the
sing +'s and

on own.

out close

CONCEPT PAGE						
Source of Evaporation	Condensation	Precipitation	Arrows Showing Cycle	Additional Features	Record in Concepts Section	
1	2	3	4		Understanding of Water Cycle	
YES NO	YES NO	YES NO	YES NO			
1.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
2.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
3.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
4.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
5.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
6.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
7.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
8.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
9.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
10.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
11.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
12.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
13.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
14.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
15.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
16.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
17.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
18.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
19.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW
20.	YES NO	YES NO	YES NO	YES NO	_____	HIGH SOME LOW

TOTALS _____

Does this review give an accurate indication of student understanding? YES NO

If not, what other evidence do you have of student learning?

Circle student responses for each question as outlined below. NOTE: the items on the tallysheet have been grouped for purposes of interpretation and are not in sequential order. Be certain that you record data in the correct columns.

For Questions 1, 3, 5, 4, 6, 7, 8, 9, 10, and 11 circle the response(s) each student marked. For Question 2, circle the letters which correspond with the items each student answered correctly.

Write in the group totals for each choice. Review the group totals to identify any items with which groups of students had difficulty. If you find such items, further activities will be necessary before proceeding to the next core.

After reviewing the group totals and taking note of any necessary group work, turn to the end of Activity 5-21 for instructions for summarizing individual results in the Student Record of Progress.

	NUMBERS PAGE				PROBLEM SOLVING PAGE													
	Using a Graph				Knowing Question				What Varies									
	2		1		3		5		4									
	15	1960	20,000	1970	A	B	C	D	A	B	C	D	A	B	C	A	B	C
1.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
2.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
3.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
4.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
5.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
6.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
7.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
8.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
9.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
10.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
11.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
12.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
13.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
14.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
15.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
16.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
17.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
18.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
19.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C
20.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	A	B	C

TOTALS - - - - -

Does this review give an accurate indication of student learning?

If not, what other evidence do you have of student learning?

TALLYSHEET 5-5
Activity 5-21 (Worksheet 5-11)

Teacher _____

PROBLEM SOLVING PAGE					CONCEPT PAGE								
Knowing Question				What Varies		Outcomes		Pollution	Water Conservation				
1				3	5	4	6	7	8	9	10	11	
<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>A B C D</u>	<u>A B C</u>	<u>A B C D</u>	<u>A B C D</u>	<u>A B C D</u>	<u>A B C</u>	<u>A B C</u>	<u>A B C</u>	<u>A B C</u>	
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C
A	B	C	D	A B C D	A B C	A B C D	A B C D	A B C D	A B C	A B C	A B C	A B C	A B C

Does this provide an accurate indication of student understanding? YES NO

Other evidence do you have of student learning?



Following Directions.

Before scoring the worksheet, rate each student's ability to follow a series of verbal directions in the teacher rating column on this tallysheet. Circle the number of parts of the total direction which you feel each student will complete successfully when scoring the worksheet. Circle the actual number of parts of the direction which each student completed successfully in the score column.

For each of the Questions 1-5 on Worksheet 5-13, circle the response each student has marked.

Record the group totals in the spaces below each column to give you an overall picture of the class. Send a copy of this tallysheet to BSCS. After scoring the worksheet, turn to the Progress in Following Directions Section of the Student Record of Progress and copy the rating and actual score for each student. Also note who needs the most help.

Then turn to the Concept page and record the following: In the column marked Activity 5-26, Carbon Dioxide, circle YES if the student marked the correct answer for Question 1. In the column marked Activity 5-26, Oxygen, circle YES if the student marked the correct answer for both Questions 2 and 3. In the column marked Activity 5-26, Interdependence, circle YES if the student marked the correct answer for Question 4. In the column marked Activity 5-26, Control, circle YES if the student marked the correct answer for Question 5.

TALLYSHEET 5-6
Activity 5-26 (Worksheet 5-13)

KEY	DIRECTIONS PAGE											
	Following Directions			Carbon Dioxide								
	Teacher Rating			Score								
	0	1	2	3	0	1	2	3	A	B	C	D
1.	0	1	2	3	0	1	2	3	A	B	C	D
2.	0	1	2	3	0	1	2	3	A	B	C	D
3.	0	1	2	3	0	1	2	3	A	B	C	D
4.	0	1	2	3	0	1	2	3	A	B	C	D
5.	0	1	2	3	0	1	2	3	A	B	C	D
6.	0	1	2	3	0	1	2	3	A	B	C	D
7.	0	1	2	3	0	1	2	3	A	B	C	D
8.	0	1	2	3	0	1	2	3	A	B	C	D
9.	0	1	2	3	0	1	2	3	A	B	C	D
10.	0	1	2	3	0	1	2	3	A	B	C	D
11.	0	1	2	3	0	1	2	3	A	B	C	D
12.	0	1	2	3	0	1	2	3	A	B	C	D
13.	0	1	2	3	0	1	2	3	A	B	C	D
14.	0	1	2	3	0	1	2	3	A	B	C	D
15.	0	1	2	3	0	1	2	3	A	B	C	D
16.	0	1	2	3	0	1	2	3	A	B	C	D
17.	0	1	2	3	0	1	2	3	A	B	C	D
18.	0	1	2	3	0	1	2	3	A	B	C	D
19.	0	1	2	3	0	1	2	3	A	B	C	D
20.	0	1	2	3	0	1	2	3	A	B	C	D

TOTALS

Does this review give an accurate indi
If not, what other evidence do you hav

DIRECTIONS PAGE		CONCEPT PAGE				
Following Directions		Carbon Dioxide	Oxygen		Interdependence	Control
Teacher Rating	Score	1	2	3	4	5
0 1 2 3	0 1 2 3	A B C <u>D</u>	A B C <u>D</u>	<u>A</u> B C D	A <u>B</u> C D	A <u>B</u> C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D
0 1 2 3	0 1 2 3	A B C D	A B C D	A B C D	A B C D	A B C D

Does this review give an accurate indication of student understanding? YES NO

ERIC Not, what other evidence do you have of student learning?

TALLYSHEET 5-7
Activity 5-27, (Worksheet 5-14)

Response to Questions.

Use the form below to record the responses from Worksheet 5-14 by circling student responses. There are two parts to each numbered question. The first answer to each question should be yes, indicating that there is pressure on the object or person. Circle YES if the student answered yes, and NO if he answered no. The second answer to each question should identify the pressure. Circle the answer the student gave. If you circle OTHER, write the student's answer in the blank provided.

When you have completed rating each student, put group totals in the space provided. This will help you with an overall picture of the class.

See the end of Activity 5-27 for instructions for recording results in the Student Record of Progress.

CONCEPT					
WOMAN WITH BASKET				BOOKSHELF	
KEY	#1			#2	
	YES	NO	OTHER	YES	NO
1.	YES	NO	BASKET &/OR AIR	YES	NO
2.	YES	NO	BASKET &/OR AIR	YES	NO
3.	YES	NO	BASKET &/OR AIR	YES	NO
4.	YES	NO	BASKET &/OR AIR	YES	NO
5.	YES	NO	BASKET &/OR AIR	YES	NO
6.	YES	NO	BASKET &/OR AIR	YES	NO
7.	YES	NO	BASKET &/OR AIR	YES	NO
8.	YES	NO	BASKET &/OR AIR	YES	NO
9.	YES	NO	BASKET &/OR AIR	YES	NO
10.	YES	NO	BASKET &/OR AIR	YES	NO
11.	YES	NO	BASKET &/OR AIR	YES	NO
12.	YES	NO	BASKET &/OR AIR	YES	NO
13.	YES	NO	BASKET &/OR AIR	YES	NO
14.	YES	NO	BASKET &/OR AIR	YES	NO
15.	YES	NO	BASKET &/OR AIR	YES	NO
16.	YES	NO	BASKET &/OR AIR	YES	NO
17.	YES	NO	BASKET &/OR AIR	YES	NO
18.	YES	NO	BASKET &/OR AIR	YES	NO
19.	YES	NO	BASKET &/OR AIR	YES	NO
20.	YES	NO	BASKET &/OR AIR	YES	NO

TOTALS _____

Does this review give an accurate indication of student progress?
If not, what other evidence do you have of student progress?

TALLYSHEET 5-7
Activity 5-27, (Worksheet 5-14)

CONCEPT PAGE

WOMAN WITH BASKET		BOOKSHELF			BOY AND GIRL			BOY	
#1		#2			#3			#4	
SKET	AND/OR AIR OTHER	YES	NO	BOOKS	AND/OR AIR OTHER	YES	NO	BOY	AND/OR AIR OTHER
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR
SKET	AND/OR AIR	YES	NO	BOOKS	AND/OR AIR	YES	NO	BOY	AND/OR AIR

ERIC Give an accurate indication of student understanding? YES NO

What other evidence do you have of student learning?

Order. Circle YES if a student was able to order the pictures correctly (2, 3, 4, 5, 1) in Question 1. Circle NO if any of the pictures were out of order.

Describe. Circle the number of words a student wrote on the lines in Question 2.

Group. Circle YES if a student was able to put the pictures into two groups for Question 3. Circle NO if a student did not suggest groups.

Label. Circle YES if a student was able to assign a logical label for both of the groups for Question 3. Circle NO if he was unable.

Describe. Circle the number of words correctly assigned to the pictures. Descriptive words which probably do not apply are: natural, pretty, funny, bright, furry, wet, and clean. But, allow flexibility and use your judgment.

Add group totals on the lines provided below.

Recording in the Student Record of Progress:

Question 1 assesses the student's observational abilities. Turn to the Development of Experience page in the Student Record of Progress. Find the column marked Activity 5-31, Order. Circle YES if the student was able to correctly observe and order the picture as indicated by a YES on the tallysheet.

Question 2 and 5 assess the student's ability to describe. Find the column marked Activity 5-31, Describe. Circle HIGH if students listed five or more descriptive words for Question 2 and circled 11-21 words in Question 5. Circle LOW if students listed less than two words for Question 2 and/or circled less than five words for Question 5. All other students may be rated as having SOME descriptive skills.

Question 3 and 4 assess the student's ability to group objects. Turn to the Development in Reasoning page of the Student Record of Progress, find the column marked Activity 5-31, Grouping. Circle YES if the student was able to group the objects and label the groups as indicated by a YES on the tallysheet for both Questions 3 and 4.

Activity

KEY	EXPERIENCE PAGE			
	ORDER		DESCRIBE	
	1	2	1	2
1.	YES	NO	0-1	2-4
2.	YES	NO	0-1	2-4
3.	YES	NO	0-1	2-4
4.	YES	NO	0-1	2-4
5.	YES	NO	0-1	2-4
6.	YES	NO	0-1	2-4
7.	YES	NO	0-1	2-4
8.	YES	NO	0-1	2-4
9.	YES	NO	0-1	2-4
10.	YES	NO	0-1	2-4
11.	YES	NO	0-1	2-4
12.	YES	NO	0-1	2-4
13.	YES	NO	0-1	2-4
14.	YES	NO	0-1	2-4
15.	YES	NO	0-1	2-4
16.	YES	NO	0-1	2-4
17.	YES	NO	0-1	2-4
18.	YES	NO	0-1	2-4
19.	YES	NO	0-1	2-4
20.	YES	NO	0-1	2-4

TOTALS _____

Does this review give you any information?

If not, what other information do you need?

TALLYSHEET 5-8
Activity 5-31 (Worksheet 5-16)

Teacher _____

KEY	EXPERIENCE PAGE				REASONING PAGE		EXPERIENCE PAGE		
	ORDER	DESCRIBE			GROUP	LABEL	DESCRIBE		
	1	2			3	4	5		
	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-10	11-21
1.	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-10	11-21
2.	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-10	11-21
3.	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-10	11-21
4.	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-10	11-21
5.	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-10	11-21
6.	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-10	11-21
7.	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-10	11-21
8.	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-10	11-21
9.	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-10	11-21
10.	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-10	11-21
11.	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-10	11-21
12.	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-10	11-21
13.	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-10	11-21
14.	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-10	11-21
15.	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-10	11-21
16.	YES NO	0-1	2-4	5-10	YES NO	YES NO	0-5	6-11	11-21
17.	YES NO	0-1	2-4	5-11	YES NO	YES NO	0-5	6-11	11-21
18.	YES NO	0-1	2-4	5-11	YES NO	YES NO	0-5	6-11	11-21
19.	YES NO	0-1	2-4	5-11	YES NO	YES NO	0-5	6-11	11-21
20.	YES NO	0-1	2-4	5-11	YES NO	YES NO	0-5	6-11	11-21

TOTALS _____

Does this review give an accurate indication of student understanding?

YES NO

If not, what other evidence do you have of student learning?

Directions for Scoring

Question 1: Circle YES if the student wrote 20 as a response.

Questions 2, 3, 4, 6, 7, 8, 9, 10, 11, and 12: Circle the letters which the student marks for each question.

Question 5: Circle the answer the student marked for each letter A through F.

Directions for Recording Results in the Student Record of Progress.

Question Number 1 assesses the student's ability to read a graph. Turn to the numbers and measurements page of the Student Record of Progress and find the column marked Activity 5-34, Reading a Graph. Circle YES if the student answered the question correctly. Circle NO if he did not.

Question Number 2 relates to the student's ability to read a graph. However, it involves a higher degree of problem-solving ability and should not be used to judge a student's success in reading graphs. For convenience, it has been included in the numbers and measurements page of the Student Record of Progress. Find the column marked Activity 5-34, Translating Data. Circle YES if the student marked Choice B.

Question Number 3 assesses the student's understanding of the concept of fumes being dangerous to living things. Turn to the concept page of the Student Record of Progress and find the column marked Activity 5-34, Fumes Dangerous to Living Things. Circle YES if the student marked B as a response.

Question Number 4 assesses the student's understanding of controlling variables. Turn to the problem-solving page of the Student Record of Progress and find the column marked Activity 5-34, Controlling Variables. Circle YES if the student marked B and/or D.

Questions 5 and 6 assess the concept of fumes being dangerous to man. Turn to the concept page of the Student Record of Progress and find the column marked Activity 5-34, Fumes Dangerous To Man. Circle YES if the student answered five of the six parts of Question 5 correctly and also answered Question 6 correctly. Circle NO if the student missed more than one part of Question 5 or missed Question 6.

Question 7 assesses the student's ability to identify variables and set up an experiment. Turn to the problem-solving page of the Student Record of Progress and find the column marked Activity 5-34, Setting Up Experiments. Circle YES if the student answered Question 7 correctly. REMEMBER: Question 7 assesses higher problem-solving skills and should be used to find out where students are rather than to judge their success. Students who do not answer correctly need more opportunities to produce such skills.

Questions 8 through 12 are value judgment questions. No results will be recorded in the Student Record of Progress.

TALLYSHEET 5-9

Activity 5-34 (Worksheet 5-18 A, B, C, D, and E)

ponse.

ne letters which the student

ch letter A through F.

Progress.

a graph. Turn to the
Progress and find the
 S if the student answered

d a graph. However, it
 should not be used to judge
 it has been included in
Progress. Find the
 S if the student marked

the concept of fumes being
 the Student Record of Progress
 to Living Things. Circle YES

controlling variables. Turn
ress and find the column
 if the student marked B

rous to man. Turn to the
 he column marked Activity 5-34,
 ed five of the six parts of
 ly. Circle NO if the student
 n 6.

ables and set up an experi-
cord of Progress and find the
 cle YES if the student answered
 her problem-solving skills and
 to judge their success.
 ies to produce such skills.

KEY

NUMBERS AND MEASUREMENTS PAGE		CONCEPT PAGE		PROBLEM-SOLVING PAGE			
Reading A Graph		Translating Data		Fumes Dangerous To Living Things		Controlling Variables	
1		2		3		4	
YES	NO	A	B C D	A	B C D	A	B C D
1.	YES NO	A	B C D	A	B C D	A	B C D
2.	YES NO	A	B C D	A	B C D	A	B C D
3.	YES NO	A	B C D	A	B C D	A	B C D
4.	YES NO	A	B C D	A	B C D	A	B C D
5.	YES NO	A	B C D	A	B C D	A	B C D
6.	YES NO	A	B C D	A	B C D	A	B C D
7.	YES NO	A	B C D	A	B C D	A	B C D
8.	YES NO	A	B C D	A	B C D	A	B C D
9.	YES NO	A	B C D	A	B C D	A	B C D
10.	YES NO	A	B C D	A	B C D	A	B C D
11.	YES NO	A	B C D	A	B C D	A	B C D
12.	YES NO	A	B C D	A	B C D	A	B C D
13.	YES NO	A	B C D	A	B C D	A	B C D
14.	YES NO	A	B C D	A	B C D	A	B C D
15.	YES NO	A	B C D	A	B C D	A	B C D
16.	YES NO	A	B C D	A	B C D	A	B C D
17.	YES NO	A	B C D	A	B C D	A	B C D
18.	YES NO	A	B C D	A	B C D	A	B C D
19.	YES NO	A	B C D	A	B C D	A	B C D
20.	YES NO	A	B C D	A	B C D	A	B C D

TOTALS

TALLYSHEET 5-9
Activity 5-34 (Worksheet 5-18 A, B, C, D, and E)

CONCEPT PAGE								PROB.						
Fumes Dangerous To Man								SOLVIN						
								Settin						
								Exper						
5							6							
KEY	A		B		C		D		E		F		A B C D	A B
	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO		
1.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
2.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
3.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
4.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
5.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
6.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
7.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
8.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
9.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
10.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
11.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
12.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
13.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
14.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
15.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
16.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
17.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
18.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
19.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B
20.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	A B C D	A B

TOTALS _____

Does this review give an accurate indication of student understand

If not, what other evidence do you have of student learning?

EXPT PAGE			PROBLEM- SOLVING PAGE						
Dangerous To Man			Setting Up An Experiment		Value Judgments				
			6	7	8	9	10	11	12
D	E	F							
<u>YES</u> <u>NO</u>	<u>YES</u> <u>NO</u>	<u>YES</u> <u>NO</u>	<u>A</u> <u>B</u> <u>C</u> <u>D</u>	<u>A</u> <u>B</u> <u>C</u> <u>D</u>	<u>A</u> <u>B</u>	<u>A</u> <u>B</u>	<u>A</u> <u>B</u>	<u>A</u> <u>B</u>	<u>A</u> <u>B</u>
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B
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YES NO	YES NO	YES NO	A B C D	A B C D	A B	A B	A B	A B	A B

SIDE B

ERIC e indication of student understanding? YES NO

ERIC e do you have of student learning?

TALLYSHEET 5-10
Activity 5-35 (Worksheet 5-19 through 5-

		CONCEPTS PAGE															
		Water Content		Water Use						Saving Water		Water					
		1		2						3		4		5			
KEY		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NO
1.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NO
2.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NO
3.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NO
4.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NO
5.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NO
6.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NO
7.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NO
8.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NO
9.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NO
10.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NO
11.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NO
12.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NO
13.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NO
14.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NO
15.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NO
16.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NC
17.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NC
18.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NC
19.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NC
20.		A	B	0	1	2	3	4	5	6	M	YES	NO	YES	NO	YES	NC

TOTALS -- -- -- -- -- -- -- -- -- -- -- -- --

TALLYSHEET 5-10

Activity 5-35 (Worksheet 5-19 through 5-23)

CONCEPTS PAGE																								
Water Use		Saving Water		Water Source		Water Treatment																		
2		3		4		5		6		7		8		9		10		11						
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D
3	4	5	6	M	YES	NO	YES	NO	YES	NO	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D

CONCEPTS PAGE																					
	Water Cycle			Fate of The River			Value Judgment		Population And Water				Oxygen				Ox Car				
	12			13			14		15				16		17		18				
KEY	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
1.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
2.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
3.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
4.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
5.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
6.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
7.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
8.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
9.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
10.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
11.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
12.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
13.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
14.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
15.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
16.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
17.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
18.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
19.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES
20.	1	2	3	LOW	SOME	HIGH	YES	NO	A	B	C	D	A	B	C	D	A	B	C	D	YES

TOTALS _____

Does this review give an accurate indication of student understanding?

If not, what other evidence do you have of student learning?

CONCEPTS PAGE

Judgment	Population And Water	Oxygen		Oxygen and Carbon Dioxide		Wind & Weather	Wind & Water	Things In Air	Air Pollution
		14	15	16	17				
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO
YES NO	A B C D	A B C D	A B C D	YES NO	A B C D	A B C D	A B C D	YES NO	YES NO

accurate indication of student understanding?

 YES NO

ERIC you have of student learning?



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

UNIT V OVERVIEW

This unit is organized in two parts, one on water, the other on air. The activity sequence is, however, continuous. The first part begins with a core of activities which establishes our uses of water. These uses extend from the basic biological needs of the student to the complex requirements of the community. The second core traces the sources of water from the tap at hand to its basic geologic origin. After the availability of water has been established, the problem of suitable preparation is studied in detail. In this core, community water treatment processes are compared with, and related to, the natural water cycle. The work on water is concluded with an examination of the broad problems of water management with special emphasis on the concept, and consequences, of pollution.

The second part of the unit consists of three cores on air. The first core emphasizes our need for air and introduces the idea that air is a mixture of several components. The two most important of these to us are oxygen and carbon dioxide. The second core of activities involves the physical properties of air and how these properties influence atmospheric conditions in time and space. The terminal core in this unit treats air in a manner similar to the last core on water. Man-made additives to the air are examined in terms of their characteristics as well as their impact on the environment.

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Perhaps no othe the rapid escalation imperative that we a lives.

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UNIT V. AIR AND WATER IN MY ENVIRONMENT

UNIT V RATIONALE

Air and water are both cycling resources. Historically we have treated both as unlimited resources (with a few obvious local exceptions in water). The current trend of environmental concern has focused attention on these two components as not only limited but also vulnerable.

Perhaps no other resources have been taken more for granted. However the rapid escalation of the pollution of these resources makes it imperative that we all consider their importance and significance in our lives.

The experiences in this unit not only are designed to develop positive and protective attitudes towards air and water but to suggest the effect they have on the quality of life. Students explore the role of air and water in the lives of their own families as well as the neighborhood and community in which they live.

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Me and my Environment



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Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE A. NEED FOR WATER

AIMS FOR ME AND MY ENVIRONMENT

1. DEVELOPMENT IN EACH CHILD OF A SENSE OF IDENTITY AS A PERSON WHO HAS SOME DEGREE OF CONTROL OVER AND CAN ACT ON HIS ENVIRONMENT. This will lead to a degree of self-determination based on a rational coping with situations rather than on a passive compliance or an impulsive response to problems.
2. DEVELOPMENT IN EACH CHILD OF A SUCCESS SYNDROME. More than anything else, each activity is intended to be a success experience for each child. It is the teacher's responsibility -- almost obligation -- to see that each child succeeds at a level that is challenging to his abilities and that preserves his self-respect. It is a further responsibility of the teacher to point out his achievement. The students as a group should help each individual fit what he has done into a pattern of accomplishment.
3. DEVELOPMENT IN EACH CHILD OF AN INTEREST THAT COULD BECOME A HOBBY OR AVOCATION OVER A LIFETIME (through an exposure to an array of experiences in science). It is hoped that many children will find some area -- perhaps growing plants, caring for animals, identifying flowers, collecting things, or simply enjoying outings into the country -- that they feel strongly about and can develop some competence or knowledge in. This would provide a means of self-expression, and (perhaps) allow some degree of sharing or involvement with others.
4. DEVELOPMENT IN EACH CHILD OF A SENSE OF RELATIONSHIP AND EMPATHY WITH OTHER LIVING THINGS. It is hoped that this will lead to a positive regard and caring about what affects them as individuals and as a group, because what affects them affects the community of man.
5. DEVELOPMENT IN EACH CHILD OF AN UNDERSTANDING OF ENVIRONMENTAL CONDITIONS that will lead to a sense of responsibility for the environment and actions that protect or improve it.

The two parts of this unit will air and water as major components. Part 1 emphasizes the importance of the environment by helping the student

1. Understand the need for water
2. Recognize the sources of water
3. Realize the problems associated with water
4. Realize the problems associated with air
5. Recognize the impact of water
6. Understand the broad problems

Part 2 emphasizes the nature of air and water by helping the student to:

7. Understand the composition of air
 8. Realize that the quality of air is important
 9. Realize that substances are carried by air
 10. Comprehend the impact of air on the environment
1. Recognize the diversity of water
 2. Develop a quantitative view of water
 3. Recognize the universal importance of water

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE A. NEED FOR WATER



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UNIT V GOALS

The two parts of this unit will serve to develop an appreciation of the roles of air and water as major components of our environment.

Part 1 emphasizes the importance of water as a vulnerable component of our environment by helping the student to:

1. Understand the need for water.
2. Recognize the sources of water.
3. Realize the problems associated with the preparation of usable water.
4. Realize the problems associated with the disposal of waste water.
5. Recognize the impact of water pollution.
6. Understand the broad problems of water management.

Part 2 emphasizes the nature of air as a complex component of our environment by helping the student to:

7. Understand the composition of air.
8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.
10. Comprehend the impact of air pollution on our environment.

CORE A OBJECTIVES

1. Recognize the diversity of water uses in everyday life.
2. Develop a quantitative view of the needs for water.
3. Recognize the universal importance of water for life.



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE A. NEED FOR WATER

UNIT V OVERVIEW

Air and water are both cycling resources. Historically we have treated both as unlimited resources (with a few obvious local exceptions for water). The current trend of environmental concern has focused attention on these two components as not only limited resources but also vulnerable ones.

This unit is organized in two parts -- one on water, the other on air. The activity sequence is, however, continuous. The first part begins with a core of activities that establish our various uses of water. These uses extend from the basic biological needs of the student, as a human being, to the complex requirements of the community. The second core traces the source of water from the tap at hand to a basic geologic origin. After the source of water has been established, the problem of suitable preparation is studied in detail. In this core, community water treatment processes are compared with, and related to, the natural water cycle. The work on water is concluded with an examination of the broad problems of water management, with special emphasis on the concept and consequences of pollution.

The second part of the unit consists of three cores of activities on air. The first core emphasizes our need for air and introduces the idea that air is a mixture of several components. The two most important components for us are oxygen and carbon dioxide. The second core of activities involves the physical properties of air and how these properties influence atmospheric conditions in time and space. The last core of activities in this unit on air is similar to the last core on water. Man-made additives to the air are examined in terms of their characteristics as well as their impact on the environment.

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE A. NEED FOR WATER



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Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE A. NEED FOR WATER

CORE A RATIONALE

Water is an environmental resource that has demonstrable importance to everyone's daily life. Man has a specific biological need for water and this need is constant. There are many other needs for water that are related to modern living. In this core, the students will have the opportunity to examine critically their own needs for water on a quantitative basis. They will also develop an order of importance for the satisfaction of these needs. This order of importance may vary from place to place and from time to time. The order of priority may not, however, necessarily reflect the widening perspective of self, home, school, community, etc. In some cases the needs of the larger group may be considered more important than the needs closer to self.

BACKGROUND

Technically water recycling system for a can be used in unlimited for water on a physiological that are related to our in terms of both quality poses problems that vary

Aside from specific requirements for bathing to be similar over wide family needs tend to vary family may quite natural livestock and crops. So and washing cars. All student. A deliberate of all students.

The sources of water next. Water may be direct faucet. The water supply municipal water main. outside the house. The sources. Municipal water some areas the source may large pumps drawing water deposit. In many cases natural lake or river. round water supply is to reservoir. A reservoir



BACKGROUND INFORMATION FOR THE TEACHER

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Technically water is a renewable resource. Nature has its own recycling system for a reusable water supply. This does not mean that it can be used in unlimited quantities. Man has specific and absolute needs for water on a physiological basis. We also have important needs for water that are related to our role in society. These needs may be characterized in terms of both quality and quantity. Providing for these needs often poses problems that vary widely from locality to locality.

Aside from specific biological needs, we all have daily household requirements for bathing, washing, cooking, and so forth. These needs tend to be similar over wide geographic and socioeconomic bounds. Second-order family needs tend to vary more widely, depending on circumstance. A farm family may quite naturally place high priority on water requirements for livestock and crops. Suburbanites may be oriented toward lawns, gardens, and washing cars. All of these uses may be entirely foreign to the city student. A deliberate attempt should be made to broaden the perspective of all students.

The sources of water may vary considerably from one situation to the next. Water may be directly available to the student from a tap or faucet. The water supply to this outlet may be an individual well or a municipal water main. In many cases it may come from a hand pump in or outside the house. The water in the main may come from a variety of sources. Municipal water supplies will vary from region to region. In some areas the source may be a well field which is essentially one or more large pumps drawing water from an underground supply, usually a gravel deposit. In many cases, a community will draw its water directly from a natural lake or river. A common practice to insure a continuous, year-round water supply is to build an artificial impoundment called a reservoir. A reservoir is usually created by building a dam at a narrow



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE A. NEED FOR WATER

BACKGROU

point in a natural st
watershed. Many comm
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UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE A. NEED FOR WATER



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BACKGROUND INFORMATION FOR THE TEACHER (continued)

point in a natural stream system that drains a geographic area called a watershed. Many communities have more than one reservoir. It should be noted that not all reservoirs are intended to function as water supplies. Some are intended for commerce, electricity, irrigation, recreation, or flood control. In the latter cases, management practice often conflicts with possible use as a water supply. Consequently, the problems of the preparation of usable water, disposal of waste water, and water resource management in general will again vary from region to region.



Me and my Environment

UNIT V CORE A

PLANNING GUIDE


NOTE: Some activities (*indicated in italics and an arrow in* be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		<i>(Italic)</i>
	Materials You Furnish	Materials in Supply Kit	
5-1. A Beginning Days needed: 1	Classroom animal Classroom pond	"Science Is..." poster Chart 5-1	<i>Preferably Preferably Water chart</i>
5-2. Clues to Success: Background and Understanding Days needed: 2	Cold water Soft drink mix Modeling clay Paper towels Objects to weigh	Test tubes, 25 X 200 mm Test tubes, 18 X 150 mm Test tubes, 13 X 100 mm Beakers (250 ml) Beakers (400 ml) Test tube racks Equal-arm balance kits Worksheet 5-1 Tallysheet 5-1	<i>About one of experimen For experim mix such One teaspoo For cleanin Such as pag Two per pag Two per pag Two per pag Two per pag One per pag One per pag Four Pad of 20 s</i>
5-3. Living Things Are Mostly Water Days needed: 2	35 mm Slide projector Knife and cutting board Paper muffin cups Oven Fresh fruits and vegetables		<i>Or a cuttin Four per st For drying Such as let A chunk siz</i>

PLANNING GUIDE



BSCS

Activities (indicated in italics and an  in the margin) must be prepared several days or weeks in advance. Use this summary as a guide for materials and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher
Materials in Supply Kit	<i>(Italics and Arrow Indicate Advance Preparation Directions)</i>
<p>"Science Is..." poster Chart 5-1</p>	<p><i>Preferably the animal from the past year</i> <i>Preferably the pond animals from the past year</i></p> <p>Water chart</p>
<p>Test tubes, 25 X 200 mm Test tubes, 18 X 150 mm Test tubes, 13 X 100 mm Beakers (250 ml) Beakers (400 ml) Test tube racks Equal-arm balance kits Worksheet 5-1 Tallysheet 5-1</p>	<p>About one gallon for mixing with the soft drink and experimenting with the clay For experimenting and drinking (about two large packages of a mix such as Kool-Aid) One teaspoon per pair of students, approximately one pound For cleaning spills and drips Such as paper clips, beans, and coins Two per pair of students Two per pair of students Two per pair of students Two per pair of students One per pair of students One per pair of students Four Pad of 20 sheets; one worksheet per student</p>
	<p>Or a cutting surface for each student pair Four per student pair For drying out fruits and vegetables Such as lettuce, apple, carrot, potato, orange A chunk size sample of each food per student group</p>



Me and my Environment

UNIT V
CORE A

PLANNING GUIDE


NOTE: Some activities (indicated in italics and an arrow) be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		(Ita)
	Materials You Furnish	Materials in Supply Kit	
5-3. Living Things Are Mostly Water (continued)		Worksheet 5-2 Slide 5-1 Slide 5-2 Slide 5-3 Equal-arm balance kits	Pad of 2 Body out Body out Workshe Four
5-4. Uses of Water Days needed: 1	3 X 5 Index cards 35 mm Slide projector	Slide 5-4 Slide 5-5 Slide 5-6 Slide 5-7 Slide 5-8 Slide 5-9	Several in thi Street v Dentist Industr Floating Water be Hydroele
5-5. Priorities of Water Use Days needed: 2	3 X 5 Index cards Pins Bulletin board Scissors Tape Lined 8 1/2 X 11 inch paper	Worksheet 5-3 Tallysheet 5-2	From Act For pinn One per One pair Masking One shee Pad of 2

PLANNING GUIDE



BSCS

Activities (indicated in italics and an  in the margin) must be prepared several days or weeks in advance. Use this summary as a planning and preparation schedule. All supplies needed are listed.

Supplies Needed

Notes and Suggestions to Teacher

(Italics and Arrow Indicate Advance Preparation Directions)

Materials in Supply Kit

Worksheet 5-2
 Slide 5-1
 Slide 5-2
 Slide 5-3
 Equal-arm balance kits

Pad of 20 sheets; one worksheet per student
 Body outline
 Body outline with water content
 Worksheet 5-2
 Four

Slide 5-4
 slide 5-5
 slide 5-6
 slide 5-7
 slide 5-8
 slide 5-9

Several dozen (three times the number of water uses listed in this Activity)

Street washer
 Dentist's drill
 Industrial cooling
 Floating logs on a river
 Water bed
 Hydroelectric power

Worksheet 5-3
 Tallysheet 5-2

From Activity 5-4
 For pinning water use cards
 One per class
 One pair per student
 Masking or cellophane
 One sheet per student
 Pad of 20 sheets; one worksheet per student



Me and my Environment

UNIT V
CORE A

PLANNING GUIDE

NOTE: Some activities (*indicated in italics and an arrow in the margin*) be prepared several days or weeks in advance. Use this as a teaching and preparation schedule. All supplies needed are listed below.

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		<i>(Italics)</i>
	Materials You Furnish	Materials in Supply Kit	
5-6. How Much Water Do I Use? Days needed: 2	Toothpaste Toothbrush One gallon jug Water Bucket or pail	Measuring cup Funnel Worksheet 5-4	One tube Have a student For measuring Use for washing For collecting For measuring For pouring Pad of 20 sheets

PLANNING GUIDE



BSCS

Activities (indicated in italics and an arrow in the margin) must be completed several days or weeks in advance. Use this summary as a guide for materials and preparation schedule. All supplies needed are listed.

Supplies Needed

Materials in Supply Kit

Measuring cup
Funnel
Worksheet 5-4

Notes and Suggestions to Teacher

(Italics and Arrow Indicate Advance Preparation Directions)

One tube
Have a student bring a toothbrush
For measuring water use
Use for washing teeth
For collecting used water
For measuring amount of water in a gallon
For pouring from container to container
Pad of 20 sheets; one worksheet per student



Me and my Environment



BSCS



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:
None emphasized

Core A Objectives for the Student:
None emphasized

ENVIRONMENTAL THEME:

None emphasized

INQUIRY SKILLS:

Identifying

PROBLEM-SOLVING SKILLS:

Knowing Question and Task

PRACTICAL APPLICATION:

Recalling Science Experiences

Activity 5-1. A Beginning

This activity will serve to reacquaint the students with the classroom animal and the classroom pond. By discussing the "Science Is..." poster, students will begin to think of what they did in science last year as well as what they will do this year.



BSCS

UNIT V. AIR AND WATER IN
MY ENVIRONMENT

CORE A. NEED FOR WATER

ACTIVITY 5-1. A BEGINNING

During this activity, each student should:

- choose a picture on the "Science Is..." poster that reminds him of something done in science class during the previous year.*
- get reacquainted with the classroom animal and the classroom pond.*
- discuss each picture of Chart 5-1 and identify it as having something to do with water.*

ACTIVITY

Goals for the Student:
One emphasized

Objectives for the Student:
One emphasized

AL THEME:
Emphasized

ILLS:
ifying

VING SKILLS:
g Question and Task

PPPLICATION:
ing Science Experiences

Beginning

*All serve to reacquaint the students
om animal and the classroom pond. By
Science Is..." poster, students will
f what they did in science last year as
y will do this year.*

"*Science Is...*" poster
Chart 5-1

- *Classroom animal
- *Classroom pond

Because Unit V begins the school year, this activity is meant to be relatively unstructured. It can be used to unpack the science equipment, refill the classroom pond, get the classroom animal back to the room, and so forth.

To get the students thinking about science once again, display the "*Science Is...*" poster where it can be seen by all students.

Ask a student to choose one picture on the poster that reminds him of something he did in science class last year. Ask him to tell what the picture reminds him of doing and allow other students to contribute their memories also.

Continue in this manner until all the pictures on the poster have been discussed. During this discussion such terms as environment, microbes, and living things will most likely be used. Be sure to review the definitions of such terms as they are brought up.

Part I.

Science in the Past

When a student selects the picture entitled Loving Some Things on the "*Science Is...*" poster, draw his attention to the animals that were present in the classroom the year before by asking:

WHAT LIVING THINGS DID WE HAVE IN OUR
CLASSROOM LAST YEAR?

LET'S GET OUR CLASSROOM READY FOR THEM AGAIN.

*Not furnished in materials kit

TEACHING STRATEGIES

V begins the school year, this activity is relatively unstructured. It can be used to science equipment, refill the classroom pond, broom animal back to the room, and so forth.

tudents thinking about science once again, "Science Is..." poster where it can be seen
nts.

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ING THINGS DID WE HAVE IN OUR
M LAST YEAR?

T OUR CLASSROOM READY FOR THEM AGAIN.

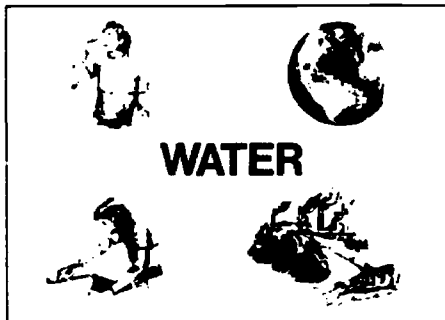
ANTICIPATED STUDENT BEHAVIORS

Students should:

--recall the classroom animal and the pond animals and state, "Our gerbil," "The fish," etc.

MATERIALS

Chart 5-1



TEACHING STRATEGIES

At this time fill the pond with water, stones, and whatever other appropriate items are available. Prepare a place in the room for the animal to occupy. If students took care of the class animal and pond animals over the summer, make arrangements for these animals to be brought back to school. Also arrange new schedules for the feeding and care of the animals.

Part II.

Science in the Future

Display Chart 5-1 (Water Chart) where it can be seen by all students.

Say:

THIS CHART IS A KIND OF MAP THAT SHOWS US WHAT WE WILL BE DOING IN SCIENCE DURING THE FIRST PART OF THIS YEAR. FOR THE NEXT SEVERAL WEEKS WE WILL BE TALKING ABOUT WATER AND DOING SOME ACTIVITIES WITH IT.

Point to the first picture on the chart (the boy).

Ask:

WHAT DOES THIS PICTURE TELL YOU ABOUT WATER?

THE FIRST GROUP OF WATER ACTIVITIES WILL BE ABOUT OUR NEED FOR WATER.

TEACHING STRATEGIES

the pond with water, stones, and appropriate items are available. Prepare a room for the animal to occupy. If possible, use the class animal and pond. In the summer, make arrangements for these to be brought back to school. Also arrange for the feeding and care of the animals.

Picture

(Water Chart) where it can be seen

IS A KIND OF MAP THAT SHOWS US WHAT IS GOING ON IN SCIENCE DURING THE FIRST YEAR. FOR THE NEXT SEVERAL WEEKS WE WILL BE TALKING ABOUT WATER AND DOING SOME THINGS WITH IT.

Put a picture on the chart (the boy).

WHAT DOES THIS PICTURE TELL YOU ABOUT WATER?

WHAT GROUPS OF WATER ACTIVITIES WILL BE SET UP FOR WATER.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-1

Students should:

--look at the picture of the boy and suggest such things as, "We drink water," "We use water."

Point to the second picture on the chart (the earth) and ask:

WHAT DOES THIS PICTURE TELL YOU ABOUT WATER?

THE SECOND GROUP OF WATER ACTIVITIES WILL BE ABOUT WHERE WE GET OUR WATER.

Point to the third picture on the chart (the dripping faucet) and ask:

WHAT DOES THIS PICTURE TELL YOU ABOUT WATER?

THE THIRD GROUP OF ACTIVITIES WE'LL DO WILL BE ABOUT WHAT WE DO TO OUR WATER SO WE CAN DRINK IT.

Point to the fourth picture on the chart (pollution) and ask:

WHAT DOES THIS PICTURE TELL YOU ABOUT WATER?

THE LAST GROUP OF ACTIVITIES WE DO WILL BE ABOUT KEEPING THE WATER CLEAN SO ALL LIVING THINGS CAN USE IT.

TEACHING STRATEGIES

Second picture on the chart (the earth)

THIS PICTURE TELL YOU ABOUT WATER?

GROUP OF WATER ACTIVITIES WILL
WHERE WE GET OUR WATER.

Third picture on the chart (the dripping
faucet):

THIS PICTURE TELL YOU ABOUT WATER?

GROUP OF ACTIVITIES WE'LL DO WILL
WHAT WE DO TO OUR WATER SO WE CAN

Fourth picture on the chart (pollution)

THIS PICTURE TELL YOU ABOUT WATER?

GROUP OF ACTIVITIES WE DO WILL BE
KEEPING THE WATER CLEAN SO ALL LIVING
THINGS CAN USE IT.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--look at the picture of the earth and suggest
such things as, "That's where we live," "That's
where our water is," "That's where we get our
water."

--look at the picture of the faucet and suggest
such things as, "We get water from a faucet,"
"The water ran out," "We get thirsty."

--look at the picture of the factory and suggest
such things as, "We get our water dirty,"
"Factories use water," "We put dirty water in
the stream."

MATERIALS

TEACHING STRATEGIES

TOMORROW (or whatever day you will begin)
WE WILL BEGIN TO TALK ABOUT OUR NEED FOR WATER.

Keep Chart 5-1 on display so it can be referred to in future activities.

TEACHING STRATEGIES

(whatever day you will begin)
IN TO TALK ABOUT OUR NEED FOR WATER.
a display so it can be referred to in

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-1

Upon completion of this activity, each student should, as a minimum:

- have recalled a science activity from the previous year.
- have observed Chart 5-1.

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE A
ACTIVITY 5-1

Teacher _____

Activity name suggested by class:

BSCS USE: Post _____ Tally _____ Rev _____
--

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific questions:

12. Was the "Science Is..." poster valuable in helping students remember previous science activities? Yes No Comment:

13. Did the water chart stimulate discussion? Yes No

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Was the "Science Is..." poster valuable in helping students remember previous science activities? Yes No Comment:
13. Did the water chart stimulate discussion? Yes No
14. What activities from last year were remembered and identified by students?
15. What percentage of the students verbally contributed to the discussion?

UNIT V, CORE A
ACTIVITY 5-1

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

BSCS Evaluation: EMH Feedback Form 1

- B. What anecdotes of student learning did you see or hear in your classroom?

- C. Concern (or questions) about content:

- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

1. Understand the need for water.

Core A Objectives for the Student:

1. Recognize the diversity of water uses in everyday life.

ENVIRONMENTAL THEME:

Diversity and Patterns

INQUIRY SKILLS:

Observing

PROBLEM-SOLVING SKILLS:

Experimenting

PRACTICAL APPLICATION:

Following Directions, Working within a Group, Practice in Weighing

Activity 5-2. Clues to Success: Background and Understanding

This first Clue to Success is designed to guide you in helping each child achieve success at his level. The scores and ratings you record should identify which children will need the most help with the materials in this unit.

The students will predict on their worksheets what they think is true. Then they will experiment to find out if they were right.

ACTIVITY

Goals for the Student:

- Understand the need for water.

Objectives for the Student:

- Recognize the diversity of water uses in everyday life.

AL THEME:

ity and Patterns

LLS:

ing

IVING SKILLS:

menting

APPLICATION:

ing Directions, Working within a
Practice in Weighing

Clues to Success: Background and
Understanding

to Success is designed to guide you in
to achieve success at his level. The
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Then they will experiment to find out
nt.

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE A.

NEED FOR WATER

ACTIVITY 5-2.

CLUES TO SUCCESS:
BACKGROUND AND UNDERSTANDING



BSCS

During this activity, each student should:

- practice following directions.
- review left and right.
- observe the soft drink in the beaker and test tube.
- complete Worksheet 5-1.
- experiment with a given amount of liquid in different containers.
- experiment with a given amount of clay molded into different shapes in the same liquid.
- experiment with the use of the equal-arm balance.
- work as a member of a team.

MATERIALS

Test tubes, 25 X 200 mm, 2 per pair
 Test tubes, 18 X 150 mm, 2 per pair
 Test tubes, 13 X 100 mm, 2 per pair
 Beakers, 250 ml, 2 per pair
 Beakers, 400 ml, 1 per pair
 Test tube racks, 1 per pair
 Equal-arm balance kits, 4
 Worksheet 5-1

- *Cold water, 1 gallon
- *Soft drink mix, 2 large packages
- *Modeling clay, 1 teaspoon per pair, 1 piece $\frac{3}{4}$ X $\frac{3}{4}$ X 1 inch
- *Paper towels
- *Objects to weigh

*Not furnished in materials kit

TEACHING STRATEGIES

Use the Guide in the Background and Development Section of the Student Record of Progress to score their responses. This will provide a basis for comparison later in the year.

In addition, this activity provides an opportunity for students to review from Unit III or to learn to use the equal-arm balance.

Part I.

It is likely that some of your students have not yet developed the ability to think in abstract logical terms. They still need to work with concrete objects and to try out things to understand what happens. These children are concrete thinkers. They have the potential to think abstractly but have not yet reached that developmental stage. Some of the students respond to what they see and experience intuitively. For example, when the shape or position of things changes, these students will believe that the quantity has also changed. Through a variety of experiences during the year, many of the students will move toward abstract thinking.

Familiarize yourself with the scoring procedures before using this activity in class. Complete your ratings of students on following directions prior to the activity. Also, you may wish to review Measuring With a Balance (Unit III, Activity 3-11), and use it to guide or instruct students in the use of the equal-arm balance.

TEACHING STRATEGIES

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This will provide a basis for comparison
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ctivity 3-11), and use it to guide or
dents in the use of the equal-arm balance.

ANTICIPATED STUDENT BEHAVIORS

MATERIALS

TEACHING STRATEGIES

Assemble the following for the demonstration part of the activity:

- 1 - 25 X 200 mm test tube
- 1 - 400 ml beaker
- Container of soft drink mix, mixed according to directions
- Test tube rack

In addition, assemble and clearly label the other materials listed for teams of two students. Pour the soft drink mix into the 250 ml beakers, one per team. Pour water into the 400 ml beakers, one per team. Trays are a handy way for students to move materials from a supply table to work areas. Trays are easily made by cutting the sides of cardboard boxes to a height of one inch.

The opportunity to be responsible for things is a valuable experience for children. Select someone to be in charge of the supply table. This student can serve as your assistant in this activity and help wash the equipment and put it away.

You may find the Participation Section of the Student Record of Progress a convenient way of recording this assistance and of seeing that all have the opportunity to play this role.

Begin class by saying:

TODAY WE ARE GOING TO MAKE SOME GUESSES AND THEN DO SOME EXPERIMENTS TO FIND OUT IF OUR GUESSES WERE RIGHT. FOR AWHILE YOU ARE TO WORK BY YOURSELF AND NOT TELL ANYONE ABOUT YOUR GUESSES. THEN WE WILL SPLIT UP INTO TEAMS.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-2

Following for the demonstration part of.

100 mm test tube

beaker

of soft drink mix, mixed

g to directions

rack

semble and clearly label the other

l for teams of two students. Pour the

into the 250 ml beakers, one per team.

the 400 ml beakers, one per team.

y way for students to move materials

ble to work areas. Trays are easily

the sides of cardboard boxes to a

ch.

to be responsible for things is a

nce for children. Select someone to be

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Participation Section of the Student

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e.

aying:

WE GOING TO MAKE SOME GUESSES AND

WE EXPERIMENTS TO FIND OUT IF OUR

WE RIGHT. FOR AWHILE YOU ARE TO

YOURSELF AND NOT TELL ANYONE ABOUT

US. THEN WE WILL SPLIT UP INTO

THE FIRST THING WE WILL DO IS TO PRACTICE FOLLOWING DIRECTIONS. LISTEN CAREFULLY! I WILL SAY THINGS ONLY TWICE.

PUT YOUR RIGHT HAND ON YOUR RIGHT EAR.

Repeat this instruction and all instructions twice. Assist students who are confused about right and left.

PUT YOUR RIGHT HAND ON YOUR LEFT ELBOW.

Try several more practice directions if students are confused.

Now that left and right and following directions have been reviewed, distribute Worksheet 5-1. Tell students to take out a pencil.

Then say:

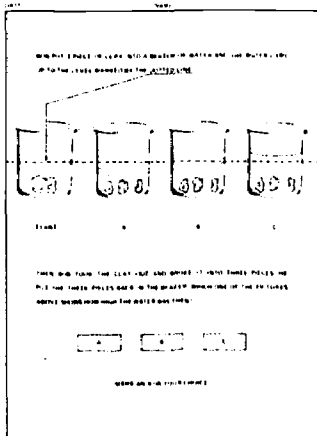
REMEMBER TO LOOK ONLY AT YOUR WORKSHEET. FOLLOW DIRECTIONS AND DO NOT TALK TO YOUR NEIGHBOR.

FIND THE LINE FOR YOUR NAME. PRINT YOUR FIRST NAME AND YOUR LAST NAME.

Ask a student to write the date on the chalkboard, and say:

ON THE LINE FOR THE DATE, COPY THE DATE EXACTLY AS IT IS WRITTEN ON THE CHALKBOARD.

Worksheet 5-1



TEACHING STRATEGIES

THE FIRST THING WE WILL DO IS TO PRACTICE
GIVING DIRECTIONS. LISTEN CAREFULLY!
REPEAT THINGS ONLY TWICE.

PUT YOUR RIGHT HAND ON YOUR RIGHT EAR.

Repeat instruction and all instructions twice.
Identify students who are confused about right and left.

PUT YOUR RIGHT HAND ON YOUR LEFT ELBOW.

Repeat more practice directions if students are

Confused about right and left and following directions have
been identified, distribute Worksheet 5-1. Tell students
to bring a pencil.

INSTRUCT STUDENTS TO LOOK ONLY AT YOUR WORKSHEET.
FOLLOW DIRECTIONS AND DO NOT TALK TO
NEIGHBOR.

USE THE FIRST LINE FOR YOUR NAME. PRINT YOUR
FIRST NAME AND YOUR LAST NAME.

INSTRUCT STUDENTS TO WRITE THE DATE ON THE CHALKBOARD,

USE THE FIRST LINE FOR THE DATE, COPY THE DATE
AS IT IS WRITTEN ON THE CHALKBOARD.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--put their right hands on their right ears.

--put their right hands on their left elbows.

--print their first and last names.

--copy the date on their worksheets.



MATERIALS

TEACHING STRATEGIES

TURN YOUR WORKSHEET OVER. WRITE HOW OLD YOU ARE ON THE BOTTOM LEFT SIDE OF THE WORKSHEET.

NOW WE ARE READY TO DO THE WORKSHEET. I WILL READ ALOUD WHILE YOU FOLLOW ON YOUR COPY. LISTEN VERY CAREFULLY.

Read the first part of the item:

JIM FILLED A TEST TUBE WITH A SOFT DRINK AND Poured IT INTO A BEAKER. THEN HE FILLED THE TEST TUBE WITH THE SOFT DRINK AGAIN AS SHOWN BELOW. WATCH ME DO THIS.

Then hold up the test tube and beaker and name them. Be sure all can see.

Fill the test tube to the top with the soft drink; then pour it into the beaker.

Fill the test tube full of the soft drink again and hold it and the beaker up so all can see.



TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-2

Students should:

--write their ages on their worksheets.



WORKSHEET OVER. WRITE HOW OLD
ON THE BOTTOM LEFT SIDE OF THE

BE READY TO DO THE WORKSHEET. I
SPEAK ALOUD WHILE YOU FOLLOW ON YOUR
WORKSHEET. LISTEN VERY CAREFULLY.

part of the item:

1. HOLD A TEST TUBE WITH A SOFT DRINK
2. HOLD IT INTO A BEAKER. THEN HE
3. HOLD THE TEST TUBE WITH THE SOFT DRINK
4. AS SHOWN BELOW. WATCH ME DO THIS.

5. NAME THE test tube and beaker and name them.
6. What can you see.

7. Hold the test tube to the top with the soft drink;
8. Hold it into the beaker.

9. Hold the test tube full of the soft drink again and
10. Hold it into the beaker up so all can see.

Now read the rest of the item:

DOES ONE CONTAINER HAVE MORE SOFT DRINK IN IT THAN THE OTHER?

THE CHOICES ARE:

THEY BOTH HAVE THE SAME AMOUNT.
THE BEAKER HAS MORE.
THE TEST TUBE HAS MORE.
MARK AN X ON YOUR CHOICE.

Pause, then read the question and responses again.

Direct the class to turn their worksheets over.

Say:

THIS TIME PRINT YOUR LAST NAME ONLY IN THE SPACE FOR YOUR NAME.

Now ask them to look at Number 2 as you read it:

BOB PUT A PIECE OF CLAY INTO A BEAKER OF WATER AND THE WATER CAME UP TO THE LEVEL MARKED BY THE DOTTED LINE. BOB TOOK THE CLAY OUT AND BROKE IT INTO THREE PIECES AND PUT THE THREE PIECES BACK IN THE BEAKER. WHICH ONE OF THE PICTURES BELOW SHOWS HOW HIGH THE WATER IS NOW? MARK AN X ON YOUR CHOICE.

Pause, then read the whole item again.

Now group the class into teams of two by collecting their worksheets and looking at them to be sure that one member of each team marked the right answer to both items.

TEACHING STRATEGIES

rest of the item:

THE CONTAINER HAVE MORE SOFT DRINK IN
THE OTHER?

CHOICES ARE:

THEY HAVE THE SAME AMOUNT.

THE BEAKER HAS MORE.

THE TUBE HAS MORE.

MARK AN X ON YOUR CHOICE.

Read the question and responses again.

Ask the class to turn their worksheets over.

Ask the students to PRINT YOUR LAST NAME ONLY IN THE
SPACES PROVIDED FOR YOUR NAME.

Ask the students to look at Number 2 as you read it:

BOB PUT A PIECE OF CLAY INTO A BEAKER OF
WATER AND THE WATER CAME UP TO THE LEVEL
MARKED BY THE DOTTED LINE. BOB TOOK THE
PIECE OF CLAY AND BROKE IT INTO THREE PIECES
AND PUT THE THREE PIECES BACK IN THE
BEAKER. WHICH ONE OF THE PICTURES BELOW
SHOWS HOW HIGH THE WATER IS NOW? MARK AN
X ON YOUR CHOICE.

Read the whole item again.

Divide the class into teams of two by collecting
worksheets and looking at them to be sure that
each team marked the right answer to

ANTICIPATED STUDENT BEHAVIORS

Students should:

--mark Xs on their choices.

--print their last names in the spaces provided.

--mark Xs on their choices.

MATERIALS

TEACHING STRATEGIES

Say:

NOW WE WILL HAVE A CHANCE TO FIND OUT IF YOU WERE RIGHT. DO THE THINGS THAT JIM AND BOB DID. FIRST MEASURE THE SOFT DRINK INTO DIFFERENT CONTAINERS. THEN MEASURE IT AGAIN AS YOU TAKE IT OUT. TRY IT AS MANY WAYS AS YOU CAN THINK OF.

AS YOUR TURN COMES, EACH TEAM SHOULD PICK UP THE THINGS LISTED ON THE CHALKBOARD FROM THE SUPPLY TABLE.

Allow two teams at a time to visit the supply table to get the following things listed on the chalkboard:

- 1 Beaker of soft drink
- 2 Big test tubes
- 2 Medium test tubes
- 2 Little test tubes
- 1 Empty beaker
- 1 Beaker of water
- 1 Piece of clay



TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-2

Students should:



HAVE A CHANCE TO FIND OUT IF YOU DO THE THINGS THAT JIM AND BOB MEASURE THE SOFT DRINK INTO CONTAINERS. THEN MEASURE IT AGAIN IT OUT. TRY IT AS MANY WAYS AS YOU CAN THINK OF.

WHEN IT COMES, EACH TEAM SHOULD PICK UP THE SUPPLIES LISTED ON THE CHALKBOARD FROM THE SUPPLY TABLE.

AT A CERTAIN TIME, VISIT THE SUPPLY TABLE TO PICK UP THE THINGS LISTED ON THE CHALKBOARD:

soft drink
tubes
test tubes
test tubes
marker
water
clay

--pick up the supplies and do the two problems that were on the worksheet.



Circulate from team to team. Before the students start on the clay and water experiments, have them recall Bob's experiment on the worksheet before trying their own experiments.

As students finish experimenting, have them return the supplies to the supply table. If time allows, continue the activity with Part II. Save Worksheet 5-1 for scoring and recording results. (See the end of this activity for instructions.) The teaspoons of clay will be used again in Part II of this activity.

Part II.

Before beginning this part of the activity, review Activity 3-11 so you are familiar with the procedure using the equal-arm balance. Some students will recall using it while others will require instruction in its use. Review and practice should be provided for all students. Consult Activity 3-11 for specific review suggestions.

Have students work in groups to use the scales to weigh things. Have them use the beads as measures of weight. Give them the opportunity to discover how the balance operates. Caution them that the scales will not tolerate rough treatment and that they should not attempt to weigh heavy or large objects.

TEACHING STRATEGIES

om team to team. Before the students start and water experiments, have them recall ment on the worksheet before trying their ats.

Finish experimenting, have them return the he supply table. If time allows, continue with Part II. Save Worksheet 5-1 for recording results. (See the end of this instructions.) The teaspoons of clay will in Part II of this activity.

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work in groups to use the scales to weigh them use the beads as measures of weight. opportunity to discover how the balance ution them that the scales will not n treatment and that they should not igh heavy or large objects.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--compare the appearance of the same amount of soft drink in many different containers; compare water levels with and without one or many pieces of clay; discuss their conclusions with one another.

--obtain the balance and items to weigh from the supply table.

MATERIALS

TEACHING STRATEGIES

Continue to work with groups or individual students until you are satisfied that they can operate the balance properly. See that each student has an opportunity to weigh things and that one person does not dominate a group.

When students are able to use the balance and have finished experimenting, do the following demonstration. Do not continue with the demonstration unless there is adequate time to complete this part of the activity.

Take a teaspoon of clay (the size used in Part I) and roll it in your hands to the shape of a ball. Weigh it and have a student tell you its weight and write the weight on the chalkboard.

In full view of the students, break the piece of clay into two equal pieces and roll one piece into a ball. Roll the other piece into a long cylinder, like a hotdog.

Then ask:

IF WE PUT BOTH PIECES OF CLAY ON THE BALANCE,
WILL THEY WEIGH MORE, LESS, OR THE SAME AS THE
BALL OF CLAY WE JUST WEIGHED?



GIVE SE
STUDENTS
TO RES

ANTICIPATED STUDENT BEHAVIORS

Students should:

--work in groups as they practice weighing things.

--make guesses of more, less, or the same.


**GIVE SEVERAL
STUDENTS A CHANCE
TO RESPOND**

TEACHING STRATEGIES

Work with groups or individual students satisfied that they can operate the balance. See that each student has an opportunity to weigh things and that one person does the weighing in each group.

Before being able to use the balance and have students demonstrating, do the following demonstration. Participate with the demonstration unless there is a student who can complete this part of the activity.

Take a piece of clay (the size used in Part I) and roll it into the shape of a ball. Weigh it and then tell you its weight and write the weight on the chalkboard.

After the students, break the piece of clay into several pieces and roll one piece into a ball. Weigh it and write its weight on the chalkboard. Roll another piece into a long cylinder, like a

Put BOTH PIECES OF CLAY ON THE BALANCE, and weigh them. Are they WEIGH MORE, LESS, OR THE SAME AS THE BALL WE JUST WEIGHED?

MATERIALS

TEACHING STRATEGIES

Now put both pieces of clay on the balance and weigh them. Ask students to compare the weight of the two pieces with the previously weighed ball of clay.

Have students return to their work teams with instructions to weigh many different shapes and sizes made from the balls of clay, being sure to use all of the clay each time.

After adequate time to experiment has elapsed, draw the class together to share their results.

Ask:

WHAT IS ONE SHAPE THAT YOUR TEAM TRIED?

HOW MUCH DID IT WEIGH?

WAS THIS THE SAME WEIGHT AS THE PIECE YOU STARTED WITH?

Elicit several responses from each group and write their responses on the chalkboard as to the shape of the clay and the weight in beads. Be careful not to force any conclusions from the data.

Then ask:

WHAT DID YOU FIND OUT FROM DOING THIS?

TEACHING STRATEGIES

pieces of clay on the balance and weigh students to compare the weight of the two the previously weighed ball of clay.

return to their work teams with to weigh many different shapes and sizes balls of clay, being sure to use all of time.

the time to experiment has elapsed, draw the to share their results.

ONE SHAPE THAT YOUR TEAM TRIED?

DID IT WEIGH?

THE SAME WEIGHT AS THE PIECE
WEIGHED WITH?

Collect responses from each group and write their on the chalkboard as to the shape of the clay used in beads. Be careful not to force any conclusions from the data.

WHAT DO YOU FIND OUT FROM DOING THIS?


**ACCEPT ALL
ANSWERS**

ANTICIPATED STUDENT BEHAVIORS

Students should:

--observe that the weights are the same.

--weigh the clay using various shapes and sizes.

--respond with one shape of clay that their team weighed.

--respond with the weight of the clay.

--compare weights and respond, "Yes."

--offer a variety of responses, including the idea that changing the shape or size of the clay did not change its weight.

MATERIALS

TEACHING STRATEGIES

Have students return equipment to the supply table.

Scoring and Recording Results

Forms for recording responses to Worksheet 5-1 are provided in the Background and Development Section of the Student Record of Progress in the front of this Guide. Also make the appropriate recording on Tallysheet 5-1 and send it in to BSCS.

Before teaching this activity, rate your students on their ability to follow directions. Use the guidelines and form provided on the Progress in Following Directions page of the Background and Development Section. Your initial impressions of student abilities will supplement the "following directions score" on the worksheet. Comparing the two, you can decide which children to monitor and support most closely to help them be more successful with the activities.

To obtain a score for following directions from Worksheet 5-1, allow one point for each of the following:

1. Printed first and last name.
2. Date copied as shown on the chalkboard.
3. One choice marked with an X for each item.
4. Age written on the bottom of the worksheet.
5. Last name only printed in the space on Side B of the worksheet.

TEACHING STRATEGIES

Return equipment to the supply table.

Recording Results

Bring responses to Worksheet 5-1 are Background and Development Section of Record of Progress in the front of this book. Make the appropriate recording on the back and send it in to BSCS.

Before this activity, rate your students on their ability to follow directions. Use the guidelines listed on the Progress in Following Directions of the Background and Development Section. Initial impressions of student abilities are recorded on the "following directions score" on the Record of Progress. Comparing the two, you can decide which student factor and support most closely to help them be successful with the activities.

Give the following directions from the Record of Progress. Allow one point for each of the following:

1. First and last name.

2. Address as shown on the chalkboard.

3. Items marked with an X for each item.

4. Name written on the bottom of the worksheet.

5. Only printed in the space on Side B of the worksheet.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-2

Record the total score in the column provided on the page labeled Progress in Following Directions in the Student Record of Progress.

Next score the two items on Worksheet 5-1 and record the score in the column provided on the Student Development in Reasoning page.

These two items indicate whether a child has had sufficient experiences to realize that the quantity of something remains the same when its shape is changed, and the ability to conserve quantity.

To score a student as having the ability to conserve quantity, he must answer both items correctly, marking Item 1, "They both have the same amount," and in Item 2 "The beaker with the same level"(B).

Children who can't conserve may reason that the level of the test tube is higher and so it must have more. Give a choice of which they would like to drink, they would choose the test tube. Similarly they may reason that when the clay is broken into pieces, there is more and it will cause the water to rise higher. Do not expect this one experience to change the child's thinking process. He will need time and many experiences with things to develop the ability to reason logically and in abstract terms.

TEACHING STRATEGIES

al score in the column provided on the progress in Following Directions in the of Progress.

two items on Worksheet 5-1 and record the column provided on the Student Development page.

s indicate whether a child has had experiences to realize that the quantity of ins the same when its shape is changed, or conserve quantity.

dent as having the ability to conserve must answer both items correctly, marking both have the same amount," and in Item 2, with the same level"(B).

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ANTICIPATED STUDENT BEHAVIORS

Upon completion of this activity, each student should, as a minimum:

- have participated in following directions.*
- have learned at least temporarily which is their right hand.*
- have responded to Worksheet 5-1.*
- have observed the appearance of the soft drink in different sized and shaped containers.*
- have experimented with clay in water.*
- have practiced using the equal-arm balance.*
- have worked as a member of a team.*

UNIT V, CORE A
ACTIVITY 5-2

Teacher _____

Activity name suggested by class:

BSCS USE:	Post _____	Tally _____	Rev _____
-----------	------------	-------------	-----------

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)					
2.	Minutes of class time on science each day					
3.	Minutes preparing for each day's science class					
4.	Students absent on each date (Use ID Number)					

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

How much time was necessary until you felt all students were competent in the use of the balance?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. How much time was necessary until you felt all students were competent in the use of the balance?
13. Did the students work effectively in teams? Yes No
14. Complete and send Tallysheet 5-1 to BSCS.

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY CONTENT

Unit Goals for the Student:

1. Understand the need for water.
2. Recognize the sources of water.

Core A Objectives for the Student:

2. Develop a quantitative view of the needs for water.

ENVIRONMENTAL THEME:

Diversity and Patterns

INQUIRY SKILLS:

Associating

PROBLEM-SOLVING SKILLS:

Recording Data

PRACTICAL APPLICATION:

Learning about the Makeup of His Body,
Using a Scale or Balance

Activity 5-3. Living Things Are Mostly Water

The first part of this activity will serve to emphasize the proportional water content of the student's own body and his need for water. The second part of the activity will show that the food he eats also has a high water content.



BSCS

UNIT V. AIR AND WATER IN
MY ENVIRONMENT

CORE A. NEED FOR WATER

ACTIVITY 5-3. LIVING THINGS ARE MOSTLY
WATER

ACTIVITY

Goals for the Student:

1. Understand the need for water.
2. Recognize the sources of water.

Objectives for the Student:

2. Develop a quantitative view of the needs for water.

CONTENTAL THEME:

Diversity and Patterns

SKILLS:

Classifying

PROBLEM SOLVING SKILLS:

Reading Data

APPLICATION:

Learning about the Makeup of His Body,
Using a Scale or Balance

Living Things Are Mostly Water

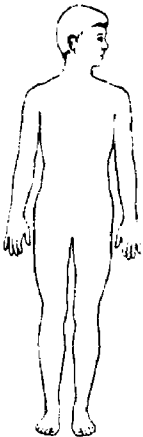
The purpose of this activity will serve to emphasize the actual water content of the student's own body and the need for water. The second part of the activity will show that the food he eats also has a high water content.

During this activity, each student should:

- guess how much of the human body is water.
- determine whether the water content was more or less than one-half the weight of the item.
- conclude that plants are made up of a great deal of water.
- conclude that the human body consists of a great deal of water.
- handle and slice some fresh fruits and vegetables.

- *35 mm Slide projector
- Equal-arm balance kits
- Slides 5-1 through 5-3
- Worksheet 5-2
- *Knife and cutting board
- *Paper muffin cups
- *Oven
- *Fresh fruits and vegetables of your choice:
 - Lettuce
 - Apple
 - Carrots
 - Potato
 - Orange

Slide 5-1



*Not furnished in materials kit

Teacher Preparation:

This activity will involve the use of the equal-arm balance. (Review Activity 3-11.) Samples of fruits and vegetables will be weighed, dried, and weighed again. Drying will require the use of an oven. If no oven is available in the school, provision should be made to transport the samples (in the paper cups) to and from a home oven.

Begin by saying:

WHAT DO YOU NEED TO STAY ALIVE?

Project Slide 5-1 on the chalkboard and ask:

HOW MUCH OF YOUR BODY IS MADE OF WATER?

Allow several students to come to the chalkboard and draw a line on the body outline to show how much of the body they think is composed of water.

TEACHING STRATEGIES

ation:

will involve the use of the equal-arm
view Activity 3-11.) Samples of fruits
will be weighed, dried, and weighed again.
require the use of an oven. If no oven is
the school, provision should be made to
samples (in the paper cups) to and from a

g:

YOU NEED TO STAY ALIVE?

5-1 on the chalkboard and ask:

OF YOUR BODY IS MADE OF WATER?

students to come to the chalkboard and
the body outline to show how much of
think is composed of water.

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- weigh a sample of the sliced material on the equal-arm balance and record the weight accurately.*
- observe that there is a significant weight loss in fresh plant material after oven-drying.*
- determine that this weight loss is due to the removal of water content.*
- calculate the weight loss of each food sample weighed and record it.*

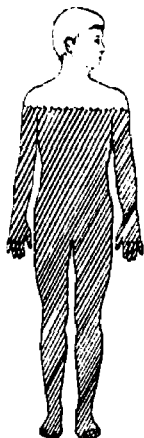
Students should:

- recall that they need air, food, water, light, friends, and so on.*

- guess how much of the body is composed of water.*

MATERIALS

Slide 5-2



TEACHING STRATEGIES

Then project Slide 5-2.

Ask:

WERE ANY OF YOUR GUESSES CLOSE?

HOW MUCH OF OUR BODY IS MADE UP OF WATER?

IF YOU ARE MADE OF THIS MUCH WATER, HOW MUCH OF OTHER LIVING THINGS IS WATER?

DO THE FRUITS AND VEGETABLES YOU EAT HAVE WATER IN THEM?

HOW COULD WE FIND OUT?

HERE IS ONE WAY WE COULD FIND OUT.

Have students work in groups of four.

DISTRIBUT

TEACHING STRATEGIES

Slide 5-2.

IF YOUR GUESSES CLOSE?

IF OUR BODY IS MADE UP OF WATER?

MADE OF THIS MUCH WATER, HOW
MUCH OTHER LIVING THINGS IS WATER?

FRUITS AND VEGETABLES YOU EAT HAVE
MUCH WATER IN THEM?

HOW CAN WE FIND OUT?

WHAT IS THE BEST WAY WE COULD FIND OUT.

Work in groups of four.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-3

Students should:

--look at the lines drawn on Slide 5-1 and indicate whether any of the students' guesses were close.

--conclude that a human body is composed of a large amount of water.

--respond, "A lot," "Not as much," "Quite a bit."

--respond, "Yes," "They should," "I don't know."

--suggest ways to find out how much water is in fruits and vegetables.









DISTRIBUTE MATERIALS

Demonstrate this procedure and then direct students to:

1. Label the paper muffin cups with their initials.
2. Place one paper muffin cup on each pan of the balance.
3. Count out 100 beads and place them in the cup on the right-hand side of the balance.
4. Carefully slice their sample material.
5. Place a quantity of the sliced sample in the left-hand cup.
6. Record the number of beads each food sample weighed (100) under the column that says "Weight in beads before" on Worksheet 5-2.

Worksheet 5-2

FOOD	WEIGHT IN BEADS BEFORE SLICING	WEIGHT IN BEADS AFTER SLICING	WEIGHT IN BEADS AFTER SLICING
			
			
			
			
			
			

After you have demonstrated the procedure, ask:

HOW WILL WE KNOW WHEN THE FOOD WEIGHS AS MUCH AS THE 100 BEADS?

This procedure should be repeated for each food sample used.

DEMO

TEACHING STRATEGIES

his procedure and then direct students to:

he paper muffin cups with their initials.

ne paper muffin cup on each pan of
alance.

ut 100 beads and place them in the cup
right-hand side of the balance.

ly slice their sample material.

quantity of the sliced sample in the
nd cup.

he number of beads each food sample
(100) under the column that says
in beads before" on Worksheet 5-2.

e demonstrated the procedure, ask:

WE KNOW WHEN THE FOOD WEIGHS AS
THE 100 BEADS?

should be repeated for each food

ANTICIPATED STUDENT BEHAVIORS

Students should:

--label the cups with their initials.

--place the paper muffin cups on the balance pans.

--count out 100 beads.

--cut fruit or vegetable samples into thin slices.

--measure sample as accurately as possible.

DEMONSTRATE



--recall other experiences they have had using the
balance and respond, "When they balance," "When
one side doesn't go up or down," "When they stop
moving."

MATERIALS

TEACHING STRATEGIES

When the food samples have been properly weighed and recorded, collect the paper cups containing the food samples and Worksheet 5-2. The samples should now be arranged carefully for transport to an oven. Dry the food samples overnight in an oven set at about 150° Fahrenheit, or the lowest temperature on the oven.

Ask:

WHY DO YOU THINK WE ARE PUTTING THE FOOD
SAMPLES IN AN OVEN?

Explain to the students that the food samples will now be put in an oven to dry up the water that is in them.

The next day distribute the paper cups containing the dried samples.

Ask:

WHAT DO YOUR FOOD SAMPLES LOOK LIKE?

WHY DID WE PUT THEM IN AN OVEN?

DR
T

TEACHING STRATEGIES**ANTICIPATED STUDENT BEHAVIORS**ACTIVITY
5-3**WORK
TIME**

Students should:

samples have been properly weighed and
pack the paper cups containing the food
worksheet 5-2. The samples should now be
ready for transport to an oven. Dry the
overnight in an oven set at about 150°
the lowest temperature on the oven.

THINK WE ARE PUTTING THE FOOD
IN AN OVEN?

students that the food samples will now
begin to dry up the water that is in them.

--suggest such reasons as, "To dry them out," "To
cook them," "To heat them up," and so forth.

**DRYING
TIME**

distribute the paper cups containing the

OUR FOOD SAMPLES LOOK LIKE?

PUT THEM IN AN OVEN?

--respond, "Shriveled up," "Wrinkly."

--respond, "To dry the water up," "To take the
water out."

MATERIALS

TEACHING STRATEGIES

IF THE WATER IN THE FOOD WAS DRIED UP BY THE OVEN, WHAT SHOULD HAPPEN TO THE WEIGHT OF THE FOOD?

HOW COULD WE FIND OUT WHETHER OR NOT OUR FOOD SAMPLES LOST ANY WEIGHT?

Distribute Worksheet 5-2 and the balance kits. Direct the students to work in the same groups as the day before.

Explain that the samples will again be weighed by determining how many beads are required to balance the dried sample. This time students will record the number of beads needed in the column on Worksheet 5-2 that is headed, "Weight in beads after."

When all of the dried samples have been weighed and the weight recorded, ask:

WHAT HAPPENED TO THE WEIGHT OF THE FOOD SAMPLES?

THESE FOODS FEEL DRY NOW BUT THEY WERE MOIST YESTERDAY. WHY DO YOU THINK THEY WEIGH LESS?

TEACHING STRATEGIES

WATER IN THE FOOD WAS DRIED UP BY
WHAT SHOULD HAPPEN TO THE WEIGHT
OF THE FOOD?

HOW DO WE FIND OUT WHETHER OR NOT OUR
FOODS HAVE LOST ANY WEIGHT?

Use Worksheet 5-2 and the balance kits. Direct
students to work in the same groups as the day

The samples will again be weighed by
determining how many beads are required to balance the
sample. This time students will record the number
of beads in the column on Worksheet 5-2 that is
labeled "Number of beads after."

After the dried samples have been weighed and
recorded, ask:

WHAT HAS HAPPENED TO THE WEIGHT OF THE FOOD?

WHY DO THE FOODS FEEL DRY NOW BUT THEY WERE MOIST
BEFORE? WHY DO YOU THINK THEY WEIGH LESS?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--predict the weight of the food samples to be
less.

--suggest using the balance.



--respond, "It is less," "They weigh less."

--associate the weight loss with the water loss
and respond, "There isn't as much water in them."

MATERIALS

TEACHING STRATEGIES

DO DIFFERENT FOODS HAVE DIFFERENT AMOUNTS OF WATER IN THEM?

HOW DO WE KNOW?

Direct the students to calculate the weight loss of each food sample tested by looking at the two figures on Worksheet 5-2. They should subtract the number of beads it weighed after drying from the number of beads it originally weighed (100). Record this figure in the last column on Worksheet 5-2.

Do an example on the chalkboard and then instruct the students to begin their calculations.

DEMO

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-3

DIFFERENT FOODS HAVE DIFFERENT AMOUNTS OF WATER IN THEM?

DO YOU KNOW?

Students are to calculate the weight loss of each food sample by looking at the two figures on the worksheet. They should subtract the number of beads lost by drying from the number of beads it started with (100). Record this figure in the 'Weight Loss' column on Worksheet 5-2.

Point to the chalkboard and then instruct the students to perform their calculations.

Students should:

--compare the weights listed on the chalkboard and infer, "Yes."

--respond, "Their weight was different," "They took different amounts of beads."

--calculate the weight change in each food sample.

DEMONSTRATE



WORK
TIME

MATERIALS

TEACHING STRATEGIES

To assist the students in visualizing the proportion of weight loss, ask:

IF OUR FOOD WEIGHED 100 BEADS TO BEGIN WITH, HOW MANY BEADS WOULD IT WEIGH IF ONE-HALF OF THE WEIGHT WAS WATER AND WENT AWAY IN THE OVEN?

GIVE
TIME
TO
THINK

IF YOUR FOOD SAMPLE LOST MORE THAN FIFTY BEADS IN WEIGHT WHEN IT DRIED OUT, THEN MORE THAN ONE-HALF OF THE FOOD CONSISTED OF WATER.

IF YOUR FOOD SAMPLE LOST LESS THAN FIFTY BEADS IN WEIGHT WHEN IT DRIED OUT, THEN LESS THAN ONE-HALF OF THE FOOD WAS WATER.

Clue to Success:

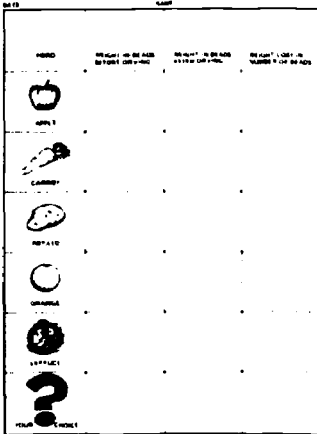
Tell the students to put an X on those foods pictured on the worksheet that are made up of more than one-half water.

Collect the worksheets to look over later.

Project Slide 5-3 of Worksheet 5-2 and ask:

WHICH FOODS WERE MADE UP OF MORE THAN ONE-HALF WATER?

Slide 5-3



TEACHING STRATEGIES

students in visualizing the proportion of
ask:

FOOD WEIGHED 100 BEADS TO BEGIN WITH,
BEADS WOULD IT WEIGH IF ONE-HALF OF
IT WAS WATER AND WENT AWAY IN THE OVEN?

FOOD SAMPLE LOST MORE THAN FIFTY BEADS
IT WHEN IT DRIED OUT, THEN MORE THAN
OF THE FOOD CONSISTED OF WATER.

FOOD SAMPLE LOST LESS THAN FIFTY BEADS
IT WHEN IT DRIED OUT, THEN LESS THAN
OF THE FOOD WAS WATER.

ss:
ents to put an X on those foods pictured
heet that are made up of more than one-half

orksheets to look over later.

5-3 of Worksheet 5-2 and ask:

ODS WERE MADE UP OF MORE THAN
WATER?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--guess how much a dried food sample would weigh
if one-half of its original weight was water.

**GIVE STUDENTS
TIME
TO
THINK**



--put an X on those foods that are composed of
more than one-half water (probably all of them).

--probably respond with the names of all the
foods tested.

MATERIALS

TEACHING STRATEGIES

WERE THERE ANY FOODS THAT WERE MADE UP OF
LESS THAN ONE-HALF WATER?

HOW MUCH WATER IS IN MOST FRUITS AND
VEGETABLES?

IS A PERSON MADE UP OF MORE WATER IN
PROPORTION TO HIS SIZE THAN A PLANT?
LESS? ABOUT THE SAME?

If, after looking at the students' worksheets, you notice that any student did not mark all the fruits as being composed of more than one-half water, review with that student before continuing.

Turn to the Numbers and Measurements page in the Student Record of Progress and find the column marked Activity 5-3, Weighing. Circle YES for each student who was able to use the balance without great difficulty. Find the column marked Activity 5-3, Calculating Weight Loss. Circle YES for each student who was able to calculate the weight loss without help. All students should be given a variety of opportunities to weigh and calculate.

TEACHING STRATEGIES

ANY FOODS THAT WERE MADE UP OF ONE-HALF WATER?

WATER IS IN MOST FRUITS AND VEGETABLES?

AN ANIMAL MADE UP OF MORE WATER IN ITS BODY THAN A PLANT? ABOUT THE SAME?

Looking at the students' worksheets, you find that a student did not mark all the fruits as containing more than one-half water, review with the student before continuing.

Check the Numbers and Measurements page in the Journal of Progress and find the column marked Weight. Circle YES for each student who was able to use the balance without great difficulty. Circle YES for each student who was able to use the balance marked Activity 5-3, Calculating Weight without help. All students have a variety of opportunities to weigh

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-3

Students should:

--probably respond by saying that none of the foods were made up of less than one-half water.

--respond, "A lot," "Almost all," "More than one-half."

--conclude that since both are living things and that more than one-half of both is water, both are made up of about the same amount of water in proportion to size.

Upon completion of this activity, each student should, as a minimum:

- have weighed a piece of fruit or vegetable by using the balance.*
- have observed that the fruit or vegetable weighed less after being in the oven.*

ACTIVITY
5-3

MATERIALS

TEACHING STRATEGIES

See Change of Pacers 1 and 2.


CHANGE

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

Upon completion of this activity, each student should, as a minimum:

- have determined from the weight loss that there is a great deal of water in plants.*
- have observed Slide 5-2 and concluded that the human body consists of a great deal of water.*



CHANGE OF PACER

Pacers 1 and 2.

UNIT V, CORE A
ACTIVITY 5-3

Teacher _____

Activity name suggested by class:

BSCS USE:	Post	_____	Tally	_____	Rev	_____
-----------	------	-------	-------	-------	-----	-------

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes preparing for each day's science class						
4.	Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. How effective were the slides in communicating the concept of water content in the human body? Comments.
13. Send the student worksheets to BSCS.
14. Turn to the numbers and measurements page of the Student Record of Progress and record the students' ability to weigh food and calculate weight loss.

UNIT V, CORE A
ACTIVITY 5-3

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

BSCS Evaluation: EMH Feedback Form 1c

E at anecdotes of student learning did you see or hear in your classroom?

- B. What anecdotes of student learning did you see or hear in your classroom?

- C. Concern (or questions) about content:

- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

1. Understand the need for water.

Core A Objectives for the Student:

1. Recognize the diversity of water uses in everyday life.
3. Recognize the universal importance of water for life.

ENVIRONMENTAL THEME:

Finiteness of Resources

INQUIRY SKILLS:

Comparing

PROBLEM-SOLVING SKILLS:

Discussion and Treatment of Group Data

PRACTICAL APPLICATION:

Working in a Group

Activity 5-4. Uses of Water

The beginning of this activity will focus the students' attention on water. The class will list and discuss the ways that water is used in daily life in the home, school, and community. Emphasis will be placed on the diversity of uses.

ACTIVITY

Goals for the Student:

1. Understand the need for water.

A Objectives for the Student:

1. Recognize the diversity of water uses in everyday life.
3. Recognize the universal importance of water for life.

NTAL THEME:

Scarceness of Resources

SKILLS:

Learning

OLVING SKILLS:

Discussion and Treatment of Group Data

APPLICATION:

Learning in a Group

Uses of Water

If this activity will focus the students' attention. The class will list and discuss water uses in daily life in the home, community. Emphasis will be placed on the uses.

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE A.

NEED FOR WATER

ACTIVITY 5-4.

USES OF WATER



BSCS

During this activity, each student should:

- observe and discuss Slides 5-4 through 5-9.
- suggest a way that water is used.
- become a member of a group and discuss water uses in a particular place.
- write a water use on a three-by-five card.

ACTIVITY
5-4

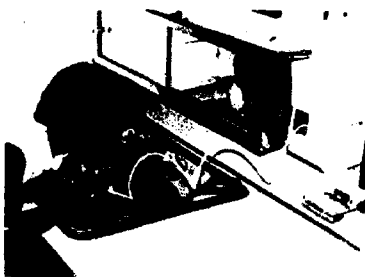
MATERIALS

Slides 5-4 through 5-9
*35 mm Slide projector
*3 X 5 Index cards

Slide 5-4



Slide 5-5



*Not furnished in materials kit

TEACHING STRATEGIES

Begin by saying:

WATER IS SOMETHING WE ALL KNOW ABOUT, BUT
WHAT IS IT?

WHERE DOES WATER COME FROM?

WHY DO WE NEED WATER?

DO HORSES, CATS, AND DOGS NEED WATER?

WHAT WOULD HAPPEN IF WE COULD NOT GET
ANY WATER?

WHAT ARE SOME OF THE WAYS THAT WE USE WATER?

Project Slide 5-4 and ask:

HOW IS WATER USED HERE?

Continue with this questioning for Slides 5-5, 5-6, 5-7, 5-8, and 5-9. If at all possible the students (not the teacher) should describe what the water use is in each slide. An exception might be Slide 5-6 (irrigation sprinkler) or Slide 5-9 (hydroelectric power).

When all the slides have been discussed, divide the class into three groups and have each group appoint one member to record ideas.

TEACHING STRATEGIES

ng:

SOMETHING WE ALL KNOW ABOUT, BUT
IT?

ES WATER COME FROM?

E NEED WATER?

S, CATS, AND DOGS NEED WATER?

LD HAPPEN IF WE COULD NOT GET
R?

SOME OF THE WAYS THAT WE USE WATER?

5-4 and ask:

ATER USED HERE?

this questioning for Slides 5-5, 5-6, 5-7,
If at all possible the students (not the
d describe what the water use is in each
ception might be Slide 5-6 (irrigation
Slide 5-9 (hydroelectric power).

Slides have been discussed, divide the
ee groups and have each group appoint one
rd ideas.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "Stuff you drink," "Liquid," "Something
you use to wash," and so forth.

--reply, "From the faucet," "From a river," "From
a lake," and so forth.

--recall activities in previous units on life needs
and reply, "To live," "To keep clean," "To drink,"
"To work."

--respond, "Yes."

--respond, "We'd get thirsty," "Things would dry
up," "Lots of things would die," and so forth.

--speculate on the variety of ways that water
is used.

--respond, "To wash the streets."

--describe the water use pictured in each slide.

MATERIALS

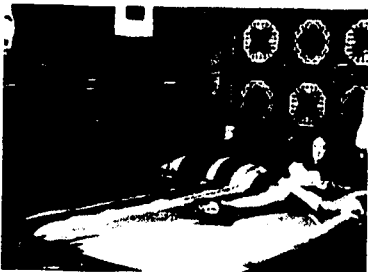
Slide 5-6



Slide 5-7



Slide 5-8



Slide 5-9



TEACHING STRATEGIES

Then say:

BEGIN THINKING OF THE MANY WAYS THAT WE USE WATER. EACH GROUP WILL BE THINKING ABOUT WATER USES IN ONE CERTAIN PLACE. ONE GROUP WILL THINK OF WAYS WE USE WATER AT HOME. ONE GROUP WILL THINK OF WAYS WE USE WATER AT SCHOOL. ONE GROUP WILL THINK OF WAYS WE USE WATER IN PLACES OTHER THAN AT HOME OR AT SCHOOL. HAVE ONE PERSON IN YOUR GROUP WRITE THESE IDEAS DOWN AS YOU THINK OF THEM.

Assign each group a place where water is used and begin.

Assist the student recorders with spelling as needed.

When the lists have been compiled, have each group present to the class the ways they thought water was used in the area assigned to them. As they are reporting, make a heading of that area (home, school, or other places) on the chalkboard and list the suggestions made by each group beneath the heading. (See the list of suggested uses.)

After each group has reported to the class their suggestions and you have recorded them on the chalkboard, ask:

CAN ANYONE ELSE IN THE CLASS THINK OF OTHER WAYS THAT WATER MIGHT BE USED IN (home, school, or other places)?

TEACHING STRATEGIES

THINKING OF THE MANY WAYS THAT WE USE
EACH GROUP WILL BE THINKING ABOUT
PLACES IN ONE CERTAIN PLACE. ONE GROUP
THINK OF WAYS WE USE WATER AT HOME. ONE
GROUP WILL THINK OF WAYS WE USE WATER AT SCHOOL.
EACH GROUP WILL THINK OF WAYS WE USE WATER IN
OTHER THAN AT HOME OR AT SCHOOL. HAVE
EACH GROUP IN YOUR GROUP WRITE THESE IDEAS
AND YOU THINK OF THEM.

Choose a place where water is used and begin.



**WORK
TIME**

Assign student recorders with spelling as needed.

After reports have been compiled, have each group
present to the class the ways they thought water was
used in the area assigned to them. As they are
presenting, write a heading of that area (home, school,
etc.) on the chalkboard and list the
ways suggested by each group beneath the heading.
(List of suggested uses.)

After each group has reported to the class their
ideas, you have recorded them on the
board:

ELSE IN THE CLASS THINK OF OTHER
PLACES WHERE WATER MIGHT BE USED IN (home, school,
other places)?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-4

Students should:

--participate in the group endeavor and offer
suggestions.

--suggest other ways water might be used.

MATERIALS

SOME COMMON WATER USES

HOME

Dishes
Cooking
Drinking
Bathing
Washing clothes
Mopping floors Cleaning
Cleaning sink
Brushing teeth
Shaving
Watering lawn
Washing cars
Watering plants
Toilet flush
Heat (some)
Car--washers, radiator
Irrigation water for animals
Water for pets

SCHOOL

Drinking
Cleaning
Cooking Food service, Home ec.
Dishes
Flush toilet
Bathing (gym)
Science
Heat (some)

OTHER PLACES

Fireman--hoses
Fire hydrants
Water treatment
Sewer
Street cleaners
Heating buildings
Cleaning buildings
Parks, lawns, lakes

TEACHING STRATEGIES

Expect to have certain uses mentioned in more than one area. When the entire list is complete, ask:

DO WE USE WATER VERY MUCH?

WHEN DO WE USE WATER?

WHERE DO WE USE WATER?

IS WATER SOMETIMES USED THE SAME WAY IN HOME, SCHOOL, OR TOWN?

LET'S MAKE A LIST OF THE WAYS WE USE WATER. WE CAN DO THIS BY LOOKING AT OUR LIST ON THE CHALKBOARD AND ERASING ALL BUT ONE OF THOSE THAT ARE LISTED MORE THAN ONCE.

When the duplicates have been erased, distribute several three-by-five-inch index cards to each group. Using the list on the chalkboard, members of the groups should label each card with one way that we use water. There should be only one water use on each card. (If there are twenty-five water uses on the chalkboard, then each group should have twenty-five cards.) Encourage students to print in neat, rather large letters so the cards will be easy to read. Suggest that each student do several cards so that all members of the group are participating. These cards will be used in the next activity when students will assign priorities to the water uses.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ASK FOR OTHER IDEAS

Students should:

Are certain uses mentioned in more than one
the entire list is complete, ask:

DO WE USE WATER VERY MUCH?

DO WE USE WATER?

DO WE USE WATER?

ARE WE SOMETIMES USED THE SAME WAY IN
SCHOOL, OR TOWN?

MAKE A LIST OF THE WAYS WE USE WATER.
DO THIS BY LOOKING AT OUR LIST ON
CHALKBOARD AND ERASING ALL BUT ONE OF
THAT ARE LISTED MORE THAN ONCE.

After duplicates have been erased, distribute several
3-inch index cards to each group. Using the
chalkboard, members of the groups should
begin with one way that we use water. There
will be one water use on each card. (If there are
more water uses on the chalkboard, then each group
will get twenty-five cards.) Encourage students to
write in rather large letters so the cards will be
readable. Suggest that each student do several
and all members of the group are participating.
The cards will be used in the next activity when
we assign priorities to the water uses.

--examine the long list and conclude, "Yes."

--respond by examining the lists on the chalkboard
and saying, "All the time."

--respond, "All over," "Everywhere."

--compare the lists and respond, "Yes," and mention
those duplicated uses such as drinking, cooking,
and washing.

--take turns erasing the duplicate water uses.

MATERIALS

TEACHING STRATEGIES

Leave the list of water uses on the chalkboard for the next activity.

After students have labeled the cards, have them put a rubber band around them and their names on the outside card. Collect the cards and save them for use in Activity 5-5.

See Change of Pacer 3.

CHANGE

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-4

f water uses on the chalkboard for the



**WORK
TIME**

ave labeled the cards, have them put a
nd them and their names on the outside
he cards and save them for use in

*Upon completion of this activity, each student
should, as a minimum:*

- be able to suggest one way that water is used.*
- have recorded one water use on a three-by-five card.*
- have participated in a group activity.*



CHANGE OF PACER

er 3.

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE A
ACTIVITY 5-4

Teacher _____

Activity name suggested by class:

BSCS USE:	Post _____	Tally _____	Rev _____
-----------	------------	-------------	-----------

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

Comment about the slides used in the activity.

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Comment about the slides used in the activity.
13. How productive were the small groups in generating ideas about water uses?

UNIT V, CORE A
ACTIVITY 5-4

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

- C. Concern (or questions) about content:

- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student

1. Understand the need for water.
6. Understand the broad problems of water management.

Core A Objectives for the Student:

1. Recognize the diversity of water uses in everyday life.

ENVIRONMENTAL THEME:

Finiteness of Resources

INQUIRY SKILLS:

Associating

PROBLEM-SOLVING SKILLS:

Organizing Data

PRACTICAL APPLICATION:

Making Up One's Mind about a Subject and Defending the Decision to Someone, Working in a Group, Using Pictorial Clues to Solve a Problem

Activity 5-5. Priorities of Water Use

This activity will serve to develop the idea that some uses of water are more important than others. Using the list of water uses developed in Activity 5-4, the students will put them in their order of importance.



BSCS

UNIT V. AIR AND WATER IN
MY ENVIRONMENT

CORE A. USES OF WATER

ACTIVITY 5-5. PRIORITIES OF WATER USE

ACTIVITY

Goals for the Student

1. Understand the need for water.
6. Understand the broad problems of water management.

Objectives for the Student:

1. Recognize the diversity of water uses in everyday life.

CONTENTAL THEME:

Scarceness of Resources

SKILLS:

Classifying

PROBLEM SOLVING SKILLS:

Organizing Data

APPLICATION:

Putting Up One's Mind about a Subject and
Presenting the Decision to Someone, Working
in a Group, Using Pictorial Clues to Solve
a Problem

Priorities of Water Use

This activity will serve to develop the idea that some water uses are more important than others. Using the water use cards developed in Activity 5-4, the student will order them in their order of importance.

During this activity, each student should:

- participate as a member of a group in putting the water use cards in their order of importance, as agreed upon by individuals in the group.
- assist as a member of a group in pinning the ordered water use cards on a bulletin board.

ACTIVITY
5-5

MATERIALS

TEACHING STRATEGIES

Water priorities should be arrived at by the student groups and not be imposed by the teacher. A Clue to Success concludes this activity. The Clue to Success will help to assess the students' understanding of water uses as well as their ability to group.

- Worksheet 5-3
*3 X 5 Index cards (from
Activity 5-4)
*Bulletin board
*Pins
*Scissors
*Tape
*Lined 8 1/2-X-11-inch paper

Begin by dividing the class into the same groups they were in for Activity 5-4. While the students are getting into their groups, distribute the three-by-five cards made in Activity 5-4.

Review the water uses by asking:

WHAT WERE THE WATER USES SHOWN IN THE
SLIDES WE SAW YESTERDAY?

WHAT WERE THE WATER USES YOUR GROUPS
THOUGHT OF YESTERDAY?

*Not furnished in materials kit

TEACHING STRATEGIES

ies should be arrived at by the student
t be imposed by the teacher. A Clue to
udes this activity. The Clue to Success
assess the students' understanding of
well as their ability to group.

ding the class into the same groups they
ctivity 5-4. While the students are
their groups, distribute the three-by-five
Activity 5-4.

ter uses by asking:

E THE WATER USES SHOWN IN THE
E SAW YESTERDAY?

E THE WATER USES YOUR GROUPS
OF YESTERDAY?

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- be able to explain and defend why the water use cards were put in that order.
- choose two or three water uses that appear high on each priority list.
- realize that his personal uses of water, such as drinking, cooking, and washing are most important to him.
- realize that other water uses make life easier for him but aren't absolutely essential to life.
- cut and group the pictures on Worksheet 5-3.
- fit the pieces of Worksheet 5-3 together to make a picture.
- name and discuss the three new groups on Worksheet 5-3.

Students should:

- recall the water uses shown in Slides 5-4 through 5-9.
- recall Activity 5-4 and respond, "Drinking," "Washing clothes," "Washing cars," and so forth.

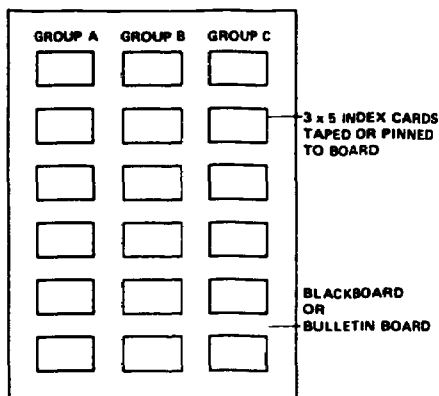
MATERIALS

TEACHING STRATEGIES

After most of the water uses from Activity 5-4 have been mentioned, say:

TODAY YOU ARE GOING TO TRY TO DECIDE WHICH WATER USES ARE MOST IMPORTANT TO YOU, WHICH ARE NEXT MOST IMPORTANT TO YOU, AND SO ON. USE THE CARDS THAT YOU MADE YESTERDAY. WHEN MEMBERS OF YOUR GROUP DECIDE WHICH WATER USE IS MOST IMPORTANT TO THEM, PUT THAT CARD ON THE TOP OF YOUR DESK OR TABLE. PUT THE CARD WITH THE WATER USE THAT IS NEXT MOST IMPORTANT TO MEMBERS OF THE GROUP UNDERNEATH THE FIRST CARD. CONTINUE TO DO THIS UNTIL ALL THE CARDS ARE LINED UP. REMEMBER, THE MOST IMPORTANT WATER USE WILL BE AT THE TOP AND THE LEAST IMPORTANT WILL BE AT THE BOTTOM. ANY QUESTIONS?

Diagram 5-1



When each of the three groups has finished putting the cards in order of priority, choose a bulletin board that will have enough room for the groups to pin up their ordered cards. (See Diagram 5-1.)

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-5

the water uses from Activity 5-4 have
, say:

ARE GOING TO TRY TO DECIDE WHICH
S ARE MOST IMPORTANT TO YOU, WHICH
MOST IMPORTANT TO YOU, AND SO ON.
ARDS THAT YOU MADE YESTERDAY. WHEN
F YOUR GROUP DECIDE WHICH WATER USE
IMPORTANT TO THEM, PUT THAT CARD ON
F YOUR DESK OR TABLE. PUT THE CARD
WATER USE THAT IS NEXT MOST
TO MEMBERS OF THE GROUP UNDERNEATH
CARD. CONTINUE TO DO THIS UNTIL
ARDS ARE LINED UP. REMEMBER, THE
RTANT WATER USE WILL BE AT THE TOP
EAST IMPORTANT WILL BE AT THE
ANY QUESTIONS?

Students should:

- respond with any questions they might have.
- arrange their cards in order of priority.



he three groups has finished putting the
of priority, choose a bulletin board
enough room for the groups to pin up
cards. (See Diagram 5-1.)

Say:

NOW THAT YOU HAVE YOUR CARDS IN THE ORDER YOU WANT, PIN THEM TO THE BULLETIN BOARD IN THAT SAME ORDER AND EXPLAIN WHY YOU PUT THEM IN THAT ORDER. THEN WE WILL BE ABLE TO COMPARE THE LISTS.



Even though some lists may seem to be in an unusual order, accept them as long as the students have a logical explanation for why they placed the cards in that order.

When all the groups have displayed their water use cards on the bulletin board and have explained why they put them in that order, draw their attention to which uses are at the top of the lists and which uses are at the bottom by asking:

DOES ANYONE SEE A WATER USE THAT APPEARS AT OR NEAR THE TOP OF ALL THREE LISTS?

Continue with this line of questioning until two or three uses (most likely personal uses such as drinking, washing, and cooking) emerge as being of more importance than others. List them on the chalkboard as they are discussed.

TEACHING STRATEGIES

YOU HAVE YOUR CARDS IN THE ORDER YOU
THEM TO THE BULLETIN BOARD IN THAT
R AND EXPLAIN WHY YOU PUT THEM IN
R. THEN WE WILL BE ABLE TO COMPARE



the lists may seem to be in an unusual
them as long as the students have a
reason for why they placed the cards in

groups have displayed their water use
bulletin board and have explained why they
in that order, draw their attention to which
is at the top of the lists and which uses are at
the top of the lists:

DO YOU SEE A WATER USE THAT APPEARS AT
THE TOP OF ALL THREE LISTS?

This line of questioning until two or
three likely personal uses such as drinking,
cooking) emerge as being of more importance
list them on the chalkboard as they are

ANTICIPATED STUDENT BEHAVIORS

Students should:

--pin their water use cards on the bulletin board
and explain the reason for ordering them in
that way.

--compare the lists and respond with a use of
water that is listed near the top of each one.

MATERIALS

TEACHING STRATEGIES

ACCE
ANS

Ask:

WHY ARE THESE WATER USES MOST IMPORTANT TO US?

If students do not realize that these water uses are most important because they have to do with the person's well-being and daily grooming, say:

WHO USES THE WATER IN THESE WAYS?

Continue by saying:

COULD WE DO WITHOUT THE WATER USES THAT ARE ON THE TOP OF THE LIST?

WHICH ONES COULD WE DO WITHOUT?

WHICH ONES COULD WE NOT DO WITHOUT?

WHAT ARE SOME OF THE WATER USES THAT ARE TOWARD THE BOTTOM OF OUR LISTS?

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-5


**ACCEPT ALL
ANSWERS**

SE WATER USES MOST IMPORTANT TO US?

ts do not realize that these water
most important because they have to
the person's well-being and daily
say:

THE WATER IN THESE WAYS?

ng:

WITHOUT THE WATER USES THAT ARE
OF THE LIST?

COULD WE DO WITHOUT?

COULD WE NOT DO WITHOUT?

ME OF THE WATER USES THAT ARE
BOTTOM OF OUR LISTS?

Students should:

--reply, "Because these are the ways we use water
everyday," "We use water in these ways to keep
alive," "Those are the uses we can't do without."

--reply, "I do," "Me," "Other people."

--reply, "No," "We need them too much," "We need
them to keep alive."

--probably indicate those water uses not related
to personal grooming or well-being.

--probably indicate those water uses related to
personal grooming or well-being.

--probably reply with uses such as watering lawns,
washing cars, street cleaners, automatic
dishwashers, fire protection, and other
community uses.

WHY DO YOU THINK THOSE ARE LESS IMPORTANT TO US?

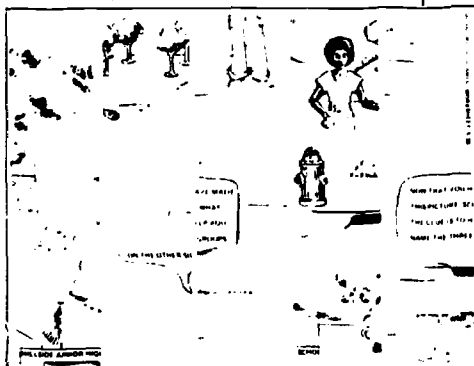
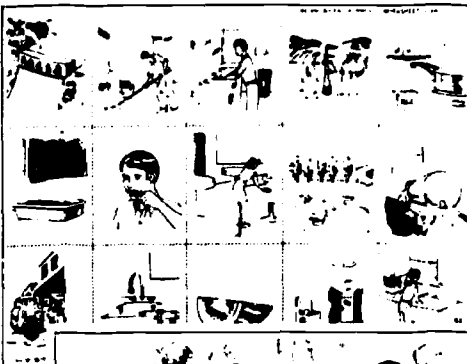
WHAT WOULD OUR LIVES BE LIKE WITHOUT THEM?

IF OUR LIVES ARE BETTER WHEN WE USE WATER IN ALL THESE WAYS, WHY DO WE CONSIDER SOME WAYS MORE IMPORTANT THAN OTHERS?

Accept any logical answers. The discussion should ultimately conclude that our lives are made easier by all the water uses, but some, such as drinking and washing, are very basic to our lives.

Clues to Success: Understanding

Worksheet 5-3



CLUES

Distribute Worksheet 5-3 and a pair of scissors to each student.

DISTRIB

TEACHING STRATEGIES

U THINK THOSE ARE LESS IMPORTANT

D OUR LIVES BE LIKE WITHOUT THEM?

YES ARE BETTER WHEN WE USE WATER
ESE WAYS, WHY DO WE CONSIDER SOME
IMPORTANT THAN OTHERS?

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s: Understanding

ANTICIPATED STUDENT BEHAVIORS

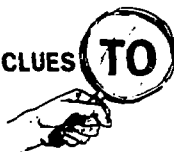
Students should:

--reply, "Because we don't absolutely need them,"
"We could do without them," "They're extras."

--reply, "Hard," "Messy," "We might get sick more
often," "We wouldn't have as nice a place to
live."

--suggest many reasons.

CLUES **TO** SUCCESS



sheet 5-3 and a pair of scissors to



DISTRIBUTE MATERIALS

MATERIALS

TEACHING STRATEGIES

Now ask various students to identify and describe the pictures on Worksheet 5-3B.



Then say:

LOOK CAREFULLY AT ALL OF THE PICTURES OF WATER. THINK OF A WAY YOU CAN PUT THEM INTO TWO GROUPS. THEN CUT THE PICTURES APART ON THE DOTTED LINES AND PUT THEM IN THE GROUPS YOU THOUGHT OF. THERE ARE DIFFERENT WAYS THEY CAN BE GROUPED. THINK OF YOUR OWN IDEA. RAISE YOUR HAND WHEN YOU HAVE FINISHED.

As you circulate around the room, encourage any students that are having difficulty. If a student is unable to generate an idea for grouping, make a suggestion such as "water used for cleaning -- water not used for cleaning," or "uses of water most important -- least important to me." Write down the names of students unable to do the task independently so you can help them in subsequent activities. Record their names on Tallysheet 5-2 after class.

As a student finishes grouping, give him a sheet of lined paper to write down the names of the two groups. Be sure he writes his name on it. Then check to see if all the pictures in each of the groups are appropriate. Have students explain their grouping as necessary.

TEACHING STRATEGIES

students to identify and describe the worksheet 5-3B.



**HAVE YOU
INVOLVED
ALL
STUDENTS?**

ULLY AT ALL OF THE PICTURES OF
INK OF A WAY YOU CAN PUT THEM
ROUPS. THEN CUT THE PICTURES
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ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-5

Students should:

--observe, describe, and identify the pictures
on Worksheet 5-3B.

--think of grouping ideas; cut, and sort the
pictures into two groups.

--write down the group names on lined paper.

Remember that this is an assessment of the student's ability to group things. Do not teach grouping at this time.

When most students have completed grouping and writing the names of their groups, allow time for sharing the category names they have created.

Then say:

NOW WE ARE GOING TO DO A DOUBLE PUZZLE. TURN THE PIECES OF YOUR TWO GROUPS OVER. IF YOU PUT THE PIECES THAT BELONG TOGETHER IN EACH GROUP, YOU WILL HAVE ONE BIG PICTURE. IT IS LIKE A JIGSAW PUZZLE. WHEN YOUR PICTURE IS COMPLETE, I WILL TAPE IT FOR YOU AND START YOU ON THE SECOND PUZZLE.

As students finish, tape each picture of Worksheet 5-3A as shown in Diagram 5-2. Then read the clue to each student and tell him to turn the picture over. Ask him to decide the way the pictures have now been put into three groups and write the groups on the lined paper. Help with spelling as necessary. Record the names of students who need help or are unable to do the puzzle.

Diagram 5-2

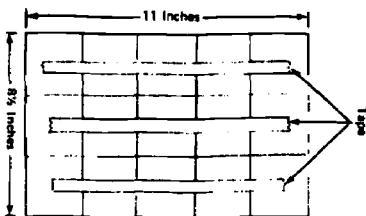


Diagram 5-2

TEACHING STRATEGIES

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Finish, tape each picture of Worksheet 5-3A Diagram 5-2. Then read the clue to each tell him to turn the picture over. Ask him e way the pictures have now been put into and write the groups on the lined paper. elling as necessary. Record the names of need help or are unable to do the puzzle.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--share the category names for the two groups they have made.

--put the puzzle together.

--use the clue and observe three groups of pictures:
(1) brushing teeth, water in food, swimming pool, making Jell-O, washing dishes; (2) cleaning classroom floor, school drinking fountain, class pond, washing hands in school restroom; (3) street cleaning truck, waitress cleaning a table, hydroelectric dam, irrigation, sprinkler system, washing a fire truck; write the names for the groups on their lined paper.

ACTIVITY
5-5

MATERIALS

TEACHING STRATEGIES

This exercise assesses student understanding of the various uses of water, primarily in three ways: (1) informally assessed through initial observation, description, and naming of each picture; (2) the types of groups into which they sorted the pictures, and; (3) whether or not they were able to label appropriately the three groups pictured on the worksheet. Review Activities 5-3, 5-4, and 5-5 as necessary with students who experienced difficulty with these aspects of the lesson. They will probably experience difficulty in subsequent activities on water if remedial help is not provided at this time. Give positive feedback to students who did well.

See Change of Pacers 4 and 5.

W
CHANG

TEACHING STRATEGIES

assesses student understanding of the of water, primarily in three ways: (1) assessed through initial observation, and naming of each picture; (2) the types to which they sorted the pictures, and; or not they were able to label appropriately ups pictured on the worksheet. Review 3, 5-4, and 5-5 as necessary with students ed difficulty with these aspects of the y will probably experience difficulty in tivities on water if remedial help is not his time. Give positive feedback to did well.

ANTICIPATED STUDENT BEHAVIORS

Upon completion of this activity, each student should, as a minimum:

- have suggested two or three ways in which water is most important to him.*
- have realized that personal water uses are more essential to his life than are other water uses.*
- have discussed the pictures on Worksheet 5-3.*
- have sorted the worksheet pictures into two groups.*
- have put the worksheet puzzle together.*



CHANGE OF PACER

Pacers 4 and 5.

MATERIALS

TEACHING STRATEGIES

The three groups of five pictures each are:

My use of water

School use of water

Other uses of water

As several students finish, draw them into a group, and say:

WHO CAN TELL US ALL THE THINGS IN ONE
OF THE GROUPS?

Repeat this strategy twice, and say:

WHO KNOWS HOW THE GROUPS WERE SORTED?

WHY DO YOU THINK THAT?

Interpretation and Scoring

Students may keep the worksheet but collect the lined paper with grouping names and record the information on Tallysheet 5-2 to send to BSCS. The tallysheet contains an explanation of how to score items and judge performance. It also explains how to enter the results in the Student Record of Progress.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-5

Students should:

--respond with the five pictures in one of the groups.

--respond with various ideas.

--defend their group names.

s of five pictures each are:

water

of water

of water

ents finish, draw them into a group,

LL US ALL THE THINGS IN ONE
UPS?

ategy twice, and say:

HOW THE GROUPS WERE SORTED?

THINK THAT?

and Scoring

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UNIT V, CORE A
ACTIVITY 5-5

Teacher _____

Activity name suggested by class:

BSCS USE: Post _____ Tally _____ Rev _____

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

Would you rank the water use priorities the same way your students did?
 Yes No Comment:

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Would you rank the water use priorities the same way your students did?
 Yes No Comment:
13. Send the sheets with grouping names to BSCS.
14. Complete and send Tallysheet 5-2 to BSCS.

UNIT V, CORE A
ACTIVITY 5-5

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

BSCS Evaluation: EMH Feedback Form 1c

- B. What anecdotes of student learning did you see or hear in your classroom?

- C. Concern (or questions) about content:

- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

2. Recognize the sources of water.
6. Understand the broad problems of water management.

Core A Objectives for the Student:

2. Develop a quantitative view of the needs for water.

ENVIRONMENTAL THEME:

Finiteness of Resources

INQUIRY SKILLS:

Comparing

PROBLEM-SOLVING SKILLS:

Recording and Organizing Data

PRACTICAL APPLICATION:

Measuring, Use of Charts and Records,
Family Communication, Realization of
Water Quantities Used

Activity 5-6. How Much Water Do I Use?

This activity will direct students to a quantitative view of their needs for water. Students will record and report the amount of water that they require each day for drinking, bathing, washing clothes, and so forth.

S ACTIVITY

Goals for the Student:

2. Recognize the sources of water.
6. Understand the broad problems of water management.

Objectives for the Student:

2. Develop a quantitative view of the needs for water.

CENTRAL THEME:

Scarceness of Resources

SKILLS:

Comparing

PROBLEM SOLVING SKILLS:

Recording and Organizing Data

APPLICATION:

Measuring, Use of Charts and Records,
Oral Communication, Realization of
Water Quantities Used

How Much Water Do I Use?

will direct students to a quantitative
needs for water. Students will record
amount of water that they require
drinking, bathing, washing clothes,

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE A.

NEED FOR WATER

ACTIVITY 5-6.

HOW MUCH WATER DO
I USE?



BSCS

During this activity, each student should:

- recall the diversity of water uses as discussed in Activities 5-4 and 5-5.
- develop a notion of the unit volume of one gallon.
- keep a detailed record of his personal and family use of water on Worksheet 5-4.

Worksheet 5-4
Funnel
Measuring cup
*One gallon jug
*Water
*Toothbrush
*Toothpaste
*Pail or bucket
*Dishpan (if there is no sink
in the classroom)

*Not furnished in materials kit

Teacher Preparation:

1. Because the students may have difficulty with various units of measure, this activity will be based upon only one fundamental unit -- the U.S. gallon. Amounts of water less than one gallon will be related to a measuring cup.
2. The day before this activity, ask one of your students to bring his toothbrush to class. Bring yours in case he forgets.
3. Refer to your ratings of students who had difficulty doing the calculations in Activity 5-4 (See the "Numbers and Measurements" page of the Student Record of Progress.) Provide additional help for these students as they work with Worksheet 5-4.
4. Observe the amount of difficulty students have in completing Worksheet 5-4. After class, rate each student's success with these calculations in the Student Record of Progress. A column headed "Act. 5-6 Totals" on the "Numbers and Measurements" page is provided for this purpose.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- participate in measuring how much water is required to brush teeth and fill a mop bucket.*
- compute water use totals on Worksheet 5-4.*
- conclude that it requires a great deal of water to conduct everyday activities.*
- conclude that drinking water would be the last water use to be eliminated.*
- suggest a number of ways to save water.*

ration:

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MATERIALS

TEACHING STRATEGIES

Begin by saying:

HOW MUCH WATER DO YOU THINK YOU DRINK IN ONE DAY?

HOW MUCH WATER DO YOU THINK YOU NEED TO DRINK IN ONE DAY?

DOCTORS SAY WE SHOULD DRINK AT LEAST EIGHT GLASSES OF WATER EVERY DAY.

COULD YOU GET THIS AMOUNT OF WATER BY EATING OR DRINKING THINGS OTHER THAN PLAIN WATER?

WHAT ARE SOME OF THE THINGS YOU COULD EAT OR DRINK TO GET THE AMOUNT OF WATER YOU NEED?

If students do not realize that most foods and beverages contain water, help them to recall Activity 5-3 by asking:

WHEN WE WEIGHED AND DRIED FOODS A FEW DAYS AGO, WHAT DID WE FIND OUT?



TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-6

Students should:

--respond in terms of glasses, cups, quarts,
or gallons; "None, I drink only milk or pop."

--guess how much water is needed in one day.

--respond, "Yes," "No," "Maybe."

--suggest such things as soft drinks, ice cream,
fruits, milk, and so forth.

--recall Activity 5-3 and respond, "The foods
had a lot of water in them."


**ACCEPT ALL
ANSWERS**

WATER DO YOU THINK YOU DRINK IN

WATER DO YOU THINK YOU NEED TO
NE DAY?

WE SHOULD DRINK AT LEAST
SES OF WATER EVERY DAY.

GET THIS AMOUNT OF WATER BY
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Activity 5-3 by asking:

WEIGHED AND DRIED FOODS
AYS AGO, WHAT DID WE FIND OUT?

MATERIALS

TEACHING STRATEGIES

Then ask:

HOW MUCH WATER DO YOU THINK YOU USE IN
OTHER WAYS DURING ONE DAY?

If any students suggest they do not use water very much
be sure to recall or even review Activity 5-4 which
established the diversity of water uses.

Then ask:

HOW CAN WE FIND OUT JUST HOW MUCH WATER EACH
OF US USES IN ONE DAY?

The amount of water each person uses daily is likely
to exceed quantities measurable by the cup, so
students should begin thinking in terms of gallons.

Hold up a one-cup measure and ask:

HOW MUCH DOES THIS MEASURE?

Identify the measure as a one-cup measure.

Hold up a gallon jug and ask:

HOW MUCH DOES THIS MEASURE?

Identify the jug as a gallon jug.

?

AC
A

TEACHING STRATEGIES

WATER DO YOU THINK YOU USE IN
YS DURING ONE DAY?


**ACCEPT ALL
ANSWERS**

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call or even review Activity 5-4 which
ne diversity of water uses.

WE FIND OUT JUST HOW MUCH WATER EACH
ES IN ONE DAY?

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cup measure and ask:

DOES THIS MEASURE?

measure as a one-cup measure.

on jug and ask:

DOES THIS MEASURE?

ug as a gallon jug.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "None," "A little," "Some,"
"Many gallons."

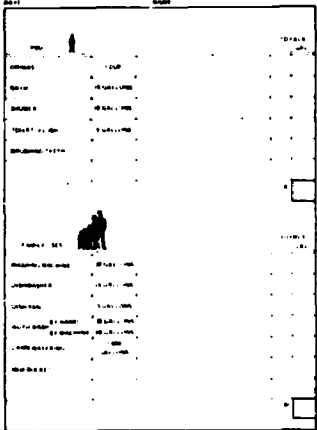
--respond, "Count the cups," "Measure the water,"
"Keep a record," "Measure the gallons," etc.

--respond, "One cup," "Not much."

--respond, "A lot," "A gallon," "A whole bunch."

MATERIALS

Worksheet 5-4



TEACHING STRATEGIES

HOW MANY CUPS DO YOU THINK WOULD BE IN A GALLON?

LET'S FIND OUT WHO'S RIGHT.

Select two students to fill a one-gallon container using a measuring cup and a funnel. This will establish that there are about sixteen cups in one gallon.

HOW COULD WE FIND OUT HOW MUCH WATER WE USE IN ONE DAY?

HOW COULD WE FIND OUT HOW MUCH WATER OUR FAMILY USES IN ONE DAY?

WE ARE GOING TO FIND OUT HOW MUCH WATER YOU AND YOUR FAMILY USE BY KEEPING A RECORD.

Distribute Worksheet 5-4 and tell the students to put their names and the date at the top.

Ask:

WHAT ARE THE THINGS LISTED ON THE SIDE OF THE WORKSHEET?

Read aloud the water uses listed.

WHAT DO YOU THINK THE NUMBERS NEXT TO THESE WATER USES ARE?

TEACHING STRATEGIES

CUPS DO YOU THINK WOULD BE IN

OUT WHO'S RIGHT.

ents to fill a one-gallon container
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WE FIND OUT HOW MUCH WATER WE
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THE THINGS LISTED ON THE SIDE OF
EET?

water uses listed.

U THINK THE NUMBERS NEXT TO
R USES ARE?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-6

Students should:

--suggest, "Ten," "Hundred," "Fifty."

--suggest, "Measure the water," "Count how many
gallons."

--suggest, "Keep count," "Have them count,"
"Measure."

--examine Worksheet 5-4 and respond, "Ways
we use water."

--respond, "How much we use," "How many times
we use water."

Explain to the students that this worksheet is what they will use to find out how much water they and their families use in a day. The numbers tell how many gallons are used each time water is used for the purpose listed in the left-hand column.

Ask:

WHICH WATER USE REQUIRES THE MOST WATER?

WHICH USES THE LEAST AMOUNT OF WATER?

WHICH WATER USES HAVE NO AMOUNT NEXT TO THEM?

WE ARE GOING TO FIGURE OUT HOW MUCH WATER IT TAKES TO BRUSH YOUR TEETH AND TO FILL A MOP BUCKET.

If you have a sink in your classroom, stopper the drain. If you do not have a sink, place the dishpan and the bucket of water on a table.

Instruct the student who was asked to bring his toothbrush to brush his teeth. Be sure all water that he uses goes either in to the sink or the dishpan.

When the student is finished brushing his teeth, ask:

HOW CAN WE FIND OUT HOW MUCH WATER
(Student's Name) USED TO BRUSH HIS TEETH?

Using a funnel, ask a student to pour the water from the dishpan (or collect the water in the sink and pour it) into the gallon jug used previously.

TEACHING STRATEGIES

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USES THE LEAST AMOUNT OF WATER?

WATER USES HAVE NO AMOUNT NEXT TO THEM?

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(or collect the water in the sink and
o the gallon jug used previously.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--indicate the lawn watering.

--indicate the drink of water.

--indicate brushing teeth, mop bucket.

--respond, "Measure how much water," "Pour the
water into the gallon jug."

MATERIALS

TEACHING STRATEGIES

Ask:

HOW MUCH WATER IS USED TO BRUSH TEETH?

Help the students to estimate how much water was used (one gallon, three-fourths gallon, one-half gallon, or one-fourth gallon). Direct them to record this amount on their worksheets in the appropriate place.

HOW COULD WE FIND OUT HOW MUCH WATER IS USED IN A CLEANING PAIL OR MOP BUCKET?

Fill the bucket with water and measure the amount by pouring it into the gallon jug, as was done in the teethbrushing activity. Record the amount used on the worksheet.

Tell the students that as soon as they leave this science class, every time they use water in one of the ways on the worksheet they will put a check () on the line next to that use. For example, if they have ten drinks of water there will be ten checks on the line. They will do this until they come back to science class the next day (twenty-four hours).

When they go home they will need to ask their parents how many times during the past twenty-four hours they used water in one of the ways listed. Again a check () will be recorded for each time water was used in that way.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "A gallon," "About one-half a gallon," "Not quite a gallon."

--suggest measuring the water by filling the bucket up and pouring that water into the gallon jug.

TEACHING STRATEGIES

WATER IS USED TO BRUSH TEETH?

Asks to estimate how much water was used (three-fourths gallon, one-half gallon, or one gallon). Direct them to record this amount in the appropriate place.

HOW DO WE FIND OUT HOW MUCH WATER IS USED FOR CLEANING PAIL OR MOP BUCKET?

Asks to fill a bucket with water and measure the amount by using the gallon jug, as was done in the previous activity. Record the amount used on the sheet.

Asks that as soon as they leave this room every time they use water in one of the ways listed on the sheet they will put a check () on the sheet for that use. For example, if they have used water there will be ten checks on the sheet. They do this until they come back to school the next day (twenty-four hours).

Asks that they will need to ask their parents during the past twenty-four hours they used water in one of the ways listed. Again a check is recorded for each time water was used in

Be certain all students understand this procedure before they leave class.

The next day say:

HOW COULD WE FIND OUT THE TOTAL NUMBER OF GALLONS WE USED?

Direct the students to make the computations below. Proceed slowly and help them as necessary.

NOTE: Do not compute totals for drinking water since measurements are in cups instead of gallons. This water use will be discussed separately.

1. Count the total number of checks next to each water use and enter that number under the " " column on the right.
2. Multiply the total number of checks times the average gallons used and enter the total number of gallons used in the "Gallons" column on the right. For example, if there were five checks next to Toilet, you would multiply five (number of checks) times five (average gallons used) and get twenty-five gallons of water used for toilet flushing that day. Do this for each water use.
3. Add the "Gallons" column and put the total for "You" and that for "Your Family" in the boxes next to the asterisks on the worksheet.

There should now be a total number of gallons for personal use and a total number of gallons for family use.

TEACHING STRATEGIES

All students understand this procedure
leave class.

say:

WOULD WE FIND OUT THE TOTAL NUMBER OF
WE USED?

Students to make the computations below.
Help and help them as necessary.

Let students compute totals for drinking water since
measurements are in cups instead of gallons.
Toilet water use will be discussed separately.

Write the total number of checks next to each
use and enter that number under the " " "
column on the right.

Multiply the total number of checks times the
average gallons used and enter the total number
of gallons used in the "Gallons" column on
the right. For example, if there were five checks
for Toilet, you would multiply five (number
of checks) times five (average gallons used) and
enter twenty-five gallons of water used for toilet
usage that day. Do this for each water use.

Write in the "Gallons" column and put the total for
yourself and that for "Your Family" in the boxes
next to the asterisks on the worksheet.

Now you have a total number of gallons for
yourself and a total number of gallons for family

ANTICIPATED STUDENT BEHAVIORS

Students should:

--suggest adding and multiplying.

ACTIVITY
5-6

MATERIALS

TEACHING STRATEGIES

IN WHICH SEASON OF THE YEAR WOULD MORE WATER
BE USED?

WHY?

IF YOUR CITY ALL OF A SUDDEN HAD A WATER
SHORTAGE AND SAID YOU COULD USE ONLY ONE-HALF
THE AMOUNT OF WATER YOU USUALLY DO, WHICH
WATER USES WOULD YOU CUT OUT FIRST?

WHY?

WHICH WATER USE WOULD YOU CUT OUT LAST?

WHY?

WHAT ARE SOME OF THE THINGS YOU AND YOUR
FAMILY COULD DO TO CUT DOWN THE AMOUNT
OF WATER YOU USE?

DISC

TEACHING STRATEGIES

SEASON OF THE YEAR WOULD MORE WATER

CITY ALL OF A SUDDEN HAD A WATER
AND SAID YOU COULD USE ONLY ONE-HALF
AMOUNT OF WATER YOU USUALLY DO, WHICH
USES WOULD YOU CUT OUT FIRST?

WATER USE WOULD YOU CUT OUT LAST?

SOME OF THE THINGS YOU AND YOUR
FAMILY WOULD DO TO CUT DOWN THE AMOUNT
OF WATER YOU USE?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--suggest summer.

--respond, "Because people are watering lawns,
washing cars."

--probably suggest water uses that require large
amounts of water, such as car washing,
dishwashers, lawn watering.

--respond, "Because they use most water."

--respond, "My drinking water."

--respond, "Because it doesn't use up much water."

--respond with ways of cutting down the amount of
water used.

DISCUSSION TIME

MATERIALS

TEACHING STRATEGIES

Ask:

DO YOU AND YOUR FAMILY USE A LOT OF WATER
IN ONE DAY?

WHO USES MORE WATER -- YOU OR YOUR FAMILY?

YOU JUST KEPT TRACK OF HOW MUCH WATER YOU
USED FOR PERSONAL CARE EVERYDAY. HOW COULD
YOU FIGURE OUT HOW MUCH A FAMILY OF FIVE
WOULD USE?

WOULD A FAMILY OF FIVE OR A FAMILY OF
THREE USE MORE WATER?

HOW MANY DRINKS OF WATER DID YOU TAKE
IN A DAY?

HOW MANY CUPS DID WE FIND THERE WERE IN A
GALLON?

DO YOU DRINK EVEN ONE GALLON OF WATER IN
A DAY?

HOW DOES THE AMOUNT OF WATER YOU DRANK COMPARE
WITH THE AMOUNT OF WATER USED FOR OTHER THINGS?

TEACHING STRATEGIES

YOUR FAMILY USE A LOT OF WATER
?

MORE WATER -- YOU OR YOUR FAMILY?

KEPT TRACK OF HOW MUCH WATER YOU
PERSONAL CARE EVERYDAY. HOW COULD
OUT HOW MUCH A FAMILY OF FIVE

FAMILY OF FIVE OR A FAMILY OF
MORE WATER?

DRINKS OF WATER DID YOU TAKE

CUPS DID WE FIND THERE WERE IN A

DRINK EVEN ONE GALLON OF WATER IN

THE AMOUNT OF WATER YOU DRANK COMPARE
AMOUNT OF WATER USED FOR OTHER THINGS?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "We sure do," "I really had to
make a lot of marks."

--probably indicate the family.

--suggest multiplying the number of gallons one
person used by five.

--indicate the larger family would use more
water.

--indicate the number of drinks (probably under
a gallon).

--recall the activity of the day before and
respond, "Sixteen."

--look at the number of cups of water they
drank and probably respond, "No."

--respond, "It's smaller," "Not as much,"
"Much less."

MATERIALS

TEACHING STRATEGIES

At this time encourage discussion of water saving practices such as: not leaving the water running while doing dishes, brushing teeth, or shaving; taking a shower instead of a bath; washing dishes by hand instead of by machine; fixing a leaky faucet; and so forth.

ENCOUR
CREATI
IDEA

GIVE S
STUDENT
TO RE

Turn to the Numbers and Measurements page of the Student Record of Progress and find the column marked Activity 5-6, Water Use Calculation. Circle YES for each student who was able to calculate total water usages without help. Some students may require much help in doing such calculations.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-6

Encourage discussion of water saving ideas: not leaving the water running while brushing teeth, or shaving; taking a shower instead of a bath; washing dishes by hand instead of a machine; fixing a leaky faucet; and so

ENCOURAGE
CREATIVE
IDEAS



GIVE SEVERAL
STUDENTS A CHANCE
TO RESPOND

Numbers and Measurements page of the Book of Progress and find the column marked Water Use Calculation. Circle YES for students who were able to calculate total water use without help. Some students may require much more help with such calculations.

Upon completion of this activity, each student should, as a minimum:

- be able to identify a cup and a gallon.*
- be able to show by measuring how many cups it takes to fill a gallon.*
- state that a family uses a great deal of water in one day.*
- keep a record of his water use on Worksheet 5-4.*
- state that drinking water is the most important water use.*

ACTIVITY
5-6

MATERIALS

TEACHING STRATEGIES

See Change of Pacer 6.

Handwritten mark
CHAN

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS



CHANGE OF PACER

f Pacer 6.

UNIT V, CORE A
ACTIVITY 5-6

Teacher _____

Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ____

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes preparing for each day's science class						
4.	Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific questions:

How many students followed through on the instructions for recording their use of water?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. How many students followed through on the instructions for recording their use of water?
13. Did students have difficulty in understanding the computations involved in determining total water use?
14. Turn to the numbers and measurements page of the Student Record of Progress and record the students' ability to calculate total water use.

UNIT V, CORE A
ACTIVITY 5-6

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

What anecdotes of student learning did you see or hear in your classroom?

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?

UNIT V
REACTIONS TO CORE A

1. Was the background information for this core clear and useful? Yes No
Comment:

2. Was there too much preparatory reading and too many directions given to the teacher? Yes No
Comment:

3. Was it clear to you why these particular activities were chosen and the direction they were leading? Yes No

4. How would you increase the clarity of this core for students? (Help them understand why they are doing these activities.)

5. Is there a practical (take-home) value for your students in these activities?
 Yes No If yes, what do you see as the "take-home" lesson? If no, what is needed?

6. In these materials, what things did your students find difficult to do?

7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?

8. Were the Clues to Success and Student Record of Progress helpful in this core?
 Yes No If helpful, how are they helpful?

9. Did you make use of the Planning Guide included in the introductory material for this core? Yes No
Comment:

10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? Yes No
Comment:

11. If you could teach your way, rather than following the Guide, how would you do it?

12. Did the activities fulfill the purposes described by the core objectives and rationale? Yes No
Comment:

6. In these materials, what things did your students find difficult to do?
7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?
8. Were the Clues to Success and Student Record of Progress helpful in this core?
 Yes No If helpful, how are they helpful?
9. Did you make use of the Planning Guide included in the introductory material for this core? Yes No
Comment:
10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? Yes No
Comment:
11. If you could teach your way, rather than following the Guide, how would you do it?
12. Did the activities fulfill the purposes described by the core objectives and rationale? Yes No
Comment:
13. Which of your students do you believe were unsuccessful in achieving the objectives of this core of activities? Explain:

NEW STUDENTS ENTERING DURING THIS C

Date Entered	Last Name	Name Used	Ethnic Group	Sex	Birthdate	Test Date	Te
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B

W = white
 B = black
 S = Spanish-
 American
 O = other

W=WIS
 B=Bir
 O=Oth
 (N

STUDENTS DROPPED IN THIS PERIOD

Date Dropped	Last Name	First	Reason for Dropping

NEW STUDENTS ENTERING DURING THIS CORE

p	Sex	Birthdate	Test Date	Test	Total	Verbal	Performance	Previous Test Score
	M F			W B O				
	M F			W B O				
	M F			W B O				
	M F			W B O				
	M F			W B O				
	M F			W B O				

W=WISC
 B=Binet
 O=Other
 (Name)

for Dropping



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE B. SOURCES OF WATER

AIMS FOR ME AND MY ENVIRONMENT

1. DEVELOPMENT IN EACH CHILD OF A SENSE OF IDENTITY AS A PERSON WHO HAS SOME DEGREE OF CONTROL OVER AND CAN ACT ON HIS ENVIRONMENT. This will lead to a degree of self-determination based on a rational coping with situations rather than on a passive compliance or an impulsive response to problems.
2. DEVELOPMENT IN EACH CHILD OF A SUCCESS SYNDROME. More than anything else, each activity is intended to be a success experience for each child. It is the teacher's responsibility -- almost obligation -- to see that each child succeeds at a level that is challenging to his abilities and that preserves his self-respect. It is a further responsibility of the teacher to point out his achievement. The students as a group should help each individual fit what he has done into a pattern of accomplishment.
3. DEVELOPMENT IN EACH CHILD OF AN INTEREST THAT COULD BECOME A HOBBY OR AVOCATION OVER A LIFETIME (through an exposure to an array of experiences in science). It is hoped that many children will find some area -- perhaps growing plants, caring for animals, identifying flowers, collecting things, or simply enjoying outings into the country -- that they feel strongly about and can develop some competence or knowledge in. This would provide a means of self-expression, and (perhaps) allow some degree of sharing or involvement with others.
4. DEVELOPMENT IN EACH CHILD OF A SENSE OF RELATIONSHIP AND EMPATHY WITH OTHER LIVING THINGS. It is hoped that this will lead to a positive regard and caring about what affects them as individuals and as a group, because what affects them affects the community of man.
5. DEVELOPMENT IN EACH CHILD OF AN UNDERSTANDING OF ENVIRONMENTAL CONDITIONS that will lead to a sense of responsibility for the environment and actions that protect or improve it.

The two parts of this unit air and water as major compon

Part 1 emphasizes the imp environment by helping the st

1. Understand the need for
2. Recognize the sources of
3. Realize the problems ass
4. Realize the problems ass
5. Recognize the impact of
6. Understand the broad pro

Part 2 emphasizes the nat by helping the student to:

7. Understand the compositi
8. Realize that the quality
9. Realize that substances
10. Comprehend the impact of
1. Identify the immediate
2. Establish that the wate
3. Establish that somethin



BSCS

T V. AIR AND WATER IN MY ENVIRONMENT

E B. SOURCES OF WATER

UNIT V GOALS

The two parts of this unit will serve to develop an appreciation of the roles of air and water as major components of our environment.

Part 1 emphasizes the importance of water as a vulnerable component of our environment by helping the student to:

1. Understand the need for water.
2. Recognize the sources of water.
3. Realize the problems associated with the preparation of usable water.
4. Realize the problems associated with the disposal of waste water.
5. Recognize the impact of water pollution.
6. Understand the broad problems of water management.

Part 2 emphasizes the nature of air as a complex component of our environment by helping the student to:

7. Understand the composition of air.
8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.
10. Comprehend the impact of air pollution on our environment.

CORE B OBJECTIVES

1. Identify the immediate sources of water available to people.
2. Establish that the water supply is limited.
3. Establish that something must be done to our water before we drink it.



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE B. SOURCES OF WATER

CORE B RATIONALE

Although most people do not drink raw water as it comes from lakes or streams, many people do drink untreated water from privately owned shallow wells. In these instances, nature has provided a filtration system of soils, sands, and gravels through which the water must pass. The general trend for people to live in cities or towns with locally abundant and concentrated wastes dictates the need for some pretreatment of municipal water supplies. This core of activities will serve to introduce the student to the advantages and complexities of a combined community effort in supplying usable water.

There are
in the chemical
suspended substances
some of these
to matter. Dependence
done to our water

If we drink
water. It most
water may, however
been filtered
likely combination
of as a formal
demands placed
treated, some of
processes that

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE B. SOURCES OF WATER



BSCS

BACKGROUND INFORMATION FOR THE TEACHER

There are essentially no natural sources of absolutely pure water in the chemical sense. All natural waters contain some dissolved and/or suspended substances. From the point of view of human health alone, some of these are desirable, some are undesirable, and some don't seem to matter. Depending on the source, however, something usually must be done to our water before we drink it.

If we drink water from a well or spring, we are not drinking pure water. It most certainly will contain dissolved substances. This water may, however, be free of microbial contamination. The water has been filtered through natural layers of soil, sand, or gravel and most likely combinations of these. A water treatment plant may be thought of as a formalized model of nature's system of purification. Since the demands placed on this artificial system may be high in terms of volume treated, some chemicals (such as lime and alum) are added to duplicate processes that otherwise might occur in the soil.



Me and my Environment

UNIT V
CORE B

PLANNING GUIDE

NOTE: Some activities (indicated in italics and an arrow in the margin) should be prepared several days or weeks in advance. Use this as a teaching and preparation schedule. All supplies are listed in the table.

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		<i>(Italic)</i>
	Materials You Furnish	Materials in Supply Kit	
5-7. Water at Hand Days needed: 1	Chalkboard 35 mm Slide projector	Slide 5-10	House diagram
5-8. A Trip to the Water Plant Days needed: 2			<i>Make arrangements in advance</i>
5-9. A Water Treatment Plant Model Days needed: 3	Water Gallon jar Mud or garden soil Egg beater Books, boxes, blocks, etc. Chlorine bleach 35 mm Slide projector	Slide 5-11 Slide 5-12 Slide 5-13 Worksheet 5-5 Large beaker, 1000 ml Vinyl tubing, 1/4 inch inside diameter Powdered alum Measuring spoons Pneumatic troughs Screw clamps Gauze squares	Mud added for model For mixing To mix with Used for slides To prepare Used in charts Of Worksheet Of Worksheet Water Treatment Four feet square troughs Used to treat One set Three, to show One per class One square

PLANNING GUIDE



BSCS

Activities (indicated in italics and an arrow in the margin) must be prepared several days or weeks in advance. Use this summary as a guide for materials and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher
Materials in Supply Kit	<i>(Italics and Arrow Indicate Advance Preparation Directions)</i>
Slide 5-10	House diagram
	<i>Make arrangements for trip to water treatment plant well in advance.</i>
Slide 5-11 Slide 5-12 Slide 5-13 Worksheet 5-5 Large beaker, 1000 ml Vinyl tubing, 1/4 inch inside diameter Powdered alum Measuring spoons Pneumatic troughs Screw clamps Glass squares	Mud added for testing the effectiveness of the water treatment model For mixing mud and water To mix with water Used for stirring water in mixing basin To prepare different levels to set the pneumatic troughs on Used in chlorination set-up of water purification Of Worksheet 5-5 Of Worksheet 5-5 Water Treatment Model Four feet should provide enough for the connections between troughs Used to treat the water One set Three, to serve as water treating basins One per class One square for filtration trough



Me and my Environment

UNIT V
CORE B

PLANNING GUIDE


NOTE: Some activities (indicated in italics and an arrow) should be prepared several days or weeks in advance. Use this as a teaching and preparation schedule. All supplies listed are in the supply kit.

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		(Italics indicate items to be prepared several days or weeks in advance)
	Materials You Furnish	Materials in Supply Kit	
5-9. A Water Treatment Plant Model (continued)		Coarse sand Fine sand Very fine sand	Wash all
5-10. Clues to Success: Background and Understanding Days needed: 1	35 mm Slide projector	Worksheet 5-6 Worksheet 5-7 Slide 5-4 Slide 5-14 Slide 5-15 Slide 5-16 Slide 5-17 Tallysheet 5-3	Pad of 2 Pad of 2 Street w Of Works Of Works Of Works Of Works

PLANNING GUIDE



BSCS

Activities (indicated in italics and an  in the margin) must be prepared several days or weeks in advance. Use this summary as a planning and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher
Materials in Supply Kit	<i>(Italics and Arrow Indicate Advance Preparation Directions)</i>
Coarse sand Fine sand Very fine sand	Wash all three types of sand
Worksheet 5-6 Worksheet 5-7 Slide 5-4 Slide 5-14 Slide 5-15 Slide 5-16 Slide 5-17 Tallysheet 5-3	Pad of 20 sheets; one worksheet per student Pad of 20 sheets; one worksheet per student Street washer Of Worksheet 5-6 Of Worksheet 5-6 Of Worksheet 5-7 Of Worksheet 5-7



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

1. Understand the need for water.
2. Recognize the sources of water.

Core B Objectives for the Student:

1. Identify the immediate sources of water available to people.

ENVIRONMENTAL THEME:

Finiteness of Resources

INQUIRY SKILLS:

Identifying

PROBLEM-SOLVING SKILLS:

Organizing Data

PRACTICAL APPLICATION:

Realizing What the Basic Construction of a House Is and How Utilities Are Brought to Members of a Community

Activity 5-7. Water at Hand

This activity will emphasize family water use and its sources. The students will identify and discuss the sources of water for their families by tracing water pipes in a cutaway house diagram to a main water pipe.

ACTIVITY

Goals for the Student:

1. Understand the need for water.
2. Recognize the sources of water.

Objectives for the Student:

1. Identify the immediate sources of water available to people.

TAL THEME:

ness of Resources

ILLS:

ifying

LVING SKILLS:

izing Data

APPLICATION:

izing What the Basic Construction of a
Is and How Utilities Are Brought to
rs of a Community

Water at Hand

*All emphasize family water use and it's
tudents will identify and discuss the
r for their families by tracing water
ay house diagram to a main water pipe.*

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE B.

SOURCES OF WATER

ACTIVITY 5-7.

WATER AT HAND



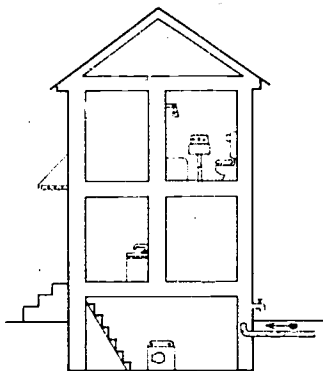
BSCS

During this activity, each student should:

- recall the family uses of water.*
- describe the drawing of the house.*
- trace the water source of each water outlet
in a home to the main water pipe.*
- identify a well and/or water plant as the
main source of community water.*
- begin to consider what a water plant does.*
- consider the process of a water plant.*

*35 mm Slide projector
Slide 5-10

Slide 5-10



*Not furnished in materials kit

Begin by saying:

A FEW DAYS AGO WE FOUND OUT HOW MUCH WATER
OUR FAMILIES USE IN A DAY. WHAT WERE SOME
OF THE THINGS OUR FAMILIES USE WATER FOR?

Project Slide 5-10 on the chalkboard, and say:

WHAT DOES THIS DRAWING SHOW?

WHY ARE WE ABLE TO SEE INSIDE?

WOULD SOMEONE DESCRIBE WHAT THE HOUSE IS
LIKE ON THE OUTSIDE?

WHAT IS THE INSIDE OF THE HOUSE LIKE?

As the students describe the house, have them label
the items they mention on the projected image.

If students do not notice or mention the outside pipe
running to the house, be sure to draw their attention
to it by asking them what it carries, what would be
coming into the house, and so on until they are able
to identify it as a water pipe, or water supply.

TEACHING STRATEGIES

ing:

DAYS AGO WE FOUND OUT HOW MUCH WATER
FAMILIES USE IN A DAY. WHAT WERE SOME
THINGS OUR FAMILIES USE WATER FOR?

5-10 on the chalkboard, and say:

DOES THIS DRAWING SHOW?

ARE WE ABLE TO SEE INSIDE?

CAN SOMEONE DESCRIBE WHAT THE HOUSE IS
LIKE ON THE OUTSIDE?

WHAT DOES THE INSIDE OF THE HOUSE LIKE?

Students describe the house, have them label
parts they mention on the projected image.

Do not notice or mention the outside pipe
on the house, be sure to draw their attention
to showing them what it carries, what would be
inside the house, and so on until they are able
to identify it as a water pipe, or water supply.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--recall Activity 5-4 and reply, "Drinking,"
"Flushing the toilet," "Washing clothes,"
"Doing dishes," "Taking a bath," "Cleaning."

--look at the slide and reply, "A house."

--reply, "Because one wall is not drawn,"
"Because it's cut in half."

--describe the house, being sure to mention that
it has three floors, a basement, a roof, four
rooms, a pipe coming in the house, and an
outside faucet.

--describe what is inside the house, being sure to
include a toilet, sinks, tub, shower, and
washing machine.

MATERIALS

Diagram 5-3

Refer to the blackboard slide of the house and water outlets in Activity 7, Unit 5. These diagrams will show what the child should draw in.

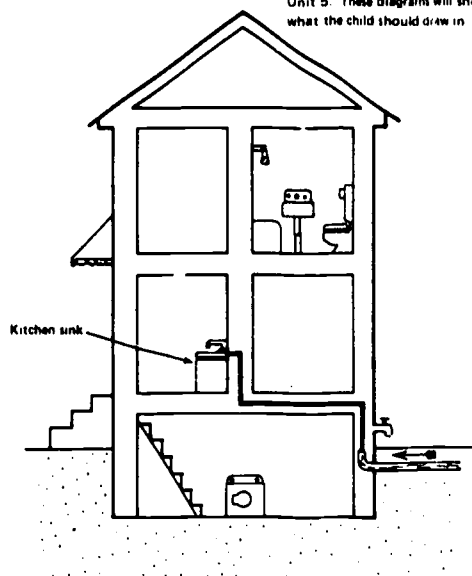
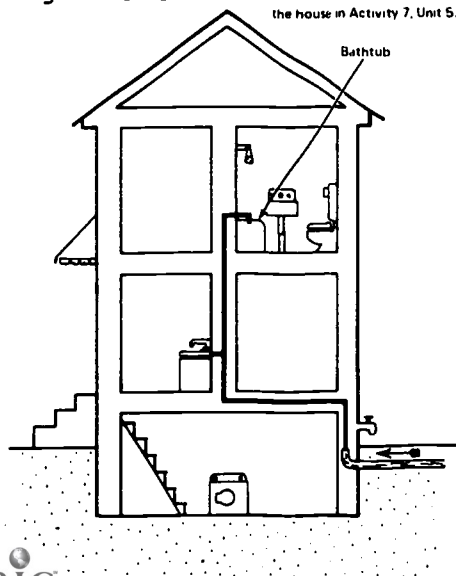


Diagram 5-4

Refer to the blackboard slide of the house in Activity 7, Unit 5.



TEACHING STRATEGIES

Then say:

THIS HOUSE HAS ALL THE THINGS IN IT THAT A FAMILY NORMALLY USES WATER FOR.

HERE IS A KITCHEN SINK. WHAT WOULD A FAMILY USE THIS FOR?

WHERE DOES THE WATER IN THE SINK COME FROM?

WHERE DOES THE WATER IN A FAUCET COME FROM?

Choose a student or a volunteer to come to the chalkboard and draw a line that will show where the water in the faucet comes from. (See Diagram 5-3.)

Continue by pointing to the bathtub and asking:

WHERE DOES THE WATER IN THE BATHTUB COME FROM?

WHERE DOES THE WATER IN THE FAUCET COME FROM?

Direct a student or a volunteer to draw a line on the house projection to show where the water from the bathtub comes from. (See Diagram 5-4.)

Continue with this line of questioning until the students have traced the source of each water outlet in the house to the main water pipe. (See Diagram 5-5.)

TEACHING STRATEGIES

HAS ALL THE THINGS IN IT THAT
FORMALLY USES WATER FOR.

KITCHEN SINK. WHAT WOULD A
THIS FOR?

THE WATER IN THE SINK COME FROM?

THE WATER IN A FAUCET COME FROM?

or a volunteer to come to the
draw a line that will show where the
faucet comes from. (See Diagram 5-3.)

ing to the bathtub and asking:

THE WATER IN THE BATHTUB

THE WATER IN THE FAUCET

or a volunteer to draw a line on the
to show where the water from the
m. (See Diagram 5-4.)

s line of questioning until the
aced the source of each water outlet
the main water pipe. (See Diagram 5-5.)

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-7

Students should:

--respond, "For dishes," "To fill a bucket,"
"For drinking water," "To get cooking water."

--respond, "The faucet."

--respond, "Water pipes," "In the wall," "In the
basement."

--draw a line from the faucet through the walls
and floor or ceiling to the main water pipe.

--respond, "The faucet."

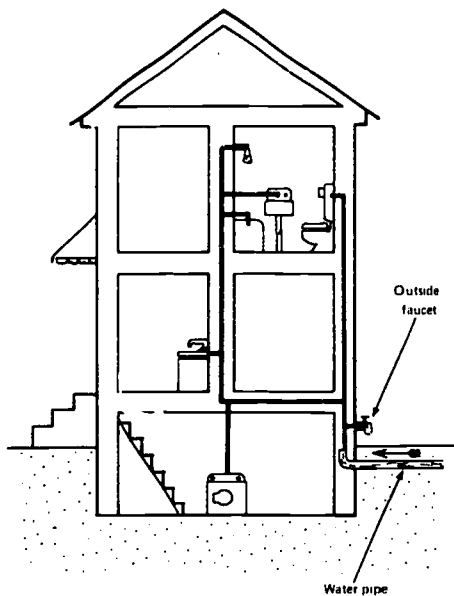
--respond, "The water pipes."

--draw a line from the faucet through the walls
and floor or ceiling to the main water pipe.

Diagram 5-5

Refer to the blackboard side of the house in Activity 7, Unit 5

This diagram will show the house as it should look when all water outlets are connected to the main water pipe



When all the water outlets in the house have been traced to the main water pipe, ask:

WHERE DO ALL OF OUR DRAWN LINES END UP?

WHERE DOES THE WATER IN THE MAIN WATER PIPE COME FROM?

If wells are the common water source in the community, the discussion of the local water source will end. If this is the case, continue by saying:

WE GET OUR WATER FROM WELLS, BUT WHERE WOULD PEOPLE IN A CITY GET THEIR WATER?

If students suggest that water in a household water system is from a lake or a river, remind them that it doesn't go directly from a lake or river to the house, but rather goes to some place in between.

HOW DOES THE WATER GET FROM THE WATER PLANT TO YOUR HOUSE? THE WATER PLANT MIGHT BE MANY MILES FROM THE HOUSE.

HOW DO YOU THINK THE CITY KNOWS YOU USE WATER?

WE LOOKED AT HOW ONE FAMILY GETS WATER. WHERE DO THE FAMILIES IN THE CITY WHO LIVE IN HOUSES AND APARTMENTS GET THEIR WATER?

TEACHING STRATEGIES

water outlets in the house have been
main water pipe, ask:

ALL OF OUR DRAWN LINES END UP?

ES THE WATER IN THE MAIN WATER
E FROM?

the common water source in the community,
n of the local water source will end. If
ase, continue by saying:

OUR WATER FROM WELLS, BUT WHERE WOULD
N A CITY GET THEIR WATER?

uggest that water in a household water
n a lake or a river, remind them that it
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THE WATER GET FROM THE WATER PLANT
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DU THINK THE CITY KNOWS YOU USE WATER?

AT HOW ONE FAMILY GETS WATER. WHERE
MILIES IN THE CITY WHO LIVE IN HOUSES
MENTS GET THEIR WATER?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "In the outside pipe," "In the
water line."

--respond, "Wells," or "Water treatment plant,"
depending on which is common in the community.

--respond, "From a water plant," "From lakes,"
"From a reservoir."

--respond, "Through pipes," "Underground."

--respond, "They read the meter," "They send a guy
around."

--respond, "Through pipes coming from the water
plant," "From the water plant," "From the same
place."

MATERIALS

TEACHING STRATEGIES

To encourage students to begin thinking about what happens at a water treatment plant and to conclude this activity, ask such open-ended questions as:

WHAT IS A WATER PLANT FOR?

WHAT DO THEY DO AT A WATER PLANT?

WHY DOES A CITY NEED A WATER PLANT?

See Change of Pacer 7.

CHANGE O

TEACHING STRATEGIES

Students to begin thinking about what
water treatment plant and to conclude this
with such open-ended questions as:

WATER PLANT FOR?

WHAT DO AT A WATER PLANT?

WHY DOES A CITY NEED A WATER PLANT?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-7

*Upon completion of this activity, each student
should, as a minimum:*

- have recalled the family uses of water.*
- have traced at least one water outlet to its
source at the main household water pipe.*
- have identified the community water source as
the water plant.*



CHANGE OF PACER

er 7.

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE B
ACTIVITY 5-7

Teacher _____

Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ____

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

How effective were the drawings of the house in demonstrating the source of water to a house?

--	--	--	--	--

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
 If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

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 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained
 unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. How effective were the drawings of the house in demonstrating the source of water
 to a house?

13. Did students seem to understand that the pipes were inside the walls? Comment.

UNIT V, CORE B
ACTIVITY 5-7

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

BSCS Evaluation: EMH Feedback Form

- B. What anecdotes of student learning did you see or hear in your classroom?

- C. Concern (or questions) about content:

- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

1. Understand the need for water.
2. Recognize the sources of water.
3. Realize the problems associated with the preparation of usable water.
6. Understand the broad problems of water management.

Core B Objectives for the Student:

1. Identify the immediate sources of water available to people.
3. Establish that something must be done to our water before we drink it.

ENVIRONMENTAL THEME:

Finiteness of Resources

INQUIRY SKILLS:

Describing

PROBLEM-SOLVING SKILLS:

Asking Questions

PRACTICAL APPLICATION:

Knowledge That He Is Dependent upon Someone for His Water and That Water Is Not an Unlimited Resource

Activity 5-8. A Trip to the Water Plant

In this activity, students will visit the city (or county) water treatment plant. They will gain

ACTIVITY

Goals for the Student:

1. Understand the need for water.
2. Recognize the sources of water.
3. Realize the problems associated with the preparation of usable water.
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SKILLS:

Describing

PROBLEM SOLVING SKILLS:

Asking Questions

APPLICATION:

Realize That He Is Dependent upon Someone for His Water and That Water Is Not an Unlimited Resource

A Trip to the Water Plant

During this activity, students will visit the city (or community) water treatment plant. They will gain

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE B.

SOURCES OF WATER

ACTIVITY 5-8.

A TRIP TO THE WATER PLANT



BSCS

During this activity, each student should:

- visit the community water treatment plant.
- participate in a discussion of their experiences at the plant.

first-hand knowledge of what is done to the water before it reaches their homes.

Teacher Preparation:

Contact the supervisor of the treatment plant at least a week in advance of the trip. Also make the necessary arrangements for transportation, permission slips, and so on. Set a date for the trip that is acceptable to the treatment plant, your administration, and to your class. Call the treatment plant again the day before the trip to confirm your plans. If your students live in an area with no treatment plant or an extremely small one, you might want to visit the water treatment plant of a nearby city.

Water treatment plants usually do not vary a great deal from community to community. The average treatment plant functions in a manner similar to that outlined below.

1. Analysis of the untreated water

There is a federal standard set for water quality that most states have adopted. Some of the tests made are for color, turbidity (amount of soil in the water), acidity, natural fluoride content, hardness (amount of dissolved minerals), and temperature.

TEACHING STRATEGIES

knowledge of what is done to the water before
their homes.

Preparation:

Supervisor of the treatment plant at least
advance of the trip. Also make the
arrangements for transportation, permission
to go. Set a date for the trip that is
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week before the trip to confirm your plans. If your
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Water treatment plants usually do not vary a great deal
from one community to another. The average treatment
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below for the untreated water

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which most states have adopted. Some of the tests
are for color, turbidity (amount of soil in
water), acidity, natural fluoride content,
hardness (amount of dissolved minerals), and
pH.

ANTICIPATED STUDENT BEHAVIORS

MATERIALS

TEACHING STRATEGIES

2. Treatment

- a. Screening -- mainly to remove algae in the water.
- b. Addition of alum -- alum will clump together and attract dirt, bacteria, and so forth. (This is called flocculation.)
- c. Settling -- to allow the clumps of alum and its attracted dirt to settle out.
- d. Addition of chemicals -- usually chlorine, fluoride, ammonia, lime.
- e. Filtering -- through layers of charcoal, sand, gravel, and clay tiles.

3. Finished water -- pumped to city systems

While on the visit the students should look for, or try to find out, the following kinds of information. Review these questions with the students before leaving on the trip:

1. Where is the water treatment plant for the community?
2. Where does the water in the treatment plant come from? (What is the community water source?)
3. Are people allowed around the area that the water comes from? Would anything be able to pollute the water?
4. By what means does the water get to the treatment plant?
5. How do they find out if the water is safe to drink?
6. Why does the water need to be treated?
7. What do they do to the water to make it so it is drinkable?
8. How are the microbes in the water killed?
9. How do they get the dirt out?
10. How much water do they treat every day?

TEACHING STRATEGIES

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e microbes in the water killed?
y get the dirt out?
water do they treat every day?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-8

11. How does the water get from the plant to the community?
12. Is the water stored anywhere after it is treated?
13. How do they know how much water to treat and send to the community?
14. Is the same amount of water used all year around?
15. What are the plans for future water use?
16. Would it be just as easy and save money for each home to clean its own water?

Have this list of questions duplicated so that the students can refer to them during the trip. Encourage the students to ask questions at the plant if they don't understand or are curious about something. They may wish to bring tape recorders to record the information or to answer questions.

The day after the trip go over the list of questions and discuss them. Also discuss their experiences, any observations they have, opinions, and so forth.

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& SL
& ST

TEACHING STRATEGIES

Does the water get from the plant to the city?

Is water stored anywhere after it is treated?

Do they know how much water to treat and for the community?

Is the same amount of water used all year long?

Are there any plans for future water use?

Can it be just as easy and save money for each person to clean its own water?

Write a list of questions duplicated so that the students can refer to them during the trip. Encourage students to ask questions at the plant if they are curious about something. They can bring tape recorders to record the answers to answer questions.

After the trip go over the list of questions with them. Also discuss their experiences, any questions they have, opinions, and so forth.

ANTICIPATED STUDENT BEHAVIORS

DISCUSSION TIME



INVOLVE YOUR

SLOWEST

STUDENTS

MATERIALS

TEACHING STRATEGIES

See Change of Pacers 8, 9, and 10.

CHANGE O

Upon completion of this activity, each student should, as a minimum:

- have visited the community water treatment plant.*
- have recognized that something is done to make the water better before it reaches his home.*
- experience the care his water gets before it arrives in his house.*



CHANGE OF PACER

ers 8, 9, and 10.

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE B
ACTIVITY 5-8

Teacher _____

Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ____

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes preparing for each day's science class						
4.	Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Were there any problems in arranging the trip to the water treatment plant?
 Yes No Comment.

- RESISTANCE OR DISLIKE
6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?
7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
- | | | | |
|-------------------------------------|--|--|------------------------------------|
| <input type="checkbox"/> Worthwhile | <input type="checkbox"/> Of value--needs the | <input type="checkbox"/> Worth salvaging--make | <input type="checkbox"/> Worthless |
| --keep as is | revision suggested | major changes described | --drop it |

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Were there any problems in arranging the trip to the water treatment plant?
 Yes No Comment.
13. How many of your students do you feel would be able to explain the water treatment plant to another person?
14. Given your experience with this activity, would you like to have more or fewer field trip activities? Explain.

UNIT V, CORE B
ACTIVITY 5-8

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

BSCS Evaluation: EMH Feedback Form

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

3. Realize the problems associated with the preparation of usable water.

Core B Objectives for the Student:

3. Establish that something must be done to our water before we drink it.

ENVIRONMENTAL THEME:

Finiteness of Resources, Ecological Trade-offs

INQUIRY SKILLS:

Applying

PROBLEM-SOLVING SKILLS:

Identifying Variables

PRACTICAL APPLICATION:

Manipulation of Materials; Seeing and Doing Himself the Same Thing That Is Done to His Water by the City Treatment Plant; Working in a Group

Activity 5-9. A Water Treatment Plant Model

This activity will utilize information obtained on the field trip. Students will be given the opportunity to apply what they have learned by building a model water treatment plant. They will purify some muddy water with their model treatment plant. This plant will later be used to purify water from the flasks of water set up in Activity 5-12.



BSCS

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE B.

SOURCES OF WATER

ACTIVITY 5-9.

A WATER TREATMENT PLANT MODEL

TIVITY

als for the Student:

Realize the problems associated with
the preparation of usable water.

Objectives for the Student:

Establish that something must be
done to our water before we drink it.

L THEME:

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ffs

LS:

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ING SKILLS:

ying Variables

PLICATION:

ation of Materials; Seeing and Doing
the Same Thing That Is Done to His
y the City Treatment Plant; Working
oup

Water Treatment Plant Model

*Students will utilize information obtained on the
elements. Students will be given the opportunity to
have learned by building a model water
treatment plant. They will purify some muddy water
treatment plant. This plant will
purify water from the flasks of water
by 5-12.*

During this activity, each student should:

- compare the diagram of the water treatment plant
with what they saw at the local plant.*
- examine the components of the class treatment
plant.*
- participate in setting up the class water
treatment plant.*
- participate in the operation of the water
treatment plant.*
- compare water leaving the plant with that
put in.*

MATERIALS

Slides 5-11 through 5-13
Worksheet 5-5
Large beaker
Plastic tubing, 1/4-inch diameter
Powdered alum
Measuring spoons
Pneumatic troughs, 3
Coarse sand
Fine sand
Very fine sand
Screw clamp, 1
*Gallon jar
*Muddy or dirty water
*Egg beater
*Materials to support containers at different levels (books, blocks, boxes, etc.)
*Chlorine bleach
*Gauze squares, 1 X 1 inch, 2
*35 mm Slide projector

*Not furnished in materials kit

TEACHING STRATEGIES

Teacher Preparation:

1. Please refer to Slide 5-13 while reading this explanation.

The water treatment plant model, though apparently complicated, may be characterized as four separate processes. These are:

- a. Chemical treatment
- b. Settling
- c. Filtration
- d. Sterilization

These processes are carried out in the model using four separate containers (i.e., three pneumatic troughs and one large beaker). Muddy water is prepared in any handy receptacle, for example, a household bucket. From there it is simply poured into Trough 1 where it is batch-mixed with alum. The alum serves to enhance flocculation of particulate matter. This is a physical-chemical reaction common to most water treatment plants. If the plant that you visited uses additional chemicals such as chloramines or lime, simply explain to the class that these are special treatments developed for local needs. When Trough 1 is full, the alum added, and the water thoroughly mixed, open the clamp between Troughs 1 and 2. The water should be allowed to flow slowly from Trough 1. The function of Trough 2 is to allow the flocculated particles in suspension to settle out. Notice that the water both enters and leaves Trough 2 from the surface. Therefore, Trough 2 will always contain a residual volume of water that will provide

TEACHING STRATEGIES

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refer to Slide 5-13 while reading this
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ANTICIPATED STUDENT BEHAVIORS

MATERIALS

TEACHING STRATEGIES

opportunity for sediment to accumulate. For this reason, no water will flow into Trough 3 until a second batch of water and alum has been provided in Trough 1. When this has been done, water will flow into Trough 2 and immediately overflow into Trough 3. Remember, this water should flow slowly to allow settling. The now partially clarified water will be filtered through the sand beds. The water will percolate through the layers of sand and flow without further interruption into a large beaker for sterilization. Since the flow of water through the system is essentially limited by the filtration rate through the sand in Trough 3, overflow at this point must be controlled above by the clamp between Troughs 1 and 2. Up to this point, treatment has been limited to chemical flocculation and mechanical (sand) filtration. There may still be microbes present. Usable water is prepared by final sterilization with chlorine (the active ingredient of household bleach).

2. Prepare a jar of muddy water by mixing one-half teaspoon of mud or dirt to a gallon of water.

Begin by asking:

WHERE DO WE GET OUR SUPPLY OF WATER?

WHAT ARE THE STEPS IN THE PURIFICATION OF OUR WATER?

TEACHING STRATEGIES

...y for sediment to accumulate. For
...n, no water will flow into Trough 3
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...n Trough 1. When this has been done,
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GET OUR SUPPLY OF WATER?

THE STEPS IN THE PURIFICATION

...R?

ANTICIPATED STUDENT BEHAVIORS

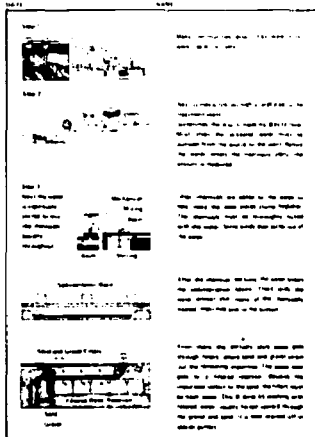
ACTIVITY
5-9

Students should:

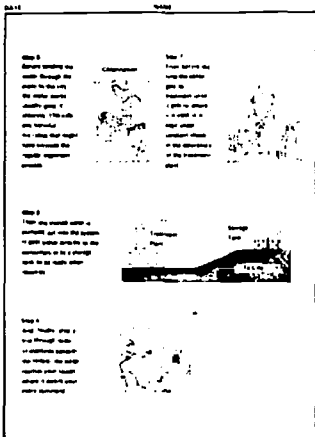
--respond, "River," "Lake," "Stream," or "Well."

--recall the water purification process from
the field trip.

Slide 5-11 (Worksheet 5-5A)



Slide 5-12 (Worksheet 5-5B)



Review the entire path of water through the local plant. List the steps in the treatment (purification) process on the chalkboard. Distribute Worksheet 5-5. This worksheet is a diagram of a typical water treatment plant for a large city. Project Slides 5-11 and 5-12 on Worksheet 5-5. Compare the features of the local plant which are listed on the chalkboard, with those of the typical treatment plant shown on the worksheet.

Display the gallon jar of muddy water.

LET'S CALL THIS MUDDY WATER JAR OUR WATER SOURCE. COULD WE BUILD A MODEL WATER TREATMENT PLANT THAT WOULD PURIFY THIS WATER?

Discuss the steps to be considered and list them on the chalkboard. Be sure to include the following:

1. Alum addition
2. Mixing
3. Sedimentation
4. Sand and gravel filters
5. Chlorination

Place the components of the water treatment plant model on a table.

Discuss each part and identify it in relation to a typical water treatment plant. (See Worksheet 5-5A and 5-5B.)

TEACHING STRATEGIES

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gravel filters

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art and identify it in relation to a
reatment plant. (See Worksheet 5-5A and

ANTICIPATED STUDENT BEHAVIORS

Students should:

--compare the local plant with the worksheet plant.

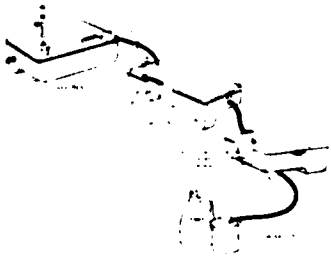
--respond, "Yes," "No," "Maybe."

--examine the components.

--compare the components with the local plant and
the worksheet plant.

MATERIALS

Slide 5-13



TEACHING STRATEGIES

Project Slide 5-13 (diagram of the water treatment model) and allow students time to study the slide. Permit the students to speculate on the way the components are to be set up and used. However, be sure to follow the set-up instructions and operating instructions very closely. Involve as many students as possible in the set-up and operation of the model.

Set-Up Instructions:

1. Four different levels will be needed. Blocks of wood, cardboard boxes, books stacked under the troughs, or using shelves or study carrels might be a few ways of obtaining various levels to work with. Trough 1 will be the highest level, Trough 2 the next highest, Trough 3 the lowest. The beaker or jar which catches the final filtered water will probably need to be slightly lower than Trough 3 to facilitate water flow.
2. Wash each grade of sand to remove any dirt or other particles present. Place the rubber bulb of a medicine dropper over the upper outlet of Trough 1. Place a short piece of tubing over the bottom opening of Trough 2. Thread this tubing upward through the tab above. This simply blocks off the bottom opening of Trough 2, which is not needed in the set-up.
3. Connect one end of a piece of tubing to the bottom opening of Trough 1 and let the other end hang over the top of Trough 2. The lengths of the tubing will depend on your individual set-up.
4. With another piece of tubing, connect the top opening of Trough 2 to the top opening of Trough 3.

TEACHING STRATEGIES

13 (diagram of the water treatment students time to study the slide. nts to speculate on the way the o be set up and used. However, be he set-up instructions and operating y closely. Involve as many students he set-up and operation of the model.

ons:
rent levels will be needed. Blocks of board boxes, books stacked under the r using shelves or study carrels might ays of obtaining various levels to work h 1 will be the highest level, he next highest, Trough 3 the lowest. or jar which catches the final ater will probably need to be slightly Trough 3 to facilitate water flow.

grade of sand to remove any dirt or icles present. Place the rubber bulb ine dropper over the upper outlet of Place a short piece of tubing over the ning of Trough 2. Thread this tubing ough the tab above. This simply blocks ttom opening of Trough 2, which is not he set-up.

e end of a piece of tubing to the ning of Trough 1 and let the other end he top of Trough 2. The lengths of ill depend on your individual set-up.

er piece of tubing, connect the top Trough 2 to the top opening of

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-9

MATERIALS

TEACHING STRATEGIES

5. Finally, connect one end of a length of tubing to the bottom opening of Trough 3 and let the other end open into the chlorination container.
6. Place the screw clamp on the tubing between Troughs 1 and 2.
7. Place a one-inch-square piece of gauze in the bottom opening of Trough 3 to prevent sand from clogging the outlet.
8. Prepare the filter basin (Trough 3) by placing a layer of coarse sand on the bottom, a layer of fine sand over that, and a final layer of very fine sand on top. Remember to wash the different grades of sand. This may be done by stirring the sand under several inches of water in a deep container. The dirt will float upward and may be poured off without spilling the sand into the sink.

The plant is now ready to be operated.

Operating Instructions:

REMINDER: Refer to the Teacher Preparation Section at the beginning of this activity.

Before a complete batch of water can be run through the system, it will be necessary to begin with a batch of water that will fill Trough 2. This trough will be constantly filled with water and therefore this first batch of water will remain in the trough until the second batch is begun.

TEACHING STRATEGIES

y, connect one end of a length of tubing to the bottom opening of Trough 3 and let the other end open into the chlorination container.

the screw clamp on the tubing between stations 1 and 2.

place a one-inch-square piece of gauze in the bottom opening of Trough 3 to prevent sand from falling through the outlet.

Prepare the filter basin (Trough 3) by placing a layer of coarse sand on the bottom, a layer of medium sand over that, and a final layer of very fine sand on top. Remember to wash the different layers of sand. This may be done by stirring the sand under several inches of water in a deep pan. The dirt will float upward and may be skimmed off without spilling the sand into the trough.

The system is now ready to be operated.

Instructions:

Refer to the Teacher Preparation Section at the beginning of this activity.

A complete batch of water can be run through the system. It will be necessary to begin with a batch of water that will fill Trough 2. This trough will be filled with water and therefore this first batch of water will remain in the trough until the filtration is begun.

ANTICIPATED STUDENT BEHAVIORS

MATERIALS

TEACHING STRATEGIES

1. Fill Trough 1 with the dirty water from the gallon jug. This will be referred to as a batch of water. You will always run one batch of water through the system at a time.
2. Sprinkle one teaspoon of alum into the batch of dirty water. Mix with an egg beater. Be careful when mixing to avoid splashing.
3. Open up the clamp on the tubing between Troughs 1 and 2 and allow the water from Trough 1 to drain into Trough 2.
4. When Trough 2 is filled, close the clamp between Troughs 1 and 2.
5. Fill Trough 1 with another batch of water and mix the alum into it.
6. At this time open the clamps on the tubing between Troughs 1 and 2 and watch the system work!
7. When this first batch of water has been completely through the treatment system, follow Steps 5 and 6 and repeat with another batch of water.
8. The rate of flow through the entire system can be regulated by adjusting the screw clamp between Troughs 1 and 2.

When several batches of water have been treated and collected, ask:

WHAT SHOULD BE ADDED TO THE CLEAN WATER AFTER IT IS FILTERED?

TEACHING STRATEGIES

1 with the dirty water from the
This will be referred to as a
water. You will always run one batch
through the system at a time.

teaspoon of alum into the batch of
Mix with an egg beater. Be careful
to avoid splashing.

clamp on the tubing between Troughs
allow the water from Trough 1 to
Trough 2.

2 is filled, close the clamp between
and 2.

1 with another batch of water and mix
to it.

open the clamps on the tubing
Troughs 1 and 2 and watch the system work!

first batch of water has been
through the treatment system, follow
6 and repeat with another batch of

flow through the entire system can
be adjusted by adjusting the screw clamp
Troughs 1 and 2.

of water have been treated and

BE ADDED TO THE CLEAN WATER
FILTERED?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-9

Students should:

--examine Worksheet 5-5 for the answer, or recall
from the treatment plant visit that chlorine is
added after filtration.

GIVE
STUDENTS
TO

Say :

CHLORINE BLEACH SUCH AS (brand name) CONTAINS "CHLORINE." (Put the word on the chalkboard.) CHLORINE IS USED IN WATER TREATMENT PLANTS TO STERILIZE THE WATER AFTER IT IS FILTERED. THAT MEANS IT IS USED TO KILL ANY BACTERIA THAT MAY STILL BE IN THE WATER AFTER IT IS FILTERED. SINCE CHLORINE IS A POISON, ONLY A SMALL AMOUNT IN PROPORTION TO THE WATER IS USED. WHEN DILUTED BY THAT MUCH WATER, THE CHLORINE IS NOT HARMFUL TO HUMAN BEINGS. IN FULL STRENGTH, HOWEVER, IT CAN BE VERY HARMFUL. THEREFORE, DO NOT TOUCH IT, TASTE IT, OR PLAY WITH IT IN ANY WAY.

WE WILL ADD ONE-HALF TEASPOON OF CHLORINE BLEACH TO OUR JAR OF CLEAN WATER.

Compare the water before and after treatment and ask:

HOW DOES THE COLOR OF OUR WATER COMPARE WITH THE WATER WE PUMPED OUT OF THE JAR?

DID OUR MODEL CLEAN THE WATER?

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS


**GIVE SEVERAL
STUDENTS A CHANCE
TO RESPOND**

Students should:

BLEACH SUCH AS (brand name) CONTAINS
." (Put the word on the chalkboard.)
IS USED IN WATER TREATMENT PLANTS TO
THE WATER AFTER IT IS FILTERED.
S IT IS USED TO KILL ANY BACTERIA
STILL BE IN THE WATER AFTER IT IS
SINCE CHLORINE IS A POISON, ONLY
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DD ONE-HALF TEASPOON OF CHLORINE
OUR JAR OF CLEAN WATER.

ter before and after treatment and ask:

THE COLOR OF OUR WATER COMPARE
WATER WE PUMPED OUT OF THE JAR?

ODEL CLEAN THE WATER?

--follow the directions and add the chlorine
bleach.

--observe and respond, "It looks cleaner."

--analyze the results and infer that the water
from the model is cleaner than the muddy
water because it is clear.

MATERIALS

TEACHING STRATEGIES

DID OUR MODEL MAKE THE WATER AS CLEAN AS
TAP WATER?

The model will be used again, so keep it as nearly
intact as possible.

See Change of Pacers 11 and 12.

Handwritten scribble
CHANGE O

TEACHING STRATEGIES

EL MAKE THE WATER AS CLEAN AS

e used again, so keep it as nearly
le.

cers 11 and 12.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-9

Students should:

--analyze the results and infer that both tap water and that from the model are clean because they went through the same processes.

Upon completion of this activity, each student should, as a minimum:

- have participated in setting up and operating the water treatment model.*
- have expressed in some way that the water coming from the model is cleaner than when it went in.*



MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE B
ACTIVITY 5-9

Teacher _____

Activity name suggested by class: _____

BSCS USE: Post ____ Tally ____ Rev ____
--

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

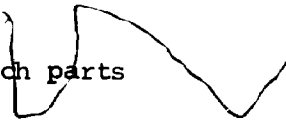
HIGH INTEREST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MODERATE INTEREST OR INDIFFERENCE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RESISTANCE OR DISLIKE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?


9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY: 

11. Your rating of this activity:
 Worthwhile Of value--needs the revision suggested Worth salvaging--make major changes described Worthless --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

 Were the instructions regarding the set-up of the water treatment plant model clear and easily followed? Yes No If not, what problems did you find?

--	--	--	--	--

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?
7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Were the instructions regarding the set-up of the water treatment plant model clear and easily followed? Yes No If not, what problems did you find?
13. Did you have any problems in the operation of the model? No Yes If so, what?
14. What indications were there that students were able to relate the model to the actual treatment plant which they visited?

UNIT V, CORE B
ACTIVITY 5-9

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

BSCS Evaluation: EMH Feedback Form II

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

1. Understand the need for water.
2. Recognize the sources of water.

Core B Objectives for the Student:

1. Identify the immediate sources of water available to people.
2. Establish that the water supply is limited.
3. Establish that something must be done to our water before we drink it.

ENVIRONMENTAL THEME:

Interrelationships of Environmental Components

INQUIRY SKILLS:

Applying

PROBLEM-SOLVING SKILLS:

Knowing the Problem and What To Do To Solve It

PRACTICAL APPLICATION:

Working Independently to Solve Problems,
Participating in a Class Discussion,
Knowing Directions of the Compass



BSCS

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE B.

SOURCES OF WATER

ACTIVITY 5-10.

CLUES TO SUCCESS:
BACKGROUND AND UNDERSTANDING

ACTIVITY

Goals for the Student:

1. Understand the need for water.
2. Recognize the sources of water.

Objectives for the Student:

1. Identify the immediate sources of water available to people.
2. Establish that the water supply is limited.
3. Establish that something must be done to our water before we drink it.

GENERAL THEME:

Relationships of Environmental
Elements

SKILLS:
Identifying

PROBLEM SOLVING SKILLS:

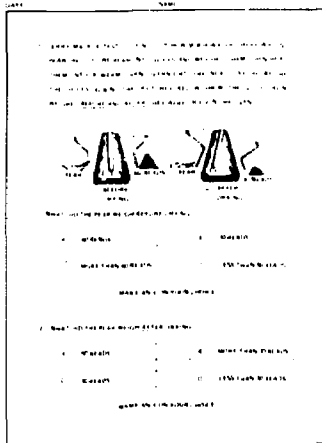
Identifying the Problem and What To Do To
Solve It

APPLICATION:

Working Independently to Solve Problems,
Participating in a Class Discussion,
Following Directions of the Compass

Worksheet 5-6
Worksheet 5-7
Slides 5-13 through 5-17
*35 mm Slide projector

Worksheet 5-6



*Not furnished in materials kit

Activity 5-10. Clues to Success:
Background and Understanding

The purpose of this activity is to make the student aware of some of the things he has learned in the first two cores of this unit as well as to inform you of his background strength in observing, describing, and understanding the use of the balance and the directions of the compass. Such information will help you to reinforce student progress, provide encouragement, and plan helpful activities.

Distribute Worksheet 5-6 and direct students to write their names and the date in the space provided.

Then say:

READ EACH QUESTION TO YOURSELF AS I READ IT ALOUD TO YOU. THEN MARK YOUR ANSWER. LOOK ONLY AT YOUR OWN WORK. AND WE WILL DISCUSS YOUR ANSWERS AFTER WE ARE FINISHED.

Read the statement and direct the students' attention to the picture of the balances. Then read the question and the choices. Circulate around the room to be sure each student is marking the correct question. Repeat this procedure for Question 2.

TEACHING STRATEGIES

Clues to Success:
Background and Understanding

of this activity is to make the student of the things he has learned in the first this unit as well as to inform you of his strength in observing, describing, and the use of the balance and the directions s. Such information will help you to dent progress, provide encouragement, and activities.

Worksheet 5-6 and direct students to write and the date in the space provided.

ASK A QUESTION TO YOURSELF AS I READ
TO YOU. THEN MARK YOUR ANSWER.
DO IT AT YOUR OWN WORK AND WE WILL
CHECK YOUR ANSWERS AFTER WE ARE FINISHED.

movement and direct the students' attention to the balances. Then read the question and Circulate around the room to be sure each is marking the correct question. Repeat this Question 2.

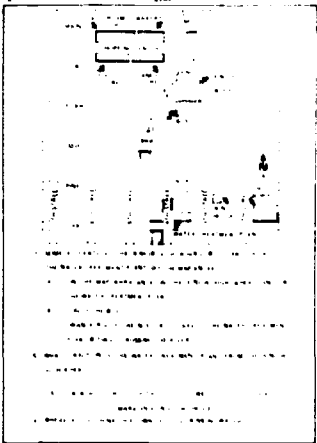
ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- complete Worksheets 5-6 and 5-7.*
- participate in a discussion of the items on the worksheets.*

MATERIALS

Worksheet 5-7



TEACHING STRATEGIES

Now have students turn the worksheet over and again put their names and the date in the spaces provided.

Say:

QUESTION 3 STILL REFERS TO THE TEST AND PICTURES IN QUESTION 1. YOU CAN LOOK BACK AT THE PICTURES IF YOU NEED TO.

Read Question 3 and the choices twice, allowing plenty of time for students to respond.

For Questions 4 and 5, assist those students who need help in writing their answers.

When students have responded to Question 6, collect Worksheet 5-6. Distribute Worksheet 5-7. Have students find the side that starts with Number 7 and put their names and the date in the spaces provided.

Question 7 will be scored for following directions.

Say:

QUESTION 7 ASKS YOU TO DO MANY THINGS. LISTEN CAREFULLY, FOR I WILL READ IT ONLY TWICE.

Read the entire item twice but do not read the words on the map.

ANTICIPATED STUDENT BEHAVIORS

TEACHING STRATEGIES

Students turn the worksheet over and again
and the date in the spaces provided.

STILL REFERS TO THE TEST AND
QUESTION 1. YOU CAN LOOK
PICTURES IF YOU NEED TO.

and the choices twice, allowing plenty
of time for students to respond.

and 5, assist those students who need
their answers.

After students have responded to Question 6, collect
the worksheets. Distribute Worksheet 5-7. Have
students turn the side that starts with Number 7 and
write the date in the spaces provided.

Answers will be scored for following directions.

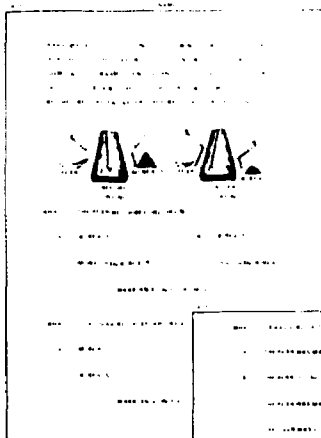
ASKS YOU TO DO MANY THINGS.
READ CAREFULLY, FOR I WILL READ IT

Read each item twice but do not read the words

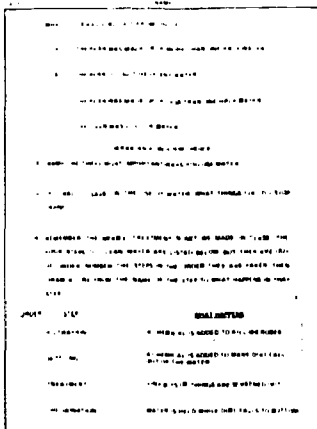
Slide 5-13



Slide 5-14



slide 5-15



GIVE
TIME
TO
THINK

Continue reading the remaining questions on Worksheet 5-7A and 5-7B.

When you get to Question 12, project Slide 5-13 of the water treatment plant model while the question is read and students respond.

When the students have finished, collect Worksheet 5-7. After class, score and record responses to the worksheets in the Student Record of Progress. Follow the guidelines at the end of the activity.

Now project Slides 5-14 through 5-17 of the worksheets and discuss each item. The following list shows acceptable answers. Strategies are suggested for some items:

Item 1: A. 60 beads.

Before reading Item 2, ask:

DOES THE PICTURE ON THE RIGHT SHOW HOW MANY BEADS THE PEAR WEIGHED AFTER DRYING?

WHAT WOULD YOU DO TO THE BALANCE TO FIND OUT HOW MUCH THE DRIED PEAR WEIGHED?

TEACHING STRATEGIES

**GIVE STUDENTS
TIME
TO
THINK**



ng the remaining questions on
A and 5-7B.

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respond.

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Item 2, ask:

PICTURE ON THE RIGHT SHOW HOW MANY
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DO YOU DO TO THE BALANCE TO FIND
MUCH THE DRIED PEAR WEIGHED?

ANTICIPATED STUDENT BEHAVIORS

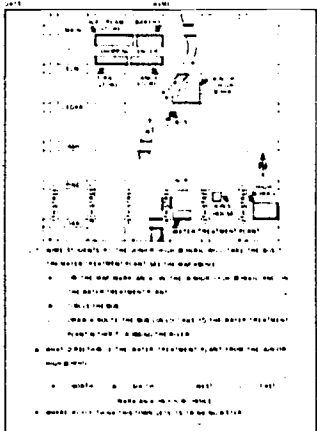
Students should:

--note that the balance beam is out of balance
and respond, "No."

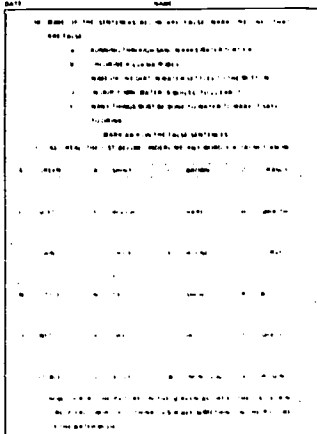
--respond, "Take beads away until the beads and
pear are even," "Take beads off the tray until
the arrow points to the center."

MATERIALS

Slide 5-16



Slide 5-17



TEACHING STRATEGIES

Item 2: D. Less than 30 beads.

Item 3: A. The pear was made up of more than one-half water.

If students had difficulty with Item 3, ask:

WHO KNOWS HOW MUCH THE PEAR WEIGHED BEFORE DRYING?

HOW MUCH WOULD HALF OF ITS WEIGHT BE?

HOW MUCH DID THE PEAR WEIGH AFTER DRYING?

WHAT CAUSED THE PEAR TO LOOSE ALL THAT WEIGHT?

HOW MUCH OF THE PEAR'S WEIGHT WAS WATER?

Item 4: For drinking, cooking, and washing.

NOTE: Students may be able to justify other answers.

Item 5: Watering lawns, washing cars, using dishwashers, and washing machines.

NOTE: Students may be able to justify other answers. If so, give them credit.

TEACHING STRATEGIES

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pear was made up of more than
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students had difficulty with Item 3, ask:

HOW MUCH THE PEAR WEIGHED
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WHAT WOULD HALF OF ITS WEIGHT BE?

HOW MUCH DID THE PEAR WEIGH AFTER
DRYING?

WHAT CAUSED THE PEAR TO LOOSE ALL
ITS WEIGHT?

WHAT PERCENT OF THE PEAR'S WEIGHT WAS
LOST?

drying, cooking, and washing.

Students may be able to justify other answers.

Examples: mowing lawns, washing cars, using
dishwashers, and washing machines.

Students may be able to justify other answers.
Give them credit.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-10

Students should:

--respond, "60 beads."

--respond, "30 beads."

--respond, "Less than 30 beads."

--respond, "The oven dried it out."

--respond, "More than one-half was water."

If so, give them credit.

For Item 6, project Slide 5-13 of the water treatment plant model. The answers as shown on the worksheet should be:

<u>ORDER</u>	<u>STEP</u>	<u>WHAT HAPPENS</u>
3	Filtration	A chemical is added to kill microbes
2	Settling	A chemical is added to make dirt fall out of the water
1	Treatment	Tiny bits of things are screened out
4	Chlorination	Water is held while dirt falls to bottom

For Item 7, project Slide 5-16 of the map on the chalkboard. Have students follow each of the directions using chalk to mark the image on the chalkboard.

Item 8: B. South.

Item 9: From the Blue River.

Item 10: False statements are:

A. Running through sand makes water dirtier.

B. In our town water is boiled to clean it.

TEACHING STRATEGIES

Project Slide 5-13 of the water treatment
The answers as shown on the worksheet

<u>STEP</u>	<u>WHAT HAPPENS</u>
Filtration	A chemical is added to kill microbes
Settling	A chemical is added to make dirt fall out of the water
Treatment	Tiny bits of things are screened out
Chlorination	Water is held while dirt falls to bottom

Project Slide 5-16 of the map on the
Have students follow each of the
using chalk to mark the image on the

South.

in the Blue River.

These statements are:

Running through sand makes water dirtier.

In our town water is boiled to clean it.

ANTICIPATED STUDENT BEHAVIORS

MATERIALS

TEACHING STRATEGIES

For Item 11, if many words are unknown, you may wish to assemble a group of objects that have the characteristics of words in the list. Let students match words with objects they describe. Allow plenty of "hands on" experience with the objects.

Item 12: Accept all circled words for which students can give reasonable justifications as they look at Slide 5-13 and discuss this item.

Guidelines for Scoring and Interpretation

Before scoring the worksheets, turn to the "Progress in Following Directions" page of the Student Record of Progress. Follow the instructions there to rate each student's ability to follow directions. When you have done this, enter the student's performance on Item 7 of Worksheet 5-7A. Circle 5 if all of the following directions were followed:

- A. Name and date written at top.
- B. An X marked on the High School and Junior High School.
- C. The bus circled.
- D. Bus route marked.
- E. Route to water plant doesn't cross river.

Now compare and combine your rating and the performance score to determine who needs the most help in following directions to succeed in the ensuing activities.

MATERIALS

TEACHING STRATEGIES

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TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-10

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ACTIVITY
5-10

MATERIALS

TEACHING STRATEGIES

Rating of Involvement: On the page titled "Responsibility and Involvement" in the Participation Section of the Student Record of Progress are guidelines to rate each student's involvement and interest in science to date. For students who are rated low, explore the suggestions in the introduction to the Student Record of Progress.

Now turn to the page titled "Development of Experience" in the Student Record of Progress and find the column headed Act. 5-10. Orientation in Space." Circle YES if students correctly completed Items 7C and 8 (drawing a route that doesn't cross the river and marking South as the direction of the water plant). Circle NO if either or both items were missed.

Next, find the column headed "Act. 5-10. Description." Circle HIGH if students underlined less than six words (words not known) and circled more than 12 words (words that describe water model). Circle LOW if students underlined more than eight words and circled less than six words. For the remaining students, circle SOME, indicating partial knowledge and use of descriptive words.

Use the Tallysheet at the back of the Student Record of Progress to record student responses to the remaining questions on Worksheets 5-6 and 5-7. When you have tallied the responses, review them to note items missed by many in the class and consider whether further review or repeating an activity is in order. Also note individual students who were unsuccessful over many items. Plan more assistance for these students to insure their success with the coming activities.

TEACHING STRATEGIES

ANTICIPATED STUDEN

Rating of Involvement: On the page titled "Responsibility and Involvement" in the Participation Section of the Student Record of Progress are guidelines to rate each student's involvement and interest in science to date. For students who are rated low, explore the suggestions in the introduction to the Student Record of Progress.

Now turn to the page titled "Development of Experience" in the Student Record of Progress and find the column headed Act. 5-10. Orientation in Space." Circle YES if students correctly completed Items 7C and 8 (drawing a route that doesn't cross the river and marking South as the direction of the water plant). Circle NO if either or both items were missed.

Next, find the column headed "Act. 5-10. Description." Circle HIGH if students underlined less than six words (words not known) and circled more than 12 words (words that describe water model). Circle LOW if students underlined more than eight words and circled less than six words. For the remaining students, circle SOME, indicating partial knowledge and use of descriptive words.

Use the Tallysheet at the back of the Student Record of Progress to record student responses to the remaining questions on Worksheets 5-6 and 5-7. When you have tallied the responses, review them to note items missed by many in the class and consider whether further review or repeating an activity is in order. Also note individual students who were unsuccessful over many items. Plan more assistance for these students to insure their success with the coming activities.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

vement: On the page titled "Participation and Involvement" in the Participation Student Record of Progress are guidelines for student's involvement and interest in the activity. For students who are rated low, explore the introduction to the Student Record of Progress.

page titled "Development of Experience" in the Record of Progress and find the column headed "0. Orientation in Space." Circle YES if the student correctly completed Items 7C and 8 (drawing a line across the river and marking South of the water plant). Circle NO if any of the items were missed.

column headed "Act. 5-10. Description." Circle students underlined less than six words (and circled more than 12 words (words in the water model). Circle LOW if students underlined less than eight words and circled less than 12 words. For the remaining students, circle SOME, indicating partial knowledge and use of descriptive

sheet at the back of the Student Record of Progress record student responses to the remaining worksheets 5-6 and 5-7. When you have reviewed the responses, review them to note items missed in class and consider whether further review of the activity is in order. Also note students who were unsuccessful over many attempts. Provide assistance for these students to succeed with the coming activities.

MATERIALS

TEACHING STRATEGIES

Record a summary of the tallied results in the Understanding Section of the Student Record of Progress as follows.

On the "Numbers and Measurements" page, find the column headed "Act. 5-10. Using a Balance." Circle YES if both Items 1 and 2 are correct; otherwise circle NO.

On the "Concepts" page, find the column titled "Act. 5-10. Water in Plants." Circle YES if this item is correct; otherwise circle NO.

Find the column titled "Act. 5-10. Water Uses," and circle YES if at least two correct answers were written for Items 4 and 5. Otherwise circle NO.

Find the column headed "Act. 5-10. Water Treatment." Circle YES if at least three of the four Items 6A, 6B, 9, and 10 were correctly answered; otherwise circle NO.

Now you can identify the students who were MOST and LEAST successful in understanding concepts in Cores A and B of Unit V. Circle HIGH if three or more of the columns were marked YES.

Circle LOW if one or less of the columns was marked YES. Explore whether these students are low in background skills as recorded in the first section of the Student Record of Progress. If so, perhaps a lower standard for success is appropriate for these children.

TEACHING STRATEGIES

Record a summary of the tallied results in the Understanding Section of the Student Record of Progress as follows.

On the "Numbers and Measurements" page, find the column headed "Act. 5-10. Using a Balance." Circle YES if both Items 1 and 2 are correct; otherwise circle NO.

On the "Concepts" page, find the column titled "Act. 5-10. Water in Plants." Circle YES if this item is correct; otherwise circle NO.

Find the column titled "Act. 5-10. Water Uses," and circle YES if at least two correct answers were written for Items 4 and 5. Otherwise circle NO.

Find the column headed "Act. 5-10. Water Treatment." Circle YES if at least three of the four Items 6A, 6B, 9, and 10 were correctly answered; otherwise circle NO.

Now you can identify the students who were MOST and LEAST successful in understanding concepts in Cores A and B of Unit V. Circle HIGH if three or more of the columns were marked YES.

Circle LOW if one or less of the columns was marked YES. Explore whether these students are low in background skills as recorded in the first section of the Student Record of Progress. If so, perhaps a lower standard for success is appropriate for these children.

ANTICIPATED STUDENT BEHAVIOR

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-10

the tallied results in the
on of the Student Record of Progress

"Measurements" page, find the
5-10. Using a Balance." Circle
and 2 are correct; otherwise

page, find the column titled
in Plants." Circle YES if this
otherwise circle NO.

led "Act. 5-10. Water Uses," and
last two correct answers were written
Otherwise circle NO.

ded "Act. 5-10. Water Treatment."
last three of the four Items 6A,
correctly answered; otherwise

y the students who were MOST and
understanding concepts in Cores A
ircle HIGH if three or more of the
YES.

r less of the columns was marked
er these students are low in back-
corded in the first section of the
rogress. If so, perhaps a lower
s is appropriate for these

ACTIVITY
5-10

MATERIALS

TEACHING STRATEGIES

Students identified as low in understanding should receive special help and support to enable them to succeed in the following activities. If no students are low, you can congratulate yourself for an effective job of teaching.

TEACHING STRATEGIES

ntified as low in understanding should
ial help and support to enable them to
ne following activities. If no students
can congratulate yourself for an
o of teaching.

ANTICIPATED STUDENT BEHAVIORS

*Upon completion of this activity, each student
should, as a minimum:*

--have completed Worksheets 5-6 and 5-7.

TEACHING STRATEGIES

ntified as low in understanding should
ial help and support to enable them to
ne following activities. If no students
can congratulate yourself for an
p of teaching.

ANTICIPATED STUDENT BEHAVIORS

*Upon completion of this activity, each student
should, as a minimum:*

--have completed Worksheets 5-6 and 5-7.

UNIT V, CORE B
ACTIVITY 5-10

Teacher _____

Activity name suggested by class:

BSCS USE:	Post _____	Tally _____	Rev _____
-----------	------------	-------------	-----------

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?


9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

 Do you feel that this clue to success will aid you in planning teaching strategies to help individual students? Yes No Comment.

UNIT V, CORE B
ACTIVITY 5-10

Teacher _____

Activity name suggested by class:

BSCS USE:	Post _____	Tally _____	Rev _____
-----------	------------	-------------	-----------

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)					
2.	Minutes of class time on science each day					
3.	Minutes preparing for each day's science class					
4.	Students absent on each date (Use ID Number)					

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?


9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

 Do you feel that this clue to success will aid you in planning teaching strategies to help individual students? Yes No Comment.

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?
7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will
use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts
were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it
- If revision is suggested, what parts of this activity should be retained
unchanged when the curriculum is revised? Page(s) _____ Comment:
- Specific Questions:
12. Do you feel that this clue to success will aid you in planning teaching strategies
to help individual students? Yes No Comment.
13. Complete and send Tallysheet 5-3 to BSCS.

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?

UNIT V
REACTIONS TO CORE B

1. Was the background information for this core clear and useful? Yes No
Comment:

2. Was there too much preparatory reading and too many directions given to the teacher? Yes No
Comment:

3. Was it clear to you why these particular activities were chosen and the direction they were leading? Yes No

4. How would you increase the clarity of this core for students? (Help them understand why they are doing these activities.)

5. Is there a practical (take-home) value for your students in these activities?
 Yes No If yes, what do you see as the "take-home" lesson? If no, what is needed?

6. In these materials, what things did your students find difficult to do?

7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?

8. Were the Clues to Success and Student Record of Progress helpful in this core?
 Yes No If helpful, how are they helpful?

9. Did you make use of the Planning Guide included in the introductory material for this core? Yes No
Comment:

10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? Yes No
Comment:

11. If you could teach your way, rather than following the Guide, how would you do it?

Did the activities fulfill the purposes described by the core objectives and rationale? Yes No
Comment:

6. In these materials, what things did your students find difficult to do?
7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?
8. Were the Clues to Success and Student Record of Progress helpful in this core?
 Yes No If helpful, how are they helpful?
9. Did you make use of the Planning Guide included in the introductory material for this core? Yes No
Comment:
10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? Yes No
Comment:
11. If you could teach your way, rather than following the Guide, how would you do it?
12. Did the activities fulfill the purposes described by the core objectives and rationale? Yes No
Comment:
13. Which of your students do you believe were unsuccessful in achieving the objectives of this core of activities? Explain:

NEW STUDENTS ENTERING DURING THIS CO

Date Entered	Last Name	Name Used	Ethnic Group	Sex	Birthdate	Test Date	Test
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B

W = white
 B = black
 S = Spanish-
 American
 O = other

W=WIS
 B=Bin
 O=Oth
 (Na

STUDENTS DROPPED IN THIS PERIOD

Date Dropped	Last Name	First	Reason for Dropping

NEW STUDENTS ENTERING DURING THIS CORE

p	Sex	Birthdate	Test Date	Test	Total	Verbal	Performance	Previous Test Score
	M F			W B O				
	M F			W B O				
	M F			W B O				
	M F			W B O				
	M F			W B O				
	M F			W B O				

W=WISC
 B=Binet
 O=Other
 (Name)

for Dropping



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE C. PREPARATION OF USABLE WATER

AIMS FOR ME AND MY ENVIRONMENT

1. DEVELOPMENT IN EACH CHILD OF A SENSE OF IDENTITY AS A PERSON WHO HAS SOME DEGREE OF CONTROL OVER AND CAN ACT ON HIS ENVIRONMENT. This will lead to a degree of self-determination based on a rational coping with situations rather than on a passive compliance or an impulsive response to problems.
2. DEVELOPMENT IN EACH CHILD OF A SUCCESS SYNDROME. More than anything else, each activity is intended to be a success experience for each child. It is the teacher's responsibility -- almost obligation -- to see that each child succeeds at a level that is challenging to his abilities and that preserves his self-respect. It is a further responsibility of the teacher to point out his achievement. The students as a group should help each individual fit what he has done into a pattern of accomplishment.
3. DEVELOPMENT IN EACH CHILD OF AN INTEREST THAT COULD BECOME A HOBBY OR AVOCATION OVER A LIFETIME (through an exposure to an array of experiences in science). It is hoped that many children will find some area -- perhaps growing plants, caring for animals, identifying flowers, collecting things, or simply enjoying outings into the country -- that they feel strongly about and can develop some competence or knowledge in. This would provide a means of self-expression, and (perhaps) allow some degree of sharing or involvement with others.
4. DEVELOPMENT IN EACH CHILD OF A SENSE OF RELATIONSHIP AND EMPATHY WITH OTHER LIVING THINGS. It is hoped that this will lead to a positive regard and caring about what affects them as individuals and as a group, because what affects them affects the community of man.
5. DEVELOPMENT IN EACH CHILD OF AN UNDERSTANDING OF ENVIRONMENTAL CONDITIONS that will lead to a sense of responsibility for the environment and actions that protect or improve it.

The two parts of this unit will deal with air and water as major components of the environment.

Part 1 emphasizes the importance of the environment by helping the student to:

1. Understand the need for water
2. Recognize the sources of water
3. Realize the problems associated with water
4. Realize the problems associated with air
5. Recognize the impact of water and air
6. Understand the broad problems of the environment

Part 2 emphasizes the nature of the environment by helping the student to:

7. Understand the composition of air and water
 8. Realize that the quality of air and water is important
 9. Realize that substances are carried by air and water
 10. Comprehend the impact of air and water on the environment
1. Examine some specific contaminants
 2. Examine some techniques required for water purification
 3. Introduce the concept of the water cycle
 4. Establish water as a finite resource

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE C. PREPARATION OF USABLE WATER



BSCS

UNIT V GOALS

The two parts of this unit will serve to develop an appreciation of the roles of air and water as major components of our environment.

Part 1 emphasizes the importance of water as a vulnerable component of our environment by helping the student to:

1. Understand the need for water.
2. Recognize the sources of water.
3. Realize the problems associated with the preparation of usable water.
4. Realize the problems associated with the disposal of waste water.
5. Recognize the impact of water pollution.
6. Understand the broad problems of water management.

Part 2 emphasizes the nature of air as a complex component of our environment by helping the student to:

7. Understand the composition of air.
8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.
10. Comprehend the impact of air pollution on our environment.

CORE C OBJECTIVES

1. Examine some specific contaminants of water.
2. Examine some techniques required to remove these contaminants.
3. Introduce the concept of the natural water cycle.
4. Establish water as a finite resource.



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE C. PREPARATION OF USABLE WATER

CORE C RATIONALE

Except in very unusual circumstances, water must be treated in some way before it is suitable for human needs. In addition to natural impurities, many byproducts of man's activities produce problems for water treatment facilities. In this core of activities, students will have the opportunity to examine some specific examples of such contaminants and the problems associated with their removal. The core is climaxed with the study of the natural water cycle and the associated concept of water as a finite resource.

BAC

In spite of the problems associated in the past few years some time. The majorized in three ways and (3) persistent of introduce examples of

Microbial contamination world and is discussed ment, as well as in point, treatment of v straightforward manner

The problem of region to region, but 5-12. This is the p Phosphates are usually The most loudly denou of washing detergents products contained la active agent (deterge

In response to p new formulations of f more than about eight phosphate products on

A second, and in is agricultural runoff to cropland (and lawn Instead it is carried or stream.



BSCS

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE C. PREPARATION OF USABLE WATER

BACKGROUND INFORMATION FOR THE TEACHER

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s produce
of activities,
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their removal.
er cycle and

In spite of the current trend toward awareness of our environment, the problems associated with producing usable water have not changed a great deal in the past few years. Many of the specific problems have been with us for some time. The major contaminants of drinking water supplies may be categorized in three ways: (1) microbial, (2) unusual or unpredicted pollutants, and (3) persistent or predictable pollutants. This core of activities will introduce examples of each of these categories.

Microbial contamination of drinking water is a concern throughout the world and is discussed in Activity 5-11. The role of microbes in our environment, as well as in human health, has already been well established. At this point, treatment of water by boiling and chlorination are compared in a straightforward manner.

The problem of continuing and predictable pollutants will vary from region to region, but one example has been chosen for emphasis in Activity 5-12. This is the problem of soluble phosphates in surface water supplies. Phosphates are usually contributed to lakes and streams from two sources. The most loudly denounced is that of domestic sewage containing large amounts of washing detergents. In the past, commercial formulations of washday products contained large amounts of phosphate in addition to the surface active agent (detergent).

In response to public concern, detergent manufacturers have developed new formulations of familiar products. Nowadays, there are few that contain more than about eight percent phosphates. There are also many new non-phosphate products on the market.

A second, and in some cases equally important, source of phosphates is agricultural runoff. A considerable amount of the fertilizer applied to cropland (and lawns!) is never utilized by the plants as intended. Instead it is carried off in solution by runoff water to the nearest lake or stream.



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE C. PREPARATION OF USABLE WATER

BACKGROUND IN

It is very important that water is not one of toxicity. It is a nutrient. Just as various nutrients are found on a field, so do they in water. Just as a variety of water plants in the water, so do microscopic green plants. In the position of this excessive mass of organic plant decomposition, this decomposition action subsequently depletes oxygen, which in turn decreases the amount of things in the water.

There are innumerable examples of pollution of surface water. Activity 5-13 because it is a familiar example, has received considerable publicity. It is a striking example of the

Activity 5-14 introduces the concept of distillation. It involves two basic phenomena. In the first, application of heat to water of undissolved solids (e.g., salts and minerals) causes them to be vaporized. The resulting condensed liquid is pure water.

The natural water cycle is shown in Chart 5-2. Heat from the sun causes evaporation from the oceans. The heated air mass rises, it cools, and condensation occurs as rain. Chart 5-2.



BSCS

UNIT V. AIR AND WATER IN MY ENVIRONMENT

LESSON C. PREPARATION OF USABLE WATER

BACKGROUND INFORMATION FOR THE TEACHER (continued)

It is very important to realize that the problem of phosphate pollution is not one of toxicity. It is entirely related to its role as a plant nutrient. Just as various forms of soluble phosphates function as fertilizers on a field, so do they in the stream. The result may be a luxurious growth of water plants in the receiving lake or stream. As often as not, these are microscopic green plants called algae. It is the subsequent death and decomposition of this excessive algal growth that causes problems. The accumulated mass of organic plant debris is then attacked by microbes. This microbial action subsequently depletes the oxygen content of the surrounding water, which in turn decreases the oxygen supply for fish, plants, and other living things in the water.

There are innumerable types of unusual or unpredictable sources of pollution of surface waters. Oil has been selected for attention in Activity 5-13 because it is a familiar and identifiable material. Oil spills have received considerable public attention in recent years, and oil provides a striking example of the difficulty of environmental clean-up.

Activity 5-14 introduces the process of distillation. This process involves two basic phenomena - vaporization and condensation of water. In application, water of unknown quality is vaporized by heating. All dissolved solids (e.g., salts and other minerals) remain behind since these are not vaporized. The resulting water vapor is then condensed by chilling. The condensed liquid is pure water.

The natural water cycle in Activity 5-15 involves a very similar process. Heat from the sun causes the evaporation of water from the earth, especially the oceans. The heated air (now laden with water vapor) naturally rises. As the air mass rises, it cools. This cooling results in condensation. Such condensation occurs as rain or snow, returning the water to the earth. See Chart 5-2.



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UNIT V
CORE C

PLANNING GUIDE

NOTE: Some activities (indicated in italics and an arrow in the margin) be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		<i>(Italics)</i>
	Materials You Furnish	Materials in Supply Kit	
5-11. The Invisible World Days needed: 2	Salt crystals Feathers Nylon stocking scraps	Microscopes Magnifying lenses Microscope slides Worksheet 1-23	Four One per student Twelve Microscope One ounce, Four Four pieces
5-12. Microbes in Water Days needed: 3	Pint jars Masking tape Noniodized salt Garden soil Dishwashing detergent Household bleach Motor oil Hot plate or stove Water	Test tubes, 13 X 100 mm Test tube racks Methylene blue solution Rubber stoppers, solid #00 Measuring spoons Medicine droppers	Five; these For labeling Two tables Three tables 1/4 Teaspoon One table Two tables Six per pair Mix 10 drops of water For test tubes One set per One per pair

PLANNING GUIDE



BSCS

Activities (indicated in italics and an arrow in the margin) must be prepared several days or weeks in advance. Use this summary as a guide for materials and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher
Materials in Supply Kit	<i>(Italics and Arrow Indicate Advance Preparation Directions)</i>
Microscopes Magnifying lenses Microscope slides Worksheet 1-23	Four One per student Twelve Microscope One ounce, or less Four Four pieces
Test tubes, 13 X 100 mm Test tube racks Methylene blue solution Rubber stoppers, solid #00 Measuring spoons Medicine droppers	<p><i>Five; these need not be identical</i></p> For labeling Two tablespoons Three tablespoons 1/4 Teaspoon One tablespoon Two tablespoons

UNIT V
COR: C

PLANNING GUIDE



Me and my Environment

NOTE: Some activities (indicated in italics and an arrow) be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		(Ita)
	Materials You Furnish	Materials in Supply Kit	
5-13. A Washday Miracle Days needed: 4	Jars 1 and 2 from Activity 5-12 Detergent packages, with phosphate content Plant food or liquid fertilizer with phosphate content Plastic kitchen wrap Rubber bands Water treatment model	"Green Water" Beakers, 250 ml Measuring spoons Microscopes Microscope slides Medicine droppers	Several One teas Order fr Three pe One set From Act Four Eight Four
5-14. Oil in Water Days needed: 2	Jar 4 from Activity 5-12 Water treatment model		From Act Gather p spills
5-15. Distillation of Water Days needed: 2	Hot plate Water treatment model Jars 3 and 5 from Activity 5-12 Ice Water		From Act

PLANNING GUIDE



BSCS

Activities (indicated in italics and an arrow in the margin) must be prepared several days or weeks in advance. Use this summary as a planning and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher
Materials in Supply Kit	<i>(Italics and Arrow Indicate Advance Preparation Directions)</i>
<p><i>Activity</i></p> <p><i>te</i></p> <p>"Green Water" Beakers, 250 ml Measuring spoons</p> <p>Microscopes Microscope slides Medicine droppers</p>	<p><i>Several brands</i></p> <p>One teaspoon is sufficient</p> <p><i>Order from BSCS three weeks prior to this activity</i></p> <p>Three per student group One set per student group From Activity 5-9</p> <p>Four Eight Four</p>
	<p>From Activity 5-9</p> <p><i>Gather pictures, newspaper clippings, and articles about oil spills and the various attempts to clean them up.</i></p>
	<p>From Activity 5-9, optional</p>



Me and my Environment

UNIT V
CORE C

PLANNING GUIDE


NOTE: Some activities (indicated in italics and an in the margin) be prepared several days or weeks in advance. Use this as a teaching and preparation schedule. All supplies needed are listed.

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		<i>(Italics)</i>
	Materials You Furnish	Materials in Supply Kit	
5-15. Distillation of Water (continued)		Flask, 250 ml Rubber stopper, 1-hole, #6 Bent glass tube Test tubes Beaker, 1000 ml Test tube clamp Vinyl tubing, 1/4 inch diameter	One One One Six, any size One Six Twelve inches
5-16. Water Cycle Days needed: 2	Globe Ice Small stones Gooseneck lamp Plastic sandwich bags Magazines, newspapers, catalogs Scissors Paste or glue Large pieces of butcher paper or construction paper Water	Plastic sweater box Chart 5-2, <i>Water Cycle in Nature</i> Tallysheet 5-4	One Approximately Several With 100-watt <i>These should be a wide selection</i> One pair per One piece per One per class

PLANNING GUIDE



BSCS

ities (indicated in italics and an  in the margin) must be prepared several days or weeks in advance. Use this summary as a guide for materials and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher (Italics and Arrow Indicate Advance Preparation Directions)
Materials in Supply Kit	
Flask, 250 ml Rubber stopper, 1-hole, #6 Bent glass tube Test tubes Beaker, 1000 ml Test tube clamp Vinyl tubing, 1/4 inch diameter	One One One Six, any size One Six Twelve inches to sixteen inches long
Plastic sweater box Chart 5-2, <i>Water Cycle in Nature</i> Tallysheet 5-4	One Approximately one tray Several With 100-watt bulb <i>These should be collected before the activity to insure that a wide selection is on hand.</i> One pair per student One piece per student One per class



Me and my Environment



BSCS



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

3. Realize the problems associated with the preparation of usable water.
5. Recognize the impact of water pollution.

Core C Objectives for the Student:

1. Examine some specific contaminants of water.

ENVIRONMENTAL THEME:

Diversity and Patterns

INQUIRY SKILLS:

Observing, Describing

PROBLEM-SOLVING SKILLS:

Experimenting: Doing Something To See
What Happens

PRACTICAL APPLICATION:

Manual Dexterity Skills, Experience with
Delicate Equipment

Activity 5-11. The Invisible World

Examining the "invisible" world with a microscope will probably be a high point in the program for your students. Share in their enthusiasm as they discover the microscopic world.

ACTIVITY

Goals for the Student:

3. Realize the problems associated with the preparation of usable water.
5. Recognize the impact of water pollution.

Objectives for the Student:

1. Examine some specific contaminants of water.

GENERAL THEME:

Quality and Patterns

SKILLS:

Observing, Describing

MOVING SKILLS:

Experimenting: Doing Something To See What Happens

APPLICATION:

Dexterity Skills, Experience with Microscopic Equipment

The Invisible World

"The invisible" world with a microscope will be a high point in the program for your students. Encourage their enthusiasm as they discover the micro-



BSCS

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE C. PREPARATION OF USABLE WATER

ACTIVITY 5-11. THE INVISIBLE WORLD

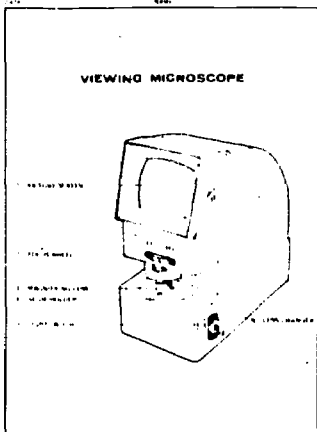
During this activity, each student should:

- identify each part of the microscope.
- examine and describe salt crystals.
- examine and describe salt crystals with a hand lens.

MATERIALS

Microscopes, 4
Magnifying lenses, 1 per student
Microscope slides, 12
Worksheet 1-23
*Salt crystals, 1 ounce or less
*Feathers, 4
*Nylon stocking scraps, 4 pieces

Worksheet 1-23



furnished in materials kit

TEACHING STRATEGIES

The first objects that students will view under their microscopes are salt crystals. What a microscope does and how it works will be demonstrated.

Since the microscope will be used several times in this core and later cores of this unit, this activity serves as an introduction to the microscope, how it works, and what it can be used for.

Begin by saying:

WE HAVE BEEN USING OUR WATER TREATMENT MODEL TO CLEAN DIFFERENT SAMPLES OF WATER.

COULD THERE POSSIBLY BE ANYTHING STILL IN THE CLEAN WATER THAT WE COULDN'T SEE?

WHAT COULD WE USE TO SEE THESE VERY SMALL THINGS IN THE WATER?

MICROSCOPES ARE USED BY PEOPLE WHO WORK IN LABORATORIES TO SEE MANY THINGS THAT CAN'T BE SEEN WITH THE EYE ALONE.

Hold up one of the microscopes and say:

THIS IS ONE OF THE MICROSCOPES WE WILL USE TO TAKE A CLOSER LOOK AT SOME OF THE THINGS IN OUR WATER AND OUR AIR. A MICROSCOPE MUST BE HANDLED CAREFULLY, HOWEVER, SO BEFORE WE CAN LOOK WITH IT WE MUST LEARN TO USE IT PROPERLY.

Divide the class into groups and distribute a microscope to each group. Let the students examine it, but caution them not to turn on any switches or move any parts until directed to do so. Also distribute Worksheet 1-23, which pictures the microscope.

Go over each part of the microscope with the class so they become familiar with its parts and how they function. Begin the directions by saying:

TEACHING STRATEGIES

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e salt crystals. What a microscope does
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t with its parts and how they function.

ct ERIC y saying:

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- examine and describe salt crystals with a microscope.*
- examine other objects with a microscope.*

Students should:

--respond, "Yes," "Maybe."

--respond, "Microscope," "Magnifying lens."

MATERIALS

TEACHING STRATEGIES

AT THE TOP OF THE MICROSCOPE IS THE PICTURE SCREEN. IT IS MARKED NUMBER ONE ON THE MICROSCOPE DRAWING.

IN ORDER TO SEE ANYTHING YOU MUST TURN ON THE MICROSCOPE LIGHT. TURN THE LIGHT SWITCH ON NOW.

Allow each student to turn the switch on and off at least once.

THE LIGHT IN THESE MICROSCOPES IS LIKE THAT IN A FLASH LIGHT - IT COMES FROM BATTERIES.

Then ask:

WHAT IS THE NUMBER OF THE LIGHT SWITCH ON THE MICROSCOPE DRAWING?

Continue by saying:

THE MICROSCOPE WILL WORK BEST WHEN THE LIGHT IS BRIGHT. WE CAN KEEP THE LIGHT BRIGHTER FOR A LONGER TIME IF WE TURN ON THE LIGHT AND USE THE BATTERIES ONLY WHEN WE ARE ACTUALLY LOOKING AT SOMETHING WITH THE MICROSCOPE.

Check to see that all the lights are out before proceeding. Continue to remind the students from time to time that it is important to conserve the batteries.

NOW HOW MANY CAN FIND THE MAGNIFYING LENS?
IT'S NUMBER FOUR ON THE MICROSCOPE DRAWING.

The microscope lens is obviously different from the magnifying lens the students have been using. Explain that, even though they can't see it, a tiny magnifier is inside the metal cylinder, and that it is strong enough

TEACHING STRATEGIES

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cylinder, and that it is strong enough

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-11

Students should:

--turn on the microscope light.

--respond, "Number five."

--raise their hands.

--locate and identify the microscope lens.

to magnify things and make them many times bigger. Point out that the microscope actually has a choice of two lenses, one in a cylinder a little longer than the other. The shorter cylinder with its lens magnifies objects 50 times, the longer one 100 times. Check with each group to see that they have identified the lenses on both the microscope itself and on the drawing.

Continue by saying:

IF A LABORATORY WORKER WANTS TO LOOK AT SOMETHING WITH A MICROSCOPE HE MUST FIRST PLACE IT ON A MICROSCOPE SLIDE.

Distribute a slide to each team. Caution them that since the slides are thin and made of glass, they will break easily. Also explain that the slides should be handled by the edges only. Otherwise the resulting smudges and finger prints will make things harder to see clearly.

Then say:

ON EACH SIDE OF THE LENSES ARE TWO METAL CLIPS.
(Point to them on a scope.) WHAT ARE THEY CALLED?

If no one identifies the clips, say:

THE METAL CLIPS ARE CALLED SLIDE HOLDERS
AND ARE USED TO HOLD THE SLIDE IN PLACE
UNDER THE LENS.

Demonstrate the proper way to put the slide in place and have the students put their slides in place. Check with each group to see that this has been done properly.

You may wish to review all of the parts so far mentioned before continuing. Terminology is not the important thing; rather, the students should know how the microscopes function.

TEACHING STRATEGIES

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ANTICIPATED STUDENT BEHAVIORS

Students should:

--locate the clips on the microscope drawing and read, "Slide holders."

MATERIALS

TEACHING STRATEGIES

Continue by saying:

NOW THAT WE KNOW HOW OUR MICROSCOPE WORKS, IT IS TIME TO LOOK AT SOMETHING WITH IT.

Distribute a few crystals of salt on a piece of dark paper.

Ask:

WHAT DOES THE SALT LOOK LIKE?

Distribute a magnifying lens to each student and ask:

WHAT DOES THE SALT LOOK LIKE UNDER THE MAGNIFIER?

WHAT WOULD SALT LOOK LIKE IF IT WAS MAGNIFIED MORE AND WAS EVEN BIGGER?

HOW COULD WE FIND OUT FOR SURE?

Have each group add a few crystals of salt to the center of their slide. (You may find it best to add the salt yourself; otherwise, emphasize that only six to eight crystals are needed. These should be grouped together but not necessarily touching.) Next direct the students to place the slide on the microscope without spilling the salt. Then have them turn the light switch on.

Say:

TO BE SEEN, THE SALT MUST BE UNDER THE LENS, AND THE PICTURE OF THE SALT MUST BE IN FOCUS. TO BE IN FOCUS MEANS THE PICTURE MUST BE SHARP AND CLEAR. TURNING THE FOCUS WHEEL BACK AND FORTH

TEACHING STRATEGIES

KNOW HOW OUR MICROSCOPE WORKS, IT
LOOK AT SOMETHING WITH IT.

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SALT LOOK LIKE?

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ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-11

Students should:

--describe the salt as being round, white,
sparkly and so forth.

--describe what the salt looks like to them.

--speculate as to the probable appearance.

--respond, "Use the microscope," "Look at it
with the microscope."

MATERIALS

TEACHING STRATEGIES

LETS US MAKE THE PICTURE CLEAR. CAN YOU FIND THE FOCUS WHEEL ON YOUR MICROSCOPE AND ON THE DRAWINGS? (Point to the focus wheel on one of the scopes.)

From this point on, the students' ability to center the object and obtain the sharpest and clearest picture possible is a matter of experience. Let each group "fiddle" with the scope and move their slides if necessary. Give assistance if no progress is made.

When viewing objects with the scope, a darkened or semi-darkened room helps. If it is not possible to adjust the light in the room (and room light is affecting the quality of the picture), a light shade can be constructed of dark paper or cardboard and taped around the top of the scope to form a hood.

When the students have had an opportunity to view the salt crystals, ask:

WHAT DO SALT CRYSTALS LOOK LIKE UNDER A MICROSCOPE?

HOW DO THEY LOOK COMPARED TO THOSE SEEN WITH THE HAND MAGNIFIER?

If the students are interested in using the higher power lens, let them do so. Simply move the "lens changer" lever (Number 3 on the microscope diagram) to the right until the longer lens is in position.

Interest should be high at this point, and the students will be eager to look at other things. Pieces of feather and nylon stocking will work well, although any number of other things can be substituted. The only

TEACHING STRATEGIES

MAKE THE PICTURE CLEAR. CAN YOU FIND THE
SLIDE ON YOUR MICROSCOPES AND ON THE
WORKSHEET? (Point to the focus wheel on one of
the slides.)

Focus on, the students' ability to center the
slide in the sharpest and clearest picture
regardless of experience. Let each group
adjust the scope and move their slides if
needed. Give assistance if no progress is made.

Use a dark cloth over the subjects with the scope, a darkened or
black cloth helps. If it is not possible to
darken the room (and room light is affecting
the picture), a light shade can be
made from dark paper or cardboard and taped around
the microscope to form a hood.

Students have had an opportunity to view the
microscope. Ask:

WHAT DO SALT CRYSTALS LOOK LIKE UNDER A
MICROSCOPE?

HOW DO THEY LOOK COMPARED TO THOSE SEEN WITH
THE NAKED EYE?

Students are interested in using the higher power
to do so. Simply move the "lens changer"
(shown on the microscope diagram) to the
longer lens is in position.

Be high at this point, and the students
are to look at other things. Pieces of
cardstock or paper on stocking will work well, although any
material can be substituted. The only

ANTICIPATED STUDENT BEHAVIORS

Students should:

--observe and locate the focus wheel on their
microscopes and on their worksheet drawings.

--describe the appearance of magnified salt
crystals.

--respond, "They look bigger," "They have a funny
shape."

MATERIALS

TEACHING STRATEGIES

criterion is that light must pass through the object if it is to be viewed. If any liquid is viewed, caution the students not to lower the lens onto the liquid but only far enough to focus properly. Liquid on the lens will cause smearing and make it difficult to view anything.

Encourage and help the students in describing other objects they look at. Have them note the differences and similarities among these things.

Conclude the activity by asking:

ARE THE OBJECTS WE ARE LOOKING AT A PART OF OUR ENVIRONMENT?

HOW DOES THE MICROSCOPE HELP US LEARN ABOUT OUR ENVIRONMENT?

WE WILL USE THE MICROSCOPE MANY TIMES WHILE WE ARE LEARNING ABOUT AIR AND WATER. THEY WILL BE STORED _____. (Designate the storage area.) YOU MAY USE THE MICROSCOPE TO LOOK AT SOMETHING AT ANY TIME, BUT BE VERY CAREFUL TO USE IT PROPERLY.

TEACHING STRATEGIES

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ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-11

Students should:

--recognize that the things being viewed are
found around them and respond, "Yes."

--respond, "It makes things bigger," "You can see
things you didn't know were there."

*Upon completion of this activity, each student
should, as a minimum:*

--be able to use the microscope.

--have examined salt crystals with the microscope.

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE C
ACTIVITY 5-11

Teacher _____

Activity name suggested by class:

BSCS USE: Post _____ Tally _____ Rev _____
--

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST
MODERATE INTEREST OR INDIFFERENCE
RESISTANCE OR DISLIKE

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

Were the instructions given to the students adequate for them to properly use the microscope? Yes No

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Were the instructions given to the students adequate for them to properly use the microscope? Yes No
13. Did any students have problems using the microscope? Yes No If so, what types of problems did they have?

UNIT V, CORE C
ACTIVITY 5-11

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

3. Realize the problems associated with the preparations of usable water.
6. Understand the broad problems of water management.

Core C Objectives for the Student:

1. Examine some specific contaminants of water.
2. Examine some techniques required to remove these contaminants.
4. Establish water as a finite resource.

ENVIRONMENTAL THEME:

Finiteness of Resources, Ecological Trade-offs

INQUIRY SKILLS:

Identifying

PROBLEM-SOLVING SKILLS:

Experimenting

PRACTICAL APPLICATION:

Knowing the Limitations of Boiling Water in Preparation for Drinking, Motor Coordination, Understanding Why There Must Be a Price on Water; Following Directions



BSCS

UNIT V. AIR AND WATER IN
MY ENVIRONMENT

CORE C. PREPARATION OF
USABLE WATER

ACTIVITY 5-12. MICROBES IN WATER

ACTIVITY

Goals for the Student:

Realize the problems associated with the preparations of usable water.

Understand the broad problems of water management.

Objectives for the Student:

Examine some specific contaminants of water.

Examine some techniques required to remove these contaminants.

Establish water as a finite resource.

GENERAL THEME:

Use of Resources, Ecological Trade-offs

OBJECTIVES:

Boiling

TECHNICAL SKILLS:

Boiling

APPLICATION:

the Limitations of Boiling Water in
Preparation for Drinking, Motor Coordination,
Understanding Why There Must Be a Price on
Following Directions

Dropper bottles
 Small Beaker
 Test tubes, 6 per student group,
 13 X 100 mm
 Test tube racks
 Methylene blue (oxygen test
 solution) (See Planning Guide)
 Rubber stoppers, solid #00
 Measuring spoons
 Medicine dropper
 *Noniodized salt
 *Garden soil
 *Dishwashing detergent
 *Household bleach
 *Motor oil
 *Hot plate or stove
 *Water
 *Masking tape
 *Pint jars, 5 (these need not be
 identical)

*Not furnished in materials kit

Activity 5-12. Microbes in Water

This activity will be the first in a series of investigations on how to prepare drinkable water. The students have already studied and constructed a water treatment plant. They will now begin to identify various impurities in water and use techniques to get rid of them. In this activity, methylene blue will be used to determine the effectiveness of boiling in eliminating bacteria from water. This can be directly related to the value of boiling as a sterilizing technique and will demonstrate one method of purifying water.

At the beginning of the class period, ask student volunteers to prepare five pint jars as follows:

Jar 1. Add one-fourth teaspoon of dishwashing detergent and one tablespoon of garden soil. Fill almost full of tap water and mix.

(Be sure to wash the tablespoon between each use.)

Jar 2. Mix tap water with one tablespoon of bleach and one tablespoon of garden soil.

SAV
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SAV
ACT

TEACHING STRATEGIES

Microbes in Water

will be the first in a series of investigations to prepare drinkable water. The students studied and constructed a water treatment and will now begin to identify various impurities use techniques to get rid of them. In this methylene blue will be used to determine the effect of boiling in eliminating bacteria from water. This can be directly related to the value of the sterilizing technique and will demonstrate the effectiveness of purifying water.

During the class period, ask student volunteers to bring five pint jars as follows:

1. One-fourth teaspoon of dishwashing detergent and one tablespoon of garden soil.
2. Fill almost full of tap water and

3. Be sure to wash the tablespoon between each jar.

4. Fill with tap water with one tablespoon of bleach and one tablespoon of garden soil.

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- recall that microbes are living things.
- participate in a group to set up the experiment with five kinds of water and a control.
- predict the results of the experiment.
- observe the results and compare them with the predictions.
- conclude that boiling a water sample kills the microbes present but does not take away other substances in the water.

SAVE THIS FOR
ACTIVITY 5-13

SAVE THIS FOR
ACTIVITY 5-13

MATERIALS

TEACHING STRATEGIES

Jar 3. Mix tap water with one tablespoon of garden soil.

SAVE T
ACTIVI

Jar 4. Mix tap water with two tablespoons of motor oil.

SAVE T
ACTIVI

Jar 5. Mix tap water with two tablespoons of noniodized salt.

SAVE T
ACTIVI

Label the jars and their contents one through five.

Ask:

WHAT IS IN JAR 1?

WHAT IS IN JAR 2?

Continue in a similar manner until the contents of all five jars have been identified.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-12

water with one tablespoon of garden

Students should:

SAVE THIS FOR
ACTIVITY 5-13

water with two tablespoons of
11.

SAVE THIS FOR
ACTIVITY 5-14

water with two tablespoons of
ed salt.

SAVE THIS FOR
ACTIVITY 5-15

their contents one through five.

R 1?

--identify the contents of Jar 1 as detergent,
soil, and water.

R 2?

--identify the contents of Jar 2 as bleach, soil,
and water.

lar manner until the contents of all
n identified.

WOULD THE WATER IN ANY OF THESE JARS BE CLEAN ENOUGH TO DRINK?

WHEN WE WENT TO THE WATER TREATMENT PLANT AND WHEN WE BUILT OUR OWN PLANT, WE SAW HOW TO MAKE WATER SO IT'S GOOD ENOUGH TO DRINK. DO YOU REMEMBER HOW OUR WATER IS CLEANED?

NOW WE'RE GOING TO BEGIN TO FIND OUT WHAT KINDS OF HARMFUL THINGS GET INTO OUR WATER AND HOW WE CAN GET THEM OUT.

WHAT ARE SOME THINGS THAT GET INTO OUR WATER?

IS THERE ANY LIVING THING THAT COULD BE IN OUR WATER THAT WE CAN SEE ONLY THROUGH A MICROSCOPE?

WHAT WAS ONE WAY WE FOUND WE CAN KILL MICROBES?

DO WE HAVE ANY REAL PROOF THAT THERE ARE NO MICROBES LIVING IN THE WATER IF WE BOIL IT? HOW DO WE KNOW THAT THEY'RE NOT IN THE WATER?

CAN YOU LIVE IN BOILING WATER?

DO YOU THINK MICROBES CAN LIVE IN BOILING WATER?

LET'S TRY TO FIND OUT IF MICROBES CAN LIVE IN BOILING WATER.

ARE MICROBES LIVING THINGS?

WHAT DO ALL LIVING THINGS NEED?

TEACHING STRATEGIES

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TO DRINK?

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LIVE IN BOILING WATER?

HINK MICROBES CAN LIVE IN BOILING WATER?

Y TO FIND OUT IF MICROBES CAN LIVE IN
WATER.

OBES LIVING THINGS?

ALL LIVING THINGS NEED?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "No!" "It's dirty," "We'd get sick,"
"It would taste bad."

--recall the process used to clean water.

--suggest such things as dirt, bugs, leaves,
microbes, rain, and so forth.

--recall the activities in Units II and IV and
respond, "Microbes."

--recall the boiling activities in Activity 2-6 and
and Activity 2-8 and respond, "By boiling."

--respond, "I don't know," "We just know," "We
did an experiment."

--respond, "No."

--respond, "No."

--recall that microbes are living things.

--recall that living things need food, air, and
water.

MATERIALS

TEACHING STRATEGIES

ARE THERE ANY MICROBES THAT LIVE IN WATER?

IS THERE ANY AIR IN WATER?

ARE MICROBES ABLE TO GET AIR FROM WATER?

If students do not seem to understand this, help them to realize that water contains dissolved air by asking:

ARE FISH LIVING THINGS?

DO THEY NEED AIR IN ORDER TO LIVE?

ARE FISH ABLE TO GET AIR FROM THE WATER THEY BREATHE?

THEN IS AIR PRESENT IN WATER?

WATER CONTAINS AIR THAT CERTAIN LIVING THINGS ARE ABLE TO BREATHE. MANY MICROBES ARE ABLE TO GET THE AIR THEY NEED IN THIS WAY.

Now ask:

WHAT WOULD HAPPEN TO THE AIR THAT IS IN THE WATER IF THERE WERE A LOT OF MICROBES IN THE WATER?

CAN ANYONE REMEMBER WHAT A TEST SOLUTION IS?

Assist the students in recalling the test solutions used previously. The solutions used have been a starch test

TEACHING STRATEGIES

BY MICROBES THAT LIVE IN WATER?

AIR IN WATER?

ABLE TO GET AIR FROM WATER?

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em to realize that water contains
ed air by asking:

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NEED AIR IN ORDER TO LIVE?

H ABLE TO GET AIR FROM THE WATER
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ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-12

Students should:

--recall that microbes do live in water.

--respond, "Yes," "No," "I don't know."

--infer that the microbes in water must be able
to get air if they are living.

--respond, "Yes."

--respond, "Yes."

--respond, "Yes."

--respond, "Yes."

--infer that if there were more microbes, more
oxygen would be used, therefore, less oxygen
would be left in the water.

--recall the use of the starch test solution in
Activity 3-21 and the carbon dioxide test
solution in Activity 4-12 and respond, "You use
it to see if something is there."

MATERIALS

TEACHING STRATEGIES

solution (turns black if starch is present) and a carbon dioxide test solution (turns yellow if carbon dioxide is present).

TODAY WE WILL USE ANOTHER TEST SOLUTION.

Write the following on the chalkboard:

OXYGEN TEST SOLUTION

Blue = much oxygen

No Color = not much oxygen

Say:

OXYGEN IS WHAT MAKES UP PART OF OUR AIR. IN THIS ACTIVITY WE ARE GOING TO USE AN OXYGEN TEST SOLUTION TO SEE HOW MUCH OXYGEN IS PRESENT IN WATER. THE TEST SOLUTION IS BLUE IN WATER WITH A LOT OF OXYGEN, BUT HAS NO COLOR WHEN THERE IS NOT MUCH OXYGEN IN THE WATER.

Direct the student pairs to obtain the following material from the supply table:

6 test tubes
masking tape
oxygen test solution
6 rubber stoppers
test tube rack
small beaker

Set the five jars of water on a table and place a medicine dropper next to each jar. Give the following



TEACHING STRATEGIES

ns black if starch is present) and a carbon
solution (turns yellow if carbon dioxide is

WILL USE ANOTHER TEST SOLUTION.

lowing on the chalkboard:

TEST SOLUTION

e = much oxygen

color = not much oxygen

WHAT MAKES UP PART OF OUR AIR. IN
VITY WE ARE GOING TO USE AN OXYGEN
TION TO SEE HOW MUCH OXYGEN IS PRESENT

THE TEST SOLUTION IS BLUE IN WATER
T OF OXYGEN, BUT HAS NO COLOR WHEN
NOT MUCH OXYGEN IN THE WATER.



dent pairs to obtain the following materials
y table:

solution
ppers
ck

ars of water on a table and place a
: to each jar. Give the following

ANTICIPATED STUDENT BEHAVIORS

MATERIALS

TEACHING STRATEGIES

directions to the students, allowing them time to perform the task before proceeding to the next direction.

USING MASKING TAPE, NUMBER FIVE TEST TUBES AND PUT YOUR NAMES ON THEM.

USING MEDICINE DROPPERS, OBTAIN A WATER SAMPLE FROM EACH OF THE FIVE JARS. DO NOT MIX MEDICINE DROPPERS BETWEEN TEST TUBES. MATCH THE TEST TUBE NUMBER WITH THE JAR NUMBER. FILL EACH TUBE ONE-HALF FULL, MAKING SURE ALL TUBES ARE FILLED TO THE SAME LEVEL.

When students have their test tubes filled, say:

PUT TEN DROPS OF OXYGEN TEST SOLUTION IN EACH OF THE FIVE TEST TUBES.

STOPPER EACH TUBE WITH A SOLID RUBBER STOPPER. TIP THE TUBE ONCE TO MIX THE WATER AND TEST SOLUTION. PUT ALL THE TEST TUBES IN A TEST TUBE RACK.

Then ask:

WHAT COLOR IS THE WATER IN EACH TUBE?

WHICH TUBE DO YOU PREDICT WILL REMAIN BLUE?

Write the students' predictions on the chalkboard.

Ask:

WHY?

TEACHING STRATEGIES

students, allowing them time to
before proceeding to the next direction.

ING TAPE, NUMBER FIVE TEST TUBES AND
ES ON THEM.

NE DROPPERS, OBTAIN A WATER
EACH OF THE FIVE JARS. DO
CINE DROPPERS BETWEEN TEST
H THE TEST TUBE NUMBER WITH
ER. FILL EACH TUBE ONE-HALF
SURE ALL TUBES ARE FILLED
LEVEL.

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S OF OXYGEN TEST SOLUTION IN EACH
TEST TUBES.

TUBE WITH A SOLID RUBBER STOPPER.
ONCE TO MIX THE WATER AND TEST
UT ALL THE TEST TUBES IN A TEST

S THE WATER IN EACH TUBE?

DO YOU PREDICT WILL REMAIN BLUE?

s' predictions on the chalkboard.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-12

Students should:

--number five test tubes and put their names on
the test tubes.

--fill the test tubes, compare water levels and
adjust accordingly.

--follow the lab procedure as directed.

--stopper and mix the contents of the test tubes.

--respond, "Blue."

--make a guess as to which test tubes will remain
blue.

--expect that if no microbes are present no oxygen
will be used up.

MATERIALS

TEACHING STRATEGIES

HOW COULD WE GET A WATER SAMPLE THAT HAS NO MICROBES IN IT SO WE HAVE SOMETHING TO COMPARE WITH THE OTHER TEST TUBE WATER SAMPLES?

Boil some tap water and allow it to cool. Pour some boiled water into the small beaker that each student pair should have. Instruct the students to:

1. Pour some water into Test Tube 6.
2. Add ten drops of oxygen test solution.
3. Put a thumb over the top and tip the test tube.
4. Stopper the tube with a rubber stopper.
5. Put the test tube in the test tube rack.

When all of the test tubes have been prepared and set aside, ask:

WHAT ARE WE TRYING TO FIND OUT BY DOING THIS EXPERIMENT?

Allow the water samples to remain in the test tubes for one to three days. Results should begin to be visible within twenty-four hours. Instruct students to observe the test tubes each day until a definite change is visible.

TEACHING STRATEGIES

WE GET A WATER SAMPLE THAT HAS NO
IN IT SO WE HAVE SOMETHING TO COMPARE
OTHER TEST TUBE WATER SAMPLES?

water and allow it to cool. Pour some
into the small beaker that each student pair
instruct the students to:

pour water into Test Tube 6.

add drops of oxygen test solution.

tap over the top and tip the test tube.

seal the tube with a rubber stopper.

insert the test tube in the test tube rack.

the test tubes have been prepared and set

TRYING TO FIND OUT BY DOING THIS

the samples to remain in the test tubes for
24 hours. Results should begin to be visible
after 24 hours. Instruct students to observe
each day until a definite change is

ANTICIPATED STUDENT BEHAVIORS

Students should:

--recall the boiling activities (2-6 and 2-8)
and infer that boiled water should be used
to check these results (as a control).

--follow the lab procedure as directed.

--respond, "If boiling water kills microbes," "If
the microbes use up all the oxygen," "What kind
of water has microbes in it," and so forth.

--observe and record results.



MATERIALS

TEACHING STRATEGIES

When the color of one or more of the test tubes has changed from blue to colorless, the activity will be ready to continue.

At that time, ask:

WERE YOUR PREDICTIONS CORRECT?

WHAT TEST TUBES REMAINED BLUE?

WHY DID THEY STAY BLUE?

HOW DO WE KNOW THAT THIS IS WHAT HAPPENS TO THE WATER WHEN THERE ARE NO MICROBES IN IT?

WHAT KILLED THE MICROBES IN OUR CONTROL TUBE?

WHAT KEPT THE MICROBES FROM LIVING IN THESE TEST TUBES THAT STAYED BLUE?

IF WE BOILED THE BLEACH WATER OR THE SALT WATER OR THE OIL WATER WOULD IT BE SAFE TO DRINK?

WHY NOT? BOILING KILLS MICROBES.

WHAT HAVE WE FOUND OUT BY DOING THIS EXPERIMENT?

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-12

Students should:

If one or more of the test tubes has
turned colorless, the activity will be
successful.

PREDICTIONS CORRECT?

--respond, "Yes," "No," "Some were."

TUBES REMAINED BLUE?

--probably reply by naming Test Tubes 2, 4, and 5
(bleach/soil, oil, and salt solutions).

STAY BLUE?

--respond, "They had no microbes in them," "The
bleach killed any microbes."

HOW THAT THIS IS WHAT HAPPENS TO THE
TUBES WHERE ARE NO MICROBES IN IT?

--recall the preparation of boiling water as the
control, and reply, "Because we boiled water
and that is what it looked like."

THE MICROBES IN OUR CONTROL TUBE?

--respond, "Boiling the water."

THE MICROBES FROM LIVING IN THESE
TUBES THAT STAYED BLUE?

--respond, "The bleach," "The stuff we mixed with
the water kept them from growing."

THE BLEACH WATER OR THE SALT
OIL WATER WOULD IT BE SAFE TO DRINK?

--respond, "No."

BOILING KILLS MICROBES.

--respond, "It doesn't take the other stuff out."

HOW WAS THIS FOUND OUT BY DOING THIS

--respond, "Boiling water will take microbes out
of water, but not everything else," "Bleach keeps
microbes from growing," "Microbes need air," and
so forth.

ACTIVITY
5-12

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

Upon completion of this activity, each student should, as a minimum:

- have participated in a group which set up the experiment.*
- be able to describe boiling water as one way to kill microbes.*

MATERIALS

TEACHING STRATEGIES

When the color of one or more of the test tubes has changed from blue to colorless, the activity will be ready to continue.

At that time, ask:

WERE YOUR PREDICTIONS CORRECT?

WHAT TEST TUBES REMAINED BLUE?

WHY DID THEY STAY BLUE?

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WHAT KILLED THE MICROBES IN OUR CONTROL TUBE?

WHAT KEPT THE MICROBES FROM LIVING IN THESE TEST TUBES THAT STAYED BLUE?

IF WE BOILED THE BLEACH WATER OR THE SALT WATER OR THE OIL WATER WOULD IT BE SAFE TO DRINK?

WHY NOT? BOILING KILLS MICROBES.

WHAT HAVE WE FOUND OUT BY DOING THIS EXPERIMENT?

TEACHING STRATEGIES

If one or more of the test tubes has
turned colorless, the activity will be
successful.

Ask:

PREDICTIONS CORRECT?

TUBES REMAINED BLUE?

WHY STAY BLUE?

KNOW THAT THIS IS WHAT HAPPENS TO THE
TUBES THAT ARE NO MICROBES IN IT?

WHAT ABOUT THE MICROBES IN OUR CONTROL TUBE?

WHAT ABOUT THE MICROBES FROM LIVING IN THESE
TUBES THAT STAYED BLUE?

DO THE BLEACH WATER OR THE SALT
OR OIL WATER WOULD IT BE SAFE TO DRINK?

DOES BOILING KILLS MICROBES.

WHAT WAS FOUND OUT BY DOING THIS

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-12

Students should:

--respond, "Yes," "No," "Some were."

--probably reply by naming Test Tubes 2, 4, and 5
(bleach/soil, oil, and salt solutions).

--respond, "They had no microbes in them," "The
bleach killed any microbes."

--recall the preparation of boiling water as the
control, and reply, "Because we boiled water
and that is what it looked like."

--respond, "Boiling the water."

--respond, "The bleach," "The stuff we mixed with
the water kept them from growing."

--respond, "No."

--respond, "It doesn't take the other stuff out."

--respond, "Boiling water will take microbes out
of water, but not everything else," "Bleach keeps
microbes from growing," "Microbes need air," and
so forth.

ACTIVITY
5-12

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

Upon completion of this activity, each student should, as a minimum:

- have participated in a group which set up the experiment.*
- be able to describe boiling water as one way to kill microbes.*

UNIT V, CORE C
ACTIVITY 5-12

Teacher _____

Activity name suggested by class:

BSCS USE: Post _____ Tally _____ Rev _____
--

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

Were the instructions regarding the experiment sufficiently clear? Yes No

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Were the instructions regarding the experiment sufficiently clear? Yes No
13. Did students have any problems in conducting the experiment? No Yes
If so, what problems did they have?

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B at anecdotes of student learning did you see or hear in your classroom?

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

3. Realize the problems associated with the preparation of usable water.
4. Realize the problems associated with the disposal of waste water.
5. Recognize the impact of water pollution.
6. Understand the broad problems of water management.

Core C Objectives for the Student:

1. Examine some specific contaminants of water.
2. Examine some techniques required to remove these contaminants.
4. Establish water as a finite resource.

ENVIRONMENTAL THEME:

Finiteness of Resources, Ecological Trade-offs

INQUIRY SKILLS:

Comparing

PROBLEM-SOLVING SKILLS:

Identifying Variables

PRACTICAL APPLICATION:

What Products Are Better To Use in Daily Life,
Making a Judgment, Manipulating Items,
Working in a Group



BSCS

UNIT V. AIR AND WATER IN
MY ENVIRONMENT

CORE C. PREPARATION OF
USABLE WATER

ACTIVITY 5-13. A WASHDAY MIRACLE

ACTIVITY

Goals for the Student:

Realize the problems associated with the preparation of usable water.

Realize the problems associated with the disposal of waste water.

Recognize the impact of water pollution.

Understand the broad problems of water management.

Objectives for the Student:

Examine some specific contaminants of water.

Examine some techniques required to remove these contaminants.

Establish water as a finite resource.

GENERAL THEME:

Scarcity of Resources, Ecological Trade-offs

OBJECTIVES:

Understanding

LEARNING SKILLS:

Identifying Variables

APPLICATION:

Products Are Better To Use in Daily Life,
Sound Judgment, Manipulating Items,
Working in a Group

ACTIVITY
5-13

MATERIALS

Jars 1 and 2 from Activity 5-12
250 ml Beakers, 3 per student
group
Teaspoon measure, 1 per student
group
Water treatment model from
Activity 5-9
Microscopes, 4
Microscope slides, 8
Medicine droppers, 4
*Plastic kitchen wrap
*Rubber bands
*Detergent packages, 4 (various
brands) with phosphate content
*Liquid plant food
*"Green water" (to be ordered
three weeks prior to activity)

furnished in materials kit

TEACHING STRATEGIES

Activity 5-13. A Washday Miracle

This activity is the second of several activities dealing with taking specific pollutants out of the water to make it drinkable. The emphasis of this activity will be on the problem of purifying water containing detergents.

Teacher Preparation:

1. Jars 1 and 2 from Activity 5-12 will be used.
2. To insure the success of this activity, it will be especially important to obtain a detergent with phosphates. If you are in an area that has forbidden the use of detergents with phosphates, this activity might have to be omitted or altered.
3. Be sure to order the "green water" needed for this activity three weeks prior to the time you begin.

Begin by saying:

TEACHING STRATEGIES

A Washday Miracle

is the second of several activities dealing with specific pollutants out of the water to make it safe to drink. The emphasis of this activity will be on purifying water containing detergents.

ration:

and 2 from Activity 5-12 will be used.

re the success of this activity, it will be especially important to obtain a detergent free of phosphates. If you are in an area that has a history of the use of detergents with phosphates, this activity might have to be omitted or altered.

to order the "green water" needed for this activity three weeks prior to the time you

g:

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- observe Jars 1 and 2 and make a prediction about the effectiveness of the water treatment plant in cleaning these water samples.
- observe the effect of the water treatment plant on the water from Jars 1 and 2 and conclude that detergents were not removed from the water.
- observe the contents listed on the boxes of detergents and commercial plant food.
- identify phosphate as a common ingredient in detergent and plant food.
- realize that phosphate is an ingredient that encourages plant growth.
- observe "green water" under the microscope.
- participate in setting up an experiment to test the effects of detergents on the growth of algae.
- identify Beaker 3 as a control.
- observe the results of the experiment and conclude that detergents enhance algae growth.
- relate the results of the experiment to the problems of water pollution and treatment.

MATERIALS

TEACHING STRATEGIES

WHAT DID WE DO IN OUR LAST ACTIVITY TO GET RID OF MICROBES IN WATER?

DOES BOILING OUR WATER GET RID OF ALL THOSE THINGS THAT WE DON'T WANT IN IT?

Place Jars 1 and 2 from Activity 5-12 on the table.

Ask:

HERE ARE TWO OF THE JARS OF WATER FROM OUR LAST ACTIVITY. WHAT IS IN THE WATER IN THESE JARS?

HOW HAVE THE CONTENTS OF THESE JARS CHANGED OVER THE PAST FEW DAYS?

HOW COULD WE GET THE DETERGENT AND BLEACH OUT OF THE WATER SO IT WOULD BE SAFE TO DRINK?

WOULD BOILING THE WATER TAKE OUT THE DETERGENT AND BLEACH?

WHAT WOULD HAPPEN IF WE PUT THE WATER FROM THESE JARS THROUGH OUR WATER TREATMENT PLANT?

**GIVE STUDENTS
TIME
TO
THINK**



TEACHING STRATEGIES

DO IN OUR LAST ACTIVITY TO GET RID
IN WATER?

OUR WATER GET RID OF ALL THOSE
WE DON'T WANT IN IT?

2 from Activity 5-12 on the table.

OF THE JARS OF WATER FROM OUR
TY. WHAT IS IN THE WATER IN THESE

E CONTENTS OF THESE JARS CHANGED
ST FEW DAYS?

E GET THE DETERGENT AND BLEACH OUT
R SO IT WOULD BE SAFE TO DRINK?

NG THE WATER TAKE OUT THE DETERGENT

HAPPEN IF WE PUT THE WATER FROM
THROUGH OUR WATER TREATMENT PLANT?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-13

Students should:

--recall Activity 5-12 and reply, "Boil the
water."

--respond, "No, just microbes."

--recall the preparation of the water, read the
labels of the jars, and reply, "Bleach and dirt,"
"Detergent and soil."

--respond, "No change," "Less suds," "Maybe more
cloudy or green," "I can't smell the bleach."

**GIVE STUDENTS
TIME
TO
THINK**



--suggest such things as boiling, putting it through
the treatment plant, and so forth.

--respond, "No," "It just kills microbes."

--predict that the water treatment plant would,
"Clean up the water," "Take the suds out."

MATERIALS

TEACHING STRATEGIES

Allow the students to test their predictions by running samples through the water treatment plant.

Then ask:

HOW CAN WE TELL IF THE SUDS ARE STILL IN THE WATER?

WHAT DO YOU OBSERVE?

DO YOU SUPPOSE THERE IS ANYTHING ELSE IN THE DETERGENT THAT COULD COME THROUGH THE WATER TREATMENT PLANT?

HOW COULD WE FIND OUT WHAT IS IN DETERGENT?

Distribute the boxes of phosphate detergents you have obtained. Allow the students to read the labels on the detergent boxes. Help with the vocabulary as needed. Also have students read the labels on a container of liquid plant food.



List the ingredients of both the detergents and the plant food on the chalkboard.

Ask:

IS THERE ANY INGREDIENT THAT IS THE SAME IN THE DETERGENT AND THE PLANT FOOD?

TEACHING STRATEGIES

ents to test their predictions by running
the water treatment plant.

TELL IF THE SUDS ARE STILL IN THE

YOU OBSERVE?

PROPOSE THERE IS ANYTHING ELSE IN THE
THAT COULD COME THROUGH THE WATER
PLANT?

HOW DO WE FIND OUT WHAT IS IN DETERGENT?

Show boxes of phosphate detergents you have
and allow the students to read the labels on the
boxes. Help with the vocabulary as needed.
Students read the labels on a container of
plant food.

Students of both the detergents and the plant
food on a chalkboard.

DO ANY INGREDIENT THAT IS THE SAME IN
PLANT FOOD AND THE PLANT FOOD?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--suggest shaking the contents of the jars.

--observe suds in the water.

--respond, "I don't know," "I can't see anything,"
"I doubt it."

--indicate, "Yes," "Phosphate."



MATERIALS

TEACHING STRATEGIES

NOTE: The ingredients listed on both the box of detergent and the plant food should include phosphates or some chemical with the word phosphate in it.

PHOSPHATE IS A CHEMICAL THAT HELPS PLANTS TO GROW.

IF PHOSPHATES ARE A PLANT FOOD, AND PHOSPHATES ARE IN DETERGENTS, THEN WHAT EFFECT WOULD DETERGENTS HAVE ON PLANTS?

HOW COULD WE FIND OUT IF THIS IS TRUE?

Display a flask of green water and say:

THIS FLASK CONTAINS MILLIONS OF SMALL WATER PLANTS.

WHY CAN'T WE SEE ANY OF THE PLANTS?

WHAT COULD WE USE TO SEE THE PLANTS?

Divide the class into four groups. Distribute the microscopes. If necessary, review how to use them properly. Distribute a slide and a cover slip to each group. Place a small drop of green water in the center of the slide.

With one edge of the cover slip touching the drop of water, lower the cover slip very gently over the water and onto the slide. Following this procedure will help to eliminate any air bubbles that might be trapped under the cover slip.

Look at the green water with both lenses. Encourage students to describe what they see. Those students who show interest should be allowed to sketch or note what they see.

TEACHING STRATEGIES

ients listed on both the box of
and the plant food should include
or some chemical with the word
in it.

A CHEMICAL THAT HELPS PLANTS TO

S ARE A PLANT FOOD, AND PHOSPHATES
GENTS, THEN WHAT EFFECT WOULD
AVE ON PLANTS?

FIND OUT IF THIS IS TRUE?

E green water and say:

ONTAINS MILLIONS OF SMALLWATER PLANTS.

SEE ANY OF THE PLANTS?

E USE TO SEE THE PLANTS?

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small drop of green water in the center

the cover slip touching the drop of
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. Following this procedure will help
air bubbles that might be trapped under

water with both lenses. Encourage
be what they see. Those students who
be allowed to sketch or note what

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-13

Students should:

--infer that detergents would also act as a plant
food.

--suggest feeding some detergent to plants.

--respond, "Because they're too small," "They're
invisible."

--suggest using the microscope.

MATERIALS

TEACHING STRATEGIES

Continue by asking:

WHAT DO YOU SEE IN THE GREEN WATER?

HOW MANY THINGS DO YOU SEE?

WHAT WOULD HAPPEN TO THESE TINY PLANTS IF WE
PUT PLANT FOOD IN THE WATER?

WOULD DETERGENTS BE A PLANT FOOD?

WHY?

LET'S TEST YOUR SUGGESTION TO FEED DETERGENTS TO
PLANTS BY SETTING UP AN EXPERIMENT.

Ask students for suggestions on how to set up the experi-
ment. Discuss each suggestion as to its practicality
and effectiveness.

Distribute three beakers to each group and give the
students the following directions, one at a time:

1. Number the beakers, 1, 2, and 3 and fill each
with water.
2. Add one teaspoon of green water to each of the
three beakers.
3. Add nothing else to Beaker 1.
4. Add one teaspoon of detergent to Beaker 2.
(Have different students use different brands.)
5. Add one teaspoon of liquid plant food to Beaker 3.

TEACHING STRATEGIES

king:

DO YOU SEE ANYTHING IN THE GREEN WATER?

WHAT THINGS DO YOU SEE?

WHAT WOULD HAPPEN TO THESE TINY PLANTS IF WE
ADDED FOOD IN THE WATER?

WOULD DETERGENTS BE A PLANT FOOD?

ASK FOR YOUR SUGGESTION TO FEED DETERGENTS TO
THE PLANTS. SETTING UP AN EXPERIMENT.

ASK FOR suggestions on how to set up the experi-
ment. Discuss each suggestion as to its practicality
and feasibility.

Give beakers to each group and give the
following directions, one at a time:

Give beakers, 1, 2, and 3 and fill each
with water.

Give a teaspoon of green water to each of the
beakers.

Give nothing else to Beaker 1.

Give a teaspoon of detergent to Beaker 2.
(Different students use different brands.)

Give a teaspoon of liquid plant food to Beaker 3.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--describe what they see, probably saying, "Small
shapes," "Small plants," "Little things," and
so forth.

--respond, "Lots," "Millions."

--respond, "They'd grow."

--respond, "Yes."

--respond, "Because it has that stuff in it,"
"Because there are phosphates in it."

MATERIALS

TEACHING STRATEGIES

6. Cover each beaker with a piece of plastic wrap secured with a rubber band.
7. Place the beakers in a window sill or other sunlit place. If no window area is available, place beaker under a fluorescent lamp.

WHY DID WE ADD NOTHING TO THE GREEN WATER IN BEAKER 1?



Allow the beakers to remain in the sunlight (or under the lamp) for a week or more.

Agitate several times each day to stir the ingredients (the more often the better).



Continue with the remaining activities in this core while waiting for results. After about a week the water in Beakers 2 and 3 should be a deeper, richer green than the water in Beaker 1. This is because the phosphates in the detergent and the plant food have acted as a fertilizer and allowed abundant plant growth.

After about a week, ask:

TEACHING STRATEGIES

beaker with a piece of plastic wrap
with a rubber band.

beakers in a window sill or other sunlit
no window area is available, place
over a fluorescent lamp.

ADD NOTHING TO THE GREEN WATER IN

beakers to remain in the sunlight (or under the
lamp) for more.

Stir each day to stir the ingredients
(the better).

Complete remaining activities in this core while
waiting. After about a week the water in
the beakers should be a deeper, richer green than the
control. This is because the phosphates in the
plant food have acted as a fertilizer
to stimulate plant growth.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-13

Students should:

--recognize this beaker as a control and reply,
"So we know what it looked like in the beginning,"
"So we know what would happen if nothing was
added," "To compare the other beakers with."



MATERIALS

TEACHING STRATEGIES

WHAT WERE WE TRYING TO FIND OUT IN THIS EXPERIMENT?

HOW ARE THE BEAKERS DIFFERENT FROM WHEN WE BEGAN THE EXPERIMENT?

WHAT WAS IN THE GREEN WATER THAT WE PUT IN THE BEAKERS?

WHAT ARE PHOSPHATES?

WHAT WOULD IT MEAN IF THE WATER TURNED A DARKER GREEN?

HOW COULD WE FIND OUT IF THERE REALLY ARE MORE PLANTS IN THE WATER?

Distribute the microscopes and slides and allow students to prepare a slide of the darker green water and examine it. Encourage description and comparison between the first drop of green water observed and this richer, deeper green water.



Students should be able to observe a denser population of plants in this water than were in the original green water.

Inform the students that these green plants are called algae and are the same kinds of plants they see in ponds and lakes.

TEACHING STRATEGIES

WE TRYING TO FIND OUT IN THIS
?

BE BEAKERS DIFFERENT FROM WHEN WE
EXPERIMENT?

IN THE GREEN WATER THAT WE PUT IN
S?

HOSPHATES?

IT MEAN IF THE WATER TURNED A
EN?

WE FIND OUT IF THERE REALLY ARE MORE
THE WATER?

microscopes and slides and allow students
side of the darker green water and examine
description and comparison between the
green water observed and this richer,
ter.

be able to observe a denser population of
water than were in the original green water.

ents that these green plants are called
e same kinds of plants they see in ponds

ANTICIPATED STUDENT BEHAVIORS

Students should:

--reply, "To see if detergents are a plant food."

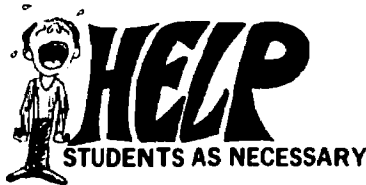
--describe Beakers 2 and 3 as a darker green than
they were when the experiment began.

--reply, "Tiny, green plants."

--reply, "A plant food."

--infer that there would be more tiny, green plants
in the water.

--suggest using the microscope.



MATERIALS

TEACHING STRATEGIES

WHAT WOULD HAPPEN IF MANY DETERGENTS FROM OUR HOUSES WENT INTO LAKES AND STREAMS NEARBY?

WHAT EFFECT WOULD THIS HAVE ON WATER TREATMENT?

During the discussion of the effect of plant growth in lakes and streams, and what this does to treatment plants, point out to the students that many types of algae have bad odors and tastes. These odors and tastes also have to be dealt with in treating water. They would probably necessitate another step in the treatment process.

IF THE WATER TREATMENT PLANT WAS CLOGGED AND COULDN'T WORK, AND IF THE WATER TASTED AND SMELLED SO BAD THAT WE COULD NOT DRINK IT, WHAT WOULD HAPPEN?

WHAT COULD YOU AS A PERSON DO TO KEEP THIS GREEN PLANT GROWTH FROM TAKING PLACE IN YOUR LAKES AND RIVERS?

TEACHING STRATEGIES

HAPPEN IF MANY DETERGENTS FROM OUR
T INTO LAKES AND STREAMS NEARBY?

T WOULD THIS HAVE ON WATER TREATMENT?

ussion of the effect of plant growth in
ns, and what this does to treatment plants,
e students that many types of algae have
astes. These odors and tastes also have
n in treating water. They would probably
ther step in the treatment process.

ER TREATMENT PLANT WAS CLOGGED AND
ORK, AND IF THE WATER TASTED AND
BAD THAT WE COULD NOT DRINK IT,
HAPPEN?

YOU AS A PERSON DO TO KEEP THIS
T GROWTH FROM TAKING PLACE IN YOUR
RIVERS?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-13

Students should:

--predict that the detergents would cause the
plants to grow.

--predict that it would cost more and would take
more time to run the water through a treatment
plant; also, it would probably clog it up.

--predict, "We'd have no water to drink," "We'd
have to boil our water."

--suggest not using phosphate detergent, not using
as much detergent, and so forth.

*Upon completion of this activity, each student
should, as a minimum:*

--have participated or observed the effect of
running the contents of Jars 1 and 2 through the
water treatment plant.

--have observed "green water" under the microscope.

--have participated in setting up the experiment.

--recognize that some detergents cause many plants
to grow.

--state or indicate in some way that these detergents
are not the best to use.

ACTIVITY
5-13

MATERIALS

TEACHING STRATEGIES

See Change of Pacers 13, 14, and 15.

CHANG

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS



CHANGE OF PACER

Pacers 13, 14, and 15.

UNIT V, CORE C
ACTIVITY 5-13

Teacher _____

Activity name suggested by class:

BSCS USE:	Post _____	Tally _____	Rev _____
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Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the revision suggested Worth salvaging--make major changes described Worthless --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Were you able to obtain the materials for the experiment? Yes No

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Were you able to obtain the materials for the experiment? Yes No
13. Did the phosphate experiment work well? Yes No
14. Were students able to easily observe the change in the number of plants present in the "green water"? Yes No

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

3. Realize the problems associated with the preparation of usable water.
5. Recognize the impact of water pollution.
6. Understand the broad problems of water management.

Core C Objectives for the Student:

1. Examine some specific contaminants of water.
2. Examine some techniques required to remove these contaminants.
4. Establish water as a finite resource.

ENVIRONMENTAL THEME:

Finiteness of Resources, Ecological Trade-offs

INQUIRY SKILLS:

Speculating

PROBLEM-SOLVING SKILLS:

Drawing Conclusions

PRACTICAL APPLICATION:

How to Dispose of Used Oil

ACTIVITY

Goals for the Student:

Realize the problems associated with the preparation of usable water.

Recognize the impact of water pollution.

Understand the broad problems of water management.

Objectives for the Student:

Examine some specific contaminants of water.

Examine some techniques required to remove these contaminants.

Establish water as a finite resource.

THEME:

Scarcity of Resources, Ecological Trade-offs

Skills:
Writing

Learning Skills:
Conclusions

APPLICATION:

Disposal of Used Oil

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE C.

PREPARATION OF
USABLE WATER

ACTIVITY 5-14. OIL IN WATER



BSCS

- *Jar 4 from Activity 5-12
- *Water treatment plant model from Activity 5-9
- *Newspaper or magazine clippings on oil spills and their effects on living things

*Not furnished in materials kit

Activity 5-14. Oil in Water

Oil pollution has become a major problem. Students geographically removed from oil spills often do not appreciate the impact of oil on the environment. Many persons who change oil in automobiles dispose of their oil through the sewage system. The purpose of this activity is to develop an awareness of the impact of oil on the water supply as inferred from their water treatment plant model.

Review by asking:

WHAT HAVE WE BEEN TALKING ABOUT IN OUR LAST ACTIVITIES?

LET'S LOOK AT ANOTHER JAR OF WATER FROM ONE OF OUR EARLIER ACTIVITIES.

Place Jar 4 from Activity 5-12 on the table.

Ask students to identify the contents of the jar.

HOW COULD WE REMOVE THIS OIL IF IT WERE IN OUR WATER SUPPLY?

Ask:

COULD YOU BURN OIL ON A LAKE OR RIVER? WHY?

HOW COULD YOU DIP THE OIL OFF A LAKE OR RIVER?

COULD YOU RUN IT THROUGH A WATER TREATMENT PLANT?

TEACHING STRATEGIES

Oil in Water

as become a major problem. Students removed from oil spills often do not impact of oil on the environment. Many use oil in automobiles dispose of their sewage system. The purpose of this develop an awareness of the impact of oil apply as inferred from their water model.

g:

WE BEEN TALKING ABOUT IN OUR LAST ?

AT ANOTHER JAR OF WATER FROM ONE LIER ACTIVITIES.

m Activity 5-12 on the table.

identify the contents of the jar.

WE REMOVE THIS OIL IF IT WERE IN SUPPLY?

BURN OIL ON A LAKE OR RIVER? WHY?

YOU DIP THE OIL OFF A LAKE OR RIVER?

RUN IT THROUGH A WATER TREATMENT PLANT?

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- observe the water in Jar 4 and identify it as oil and water.
- speculate on the various ways oil in water can be cleaned up.
- observe the effects of oil in the water treatment plant.
- conclude that oil in the community water treatment plant would be a disaster.
- discuss several ways oil gets into water.
- conclude that oil should be reused.

Students should:

- recall Activities 5-12 and 5-13 and respond, "Microbes in water," "Dirty water," "Detergents."
- identify the contents of Jar 4 as oil and water.
- speculate on ways of removing the oil, such as burning it, absorbing it with something, dipping it off, running it through the treatment plant.
- respond, "No, it would burn trees and stuff along the shore."
- respond, "Don't think you could," "It is too hard to dip it off the surface."
- respond, "Yes," but may express concern for the plant.

MATERIALS

TEACHING STRATEGIES

LET'S RUN WATER FROM JAR 4 THROUGH OUR WATER TREATMENT PLANT AND SEE WHAT HAPPENS.

WHAT DO YOU THINK WILL HAPPEN?

Run the oil through the model. Be sure to continue running the water through the model until much of the oil has gone through the filter to the bed of sand.

Ask:

DID THE MODEL TAKE THE OIL OUT OF THE WATER?

DID THE OIL CREATE ANY PROBLEMS? WHAT WERE THEY?

Discuss the mess and how to clean up the model.

WHAT WOULD OIL DO TO OUR CITY WATER TREATMENT PLANT?

HOW WOULD OIL LIKE THIS GET INTO OUR WATER SUPPLY IN THE FIRST PLACE?

At this time display and discuss the newspaper or magazine clippings you have gathered on oil spills, how they have been cleaned up, how they have affected wildlife, and so forth.

WHAT CAN WE DO TO PREVENT THIS OIL FROM ENTERING OUR WATER SUPPLY?

TEACHING STRATEGIES

WATER FROM JAR 4 THROUGH OUR WATER
PLANT AND SEE WHAT HAPPENS.

WHAT DO YOU THINK WILL HAPPEN?

Run through the model. Be sure to continue
through the model until much of the
oil has passed through the filter to the bed of sand.

HOW CAN WE TAKE THE OIL OUT OF THE WATER?

WHAT PROBLEMS DID YOU CREATE? WHAT WERE

THE PROBLEMS AND HOW TO CLEAN UP THE MODEL.

WHAT CAN WE DO TO OUR CITY WATER TREATMENT

PLANT TO PREVENT THIS OIL FROM GETTING INTO OUR WATER
PLANT IN THE FIRST PLACE?

Read and discuss the newspaper or magazine
articles gathered on oil spills, how they have
affected wildlife, and so

WHAT CAN WE DO TO PREVENT THIS OIL FROM ENTERING
OUR WATER SUPPLY?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-14

Students should:

--speculate on what might happen when the oil is
run through the water treatment plant.

--respond, "Yes."

--respond, "Yes, made a complete mess of the model."

--conclude it might be best to throw out the sand
and wash everything with soap and water or throw
the model away.

--infer that oil in the city water treatment plant
supply would be a disaster.

--respond, "From cars," "From any motor," "Tanker
leaks."

--suggest care in disposing used motor oil, checking
oil tankers for leaks, and so forth.

MATERIALS

TEACHING STRATEGIES

CAN USED OIL BE RECYCLED?

Students may wish to phone or visit a garage or gas station to find out where their used oil goes. Used oil is sometimes cleaned and used again.

WHAT IS DONE WITH THE OLD OIL WHEN THE OIL IN YOUR FAMILY CAR IS CHANGED?

WHAT COULD WE USE OLD OIL FOR?

See Change of Pacers 16 and 17.

CHAN

TEACHING STRATEGIES

OIL BE RECYCLED?

wish to phone or visit a garage or gas
d out where their used oil goes. Used
es cleaned and used again.

ONE WITH THE OLD OIL. WHEN THE OIL IN
LY CAR IS CHANGED?

D WE USE OLD OIL FOR?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "Yes," "No," "I don't know."

--tell what is done with oil from an oil change.

--suggest such things as "Oil roads," "Clean it up
and use it again."

*Upon completion of this activity, each student
should, as a minimum:*

*--be able to state in some way that oil in a
community treatment plant would be a disaster
and must be avoided.*

*--suggest an alternative to disposing of oil in
water.*



CHANGE OF PACER

Pacers 16 and 17.

TEACHING STRATEGIES

OIL BE RECYCLED?

ish to phone or visit a garage or gas
d out where their used oil goes. Used
es cleaned and used again.

ONE WITH THE OLD OIL WHEN THE OIL IN
LY CAR IS CHANGED?

D WE USE OLD OIL FOR?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "Yes," "No," "I don't know."

--tell what is done with oil from an oil change.

--suggest such things as "Oil roads," "Clean it up
and use it again."

*Upon completion of this activity, each student
should, as a minimum:*

--be able to state in some way that oil in a
community treatment plant would be a disaster
and must be avoided.

--suggest an alternative to disposing of oil in
water.



CHANGE OF PACER

Pacers 16 and 17.

UNIT V, CORE C
ACTIVITY 5-14

Teacher _____

Activity name suggested by class:

BSCS USE:	Post _____	Tally _____	Rev _____
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Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes preparing for each day's science class						
4.	Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Do you feel that the students realized the great effect oil could have on a water treatment plant following the experiment? Yes No

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Do you feel that the ~~students~~ realized the great effect oil could have on a water treatment plant following the experiment? Yes No
13. What suggestions did students make for alternative methods of oil disposal?

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

BSCS Evaluation: EMH Feedback Form 10

What anecdotes of student learning did you see or hear in your classroom?

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

2. Recognize the sources of water.
6. Understand the broad problems of water management.

Core C Objectives for the Student:

1. Examine some specific contaminants of water.
2. Examine some techniques required to remove these contaminants.
4. Establish water as a finite resource.

ENVIRONMENTAL THEME:

Finiteness of Resources

INQUIRY SKILLS:

Inferring

PROBLEM-SOLVING SKILLS:

Explaining, Defending, Answering Why Questions

PRACTICAL APPLICATION:

How to Prepare Salt Water for Drinking,
Discussing in a Group



BSCS

UNIT V. AIR AND WATER IN
MY ENVIRONMENT

CORE C. PREPARATION OF
USABLE WATER

ACTIVITY 5-15. DISTILLATION OF WATER

ACTIVITY

Goals for the Student:

Recognize the sources of water.

Understand the broad problems
of water management.

Objectives for the Student:

Examine some specific contaminants
of water.

Examine some techniques required to
remove these contaminants.

Establish water as a finite resource.

THEME:

Scarcity of Resources

Skills:
Learning

LEARNING SKILLS:

Learning, Defending, Answering Why Questions

APPLICATION:

Prepare Salt Water for Drinking,
Learning in a Group

MATERIALS

1 Flask, 250 ml
1 Rubber stopper, 1-holed, #6
1 Bent glass tube
6 Test tubes
1 Beaker, 1000 ml, with ice
Test tube clamp
Vinyl tubing, 1/4-inch diameter
*Water treatment model, from
Activity 5-9
*Jars 3 and 5 from Activity 5-12
*Hot plates
*Water

*Not furnished in materials kit

TEACHING STRATEGIES

Activity 5-15. Distillation of Water

This activity will show another method of removing dissolved and solid substances from water. Though seldom presently used in water treatment plants, the process of distillation has application for desalinization of salt water. The process of evaporation and condensation will be elaborated on in a later activity on the water cycle.

Begin by asking:

IF WE HAVE SOME WATER WE KNOW IS DIRTY AND PROBABLY HAS MICROBES LIVING IN IT, HOW CAN WE KILL THOSE MICROBES?

CAN YOU GET OTHER THINGS LIKE MUD AND SALT OUT OF WATER BY BOILING IT?

HOW COULD YOU GET THE MUD AND SALT OUT OF THE WATER?

WHAT HAPPENS TO THE WATER WHEN YOU BOIL IT?

WOULD MUD AND SALT BE IN THE STEAM, TOO?

WHERE DOES STEAM GO?

HOW COULD YOU GET THIS STEAM WATER BACK?

IN TODAY'S ACTIVITY WE WILL CATCH THE STEAM WATER THAT COMES FROM BOILING WATER. THEN WE WILL FIND OUT IF THE MUD AND SALT ARE STILL IN THE WATER.

TEACHING STRATEGIES

Distillation of Water

will show another method of removing solid substances from water. Although seldom used in water treatment plants, the process of desalination for desalination of salt water by the process of evaporation and condensation will be discussed in a later activity on the water cycle.

g:

SOME WATER WE KNOW IS DIRTY AND HAS MICROBES LIVING IN IT, HOW CAN WE GET THOSE MICROBES?

GET OTHER THINGS LIKE MUD AND SALT OUT OF THE WATER BY BOILING IT?

HOW DO YOU GET THE MUD AND SALT OUT OF THE WATER?

WHAT HAPPENS TO THE WATER WHEN YOU BOIL IT?

DOES THE MUD AND SALT BE IN THE STEAM, TOO?

WHERE DOES THE STEAM GO?

HOW DO YOU GET THIS STEAM WATER BACK?

IN THIS ACTIVITY WE WILL CATCH THE STEAM THAT COMES FROM BOILING WATER. THEN WE WILL SEE IF THE MUD AND SALT ARE STILL IN THE WATER.

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

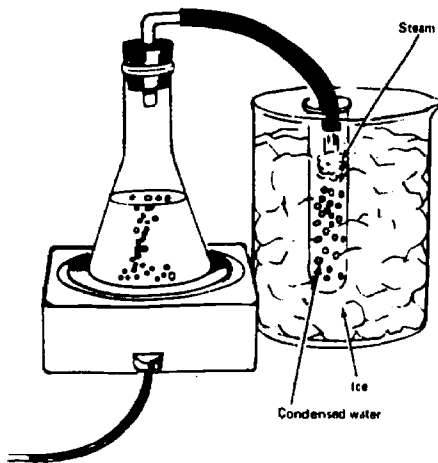
- observe the distillation of water.
- conclude that distillation removes solids and dissolved minerals from water.
- conclude that distilled water would be safe to drink.
- predict that under the normal processes used in water treatment plants, salt would not be taken out of water.
- speculate that distillation could be used on ocean vessels, in coastal cities, or in emergencies to prepare drinking water.

Students should:

- recall the boiling process used in Activity 5-12.
- respond, "No, only microbes."
- suggest ways to get mud and salt out of water or respond, "I don't know."
- respond, "It gets hot," "Bubbles," "Steams."
- respond, "Yes," "No," "Maybe," "I don't know."
- respond, "Into the air."
- respond, "I don't know," "With a glass."

MATERIALS

Diagram 5-6



TEACHING STRATEGIES

DO YOU THINK THE MUD AND SALT WILL STILL BE IN THE WATER AFTER WE CATCH THE STEAM?

Set up the apparatus as shown in Diagram 5-6. Use the muddy water and salt water samples from Activity 5-12 (Jars 3 and 5). First boil the salt water and then the muddy water. Collect a number of test tube samples of each kind of water. As the distillation is in process, ask one or more of the students to describe what is happening.

Display the samples of the condensed water collected and ask:

DO THESE WATER SAMPLES HAVE LIVING MICROBES IN THEM?

HOW DO YOU KNOW?

DID THE MUD COME THROUGH THE TUBE?

DID THE SALT COME THROUGH THE TUBE?

HOW COULD WE FIND OUT?

WOULD THIS BOILED SALT WATER BE SAFE TO DRINK? WHY?

Ask some volunteers to drink the water samples.

Ask:

CAN YOU TASTE ANY SALT IN THE WATER?

DO YOU THINK THIS WATER IS NOW SAFE ENOUGH TO DRINK? WHY?

TEACHING STRATEGIES

THE MUD AND SALT WILL STILL BE
AFTER WE CATCH THE STEAM?

tus as shown in Diagram 5-6. Use the
salt water samples from Activity 5-12
First boil the salt water and then the
lect a number of test tube samples of
r. As the distillation is in process,
f the students to describe what is

es of the condensed water collected and

ER SAMPLES HAVE LIVING MICROBES IN

NOW?

COME THROUGH THE TUBE?

COME THROUGH THE TUBE?

FIND OUT?

BOILED SALT WATER BE SAFE TO DRINK?

rs to drink the water samples.

E ANY SALT IN THE WATER?

THIS WATER IS NOW SAFE ENOUGH TO

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-15

Students should:

--guess, "Yes," "No."

--respond, "No."

--recall that boiling kills microbes.

--recall the observation and respond, "No."

--conclude that you cannot tell by looking at the
sample.

--infer that tasting would be a good test for salt.

--state, "Yes, the boiling kills the microbes."

--respond, "No."

--respond, "Yes," and give such reasons as "It's
clear," "Boiling killed the microbes," "Yes,
but it tastes funny."

MATERIALS

TEACHING STRATEGIES

If the students raise the question of a strange taste in the water you may want to stopper the tubes and shake them to mix the air with the water in order to improve the flavor. You may also wish to discuss with the students the source of the funny taste (the rubber stopper, no air could get in, and so forth).

WHERE DOES THE WATER WE DRINK COME FROM?

COULD PEOPLE WHO LIVE NEAR THE OCEAN USE THAT WATER FOR DRINKING WATER?

WHAT WOULD OCEAN WATER TASTE LIKE?

WOULD A WATER TREATMENT PLANT LIKE OURS TAKE THE SALT OUT OF THE WATER?

At this time if any students think that the treatment plant will remove the salt, have them put some salty water through the treatment plant, treat it with chlorine, stick their finger in the water, and taste it. It should taste salty.

HOW COULD CITIES WHO NEED TO USE OCEAN WATER REMOVE THE SALT FROM IT?

WHO ELSE MIGHT NEED TO USE THIS METHOD OF CLEANING WATER?

TEACHING STRATEGIES

raise the question of a strange taste in
may want to stopper the tubes and shake
the air with the water in order to improve
you may also wish to discuss with the
source of the funny taste (the rubber
could get in, and so forth).

THE WATER WE DRINK COME FROM?

LE WHO LIVE NEAR THE OCEAN USE THAT
DRINKING WATER?

OCEAN WATER TASTE LIKE?

TER TREATMENT PLANT LIKE OURS TAKE
OUT OF THE WATER?

any students think that the treatment
ve the salt, have them put some salty
he treatment plant, treat it with
their finger in the water, and taste it.
salty.

CITIES WHO NEED TO USE OCEAN WATER
SALT FROM IT?

IGHT NEED TO USE THIS METHOD OF
ATER?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "Faucet," "Water tower," "Reservoir,"
"Treatment plant," and so on.

--respond, "Yes," "No," "Maybe."

--respond, "Salty," "Bad."

--predict that it probably will not.

--respond, "Just as we did," "Boil it and catch
the steam water."

--speculate on different circumstances and respond
with such instances as, "On a ship," "In the
Navy," "In emergencies."

*Upon completion of this activity, each student
should, as a minimum:*

--have observed the distillation of water.

*--be able to describe distillation as a way of
removing things from water.*

MATERIALS

TEACHING STRATEGIES


CHANGE

See Change of Pacer 18.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-15



acer 18.

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE C
ACTIVITY 5-15

Teacher _____

Activity name suggested by class:

BSCS USE: Post _____ Tally _____ Rev _____
--

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

Did the distillation experiment work correctly? Yes No If not, what problems did you have?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Did the distillation experiment work correctly? Yes No If not, what problems did you have?
13. Do you think that students believed that the mud and salt were being left behind because of distillation or did they look on it as magic?
14. Were the students able to relate the distillation experiment with desalinization on a large scale? Yes No If not, what materials and/or methods could be used to emphasize the relationship?

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

1. Understand the need for water.
2. Recognize the sources of water.
3. Realize the problems associated with the preparation of usable water.
6. Understand the broad problems of water management.

Core C Objectives for the Student:

2. Examine some techniques required to remove these contaminants.
3. Introduce the concept of the natural water cycle.

ENVIRONMENTAL THEME:

Interrelationships of Environmental Components,
Cyclic Nature of Processes.

INQUIRY SKILLS:

Applying

PROBLEM-SOLVING SKILLS:

Interpreting Results

PRACTICAL APPLICATION:

Vocabulary, Discussion Skills



BSCS

UNIT V. AIR AND WATER IN
MY ENVIRONMENT

CORE C. PREPARATION OF
USABLE WATER

ACTIVITY 5-16. THE WATER CYCLE

ACTIVITY

Goals for the Student:

1. Understand the need for water.
2. Recognize the sources of water.
3. Realize the problems associated with the preparation of usable water.
4. Understand the broad problems of water management.

Objectives for the Student:

1. Examine some techniques required to remove these contaminants.
2. Introduce the concept of the natural water cycle.

AL THEME:

relationships of Environmental Components,
Nature of Processes

ILLS:

ng

IVING SKILLS:

reting Results

APPLICATION:

lary, Discussion Skills

Activity 5-16. The Water Cycle

We have now investigated the immediate sources of water as well as the problems of supplying drinkable water. Water supply is related to a larger water picture called the water cycle. The total amount of water available is in solid (ice and snow), liquid (lakes, streams, and oceans), and gaseous states (water vapor and clouds), and is really a finite resource. It is important that the students realize that the total supply of water on the earth is not unlimited. In this activity, the students will examine nature's way of preparing water (the water cycle) and assemble a working model of this system in the classroom.

Teacher Preparation:

The water cycle model is designed so that the process of evaporation and condensation of water are confined within a closed plastic box. Sources of heat (light bulb) and cold (ice cubes) are applied to the outside of the box. The elements of the model are: a plastic box which holds the moisture-laden air, a pool of water (about one cup) representing the earth's oceans, a pile of small stones representing a mountain range, a small lamp representing the sun, and a bag of ice cubes to represent the chilling of the upper atmosphere. As pictured in Diagram 5-7, the model should be assembled on a slant so that the "ocean" is confined to one end (about one-third of the bottom area.) The warm air, heated by the lamp and carrying the moisture from the "ocean," will rise to the upper end of the chamber, where it will be chilled by the ice. As the air is chilled by the ice, the moisture in the air will condense and form droplets on the area of the lid that is underneath the ice. When these droplets fall, it will "rain." The stones for the model should be washed immediately before use. This will saturate the dry surfaces and reduce the length of time it takes for the model to work. The model will operate most effectively if the bag of ice is covered with an inverted dish or beaker. This will confine the cold and keep the ice from melting.

Chart 5-2, *Nature's Water Cycle*

Plastic sweater box

*Globe

*Ice

*Small stones

*Gooseneck lamp, 100 watt

*Plastic sandwich bags

*Magazines, newspapers, catalogs

*Scissors

*Glue or paste

*Large pieces of butcher paper or construction paper

*Water

furnished in materials kit

TEACHING STRATEGIES

The Water Cycle

Investigated the immediate sources of water problems of supplying drinkable water. is related to a larger water picture called . The total amount of water available is and snow), liquid (lakes, streams, and ous states (water vapor and clouds), and ite resource. It is important that the e that the total supply of water on the limited. In this activity, the students ture's way of preparing water (the water mble a working model of this system in

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ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- observe the operation of the water cycle model.
- associate the operation of the model with the natural water cycle of the earth.
- describe the water cycle.
- complete a picture chart of the natural water cycle.

MATERIALS

Diagram 5-7

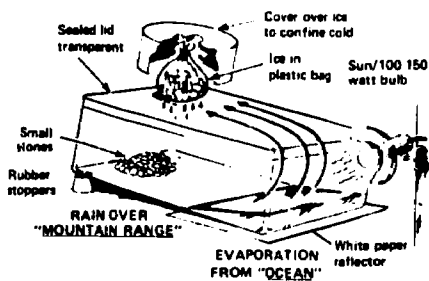
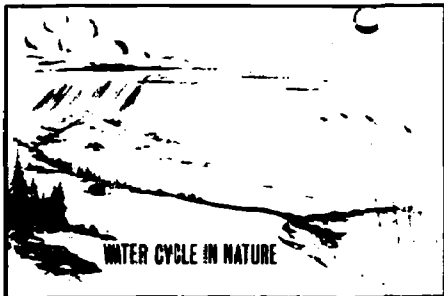


Chart 5-2



TEACHING STRATEGIES

A sheet of white paper under the "ocean" and the lamp will reflect heat in that area. Again, this will reduce the time it takes for the model to work.

In review, ask:

HOW DID WE GET THE SALT OUT OF THE WATER IN OUR LAST EXPERIMENT?

WHAT HAPPENED TO THE WATER WHEN IT WAS BOILED?

HOW DOES WATER GET INTO THE AIR? DO YOU ALWAYS HAVE TO BOIL IT?

HOW DO WE KNOW THAT THERE IS WATER IN THE AIR?

If students do not indicate knowledge that there is water in the air, tell them that clouds are made of water, as is fog.

WHAT DOES WATER FORM WHEN IT GOES INTO THE AIR?

WHAT COMES FROM CLOUDS?

WHERE DO THE RAIN AND SNOW GO?

Display Chart 5-2, *The Natural Water Cycle*, and continue the discussion, reinforcing the conclusions and inferences already established (i.e., water from lakes, oceans, and rivers goes into the air; forms clouds; comes out of the clouds as rain; and goes back into the bodies of water). Then display the components of the water cycle model.

Say:

TEACHING STRATEGIES

paper under the "ocean" and the lamp
t in that area. Again, this will reduce
s for the model to work.

GET THE SALT OUT OF THE WATER IN
PERIMENT?

ED TO THE WATER WHEN IT WAS BOILED?

TER GET INTO THE AIR? DO YOU
TO BOIL IT?

NOW THAT THERE IS WATER IN THE AIR?

ot indicate knowledge that there is water
them that clouds are made of water, as is

ATER FORM WHEN IT GOES INTO THE AIR?

FROM CLOUDS?

E RAIN AND SNOW GO?

2, *The Natural Water Cycle*, and continue
reinforcing the conclusions and
y established (i.e., water from lakes,
s goes into the air; forms clouds; comes
s as rain; and goes back into the bodies
display the components of the water

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-16

Students should:

--recall and state, "Water was boiled and
caught again."

--indicate it went up in steam, went into the air.

--respond, "No," "Rain is in the air," "I don't
know."

--indicate, "Clouds," "Fog," "You can see it,"
as evidence of water in the air.

--state, "Clouds."

--state, "Rain," "Snow," "Hail," "Sleet," etc.

--indicate some places that precipitation goes,
such as, "Rivers," "Oceans," "The ground."

MATERIALS

TEACHING STRATEGIES

WE SHOULD NOW BE ABLE TO PUT TOGETHER A MODEL OF THE NATURAL WATER CYCLE.

Have the students assist you in assembling the model according to Diagram 5-7. Pour water into the model and replace the cover.

Then say:

WHEN THE WATER GOES FROM THE OCEAN INTO THE AIR, DOES IT TAKE ANY DIRT WITH IT?

WE'VE TALKED ABOUT THE WAYS PEOPLE CLEAN UP THE WATER. THE WATER CYCLE IS NATURE'S WAY OF CLEANING THE WATER.

Set the assembled model aside until the next day.

The next day, begin by saying?

TODAY WE WILL USE OUR MODEL TO SHOW HOW THE NATURAL WATER CYCLE WORKS.

Have the students turn on the light and place a sandwich bag of ice cubes (about six) in the cover trough.

TEACHING STRATEGIES

NOW BE ABLE TO PUT TOGETHER A MODEL
NATURAL WATER CYCLE.

nts assist you in assembling the model
Diagram 5-7. Pour water into the model and
over.

WATER GOES FROM THE OCEAN INTO THE AIR,
TAKE ANY DIRT WITH IT?

ED ABOUT THE WAYS PEOPLE CLEAN UP THE
THE WATER CYCLE IS NATURE'S WAY OF
THE WATER.

ed model aside until the next day.

egin by saying?

ILL USE OUR MODEL TO SHOW HOW THE
TER CYCLE WORKS.

ts turn on the light and place a sandwich
s (about six) in the cover trough.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--recall the distillation process in Activity 5-15
and respond, "No, that stays behind."



MATERIALS

TEACHING STRATEGIES

Direct attention to the chart, *The Natural Water Cycle*, and review yesterday's discussion on it.

When the condensate begins to drip (rain) from the area of the ice trough, ask:

WHAT DO YOU SEE HAPPENING?

WHAT HAPPENED TO THE WATER WE PUT INTO THE MODEL?

WHAT HAPPENED TO THE WATER THAT WENT INTO THE AIR?

WHAT DID THE ICE DO TO THE WATER THAT WENT INTO THE AIR?

WHAT HAPPENED TO THE WATER IN THE AIR AFTER IT COOLED?

WHERE DID THE DROPS OF WATER (rain) GO?

WHERE WOULD THE RAIN GO AFTER IT FELL ON THE ROCKS?

Have students relate the parts of the model to their surroundings by asking:

HOW DID THE WATER IN OUR MODEL GET HEATED?

WHAT HEATS OUR WATER IN THE OCEANS AND LAKES?

WHAT DID OUR LAMP REPRESENT?

TEACHING STRATEGIES

Refer to the chart, *The Natural Water Cycle*,
yesterday's discussion on it.

As the water begins to drip (rain) from the area
above, ask:

WHAT DO YOU SEE HAPPENING?

WHAT HAPPENS TO THE WATER WE PUT INTO THE MODEL?

WHAT HAPPENS TO THE WATER THAT WENT INTO THE

MODEL? DOES THE ICE DO TO THE WATER THAT WENT

INTO THE MODEL? WHAT HAPPENS TO THE WATER IN THE AIR AFTER IT

COOLS? WHERE DO THE DROPS OF WATER (rain) GO?

WHAT HAPPENS TO THE RAIN GO AFTER IT FELL ON THE

MODEL? ASK THE STUDENTS TO RELATE THE PARTS OF THE MODEL TO THEIR
OWN EXPERIENCE ASKING:

WHAT DOES THE WATER IN OUR MODEL GET HEATED?

WHAT HAPPENS TO OUR WATER IN THE OCEANS AND LAKES?

WHAT DOES THE LAMP REPRESENT?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-16

Students should:

--should recall the essentials of the water
cycle.

--state their observations, any number of related
responses, such as, "It's dripping," "It's
raining."

--state, "Got hot," "Gave off steam," "Went into
the air."

--indicate it rose to the top of the model.

--state, "Cooled it."

--conclude that the water in the air cooled and
formed drops of water or rain.

--state, "Returned to the rocks."

--infer that because the area is tipped, the water
would roll down into the lower end.

--state, "The lamp."

--indicate that the sun heats our water.

--indicate that the lamp represented the sun.

MATERIALS

TEACHING STRATEGIES

WHERE DID THE WATER IN THE MODEL GO?

WAS IT COLD AT THE TOP OF THE MODEL?

DOES THE AIR GET COLDER HIGHER IN THE SKY THAN
CLOSER TO THE GROUND?

WHAT DID THE TOP OF OUR MODEL WITH THE ICE ON IT
REPRESENT?

The idea of a decrease in temperature as altitude is increased can be developed by discussing how it snows in the mountains while it rains below, or how airplanes need to be heated or pilots need to wear warm clothing.

WHAT HAPPENS TO THE WATER IN THE OCEAN?

WHERE DOES IT RISE TO?

WHAT HAPPENED TO THE WATER IN THE AIR WHEN IT
TOUCHED OR REACHED THE COLD TOP WITH THE ICE
ON IT?

WHAT HAPPENS TO THE OCEAN WATER WHEN IT EVAPORATES
INTO THE AIR AND RISES TO THE COLDER AIR FOUND
HIGHER IN THE SKY?

Print each of the following words on a three-by-five-
inch index card: evaporation, condensation, and
precipitation.

Say:

TEACHING STRATEGIES

THE WATER IN THE MODEL GO?

AT THE TOP OF THE MODEL?

DOES IT GET COLDER HIGHER IN THE SKY THAN
AT THE GROUND?

WHAT IS AT THE TOP OF OUR MODEL WITH THE ICE ON IT?

How do you explain the decrease in temperature as altitude is increased? This can be developed by discussing how it snows at high altitudes while it rains below, or how airplanes fly at high altitudes and pilots need to wear warm clothing.

WHAT HAPPENS TO THE WATER IN THE OCEAN?

DOES IT RISE TO?

WHAT HAPPENS TO THE WATER IN THE AIR WHEN IT
REACHES THE COLD TOP WITH THE ICE?

WHAT HAPPENS TO THE OCEAN WATER WHEN IT EVAPORATES
AND RISES TO THE COLDER AIR FOUND
AT THE TOP OF THE SKY?

Write the following words on a three-by-five-
card: evaporation, condensation, and

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "To the air," "To the top of the model."

--recall the location of the ice and state, "Yes."

--indicate that the air gets colder higher in the sky.

--infer that it represented the sky, or the atmosphere.

--indicate that it rises into the air.

--state, "Into the air," "Into the clouds."

--state, "It turned back to water," "It rained."

--infer that it must turn into water, clouds, or rain.

MATERIALS

TEACHING STRATEGIES

WHAT WE HAVE JUST OBSERVED AND DESCRIBED IS CALLED OUR WATER CYCLE. (Point to the chart and to the word on the chalkboard.) A WATER CYCLE IS THE CIRCLE OUR WATER MAKES.

OUR WATER EVAPORATES, WHICH MEANS IT GOES INTO THE AIR. (Point to the chart.)

Tape the evaporation card on the chart next to the arrows. Do this by putting tape on the back of the card so it sticks to the chart.

THE WATER RISES TO THE COLDER UPPER AIR WHERE IT CONDENSES. (Point to the word.)

Tape the condensation card on the chart next to the clouds.

CONDENSES MEANS THE WATER IN THE AIR BEGINS TO FORM DROPS OF REAL WATER AGAIN. (Point to the chart.)

THOSE DROPS FORM CLOUDS AND PRECIPITATION. (Point to the word.) PRECIPITATION MEANS RAIN OR SNOW.

Tape the precipitation card on the chart next to the rain drops.

THE RAIN OR SNOW FALLS BACK TO THE EARTH AND RUNS INTO OUR RIVERS, OCEANS, PONDS, AND LAKES. (Point to the chart.)

WHY'RE DOES THE WATER GO AFTER IT REACHES THE RIVERS, OCEANS, AND PONDS?

Emphasize, by using the water cycle chart, the cyclic nature of the water.

TEACHING STRATEGIES

THE JUST OBSERVED AND DESCRIBED IS
WATER CYCLE. (Point to the chart and to
the chalkboard.) A WATER CYCLE IS
OUR WATER MAKES.

EVAPORATES, WHICH MEANS IT GOES INTO
(Point to the chart.)

ATTACH A LABEL CARD ON THE CHART NEXT TO THE
STEP BY PUTTING TAPE ON THE BACK OF THE CARD
NEXT TO THE CHART.

MOVES TO THE COLDER UPPER AIR WHERE
IT CONDENSES. (Point to the word.)

ATTACH A LABEL CARD ON THE CHART NEXT TO THE

CONDENSES MEANS THE WATER IN THE AIR BEGINS
TO FORM DROPS OF REAL WATER AGAIN. (Point
to the word.)

THE DROPS FORM CLOUDS AND PRECIPITATION.
(Point to the word.) PRECIPITATION MEANS

ATTACH A LABEL CARD ON THE CHART NEXT TO THE

PRECIPITATION MEANS SNOW FALLS BACK TO THE EARTH AND RUNS
OFF INTO RIVERS, OCEANS, PONDS, AND LAKES.
(Point to the chart.)

WHAT DO YOU THINK THE WATER GOES AFTER IT REACHES THE
RIVERS, OCEANS, AND PONDS?

Using the water cycle chart, the cyclic
process.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-16

Students should:

--respond, "Back into the air," "Into the sky."

MATERIALS

TEACHING STRATEGIES

Remove the three identification cards from the chart and have several students try to describe the water cycle. As they describe the cycle, have them tape the identification cards in the proper places.

Clues to Success:

Have a large selection of magazines, newspapers, catalog scissors, and paste or tape available. Distribute one large piece of butcher paper or construction paper to each student.

Say:

WE HAVE MADE A MODEL OF THE NATURAL WATER CYCLE IN OUR ROOM. THE NEXT THING WE ARE GOING TO DO IS MAKE A PICTURE CHART OF THE NATURAL WATER CYCLE. TRY TO FIND PICTURES THAT REMIND YOU OF EACH PART OF THE WATER CYCLE: EVAPORATION, OR THE WATER GOING INTO THE AIR, CONDENSATION, OR THE WATER IN THE AIR BEGINNING TO FORM BACK INTO DROPS, AND PRECIPITATION, OR THE WATER COMING BACK TO THE EARTH. (Point to these parts of the water cycle on Chart 5-2 as you explain.)

IF YOU WOULD RATHER DRAW A PICTURE THAT SHOWS THESE PARTS OF THE WATER CYCLE, YOU MAY.

THESE THINGS HAPPEN IN A CERTAIN ORDER, SO WHEN YOU FIND PICTURES THAT REMIND YOU OF THE PARTS OF THE WATER CYCLE, BE SURE YOU PASTE THEM ON YOUR PAPER IN THE RIGHT ORDER.

WHEN YOUR WATER CYCLE PICTURES ARE PASTED ON THE PAPER, DRAW ARROWS ON THE PAPER TO SHOW THAT THE NATURAL WATER CYCLE IS A CYCLE, OR A CIRCLE.

TEACHING STRATEGIES

Use identification cards from the chart and have students try to describe the water cycle. To describe the cycle, have them tape the identification cards in the proper places.

Materials:

A collection of magazines, newspapers, catalogs, and a glue paste or tape available. Distribute one sheet of butcher paper or construction paper to each student.

1. PREPARE A MODEL OF THE NATURAL WATER CYCLE
2. M. THE NEXT THING WE ARE GOING TO DO IS TO
3. MAKE A PICTURE CHART OF THE NATURAL WATER CYCLE.
4. TRY TO FIND PICTURES THAT REMIND YOU OF EACH PART
5. OF THE WATER CYCLE: EVAPORATION, OR WATER
6. GOING INTO THE AIR, CONDENSATION, OR CLOUDS
7. FORMING IN THE AIR BEGINNING TO FORM BACK
8. DROPS OF WATER, AND PRECIPITATION, OR THE WATER
9. FALLING TO THE EARTH. (Point to these parts of
10. the water cycle on Chart 5-2 as you describe each part.)

11. YOU MIGHT WANT TO DRAW A PICTURE THAT SHOWS
12. THE ORDER OF THE WATER CYCLE, YOU MAY.

13. REMEMBER THAT THINGS HAPPEN IN A CERTAIN ORDER, SO WHEN
14. YOU PASTE PICTURES THAT REMIND YOU OF THE PARTS OF THE
15. WATER CYCLE, BE SURE YOU PASTE THEM ON THE PAPER
16. IN THE RIGHT ORDER.

17. WHEN THE WATER CYCLE PICTURES ARE PASTED ON THE PAPER,
18. DRAW ARROWS ON THE PAPER TO SHOW THAT THE WATER
19. CYCLE IS A CYCLE, OR A CIRCLE.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--describe the water cycle.

MATERIALS

TEACHING STRATEGIES

As a reminder to the students of what they are to do, write, "evaporation," "condensation," "precipitation," and "cycle" on the chalkboard. Also display Chart 5-2 and tell the students that if they have difficulty, looking at the chart might give them a hint.

Circulate among the students as they are working, encouraging them, but not giving specific suggestions.

If the student has a good understanding of the natural water cycle, his picture chart should include one of the types of pictures suggested as representing a part of the water cycle.

1. Evaporation: a lake, river, ocean, pool, pond, waterfall, dam, reservoir, wet clothes, barrel of water, stream, or any other picture showing a body or collection of water.
2. Condensation: a cloud, fog, drops on the outside of a cold glass.
3. Precipitation: rain, snow falling, snow on the ground, sleet, hail, thunder, lightning, puddles of rain water, or any other picture suggesting precipitation.
4. Cycle: arrows should be drawn connecting all parts of the cycle. An arrow should be shown going from evaporation to condensation, from condensation to precipitation, and from precipitation back to evaporation. If a picture of land or people was included, the arrow from precipitation should go to the land or people, and then to evaporation.

The criteria for rating the picture charts appear on Tallysheet 5-4. Make a copy of the completed Tallysheet

TEACHING STRATEGIES

the students of what they are to do, "ion," "condensation," "precipitation," the chalkboard. Also display Chart 5-2. Students that if they have difficulty, a chart might give them a hint.

the students as they are working, but not giving specific suggestions.

as a good understanding of the natural picture chart should include one of the pictures suggested as representing a part of the

Examples: a lake, river, ocean, pool, pond, waterfall, dam, reservoir, wet clothes, barrel of water, stream, or any other picture showing a body of water or collection of water.

Examples: a cloud, fog, drops on the outside of a cold glass.

Examples: rain, snow falling, snow on the ground, sleet, hail, thunder, lightning, puddles of rain water, or any other picture suggesting precipitation.

Arrows should be drawn connecting all parts of the cycle. An arrow should be shown going from evaporation to condensation, from condensation to precipitation, and from precipitation back to evaporation. If a picture of land or people was included, the arrow from precipitation should go to the land or people, and then to evaporation.

When rating the picture charts appear on the Tallysheet. Make a copy of the completed Tallysheet.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-16

MATERIALS

TEACHING STRATEGIES

and send it to BSCS. Also record the results on the Concepts page of the Student Record of Progress. If by looking at the students' posters you see that the majority of them have not grasped the concept of the natural water cycle, further instruction using Part I of this Activity is appropriate.

TEACHING STRATEGIES

BSCS. Also record the results on the of the Student Record of Progress. If by students' posters you see that the majority of grasped the concept of the natural water instruction using Part I of this Activity .

ANTICIPATED STUDENT BEHAVIORS

Upon completion of this activity, each student should, as a minimum:

- have observed the operation of the water cycle model.*
- have associated the operation of the model with the natural water cycle.*
- have attempted to complete the picture chart of the natural water cycle.*

UNIT V, CORE C
ACTIVITY 5-16

Teacher _____

Activity name suggested by class:

BSCS USE:	Post	___	Tally	___	Rev	___
-----------	------	-----	-------	-----	-----	-----

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)					
2.	Minutes of class time on science each day					
3.	Minutes preparing for each day's science class					
4.	Students absent on each date (Use ID Number)					

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Did the model of the water cycle work well? Yes No If not, what problems did you have with it?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Did the model of the water cycle work well? Yes No If not, what problems did you have with it?
13. Was the water cycle chart with its component cards helpful in the discussion of the water cycle? Yes No
14. Select two or three student water cycle posters and send them to BSCS.
15. Complete and send Tallysheet 5-4 to BSCS.

UNIT V, CORE C
ACTIVITY 5-16

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

- C. Concern (or questions) about content:

- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?

UNIT V
REACTIONS TO CORE C

1. Was the background information for this core clear and useful? Yes No
Comment:

2. Was there too much preparatory reading and too many directions given to the teacher? Yes No
Comment:

3. Was it clear to you why these particular activities were chosen and the direction they were leading? Yes No

4. How would you increase the clarity of this core for students? (Help them understand why they are doing these activities.)

5. Is there a practical (take-home) value for your students in these activities?
 Yes No If yes, what do you see as the "take-home" lesson? If no, what is needed?

6. In these materials, what things did your students find difficult to do?

7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?

8. Were the Clues to Success and Student Record of Progress helpful in this core?
 Yes No If helpful, how are they helpful?

9. Did you make use of the Planning Guide included in the introductory material for this core? Yes No
Comment:

10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? Yes No
Comment:

11. If you could teach your way, rather than following the Guide, how would you do it?

12. Did the activities fulfill the purposes described by the core objectives and rationale? Yes No
Comment:

6. In these materials, what things did your students find difficult to do?
7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?
8. Were the Clues to Success and Student Record of Progress helpful in this core?
 Yes No If helpful, how are they helpful?
9. Did you make use of the Planning Guide included in the introductory material for this core? Yes No
Comment:
10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? Yes No
Comment:
11. If you could teach your way, rather than following the Guide, how would you do it?
12. Did the activities fulfill the purposes described by the core objectives and rationale? Yes No
Comment:
13. Which of your students do you believe were unsuccessful in achieving the objectives of this core of activities? Explain:

NEW STUDENTS ENTERING DURING THIS CO

Date Entered	Last Name	Name Used	Ethnic Group	Sex	Birthdate	Test Date	Test
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B

W = white
 B = black
 S = Spanish-
 American
 O = other

W=WIS
 B=Bin
 O=Oth
 (Na

STUDENTS DROPPED IN THIS PERIOD

Date Dropped	Last Name	First	Reason for Dropping

NEW STUDENTS ENTERING DURING THIS CORE

up	Sex	Birthdate	Test Date	Test	Total	Verbal	Performance	Previous Test Score
	M F			W B O				
	M F			W B O				
	M F			W B O				
	M F			W B O				
	M F			W B O				
	M F			W B O				

W=WISC
 B=Binet
 O=Other
 (Name)

for Dropping



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE D. WATER MANAGEMENT

AIMS FOR ME AND MY ENVIRONMENT

1. DEVELOPMENT IN EACH CHILD OF A SENSE OF IDENTITY AS A PERSON WHO HAS SOME DEGREE OF CONTROL OVER AND CAN ACT ON HIS ENVIRONMENT. This will lead to a degree of self-determination based on a rational coping with situations rather than on a passive compliance or an impulsive response to problems.
2. DEVELOPMENT IN EACH CHILD OF A SUCCESS SYNDROME. More than anything else, each activity is intended to be a success experience for each child. It is the teacher's responsibility -- almost obligation -- to see that each child succeeds at a level that is challenging to his abilities and that preserves his self-respect. It is a further responsibility of the teacher to point out his achievement. The students as a group should help each individual fit what he has done into a pattern of accomplishment.
3. DEVELOPMENT IN EACH CHILD OF AN INTEREST THAT COULD BECOME A HOBBY OR AVOCATION OVER A LIFETIME (through an exposure to an array of experiences in science). It is hoped that many children will find some area -- perhaps growing plants, caring for animals, identifying flowers, collecting things, or simply enjoying outings into the country -- that they feel strongly about and can develop some competence or knowledge in. This would provide a means of self-expression, and (perhaps) allow some degree of sharing or involvement with others.
4. DEVELOPMENT IN EACH CHILD OF A SENSE OF RELATIONSHIP AND EMPATHY WITH OTHER LIVING THINGS. It is hoped that this will lead to a positive regard and caring about what affects them as individuals and as a group, because what affects them affects the community of man.
5. DEVELOPMENT IN EACH CHILD OF AN UNDERSTANDING OF ENVIRONMENTAL CONDITIONS that will lead to a sense of responsibility for the environment and actions that protect or improve it.

The two parts of this unit will deal with air and water as major components.

Part 1 emphasizes the importance of the environment by helping the student

1. Understand the need for water
2. Recognize the sources of water
3. Realize the problems associated with water
4. Realize the problems associated with air
5. Recognize the impact of water
6. Understand the broad problems

Part 2 emphasizes the nature of the environment by helping the student to:

7. Understand the composition of air
8. Realize that the quality of air is important
9. Realize that substances are carried by air
10. Comprehend the impact of air

1. Establish that water is a limited resource
2. Establish that water is a valuable resource
3. Establish that, as population increases, water becomes a more valuable resource
4. Establish that, as population increases, water becomes a more limited resource



BSCS

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE D. WATER MANAGEMENT

UNIT V GOALS

A The two parts of this unit will serve to develop an appreciation of the roles of
ACT air and water as major components of our environment.

Part 1 emphasizes the importance of water as a vulnerable component of our environment by helping the student to:

1. Understand the need for water.
2. Recognize the sources of water.
3. Realize the problems associated with the preparation of usable water.
4. Realize the problems associated with the disposal of waste water.
5. Recognize the impact of water pollution.
6. Understand the broad problems of water management.

Part 2 emphasizes the nature of air as a complex component of our environment by helping the student to:

7. Understand the composition of air.
8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.
10. Comprehend the impact of air pollution on our environment.

CORE D OBJECTIVES

1. Establish that water is a limited resource.
2. Establish that water is a vulnerable resource.
3. Establish that, as population increases, demands upon resources increase.
4. Establish that, as population increases, impact on environment increases.



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE D. WATER MANAGEMENT

CORE D RATIONALE

Previous cores in this unit have emphasized uses, sources, and preparation of usable water. The impact of man's activities on water quality, while always implicit, was subordinate to a process or condition. This core deals directly with the consequences of human action. In this sequence of activities, the students will examine some environmental situations in which human decisions have far-reaching effects. The underlying theme, from the point of view of water quality, is: more people, more problems, more need for careful management.

BACKGR

The story, *Fate* of information. At one as sewage is eventual ment. While this sub of the students, a br below. This is for ye be taught.

Sewage disposal p roughly similar to the That is, raw sewage, a chemical reaction, flo the gross process dif chemical reactions of these may be extended than initial flocculat collected by sedimenta oxidized by microbial liquid effluent is the a stream.

Activity 5-18, Sa the issue of streamflo student is why the sal them stay downstream, return to their place salmon are anadromous freshwater to spawn. They not only return t stream. This must be basis of this homing b is beyond the scope of



BACKGROUND INFORMATION FOR THE TEACHER

sources, and
ities on water
ocess or
ces of human
ill examine some
far-reaching
of water
careful

The story, *Fate of the River*, in itself requires no detailed background information. At one point in the booklet, mention is made that waste water as sewage is eventually returned to the environment after appropriate treatment. While this subject is unlikely to provoke much interest on the part of the students, a brief outline of common disposal practices is presented below. This is for your background only and not provided as information to be taught.

Sewage disposal practices in most communities follow a sequence of events roughly similar to the water treatment process examined in Core B of this unit. That is, raw sewage, after mechanical screening, is subjected to processes of chemical reaction, flocculation, filtration, and sterilization. Naturally the gross process differs in detail. Unlike drinking water treatment, the major chemical reactions of sewage plants involve the action of microbes. Locally these may be extended aeration, activated sludge, or controlled digestion rather than initial flocculation with chemicals. The digestion products are then collected by sedimentation and removed. The remaining liquid is further oxidized by microbial action in lagoons or trickling filters. The final liquid effluent is then sterilized (usually with chlorine) before release to a stream.

Activity 5-18, *Save the Salmon*, is also a straightforward story involving the issue of streamflow regulation. One point that may be obscure to the student is why the salmon should be aided in swimming upstream. Why not let them stay downstream, or back in the ocean? The answer is that salmon must return to their place of origin in order to reproduce (spawn). Technically salmon are anadromous fish. That is, they live in the sea but return to freshwater to spawn. In practice, this involves a series of complex responses. They not only return to a freshwater stream at spawning time, but to a specific stream. This must be the stream in which they were hatched from the egg. The basis of this homing behavior is not known at this time, and in any event it is beyond the scope of this activity. It is known, however, that the fish



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE D. WATER MANAGEMENT

BACKGROUND INFO

not only must return to environment for satisfac oxygenated gravel beds, headwaters of the stream not spawn. Obviously, will decline. No matter adult salmon, population

Activity 5-20, A Lf

1. It clearly demonstra such as air, water,
2. It suggests that pol simply out of place.
3. It establishes that great deal of troubl

Previous activities this activity, a "make b suitable for goldfish. oxygen in the water. Th

In the class model, dry pet food. Introduce environment results in oxygen. Most pollutants or important materials. are useful materials. T are now out of place. T in short periods of time pollutant may have a gre



BACKGROUND INFORMATION FOR THE TEACHER (continued)

not only must return to their birthplace but also must have a certain environment for satisfactory reproduction. They must find shallow, well-oxygenated gravel beds, for instance, usually at some point well up in the headwaters of the stream. If these conditions are not met, the salmon will not spawn. Obviously, if reproduction is limited, future adult populations will decline. No matter how favorable conditions may be in the ocean for adult salmon, populations are doomed if deprived of suitable spawning sites.

Activity 5-20, A Little Goes a Long Way, serves three functions:

1. It clearly demonstrates the interrelationships of environmental components such as air, water, fish, and microbes.
2. It suggests that pollution may be caused by very common things that are simply out of place.
3. It establishes that sometimes a very small amount of pollutant can cause a great deal of trouble.

Previous activities have established that living things need oxygen. In this activity, a "make believe sewage" mixture is introduced to water normally suitable for goldfish. Subsequent microbial action uses up the available oxygen in the water. The fish responds by exhibiting symptoms of stress.

In the class model, the "sewage" material is prepared by emulsifying some dry pet food. Introduction of this otherwise useful material to the fish's environment results in obvious pollution, with associated depletion of oxygen. Most pollutants that students will encounter are otherwise useful or important materials. Oil, phosphates, metals, acids, even sewage solids, are useful materials. Trouble occurs when they are not handled properly. They are now out of place. The environment may not be able to cope with this change in short periods of time. In such a situation, a very small amount of pollutant may have a great deal of impact.



Me and my Environment




BSCS



Me and my Environment

UNIT V
CORE D

PLANNING GUIDE


NOTE: Some activities (indicated in italics and an  in the margin) may be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		<i>(Italic)</i>
	Materials You Furnish	Materials in Supply Kit	
5-17. Fate of the River Days needed: 2	Tape recorder	Booklet, <i>Fate of the River</i>	One per stu
5-18. Save the Salmon Days needed: 2	35 mm Slide projector A variety of art supplies and magazines Paper to make a mural	Slide 5-18 Slide 5-19 Slide 5-20 Slide 5-21 Slide 5-22 Slide 5-23 Slide 5-24 Slide 5-25 Slide 5-26 Slide 5-27 Slide 5-28	Newspaper h Newspaper h Newspaper h Newspaper h Picture of Aerial view Salmon swim Graph of wa Newspaper h Newspaper h Salmon swim
5-19. Population Versus Water Supply Days needed: 3+	35 mm Slide projector 1/2" - 1" Grid graph paper Local data for the years 1900-1970 on: Rainfall amounts Population increase Water use increase		Three sheet Consult you Consult com Consult com

PLANNING GUIDE



BSCS

Activities (indicated in italics and an  in the margin) must be prepared several days or weeks in advance. Use this summary as a guide for materials and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher (<i>Italics and Arrow Indicate Advance Preparation Directions</i>)
Materials in Supply Kit	
<i>Booklet, Fate of the River</i>	One per student
Slide 5-18 Slide 5-19 Slide 5-20 Slide 5-21 Slide 5-22 Slide 5-23 Slide 5-24 Slide 5-25 Slide 5-26 Slide 5-27 Slide 5-28	Newspaper headline Newspaper headline Newspaper headline Newspaper headline Picture of Gold Stream Aerial view of Victoria, B. C. Salmon swimming upstream Graph of water use Newspaper headline Newspaper headline Salmon swimming upstream
	Three sheets per student Consult your nearest weather service Consult community government or census figures Consult community water treatment plant



Me and my Environment

UNIT V
CORE D

PLANNING GUIDE


NOTE: Some activities (indicated in italics and an arrow) be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		(Ita)
	Materials You Furnish	Materials in Supply Kit	
5-19. Population Versus Water Supply (continued)		Worksheet 5-8 Worksheet 5-9 Worksheet 5-10 Slide 5-29 Slide 5-30 Slide 5-31 Slide 5-32 Slide 5-33 Slide 5-34	Rainfall Populati Water us Boulder, Complete Boulder, Complete Boulder, Complete
5-20. A Little Goes a Long Way Days needed: 2	One gallon, wide-mouthed jars Goldfish Aquarium water Dry pet food Small aquarium net	400 ml Cup or beaker Tablespoon Microscopes Microscope slides Medicine droppers	Two Two Two gall if it from t to sta (added vapor. Dog, ham To catch Four Four Four

PLANNING GUIDE



BSCS

Activities (indicated in italics and an  in the margin) must be prepared several days or weeks in advance. Use this summary as a planning and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher
Materials in Supply Kit	<i>(Italics and Arrow Indicate Advance Preparation Directions)</i>
<p>Worksheet 5-8 Worksheet 5-9 Worksheet 5-10 Slide 5-29 Slide 5-30 Slide 5-31 Slide 5-32 Slide 5-33 Slide 5-34</p>	<p>Rainfall graph - one worksheet per student Population graph - one worksheet per student Water use graph - one worksheet per student Boulder, Colorado rainfall figures Completed Worksheet 5-8 Boulder, Colorado population figures Completed Worksheet 5-9 Boulder, Colorado water use Completed Worksheet 5-10</p>
<p>400 ml Cup or beaker Tablespoon Microscopes Microscope slides Medicine droppers</p>	<p>Two Two <i>Two gallons. Tap water may be substituted for aquarium water if it is suitably conditioned. Water should be run forcibly from the tap into a large open container (basin) and allowed to stand for three or four days. This will allow the chlorine (added at the treatment plant) to dissipate into the air as vapor.</i> Dog, hamster, gerbil, cat To catch fish Four Four Four</p>



Me and my Environment

UNIT V
CORE D

PLANNING GUIDE

NOTE: Some activities *(indicated in italics and an arrow in the original document)* be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		<i>(Italics in original document)</i>
	Materials You Furnish	Materials in Supply Kit	
5-21. Clues to Success: Understanding Days needed: 1	35 mm Slide projector	Worksheets 5-11A, B, C, D Slide 5-35 Slide 5-36 Slide 5-37 Slide 5-38 Tallysheet 5-5	Review Questions Of review questions Of review questions Of review questions Of review questions

PLANNING GUIDE



BSCS

Activities (*indicated in italics and an arrow in the margin*) must be prepared several days or weeks in advance. Use this summary as a guide for planning and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher
Materials in Supply Kit	<i>(Italics and Arrow Indicate Advance Preparation Directions)</i>
<p>Worksheets 5-11A, B, C, D Slide 5-35 Slide 5-36 Slide 5-37 Slide 5-38 Tallysheet 5-5</p>	<p>Review Questions - one worksheet per student <i>Of review questions</i> <i>Of review questions</i> <i>Of review questions</i> <i>Of review questions</i></p>



Me and my Environment



BSCS



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

1. Understand the need for water.
2. Recognize the sources of water.
3. Realize the problems associated with the preparation of usable water.
4. Realize the problems associated with the disposal of waste water.
5. Recognize the impact of water pollution.
6. Understand the broad problems of water management.

Core D Objectives for the Student:

1. Establish that water is a limited resource.
2. Establish that water is a vulnerable resource.
4. Establish that, as population increases, impact on environment increases.

ENVIRONMENTAL THEME:

Finiteness of Resources, Complementarity of Organisms and Environment

INQUIRY SKILLS:

Speculating

PROBLEM-SOLVING SKILLS:

Recognizing Problems and Formulating Questions

PRACTICAL APPLICATION:

Working in a Group, Developing Vocabulary, Reinforcing Reading Skills, Introduction to Community Problems

ACTIVITY

Objectives for the Student:

- Understand the need for water.
- Recognize the sources of water.
- Realize the problems associated with the preparation of usable water.
- Realize the problems associated with the disposal of waste water.
- Recognize the impact of water pollution.
- Understand the broad problems of water management.

Objectives for the Student:

- Establish that water is a limited resource.
- Establish that water is a vulnerable resource.
- Establish that, as population increases, impact on environment increases.

THEME:

Use of Resources, Complementarity of
Human and Environment

Learning

LEARNING SKILLS:

Identifying Problems and Formulating Questions

TEACHING METHODS:

Working in a Group, Developing Vocabulary,
Improving Reading Skills, Introduction
to Environmental Problems

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE D.

WATER MANAGEMENT

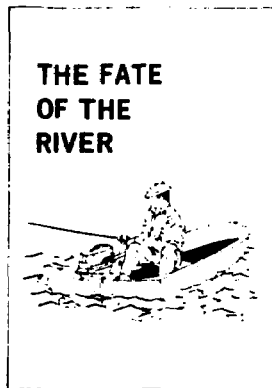
ACTIVITY 5-17. FATE OF THE RIVER



BSCS

Booklet, *Fate of the River*, 1
per student

*Tape recorder



*Not furnished in materials kit

Activity 5-17. Fate of the River

This activity will be used to review many of the concepts of water treatment covered earlier in this unit and to develop further the relationship between water quality and quality living.

The booklet, *Fate of the River*, may be used as a class oral reading exercise or as a silent reading experience with oral rereading for specific purposes. This booklet will provide the required information for a classroom discussion on water quality as it is related to quality living.

To introduce the story, say:

THIS STORY (hold up the booklet) IS ABOUT TWO TOWNS THAT DON'T GET ALONG VERY WELL. BEFORE WE READ THE STORY, LET'S REVIEW SOME OF THE WORDS IN THE BOOKLET THAT WE ALREADY KNOW ABOUT.

Place the following list of vocabulary words on the chalkboard and discuss the meaning of each word. Have the students use the vocabulary words in sentences and recall where they studied the concepts. A definition similar to one the students might suggest is listed after the word. Do not put this meaning on the chalkboard. It is for your use only.

Source: where something begins, where you get something.

TEACHING STRATEGIES

Fate of the River

will be used to review many of the concepts
ment covered earlier in this unit and to
r the relationship between water quality
ying.

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water quality as it is related to quality

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e the vocabulary words in sentences and
ey studied the concepts. A definition
the students might suggest is listed

Do not put this meaning on the chalk-
or your use only.

e something begins, where you get
thing.

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- participate in a discussion of vocabulary words.
- read, or listen to, the story Fate of the River.
- participate in a discussion of the story.
- associate the decrease in water quality with growth and industrialization.
- participate in a committee group that suggests solutions to the problem.
- participate as a voter and demonstrate by his vote that he has inferred that water quality is related to the quality of life.

Students should:

- discuss and define the vocabulary words listed.

MATERIALS

TEACHING STRATEGIES

Settling basin: a tank in a water treatment plant where the sediment or dirt particles in the water are allowed to settle to the bottom.

Filter plant: a tank with several layers of sand, gravel, or rock through which water filters from top to bottom, removing foreign particles.

Microbes: microscopic living things.

Chlorine: a chemical put into the water at water treatment plants to kill the microbes.

Pollution: something in the water that does not belong there.

Phosphates: a chemical found in detergents that encourages plant growth.

Sewage: human wastes put into the water.

Solid: something you can hold that keeps its shape or form.

Fertilizers: a material that helps things to grow.

Liquid: something that's runny and does not hold its shape.

Untreated water: nothing has been put into the water to make it any cleaner than it is.

Detergents: a cleaner, soap for dishes or clothes.

Committee: a group of people who decide something.

NOW LET'S READ THE STORY.

Distribute the booklets and ask the students to read them either silently or orally, as appropriate for the class.

TEACHING STRATEGIES

a tank in a water treatment plant where the sediment or dirt particles in the water are allowed to settle to the bottom.

tank with several layers of sand, gravel, or rock through which water filters from top to bottom, removing foreign particles.

scopic living things.

chemical put into the water at water treatment plants to kill the microbes.

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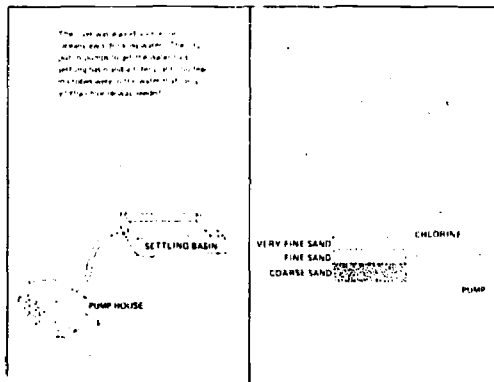
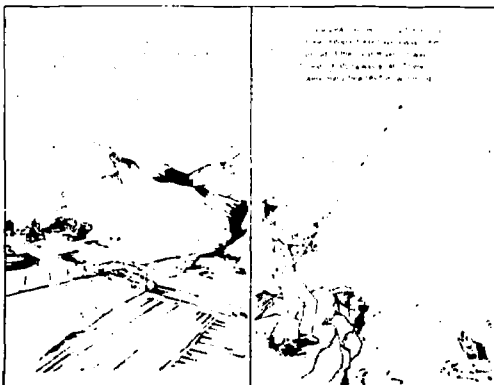
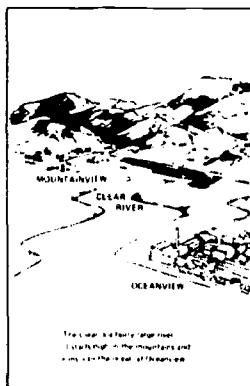
THE STORY.

ask the students to read them as appropriate for the class.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-17

MATERIALS



TEACHING STRATEGIES

Before selecting the Mountainview and Oceanview committees, go through the booklet again and have the students discuss the following questions. Oral or silent rereading may help in arriving at the answers; it should be encouraged.

WHERE IS THE SOURCE OF THE CLEAR RIVER? (page

WHICH TOWN DOES THE WATER FLOW THROUGH FIRST? (page

WHAT ARE FOOTHILLS? (page

WHICH TOWN GREW BIG FIRST? (page

WHICH TOWN WAS THE FIRST TO TREAT THE WATER? (page

WHERE DOES THE MOUNTAINVIEW AND OCEANVIEW WATER SUPPLY COME FROM? (page

WHICH TOWN DOES THE WATER BELONG TO? (pages 5-8)


WHY WAS VERY LITTLE CHLORINE NEEDED IN THE WATER? (page

WHY DIDN'T THE WATER FROM MOUNTAINVIEW BOTHER OCEANVIEW PEOPLE WHEN MOUNTAINVIEW WAS A FARM COMMUNITY? (pages 6-12)

GIV
STUDE
TO

TEACHING STRATEGIES

ing the Mountainview and Oceanview
o through the booklet again and have the
ass the following questions. Oral or
ing may help in arriving at the answers; it
ouraged.


**GIVE SEVERAL
STUDENTS A CHANCE
TO RESPOND**

THE SOURCE OF THE CLEAR RIVER? (page 5)

IN DOES THE WATER FLOW THROUGH (page 5)

FOOTHILLS? (page 6)

IN GREW BIG FIRST? (page 7)

IN WAS THE FIRST TO TREAT THE (page 8)

AS THE MOUNTAINVIEW AND OCEANVIEW (page 8)
PLY COME FROM?

IN DOES THE WATER BELONG TO? (pages
5-8)

ERY LITTLE CHLORINE NEEDED IN THE (page 8)

T THE WATER FROM MOUNTAINVIEW (pages
EANVIEW PEOPLE WHEN MOUNTAINVIEW
M COMMUNITY? 6-12)

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "In the mountains."

--respond, "Mountainview."

--respond, "Smaller mountains," "The hills before you
get to the mountains," "Close to the mountains."

--respond, "Oceanview."

--respond, "Oceanview."

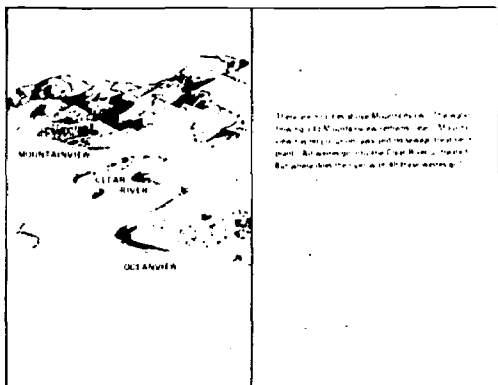
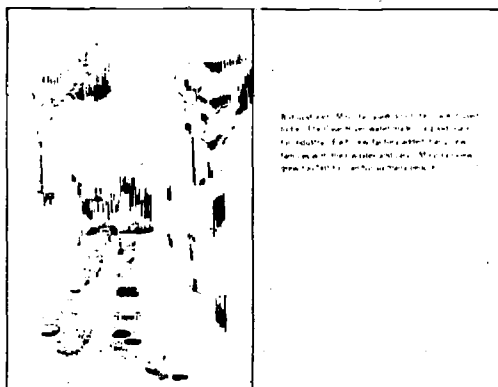
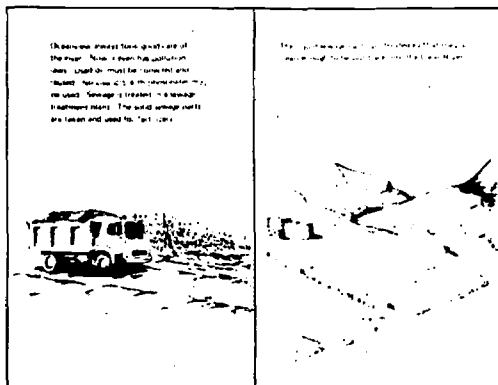
--respond, "From the Clear River."

--respond, "Both towns."

--respond, "Because the river was clean," "There
weren't many microbes in it."

--infer it was smaller and did not have factories
and other polluters; a treatment plant was not
needed.

MATERIALS



TEACHING STRATEGIES

WHY DOES OCEANVIEW HAVE LAWS ABOUT PUTTING OIL AND DETERGENTS IN THE RIVER?

(page 10)

WOULD A SEWAGE TREATMENT PLANT BE SOMETHING LIKE A WATER TREATMENT PLANT? WHY?

(pages 10 & 11)

WHERE DOES THE WATER GO AFTER IT PASSES OCEANVIEW?

(page 5)

HOW DID MOUNTAINVIEW CHANGE?

(pages 12 & 13)

WHY DID IT CHANGE?

(pages 12 & 13)

WHAT PROBLEMS HAS THE GROWTH OF MOUNTAINVIEW CAUSED?

(pages 16 & 17)

WHY ARE THE FISH DYING?

(page 14)

WHY DOES THE WATER IN OCEANVIEW TASTE SO BAD?

(page 16)

WHY DON'T MOUNTAINVIEW FACTORIES WANT TO CLEAN THINGS UP?

(page 18)

WHY DOESN'T MOUNTAINVIEW WANT TO BUILD A SEWAGE TREATMENT PLANT?

(page 18)

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-17

OCEANVIEW HAVE LAWS ABOUT PUTTING
POLLUTANTS IN THE RIVER? (page 10)

Students should:

--respond, "So they won't pollute the river."

WATER TREATMENT PLANT BE SOMETHING
LIKE WASTE TREATMENT PLANT? WHY? (pages
10 & 11)

--infer that because they separate solids and
liquids and treat the water, they would be
similar.

WHERE DOES THE WATER GO AFTER IT PASSES
THE TREATMENT PLANT? (page 5)

--respond, "The ocean."

WHAT FACTORS CAUSE MOUNTAINVIEW CHANGE?
(pages
12 & 13)

--respond, "More factories," "More people," "More
cars and more wastes."

WHAT CAUSES MOUNTAINVIEW CHANGE?
(pages
12 & 13)

--respond, "Because people thought it was a good
place to live, and came there."

WHAT HAS CAUSED THE GROWTH OF
MOUNTAINVIEW? (pages
16 & 17)

--respond, "Water pollution," "Dead fish," "Bad
water."

ARE THERE ANY FISH DYING?
(page 14)

--respond, "Because the water is so dirty."

WHY DOES THE WATER IN OCEANVIEW TASTE SO
BAD? (page 16)

--respond, "The water is so dirty that they have
to put lots of chlorine in it."

WHAT FACTORS CAUSE MOUNTAINVIEW FACTORIES WANT
TO MOVE HERE? (page 18)

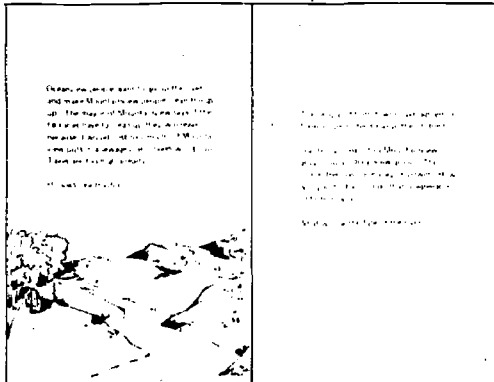
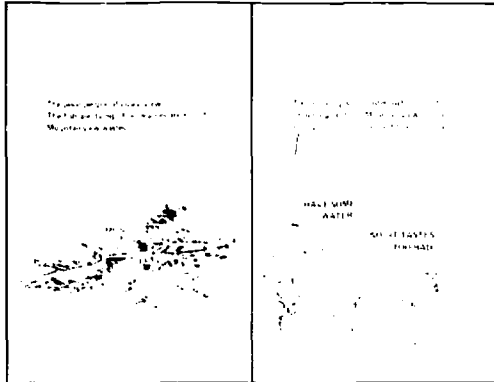
--respond, "Because it will cost too much."

WHAT FACTORS CAUSE MOUNTAINVIEW WANT TO BUILD
A WASTE TREATMENT PLANT? (page 18)

--respond, "Because it will make taxes go up."

MATERIALS

TEACHING STRATEGIES



After students have discussed the problems and answered the questions, select the Mountainview and Oceanview committee groups. Instruct them to get together and attempt to solve the problems. Do not dominate the discussion. Allow the students to interact freely.

Leave the structuring of the groups and committee organization up to the students.

Suggest that the findings and suggestions of the committee be broadcasted to the communities of Oceanview and Mountainview.

Choose a spokesman and have him tape-record his interpretations of the findings and the suggestions of the groups. This should be done so that the rest of the class cannot hear the recording. Then play back the recording to the entire class as if it were a radio broadcast.

Have the two committee groups again react, but this time have the students imagine themselves as voting citizens of each community.

INV
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ST

DISC

TEACHING STRATEGIES

INVOLVE YOUR

 SLOWEST STUDENTS

have discussed the problems and answered
select the Mountainview and Oceanview
s. Instruct them to get together and
e the problems. Do not dominate the dis-
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turing of the groups and committee
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DISCUSSION TIME

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lass as if it were a radio broadcast.

committee groups again react, but this time
ts imagine themselves as voting citizens
ty.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--attempt to solve the problems as a group.

--listen to the broadcast.

--demonstrate by their willingness to cooperate in
cleaning up the river that they have inferred
water quality is related to quality of life.

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES**ANTICIPATED STUDENT BEHAVIORS**ACTIVITY
5-17

Upon completion of this activity, each student should, as a minimum:

--have read, or listened to the story, Fate of the River.

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE D
ACTIVITY 5-17

Teacher _____

Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ____

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

ERIC How many students had difficulty reading the story?
Full Text Provided by ERIC

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. How many students had difficulty reading the story?
13. Did the students work well in the two committees? Yes No
14. Did you have to give a great amount of input to the committee discussions?
 Yes No Comments.

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

BSCS Evaluation: EMI Feedback Form 1a

What anecdotes of student learning did you see or hear in your classroom?

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

1. Understand the need for water.
2. Recognize the sources of water.
6. Understand the broad problems of water management.

Core D Objectives for the Student:

1. Establish that water is a limited resource.
2. Establish that water is a vulnerable resource.

ENVIRONMENTAL THEME:

Complementarity of Organisms and Environment,
Finiteness of Resources, Ecological Trade-offs

INQUIRY SKILLS:

Value Judging

PROBLEM-SOLVING SKILLS:

Identifying Variables

PRACTICAL APPLICATION:

How To Use Less Water, Developing Vocabulary,
Encouraging Discussion

ACTIVITY

Goals for the Student:

- Understand the need for water.
- Recognize the sources of water.
- Understand the broad problems of water management.

Objectives for the Student:

- Establish that water is a limited resource.
- Establish that water is a vulnerable resource.

AL THEME:

Interdependency of Organisms and Environment,
Scarceness of Resources, Ecological Trade-offs

SKILLS:

Judging

MOVING SKILLS:

Identifying Variables

APPLICATION:

Use Less Water, Developing Vocabulary,
Engaging Discussion

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE D.

WATER MANAGEMENT

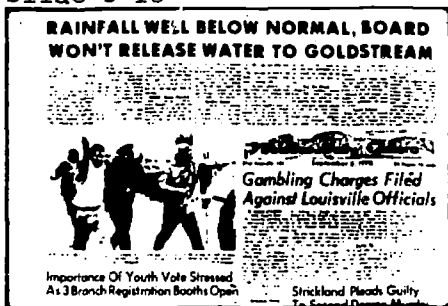
ACTIVITY 5-18. SAVE THE SALMON



BSCS

- Slides 5-18 through 5-28
- *35 mm Slide projector
- *Variety of art supplies and magazines
- *Paper to make a mural

Slide 5-18



Slide 5-19



t furnished in materials kit

Activity 5-18. Save the Salmon

This activity is designed to establish a specific need for water conservation. The slides and discussion are related to an actual environmental situation that occurred in Canada.

Part I.

Project Slide 5-18.

DAILY CAMERA
September 5, 1970

RAINFALL WELL BELOW NORMAL
BOARD WON'T RELEASE WATER TO GOLD STREAM

Read the headlines and ask:

WHAT IS GOLD STREAM?

WHAT IS THIS BOARD THE PAPER IS TALKING ABOUT?

Establish that Gold Stream is a stream. If students do not know what a water board is, tell them it is a group of people who make decisions about the city's water.

WHAT DO THE HEADLINES TELL YOU?

WHAT IS THE DATE OF THE HEADLINE?

Project Slide 5-19.

TEACHING STRATEGIES

Save the Salmon

is designed to establish a specific need for
ion. The slides and discussion are related
vironmental situation that occurred in

18.

DAILY CAMERA

September 5, 1970

RAINFALL WELL BELOW NORMAL

D WON'T RELEASE WATER TO GOLD STREAM

es and ask:

D STREAM?

IS BOARD THE PAPER IS TALKING ABOUT?

old Stream is a stream. If students do
water board is, tell them it is a group of
decisions about the city's water.

HEADLINES TELL YOU?

DATE OF THE HEADLINE?

19.

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- observe and participate in a discussion of
Slides 5-18 through 5-28.*
- recognize the need to conserve water.*
- conclude that individual action can have an
enormous impact.*
- select an illustration for each of the three
parts of the mural.*
- explain each illustration for the class mural.*

Students should:

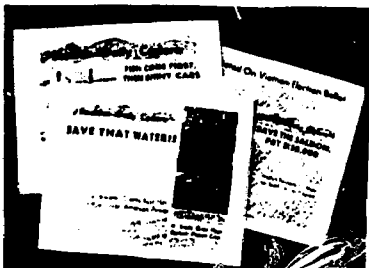
- respond, "Town," "City," "River," "Lake," "Stream."*
- speculate about what the "Board" means.*

- respond with something about the water in
Gold Stream and that rainfall is below normal.*

- respond, "September 5, 1970." (This will
establish a starting point for the general
time sequence that follows.)*

MATERIALS

Slide 5-20



TEACHING STRATEGIES

DAILY CAMERA
October 14, 1970

FISH DISASTER THREATENS GOLD STREAM

Read the headline aloud and ask:

WHAT DOES THIS SLIDE TELL US ABOUT GOLD STREAM?

WHAT IS A DISASTER?

WHY DO YOU SUPPOSE THERE IS GOING TO BE A
DISASTER?

WHAT IS THE DATE OF THIS HEADLINE?

Project Slide 5-20.

DAILY CAMERA
October 19, 1970

SAVE THAT WATER!

October 21, 1970

FISH COME FIRST, THEN SHINY CARS

October 22, 1970

SAVE THE SALMON, PAY \$150,000

Read and discuss each headline and ask:

TEACHING STRATEGIES

DAILY CAMERA

October 14, 1970

DISASTER THREATENS GOLD STREAM

Read aloud and ask:

WHAT DOES THIS SLIDE TELL US ABOUT GOLD STREAM?

WHAT IS A DISASTER?

WHAT DO YOU SUPPOSE THERE IS GOING TO BE A

DATE OF THIS HEADLINE?

DAILY CAMERA

October 19, 1970

SAVE THAT WATER!

October 21, 1970

COME FIRST, THEN SHINY CARS

October 22, 1970

BUY THE SALMON, PAY \$150,000

Read each headline and ask:

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-18

Students should:

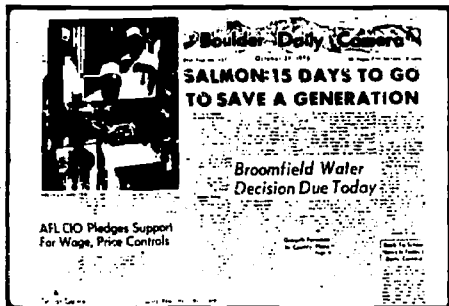
--respond that it is threatened with a fish disaster.

--respond, "Something terrible," "Something bad."

--infer that there will be a disaster because there is not enough rain.

--respond, "October 14, 1970."

Slide 5-21



Project Slide 5-21.

DAILY CAMERA
October 27, 1970

SALMON: 15 DAYS TO GO TO SAVE A GENERATION

Slide 5-22



Ask:

WHAT DO YOU THINK THESE ARTICLES ARE ABOUT?

WHAT IS A GENERATION?

Assist the students with this definition.

WHAT GENERATION NEEDS TO BE SAVED?

Slide 5-23



Project Slide 5-22 and say:

GOLD STREAM FLOWS OUT OF THE HILLS THAT SUPPLY
WATER TO THE CITY OF VICTORIA.

Project Slide 5-23 and say:

VICTORIA IS THE CAPITAL CITY OF BRITISH COLUMBIA
IN CANADA.

Project Slide 5-24 and say:

TEACHING STRATEGIES

DO WE KNOW ABOUT THE DISASTER AND
TEAM AFTER READING THESE HEADLINES?

5-21.

DAILY CAMERA
October 27, 1970

15 DAYS TO GO TO SAVE A GENERATION

DO YOU THINK THESE ARTICLES ARE ABOUT?

GENERATION?

Students with this definition.

GENERATION NEEDS TO BE SAVED?

5-22 and say:

WATER FLOWS OUT OF THE HILLS THAT SUPPLY
THE CITY OF VICTORIA.

5-23 and say:

VICTORIA IS THE CAPITAL CITY OF BRITISH COLUMBIA

5-24 and say:

ANTICIPATED STUDENT BEHAVIORS

Students should:

--conclude that the disaster has something to do with water, that fish are more important than shiny cars, that the fish are salmon, that it will cost \$150,000 to save the salmon, and that people are involved with the problem.

--conclude that the articles are about a stream with salmon. The salmon don't have enough water and there are only fifteen days left to save the salmon.

--respond, "An age group," "A bunch of people."

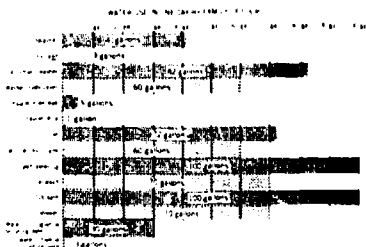
--respond, "The fish."

MATERIALS

Slide 5-24



Slide 5-25



TEACHING STRATEGIES

THE SUMMER OF 1970 WAS THE THIRD DRY SUMMER IN A ROW FOR THE GOLD STREAM HILLS. GOLD STREAM HAD SO LITTLE WATER IN IT THAT SALMON WAITING TO COME IN TO LAY THEIR EGGS COULD NOT SWIM. THE SALMON WOULD SWIM INTO THE STREAM ONLY TO BE STOPPED BY THE SHALLOW WATER.

EACH PERSON IN CITIES LIKE VICTORIA USES FIFTY OR MORE GALLONS OF WATER EVERY DAY. HOW MUCH WATER IS THAT?

IF EVERY PERSON IN VICTORIA SAVED 25 GALLONS OF WATER EACH DAY - IN OTHER WORDS, CUT HIS WATER USAGE IN HALF, THERE WOULD BE 1,250,000 GALLONS OF WATER THAT COULD BE SENT DOWN THE GOLD STREAM RIVER TO SAVE THE SALMON.

Project Slide 5-25 to help students remember some of the many water uses they have identified. Say:

HERE IS A PICTURE OF SOME OF THE WAYS WE USE WATER. IF YOU WERE LIVING IN VICTORIA IN 1970, HOW WOULD YOU HAVE SAVED WATER?

PRETEND IT IS NOW A WEEK LATER. WHAT WILL COME FIRST, THE CITY AND ITS PEOPLE, OR THE SALMON? IF IT DOES NOT RAIN SOON, IT MAY MEAN THE PEOPLE IN THE CITY WILL BE SHORT OF WATER ALL WINTER.

TEACHING STRATEGIES

OF 1970 WAS THE THIRD DRY SUMMER IN THE GOLD STREAM HILLS. GOLD STREAM HAD WATER IN IT THAT SALMON WAITING TO LAY THEIR EGGS COULD NOT SWIM. THE D SWIM INTO THE STREAM ONLY TO BE THE SHALLOW WATER.

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ANTICIPATED STUDENT BEHAVIORS

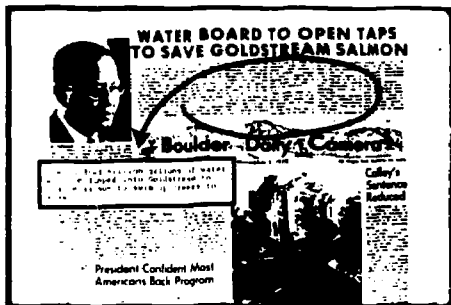
ACTIVITY
5-18

Students should:

--comment, "A lot," "About as much as two bathtubs," and so forth.

--suggest, "Take fewer baths," "Don't peel vegetables or potatoes under running water," "Don't leave water running when brushing teeth," "Use suds saver on automatic washing machine," "Don't wash car," "Don't use automatic dishwasher - use a pan," "Fix leaky faucets," "Don't water lawn," "Don't flush toilet every time you use it."

slide 5-26



DIS

Direct the class members to make a decision about whether they would release water for the salmon.

Ask:

WHAT DO YOU THINK THE CITY OF VICTORIA DID?

Project Slide 5-26.

DAILY CAMERA
November 4, 1970

WATER BOARD TO OPEN TAPS TO SAVE
GOLD STREAM SALMON

"One hundred million gallons of water will be dumped in Gold Stream to enable salmon to swim upstream to spawn."

Read and discuss the headline and ask:

HOW MUCH WATER DO YOU THINK THE PEOPLE OF VICTORIA SAVED BY NOT WASHING CARS AND BY DOING THE OTHER THINGS WE TALKED ABOUT?

WHAT DOES THE WORD "SPAWN" MEAN?

Assist the students in defining this word as "laying eggs."

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

DISCUSSION TIME



Students should:

members to make a decision about whether
use water for the salmon.

--decide either to have water for the city or for
the salmon, or possibly some water for both.

THINK THE CITY OF VICTORIA DID?

--speculate on the actions that people in the city of
Victoria took.

26.

DAILY CAMERA

November 4, 1970

R BOARD TO OPEN TAPS TO SAVE
GOLD STREAM SALMON

nd million gallons of water will be
old Stream to enable salmon to swim
spawn."

the headline and ask:

TER DO YOU THINK THE PEOPLE OF
VED BY NOT WASHING CARS AND BY
OTHER THINGS WE TALKED ABOUT?

--speculate on the amount of water saved and recall
that if each person saved 25 gallons a day,
1,250,000 gallons would be saved.

HE WORD "SPAWN" MEAN?

--speculate on the definition of spawn.

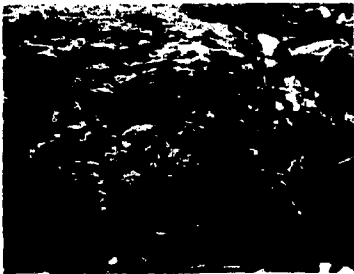
ats in defining this word as "laying

MATERIALS

Slide 5-27



Slide 5-28



TEACHING STRATEGIES

Project Slide 5-27.

DAILY CAMERA
November 25, 1970

MILLION GALLON EFFORT

"Victorians have saved up to one million gallons of water a day to help the salmon."

LIFE RETURNS TO GOLD STREAM

Read and discuss the headline of Slide 5-27.

Ask:

WHAT DOES "LIFE RETURNS TO GOLD STREAM" MEAN?

WHAT IS THE DATE OF THIS HEADLINE?

Briefly continue discussion on the time period between the first and last headline (about three months).

Project Slide 5-28 and say:

THIS SLIDE SHOWS THE SALMON SPAWNING IN GOLD STREAM. WHY IS IT IMPORTANT THAT PEOPLE IN VICTORIA CONTINUE TO BE CAREFUL ABOUT USING WATER?

WHAT OTHER KINDS OF THINGS COULD HAPPEN IF PEOPLE USED UP A GREAT DEAL OF THE WATER IN THE STREAMS AND RIVERS.

TEACHING STRATEGIES

7.

DAILY CAMERA

November 25, 1970

MILLION GALLON EFFORT

have saved up to one million gallons
ay to help the salmon."

FE RETURNS TO GOLD STREAM

the headline of slide 5-27.

"FE RETURNS TO GOLD STREAM" MEAN?

DATE OF THIS HEADLINE?

discussion on the time period between the
adline (about three months).

and say:

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E CAREFUL ABOUT USING WATER?

ND S OF THINGS COULD HAPPEN IF
P A GREAT DEAL OF THE WATER IN
ND RIVERS.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-18

Students should:

--interpret the headline and reply, "The fish
can live there now," "The fish can have
babies," "They put water in the stream."

--respond, "November 25, 1970."

--infer that it takes time for people to work
together, to get things done.

--respond, "So that Gold Stream will always have
water for the salmon."

--speculate, "Water plants would die," "Fish, frogs,
and tadpoles would have to live elsewhere,"
"There would be a smaller source of drinking
water."

DIS

ENCOUR
CREA
IDE

Part II.

This part of the activity is designed to assess student understanding of the three ideas outlined in this activity:

1. The effects of using up water in the environment, e.g., rivers and streams.
2. Ways of conserving water.
3. The impact of individual action in conserving water.

Before class, tack the mural paper to a bulletin board. Using a yardstick and black felt pen, divide the paper into three sections. Label the sections at the top in whatever way will be easiest for your students - either titles or numbers. Sketch a river or lake in Sections 1 and 3, leaving ample space for student pictures.

Tell students that they are going to make a class mural that tells a story in three parts. Be sure they understand that a mural is a picture that is hung on the wall. Have them recall the previous discussion of the salmon, including the decrease in water, ways of conserving water and the positive effect of conserving water.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

DISCUSSION TIME



ENCOURAGE
CREATIVE
IDEAS



The activity is designed to assess student understanding of the three ideas outlined in this

effects of using up water in the environment, e.g., rivers and streams.

conserving water.

effect of individual action in conserving

tack the mural paper to a bulletin board. With a black and black felt pen, divide the paper into three sections. Label the sections at the top in a way that will be easiest for your students - either "Effects of Using Up Water in the Environment," "Effects of Conserving Water," or "Effects of Individual Action in Conserving Water." Sketch a river or lake in Section 1. Leave ample space for student pictures.

that they are going to make a class mural. The mural is to be in three parts. Be sure they understand that the mural is a picture that is hung on the wall. Review all the previous discussion of the salmon, the decrease in water, ways of conserving water, and the effect of conserving water.

MATERIALS

TEACHING STRATEGIES

Then say:

EACH OF YOU IS TO DRAW OR CUT OUT FROM MAGAZINES SOMETHING TO SHOW (1) WHAT CAN HAPPEN TO THE ENVIRONMENT WHEN THERE ISN'T ENOUGH WATER, (2) WAYS PEOPLE CAN SAVE WATER, AND (3) WHAT WILL HAPPEN AFTER THEY SAVE WATER.

Clarify as needed and ask students what they might draw or cut out for each section of the mural. Some possibilities are:

1. Salmon unable to spawn, dying frogs or fish, dead water plants, lowered water level in the pond or river, grasses parched by the dryness, and so forth.
2. Water shut off while brushing teeth or peeling vegetables, dirty cars, fixing leaky faucets, water sprinkler shut off, and so forth.
3. Fish, frogs, and water plants thriving and plentiful; raised water level; lush green color; salmon eggs; and so forth.

Tell the students when they have finished, to bring their pictures to the mural paper and explain to you where their pictures belong as they paste them on. Note which students are having difficulty with any of the sections so you can plan to assist them with additional instruction as necessary.

When students have finished, ask them to suggest an appropriate title for the mural and vote on it. Allow interested students to complete the mural by filling in empty spaces with drawings, pictures, torn paper, and so on. Besides cluing you on the success of individual students, the mural will provide an attractive and meaningful bulletin board.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

IS TO DRAW OR CUT OUT FROM MAGAZINES
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board.

ACTIVITY
5-18

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

Upon completion of this activity, each student should, as a minimum:

- have observed Slides 5-18 through 5-28.*
- have recognized the need to conserve water.*
- have participated in making a class mural.*

UNIT V, CORE D
ACTIVITY 5-18

Teacher _____

Activity name suggested by class:

BSCS USE: Post _____ Tally _____ Rev _____
--

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

Could the students follow the story from the newspaper headlines? Yes No

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Could the students follow the story from the newspaper headlines? Yes No
13. Did all students contribute to the construction of the mural? Yes No Comment.
14. When the mural is completed send a Polaroid picture of it to BSCS. (You may also wish to send the mural when you have finished using it as a bulletin board.)

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. at anecdotes of student learning did you see or hear in your classroom?

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

1. Understand the need for water.
2. Recognize the sources of water.
6. Understand the broad problems of water management.

Core D Objectives for the Student:

1. Establish that water is a limited resource.
3. Establish that, as population increases, demands upon resources increase.
4. Establish that, as population increases, impact on environment increases.

ENVIRONMENTAL THEME:

Population Dynamics, Finiteness of Resources

INQUIRY SKILLS:

Translating

PROBLEM-SOLVING SKILLS:

Organizing Data

PRACTICAL APPLICATION:

Construction and Comprehension of a Graph,
Eye-hand Coordination, Need for Conserving
Water

ACTIVITY

Goals for the Student:

1. Understand the need for water.
2. Recognize the sources of water.
3. Understand the broad problems of water management.

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AL THEME:

tion Dynamics, Finiteness of Resources

ILLS:

ating

IVING SKILLS:

izing Data

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BSCS

UNIT V. AIR AND WATER IN
MY ENVIRONMENT

CORE D. WATER MANAGEMENT

ACTIVITY 5-19. POPULATION VERSUS
WATER SUPPLY

MATERIALS

TEACHING STRATEGIES

Worksheets 5-8 through 5-10
Slides 5-29 through 5-34

*Data on rainfall, population, and water consumption for your own locality -- 1900 to 1970 (These data should be available from the weather bureau, water department, or chamber of commerce.)

*Graph paper, 3 sheets per student of 1/2-inch grid or larger

*Not furnished in materials kit

Activity 5-19. Population Versus Water Supply

This activity provides a review of the previous activities related to water. In addition, graphing is used to help the student conclude that there is a need for conservation of water.

NOTE: You should not attempt to complete this activity in less than two class periods.

Begin the activity by referring to the story, *Fate of the River*.

Say:

THE STORY ABOUT SALMON WHICH WE READ EARLIER, IS A STORY WITH A HAPPY ENDING. BUT WHAT ABOUT TOWNS LIKE OCEANVIEW OR MOUNTAINVIEW? DO PEOPLE IN TOWNS LIKE THESE NEED TO BE CONCERNED ABOUT WATER?

TEACHING STRATEGIES

Population Versus Water Supply

provides a review of the previous activities
er. In addition, graphing is used to help
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ABOUT SALMON WHICH WE READ EARLIER, IS A
A HAPPY ENDING. BUT WHAT ABOUT TOWNS
VIEW OR MOUNTAINVIEW? DO PEOPLE IN
THESE NEED TO BE CONCERNED ABOUT

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- construct a graph of annual rainfall for Boulder, Colorado, and for his local community.
- conclude that the amount of rainfall received at a particular locality does not change much from year to year.
- construct a graph of population growth for Boulder, Colorado, and for his local community.
- compare the rainfall and population graphs of Boulder and conclude that the population has risen sharply while the rainfall remained relatively constant.
- indicate a prediction for a trend in water use since 1900 in Boulder, Colorado.
- construct a graph of water use in Boulder and in the local community if data are available.
- conclude that water use has risen sharply and tends to follow population increase.
- predict a water shortage for Boulder and perhaps for the local community.
- infer the need for water conservation.

Students should:

- recall that Mountainview created problems for Oceanview, and that these towns do need to be concerned about water.

MATERIALS

2

Slide 5-29

BOULDER, COLORADO RAINFALL	
YEAR	RAINFALL IN INCHES
1900	17
1910	13
1920	19
1930	16
1940	20
1950	14
1960	15
1970	16
1980	?

TEACHING STRATEGIES

Review the plight of these two cities on the Clear River. Relate the problems of Oceanview and Mountainview to problems of the students' own community by asking:

WHERE DOES OUR DRINKING WATER COME FROM?

COULD A PROBLEM SIMILAR TO THE ONE IN OCEANVIEW AND MOUNTAINVIEW OCCUR HERE?

Using knowledge based on the previous activity (5-16) concerning water cycles, trace the local source of water from reservoir, lake, river, or well to rainfall.

Now ask:

DO YOU THINK THE AMOUNT OF WATER FROM RAINFALL CHANGES MUCH FROM YEAR TO YEAR? WHY?

Accept any reasonable answer and explanation at this point.

Say:

LET US LOOK AT THE AMOUNT OF RAINFALL IN BOULDER, COLORADO, SINCE 1900.

Project Slide 5-29. (Leave room lights on if possible.)

The following data appear on the slide:

TEACHING STRATEGIES

of these two cities on the Clear River.
s of Oceanview and Mountainview to
students' own community by asking:

WHERE DRINKING WATER COME FROM?

ARE THEY SIMILAR TO THE ONE IN OCEANVIEW
DO SIMILAR PROBLEMS OCCUR HERE?

Based on the previous activity (5-16)
cycles, trace the local source of water
lake, river, or well to rainfall.

WHAT IS THE AMOUNT OF WATER FROM RAINFALL
FROM YEAR TO YEAR? WHY?

able answer and explanation at this point.

WHAT IS THE AMOUNT OF RAINFALL IN
COLORADO, SINCE 1900.

(Leave room lights on if possible.)

appear on the slide:

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-19

Students should:

--state the source of their local water supply.

--predict whether or not a problem similar to **this**
one could occur.

--respond, "Yes," "No," "Don't know," and attempt
to explain why.

MATERIALS

TEACHING STRATEGIES

<u>YEAR</u>	<u>RAINFALL IN INCHES</u>
1900	17
1910	13
1920	19
1930	16
1940	20
1950	14
1960	15
1970	16
1980	?

Point out the column on the slide where the years appear and the column where the rainfall amount appears.

Ask:

DID THE AMOUNT OF RAINFALL IN BOULDER CHANGE VERY MUCH FROM YEAR TO YEAR SINCE 1900?

Worksheet 5-8



WE CAN MORE EASILY SEE HOW MUCH CHANGE THERE IS BY MAKING A GRAPH.

Distribute Worksheet 5-8 to each student.

Review the basic concepts of graph construction by asking

REMEMBER WHAT A GRAPH IS?
(Write "graph" on the chalkboard.)

TEACHING STRATEGIES

<u>YEAR</u>	<u>RAINFALL IN INCHES</u>
1900	17
1910	13
1920	19
1930	16
1940	20
1950	14
1960	15
1970	16
1980	?

column on the slide where the years appear where the rainfall amount appears.

AMOUNT OF RAINFALL IN BOULDER CHANGE FROM YEAR TO YEAR SINCE 1900?


ACCEPT ALL ANSWERS

EASILY SEE HOW MUCH CHANGE THERE IS BY DRAWING A GRAPH.

Hand out sheet 5-8 to each student.

Discuss concepts of graph construction by asking:

WHAT IS A GRAPH?
("What is a graph" on the chalkboard.)

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "No," "Yes," "Some."

--construct a rainfall line graph.

--recall graphing activities in Unit III and respond, "It's a picture of something," "It uses a line to tell you something."

MATERIALS

TEACHING STRATEGIES

Point to the vertical axis on the worksheet and say:

THIS LINE SHOWS THE INCHES OF RAIN RECEIVED:
FIVE, TEN, FIFTEEN, TWENTY.

Point to the horizontal axis and say:

THIS LINE SHOWS THE YEARS: 1900, 1910, 1920,
1930, 1940, 1950, 1960, 1970, and 1980.

IN 1900 HOW MANY INCHES OF RAIN DID BOULDER
RECEIVE?

WHICH LINE ON OUR GRAPH WOULD BE CLOSEST TO
SEVENTEEN INCHES?

Instruct the students to put a finger on 1900 and go up
the line until they get to fifteen. Ask:

IS SEVENTEEN MORE OR LESS THAN FIFTEEN?

Have the students put a dot a little above the fifteen-
inch mark to represent seventeen inches. Be sure all
students understand this process before you continue.

If students still seem to lack the graphing concept, plot
one more point with them until they understand.
Otherwise, instruct them to finish constructing the graph.



TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-19

Students should:

--respond, "Seventeen inches."

--respond, "Fifteen."

--respond, "More."

tical axis on the worksheet and say:

OWS THE INCHES OF RAIN RECEIVED:
FIFTEEN, TWENTY.

zontal axis and say:

OWS THE YEARS: 1900, 1910, 1920,
1950, 1960, 1970, and 1980.

MANY INCHES OF RAIN DID BOULDER

N OUR GRAPH WOULD BE CLOSEST TO
CHES?

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MORE OR LESS THAN FIFTEEN?



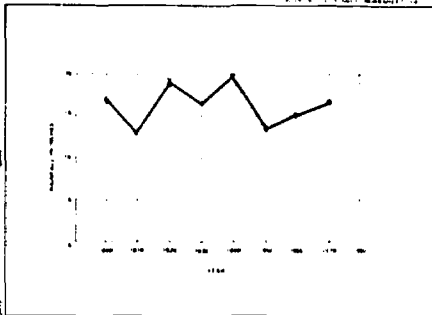
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esent seventeen inches. Be sure all
nd this process before you continue.

seem to lack the graphing concept, plot
h them until they understand.
ct them to finish constructing the graph.



MATERIALS

Slide 5-30



TEACHING STRATEGIES

When students have plotted all the points, instruct them to connect the points in order to form a line.

Project Slide 5-30, which shows a completed Worksheet 5- Have students compare their graphs with the one projected. Then ask:

WHAT KIND OF A LINE DO YOU SEE ON YOUR GRAPHS?

DOES THE LINE GO UP AND DOWN MUCH?

WHAT CAN WE LEARN FROM OUR GRAPH ABOUT THE RAINFALL FROM YEAR TO YEAR IN A PLACE SUCH AS BOULDER?

Make sure students see that, in spite of minor ups and downs, the overall average does not change much.

Now ask:

DOES THE AMOUNT OF RAINFALL HERE IN (name of local community) CHANGE MUCH FROM YEAR TO YEAR?

Place the local data for the past several years on the chalkboard in a way similar to that in Slide 5-29. (Years need not coincide with Boulder data; however, students may have less trouble constructing graphs if it does.) Distribute a sheet of graph paper ruled with half-inch (or larger) squares to each of the students and have them construct a graph of local rainfall. On the chalkboard, draw a facsimile of the graph paper, putting rainfall in inches on the vertical axis and years on the horizontal axis. The students can then label their axes by copying your example. Remind them to graph the

TEACHING STRATEGIES

have plotted all the points, instruct them to connect the points in order to form a line.

5-30, which shows a completed Worksheet 5-8. Compare their graphs with the one projected.

OF A LINE DO YOU SEE ON YOUR GRAPHS?

LINE GO UP AND DOWN MUCH?

WE LEARN FROM OUR GRAPH ABOUT
ALL FROM YEAR TO YEAR IN A PLACE
BOULDER?

ents see that, in spite of minor ups and
fall average does not change much.

AMOUNT OF RAINFALL HERE IN (name of
community) CHANGE MUCH FROM YEAR TO

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a graph of local rainfall. On the chalk-
acsimile of the graph paper, putting
nes on the vertical axis and years on
axis. The students can then label their
your example. Remind them to graph the

ANTICIPATED STUDENT BEHAVIORS

Students should:

--connect the points plotted to form a line.

--compare their graphs with the one projected.

--respond, "Crooked," "Wiggly."

--respond, "Just a little," "Not much."

--interpret the graph and indicate that because the
line stays fairly straight the rainfall does not
change very much from year to year.

--predict that it probably does not; may respond,
"Yes," "No," "Don't know."

MATERIALS

TEACHING STRATEGIES

same way they did on Worksheet 5-8. Assist students as necessary.

GIVE S
TIME
TO
THINK

When the graphs are completed, have students compare them with the Boulder rainfall graph on Slide 5-30. Discuss the similarities and differences, finally asking:

DOES THE RAINFALL CHANGE MUCH FROM YEAR TO YEAR IN OUR COMMUNITY?

HOW CAN WE TELL?

Project Slide 5-31. The following data appears on the slide.

Slide 5-31

BOULDER, COLORADO POPULATION

YEAR	NUMBER OF PEOPLE
1900	7,000
1910	11,000
1920	13,000
1930	14,000
1940	17,100
1950	20,000
1960	38,000
1970	68,000
1980	?

BOULDER, COLORADO POPULATION

<u>YEAR</u>	<u>NUMBER OF PEOPLE</u>
1900	7,000
1910	11,000
1920	13,000
1930	14,000
1940	17,000
1950	20,000
1960	38,000
1970	68,000
1980	?

TEACHING STRATEGIES**ANTICIPATED STUDENT BEHAVIORS**ACTIVITY
5-19

on Worksheet 5-8. Assist students as

Students should:

**GIVE STUDENTS
TIME
TO
THINK**



When completed, have students compare their rainfall graph on Slide 5-30. Discuss similarities and differences, finally asking:

--compare local rainfall graph with that for Boulder.

Does rainfall change much from year to year in your community?

--conclude that it does not.

Why?

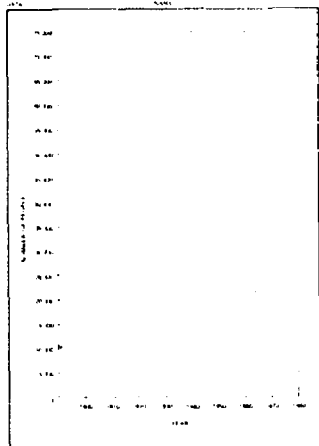
--conclude that because the line on the graph does not go up and down much, the rainfall did not change significantly.

The following data appears on the

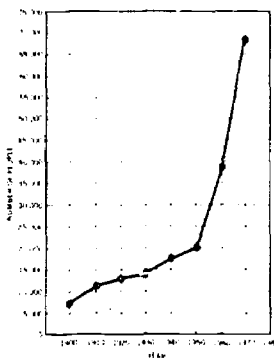
POPULATIONNUMBER OF PEOPLE

1970	7,000
1980	11,000
1990	13,000
2000	14,000
2010	17,000
2020	20,000
2030	38,000
2040	68,000
2050	?

Worksheet 5-9



Slide 5-32



Discuss the slide, pointing out the years mentioned and the number of people. Distribute Worksheet 5-9 to each student. Following the same strategy suggested in this activity for Worksheet 5-8, plot the first points on the graph together and then instruct the students to continue graphing the population of Boulder from 1900-1970.

Remind the students to connect the points on the graph to make a line.

When the students have completed their graphs, project Slide 5-32 for comparison and verification of their accuracy.

Now instruct the students to compare the rainfall and population graphs.

Ask:

HOW DO THE LINES OF THE RAINFALL AND POPULATION GRAPHS COMPARE?

HAS THE POPULATION OF BOULDER GONE UP OR DOWN?

WHY DO WE KNOW THAT?

WHAT DO YOU THINK HAS HAPPENED TO THE POPULATION OF (name of local community) SINCE 1900?

TEACHING STRATEGIES

de, pointing out the years mentioned and people. Distribute Worksheet 5-9 to each giving the same strategy suggested in this worksheet 5-8, plot the first points on paper and then instruct the students to graph the population of Boulder from 1900-

ents to connect the points on the graph to

ts have completed their graphs, project comparison and verification of their

students to compare the rainfall and s.

INES OF THE RAINFALL AND POPULATION ARE?

ULATION OF BOULDER GONE UP OR DOWN?

NOW THAT?

THINK HAS HAPPENED TO THE POPULATION (local community) SINCE 1900?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--construct a population line graph for Boulder.

--compare their graphs with the one projected.

--compare the graphs and indicate that the population line has risen sharply while the rainfall has not increased but stayed about the same.

--look at the graphs prepared and respond, "Up."

--respond, "Because the line goes up."

--responses will vary, depending upon the locale and the experience of the students.


**ACCEPT ALL
ANSWERS**

MATERIALS

Slide 5-33

BOULDER, COLORADO WATER USE	
YEAR	MILLIONS OF GALLONS
1900	2
1910	4
1920	5
1930	5
1940	6
1950	9
1960	18
1970	25
1980	?

TEACHING STRATEGIES

Place the local population data for each decade since 1900 on the chalkboard in a way similar to that presented in Slide 5-31. Distribute a sheet of graph paper to each of the students and have them construct a graph of the local population. Assist students as necessary. Remind them to do it the same way they did Worksheet 5-9.

When the graphs are completed, have students compare them with the Boulder population growth graph. Discuss the similarities and differences, especially in the line direction.

Now ask:

WHAT DO YOU THINK THE INCREASE IN POPULATION MIGHT DO TO THE AMOUNT OF WATER USED BY THE PEOPLE IN BOULDER, COLORADO?

Project Slide 5-33 and say:

HERE IS INFORMATION ABOUT THE AMOUNT OF WATER USED BY THE PEOPLE IN BOULDER.

The data on Slide 5-33 are as follows:

BOULDER, COLORADO WATER USE

<u>YEAR</u>	<u>MILLIONS OF GALLONS</u>
1900	2
1910	4
1920	5
1930	5
1940	6
1950	9
1960	18
1970	25
1980	?

TEACHING STRATEGIES

Population data for each decade since 1900 in a way similar to that presented in distribute a sheet of graph paper to each of have them construct a graph of the local st students as necessary. Remind them to y they did Worksheet 5-9.

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THINK THE INCREASE IN POPULATION THE AMOUNT OF WATER USED BY THE ULDER, COLORADO?

B and say:

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5-33 are as follows:

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<u>YEAR</u>	<u>MILLIONS OF GALLONS</u>
1900	2
1910	4
1920	5
1930	5
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1950	9
1960	18
1970	25
1980	?

ANTICIPATED STUDENT BEHAVIORS

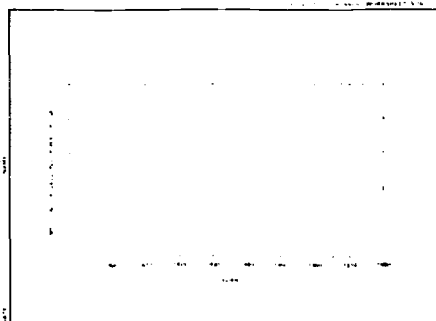
ACTIVITY
5-19

Students should:

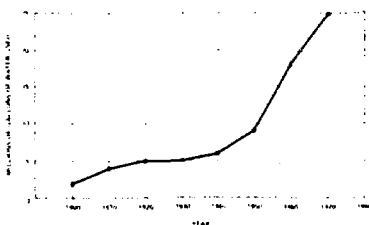
--compare the local population growth with that of Boulder.

--predict that the amount used might increase.

Worksheet 5-10



Slide 5-34



Discuss the slide until the students understand what is being presented.

Distribute Worksheet 5-10 to each student. Discuss both axes to familiarize the students with the graph.

Say:

ON THIS WORKSHEET WE ARE GOING TO GRAPH THE AMOUNT OF WATER USED BY THE PEOPLE OF BOULDER, JUST AS WE DID WITH THE RAINFALL AND THE POPULATION. BEFORE WE DO THAT, DRAW A DOTTED LINE ON THE WORKSHEET SHOWING WHAT YOU PREDICT HAPPENED TO THE AMOUNT OF WATER USED FROM 1900 TO 1970.

Review the meaning of "predict," if necessary.

NOW CONSTRUCT A GRAPH OF THE INFORMATION AND SEE IF YOUR PREDICTION IS CORRECT.

Assist students as necessary in completing their graphs.

Project Slide 5-34 for comparison and verification of accuracy.

Instruct the students to compare their graphs with Slide 5-34.

Now ask the students to look at the three graphs they have made for Boulder, Colorado (Worksheets 5-8, 5-9, 5-10).

TEACHING STRATEGIES

ide until the students understand what is
d.

ksheet 5-10 to each student. Discuss both
rize the students with the graph.

ORKSHEET WE ARE GOING TO GRAPH THE AMOUNT
SED BY THE PEOPLE OF BOULDER, JUST AS
H THE RAINFALL AND THE POPULATION.
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4 for comparison and verification of

ents to compare their graphs with Slide

nts to look at the three graphs they have
Colorado (Worksheets 5-8, 5-9, 5-10).

ANTICIPATED STUDENT BEHAVIORS

Students should:

--indicate their predictions by drawing a dotted
line on the worksheet.

--graph the data for water consumption and compare it
with their predictions.

--compare their water use graphs with the one
projected.

MATERIALS

TEACHING STRATEGIES

Ask:

WHAT HAS HAPPENED TO THE AMOUNT OF WATER USED BY THE PEOPLE IN BOULDER?

HOW DO YOU KNOW?

IS YOUR PREDICTION ACCURATE?

DOES THE GRAPH OF WATER USE LOOK MORE LIKE THE RAINFALL GRAPH OF THE POPULATION GRAPH?

WHY DO YOU THINK THIS IS SO?

DOES THE AMOUNT OF WATER AVAILABLE TO THE PEOPLE IN BOULDER CHANGE MUCH FROM YEAR TO YEAR?

WHAT WOULD YOU PREDICT WILL HAPPEN TO THE WATER SUPPLY IN BOULDER IF THE POPULATION CONTINUES TO GROW AS IT HAS IN THE PAST?

WHAT WOULD YOU PREDICT HAS HAPPENED TO THE WATER USE IN (name of local community) SINCE (date of first data available)?

Place the local water use data on the chalkboard in a way similar to that presented in Slide 5-33 and discuss it. Distribute a sheet of graph paper to each student.



DISTRIBUTE

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

OPENED TO THE AMOUNT OF WATER
PEOPLE IN BOULDER?

NOW?

FICTION ACCURATE?

PH OF WATER USE LOOK MORE LIKE THE
PH OF THE POPULATION GRAPH?

HINK THIS IS SO?

UNT OF WATER AVAILABLE TO THE
ULDER CHANGE MUCH FROM YEAR TO

OU PREDICT WILL HAPPEN TO THE
IN BOULDER IF THE POPULATION
GROW AS IT HAS IN THE PAST?

OU PREDICT HAS HAPPENED TO THE
(name of local community) SINCE
(data available)?

ter use data on the chalkboard in a way
resented in Slide 5-33 and discuss it.
of graph paper to each student.

Students should:

--indicate that it has increased sharply.

--respond, "The line on the graph goes up."

--indicate yes or no.

--respond, "The population graph."

--infer that more people use more water.

--infer that it doesn't since the rainfall remains
about the same.

--predict that there will be a water shortage.

--predict that the water use has increased.



DISTRIBUTE MATERIALS

MATERIALS

TEACHING STRATEGIES

Have them construct a graph of local water use. Assist students as necessary. However, this is the third graph constructed so they should be able to work independently.

The local data will likely be similar to that for Boulder. If the data are not available, predictions may be made from the rainfall and population graphs for the local area.



When the graphs are constructed, or predictions made about local water use, ask:

WHAT HAS HAPPENED TO THE WATER USE IN (name of local community)?

HOW DO WE KNOW?

DOES THE AMOUNT OF WATER AVAILABLE INCREASE IN THE SAME WAY THAT WATER USE DOES?

HOW DO WE KNOW?

WHAT MIGHT HAPPEN IF THE POPULATION OF (name of local community) CONTINUES TO GROW?

SHOULD YOU BE CONCERNED ABOUT HOW YOU USE WATER?

WHAT COULD A CITY LIKE BOULDER (or local city) DO TO KEEP FROM RUNNING OUT OF WATER?

TEACHING STRATEGIES

Construct a graph of local water use. Assist as necessary. However, this is the third graph they should be able to work independently.

Results will likely be similar to that for Boulder. If data is not available, predictions may be made from rainfall and population graphs for the local

Graphs are constructed, or predictions made about water use, ask:

WHAT HAPPENED TO THE WATER USE IN (name community)?

DO YOU KNOW?

HOW MUCH OF WATER AVAILABLE INCREASED IN ANY WAY THAT WATER USE DOES?

DO YOU KNOW?

WHAT WILL HAPPEN IF THE POPULATION OF (name community) CONTINUES TO GROW?

ARE YOU CONCERNED ABOUT HOW YOU USE WATER?

WHAT WOULD A CITY LIKE BOULDER (or local city) DO TO AVOID RUNNING OUT OF WATER?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "Gone up."

--respond, "The line on the graph goes up."

--respond, "No."

--respond, "Look on the rainfall map," "The line stays about the same."

--infer that the community might run short of water.

--infer the need for water conservation.

--suggest various ideas including limiting population growth, rationing the use of water, getting more water from somewhere else, and so forth.



MATERIALS

TEACHING STRATEGIES

Accept and discuss all responses. Make sure the students understand that water is a finite resource, i.e., a city usually cannot import water from somewhere else without causing a shortage at that place. A review of the rainfall graphs should serve to emphasize that there is only so much water available at any location.

TEACHING STRATEGIES

Discuss all responses. Make sure the students understand that water is a finite resource, i.e., it cannot be imported from somewhere else to solve a shortage at that place. A review of the lessons should serve to emphasize that there is not always water available at any location.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-19

Upon completion of this activity, each student should, as a minimum:

- have attempted to construct the rainfall, population, and water use graphs.*
- have participated in the discussion and inferred the need for water conservation.*

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE D
ACTIVITY 5-19

Teacher _____

Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ____

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

How many students had problems constructing the graphs? What problems did they have?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. How many students had problems constructing the graphs? What problems did they have?
13. Do you feel that the students were able to relate population to water usage?
Comment.
14. What ways were students able to suggest to keep from running out of water?

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B at anecdotes of student learning did you see or hear in your classroom?

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

4. Realize the problems associated with the disposal of waste water.
5. Recognize the impact of water pollution.
6. Understand the broad problems of water management.

Core D Objectives for the Student:

2. Establish that water is a vulnerable resource.
4. Establish that, as population increases, impact on environment increases.

ENVIRONMENTAL THEME:

Ecological Trade-offs, Finiteness of Resources, Complementarity of Organisms and Environment

INQUIRY SKILLS:

Inferring

PROBLEM-SOLVING SKILLS:

Identifying Controls

PRACTICAL APPLICATION:

Communication Skills, Realization that Sewage Is out of Place in Water

ACTIVITY

Goals for the Student:

Realize the problems associated with the disposal of waste water.

Recognize the impact of water pollution.

Understand the broad problems of water management.

Objectives for the Student:

Establish that water is a vulnerable resource.

Establish that, as population increases, impact on environment increases.

THEME:

Environmental Trade-offs, Finiteness of Resources, Interdependence of Organisms and Environment

Skills:

Identifying Skills:
Identifying Controls

Application:

Identifying Skills, Realization that Sewage Treatment is a Necessary Place in Water

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE D.

WATER MANAGEMENT

ACTIVITY 5-20.

A LITTLE GOES A
LONG WAY



BSCS

MATERIALS

Cup or beaker, 400 ml
Measure: 1 tablespoon
Microscopes, 4
Microscope slides, 4
Medicine droppers, 4
*Jars, 2 one-gallon, widemouthed
*Goldfish, 2
*Aquarium or pond water
*Dry pet food
*Small aquarium net

*Not furnished in materials kit

TEACHING STRATEGIES

Activity 5-20. A Little Goes a Long Way

Domestic sewage places a severe burden on natural waters by introducing organic material subject to microbial action. The microbial activity in turn reduces the oxygen content available to aquatic life. This activity demonstrates the reduction of available oxygen due to the biological oxygen demand (BOD) of sewage.

Teacher Preparation:

1. This activity will be done in two days. The first day will be spent preparing the experiment, and the second day carrying it out.
2. Tap water may be substituted for aquarium or pond water if it is suitably conditioned. Water should be run forcibly from the tap into a large open container (basin) and allowed to stand for three or four days. This will allow the chlorine (added at the treatment plant) to dissipate into the air as vapor.

Day 1.

It will be necessary to prepare some artificial "sewage". This is easily accomplished by suspending a small amount of dry pet food (dog or hamster) in water. Use about one tablespoon of crushed dry pet food in one cup of aquarium

TEACHING STRATEGIES

A Little Goes a Long Way

... places a severe burden on natural waters
... organic material subject to microbial
... microbial activity in turn reduces the oxygen
... ble to aquatic life. This activity demon-
... reduction of available oxygen due to the
... gen demand (BOD) of sewage.

ation:

... ivity will be done in two days. The first
... be spent preparing the experiment, and
... nd day carrying it out.

... r may be substituted for aquarium or pond
... it is suitably conditioned. Water should
... orcibly from the tap into a large open
... r (basin) and allowed to stand for three
... days. This will allow the chlorine
... t the treatment plant) to dissipate
... air as vapor.

... ecessary to prepare some artificial "sewage".
... accomplished by suspending a small amount
... d (dog or hamster) in water. Use about one
... crushed dry pet food in one cup of aquarium

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- participate in mixing the pet food solution and preparing the jars of aquarium water.
- conclude that microbes are present in the mixture as well as in sewage.
- observe that the fish in Jar 2 gulped air from the surface while the fish in Jar 1 swam in a normal fashion.
- recognize Jar 1 as a control.
- conclude that the microbes present in the sewage used up a lot of the air present in Jar 2.
- conclude that what is desirable for one organism may be detrimental to another.
- conclude that pollution is often simply something out of place.
- conclude that sometimes a very small amount of pollution does a great deal of harm.
- set up gallon jars of water.

MATERIALS

TEACHING STRATEGIES

or pond water. Allow this to soak for awhile, then stir into a slurry. This is essentially a nutrient rich broth that has many of the chemical and physical properties of sewage without the obvious drawbacks.

When the sewage is prepared, fill two one-gallon jars about two-thirds full of aquarium or pond water. Label these 1 and 2.

Begin by saying:

TOMORROW WE WILL DO AN EXPERIMENT TO SEE HOW FISH ARE AFFECTED BY SEWAGE DUMPED INTO THEIR ENVIRONMENT. TODAY WE MUST GET READY BY PREPARING SOME "MAKE-BELIEVE SEWAGE".

Select some students to prepare the "sewage" and others to prepare the jars of aquarium or pond water as directed above.

When the "sewage" and jars of water have been prepared, ask:

WHAT WILL THE PET FOOD MIXTURE STAND FOR IN OUR EXPERIMENT?

WHAT IS SEWAGE?

COULD ANYTHING LIVE IN SEWAGE?

COULD MICROBES BE LIVING IN OUR PET FOOD MIXTURE?

WHAT WOULD THE MICROBES USE FOR FOOD IF THEY LIVED IN SEWAGE?

TEACHING STRATEGIES

Allow this to soak for awhile, then stir. This is essentially a nutrient rich mixture of many of the chemical and physical components of sewage without the obvious drawbacks.

When the mixture is prepared, fill two one-gallon jars with jars full of aquarium or pond water. Label

g:
WE WILL DO AN EXPERIMENT TO SEE HOW FISH ARE AFFECTED BY SEWAGE DUMPED INTO THEIR ENVIRONMENT. TODAY WE MUST GET READY BY PREPARING SOME "SIMULATED SEWAGE".

Students to prepare the "sewage" and others to prepare jars of aquarium or pond water as directed

"sewage" and jars of water have been prepared,

THE PET FOOD MIXTURE STAND FOR IN THE ENVIRONMENT?

SEWAGE?

WHAT THING LIVE IN SEWAGE?

WHAT MICROBES BE LIVING IN OUR PET FOOD?

WHAT DO THE MICROBES USE FOR FOOD IF THEY ARE IN SEWAGE?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-20

Students should:

--respond, "Sewage."

--respond, "Wastes," "Icky stuff," "Leftovers," "Stuff from the toilet," and so forth.

--respond, "Yes, lots of microbes."

--respond, "Probably."

--recall the decomposition activities in Unit IV and respond, "All that stuff," "All the rotten food," "The wastes."

WHAT WOULD THEY USE FOR FOOD IN OUR PET FOOD MIXTURE?

DO YOU THINK THEY'D LIKE TO LIVE IN A PLACE LIKE THAT?

WHY WOULD IT BE A GOOD PLACE TO LIVE?

WHEN WE MIXED THE PET FOOD AND AQUARIUM WATER, WHERE DID THE MICROBES COME FROM?

Emphasize that the microbes were in the aquarium water and that the pet food is now food for the microbes. Guard against allowing the students to assume that microbes are in the pet food and that they feed their pets microbes.

Then direct the students to pour the "sewage" mixture into Jar 2. Stir the mixture thoroughly and set the jars aside overnight.

Day 2.

Discuss and describe with the students the appearance of both water jars, noticing the thickness of Jar 2, its similarity to real sewage, and so forth.

Allow students to examine a drop of the "sewage" mixture under the microscopes. Follow the procedures and cautions outlined in Core C for preparing a "wet" slide. Even though microorganisms will be present, they may or may not be able to see them. Tell students to watch very closely, for the microbes will dart in and out of view.

Encourage descriptions of what is seen, and if one student has a slide which shows many microorganisms, allow him to share his find with the other students.

TEACHING STRATEGIES

THEY USE FOR FOOD IN OUR PET FOOD

WANT THEM TO LIVE IN A PLACE

IT BE A GOOD PLACE TO LIVE?

WHERE THE PET FOOD AND AQUARIUM WATER,
THE MICROBES COME FROM?

THE MICROBES WERE IN THE AQUARIUM WATER AND
FOOD IS NOW FOOD FOR THE MICROBES. GUARD
THE STUDENTS TO ASSUME THAT MICROBES
EAT THE FOOD AND THAT THEY FEED THEIR PETS

ASK THE STUDENTS TO POUR THE "SEWAGE" MIXTURE
INTO THE JARS THOROUGHLY AND SET THE
JARS ASIDE FOR THE NIGHT.

ASK THE STUDENTS TO DESCRIBE THE APPEARANCE OF
THE JARS, NOTICING THE THICKNESS OF JAR 2, ITS
CONTENTS, AND SO FORTH.

ASK THE STUDENTS TO EXAMINE A DROP OF THE "SEWAGE"
MIXTURE UNDER A MICROSCOPE. FOLLOW THE PROCEDURES
DESCRIBED IN CORE C FOR PREPARING A "WET" SLIDE.
IF MICROORGANISMS WILL BE PRESENT, THEY MAY OR
MAY NOT BE ABLE TO SEE THEM. TELL STUDENTS TO WATCH VERY
CLOSELY AS THE MICROBES WILL DART IN AND OUT OF VIEW.

ASK THE STUDENTS TO DESCRIBE THEIR OBSERVATIONS
OF WHAT IS SEEN, AND IF ONE STUDENT HAS A SLIDE
WHICH SHOWS MANY MICROORGANISMS, ASK THEM TO
SHOW IT TO THE OTHER STUDENTS.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "The pet food."

--indicate their opinions.

--respond, "Because there's lots of food."

--respond, "Microbes are everywhere," "From
the aquarium water."

--place the jars in an assigned spot for use
during the next class period.

MATERIALS

TEACHING STRATEGIES

INVOL
SLOW
STUD

Continue by saying:

TODAY WE WILL CONDUCT OUR EXPERIMENT TO SEE HOW
FISH ARE AFFECTED BY SEWAGE PUT INTO THEIR
WATER.

Select students to transfer one goldfish from the aquarium
or pond to each jar.



While waiting for results, ask:

WHY DID WE ADD NOTHING TO THE WATER IN JAR 1?

INVOL
SLOW
STUD

In a short time the fish in Jar 1 should be acclimated
to its new surroundings. About the same time, the fish
in Jar 2 should be noticeably stressed. It should be
swimming near the surface and gulping for air.

TEACHING STRATEGIES**ANTICIPATED STUDENT BEHAVIORS**ACTIVITY
5-20

Students should:

**INVOLVE YOUR
SLOWEST
STUDENTS**



g:

CONDUCT OUR EXPERIMENT TO SEE HOW
AFFECTED BY SEWAGE PUT INTO THEIR

transfer one goldfish from the aquarium
jar.



results, ask:

NOTHING TO THE WATER IN JAR 1?

--recall the importance and meaning of a control,
and respond, "To see what happens without
sewage," "To check our experiment," "To have
something to compare Jar 2 with," "As a control."

**INVOLVE YOUR
SLOWEST
STUDENTS**



the fish in Jar 1 should be acclimated
gradually. About the same time, the fish
should be noticeably stressed. It should be
observed at the surface and gulping for air.

MATERIALS

TEACHING STRATEGIES

Then ask:

DO YOU NOTICE ANY DIFFERENCES IN THE BEHAVIOR
OF OUR FISH?

After the observation has been made (Fish 2 gulping)
return both fish to their home aquarium or pond. Don't
stress the fish more than necessary!

WHAT DID THE SEWAGE DO TO THE WATER IN JAR 2?

WHY DID THE FISH COME TO THE TOP?

WHERE DID ALL THE AIR IN JAR 2 GO? THE FISH
IN JAR 1 HAD ENOUGH AIR.

If students do not recall that microbes use air and that
they most likely depleted the oxygen supply in Jar 2,
recall Activity 5-12, "Microbes in Water," by asking:

WHAT DO MICROBES NEED TO LIVE?

WERE MICROBES IN JAR 2?

WHY WAS THERE LESS OXYGEN IN JAR 2 THAN IN
JAR 1?



TEACHING STRATEGIES

ICE ANY DIFFERENCES IN THE BEHAVIOR
H?

vation has been made (Fish 2 gulping)
n to their home aquarium or pond. Don't
more than necessary!

HE SEWAGE DO TO THE WATER IN JAR 2?

E FISH COME TO THE TOP?

ALL THE AIR IN JAR 2 GO? THE FISH
AD ENOUGH AIR.

not recall that microbes use air and that
y depleted the oxygen supply in Jar 2,
5-12, "Microbes in Water," by asking:

ROBES NEED TO LIVE?

ES IN JAR 2?

RE LESS OXYGEN IN JAR 2 THAN IN

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "Yes," "Fish 1 is happy," "Fish 1 feels
at home," "Fish 1 is O.K.," and so forth.

--respond, "Yes," "Fish 2 is unhappy," "Fish 2
is gasping for breath," "Fish 2 is swimming on
the surface," and so forth.

--respond, "It made it hard for the fish to
breathe," "It took away the air," "It removed
the oxygen."

--respond, "For air," "It couldn't breathe."

--respond, "Sewage took the air away," "Microbes
used it all up."

--respond, "Air," "Food."

--respond, "Yes."

--respond, "The microbes used it up."



MATERIALS

TEACHING STRATEGIES

INVO
SLC
STU

Hold up the amount of pet food used and say:

WE PUT IN ONLY A LITTLE BIT, BUT IT DID SO MUCH HARM. OUR PETS EAT THIS AND IT DOESN'T HURT THEM. WHY DID OUR FISH NOT LIKE IT?

DISCUS

WHAT WOULD HAPPEN, THEN, IF WE PUT A LITTLE BIT OF SEWAGE IN THE WATER?

SEWAGE ISN'T SO BAD IF IT'S IN A TRUCK OR USED AS FERTILIZER.

Continue the discussion until it is established that sewage or pollution is something that doesn't belong in water and that it doesn't take much to do some harm. It might also be interesting to ask the students to relate the title of this activity to what was actually done.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-20

Students should:

**INVOLVE YOUR
SLOWEST
STUDENTS**

Amount of pet food used and say:

ONLY A LITTLE BIT, BUT IT DID SO
OUR PETS EAT THIS AND IT DOESN'T
WHY DID OUR FISH NOT LIKE IT?

--respond, "The dog eats the food, the fish don't,"
"The hamster doesn't breathe the sewage," "The
dog food doesn't belong in the water."

DISCUSSION TIME

HAPPEN, THEN, IF WE PUT A LITTLE BIT
IN THE WATER?

--infer that because it is not supposed to be
in the water, it will do some harm.

ISN'T SO BAD IF IT'S IN A TRUCK OR USED
FOR OTHER PURPOSES.

Discussion until it is established that
this is something that doesn't belong
in the water and it doesn't take much to do some harm.
It is interesting to ask the students to
relate the results of this activity to what was actually

MATERIALS

TEACHING STRATEGIES

See Change of Pacer 19.

See
CHANGE

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

Upon completion of this activity, each student should, as a minimum:

- have observed that the fish in Jar 2 had difficulty getting air while the fish in Jar 1 did not.*
- have concluded that the fish did not get enough air because the sewage was in the water.*



CHANGE OF PACER

er 19.

UNIT V, CORE D
ACTIVITY 5-20

Teacher _____

Activity name suggested by class:

BSCS USE:	Post _____	Tally _____	Rev _____
-----------	------------	-------------	-----------

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)					
2.	Minutes of class time on science each day					
3.	Minutes preparing for each day's science class					
4.	Students absent on each date (Use ID Number)					

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific questions:

ERIC Did the students have any difficulty relating the pet food mixture to sewage?
 Yes No

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Did the students have any difficulty relating the pet food mixture to sewage?
 Yes No
13. Do you feel that the students grasped the concept of microbes using up the oxygen?

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

BSCS Evaluation: EMH Feedback Form 1c

1. What anecdotes of student learning did you see or hear in your classroom?

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

1. Understand the need for water.
2. Recognize the sources of water.
3. Realize the problems associated with the preparation of usable water.
4. Realize the problems associated with the disposal of waste water.
5. Recognize the impact of water pollution.
6. Understand the broad problems of water management.

Core D Objectives for the Student:

1. Establish that water is a limited resource.
2. Establish that water is a vulnerable resource.
3. Establish that, as population increases, demands upon resources increase.
4. Establish that, as population increases, impact on environment increases.

ENVIRONMENTAL THEME:

Complementarity of Organisms and Environment

INQUIRY SKILLS:

Applying Value Judging

PROBLEM-SOLVING SKILLS:

Knowing the Question, Knowing What Varies,
Predicting Outcomes

PRACTICAL APPLICATION:

Expressing Values in Regard to Water
Conservation, Oral Expression to Explain and
Defend Their Choices

ACTIVITY

Goals for the Student:

- Understand the need for water.
- Recognize the sources of water.
- Realize the problems associated with the preparation of usable water.
- Realize the problems associated with the disposal of waste water.
- Recognize the impact of water pollution.
- Understand the broad problems of water management.

Objectives for the Student:

- Establish that water is a limited resource.
- Establish that water is a vulnerable resource.
- Establish that, as population increases, demands upon resources increase.
- Establish that, as population increases, impact on environment increases.

LEARNING THEME:

Interdependence of Organisms and Environment

VALUES:

Appreciating Value Judging

LEARNING SKILLS:

Asking the Question, Knowing What Varies, Predicting Outcomes

APPLICATION:

Applying Values in Regard to Water Conservation, Oral Expression to Explain and Justify Choices

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE D.

WATER MANAGEMENT

ACTIVITY 5-21.

CLUES TO SUCCESS:
UNDERSTANDING



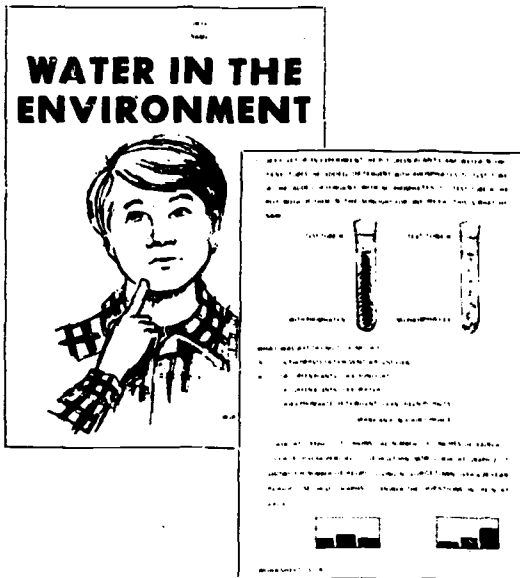
BSCS

Worksheets 5-11A, B, C, D
(Water in the Environment)

Slides 5-35 through 5-38

*33 mm Slide projector

Slide 5-35, Worksheet 5-11



*Not furnished in materials kit

Activity 5-21. Clues to Success: Understanding

The Clues to Success booklet, Worksheet 5-11 (Water in the Environment), will help you assess student understanding of Part I of this unit. Besides concept assessment, it will indicate facility in reading a bar graph as well as some of the problem-solving skills related to successful use of the materials. Based on the results of this assessment, a review of previous activities and Change of Pacers should be made as necessary before continuing with Part II. The use of the assessment will help to reinforce in the student's mind a dichotomy between the two parts of this unit.

Distribute Worksheet 5-11 (Water in the Environment) and have students write their names and the date in the space provided on the cover. Direct a student to read the booklet title and offer ideas on what it will be about.

Say:

THE PURPOSE OF THIS BOOKLET IS TO HELP YOU SEE WHAT SOME OF THE THINGS ARE THAT YOU HAVE LEARNED ABOUT WATER. LOOK ONLY AT YOUR OWN BOOKLET AND WE WILL TALK ABOUT YOUR ANSWERS LATER. ARE THERE ANY QUESTIONS?

Read Question 1. Repeat the question, allowing students time to mark the answer.

DISTR

TEACHING STRATEGIES

Clues to Success: Understanding

Access booklet, Worksheet 5-11 (Water in the Environment), will help you assess student understanding of Part I of this unit. Besides concept change, this booklet will indicate facility in reading a bar graph and use of some of the problem-solving skills learned in the successful use of the materials. Based on the results of this assessment, a review of previous units and Change of Pacers should be made as you continue with Part II. The use of this booklet will help to reinforce in the student's understanding of the relationship between the two parts of this unit.



DISTRIBUTE MATERIALS

Worksheet 5-11 (Water in the Environment) and have students write their names and the date in the top right corner of the cover. Direct a student to read the booklet and offer ideas on what it will be about.

THE PURPOSE OF THIS BOOKLET IS TO HELP YOU UNDERSTAND SOME OF THE THINGS ARE THAT YOU HAVE LEARNED ABOUT WATER. LOOK ONLY AT YOUR OWN WORK AND WE WILL TALK ABOUT YOUR ANSWERS AND QUESTIONS. ARE THERE ANY QUESTIONS?

Repeat the question, allowing students to give their answer.

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- complete Worksheets 5-11A, B, C, D.
- discuss the questions and choices in the booklet.

Students should:

- mark Choice A of Question 1.



WORK TIME

MATERIALS

Slide 5-36, Worksheet 5-11B

THE STATEMENTS IN EACH PART OF THE GROUPS ARE EITHER TRUE OR FALSE. WRITE TRUE OR FALSE IN THE SPACE PROVIDED.

Part 1

- THE STATEMENT "THE SUM OF TWO EVEN NUMBERS IS AN EVEN NUMBER" IS TRUE.
- THE STATEMENT "THE PRODUCT OF TWO EVEN NUMBERS IS AN EVEN NUMBER" IS TRUE.

Part 2

- THE STATEMENT "THE SUM OF TWO ODD NUMBERS IS AN ODD NUMBER" IS TRUE.
- THE STATEMENT "THE PRODUCT OF TWO ODD NUMBERS IS AN ODD NUMBER" IS TRUE.

Part 3

- THE STATEMENT "THE SUM OF TWO EVEN NUMBERS IS ALWAYS AN EVEN NUMBER" IS TRUE.
- THE STATEMENT "THE PRODUCT OF TWO EVEN NUMBERS IS ALWAYS AN EVEN NUMBER" IS TRUE.
- THE STATEMENT "THE SUM OF TWO ODD NUMBERS IS ALWAYS AN ODD NUMBER" IS TRUE.
- THE STATEMENT "THE PRODUCT OF TWO ODD NUMBERS IS ALWAYS AN ODD NUMBER" IS TRUE.

Part 4

- THE STATEMENT "THE SUM OF TWO EVEN NUMBERS IS ALWAYS AN EVEN NUMBER" IS TRUE.
- THE STATEMENT "THE PRODUCT OF TWO EVEN NUMBERS IS ALWAYS AN EVEN NUMBER" IS TRUE.
- THE STATEMENT "THE SUM OF TWO ODD NUMBERS IS ALWAYS AN ODD NUMBER" IS TRUE.
- THE STATEMENT "THE PRODUCT OF TWO ODD NUMBERS IS ALWAYS AN ODD NUMBER" IS TRUE.

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Slide 5-37, Worksheet 5-11C

THE STATEMENTS IN EACH PART OF THE GROUPS ARE EITHER TRUE OR FALSE. WRITE TRUE OR FALSE IN THE SPACE PROVIDED.

Part 1

- THE STATEMENT "THE SUM OF TWO EVEN NUMBERS IS AN EVEN NUMBER" IS TRUE.
- THE STATEMENT "THE PRODUCT OF TWO EVEN NUMBERS IS AN EVEN NUMBER" IS TRUE.

Part 2

- THE STATEMENT "THE SUM OF TWO ODD NUMBERS IS AN ODD NUMBER" IS TRUE.
- THE STATEMENT "THE PRODUCT OF TWO ODD NUMBERS IS AN ODD NUMBER" IS TRUE.

Part 3

- THE STATEMENT "THE SUM OF TWO EVEN NUMBERS IS ALWAYS AN EVEN NUMBER" IS TRUE.
- THE STATEMENT "THE PRODUCT OF TWO EVEN NUMBERS IS ALWAYS AN EVEN NUMBER" IS TRUE.
- THE STATEMENT "THE SUM OF TWO ODD NUMBERS IS ALWAYS AN ODD NUMBER" IS TRUE.
- THE STATEMENT "THE PRODUCT OF TWO ODD NUMBERS IS ALWAYS AN ODD NUMBER" IS TRUE.

Part 4

- THE STATEMENT "THE SUM OF TWO EVEN NUMBERS IS ALWAYS AN EVEN NUMBER" IS TRUE.
- THE STATEMENT "THE PRODUCT OF TWO EVEN NUMBERS IS ALWAYS AN EVEN NUMBER" IS TRUE.
- THE STATEMENT "THE SUM OF TWO ODD NUMBERS IS ALWAYS AN ODD NUMBER" IS TRUE.
- THE STATEMENT "THE PRODUCT OF TWO ODD NUMBERS IS ALWAYS AN ODD NUMBER" IS TRUE.

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TEACHING STRATEGIES

Read the introductory statements for Question 2, including the labels on the graphs, allowing plenty of time for the students to look at the graphs. Read and repeat each part to this question. Caution students to write their answers in the right place.

When all have written their answers, read Question 3 twice. Read it slowly and repeat as necessary.

Read and repeat the question and statements for Question 4.

When all students have responded, have them turn the page and look at Question 5. Read each question on this page twice, allowing time for all to respond.

Now direct attention to Item 8 on the next page.

Read and repeat the introduction to Question 8. Be sure the students understand the directions before reading the groups of statements.

GIVE
S
TIME
TO
THINK

TEACHING STRATEGIES**ANTICIPATED STUDENT BEHAVIORS**ACTIVITY
5-21

ctory statements for Question 2,
bels on the graphs, allowing plenty of
dents to look at the graphs. Read and
to this question. Caution students to
ers in the right place.

Students should:

--mark each part of Question 2 as follows:

Graph 1. A. 15 B. 1960

Graph 2. C. 20,000 D. 1970

**WORK
TIME**

ttten their answers, read Question 3
slowly and repeat as necessary.

--mark an X on Option D of Question 3.

**GIVE STUDENTS
TIME
TO
THINK**

he question and statements for

--mark an X on Options A and/or B of Question 4.

have responded, have them turn the page
ion 5. Read each question on this page
ime for all to respond.

--mark an X on Option B of Question 5.

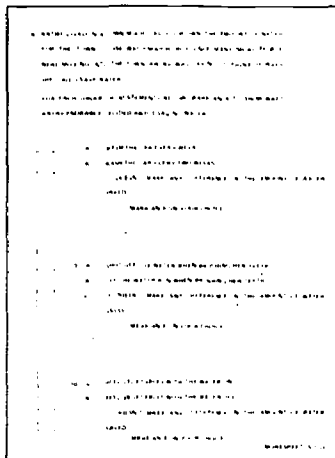
--mark an X on Option B and/or C of Question 6.

--mark an X on Option C of Question 7.

ion to Item 8 on the next page.

he introduction to Question 8. Be
understand the directions before
s of statements.

Slide 5-38, Worksheet 5-11D



Then read each group of statements twice, allowing plenty of time to respond.

When students have finished, collect the booklets. Then project Slides 5-35 through 5-38 of the booklet on the chalkboard and review students' responses. Have the students explain and discuss the choices they marked as well as why they did not mark other choices. When possible, have the students clear up misunderstandings for other students.

After class, complete Tallysheet 5-5 and send a copy of it to BSCS. Instructions for scoring the worksheet appear on the tallysheet. Review students' success with these items and summarize the results in the Student Record of Progress as outlined below.

Guidelines for Interpretation and Recording

Rating of Involvement: On the page titled "Responsibility and Involvement" in the Participation Section of the Student Record of Progress are guidelines to rate each student's involvement and interest in science to date. For students who are rated low, explore the suggestions in the Introduction to the Student Record of Progress.

NOTE: Items will be recorded in the Student Record of Progress in the order in which they appear on Tallysheet 5-5. Check to be sure that you have recorded responses in the proper columns.

Question 2 was designed as a clue to the measurement skills of students as they relate to the use of graphs. Two dimensions of using a graph were measured. One

TEACHING STRATEGIES

group of statements twice, allowing plenty of time to respond.

When they have finished, collect the booklets. Then read pages 5-35 through 5-38 of the booklet on the review students' responses. Have the students discuss the choices they marked as correct and discuss the choices they did not mark other choices. When the students clear up misunderstandings, discuss the results.

Complete Tallysheet 5-5 and send a copy of the instructions for scoring the worksheet to the students. Review students' success with the worksheet and summarize the results in the Student Record of Progress as outlined below.

Interpretation and Recording

Measurement: On the page titled "Responsibility and Participation" in the Participation Section of the Student Record of Progress are guidelines to rate each student's involvement and interest in science to date. If a student is rated low, explore the suggestions for improvement and report them to the Student Record of Progress.

All responses will be recorded in the Student Record of Progress in the order in which they appear on the worksheet 5-5. Check to be sure that you have recorded all responses in the proper columns.

The worksheet is designed as a clue to the measurement of student involvement and interest in science as they relate to the use of graphs. The results of using a graph were measured. One

ANTICIPATED STUDENT BEHAVIORS

Students should:

- mark an X on Option B of Question 8.
- mark an X on Option A of Question 9.
- mark an X on Option A of Question 10.
- mark an X on Option B of Question 11.

--explain and defend answers; recall previous classroom experiences.

MATERIALS

TEACHING STRATEGIES

(Items A and C) was the student's ability to locate a date on one axis and record the corresponding number. The other (Items B and D) was the student's ability to locate a given number on one axis and record the corresponding date.

On the numbers page in the Student Record of Progress, find the columns headed "Act. 5-21. Using A Graph." In the first column titled "Number" circle YES if the student answered both A and C correctly. Circle NO if the student answered either or both incorrectly or failed to respond to either or both questions.

In the second column titled "Date" circle YES if the student answered both B and D correctly. Circle NO if the student answered either or both incorrectly or failed to respond to either or both questions.

Question 1 was designed to assess the problem-solving ability of knowing the question to be answered in an experiment. Students experiencing difficulty in problem-solving will have greater difficulty with the materials and need many experiences for increasing this aspect of their development.

On the "Problem-Solving Page" of the Student Record of Progress find the column titled "Knowing Question." Circle YES if the student marked the correct response to Item 1. Circle NO if the student marked an incorrect response or failed to respond to the question.

Questions 3 and 5 were designed to assess the problem-solving ability of knowing what varies in a problem. On the "Problem-Solving Page" of the Student Record of Progress find the title titled "What Varies." Circle YES if the student marked the correct responses for both Questions 3 and 5. Circle NO if the student marked an incorrect response for either or both questions, or if the student failed to respond to either or both questions.

TEACHING STRATEGIES

as the student's ability to locate a
and record the corresponding number.
B and D) was the student's ability to
number on one axis and record the
e.

ge in the Student Record of Progress,
headed "Act. 5-21. Using A Graph."
column titled "Number" circle YES if the
both A and C correctly. Circle NO if
answered either or both incorrectly or failed
either or both questions.

column titled "Date" circle YES if the
both B and D correctly. Circle NO
answered either or both incorrectly or
to either or both questions.

signed to assess the problem-solving
the question to be answered in an
students experiencing difficulty in problem-
greater difficulty with the materials
experiences for increasing this aspect of

"Solving Page" of the Student Record of
column titled "Knowing Question."
student marked the correct response to
if the student marked an incorrect
to respond to the question.

were designed to assess the problem-
knowing what varies in a problem. On
"Solving Page" of the Student Record of
title titled "What Varies." Circle
marked the correct responses for both
Circle NO if the student marked an
for either or both questions, or if
to respond to either or both questions.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-21

Questions 4 and 6 were designed to assess the problem-solving ability of predicting outcomes. On the "Problem Solving Page" of the Student Record of Progress find the column titled "Outcomes." Circle HIGH if the student marked all four possible correct responses and no incorrect responses. Circle SOME if the student marked two or three correct responses, no incorrect responses, and did not omit either question. Circle LOW if the student marked any incorrect responses or omitted either question.

Now review the three problem-solving skills summarized in the Student Record of Progress and note which students lack these skills. Low rankings should not concern you and high marks should be very reassuring. The rankings for this section, like all others in the Student Record of Progress, are not used to grade or pass judgments on students. Their only purpose is to establish baselines from which to proceed in your continuing effort to aid the intellectual development of students. If a student lacks problem-solving skills, he must not be expected to hypothesize, think abstractly, or generalize well. He should be helped in focusing his thinking on concrete objects. Any progress in concrete reasoning is success for you and him.

Question 7 assesses the students' understanding of the column marked 5-21, Pollution. Circle YES if the student marked the correct answer.

Questions 8-11 were designed to assess the students' understanding of the concept "Water Conservation." Circle HIGH if the student marked correct responses for all four questions. Circle SOME if the student marked correct responses for three of the questions. Circle LOW if the student marked correct responses for less than three questions.

TEACHING STRATEGIES

and 6 were designed to assess the problem-
solving skills of predicting outcomes. On the "Problem-
Solving" section of the Student Record of Progress find the
"Outcomes." Circle HIGH if the student
marked all possible correct responses and no
incorrect responses. Circle SOME if the student marked
some correct responses, no incorrect responses,
or both correct and incorrect responses. Circle LOW if the
student marked any incorrect responses or omitted either

any of the three problem-solving skills summarized in
the Record of Progress and note which students
are in the low ranks. Low rankings should not concern you
because they should be very reassuring. The rankings
on this section, like all others in the Student Record
of Progress, are not used to grade or pass judgments on
students. Their only purpose is to establish baselines
to guide your continuing effort to aid the
intellectual development of students. If a student
is in the low ranks on problem-solving skills, he must not be expected to
think abstractly, or generalize well. He
needs to be encouraged in focusing his thinking on concrete
problems. Progress in concrete reasoning is success.

Questions 15-21 assess the students' understanding of the
concept of Pollution. Circle YES if the student
marked the correct answer.

Questions 22-24 were designed to assess the students'
understanding of the concept "Water Conservation." Circle
HIGH if the student marked correct responses for all four
questions. Circle SOME if the student marked correct
responses for three of the questions. Circle LOW if the
student marked correct responses for less than three

ANTICIPATED STUDENT BEHAVIORS

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES**ANTICIPATED STUDENT BEHAVIORS**ACTIVITY
5-21

Upon completion of this activity, each student should, as a minimum:

- have completed Worksheets 5-11A, B, C, D.*
- have discussed the questions and choices in the booklet.*

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE D
ACTIVITY 5-21

Teacher _____

Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ____

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

How do you feel about the spacing of the Clues to Success?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. How do you feel about the spacing of the Clues to Success?
13. How would you change this clue to success to make the results more helpful to you?
14. Complete and send Tallysheet 5-5 to BSCS.

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?

UNIT V
REACTIONS TO CORE D

1. Was the background information for this core clear and useful? Yes No
Comment:

2. Was there too much preparatory reading and too many directions given to the teacher? Yes No
Comment:

3. Was it clear to you why these particular activities were chosen and the direction they were leading? Yes No

4. How would you increase the clarity of this core for students? (Help them understand why they are doing these activities.)

5. Is there a practical (take-home) value for your students in these activities?
 Yes No If yes, what do you see as the "take-home" lesson? If no, what is needed?

6. In these materials, what things did your students find difficult to do?

7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?

8. Were the Clues to Success and Student Record of Progress helpful in this core?
 Yes No If helpful, how are they helpful?

9. Did you make use of the Planning Guide included in the introductory material for this core? Yes No
Comment:

10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? Yes No
Comment:

11. If you could teach your way, rather than following the Guide, how would you do it?

6. In these materials, what things did your students find difficult to do?
7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?
8. Were the Clues to Success and Student Record of Progress helpful in this core?
 Yes No If helpful, how are they helpful?
9. Did you make use of the Planning Guide included in the introductory material for this core? Yes No
Comment:
10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? Yes No
Comment:
11. If you could teach your way, rather than following the Guide, how would you do it?
12. Did the activities fulfill the purposes described by the core objectives and rationale? Yes No
Comment:
13. Which of your students do you believe were unsuccessful in achieving the objectives of this core of activities? Explain:

NEW STUDENTS ENTERING DURING THIS C

Date Entered	Last Name	Name Used	Ethnic Group	Sex	Birthdate	Test Date	Te
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B

W = white
 B = black
 S = Spanish-
 American
 O = other

W=Wh
 B=Bl
 O=Ot
 (N

STUDENTS DROPPED IN THIS PERIOD

Date Dropped	Last Name	First	Reason for Dropping

NEW STUDENTS ENTERING DURING THIS CORE

Group	Sex	Birthdate	Test Date	Test	Total	Verbal	Performance	Previous Test Score
O	M F			W B O				
O	M F			W B O				
O	M F			W B O				
O	M F			W B O				
O	M F			W B O				
O	M F			W B O				

W=WISC
 B=Binet
 O=Other
 (Name)

sh-
can

Reason for Dropping



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE E. COMPONENTS OF AIR

AIMS FOR ME AND MY ENVIRONMENT

1. DEVELOPMENT IN EACH CHILD OF A SENSE OF IDENTITY AS A PERSON WHO HAS SOME DEGREE OF CONTROL OVER AND CAN ACT ON HIS ENVIRONMENT. This will lead to a degree of self-determination based on a rational coping with situations rather than on a passive compliance or an impulsive response to problems.
2. DEVELOPMENT IN EACH CHILD OF A SUCCESS SYNDROME. More than anything else, each activity is intended to be a success experience for each child. It is the teacher's responsibility -- almost obligation -- to see that each child succeeds at a level that is challenging to his abilities and that preserves his self-respect. It is a further responsibility of the teacher to point out his achievement. The students as a group should help each individual fit what he has done into a pattern of accomplishment.
3. DEVELOPMENT IN EACH CHILD OF AN INTEREST THAT COULD BECOME A HOBBY OR AVOCATION OVER A LIFETIME (through an exposure to an array of experiences in science). It is hoped that many children will find some ~~some~~ -- perhaps growing plants, caring for animals, identifying flowers, collecting things, or simply enjoying outings into the country -- that they feel strongly about and can develop some competence or knowledge in. This would provide a means of self-expression, and (perhaps) allow some degree of sharing or involvement with others.
4. DEVELOPMENT IN EACH CHILD OF A SENSE OF RELATIONSHIP AND EMPATHY WITH OTHER LIVING THINGS. It is hoped that this will lead to a positive regard and caring about what affects them as individuals and as a group, because what affects them affects the community of man.
5. DEVELOPMENT IN EACH CHILD OF AN UNDERSTANDING OF ENVIRONMENTAL CONDITIONS that will lead to a sense of responsibility for the environment and actions that protect or improve it.

The two parts of this unit will air and water as major components.

Part 1 emphasizes the importance of the environment by helping the student

1. Understand the need for water
2. Recognize the sources of water
3. Realize the problems associated with water
4. Realize the problems associated with air
5. Recognize the impact of water
6. Understand the broad problems

Part 2 emphasizes the nature of air by helping the student to:

7. Understand the composition of air
 8. Realize that the quality of air is important
 9. Realize that substances are carried by air
 10. Comprehend the impact of air on the environment
1. Establish the need for air.
 2. Identify oxygen and carbon dioxide
 3. Relate the cycling of oxygen

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE E. COMPONENTS OF AIR



BSCS

UNIT V GOALS

The two parts of this unit will serve to develop an appreciation of the roles of air and water as major components of our environment.

Part 1 emphasizes the importance of water as a vulnerable component of our environment by helping the student to:

1. Understand the need for water.
2. Recognize the sources of water.
3. Realize the problems associated with the preparation of usable water.
4. Realize the problems associated with the disposal of waste water.
5. Recognize the impact of water pollution.
6. Understand the broad problems of water management.

Part 2 emphasizes the nature of air as a complex component of our environment by helping the student to:

7. Understand the composition of air.
8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.
10. Comprehend the impact of air pollution on our environment.

CORE E OBJECTIVES

1. Establish the need for air.
2. Identify oxygen and carbon dioxide as components of air.
3. Relate the cycling of oxygen and carbon dioxide to life processes.



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE E. COMPONENTS OF AIR

CORE E RATIONALE

BAC

As is the case with water, air is an environmental resource that has critical importance to everyone's daily life. Most living things need a plentiful supply of fresh air for survival. In this core, the students will have the opportunity to identify the components of air that are of direct importance to them and other living things. They will also examine the cyclic nature of these components within the environment.

This core introduced in 5-22 forms a transition. Points are emphasized, nature of that source, concepts are reinforced.

Activity 5-23 introduced. This is done through a extinguished when it oxygen is compared to

In Activity 5-24 air. In this case, ex balloon is emptied into in the jar (because of during the filling of times in order to increase

Activity 5-25 demonstrated. In both cases, air is chamber (water pipe). from blue to yellow will blue will turn from color these indicators are tapping splashing. These are

Activity 5-26 utilized of oxygen and carbon dioxide.strate the production carbon dioxide by an apparatus demonstrates the utilization produced by the plant



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE E. COMPONENTS OF AIR

CORE E RATIONALE

BACK

As is the case with water, air is an environmental resource that has critical importance to everyone's daily life. Most living things need a plentiful supply of fresh air for survival. In this core, the students will have the opportunity to identify the components of air that are of direct importance to them and other living things. They will also examine the cyclic nature of these components within the environment.

This core introduces Core E. Core E-22 forms a transition to Core E-23. The following points are emphasized: the nature of that source, the components of that source, and the concepts are reinforced.

Activity 5-23 introduces the concept of air. This is done through a demonstration where a candle is extinguished when it is placed in a jar of oxygen. The oxygen is compared to air.

In Activity 5-24, the concept of air is further explored. In this case, an empty balloon is emptied into a jar (because of the weight of the air during the filling of the jar) several times in order to increase the weight of the air.

Activity 5-25 demonstrates the concept of air. In both cases, air is used in a chamber (water pipe). The color of the indicator changes from blue to yellow with the addition of air. The blue will turn from colorless to blue. These indicators are used to demonstrate the concept of air splashing. These are used to demonstrate the concept of air.

Activity 5-26 utilizes the concept of air. It demonstrates the production of carbon dioxide by an animal. The animal demonstrates the utilization of oxygen produced by the plant.

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE E. COMPONENTS OF AIR



BSCS

BACKGROUND INFORMATION FOR THE TEACHER

l resource that
t living things
t this core, the
ponents of air
things. They
s within the

This core introduces air as an important environmental resource. Activity 5-22 forms a transition from the study of water to air. As before, four points are emphasized: our need for air, our source of air, the limited nature of that source, and our ability to pollute that resource. These concepts are reinforced and expanded in subsequent cores.

Activity 5-23 introduces oxygen as an essential natural component of air. This is done through a straightforward experiment in which a candle flame is extinguished when it consumes the oxygen in a closed jar. The candle's use of oxygen is compared to that of our own body.

In Activity 5-24 carbon dioxide is established as a natural component of air. In this case, exhaled breath is captured in a balloon. The air from the balloon is emptied into a jar. A lit candle is extinguished when it is placed in the jar (because of the accumulated carbon dioxide). It is important that, during the filling of the balloon, the same air is exhaled and inhaled several times in order to increase the amount of carbon dioxide.

Activity 5-25 demonstrates laboratory tests for carbon dioxide and oxygen. In both cases, air is bubbled through an indicator solution in a confined test chamber (water pipe). Bromthymol blue is an indicator solution that will turn from blue to yellow with increased carbon dioxide. Decolorized methylene blue will turn from colorless to blue with the addition of oxygen. Even though these indicators are totally safe, caution should be exercised to avoid excessive splashing. These are colored dye solutions.


Activity 5-26 utilizes the tests established above to detect the production of oxygen and carbon dioxide by other organisms. An experiment will demonstrate the production of oxygen by a plant (elodea) and the production of carbon dioxide by an animal (snail). A combined experiment (snail and plant) demonstrates the utilization of the snails carbon dioxide by the plant. Oxygen produced by the plant will be utilized by the snail.



Me and my Environment

UNIT V CORE E

PLANNING GUIDE

NOTE: Some activities (indicated in italics and an  in the margin) should be prepared several days or weeks in advance. Use this as a teaching and preparation schedule. All supplies needed are listed in the table below.

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		<i>(Italics)</i>
	Materials You Furnish	Materials in Supply Kit	
5-22. The Air We Breathe Days needed: 1	35 mm Slide projector #3 Can, empty 8 1/2 X 11 inch Paper Small rubber bands Cover for can	Slide 5-39 Slide 5-40 Slide 5-41 Slides 5-42, 5-43 Slides 5-44, 5-45 Slides 5-46, 5-47 Slides 5-48, 5-49 Chart 5-1 Chart 5-3	Remove the p Two or three Four or five To extinguis Fireman Scuba diver Astronaut Industrial S City Streets Agricultural Smokers Water Air
5-23. Oxygen Is a Part of Air Days needed: 1	Balloons Birthday candles 32-ounce glass jar with screw lid Matches Clock with second hand Cardboard or heavy paper	Crucible tongs	One per stud One half by One, such as <i>orange dri</i> To attach to To lower can

PLANNING GUIDE



BSCS

ities (*indicated in italics and an arrow in the margin*) must
several days or weeks in advance. Use this summary as
and preparation schedule. All supplies needed are listed.

Supplies Needed

Notes and Suggestions to Teacher

Materials in Supply Kit

(Italics and Arrow Indicate Advance Preparation Directions)

Slide 5-39
Slide 5-40
Slide 5-41
Slides 5-42, 5-43
Slides 5-44, 5-45
Slides 5-46, 5-47
Slides 5-48, 5-49
Chart 5-1
Chart 5-3

Remove the paper covering
Two or three pieces
Four or five
To extinguish fire
Fireman
Scuba diver
Astronaut
Industrial Scenes
City Streets
Agricultural Area
Smokers
Water
Air

Crucible tongs

One per student
One half by three inches
*One, such as coffee creamer, instant tea or coffee, powdered
orange drink*

To attach to candle
To lower candle into jar

UNIT V
CORE E

PLANNING GUIDE



Me and my
Environment

NOTE: Some activities (*indicated in italics and an arrow*) be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		<i>(Italics)</i>
	Materials You Furnish	Materials in Supply Kit	
5-24. Carbon Dioxide Is a Part of Air Days needed: 1	Balloon Rubber band, medium size Glass jars Birthday candles Cardboard or heavy paper	Vinyl tubing, 1/16-inch wall, 1/4-inch inside diameter Worksheet 5-12 Crucible tongs	One One <i>Two tall</i> To attach About 12 Pad of 2 To lower
5-25. Testing for Car- bon Dioxide and Oxygen Days needed: 1	Balloon Rubber band, medium size 32-ounce Tall glass jar Sink or bucket Water Toothpicks Spoon	Water pipe test chamber Vinyl tubing, 1/4-inch diameter Oxygen test solution Carbon dioxide test solution Mityvac hand pump Sodium hydrosulfite	One per One per One per For rins One or t One larg One per About tw <i>One drop</i> <i>mixing</i> One drop One per For deco

PLANNING GUIDE



BSCS

Activities (*indicated in italics and an arrow in the margin*) must be prepared several days or weeks in advance. Use this summary as a planning and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher
Materials in Supply Kit	<i>(Italics and Arrow Indicate Advance Preparation Directions)</i>
<p>Vinyl tubing, 1/16-inch wall, 1/4-inch inside diameter</p> <p>Worksheet 5-12</p> <p>Crucible tongs</p>	<p>One</p> <p>One</p> <p><i>Two tall jars, preferably of a similar size</i></p> <p>To attach to the candles</p> <p>About 12 inches long</p> <p>Pad of 20; one worksheet per student</p> <p>To lower candle into jar</p>
<p>Water pipe test chamber</p> <p>Vinyl tubing, 1/4-inch diameter</p> <p>Oxygen test solution</p> <p>Carbon dioxide test solution</p> <p>Mityvac hand pump</p> <p>Sodium hydrosulfite</p>	<p>One per pair of students</p> <p>One per pair of students</p> <p>One per pair of students</p> <p>For rinsing water pipes</p> <p>One or two</p> <p>One large spoon for stirring</p> <p>One per pair of students</p> <p>About two feet for each pair of students</p> <p><i>One dropping bottle per pair of students (see instructions for mixing in Activity 5-25).</i></p> <p>One dropping bottle per pair of students</p> <p>One per pair of students</p> <p>For decolorizing oxygen test solution</p>

UNIT V
CORE E

PLANNING GUIDE



Me and my Environment

NOTE: Some activities (indicated in italics and an *✦* in the margin) should be prepared several days or weeks in advance. Use this guide to develop a teaching and preparation schedule. All supplies needed are listed in the table below.

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		<i>(Italics)</i>
	Materials You Furnish	Materials in Supply Kit	
5-26. Natural Sources of Oxygen and Carbon Dioxide Days needed: 3	Elodea (Anacharis) Small water snails Pond or aquarium water Desk lamp 35 mm Slide projector Tape recorder (optional)	Test tubes, 150 X 18 mm Rubber stoppers, solid #2 Test tube rack Bromthymol blue solution Methylene blue solution, decolorized Worksheet 5-13 Slide 5-50 Tallysheet 5-6	Two sprigs of Elodea Two per group One-half gallon jar With 100-watt light bulb Four per group Four per group One per group In dropping bottle In dropping bottle Clue to Success Elodea experiment

PLANNING GUIDE



BSCS

ies (indicated in italics and an **←** in the margin) must
several days or weeks in advance. Use this summary as
and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher
Materials in Supply Kit	<i>(Italics and Arrow Indicate Advance Preparation Directions)</i>
<p>est tubes, 150 X 18 mm ubber stoppers, solid #2 est tube rack romthymol blue solution ethylene blue solution, decolored orksheets 5-13 lide 5-50 allysheet 5-6</p>	<p>Two sprigs per group of students Two per group of students One-half gallon With 100-watt bulb</p> <p>Four per group of students Four per group of students One per group of students In dropping bottles, one per group of students In dropping bottles, one per group of students</p> <p>Clue to Success Elodea experiment</p>



Me and my Environment



BSCS



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.
10. Comprehend the impact of air pollution on our environment.

Core E Objectives for the Student:

1. Establish the need for air.

ENVIRONMENTAL THEME:

Ecological Trade-offs, Finiteness of Resources

INQUIRY SKILLS:

Associating

PROBLEM-SOLVING SKILLS:

Drawing Conclusions

PRACTICAL APPLICATION:

Observation Skills; Discussion Skills;
Realization That It Is Harmful To Breathe
Bad Air

Activity 5-22. The Air We Breathe

This activity will provide a subject-matter transition from water to air by relating the four main themes used in the water section (needs, sources, finiteness, and pollution) to air. Through this activity the student will also recognize that some components of air are natural and others are man-made.

ACTIVITY

Goals for the Student:

Realize that the quality of air is variable.

Realize that substances are continually added to air.

Comprehend the impact of air pollution on our environment.

Objectives for the Student:

Establish the need for air.

LOCAL THEME:

Local Trade-offs, Finiteness of Resources

OBJECTIVES:

Identifying

READING SKILLS:

Drawing Conclusions

APPLICATION:

Communication Skills; Discussion Skills;
Understanding That It Is Harmful To Breathe

The Air We Breathe

provide a subject-matter transition by relating the four main themes used in the unit (needs, sources, finiteness, and quality). Through this activity the student will understand that some components of air are man-made.

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE E.

COMPONENTS OF AIR

ACTIVITY 5-22. THE AIR WE BREATHE



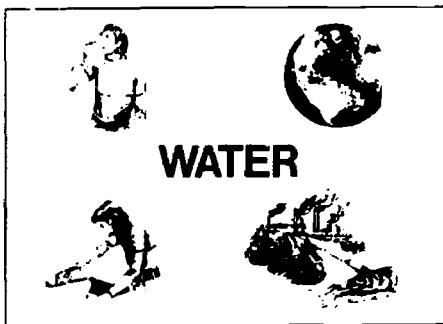
BSCS

During this activity, each student should:

- observe Chart 5-1 and describe each water theme.*
- observe Charts 5-1 and 5-3 and describe each way air is like water.*

- Chart 5-1
- Chart 5-3
- Slides 5-39 through 5-49
- *35 mm Slide projector
- *No. 3 Can
- *8 1/2 X 11 Paper, 2 pieces
- *Small rubber bands, 4 or 5
- *Cover for can to extinguish fire

Chart 5-1



*Not furnished in materials kit

Begin this activity by displaying Chart 5-1 (Water Chart) and saying:

FOR SEVERAL WEEKS WE HAVE DISCUSSED MANY THINGS ABOUT WATER. THIS CHART REMINDS US OF WHAT WE TALKED ABOUT.

Point to each area of the chart and ask students what it suggests to them.

Then say:

FOR THE NEXT SEVERAL WEEKS WE WILL BE DISCUSSING AIR AND DOING VARIOUS THINGS WITH IT. AIR IS LIKE WATER IN MANY WAYS. BY LOOKING AT THE FIRST PICTURE ON THE CHART, CAN YOU THINK OF ONE WAY AIR IS LIKE WATER?

WE NEED AIR JUST AS MUCH AS WE NEED WATER. WE COULDN'T LIVE LONG IF WE DIDN'T HAVE BOTH OF THEM.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- observe Slides 5-39, 5-40, and 5-41 and describe each man as wearing a mask because his air is undesirable.
- observe the burning rubber band and paper demonstration.
- observe Slides 5-42 through 5-49 and describe what is different in each picture.
- realize that man helps to make parts of the air dirty.

Students should:

- recall the activities in Cores A, B, C, and D of this Unit and indicate that the person suggests the need for water; the earth suggests that is where we get water; the dripping faucet suggests water's finiteness; and the factory suggests our pollution of water.

- infer from the first picture, which suggests that we need water, that we also need air.

Activity by displaying Chart 5-1 (Water Chart)

SEVERAL WEEKS WE HAVE DISCUSSED MANY THINGS
ABOUT AIR. THIS CHART REMINDS US OF WHAT WE
LEARNED ABOUT AIR.

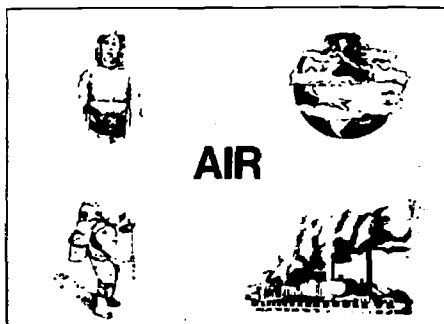
Look at the area of the chart and ask students what it
shows.

AT SEVERAL WEEKS WE WILL BE DISCUSSING
ABOUT AIR AND VARIOUS THINGS WITH IT. AIR IS LIKE
WATER IN MANY WAYS. BY LOOKING AT THE FIRST
PICTURE OF THE CHART, CAN YOU THINK OF ONE WAY
IN WHICH AIR IS LIKE WATER?

AS MUCH AS WE NEED WATER. WE
DON'T KNOW HOW LONG IF WE DIDN'T HAVE BOTH OF THEM.

MATERIALS

Chart 5-3



Slide 5-39



TEACHING STRATEGIES

WHAT DOES THE SECOND PICTURE TELL YOU ABOUT THE WAY WATER AND AIR ARE ALIKE?

Continue in a similar manner with the third and fourth pictures until students indicate their understanding that we need air, that it comes from our environment, we can run out of it, and that we can pollute it.

Now display Chart 5-3 (Air Chart) and say:

WHAT DO YOU THINK THIS CHART SHOWS US?

HERE IS A CHART REMINDING US HOW IMPORTANT AIR IS. IT IS VERY SIMILAR TO THE WATER CHART.

Discuss each picture on the chart and how it is similar to the water chart.

FROM LOOKING AT THIS CHART, WHAT DO YOU THINK WE WILL BE LEARNING ABOUT AIR?

Begin by projecting Slide 5-39 and ask:

WHAT DO YOU SEE IN THIS PICTURE?

WHY IS THE FIREMAN WEARING A MASK?

GIVE SE
STUDENTS
TO RES

TEACHING STRATEGIES

THE SECOND PICTURE TELL YOU ABOUT THE
AND AIR ARE ALIKE?

Similar manner with the third and fourth
students indicate their understanding
, that it comes from our environment,
of it, and that we can pollute it.

Chart 5-3 (Air Chart) and say:

WHAT DOES THIS CHART SHOWS US?

CHART REMINDING US HOW IMPORTANT AIR
IS VERY SIMILAR TO THE WATER CHART.

Picture on the chart and how it is
like water chart.

AT THIS CHART, WHAT DO YOU THINK
WE CAN LEARN ABOUT AIR?

Using Slide 5-39 and ask:

WHAT DO YOU SEE IN THIS PICTURE?

THE FIREMAN WEARING A MASK?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-22

Students should:

--infer from the second picture which suggests that
water comes from our environment, that air does
also.


--observe Pictures 3 and 4 on Chart 5-1 and relate
them to the finiteness of air and to man's
pollution of air.

--observe Chart 5-3 and conclude that it shows us the
importance of air.

--respond, "We need air," "We get it from our
environment," "We can run out of it," "We can
pollute it."

--respond, "A fireman wearing a mask while fighting
a fire."

--infer that the fireman is wearing a mask because
the air is undesirable.


GIVE SEVERAL
STUDENTS A CHANCE
TO RESPOND

MATERIALS

TEACHING STRATEGIES

Slide 5-40



Slide 5-41



Slide 5-42



Project Slide 5-40 and ask:

WHAT DO YOU SEE IN THIS PICTURE?

WHY IS THE MAN WEARING A MASK?

Show Slide 5-41 and ask:

WHAT DO YOU SEE IN THIS PICTURE?

WHY IS THE MAN WEARING A MASK?

WHAT KIND OF AIR DO YOU THINK IS AROUND ALL OF THESE PEOPLE?

WHY ARE THEY WEARING MASKS?

CAN WE BREATHE SMOKY AIR, SMALL AMOUNTS OF AIR, OR NO AIR AT ALL AND STILL LIVE?

DOES OUR CLASSROOM HAVE THE KIND OF AIR WE WANT TO BREATHE?

Before proceeding with the following demonstration, check your school rules to make sure a burning demonstration such as this is allowed. Close the windows and doors. Crumple some paper and place it in the No. 3 can. Light the paper and add the rubber bands. This will cause a great deal of smoke and a pungent odor. Have students observe the burning for a couple of minutes. Then cover the can to put out the fire, open the windows and ask:

WHAT IS IN THE AIR WE ARE BREATHING?

TEACHING STRATEGIES

5-40 and ask:

DO YOU SEE IN THIS PICTURE?

THE MAN WEARING A MASK?

1 and ask:

DO YOU SEE IN THIS PICTURE?

THE MAN WEARING A MASK?

WHAT KIND OF AIR DO YOU THINK IS AROUND ALL OF
THE PEOPLE?

WHY ARE THEY WEARING MASKS?

HOW DO WE BREATHE SMOKY AIR, SMALL AMOUNTS OF AIR,
AND AIR THAT IS NOT AT ALL AND STILL LIVE?

DO OUR CLASSROOMS HAVE THE KIND OF AIR WE WANT
TO BREATHE?

Working with the following demonstration, check
steps to make sure a burning demonstration
is allowed. Close the windows and doors.
Paper and place it in the No. 3 can. Light
and add the rubber bands. This will cause a
smoke and a pungent odor. Have students
waiting for a couple of minutes. Then cover
out the fire, open the windows and ask:

WHAT KIND OF AIR ARE WE BREATHING?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "A diver wearing an air tank."

--infer that the diver is wearing the tank and mask
because air is unavailable.

--respond, "A spaceman," "An astronaut."

--infer that the astronaut is wearing a mask because
air is unavailable.

--conclude that the air is bad, or that none is
available.

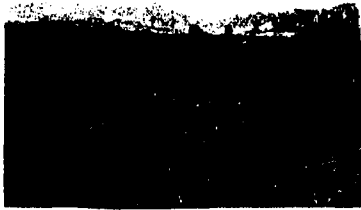
--infer that masks are being worn to keep out the
undesirable air, or to provide air.

--indicate, "Maybe," "Don't know."

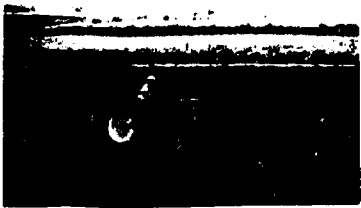
--state that the classroom contains the kind of air
they want to breathe.

--state, "Smoke," "Dirt," "Paper," "Soot."

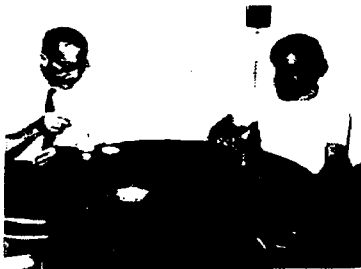
Slide 5-46



Slide 5-47



Slide 5-48



See Change of Pacers 20 and 21.

Slide 5-49



CHAN

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

Upon completion of this activity, each student should, as a minimum:

- have observed Charts 5-1 and 5-3 and listed at least two ways that water is similar to air.*
- have observed Slides 5-39 through 5-41 and described the men as wearing a mask to help them breathe.*
- have observed the burning demonstration.*
- have observed Slides 5-42 through 5-49 and indicated that in each case man has done something to the air.*

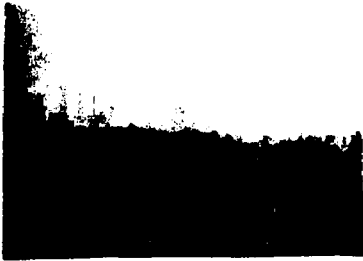


CHANGE OF PACER

pacers 20 and 21.

MATERIALS

Slide 5-43



Slide 5-44



Slide 5-45



TEACHING STRATEGIES

WHAT KIND OF AIR WOULD YOU PREFER TO BREATHE --
GOOD CLEAN AIR OR BAD DIRTY AIR?

WHAT MADE OUR AIR DIRTY AND BAD?

WHAT WAS BAD ABOUT THE AIR AROUND THE FIREMAN?

WHAT WAS BAD ABOUT THE AIR AROUND THE SCUBA
DIVER?

WHAT WAS BAD ABOUT THE AIR AROUND THE ASTRONAUT?

DOES MAN HELP MAKE PARTS OF THE AIR?

HOW?

Project Slides 5-42 through 5-49 of the before-and-after
scenes. Discuss each by asking:

WHAT KIND OF AIR DO YOU SEE?

HOW WAS THE AIR CHANGED IN EACH PICTURE?

Conclude this activity by saying:

WHAT CAUSED THE AIR IN THESE PICTURES TO GET
DIRTY?

TEACHING STRATEGIES

AIR WOULD YOU PREFER TO BREATHE --
OR OR BAD DIRTY AIR?

AIR DIRTY AND BAD?

ABOUT THE AIR AROUND THE FIREMAN?

ABOUT THE AIR AROUND THE SCUBA

ABOUT THE AIR AROUND THE ASTRONAUT?

MAKE PARTS OF THE AIR?

through 5-49 of the before-and-after
ch by asking:

AIR DO YOU SEE?

WHAT CHANGED IN EACH PICTURE?

ity by saying:

THE AIR IN THESE PICTURES TO GET

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-22

Students should:

--state a preference for good clean air.

--indicate, "The fire," "The teacher."

--respond, "It was too hot," "It was smoky."

--respond, "There was water in it," "There
wasn't any."

--respond, "There wasn't any," "There wasn't
enough."

--respond, "Yes."

--respond, "Burning stuff," "From driving cars,"
and so forth.

--observe the slides and state, "Clean air," "Dirty
air."

--observe that the air became dirty, smoky, and
smoggy. Infer that man and his machines caused
the changes.

--conclude that man and his machines caused the air
to get dirty.

Activity name suggested by class:

BSCS USE:	Post _____	Tally _____	Rev _____
-----------	------------	-------------	-----------

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes preparing for each day's science class						
4.	Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the revision suggested Worth salvaging--make major changes described Worthless --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

Were the students able to draw the analogy between water and air?

Yes No

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?
7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will
use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts
were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained
unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Were the students able to draw the analogy between water and air?
 Yes No
13. Was the chart helpful in the discussion of the importance of air? Yes No
Comment.
14. Were students able to infer air conditions from the pictures of the men wearing
masks? Yes No

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

7. Understand the composition of air.
8. Realize that the quality of air is variable.

Core E Objectives for the Student:

1. Establish the need for air.
2. Identify oxygen and carbon dioxide as components of air

ENVIRONMENTAL THEME:

Cyclic Nature of Processes

INQUIRY SKILLS:

Inferring

PROBLEM-SOLVING SKILLS:

Interpreting Results

PRACTICAL APPLICATION:

How To Extinguish a Fire, Hazards of Playing in Refrigerators, Hazards of Playing with Plastic Bags, Identification of Oxygen, Increased Vocabulary

Activity 5-23. Oxygen is a Part of Air

This activity is designed to relate air to breathing and to identify oxygen as a component of air that is necessary for life. This is accomplished through a series of activities designed for both individual and team work and through a demonstration by the teacher.

ACTIVITY

Goals for the Student:

- Understand the composition of air.
- Realize that the quality of air is variable.

Objectives for the Student:

- Establish the need for air.
- Identify oxygen and carbon dioxide as components of air

LEARNING THEME:

Nature of Processes

LEARNING OBJECTIVES:

Understanding

LEARNING SKILLS:

Learning Results

APPLICATION:

Extinguish a Fire, Hazards of Playing
Generators, Hazards of Playing with
Bags, Identification of Oxygen,
Key Vocabulary

Oxygen is a Part of Air

Designed to relate air to breathing and
as a component of air that is necessary
accomplished through a series of
for both individual and team work
ion by the teacher.

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE E.

COMPONENTS OF AIR

ACTIVITY 5-23.

OXYGEN IS A
PART OF AIR



BSCS

During this activity, each student should:

- breathe in and out of a balloon.*
- observe an increase and a decrease in the size of the balloon.*
- observe the movements another person's chest makes while that person is breathing.*

MATERIALS

- Crucible tongs
- *Balloons, 1 per student
- *Candle, 1/2 X 3 inches
- *Matches
- *Glass jar with screw cap
- *Cardboard disc, 2-inch diameter

*Not furnished in materials kit

TEACHING STRATEGIES

Distribute the balloons and direct the students to work in pairs. You might prefer to suggest male-male and female-female partners for this specific activity.

Begin by saying:

WHAT IS THE AIR?

LET'S DO SOME THINGS THAT MIGHT HELP US ANSWER THIS QUESTION.

Distribute a balloon to each student.

BREATHE INTO THE BALLOON AND THEN PINCH THE BALLOON TIGHTLY CLOSED.

WHAT IS IN THE BALLOON?

AC
A

DISTRIB

TEACHING STRATEGIES

balloons and direct the students to work in pairs. You might prefer to suggest male-male and female-female partners for this specific activity.

g:

HE AIR?

SOME THINGS THAT MIGHT HELP US ANSWER THE QUESTION.

balloon to each student.

TO THE BALLOON AND THEN PINCH IT OFF UNTIL IT IS TIGHTLY CLOSED.

THE BALLOON?

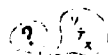
ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- be able to use properly the terms "inhale" and "exhale".*
- observe the extinction of a candle deprived of air.*
- infer that the candle flame went out because it ran out of oxygen.*
- identify oxygen as an important part of the air.*
- identify the lack of oxygen as the reason the flame was extinguished.*

Students should:

- speculate on the makeup of the air.*



ACCEPT ALL ANSWERS



DISTRIBUTE MATERIALS

- respond, "Air is in the balloon," "My breath."*

MATERIALS

TEACHING STRATEGIES

BLOW INTO THE BALLOON AND THEN DRAW THE AIR OUT AGAIN WITHOUT REMOVING YOUR MOUTH FROM THE BALLOON. WHAT HAPPENS?

NOW TAKE TURNS AND WATCH YOUR PARTNER'S CHEST AS HE BREATHEES.

Have each student locate his rib cage, place his hands on it, take a deep breath, and describe the movement and size increase.

Then ask:

WHAT HAPPENS TO YOUR CHEST AS YOU BREATHE?

WHAT HAPPENS TO THE BALLOON WHEN YOU BREATHE IN AND OUT?

Introduce the words "inhale" and "exhale" at this time. Write the two words on the chalkboard. Help the students realize that as their chests get bigger, the balloons get smaller, and vice versa because the air from the balloons goes into their chests.

Then ask:

WAS YOUR CHEST SIZE BIGGER WHEN YOU INHALED OR WHEN YOU EXHALED?

WHY WAS YOUR CHEST BIGGER WHEN YOU INHALED?

WHAT DO YOU THINK IS IN YOUR INHALED AIR?

TEACHING STRATEGIES

E BALLOON AND THEN DRAW THE
WITHOUT REMOVING YOUR MOUTH
LOON. WHAT HAPPENS?

IS AND WATCH YOUR PARTNER'S CHEST
S.

locate his rib cage, place his hands on
breath, and describe the movement and

TO YOUR CHEST AS YOU BREATHE?

TO THE BALLOON WHEN YOU BREATHE

s "inhale" and "exhale" at this time.
s on the chalkboard. Help the students
eir chests get bigger, the balloons get
versa because the air from the balloons
ests.

T SIZE BIGGER WHEN YOU INHALED OR
LED?

CHEST BIGGER WHEN YOU INHALED?

WINK IS IN YOUR INHALED AIR?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-23

Students should:

--observe and respond that the balloon increases
and then decreases in size.

--observe their partner's chest movements as their
partners breathe.

--feel and describe the upward and outward movement
of their rib cages during breathing.

--respond, "Gets bigger and smaller."

--respond, "Gets bigger and smaller."

--state, "Bigger when I inhaled."

--infer that they had air in their chests.

--state, "Air," "I don't know," "Dirt," and so on.

MATERIALS

TEACHING STRATEGIES

Set up the following demonstration to illustrate that oxygen is one key component of inhaled air.

Support a candle on a piece of cardboard or heavy paper by putting a few drops of melted wax on the paper and holding the candle on it as it hardens. Light the candle.

Ask:

IS THIS CANDLE SURROUNDED BY THE SAME AIR AS YOU BREATHE?

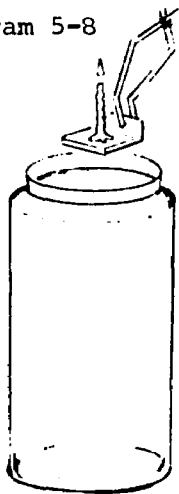
WATCH CAREFULLY AND NOTICE WHAT HAPPENS. I AM GOING TO SET THE CANDLE INTO THE BOTTOM OF THIS JAR. (See Diagram 5-8.)

IS THE AIR INSIDE THE JAR THE SAME AS THE AIR YOU BREATHE IN?

I AM GOING TO PUT THE LID ON THE JAR. WHAT DO YOU THINK WILL HAPPEN?

Carefully screw the lid on the jar. Have the students watch until the flame goes out. Replenish the air in the jar by moving the jar through the air rapidly or by pushing a wad of paper in and out of the jar. Repeat this procedure and have a student time how long it takes for the flame to go out. Record the time it took for the flame to go out on the chalkboard.

Diagram 5-8



TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

Students should:


**ACCEPT ALL
ANSWERS**

...ing demonstration to illustrate that
...y component of inhaled air.

... on a piece of cardboard or heavy paper
... drops of melted wax on the paper and
... le on it as it hardens. Light the

...OLE SURROUNDED BY THE SAME AIR AS

...ULLY AND NOTICE WHAT HAPPENS. I
... SET THE CANDLE INTO THE BOTTOM
... (See Diagram 5-8.)

...INSIDE THE JAR THE SAME AS THE AIR
... IN?

...O PUT THE LID ON THE JAR. WHAT DO
...LL HAPPEN?

...he lid on the jar. Have the students
...lame goes out. Replenish the air in
... the jar through the air rapidly or by
... paper in and out of the jar. Repeat
... d have a student time how long it takes
... go out. Record the time it took for the
... n the chalkboard.

--respond, "Yes," "I think so."

--respond, "Yes," "Sure."

--predict, "Nothing," "I don't know," "The candle
will go out," "The jar will get hot," and so
forth.

--observe and note the duration of the flame.

MATERIALS

TEACHING STRATEGIES

HINT: The flame is out when the puff of smoke first appears.

Ask:

WHAT HAPPENED TO THE LAST FLAME?

HOW LONG DID IT BURN?

WHY DID IT GO OUT?

WHAT WOULD HAPPEN IF WE PUT A BUTTERFLY OR A MOUSE IN A JAR WITH A LID ON IT?

WHY?

WHAT WOULD HAPPEN IF WE PUT YOU INTO A BIG JAR WITH A LID ON IT?

HOW LONG WOULD YOU LIVE?

IMPORTANT: Relate this to the danger of playing in old refrigerators, or with plastic bags, and so forth.

WHY DID THE CANDLE GO OUT?

AIR IS MADE UP OF MANY PARTS. OUR BODIES USE ONLY SOME OF THESE PARTS. ONE PART OF AIR THAT IS VERY IMPORTANT TO US IS OXYGEN.

Write "oxygen" on the chalkboard.

IF THE OXYGEN FROM THE AIR IS GONE, A CANDLE CANNOT BURN.

IF THE OXYGEN FROM THE AIR IS GONE, WE CANNOT LIVE.

TEACHING STRATEGIES

is out when the puff of smoke first

GOES TO THE LAST FLAME?

DOES IT BURN?

GOES OUT?

WHAT HAPPENS IF WE PUT A BUTTERFLY OR A
CANDLE IN A JAR WITH A LID ON IT?

WHAT HAPPENS IF WE PUT YOU INTO A BIG JAR
WITH A LID ON IT?

WOULD YOU LIVE?

Explain this to the danger of playing in old
radiators, or with plastic bags, and
so forth.

DOES A CANDLE GO OUT?

IS MADE UP OF MANY PARTS. OUR BODIES USE ONLY
A FEW PARTS. ONE PART OF AIR THAT IS VERY
IMPORTANT FOR US IS OXYGEN.

Write on the chalkboard.

IF ALL THE AIR IS GONE, A CANDLE

WOULD GO OUT. IF ALL THE AIR IS GONE, WE CANNOT

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-23

Students should:

--respond, "It went out," "It stopped burning."

--indicate the number of seconds the candle burned.

--respond, "I don't know," "No air," and so forth.

--respond, "It would die," "Suffocate."

--respond, "Because it wouldn't have any air,"
"Need to punch holes."

--respond, "We'd die," "We'd run out of air,"
"Suffocate."

--infer they would live until the air ran out.

--respond, "It didn't have enough air."

MATERIALS

TEACHING STRATEGIES

INV
& S
S

WHAT PART OF THE AIR DID THE CANDLE RUN OUT OF?

A FLAME NEEDS OXYGEN TO BURN. WHAT WOULD BE ONE WAY YOU COULD PUT OUT A FIRE?

IF WE HAD A BUTTERFLY IN A COVERED JAR, WHY WOULD IT LIVE ONLY A LITTLE WHILE?

WHAT PART OF THE AIR DO WE NEED IN ORDER TO LIVE?

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

Students should:

INVOLVE YOUR SLOWEST STUDENTS

OF THE AIR DID THE CANDLE RUN OUT OF?

EDS OXYGEN TO BURN. WHAT WOULD BE ONE
ULD PUT OUT A FIRE?

A BUTTERFLY IN A COVERED JAR, WHY WOULD
Y A LITTLE WHILE?

OF THE AIR DO WE NEED IN ORDER TO LIVE?

--respond, "Oxygen."

--respond, "Take away the oxygen," "Smother it,"
"Cover it up."

--respond, "Because it would use up all the
oxygen."

--respond, "Oxygen."

*Upon completion of this activity, each student
should, as a minimum:*

- have breathed in and out of a balloon.*
- have observed an increase and decrease in the
size of the balloon.*
- have observed movements of another person's chest
while that person is breathing.*
- be able to use the terms *inhale* and *exhale*
properly.*
- have observed the extinction of the candle.*
- have inferred that the flame went out because
it ran out of air.*
- have identified oxygen as an important part of
air.*

MATERIALS

TEACHING STRATEGIES

CHANGE

See Change of Pacers 22, 23, and 24.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-23



ers 22, 23, and 24.

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE E
ACTIVITY 5-23

Teacher _____

Activity name suggested by class:

BSCS USE:	Post _____	Tally _____	Rev _____
-----------	------------	-------------	-----------

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes preparing for each day's science class						
4.	Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

How many students understand the terms inhale and exhale?

--	--	--	--	--	--	--	--

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?
7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:
- Specific Questions:
12. How many students understand the terms inhale and exhale?
13. Do you feel that the experiment was effective in demonstrating the necessity of oxygen? Yes No

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

7. Understand the composition of air.
9. Realize that substances are continually added to air.

Core E Objectives for the Student:

1. Establish the need for air
2. Identify oxygen and carbon dioxide as components of air.

ENVIRONMENTAL THEME:

Cyclic Nature of Processes, Finiteness of Resources

INQUIRY SKILLS:

Inferring

PROBLEM-SOLVING SKILLS:

Explaining, Defending, Answering Why Questions

PRACTICAL APPLICATION:

Discussion Skills, How Our Body Works, Increased Vocabulary

Activity 5-24. Carbon Dioxide Is Part of Air

This activity will serve to establish one difference between inhaled and exhaled air. An experiment will be performed that will describe carbon dioxide as one difference between inhaled and exhaled air.

ACTIVITY

Objectives for the Student:

Understand the composition of air.

Realize that substances are continually added to air.

Objectives for the Student:

Establish the need for air

Identify oxygen and carbon dioxide as components of air.

THEME:

Nature of Processes, Finiteness of

6:

TEACHING SKILLS:

Arguing, Defending, Answering Why Questions

APPLICATION:

Life Skills, How Our Body Works, Vocabulary

Carbon Dioxide Is Part of Air

Students will be able to observe to establish one difference between inhaled and exhaled air. An experiment will be conducted to describe carbon dioxide as one component of inhaled and exhaled air.

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE E.

COMPONENTS OF AIR

ACTIVITY 5-24.

CARBON DIOXIDE
IS PART OF AIR



BSCS

During this activity, each student should:

- recall the meaning of inhale and exhale.*
- observe the experiment with Jar A and Jar B.*
- infer the candle went out in Jar B because the air in it was different.*

MATERIALS

Vinyl tubing, 1/4-inch inside diameter, 1/16-inch wall, 12 inches long

Worksheet 5-12

Crucible tongs

*Balloon, 1

*Rubber band

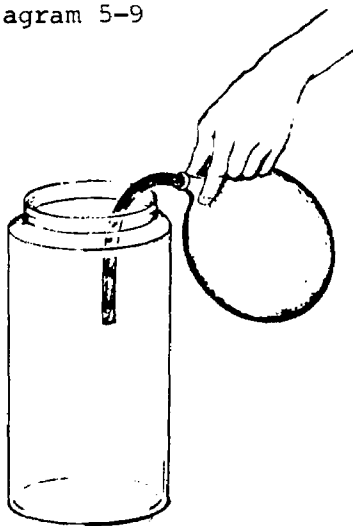
*Glass jars, 2

*Birthday candles, 2

*Matches

*Cardboard or heavy paper

Diagram 5-9



*Not furnished in materials kit

TEACHING STRATEGIES

Begin by having the students recall the meaning and action of inhaling and exhaling.

Ask:

WHAT HAPPENED TO THE BALLOON AS YOU BREATHED IN AND OUT?

DO YOU THINK INHALED AIR IS DIFFERENT FROM EXHALED AIR?

TODAY WE WILL WATCH A DEMONSTRATION TO FIND OUT IF YOUR EXHALED AIR IS DIFFERENT FROM YOUR INHALED AIR.

Begin the demonstration by following these directions:

1. Prepare two small cardboard bases for the candles (about one- to two-inches square).
2. Attach the candles to the cardboard bases with a drop of wax.
3. Attach a balloon to the vinyl tubing and secure it with a rubber band. (See Diagram 5-9.)
4. Label one of the jars "Jar A" and one "Jar B."

TEACHING STRATEGIES

the students recall the meaning and
ing and exhaling.

ED TO THE BALLOON AS YOU BREATHED

INK INHALED AIR IS DIFFERENT FROM
R?

ILL WATCH A DEMONSTRATION TO FIND OUT
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candles to the cardboard bases with a
x.

alloon to the vinyl tubing and secure
rubber band. (See Diagram 5-9.)

ERIC jars "Jar A" and one "Jar B."
Full Text Provided by ERIC

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- describe exhaled air as being different from inhaled air.*
- describe more carbon dioxide and/or lack of oxygen as being the difference between inhaled and exhaled air.*
- discuss the drawing of the bubbles of air.*
- explain why the candle went out in Jar B.*
- explain why the candle did not go out in Jar A.*
- recall why the candle went out when a lid was put on the jar.*
- successfully complete Worksheet 5-12.*

Students should:

- recall the movement of air resulting from the inflation and deflation of the lungs.*
- respond, "Yes," "No," "I don't know."*

MATERIALS

TEACHING STRATEGIES

Select a student to inflate the balloon. Then without removing his mouth from the tube, have him inhale and exhale six times. The balloon will deflate and inflate with each exchange. During this procedure, the reuse of the exhaled air will result in the accumulation of carbon dioxide in the balloon. After the last (sixth) breath, the student should pinch off the balloon with thumb and forefinger and keep it pinched off until the next step.

Then ask:

WHAT IS IN THE BALLOON?

Continue with the experiment.

5. Light the two candles and place one in Jar A. (See Diagram 5-8 in Activity 5-23 to see how to prepare the candle in the jar.)
6. Direct a student to place the end of the vinyl tube at the bottom of Jar B. (See Diagram 5-9.) While keeping the end of the tube at the bottom of the jar, allow the balloon to deflate slowly. This will fill the jar with exhaled air which contains much carbon dioxide.
7. Then quickly place the other lighted candle in Jar B. (See Diagram 5-8 in Activity 5-23 to see how to place the candle in the jar.) The flame should still be burning.

Now ask:

WHAT HAPPENED WHEN WE PUT THE CANDLE IN JAR B?

WHAT HAPPENED TO THE CANDLE WE PUT IN JAR A?

WHAT WAS THE CONTROL IN THIS DEMONSTRATION?

TEACHING STRATEGIES

to inflate the balloon. Then without
th from the tube, have him inhale and
The balloon will deflate and inflate
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THE BALLOON?

experiment.

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ch carbon dioxide.

place the other lighted candle in
Diagram 5-8 in Activity 5-23 to see
the candle in the jar.) The flame
be burning.

WHEN WE PUT THE CANDLE IN JAR B?

TO THE CANDLE WE PUT IN JAR A?

CONTROL IN THIS DEMONSTRATION?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-24

Students should:

--respond, "Air," "His breath," "His exhaled breath."

--respond, "It went out."

--respond, "It kept burning."

--indicate that Jar A was the control.

MATERIALS

TEACHING STRATEGIES

If students do not recall the meaning of control, remind them that it is something to compare other parts of the experiment with.

IN OUR LAST ACTIVITY (5-23) WE PUT A LID ON THE JAR TO MAKE THE CANDLE GO OUT. WHY DID THAT CANDLE GO OUT?

WHAT DOES A CANDLE NEED IN ORDER TO BURN?

WHY DID THE CANDLE IN JAR B GO OUT?

WHY DID THE CANDLE IN JAR B GO OUT WITHOUT A LID ON IT WHEN THE CANDLE IN OUR OTHER ACTIVITY WENT OUT ONLY WHEN WE PUT A LID ON THE JAR?

THE AIR WE PUT IN JAR B (point to Jar B) WAS EXHALED AIR, AIR WE BREATHE OUT. THE AIR IN JAR A (point to Jar A) AND IN OUR LAST EXPERIMENT WAS INHALED AIR, AIR WE BREATHE IN. WHAT IS THE DIFFERENCE BETWEEN THE AIR IN THE TWO JARS?

THERE IS LESS OXYGEN IN EXHALED AIR. HOW DO WE KNOW?

DOES ANYONE KNOW WHAT HAS TAKEN THE PLACE OF THE OXYGEN IN OUR EXHALED AIR?

OUR EXHALED BREATH HAS MOSTLY CARBON DIOXIDE IN IT. (Write "carbon dioxide" on the chalkboard.) OUR INHALED BREATH HAS MOSTLY OXYGEN IN IT. (Write "oxygen" on the chalkboard.)

TEACHING STRATEGIES

Students do not recall the meaning of
control, remind them that it is something
to compare other parts of the experiment

IN THE NEXT ACTIVITY (5-23) WE PUT A LID ON THE
JAR TO MAKE THE CANDLE GO OUT. WHY DID THAT
HAPPEN?

DOES A CANDLE NEED IN ORDER TO BURN?

DOES THE CANDLE IN JAR B GO OUT?

DOES THE CANDLE IN JAR B GO OUT WITHOUT A
LID WHEN THE CANDLE IN OUR OTHER ACTIVITY
GOES OUT ONLY WHEN WE PUT A LID ON THE JAR?

THE AIR WE PUT IN JAR B (point to Jar B) WAS
DIFFERENT FROM THE AIR WE BREATHE OUT. THE AIR IN
JAR A (point to Jar A) AND IN OUR LAST
ACTIVITY WAS INHALED AIR, AIR WE BREATHE
OUT. IS THERE A DIFFERENCE BETWEEN THE AIR IN
THE JARS?

LESS OXYGEN IN EXHALED AIR. HOW DO
WE KNOW?

DOES ANYTHING WE KNOW WHAT HAS TAKEN THE PLACE OF
OXYGEN IN OUR EXHALED AIR?

DOES OUR BREATH HAVE MOSTLY CARBON DIOXIDE
(write "carbon dioxide" on the chalk-
board.) OUR INHALED BREATH HAS MOSTLY OXYGEN
(write "oxygen" on the chalkboard.)

ANTICIPATED STUDENT BEHAVIORS

Students should:

--recall Activity 5-23 and respond, "It ran out of
air," "It didn't have enough oxygen."

--recall Activity 5-23 and respond, "Oxygen."

--respond, "It didn't have any oxygen," "There
was something different in the air," "It didn't
have enough air."

--respond, "There was different air in Jar B."

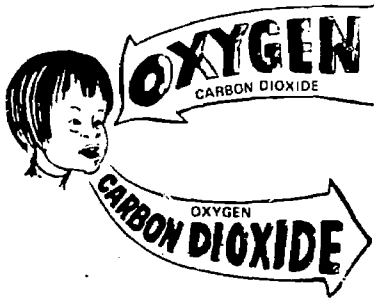
--infer that since the exhaled air put out the
flame there must be less oxygen in exhaled air.

--recall that the exhaled air put out the flame.

--speculate on what might take the place of oxygen.

MATERIALS

Diagram 5-10



TEACHING STRATEGIES

WE COULD DRAW A PICTURE THAT WOULD HELP US SEE THIS.

Draw a picture similar to Diagram 5-10 on the chalkboard. Discuss the drawing emphasizing that air breathed in is made mostly of oxygen.

TO SHOW THAT THE AIR WE BREATHE IN HAS A LOT OF OXYGEN IN IT, AND ONLY A LITTLE CARBON DIOXIDE, WE WROTE THE WORD OXYGEN WITH BIG LETTERS AND THE WORD CARBON DIOXIDE WITH SMALL LETTERS.

AIR WE BREATHE OUT IS MADE MOSTLY OF CARBON DIOXIDE. WRITE CARBON DIOXIDE IN LARGE LETTERS.

WHY DID WE MAKE THE WORD CARBON DIOXIDE SO BIG?

WHY DID WE MAKE THE WORD OXYGEN SO SMALL?

When students have thoroughly discussed the drawing and its significance, continue by saying:

NOW WE CAN BETTER EXPLAIN WHAT HAPPENED IN OUR EXPERIMENTS.

Place Jar A and Jar B where they can be seen easily by all students. Have several students take turns explaining why the candle went out in Jar B, why the candle did not go out in Jar A, and why the candle went out in Activity 5-23 when the lid was put on the jar.

If some students still do not understand the difference between inhaled and exhaled air, review the experiment and the drawing again.

TEACHING STRATEGIES

W A PICTURE THAT WOULD HELP US

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xygen.

THE AIR WE BREATHE IN HAS A LOT
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nd why the candle went out in Activity
was put on the jar.

ill do not understand the difference
led air, review the experiment and

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-24

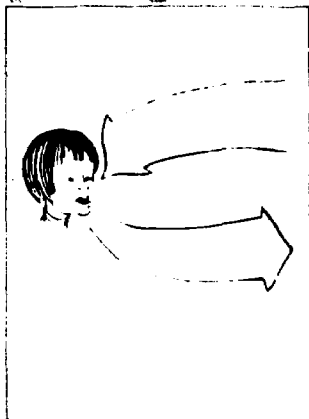
Students should:

--respond, "To show there is a lot of it in the
air we breathe out."

--respond, "To show that there is only a little
of it in the air we breathe out."

--indicate their understanding of the components
of inhaled and exhaled air by explaining what
happened and why it happened in each jar.

Worksheet 5-12



Clues to Success

Distribute Worksheet 5-12 to each of the students. Direct them to write their names and the date on the top of the page.

On the chalkboard, write:

CARBON DIOXIDE
OXYGEN

carbon dioxide
oxygen

Be sure there is a distinct difference in the size of the letters.

Also write on the chalkboard "inhaled air" and "exhaled air."

Say:

LET'S SEE IF YOU CAN REMEMBER SOME OF THE
THINGS ABOUT AIR THAT WE'VE TALKED ABOUT.

Instruct the students to label each bubble of air as inhaled or exhaled air.

Then instruct the students to write each one of the four words written on the chalkboard in the appropriate air bubble. Remind them that the size of the letters is different and that the difference should also show on their papers.

TEACHING STRATEGIES

s

sheet 5-12 to each of the students.
write their names and the date on the top

rd, write:

XIDE carbon dioxide
 oxygen

s a distinct difference in the size of the

ne chalkboard "inhaled air" and "exhaled

IF YOU CAN REMEMBER SOME OF THE
UT AIR THAT WE'VE TALKED ABOUT.

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ed air.



**WORK
TIME**

e students to write each one of the four
the chalkboard in the appropriate air
them that the size of the letters is
at the difference should also show on

ANTICIPATED STUDENT BEHAVIORS

students should:

--label the top bubble as inhaled air and the bottom
bubble as exhaled air.

--write "OXYGEN" and "carbon dioxide" in the top
bubble and "CARBON DIOXIDE" and "oxygen" in the
bottom bubble.

MATERIALS

TEACHING STRATEGIES

Collect the papers. Discuss the correct answers with the students. If, after correcting the students' papers, you notice that some students are still uncertain about these concepts, help them individually before continuing with the next activity. Allow students to make the necessary corrections on their papers before the period ends or at some other appropriate time.



s. Discuss the correct answers with the teacher after correcting the students' papers, you should discuss with the students if they are still uncertain about these questions individually before continuing with the next activity.
Allow students to make the necessary corrections to their papers before the period ends or at an appropriate time.

Upon completion of this activity, each student should, as a minimum:

- have observed the experiment with Jars A and B.*
- be able to identify inhaled and exhaled air as being different from one another.*
- have completed Worksheet 5-12.*

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE E
ACTIVITY 5-24

Teacher _____

Activity name suggested by class:

BSCS USE:	Post	_____	Tally	_____	Rev	_____
-----------	------	-------	-------	-------	-----	-------

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes preparing for each day's science class						
4.	Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Did the experiment with the candles make clear the differences between inhaled and exhaled air? Yes No

--	--	--	--	--	--	--	--

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?
7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Did the experiment with the candles make clear the differences between inhaled and exhaled air? Yes No
13. Was the use of Diagram 5-10 helpful in identifying the major components of inhaled and exhaled air? Yes No
14. Were any students still having problems at the end of this activity? Yes No
If so, what problems were they having?

UNIT V, CORE E
ACTIVITY 5-24

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

7. Understand the composition of air.
9. Realize that substances are continually added to air.

Core E Objectives for the Student:

2. Identify oxygen and carbon dioxide as components of air.
3. Relate the cycling of oxygen and carbon dioxide to life processes.

ENVIRONMENTAL THEME:

Complementarity of Organisms and Environment,
Cyclic Nature of Processes

INQUIRY SKILLS:

Comparing

PROBLEM-SOLVING SKILLS:

Interpreting Results

PRACTICAL APPLICATION:

How the Body Works, Following Directions,
Manipulation of Materials

Activity 5-25. Testing for Carbon Dioxide and Oxygen

This activity will enable students to identify two important components of air. They will test for both oxygen and carbon dioxide, using two test solutions.



BSCS

- UNIT V. AIR AND WATER IN MY ENVIRONMENT
- CORE E. COMPONENTS OF AIR
- ACTIVITY 5-25. TESTING FOR CARBON DIOXIDE AND OXYGEN

ACTIVITY

Objectives for the Student:

Understand the composition of air.

Realize that substances are continually added to air.

Objectives for the Student:

Identify oxygen and carbon dioxide as components of air.

Relate the cycling of oxygen and carbon dioxide to life processes.

THEME:

Interdependence of Organisms and Environment, Nature of Processes

5:

g

LEARNING SKILLS:

Interpreting Results

APPLICATION:

Following Directions, Use of Materials

Testing for Carbon Dioxide and Oxygen

Enable students to identify two components of air. They will test for both carbon dioxide, using two test solutions.

During this activity, each student should:

- recall that oxygen is the most important component of inhaled air to man.
- recall that carbon dioxide is the most important component of exhaled air to man.
- perform the experiment to test for the presence of oxygen.
- perform the experiment to test for the presence of carbon dioxide.

MATERIALS

1% Methylene blue
1000 ml Beaker
Hydrosulfite crystals
Water pipe test chamber, 1 per pair of students
Vinyl tubing, 1/4-inch diameter, about 2 feet for each test chamber
Oxygen test solution in dropping bottles (See special instructions in Teaching Strategies column)
Carbon dioxide test solution in dropping bottles
Hand pump, 1 per pair of students
*Balloons, 1 per pair of students
*Rubber bands, 1 per pair of students
*Tall jar, about 32 ounces, 1 per pair of students
*Water
*Sink or bucket for rinsing water pipes
*Toothpicks
*Spoon

*Not furnished in materials kit

TEACHING STRATEGIES

Begin this activity by having the students recall the difference between inhaled and exhaled air.

Ask:

WHAT IS ONE THING WE FOUND IN THE AIR WE BREATHE?

HOW DOES THE AIR WE INHALE, OR BREATHE IN, DIFFER FROM THE AIR WE EXHALE, OR BREATHE OUT?

WHAT DID WE LEARN ABOUT OXYGEN FROM OUR EXPERIMENT WITH THE CANDLE?

Continue the discussion to reinforce the idea that we consume oxygen just as the candle did.

Then say:

WHAT ARE SOME THINGS WE COULD DO TO SEE IF OXYGEN IS IN THE AIR?

The oxygen test solution must be diluted and decolorized for this experiment. To obtain the proper dilution of the oxygen test solution, add ten drops of the 1 percent methylene blue from your kit to 500 ml of water in a beaker. Then, immediately prior to use, add a minute amount of sodium hydrosulfite to turn the diluted methylene blue colorless. To do this, add only the quantity of powdered sodium hydrosulfite which can be

TEACHING STRATEGIES

Activity by having the students recall the difference between inhaled and exhaled air.

ONE THING WE FOUND IN THE AIR WE BREATHE?

THE AIR WE INHALE, OR BREATHE IN, DIFFER FROM THE AIR WE EXHALE, OR BREATHE OUT?

WHAT DO WE LEARN ABOUT OXYGEN FROM OUR EXPERIMENT WITH THE CANDLE?

Use a class discussion to reinforce the idea that we need oxygen just as the candle did.

SOME THINGS WE COULD DO TO SEE IF OXYGEN IS IN THE AIR?

The solution must be diluted and decolorized before use. To obtain the proper dilution of the solution, add ten drops of the 1 percent solution from your kit to 500 ml of water in a beaker. Immediately prior to use, add a minute amount of sodium hydrosulfite to turn the diluted solution colorless. To do this, add only the powdered sodium hydrosulfite which can be

ANTICIPATED STUDENT BEHAVIORS

Students should:

--recall, "Oxygen."

--recall that the air we breathe in is composed mainly of oxygen, and the air we breathe out contains more carbon dioxide than oxygen.

--recall that the candle continued to burn until the jar was covered. When the oxygen was used up, the candle went out. Infer that just as the candle needs oxygen to burn, we need it to live.

--perhaps suggest different ways to find out if oxygen is in the air.

MATERIALS

TEACHING STRATEGIES

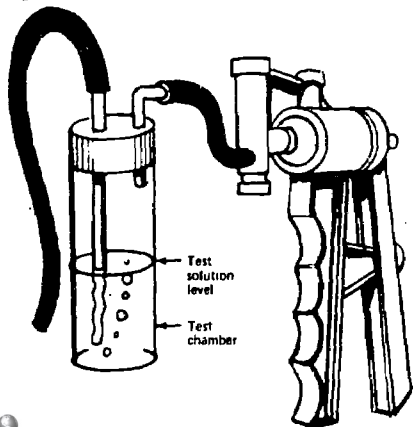
picked up on a toothpick while constantly stirring the solution with a spoon. If this addition does not turn the blue solution colorless, add another toothpick measure of sodium hydrosulfite while stirring. Repeat until the solution is colorless.

Hold up the oxygen test solution (colorless methylene blue), and say:

YOU MADE SOME GOOD SUGGESTIONS ABOUT WAYS TO FIND OUT IF OXYGEN IS IN THE AIR. WOULD YOU LIKE TO SEE HOW A SCIENTIST MIGHT DO IT? THIS IS THE TEST SOLUTION HE MIGHT USE TO TEST FOR OXYGEN. IF OXYGEN IS PRESENT IN THE AIR THE SOLUTION WILL TURN BLUE.

WHAT IS A TEST SOLUTION?

Diagram 5-11



Distribute the water pipes, oxygen test solution, and hand pump to each student pair. Give the following directions, one at a time, to the students.

1. Fill the water pipe chamber with water up to the mark. (Refer to Diagram 5-11.)
2. Add an equal volume of the oxygen test solution to the water.



SAVE EXCE
SOLUTION FOR A

TEACHING STRATEGIES**ANTICIPATED STUDENT BEHAVIORS**ACTIVITY
5-25

toothpick while constantly stirring the
solution. If this addition does not turn
colorless, add another toothpick
of sodium hydrosulfite while stirring. Repeat
until the solution is colorless.

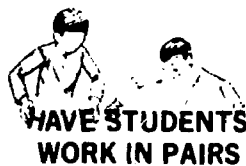
Prepare a test solution (colorless methylene.

Make GOOD SUGGESTIONS ABOUT WAYS TO FIND
OXYGEN IS IN THE AIR. WOULD YOU LIKE TO
KNOW WHAT A CHEMIST MIGHT DO IT? THIS IS THE
QUESTION HE MIGHT USE TO TEST FOR OXYGEN.
WHAT IS PRESENT IN THE AIR THE SOLUTION
TESTS FOR.

TEST SOLUTION?

Students should:

--recall that a test solution is used to find out if
a certain substance is present.



Prepare test tubes, oxygen test solution, and hand
out pair. Give the following directions,
to the students.

Fill the test tube chamber with water up to the
line (see Diagram 5-11.)

Add a small volume of the oxygen test solution to

--fill the test chamber with water.

--put two drops of the test solution in the water.

SAVE EXCESS TEST
SOLUTION FOR ACTIVITY 5-26

MATERIALS

TEACHING STRATEGIES

3. Attach a short piece of vinyl tubing to the bent tube of the test chamber.
4. Attach the hand pump to the other end of the tubing. (See Diagram 5-11.)
5. Do not attach any vinyl tubing to the straight tube on the cap. Cap the test chamber.

Explain to the students that when they work the pump, it will draw air through the water pipe. In doing so, the fresh air will pass through the test solution. If oxygen is present in the air, the solution will turn blue.

6. Direct one of the students in each pair (the other will have a turn to pump later during the carbon dioxide test) to begin to draw air through the chamber by slowly working the hand pump. Caution the student to pump slowly so as not to draw test solution into their tubing and into the pump.

The test solution will slowly turn blue as a continual supply of oxygen is brought in contact with it.

Ask:

WHAT DID WE PUMP THROUGH THE TEST SOLUTION?

WHAT HAPPENED TO THE TEST SOLUTION IN THE WATER PUMP?

WHAT DOES THIS TELL US ABOUT THE AIR WE BREATHE?

Explain that this test solution will be used later in another activity (Activity 5-26).

Now direct the students' attention to the air we breathe out, or exhale.

TEACHING STRATEGIES

a short piece of vinyl tubing to the bent
the test chamber.

the hand pump to the other end of the tubing.
agram 5-11.)

attach any vinyl tubing to the straight
the cap. Cap the test chamber.

e students that when they work the pump, it
through the water pipe. In doing so, the
pass through the test solution. If
ent in the air, the solution will turn blue.

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ve a turn to pump later during the carbon
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by slowly working the hand pump. Caution
ent to pump slowly so as not to draw test
into their tubing and into the pump.

ion will slowly turn blue as a continual
en is brought in contact with it.

WE PUMP THROUGH THE TEST SOLUTION?

ENED TO THE TEST SOLUTION IN THE WATER

THIS TELL US ABOUT THE AIR WE BREATHE?

his test solution will be used later in
ty (Activity 5-26).

students' attention to the air we breathe

ANTICIPATED STUDENT BEHAVIORS

Students should:

--attach the tubing.

--attach the hand pump.

--slowly work the hand pump.

--respond, "Regular air," "Oxygen," "Air we breathe."

--indicate that it turned blue.

--respond, "It contains oxygen."

MATERIALS

TEACHING STRATEGIES

Ask:

WHAT DO WE KNOW FOR SURE ABOUT THE AIR WE EXHALE,
OR BREATHE OUT?

Say:

WE DISCOVERED THAT OUR EXHALED BREATH WAS
DIFFERENT FROM OUR INHALED BREATH. HOW WAS
IT DIFFERENT?

WHAT COULD WE DO TO PROVE THAT THERE IS CARBON
DIOXIDE IN THE AIR?

Hold up the carbon dioxide test solution (bromthymol blue)
and say:

THIS IS THE TEST SOLUTION FOR CARBON DIOXIDE. IF
THERE IS CARBON DIOXIDE PRESENT IN THE AIR, IT WILL
TURN YELLOW.

HOW COULD WE GET A SAMPLE OF EXHALED BREATH?

If students do not suggest a set up similar
to the one in Activity 5-24, ask:

HOW DID WE GET THE SAMPLE OF EXHALED AIR IN
OUR LAST ACTIVITY WHEN WE PUT OUT THE CANDLE
AS WE LOWERED IT INTO THE JAR?

WHERE DID THE AIR IN THAT BALLOON COME FROM?

WAS IT EXHALED BREATH OR INHALED BREATH THAT WAS
IN THE BALLOON?

TEACHING STRATEGIES

KNOW FOR SURE ABOUT THE AIR WE EXHALE,
OUT?

ED THAT OUR EXHALED BREATH WAS
FROM OUR INHALED BREATH. HOW WAS
?

WE DO TO PROVE THAT THERE IS CARBON
DIOXIDE IN THE AIR?

Carbon dioxide test solution (bromthymol blue)

TEST SOLUTION FOR CARBON DIOXIDE. IF
CARBON DIOXIDE PRESENT IN THE AIR, IT WILL

HOW DO WE GET A SAMPLE OF EXHALED BREATH?

Students do not suggest a set up similar
to the one in Activity 5-24, ask:

HOW DO WE GET THE SAMPLE OF EXHALED AIR IN
THE JAR? AT ACTIVITY WHEN WE PUT OUT THE CANDLE
AND LOWERED IT INTO THE JAR?

WHERE DOES THE AIR IN THAT BALLOON COME FROM?

WHERE DOES THE AIR IN THAT BALLOON COME FROM?
FROM THE AIR OR INHALED BREATH THAT WAS

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-25

Students should:

--respond, "It's different," "It made the candle
go out," "It contains carbon dioxide."

--recall Activity 5-24 and respond, "It had less
oxygen," "It has carbon dioxide."

--suggest using a test solution to do an experiment
similar to the oxygen test.

--suggest blowing up a balloon and emptying it
into a jar, as done in Activity 5-24.

--recall that they inflated a balloon and let out
the air into a jar.

--state that since they inflated the balloon, the
air came from them.

--recall that it was exhaled breath.

MATERIALS

TEACHING STRATEGIES

IF WE TESTED THE AIR FROM THE BALLOON WITH OUR WATER PIPE AND PUMP, WHAT DO YOU THINK WOULD HAPPEN TO THE TEST SOLUTION?

WHY WOULD THE TEST SOLUTION TURN YELLOW?

Tell the students that during this test they will use the pump to pull the air from the jar through the test solution, and if there is carbon dioxide in that air the solution will turn yellow.

Give the following directions, one at a time, to the students.

1. Rinse out the test chamber in a sink or bucket of water.
2. Fill the chamber to the top mark with water and add three drops of carbon dioxide test solution.

SAVE
SOLUTION

3. Attach another piece of vinyl tubing to the long straight tube. (See Diagram 5-11.)
4. Prepare a sample of exhaled air using the balloon method as described in Activity 5-24 and shown in Diagram 5-9. Slowly release the exhaled air from the balloon into the jar. (One student should carry out this step while the other member of the pair carries out Step 5.)

TEACHING STRATEGIES

STED THE AIR FROM THE BALLOON WITH OUR
PE AND PUMP, WHAT DO YOU THINK WOULD
O THE TEST SOLUTION?

D THE TEST SOLUTION TURN YELLOW?

ents that during this test they will use the
the air from the jar through the test
if there is carbon dioxide in that air the
turn yellow.

owing directions, one at a time, to the

ut the test chamber in a sink or bucket
f.

e chamber to the top mark with water and add
rops of carbon dioxide test solution.

another piece of vinyl tubing to the long
tube. (See Diagram 5-11.)

a sample of exhaled air using the balloon
s described in Activity 5-24 and shown in
5-9. Slowly release the exhaled air from
oon into the jar. (One student should
t this step while the other member of the
ries out Step 5.)

ANTICIPATED STUDENT BEHAVIORS

Students should:

--predict that the test solution would turn yellow.

--respond, "Because the air has carbon dioxide in
it."

--rinse the test chamber.

--fill the test chamber with water and add the
test solution.

SAVE EXCESS TEST
SOLUTION FOR ACTIVITY 5-26

--attach the tubing.

--prepare a sample of exhaled air.

MATERIALS

TEACHING STRATEGIES

5. Quickly put the free end of the vinyl tubing into the bottom part of the jar containing the exhaled breath and begin to pump.

In a very short time, the test solution should turn from blue to yellow, indicating the presence of carbon dioxide.

Then ask:

WHAT DID WE PUMP THROUGH THE TEST SOLUTION?

WHAT HAPPENED TO THE TEST SOLUTION IN THE WATER PIPE?

WHAT DOES THIS TELL US ABOUT THE AIR WE BREATHE OUT OR EXHALE?

WHAT DO WE KNOW FOR SURE ABOUT THE DIFFERENCE BETWEEN INHALED AND EXHALED AIR?

TEACHING STRATEGIES

the free end of the vinyl tubing into part of the jar containing the exhaled air. Begin to pump.

When the test solution should turn from blue to yellow, indicating the presence of carbon dioxide.

PUMP THROUGH THE TEST SOLUTION?

TO THE TEST SOLUTION IN THE WATER

IS TELL US ABOUT THE AIR WE BREATHE IN?

HOW FOR SURE ABOUT THE DIFFERENCE BETWEEN INHALED AND EXHALED AIR?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-25

Students should:

--put the vinyl tubing into the jar and begin to pump.

--respond, "Carbon dioxide," "Exhaled air," "Air we breathe out."

--indicate that it turned from blue to yellow.

--respond, "It has carbon dioxide in it," "It's different air," "It's different from the air we breathe in."

--recall Activity 5-24 and indicate that inhaled air is mostly oxygen and exhaled air is mostly carbon dioxide.

Upon completion of this activity, each student should, as a minimum:

--recall that inhaled air is different from exhaled air.

--have performed the experiment to test for the presence of oxygen.

--have performed the experiment to test for the presence of carbon dioxide.

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE E
ACTIVITY 5-25

Teacher _____

Activity name suggested by class:

BSCS USE:	Post _____	Tally _____	Rev _____
-----------	------------	-------------	-----------

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes preparing for each day's science class						
4.	Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Were the instructions for the carbon dioxide and oxygen tests clear? Yes No

13. Did the students have any difficulties working the pumps correctly? Yes No

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?
7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:


12. Were the instructions for the carbon dioxide and oxygen tests clear? Yes No
13. Did the students have any difficulties working the pumps correctly? Yes No
Comment.
14. Were students able to relate the change in color of the test solution to the presence of oxygen or carbon dioxide? Yes No
15. Did you have any problems mixing the oxygen test solution? Yes No

UNIT V, CORE E
ACTIVITY 5-25

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

BSCS Evaluation: EMH Feedback Form 1

B.  at anecdotes of student learning did you see or hear in your classroom?

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

7. Understand the composition of air
9. Realize that substances are continually added to air.

Core E Objectives for the Student:

2. Identify oxygen and carbon dioxide as components of air.
3. Relate the cycling of oxygen and carbon dioxide to life processes.

ENVIRONMENTAL THEME:

Complementarity of Organisms and Environment,
Cyclic Nature of Processes

INQUIRY SKILLS:

Inferring

PROBLEM-SOLVING SKILLS:

Drawing Conclusions, Explaining

PRACTICAL APPLICATION:

Realizing the Importance of Preserving
Plants, Verbal Communication

Activity 5-26. Natural Sources of Oxygen and Carbon Dioxide

This activity is designed to identify sources of carbon dioxide and oxygen in the environment. After setting up the snail-elodea experiment, the students will be able



BSCS

UNIT V. AIR AND WATER IN
MY ENVIRONMENT

CORE E. COMPONENTS OF AIR

ACTIVITY 5-26. NATURAL SOURCES OF
OXYGEN AND CARBON
DIOXIDE

ACTIVITY

Goals for the Student:

Understand the composition of air

Realize that substances are
continually added to air.

Objectives for the Student:

Identify oxygen and carbon dioxide
as components of air.

Relate the cycling of oxygen and
carbon dioxide to life processes.

GENERAL THEME:

Interdependence of Organisms and Environment,
Nature of Processes

LEARNING

OBJECTIVES:

LEARNING SKILLS:

Conclusions, Explaining

APPLICATION:

Understanding the Importance of Preserving
Verbal Communication

Natural Sources of Oxygen and Carbon Dioxide

Designed to identify sources of carbon
in the environment. After setting up
experiment, the students will be able

During this activity, each student should:

- recall that oxygen and carbon dioxide are the
components of air that are important to man.*
- set up the snail and Elodea experiment.*
- predict which tubes will indicate carbon dioxide
and which oxygen when tested.*

MATERIALS

TEACHING STRATEGIES

to infer that animals are dependent on plants for oxygen and that plants are dependent on animals for carbon dioxide. They should also be able to relate this interdependence to the total environment.

Worksheet 5-13

Slide 5-50

Test tubes, 4 per student group

Rubber stoppers, 4 per student group

Test tube rack, 1 per student group

Bromthymol blue solution, (carbon dioxide test solution)

Methylene blue, decolorized, (oxygen test solution)

*Small water snails, 2 per student group

*Elodea (*Anacharis*) is a dish of water, 2 pieces per student group

*Pond or aquarium water, 1/2 gallon

*Desk lamp with 100-watt bulb, 1 or more

*Household ammonia

*Masking tape

*Not furnished in materials kit

Teacher Preparation:

1. Elodea (el-uh-DEE-uh) for this activity must be obtained fresh from a pet shop or dime store that sells aquarium supplies. Plants should be bright green in color.
2. Obtain pond water from any pond or use water from an aquarium or classroom pond that has been set up for a long time. Any pet shop should be willing to supply you with a half-gallon of aged water. If you are not able to acquire any pond or aquarium water, see Number 2 in the Teacher Preparation Section of Activity 5-20.
3. CAUTION: This activity demonstrates that the carbon dioxide exhaled by the snail will cause the pond water to turn yellow when tested with the carbon dioxide test solution. To insure that this will work, there must be NO carbon dioxide in the pond water at the beginning of the experiment. THE WATER MUST TEST BLUE!

TEACHING STRATEGIES

*animals are dependent on plants for oxygen
plants are dependent on animals for carbon
dioxide. Students should also be able to relate this
to the total environment.*

Preparation:

Water (el-uh-DEE-uh) for this activity must be
fresh from a pet shop or dime store
or aquarium supplies. Plants should be
bright green in color.

Pond water from any pond or use water
from an aquarium or classroom pond that has
been set up for a long time. Any pet shop
should be willing to supply you with a half-
gallon of aged water. If you are not able
to get pond or aquarium water, see
instructions in the Teacher Preparation Section
of this activity 5-20.

This activity demonstrates that the
carbon dioxide exhaled by the snail
will cause the pond water to turn
yellow when tested with the carbon
dioxide test solution. To insure
that this will work, there must be
NO carbon dioxide in the pond water
at the beginning of the experiment.
THE WATER MUST TEST BLUE!

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- describe what happened in each tube during the
carbon dioxide test.*
- describe what happened in each tube during the
oxygen test.*
- infer that plants give off oxygen.*
- infer that animals give off carbon dioxide.*
- appreciate the interdependence of plants and
animals.*
- explain the phrase, "Have you thanked a green
plant today?"*
- complete Worksheet 5-13.*

MATERIALS

TEACHING STRATEGIES

To test, add six drops of test solution to a test tube sample of the pond water. If the sample turns green or blue, use the pond water as is. If the sample of pond water turns yellow, there is carbon dioxide present which must be removed before starting. To remove, add two drops of household ammonia to the whole supply of pond water. Take a test tube sample and again test for color with three drops of carbon dioxide test solution. If still yellow, add two more drops of ammonia to the water.

Begin by saying:

WHERE DO CARBON DIOXIDE AND OXYGEN COME FROM?

DO YOU THINK YOU COULD FIND CARBON DIOXIDE AND OXYGEN ANYWHERE ELSE?

HOW COULD YOU FIND OUT IF CARBON DIOXIDE AND OXYGEN COULD BE FOUND ANYWHERE ELSE?

WE'RE GOING TO USE A PLANT AND AN ANIMAL TO SEE IF THEY WILL GIVE US SOME CLUES TO OTHER PLACES THAT MIGHT PRODUCE OXYGEN AND CARBON DIOXIDE.

LET'S SEE IF THERE IS ANY CARBON DIOXIDE IN THE POND WATER.

WHAT COLOR WILL THE POND WATER TURN IF THERE IS CARBON DIOXIDE IN IT?

Test a sample of pond water with six drops of test solution and ask:

TEACHING STRATEGIES

To test, add six drops of test solution to a test tube sample of the pond water. If the sample turns green or blue, use the pond water as is. If the sample of pond water turns yellow, there is carbon dioxide present which must be removed before starting. To remove, add two drops of household ammonia to the whole supply of pond water. Take a test tube sample and again test for color with three drops of carbon dioxide test solution. If still yellow, add two more drops of ammonia to the water.

Begin by saying:

WHERE DO CARBON DIOXIDE AND OXYGEN COME FROM?

DO YOU THINK YOU COULD FIND CARBON DIOXIDE AND OXYGEN ANYWHERE ELSE?

HOW COULD YOU FIND OUT IF CARBON DIOXIDE AND OXYGEN COULD BE FOUND ANYWHERE ELSE?

WE'RE GOING TO USE A PLANT AND AN ANIMAL TO SEE IF THEY WILL GIVE US SOME CLUES TO OTHER PLACES THAT MIGHT PRODUCE OXYGEN AND CARBON DIOXIDE.

LET'S SEE IF THERE IS ANY CARBON DIOXIDE IN THE POND WATER.

WHAT COLOR WILL THE POND WATER TURN IF THERE IS CARBON DIOXIDE IN IT?

Test a sample of pond water with six drops of test solution and ask:

ANTICIPATED STUDENT B

Students should:

--recall Activities 5-22 that
"From air."

--speculate on other sources
and oxygen.

--suggest an experiment to
dioxide and oxygen come from

--respond, "It turns yellow"

TEACHING STRATEGIES

dd six drops of test solution to a test
e of the pond water. If the sample turns
ue, use the pond water as is. If the
pond water turns yellow, there is carbon
esent which must be removed before
To remove, add two drops of household
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e sample and again test for color with
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ow, add two more drops of ammonia to

BON DIOXIDE AND OXYGEN COME FROM?

YOU COULD FIND CARBON DIOXIDE AND
ERE ELSE?

U FIND OUT IF CARBON DIOXIDE AND
BE FOUND ANYWHERE ELSE?

TO USE A PLANT AND AN ANIMAL
EY WILL GIVE US SOME CLUES TO
THAT MIGHT PRODUCE OXYGEN AND
DE.

THERE IS ANY CARBON DIOXIDE IN
ER.

LL THE POND WATER TURN IF THERE
OXIDE IN IT?

ond water with six drops of test

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-26

Students should:

--recall Activities 5-22 through 5-25 and respond,
"From air."

--speculate on other sources of carbon dioxide
and oxygen.

--suggest an experiment to find out where carbon
dioxide and oxygen come from.

--respond, "It turns yellow."

MATERIALS

TEACHING STRATEGIES

IS THERE CARBON DIOXIDE IN THE WATER AS WE START THE TEST?

HOW DO YOU KNOW?

Hold up the oxygen test solution, which was saved from the previous activity, and say:

HERE IS OXYGEN TEST SOLUTION. WHAT COLOR WOULD THE POND WATER TURN IF IT CONTAINED OXYGEN?

Test a sample of pond water using an equal amount of test solution and water.

DOES THE POND WATER CONTAIN OXYGEN AS WE START THE EXPERIMENT?

Divide the class into four groups. Two groups will conduct the oxygen portion of the activity and the other two groups will experiment with carbon dioxide. Distribute masking tape, four test tubes, and four stoppers to each group. Have each group do the following:

1. Number the test tubes from one to four.
2. Half-fill each tube with pond or aquarium water.
3. To Tube 1 add a small snail.
4. To Tube 2 add a fresh leafy stem of elodea.
5. To Tube 3 add elodea and a small snail. (See Diagram 5-12.)

WHAT SHOULD WE ADD TO THIS LAST TUBE?

TEACHING STRATEGIES

ANTICIPATED STUD

IS THERE CARBON DIOXIDE IN THE WATER AS WE
START THE TEST?

HOW DO YOU KNOW?

Hold up the oxygen test solution, which was saved from
the previous activity, and say:

HERE IS OXYGEN TEST SOLUTION. WHAT COLOR WOULD
THE POND WATER TURN IF IT CONTAINED OXYGEN?

Test a sample of pond water using an equal amount of test
solution and water.

DOES THE POND WATER CONTAIN OXYGEN AS WE START
THE EXPERIMENT?

Divide the class into four groups. Two groups will
conduct the oxygen portion of the activity and the
other two groups will experiment with carbon dioxide.
Distribute masking tape, four test tubes, and four
stoppers to each group. Have each group do the
following:

1. Number the test tubes from one to four.
2. Half-fill each tube with pond or aquarium water.
3. To Tube 1 add a small snail.
4. To Tube 2 add a fresh leafy stem of elodea.
5. To Tube 3 add elodea and a small snail. (See
Diagram 5-12.)

WHAT SHOULD WE ADD TO THIS LAST TUBE?

Students should:

--respond, "No."

--relate the blue color to
dioxide.

--recall that the test sol

--respond, "Yes."

--suggest leaving this tube
would have something to
with.

TEACHING STRATEGIES

CARBON DIOXIDE IN THE WATER AS WE TEST?

KNOW?

When test solution, which was saved from activity, and say:

OXYGEN TEST SOLUTION. WHAT COLOR WOULD WATER TURN IF IT CONTAINED OXYGEN?

Use pond water using an equal amount of test water.

DOES POND WATER CONTAIN OXYGEN AS WE START THE TEST?

Divide students into four groups. Two groups will perform one portion of the activity and the other two will experiment with carbon dioxide. Using tape, four test tubes, and four test tubes per group. Have each group do the

Label the test tubes from one to four.

Fill each tube with pond or aquarium water.

Add a small snail.

Add a fresh leafy stem of elodea.

Add elodea and a small snail. (See procedure 12.)

WHAT DO WE ADD TO THIS LAST TUBE?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "No."

--relate the blue color to the absence of carbon dioxide.

--recall that the test solution turns blue.

--respond, "Yes."

--suggest leaving this tube with water only so they would have something to compare the other tubes with.

MATERIALS

TEACHING STRATEGIES

IS THERE CARBON DIOXIDE IN THE WATER AS WE START THE TEST?

HOW DO YOU KNOW?

Hold up the oxygen test solution, which was saved from the previous activity, and say:

HERE IS OXYGEN TEST SOLUTION. WHAT COLOR WOULD THE POND WATER TURN IF IT CONTAINED OXYGEN?

Test a sample of pond water using an equal amount of test solution and water.

DOES THE POND WATER CONTAIN OXYGEN AS WE START THE EXPERIMENT?

Divide the class into four groups. Two groups will conduct the oxygen portion of the activity and the other two groups will experiment with carbon dioxide. Distribute masking tape, four test tubes, and four stoppers to each group. Have each group do the following:

1. Number the test tubes from one to four.
2. Half-fill each tube with pond or aquarium water.
3. To Tube 1 add a small snail.
4. To Tube 2 add a fresh leafy stem of elodea.
5. To Tube 3 add elodea and a small snail. (See Diagram 5-12.)

WHAT SHOULD WE ADD TO THIS LAST TUBE?

TEACHING STRATEGIES

CARBON DIOXIDE IN THE WATER AS WE
TEST?

DO YOU KNOW?

Oxygen test solution, which was saved from
activity, and say:

OXYGEN TEST SOLUTION. WHAT COLOR WOULD
WATER TURN IF IT CONTAINED OXYGEN?

of pond water using an equal amount of test
water.

POND WATER CONTAIN OXYGEN AS WE START
EXPERIMENT?

Divide into four groups. Two groups will
do the oxygen portion of the activity and the
other two groups will experiment with carbon dioxide.
Using masking tape, four test tubes, and four
pipettes for each group. Have each group do the

number the test tubes from one to four.

1. Fill each tube with pond or aquarium water.

2. Add a small snail.

3. Add a fresh leafy stem of elodea.

4. Add elodea and a small snail. (See
pages 5-12.)

WHAT SHOULD WE ADD TO THIS LAST TUBE?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "No."

--relate the blue color to the absence of carbon
dioxide.

--recall that the test solution turns blue.

--respond, "Yes."

--suggest leaving this tube with water only so they
would have something to compare the other tubes
with.

MATERIALS

TEACHING STRATEGIES

WHAT NAME DO WE GIVE TO SOMETHING WE USE AS A COMPARISON?

GIVE S
TIME
TO
THINK

6. Have the groups of students testing for oxygen fill the remainder of each test tube with oxygen test solution.
7. Have the students who are testing for carbon dioxide add six drops of carbon dioxide test solution to each test tube. Add pond water to each tube to fill completely the remaining space in each tube.

Direct the students to continue preparing the experiment.

8. Place a rubber stopper in each test tube.
9. When all tubes are stoppered, place them in a test tube rack.
10. Arrange a desk lamp about six inches from the tubes so that the light falls directly on the tubes.

Ask:

WHAT IS IN TUBE 1?

WHAT IS IN TUBE 2?

WHAT IS IN TUBE 3?

TEACHING STRATEGIES

DO WE GIVE TO SOMETHING WE USE AS A
?

**GIVE STUDENTS
TIME
TO
THINK**

groups of students testing for
all the remainder of each test
oxygen test solution.

students who are testing for carbon
add six drops of carbon dioxide test
to each test tube. Add pond water to
to fill completely the remaining
each tube.

ents to continue preparing the experiment.

ubber stopper in each test tube.

tubes are stoppered, place them in a
rack.

desk lamp about six inches from the
that the light falls directly on the

TUBE 1?

TUBE 2?

TUBE 3?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-26

Students should:

--identify the comparison tube as a control.

--prepare the experimental setup as directed.

--identify Tube 1 as containing a snail.

--identify Tube 2 as containing a plant.

--identify Tube 3 as containing a snail and a
plant.

MATERIALS

TEACHING STRATEGIES

WHAT IS IN TUBE 4?

TOMORROW WE WILL OBSERVE THE TEST TUBE FOR CHANGES IN THE CARBON DIOXIDE AND OXYGEN TEST SOLUTIONS TO SEE IF ANY OF THE TUBES CONTAIN CARBON DIOXIDE, OXYGEN, OR BOTH.

WHAT TEST TUBES DO YOU THINK WILL HAVE CARBON DIOXIDE IN THEM TOMORROW?

Record the students' predictions on the chalkboard.

WHICH TEST TUBES DO YOU THINK WILL HAVE OXYGEN IN THEM?

Record the students' predictions on the chalkboard. Save these predictions until the next day.

The test tube setup should remain undisturbed for about twenty-four hours.

The next day remind the students that two of the groups are testing their four tubes for oxygen and the other two teams are testing their four tubes for carbon dioxide.

Hold the bromthymol blue solution in front of the class and say:

THIS IS THE CARBON DIOXIDE TEST SOLUTION THAT WE PUT IN SOME OF THE TEST TUBES.

TEACHING STRATEGIES

IN TUBE 4?

WE WILL OBSERVE THE TEST TUBE FOR
IN THE CARBON DIOXIDE AND OXYGEN TEST
S TO SEE IF ANY OF THE TUBES CONTAIN
DIOXIDE, OXYGEN, OR BOTH.

ST TUBES DO YOU THINK WILL HAVE
DIOXIDE IN THEM TOMORROW?

udents' predictions on the chalkboard.

ST TUBES DO YOU THINK WILL HAVE OXYGEN

udents' predictions on the chalkboard. Save
ions until the next day.

setup should remain undisturbed for
four hours.



**WORK
TIME**

remind the students that two of the
sting their four tubes for oxygen and the
ns are testing their four tubes for carbon

thymol blue solution in front of the class

THE CARBON DIOXIDE TEST SOLUTION THAT
OF THE TEST TUBES.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--identify Tube 4 as containing only pond water.

--predict which tubes will test positive for
carbon dioxide.

--predict which tubes will test positive for
oxygen.

--recall Activity 5-25.

MATERIALS

TEACHING STRATEGIES

Ask :

HOW DOES THIS TEST SOLUTION TELL US THAT CARBON DIOXIDE IS PRESENT?

IN WHICH TEST TUBES DID WE PUT THIS TEST SOLUTION?

WAS THERE CARBON DIOXIDE IN THE POND WATER WHEN WE STARTED YESTERDAY?

WHAT COLOR WAS THE WATER IN THE TUBES?

WHICH TUBES CHANGED COLOR?

WHICH TUBES HAVE CARBON DIOXIDE IN THEM?

WHAT LIVING THING IS IN THE TUBE WHERE THE COLOR CHANGE OCCURRED?

WHY DID THE COLOR CHANGE IN THE TUBE WITH THE SNAIL IN IT?

WHY DIDN'T THE COLOR CHANGE IN TUBE 2?

WHY DIDN'T THE COLOR CHANGE IN TUBE 4?

IF THERE IS A SNAIL IN TUBE 3, WHY DIDN'T WE SEE A COLOR CHANGE?

TEACHING STRATEGIES

THIS TEST SOLUTION TELL US THAT CARBON
PRESENT?

TEST TUBES DID WE PUT THIS TEST SOLUTION?

CARBON DIOXIDE IN THE POND WATER WHEN
YESTERDAY?

WAS THE WATER IN THE TUBES?

CHANGED COLOR?

HAVE CARBON DIOXIDE IN THEM?

THING IS IN THE TUBE WHERE THE
E OCCURRED?

COLOR CHANGE IN THE TUBE WITH THE

THE COLOR CHANGE IN TUBE 2?

THE COLOR CHANGE IN TUBE 4?

A SNAIL IN TUBE 3, WHY DIDN'T WE

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-26

Students should:

--respond, "It turns yellow or yellow-green."

--respond with which tubes the carbon dioxide test
solution is in.

--respond, "No."

--recall the blue color.

--observe and respond accordingly. (The change
should be noted in Tube 1.)

--relate the change of color to the presence of
carbon dioxide and respond accordingly.
(Probably Tube 1.)

--respond, "Snail."

--infer that the carbon dioxide test solution is
being changed in color because the snail is
producing carbon dioxide.

--infer that there is no color change in Tube 2
because there was no carbon dioxide produced;
infer that no carbon dioxide accumulates in the
presence of elodea alone.

--infer that there is no color change in Tube 4
because there is nothing there to produce carbon
dioxide.

--respond, "I don't know."



GIV
TIM
TO
TH

LET'S REVIEW WHAT HAPPENED IN TUBE 3.

WHAT IS IN TUBE 3?

IS ANYTHING GIVING OFF CARBON DIOXIDE?

HOW DO WE KNOW?

THE TEST DID NOT SHOW CARBON DIOXIDE IN TUBE 3.
WHAT HAPPENED TO IT?

WE MADE PREDICTIONS ABOUT WHERE WE WOULD FIND
CARBON DIOXIDE. WHERE DID WE FIND IT?

Check the predictions made previously and listed on the
chalkboard.

WE FOUND OUT WHICH TUBES HAD CARBON DIOXIDE
PRESENT. NOW LET'S SEE WHICH HAVE OXYGEN
PRESENT.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

Students should:



**GIVE STUDENTS
TIME
TO
THINK**



VIEW WHAT HAPPENED IN TUBE 3.

IN TUBE 3?

ING GIVING OFF CARBON DIOXIDE?

E KNOW?

DID NOT SHOW CARBON DIOXIDE IN TUBE 3.
OPENED TO IT?

PREDICTIONS ABOUT WHERE WE WOULD FIND
OXIDE. WHERE DID WE FIND IT?

ictions made previously and listed on the

OUT WHICH TUBES HAD CARBON DIOXIDE
NOW LET'S SEE WHICH HAVE OXYGEN

--identify the snail and a plant.

--identify the snail as giving off carbon dioxide.

--recall that Tube 1 tested positive for carbon dioxide.

--speculate that the plant used up the carbon dioxide.

--respond, "In Tube 1."

--check their predictions.

MATERIALS

TEACHING STRATEGIES

Direct the other half of the student groups to get their test tubes. They will test the tubes for oxygen while the first half observes. Hold up the oxygen test solution before the class and say:

THIS IS OXYGEN TEST SOLUTION THAT WE PUT IN THESE TEST TUBES. WHAT HAPPENS TO IT IF OXYGEN IS PRESENT?

WAS THERE ANY OXYGEN IN THE POND WATER WHEN WE STARTED YESTERDAY?

Direct students to hold each tube against white paper to detect any color change. The more oxygen that is present, the deeper blue the solution will turn.

Then ask:

WHICH TUBES ARE NOW MOST BLUE?

WHICH TUBES HAVE OXYGEN IN THEM?

WHAT COLOR IS THE WATER IN TUBE 4?

WHAT DOES THIS TELL US ABOUT THE WATER?

TUBE 1 IS NOT AS BLUE AS THE OTHER TUBES. WHY?

WE SAW THAT THERE WAS OXYGEN IN THE WATER IN TUBE 4. WAS THE WATER IN TUBE 1 THE SAME AS THAT IN TUBE 4 WHEN WE STARTED?

TEACHING STRATEGIES

For half of the student groups to get their tubes they will test the tubes for oxygen while the teacher observes. Hold up the oxygen test tubes to the class and say:

OXYGEN TEST SOLUTION THAT WE PUT IN TUBES. WHAT HAPPENS TO IT IF OXYGEN

IS ANY OXYGEN IN THE POND WATER WHEN WE STARTED YESTERDAY?

How do you know? Hold each tube against white paper to observe color change. The more oxygen that is present, the deeper blue the solution will turn.

WHICH TUBES ARE NOW MOST BLUE?

DO THEY HAVE OXYGEN IN THEM?

IS THERE OXYGEN IN THE WATER IN TUBE 4?

WHAT DOES THIS TELL US ABOUT THE WATER?

IS TUBE 4 NOT AS BLUE AS THE OTHER TUBES. WHY?

WAS THERE OXYGEN IN THE WATER IN TUBE 4 BEFORE WE STARTED? IS THERE OXYGEN IN THE WATER IN TUBE 1 THE SAME AS IN TUBES 2, 3, AND 4 WHEN WE STARTED?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-26

Students should:

--recall Activity 5-25 and state that it will turn blue.

--respond, "Yes."

--state that Tubes 2, 3, and 4 are the most blue and that Tube 1 is clear.

--relate the blue color to the presence of oxygen and state that Tubes 2, 3, and 4 have oxygen in them.

--respond, "Blue."

--infer that there must have been oxygen in the water.

--indicate that because it is not as blue, there is not as much oxygen present.

--respond, "Yes," "They were the same."

MATERIALS

TEACHING STRATEGIES

WHERE DID THE OXYGEN GO IN TUBE 1?

WHY IS THE WATER BLUE IN TUBE 2?

WHAT IS IN TUBE 3?

WHAT HAPPENED IN TUBE 3?

WHAT DOES THE BLUE COLOR MEAN?

IF THE SNAIL USES UP OXYGEN, AS WE SAW IN TUBE 1, WHERE WOULD THE OXYGEN COME FROM THAT IS IN THIS TUBE?

Check the predictions made previously and listed on the chalkboard to see how many predictions were correct.

LET'S REVIEW WHAT HAPPENED IN THE TESTS.

WHAT GIVES OFF OXYGEN?

WHAT USES OXYGEN?

WHAT GIVES OFF CARBON DIOXIDE?

WHAT USES CARBON DIOXIDE?

WILL THE SNAIL IN TEST TUBE 1 OR THE ONE IN TEST TUBE 3 LIVE LONGER?

WHICH PLANT WOULD LIVE LONGER, THE ONE IN TEST TUBE 2 OR THE ONE IN TEST TUBE 3?

WHERE DOES OUR OXYGEN COME FROM?

TEACHING STRATEGIES

1. DID THE OXYGEN GO IN TUBE 1?

2. WAS THE WATER BLUE IN TUBE 2?

3. WAS THERE OXYGEN IN TUBE 3?

4. WHAT HAPPENED IN TUBE 3?

5. WHAT DOES THE BLUE COLOR MEAN?

6. IF A SNAIL USES UP OXYGEN, AS WE SAW IN TUBE 1, WHERE WOULD THE OXYGEN COME FROM IN THIS TUBE?

7. CHECK THE PREDICTIONS MADE PREVIOUSLY AND LISTED ON THE SHEET TO SEE HOW MANY PREDICTIONS WERE CORRECT.

8. REVIEW WHAT HAPPENED IN THE TESTS.

9. DOES A SNAIL GIVE OFF OXYGEN?

10. DOES A SNAIL USE OXYGEN?

11. DOES A SNAIL GIVE OFF CARBON DIOXIDE?

12. DOES A SNAIL USE CARBON DIOXIDE?

13. WHICH SNAIL IN TEST TUBE 1 OR THE ONE IN TUBE 2 OR TUBE 3 WILL LIVE LONGER?

14. WHICH SNAIL WOULD LIVE LONGER, THE ONE IN TUBE 1 OR THE ONE IN TUBE 2 OR THE ONE IN TUBE 3?

15. WHERE DOES OUR OXYGEN COME FROM?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--infer that the snail must have used it up.

--infer that there was oxygen present in the water, and that the plant did not use the oxygen.

--identify the snail and a plant.

--state that the water in the tube is blue.

--state that oxygen is present.

--infer that the plant is giving off oxygen.

--indicate that the plant gives off oxygen.

--indicate that the snail uses oxygen.

--indicate that the snail gives off carbon dioxide.

--indicate that the plant uses carbon dioxide.

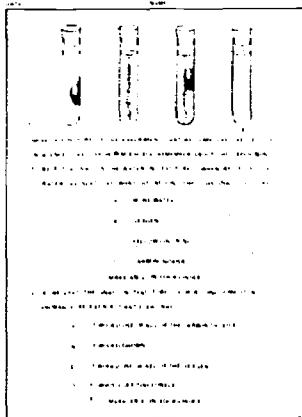
--infer that the snail in Tube 3 will live longer because it will have oxygen from the plant.

--infer that the plant in Tube 3 will live longer because it will have carbon dioxide from the snail.

--respond, "Air."

MATERIALS

Worksheet 5-13



TEACHING STRATEGIES

WHERE DOES THE OXYGEN IN THE AIR COME FROM?

IF THERE WERE NO PLANTS ON EARTH, WOULD WE LIVE VERY LONG? WHY?

WHAT IS IN THE AIR WE BREATHE OUT?

WHAT USES UP THAT CARBON DIOXIDE?

Clues to Success:

Part I.

In the Clues to Success Activities 5-2 and 5-10, you assessed your students' ability to follow directions. This Clues to Success activity provides you with another opportunity to assess each student's ability to follow directions. However, this activity focuses on the ability to follow a series of verbal directions.

Before assessing students on their ability to follow directions, turn to Tallysheet 5-6 and rate students as directed.

Distribute Worksheet 5-13 and have each student put his name and the date on the paper. Then say:

TODAY WE ARE GOING TO SEE WHAT YOU REMEMBER ABOUT THE EXPERIMENT WE COMPLETED YESTERDAY. EVERYONE WILL WORK ALONE AT FIRST. LATER WE WILL TALK TOGETHER ABOUT YOUR ANSWERS.

FIRST WE ARE GOING TO PRACTICE FOLLOWING DIRECTIONS. LOOK AT THE PICTURE OF THE EXPERIMENT AT THE TOP OF YOUR PAPER. I AM GOING TO GIVE YOU A DIRECTION THAT TELLS

TEACHING STRATEGIES

THE OXYGEN IN THE AIR COME FROM?

IF THERE WERE NO PLANTS ON EARTH, WOULD WE
SURVIVE? WHY?

WHAT IS THE AIR WE BREATHE OUT?

WHAT IS THAT CARBON DIOXIDE?

Success Activities 5-2 and 5-10, you
assess students' ability to follow directions.
This success activity provides you with another
way to assess each student's ability to follow
directions. However, this activity focuses on the
ability to follow a series of verbal directions.

Assess students on their ability to follow
directions by using the Tallysheet 5-6 and rate students as

Use sheet 5-13 and have each student put his
answers on the paper. Then say:

WE ARE GOING TO SEE WHAT YOU REMEMBER
FROM THE EXPERIMENT WE COMPLETED YESTERDAY.
YOU WILL WORK ALONE AT FIRST. LATER WE
WILL TALK TOGETHER ABOUT YOUR ANSWERS.

WE ARE GOING TO PRACTICE FOLLOWING
DIRECTIONS. LOOK AT THE PICTURE OF THE
PLANT AT THE TOP OF YOUR PAPER. I AM
GIVING YOU A DIRECTION THAT TELLS

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-26

Students should:

--infer that the plants supply oxygen.

--infer that with no plants there would be no
oxygen supply and, therefore, no life.

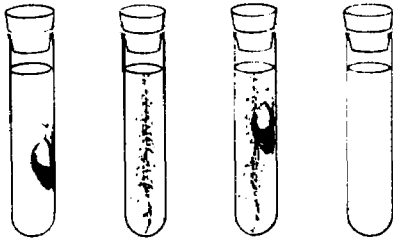
--respond, "Carbon dioxide."

--infer that plants use carbon dioxide.

MATERIALS

TEACHING STRATEGIES

Slide 5-50



YOU TO DO THREE DIFFERENT THINGS, SO YOU MUST LISTEN VERY CAREFULLY. WAIT UNTIL I HAVE READ THE WHOLE DIRECTION TWICE BEFORE YOU START. I WILL NOT REPEAT THE DIRECTION AFTER YOU START.

READY? (When students are ready, proceed.)

PUT AN X ABOVE EACH TEST TUBE THAT HAS WATER IN IT, CIRCLE EACH TEST TUBE THAT HAS A SNAIL IN IT, AND PUT A CHECK MARK UNDER EACH TEST TUBE THAT HAS A PLANT IN IT.

Repeat the direction once.

Part II.

Project Slide 5-50 and point to each tube as you describe its contents. Point out to the students that the picture at the top of their papers is the same as the one on the slide. Read the description below the picture on the worksheet.

Read each question and each of the choices to the students. Allow ample time for them to mark their worksheets. Repeat each question.

As you read the questions, circulate around the room to see that each student is marking an answer for each question.

After all students have completed their worksheets, collect them. Then read through each question again and discuss each answer. Refer to Slide 5-50 when necessary.

TEACHING STRATEGIES

THREE DIFFERENT THINGS, SO YOU MUST TRY CAREFULLY. WAIT UNTIL I HAVE WHOLE DIRECTION TWICE BEFORE YOU WILL NOT REPEAT THE DIRECTION AFTER

When students are ready, proceed.)

ABOVE EACH TEST TUBE THAT HAS WATER
CIRCLE EACH TEST TUBE THAT HAS A SNAIL
AND PUT A CHECK MARK UNDER EACH TEST
TUBE THAT HAS A PLANT IN IT.

direction once.

5-50 and point to each tube as you describe
Point out to the students that the picture
on their papers is the same as the one on
Slide 5-50 and the description below the picture on

direction and each of the choices to the
allow ample time for them to mark their
answers. Repeat each question.

As students answer questions, circulate around the room to
observe if a student is marking an answer for each

When students have completed their worksheets,
Then read through each question again
and check the answer. Refer to Slide 5-50 when

ANTICIPATED STUDENT BEHAVIORS

Students should:

- mark or circle D for Question 1.
- mark or circle C for Question 2.
- mark or circle A for Question 3.
- mark or circle B for Question 4.
- mark or circle B for Question 5.

MATERIALS

TEACHING STRATEGIES

After class, tally the students' responses on Tallysheet 5-6. Consider whether the whole class needs further review or if a few individuals need special attention.

See Tallysheet 5-6 for instructions for scoring and recording in the Student Record of Progress.

Group Discussion

Write in large letters on the chalkboard and say to the students:

"HAVE YOU THANKED A GREEN PLANT TODAY?"

Allow students to discuss what they believe this saying means. Students with an understanding of the interdependence of plants and animals should mention the following:

1. Animals produce carbon dioxide.
2. Plants produce oxygen.
3. Animals need the oxygen that plants produce.
4. Plants need the carbon dioxide that animals produce.
5. We could not live without plants because they help supply us with the oxygen we need to breathe.

This discussion may be used as an informal assessment. Note which students seem to need more work to grasp the concept of interdependence of plants and animals.

TEACHING STRATEGIES

lly the students' responses on Tallysheet whether the whole class needs further few individuals need special attention.

5-6 for instructions for scoring and the Student Record of Progress.

Letters on the chalkboard and say to the

"THANKED A GREEN PLANT TODAY?"

to discuss what they believe this saying is with an understanding of the inter- plants and animals should mention the

roduce carbon dioxide.

roduce oxygen.

eed the oxygen that plants produce.

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ot live without plants because they y us with the oxygen we need to breathe.

may be used as an informal assessment. nts seem to need more work to grasp the dependence of plants and animals.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-26

Upon completion of this activity, each student should, as a minimum:

- have participated in the snail and elodea experiment.*
- have observed what happened to each test tube during the oxygen and carbon dioxide tests.*
- have completed Worksheet 5-13.*
- have participated in a group discussion of the importance of plants to man.*

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE E
ACTIVITY 5-26

Teacher _____

Activity name suggested by class:

BSCS USE: Post _____ Tally _____ Rev _____
--

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes preparing for each day's science class						
4.	Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

Did you have any trouble obtaining the materials needed for this experiment?
 Yes No

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:
- Specific Questions:
12. Did you have any trouble obtaining the materials needed for this experiment?
 Yes No
13. What problems did you or the students have in conducting this experiment?
14. Were you able to obtain the expected experimental results using the set-up as described in the strategy? Yes No Comment.

Complete and send Tallysheet 5-6 to BSCS.

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

B. What anecdotes of student learning did you see or hear in your classroom?

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?

UNIT V
REACTIONS TO CORE E

1. Was the background information for this core clear and useful? Yes No
Comment:
2. Was there too much preparatory reading and too many directions given to the teacher? Yes No
Comment:
3. Was it clear to you why these particular activities were chosen and the direction they were leading? Yes No
4. How would you increase the clarity of this core for students? (Help them understand why they are doing these activities.)
5. Is there a practical (take-home) value for your students in these activities?
 Yes No If yes, what do you see as the "take-home" lesson? If no, what is needed?
6. In these materials, what things did your students find difficult to do?
7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?
8. Were the Clues to Success and Student Record of Progress helpful in this core?
 Yes No If helpful, how are they helpful?
9. Did you make use of the Planning Guide included in the introductory material for this core? Yes No
Comment:
10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? Yes No
Comment:
11. If you could teach your way, rather than following the Guide, how would you do it?

6. In these materials, what things did your students find difficult to do?
7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?
8. Were the Clues to Success and Student Record of Progress helpful in this core?
 Yes No If helpful, how are they helpful?
9. Did you make use of the Planning Guide included in the introductory material for this core? Yes No
Comment:
10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? Yes No
Comment:
11. If you could teach your way, rather than following the Guide, how would you do it?
12. Did the activities fulfill the purposes described by the core objectives and rationale? Yes No
Comment:
13. Which of your students do you believe were unsuccessful in achieving the objectives of this core of activities? Explain:

NEW STUDENTS ENTERING DURING THIS C

Date Entered	Last Name	Name Used	Ethnic Group	Sex	Birthdate	Test Date	Te
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B

W = white
 B = black
 S = Spanish-
 American
 O = other

W=WIS
 B=Bir
 O=Oth
 (Na

STUDENTS DROPPED IN THIS PERIOD

Date Dropped	Last Name	First	Reason for Dropping

NEW STUDENTS ENTERING DURING THIS CORE

ap	Sex	Birthdate	Test Date	Test	Total	Verbal	Performance	Previous Test Score
	M F			W B O				
	M F			W B O				
	M F			W B O				
	M F			W B O				
	M F			W B O				
	M F			W B O				

W=WISC
 B=Binet
 O=Other
 (Name)

for Dropping



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE F. CHANGES IN THE AIR

AIMS FOR ME AND MY ENVIRONMENT

1. DEVELOPMENT IN EACH CHILD OF A SENSE OF IDENTITY AS A PERSON WHO HAS SOME DEGREE OF CONTROL OVER AND CAN ACT ON HIS ENVIRONMENT. This will lead to a degree of self-determination based on a rational coping with situations rather than on a passive compliance or an impulsive response to problems.
2. DEVELOPMENT IN EACH CHILD OF A SUCCESS SYNDROME. More than anything else, each activity is intended to be a success experience for each child. It is the teacher's responsibility -- almost obligation -- to see that each child succeeds at a level that is challenging to his abilities and that preserves his self-respect. It is a further responsibility of the teacher to point out his achievement. The students as a group should help each individual fit what he has done into a pattern of accomplishment.
3. DEVELOPMENT IN EACH CHILD OF AN INTEREST THAT COULD BECOME A HOBBY OR AVOCATION OVER A LIFETIME (through an exposure to an array of experiences in science). It is hoped that many children will find some area -- perhaps growing plants, caring for animals, identifying flowers, collecting things, or simply enjoying outings into the country -- that they feel strongly about and can develop some competence or knowledge in. This would provide a means of self-expression, and (perhaps) allow some degree of sharing or involvement with others.
4. DEVELOPMENT IN EACH CHILD OF A SENSE OF RELATIONSHIP AND EMPATHY WITH OTHER LIVING THINGS. It is hoped that this will lead to a positive regard and caring about what affects them as individuals and as a group, because what affects them affects the community of man.
5. DEVELOPMENT IN EACH CHILD OF AN UNDERSTANDING OF ENVIRONMENTAL CONDITIONS that will lead to a sense of responsibility for the environment and actions that protect or improve it.

The two parts of this unit air and water as major components.

Part 1 emphasizes the impact of air on the environment by helping the student to:

1. Understand the need for water.
2. Recognize the sources of water.
3. Realize the problems associated with water.
4. Realize the problems associated with air.
5. Recognize the impact of water on the environment.
6. Understand the broad problems associated with air.

Part 2 emphasizes the nature of air by helping the student to:

7. Understand the composition of air.
 8. Realize that the quality of air affects the environment.
 9. Realize that substances affect the environment.
 10. Comprehend the impact of air on the environment.
1. Establish that air has physical properties.
 2. Establish that weather conditions are related to air.
 3. Establish that local conditions affect the properties of air.

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE F. CHANGES IN THE AIR



BSCS

UNIT V GOALS

The two parts of this unit will serve to develop an appreciation of the roles of air and water as major components of our environment.

Part 1 emphasizes the importance of water as a vulnerable component of our environment by helping the student to:

1. Understand the need for water.
2. Recognize the sources of water.
3. Realize the problems associated with the preparation of usable water.
4. Realize the problems associated with the disposal of waste water.
5. Recognize the impact of water pollution.
6. Understand the broad problems of water management.

Part 2 emphasizes the nature of air as a complex component of our environment by helping the student to:

7. Understand the composition of air.
8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.
10. Comprehend the impact of air pollution on our environment.

CORE F OBJECTIVES

1. Establish that air has physical properties.
2. Establish that weather conditions are related to the properties of air.
3. Establish that local conditions may be altered by utilizing the physical properties of air.



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE F. CHANGES IN THE AIR

CORE F RATIONALE

BACK

This core is concerned with the physical characteristics of air. Special emphasis is placed upon the density, pressure, and movement of air, and how these features relate to weather. Weather is established as a naturally changing factor in our environment. The student is introduced to some of the properties of air that influence his life and how he in turn may have some influence over local environmental conditions.

The first activity establish that air has pressure (weight per unit area). The student relates air pressure to its direct impact on our environment for your background and

In very general terms on the earth. Warm air and low pressure systems result in high pressure systems. The atmosphere of the earth is balanced by increased movement of air from high to low of relatively constant temperature (e.g., polar regions = cold). In the midlatitudes, temperature differences in summer, continental land areas are occupied by areas of high pressure cooler, underlie high pressure. This can be reversed. In some areas are characterized by temperature differences phenomenon may be evident in hurricanes. In the interior can result in pressure

The last activity Activities 5-15 and 5-16 are introduced. Two fundamental concepts of water vapor by its movement has consequences from a surface is increased by the lowering of the temperature

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE F. CHANGES IN THE AIR



BSCS

BACKGROUND INFORMATION FOR THE TEACHER

eristics of air.
, and movement of
er is established
he student is
uence his life
environmental

The first activity of this core (Activity 5-27) serves simply to establish that air has weight and occupies space. As such, it exhibits pressure (weight per unit space). The second activity (Activity 5-28) relates air pressure to movement. Air movement, as wind or weather, has direct impact on our environment. The following information is presented for your background and is not intended as information to be taught.

In very general terms, air pressure reflects temperature patterns on the earth. Warm areas, characterized by rising air masses, provide low pressure systems. Colder areas, characterized by denser air masses, result in high pressure systems. Because the total weight of the atmosphere of the earth remains constant, decreased pressure in one area is balanced by increased pressure in another. We recognize the outward movement of air from high pressure to low pressure areas as wind. Areas of relatively constant temperature are characterized by stable air pressure (e.g., polar regions = high pressure; tropic regions = low pressure). In the midlatitudes, temperature patterns reflect seasonal changes. In summer, continental land masses are warmer than the oceans. As such, they are occupied by areas of low pressure. The oceans, being relatively cooler, underlie high pressure systems. In winter the situation may be reversed. In some regions, the periods of reversal (spring or fall) are characterized by the intense air movement we recognize as storms. This phenomenon may be evident toward the edges of continents in the form of hurricanes. In the interior, irregular and localized heating or cooling can result in pressure systems that take the form of tornadoes.

The last activity (Activity 5-29) serves to relate this core to Activities 5-15 and 5-16, in which the process of evaporation was introduced. Two fundamental points are combined: (1) air can incorporate water vapor by evaporation, and (2), since air has substance, its movement has consequence. In this activity, the rate of evaporation from a surface is increased by air movement. The environmental impact is the lowering of the temperature at the evaporating surface.



Me and my Environment

UNIT V
CORE F

PLANNING GUIDE

NOTE: Some activities (indicated in italics and an arrow in the margin) should be prepared several days or weeks in advance. Use this as a teaching and preparation schedule. All supplies are listed in the table below.

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		<i>(Italics indicate items to be prepared in advance)</i>
	Materials You Furnish	Materials in Supply Kit	
5-27. Air Is More than Space Days needed: 1	Balloons Paper clips A heavy object	Worksheet 5-14 Equal-arm balance kits Tallysheet 5-7	Two per student Two per student Such as a ball Pad of 20 sheets One per student
5-28. Weather and Air Days needed: 2	35 mm Slide projector	Chart 5-2, <i>Water Cycle in Nature</i> Slide 5-51 Slide 5-52 Slide 5-53 Slide 5-54 Slide 5-55 Slide 5-56 Slide 5-57 Slide 5-58 Worksheet 5-15	Sunny versus cloudy Direct sun Air conditioner Smoke blowing Windy day versus calm Foggy day versus clear Wind blowing Weather map Pad of 20 sheets
5-29. Can I Influence Air? Days needed: 1	Electric fan Water	Chart 5-2, <i>Water Cycle in Nature</i> Thermometers Beaker	Any size Two Any size

PLANNING GUIDE



BSCS

Activities (indicated in italics and an arrow in the margin) must be prepared several days or weeks in advance. Use this summary as a guide for materials and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher (Italics and Arrow Indicate Advance Preparation Directions)
<p>Materials in Supply Kit</p> <p>Worksheet 5-14 Equal-arm balance kits Tallysheet 5-7</p>	<p>Two per student group Two per student group Such as a book, record player, etc. Pad of 20 sheets; one worksheet per student One per student group</p>
<p>Chart 5-2, <i>Water Cycle in Nature</i> Slide 5-51 Slide 5-52 Slide 5-53 Slide 5-54 Slide 5-55 Slide 5-56 Slide 5-57 Slide 5-58 Worksheet 5-15</p>	<p>Sunny versus cloudy area Direct sun versus shade Air conditioner versus no air conditioner Smoke blowing west versus smoke blowing east Windy day versus calm day Foggy day versus clear day Wind blowing from ocean versus blowing from land Weather map Pad of 20 sheets; one worksheet per student</p>
<p>Chart 5-2, <i>Water Cycle in Nature</i> Thermometers Beaker</p>	<p>Any size</p> <p>Two Any size</p>



Me and my Environment



BSCS



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

7. Understand the composition of air.
8. Realize that the quality of air is variable.

Core F Objectives for the Student:

1. Establish that air has physical properties.

ENVIRONMENTAL THEME:

Interrelationships of Environmental Components

INQUIRY SKILLS:

Inferring

PROBLEM-SOLVING SKILLS:

Drawing Conclusions

PRACTICAL APPLICATION:

Developing the Concept of Weight, Vocabulary Development, Working in a Group

Activity 5-27. Air Is More than Space

This activity will introduce more properties of air. By doing an experiment with balloons, the students will discover that air has weight. This fact will be used later to help explain air pressure. In the following activities, air pressure will be used to help explain weather variations.

ACTIVITY

Objectives for the Student:

Understand the composition of air.

Realize that the quality of air is variable.

Objectives for the Student:

Establish that air has physical properties.

THEME:

Relationships of Environmental Components

Skills:

g

Learning Skills:

Conclusions

Application:

Understanding the Concept of Weight, Vocabulary Development, Working in a Group

Air Is More than Space

To introduce more properties of air. When experiment with balloons, the students will learn about weight. This fact will be used to explain air pressure. In the following experiment, air pressure will be used to help explain

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE F.

CHANGES IN THE AIR

ACTIVITY 5-27.

AIR IS MORE
THAN SPACE



BSCS

During this activity, each student should:

- recall the difference between exhaled and inhaled air.*
- attempt to describe air.*
- participate in a group to weigh balloons.*
- observe that an inflated balloon weighs more than a deflated balloon.*
- conclude that air has weight.*

MATERIALS

Worksheet 5-14
Equal-arm balance, 1 kit per
student group
*2 Balloons per student group
*2 Paper clips per student group
*A heavy object (book, record
player)

*Not furnished in materials kit

TEACHING STRATEGIES

Begin by reviewing the difference between inhaled and exhaled air. Say:

WE HAVE BEEN TALKING ABOUT AIR AND WHAT IS IN IT.
CAN ANYBODY REMEMBER WHAT WE USE MOSTLY IN
INHALED AIR?

WHAT DO WE FIND IN OUR EXHALED AIR?

IF YOU HAD TO DESCRIBE AIR TO SOMEONE, WHAT
WOULD YOU SAY?

HOW ARE PEOPLE USUALLY DESCRIBED ON A DRIVER'S
LICENSE OR IDENTIFICATION CARD?

Write "Name," "Address," "Age," "Height," "Color," and
"Weight" on the chalkboard.

LET'S SEE IF WE COULD DESCRIBE AIR BY USING
THESE WORDS.

NAME. WHAT DO WE CALL AIR?

ADDRESS. WHERE COULD WE FIND AIR?

AGE. HOW OLD IS AIR?

HEIGHT. HOW TALL IS AIR?

COLOR. WHAT COLOR IS THE HAIR AND EYES OF AIR?

TEACHING STRATEGIES

...ewing the difference between inhaled and
Say:

...BEEN TALKING ABOUT AIR AND WHAT IS IN IT.
...DY REMEMBER WHAT WE USE MOSTLY IN
AIR?

...VE FIND IN OUR EXHALED AIR?

...D TO DESCRIBE AIR TO SOMEONE, WHAT
...Y SAY?

...EOPLE USUALLY DESCRIBED ON A DRIVER'S
...R IDENTIFICATION CARD?

"Address," "Age," "Height," "Color," and
...e chalkboard.

... IF WE COULD DESCRIBE AIR BY USING
...DS.

...AT DO WE CALL AIR?

...WHERE COULD WE FIND AIR?

...OLD IS AIR?

...HOW TALL IS AIR?

...WHAT COLOR IS THE HAIR AND EYES OF AIR?

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- describe pressure as the force, or pushing of the weight of one thing against something else.*
- successfully complete Worksheet 5-14.*

Students should:

- recall that we use mostly oxygen in inhaled air.
- recall that there is mostly carbon dioxide in exhaled air.
- speculate about how they would describe air.
- respond, "Name," "Address," "Age," "Height," "Weight," "Color of hair or eyes."
- respond, "Just air," "Oxygen," "Carbon dioxide."
- respond, "All over," "Everywhere."
- respond, "Really old," "It doesn't have an age."
- respond, "As tall as the sky," "Really tall," "I don't know."
- respond, "It doesn't have any eyes or hair," "It doesn't have any color."

MATERIALS

TEACHING STRATEGIES

HAS IT BEEN EASY TO DESCRIBE AIR?

WE HAVEN'T TALKED ABOUT WEIGHT YET. HOW MUCH DOES AIR WEIGH?

HOW COULD WE FIND OUT IF AIR HAS ANY WEIGHT?

WHAT DO WE USUALLY USE TO WEIGH THINGS?

WHAT COULD WE USE TO WEIGH AIR?

Hold up a balloon and say:

WHAT DO WE DO WHEN WE BLOW UP A BALLOON?

IF AIR HAD ANY WEIGHT, WOULD THE BALLOON WEIGH LESS, THE SAME, OR MORE THAN IT DID BEFORE WE BLEW IT UP?

LET'S FIND OUT.

NOTE: If necessary, review how to use the equal-arm balance. Refer to Activity 3-11 for specific strategy.

Divide the class into four groups and distribute an equal-arm balance, two balloons, and two paper clips to each group.



DISTRIBUTE

TEACHING STRATEGIES

EASY TO DESCRIBE AIR?

TALKED ABOUT WEIGHT YET. HOW
AIR WEIGH?

WE FIND OUT IF AIR HAS ANY WEIGHT?

USUALLY USE TO WEIGH THINGS?

WE USE TO WEIGH AIR?

and say:

DO WHEN WE BLOW UP A BALLOON?

ANY WEIGHT, WOULD THE BALLOON WEIGH
SAME, OR MORE THAN IT DID BEFORE WE

OUT.

ary, review how to use the equal-arm
Refer to Activity 3-11 for specific

e class into four groups and distribute
arm balance, two balloons, and two
ps to each group.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-27

Students should:

--indicate that it has not been easy to describe
air.

--respond, "Not much," "It doesn't," "I don't
know."

--respond, "Weigh it."

--respond, "A scale," "Our balance."

--respond, "I don't know," "You can't weigh air."

--respond, "Put air into it," "Fill it with air."

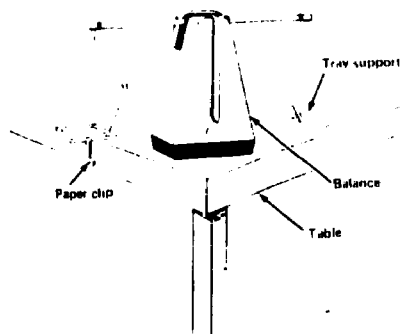
--predict whether the balloon would weigh more,
less, or the same.



DISTRIBUTE MATERIALS

MATERIALS

Diagram 5-13



TEACHING STRATEGIES

Give the following directions, one at a time, to the students.

1. Remove the trays from both sides of the balance.
2. Open two paper clips so there is a hook on both ends of the clip.
3. Hang one of these paper clips from the tray supports on both ends of the balance. (See Diagram 5-13.)
4. Drape a balloon over each tray support and balance the arms. The balloons should balance perfectly.

5. Remove one balloon and blow it up. Tie the end of the balloon shut.
6. Attach the blown-up balloon to the paper clip that is hanging from the tray support.

The side of the balance with the inflated balloon should be lower than the side of the balance with the deflated balloon.

When the weighing of the balloons has been completed, ask

DOES AIR HAVE WEIGHT?

HOW DO WE KNOW THAT AIR HAS WEIGHT?



TEACHING STRATEGIES

Following directions, one at a time, to the

the trays from both sides of the balance.

to paper clips so there is a hook on both
the clip.

one of these paper clips from the tray
on both ends of the balance. (See
5-13.)

balloon over each tray support and
the arms. The balloons should balance
equally.

one balloon and blow it up. Tie the end
of the balloon shut.

Attach the blown-up balloon to the paper clip
hanging from the tray support.

The balance with the inflated balloon should
tilt toward the side of the balance with the deflated

balloon. When the blowing of the balloons has been completed, ask:

DO BALLOONS HAVE WEIGHT?

DO YOU KNOW THAT AIR HAS WEIGHT?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--remove the trays.

--make the paper clip hooks.

--attach the paper clip hooks.

--balance the balloons.

--blow up one balloon.

--attach the inflated balloon.

--indicate that air has weight.

--respond, "Because the blown-up balloon was
lower," "The side with the air went down."



MATERIALS

TEACHING STRATEGIES

IF SOMETHING WEIGHS A LOT AND YOU HAVE TO HOLD IT IN YOUR LAP, WHAT DOES IT FEEL LIKE?

Write "Pressure" on the chalkboard.

THIS IS A WORD WE'RE GOING TO BE USING WHEN WE TALK ABOUT AIR.

WHAT IS PRESSURE?

PRESSURE IS THE FORCE, OR THE PUSHING, OF THE WEIGHT OF ONE THING AGAINST SOMETHING ELSE.

Ask a student to hold out his hand. Set a heavy book on his hand and ask:

(Student's name), DO YOU FEEL ANY PRESSURE?

WHAT PRESSURE DO YOU FEEL?

Set a heavy object on the table.

Then ask:

IS THERE ANY PRESSURE ON THIS TABLE?

WHAT IS PUTTING THE PRESSURE ON THE TABLE?

DOES AIR HAVE WEIGHT?

WOULD AIR HAVE PRESSURE?

Tell a student to stand up next to his desk.

TEACHING STRATEGIES

WEIGHS A LOT AND YOU HAVE TO HOLD
LAP, WHAT DOES IT FEEL LIKE?

on the chalkboard.

WORD WE'RE GOING TO BE USING WHEN
IT AIR.

SURE?

THE FORCE, OR THE PUSHING, OF THE
E THING AGAINST SOMETHING ELSE.

hold out his hand. Set a heavy book
sk:

(name), DO YOU FEEL ANY PRESSURE?

E DO YOU FEEL?

t on the table.

PRESSURE ON THIS TABLE?

ING THE PRESSURE ON THE TABLE?

E WEIGHT?

VE PRESSURE?

stand up next to his desk.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-27

Students should:

--respond, "Heavy," "Like someone pushing down on
me," "Not very good."

--guess what pressure means.

--indicate that he feels pressure.

--respond, "The book pushing on my hand."

--indicate that there is pressure on the table.

--indicate that the heavy object is exerting
pressure on the table.

--recall the balloon-weighing activity and respond,
"Yes," "The blown-up balloon was heavier."

--recall the definition of pressure and infer that
because air has weight, it would also have
pressure.

Then ask:

IS THERE ANY PRESSURE ON (student's name)
RIGHT NOW?

WHAT IS PUTTING THE PRESSURE ON (student's name)?

Review by asking:

WHAT THINGS DO WE KNOW ABOUT AIR?

GIV
STUDE
TO

The following questions should be asked only to stimulate the students' curiosity and awareness. Do not emphasize or "teach" these ideas, just present them.

HOW MUCH AIR DO YOU THINK IS OVER YOUR HEAD?

HOW MUCH DOES ALL THAT AIR WEIGH?

THERE IS A LOT OF AIR ABOVE OUR HEADS THAT IS
PRESSING DOWN ON US.

WHEN YOU DIVE TO THE BOTTOM OF A SWIMMING POOL,
YOU CAN FEEL THE PRESSURE OF THE WATER. FISH
SWIMMING AT THE BOTTOM OF THE OCEAN DON'T FEEL
THAT PRESSURE. WE ARE LIKE THE FISH EXCEPT THAT
WE LIVE IN AN OCEAN OF AIR. WE DON'T FEEL THE

TEACHING STRATEGIES

ANY PRESSURE ON (student's name)

GETTING THE PRESSURE ON (student's name)?

g:
DO WE KNOW ABOUT AIR?

Questions should be asked only to stimulate curiosity and awareness. Do not emphasize ideas, just present them.

DO YOU THINK AIR IS OVER YOUR HEAD?

DOES ALL THAT AIR WEIGH?

IS THERE A LOT OF AIR ABOVE OUR HEADS THAT IS DOWN ON US.

IF YOU WENT TO THE BOTTOM OF A SWIMMING POOL, FEEL THE PRESSURE OF THE WATER. FISH AT THE BOTTOM OF THE OCEAN DON'T FEEL PRESSURE. WE ARE LIKE THE FISH EXCEPT THAT WE LIVE IN AN OCEAN OF AIR. WE DON'T FEEL THE

ANTICIPATED STUDENT BEHAVIORS

Students should:

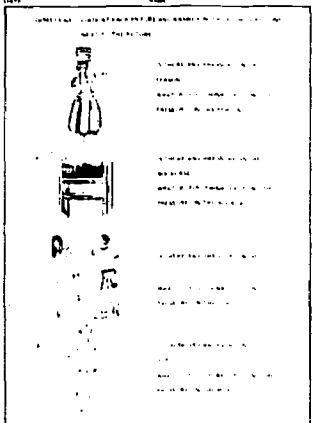
- indicate that there is pressure on the student standing.
- indicate that the air around him is exerting pressure.
- indicate that inhaled air is different from exhaled air, air is formed of oxygen and carbon dioxide, air has weight, and air has pressure.


**GIVE SEVERAL
STUDENTS A CHANCE
TO RESPOND**

- guess the quantity of air present.
- guess the weight of the air.

MATERIALS

Worksheet 5-14



TEACHING STRATEGIES

PRESSURE OF THE AIR, JUST AS THE FISH DON'T FEEL
THE PRESSURE OF THE WATER.

CLUES



Clues to Success:

Distribute Worksheet 5-14. Direct students to put their names and the date at the top of the paper. Read the directions aloud while the students follow along. Assist the students with spelling and reading as necessary.



DISTRIBUTE

Collect student worksheets. Tallysheet 5-7 will help you summarize student responses to the worksheet. Complete the tallysheet and send it to BSCS with your feedback on this activity.

Turn to the concepts page of the Student Record of Progress and find the column labeled "Act. 5-27, Pressure." Circle YES if the student made correct responses to all eight questions. Circle NO if the student made any incorrect responses.

If, after reviewing and correcting the worksheets, you see that the majority of students have not grasped the concepts introduced in this activity, go back and review this activity. If you see from the worksheet that any one student is having difficulty, review individually with him before proceeding.

TEACHING STRATEGIES**ANTICIPATED STUDENT BEHAVIORS**ACTIVITY
5-27

Students should:

THE AIR, JUST AS THE FISH DON'T FEEL
E OF THE WATER.



heet 5-14. Direct students to put their
te at the top of the paper. Read the
while the students follow along. Assist
a spelling and reading as necessary.



worksheets. Tallysheet 5-7 will help you
responses to the worksheet. Complete
d send it to BSCS with your feedback on

pts page of the Student Record of Progress
mn labeled "Act. 5-27, Pressure." Circle
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ed in this activity, go back and review
f you see from the worksheet that any
ving difficulty, review individually
proceeding.

MATERIALS

TEACHING STRATEGIES

See Change of Pacer 26.

Handwritten mark
CHANG

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

Upon completion of this activity, each student should, as a minimum:

- have helped weigh balloons using an equal-arm balance.
- have observed that an inflated balloon weighs more than a deflated balloon.
- have concluded that air has weight.
- have related the weight of air to pressure.
- have completed Worksheet 5-14.



CHANGE OF PACER

cer 26.

UNIT V, CORE F
ACTIVITY 5-27

Teacher _____

Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ____

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

ERIC Were the instructions given to students for weighing the balloons sufficiently clear? Yes No

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Were the instructions given to students for weighing the balloons sufficiently clear? Yes No
13. Did students have any problems in using the balance to weigh the balloons?
 No Yes If so, what problems did they have?
14. Do you think students were able to grasp the concept of air pressure? Yes No
Comment.

Complete and send Tallysheet 5-7 to BSCS.

UNIT V, CORE F
ACTIVITY 5-27

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

BSCS Evaluation: EMH Feedback Form 1c

What anecdotes of student learning did you see or hear in your classroom?



- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

8. Realize that the quality of air is variable.

Core F Objectives for the Student:

1. Establish that air has physical properties.
2. Establish that weather conditions are related to the properties of air.

ENVIRONMENTAL THEME:

Interrelationships of Environmental Components

INQUIRY SKILLS:

Applying

PROBLEM-SOLVING SKILLS:

Explaining, Defending, Answering Why Questions

PRACTICAL APPLICATION:

How to Understand a Weather Map, What Changes the Weather

Activity 5-28. Weather and Air

This activity will utilize pictures to help identify factors that influence weather. This is not intended as a detailed study of weather. For many it will be an introduction to weather elements, and for others a review. In Part I students are made aware of the changeable nature of air and identify some of the factors that produce these changes. Part II will relate air pressure, as studied in Activity 5-27, to the highs and lows as seen on weather maps, and how high and low air pressures affect the weather.



BSCS

UNIT V. AIR AND WATER IN
MY ENVIRONMENT

CORE F. CHANGES IN THE AIR

ACTIVITY 5-28. WEATHER AND AIR

ACTIVITY

Goals for the Student:

Realize that the quality of air is variable.

Objectives for the Student:

Establish that air has physical properties.

Establish that weather conditions are related to the properties of air.

THEME:

Relationships of Environmental Components

LEARNING

LEARNING SKILLS:

Observing, Defending, Answering Why Questions

APPLICATION:

Understand a Weather Map, What Changes Weather

Weather and Air

Utilize pictures to help identify weather. This is not intended to be a study of weather. For many it will be an introduction to weather elements, and for others a review. Students are made aware of the properties of air and identify some of the factors that cause weather changes. Part II will relate air pressure changes. Part II will relate air pressure changes in Activity 5-27, to the highs and lows on weather maps, and how high and low pressure affect weather.

During this activity, each student should:

- observe Slides 5-51 through 5-57 and describe what is different in each of the two pictures.
- suggest ways that temperature changes air.
- suggest ways that air can be changed by wind.
- suggest ways that water can change air.
- identify a high pressure system as heavy, descending air that brings good weather.
- identify a low pressure system as light, ascending air that brings bad weather.

Slides 5-51 through 5-59
Worksheet 5-15
Chart 5-2, *Water Cycle in Nature*
*35 mm Slide projector

Slide 5-51



*Not furnished in materials kit

Part I.

WHAT HAVE WE LEARNED ABOUT AIR SO FAR?

IS AIR THE SAME ALL THE TIME?

Project Slide 5-51 and say:

THESE SLIDES SHOW THE SAME PLACES AT TWO DIFFERENT TIMES. SOMETHING ABOUT THE AIR HAS CHANGED IN EACH PAIR OF PICTURES. WHAT IS DIFFERENT IN THESE TWO PICTURES?

HOW HAS THE AIR CHANGED?

WHAT MADE THE AIR CHANGE?

HOW DO YOU KNOW IT'S COOLER WHEN THE SUN GOES BEHIND A CLOUD?

Project Slide 5-52.

WHAT IS DIFFERENT IN THESE PICTURES?

TEACHING STRATEGIES

WE LEARNED ABOUT AIR SO FAR?

SAME ALL THE TIME?

-51 and say:

ES SHOW THE SAME PLACES AT TWO
TIMES. SOMETHING ABOUT THE AIR
D IN EACH PAIR OF PICTURES. WHAT
NT IN THESE TWO PICTURES?

E AIR CHANGED?

THE AIR CHANGE?

KNOW IT'S COOLER WHEN THE SUN GOES
LOUD?

-52.

FFERENT IN THESE PICTURES?

ANTICIPATED STUDENT BEHAVIORS

During this activity each student should:

- associate the rising air of a low pressure system with the water cycle.*
- complete Worksheet 5-15.*

Students should:

- recall that inhaled air is different from exhaled air, air has weight, air is formed of carbon dioxide and oxygen, and air has pressure.*
- speculate on whether air always stays the same.*

--observe and state that the sun has come out from behind the cloud in one picture and the other picture is cloudy.

--respond, "It's hotter when the sun is out," "The cloud cooled the air."

--state that the cloud covered the sun and therefore the sun could not heat the air.

--observe the man and state, "The man is not sweating."

--observe the pictures and state, "The man is in the sun and then in the shade."

MATERIALS

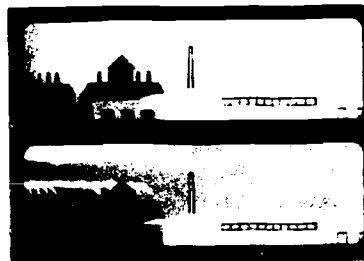
Slide 5-52



Slide 5-53



Slide 5-54



TEACHING STRATEGIES

HOW HAS THE AIR CHANGED?

HOW DO WE KNOW THAT THE AIR UNDER THE TREE IS DIFFERENT FROM THE AIR IN THE OPEN?

WHAT CAUSED THE CHANGE IN THE TEMPERATURE OF THE AIR?

Project slide 5-53.

HOW IS THE AIR DIFFERENT IN THESE TWO PICTURES?

WHAT CAUSED THE AIR TO CHANGE?

NAME SOME OTHER THINGS THAT MIGHT CHANGE THE TEMPERATURE OF THE AIR.

Discuss the suggested factors.

Project slide 5-54 and ask:

WHAT IS DIFFERENT IN THESE TWO PICTURES?

DISCUS

TEACHING STRATEGIES

AIR CHANGED?

NOW THAT THE AIR UNDER THE TREE IS
FROM THE AIR IN THE OPEN?

THE CHANGE IN THE TEMPERATURE OF

3.

AIR DIFFERENT IN THESE TWO PICTURES?

THE AIR TO CHANGE?

OTHER THINGS THAT MIGHT CHANGE THE
OF THE AIR.

sted factors.

4 and ask:

DIFFERENT IN THESE TWO PICTURES?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-28

Students should:

--state that air under the tree is cooler because
the sun is blocked.

--state that the man in the picture is hot in one
picture and not in the other.

--infer that the shade of the trees caused the
difference in temperature.

--observe the pictures and state, "One room is
cooler," "The man is cooler in the air-conditioned
room."

--state that the air conditioner changed the air.

--suggest factors that might influence temperature
changes such as shade, clouds, rain, indoors
versus outdoors, altitude, wind.

DISCUSSION TIME



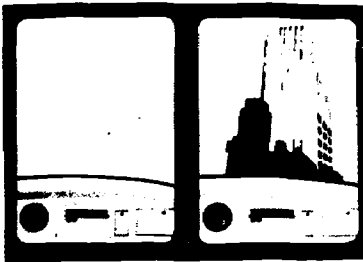
--observe the pictures and state that the wind is
blowing in one picture and not in the other.

MATERIALS

Slide 5-55



Slide 5-56



TEACHING STRATEGIES

WHAT IS MOVING THE SMOKE IN THESE PICTURES?

WHAT IS WIND?

If students do not define wind correctly, remind them that wind is merely moving air.

Project Slide 5-55 and ask:

WHAT IS DIFFERENT IN THESE TWO PICTURES?

IN WHAT WAYS MIGHT WIND CHANGE THE AIR?

Discuss the suggested ways that wind might change the air.

DISC

If your community is in an area where hurricanes and tornadoes occur, special mention of them might be made here. Discuss what they are, what to do if one comes, what times of the year to expect them, and so forth.

Project Slide 5-56 and ask:

HOW ARE THESE TWO PICTURES DIFFERENT?

WHAT IS FOG?

TEACHING STRATEGIES

MOVING THE SMOKE IN THESE PICTURES?

END?

Students do not define wind correctly, remind that wind is merely moving air.

-55 and ask:

DIFFERENT IN THESE TWO PICTURES?

WAYS MIGHT WIND CHANGE THE AIR?

Suggested ways that wind might change the

city is in an area where hurricanes and
, special mention of them might be made
what they are, what to do if one comes,
the year to expect them, and so forth.

-56 and ask:

THESE TWO PICTURES DIFFERENT?

END?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--infer that the wind is moving the smoke.

--describe wind as moving air.

--observe the pictures and state that the wind is blowing in one picture and not in the other.

--suggest ways that wind changes the air, such as bringing in cloudy or rainy weather, putting dust into the air, cooling the air, bringing tornadoes or hurricanes and so on.

DISCUSSION TIME

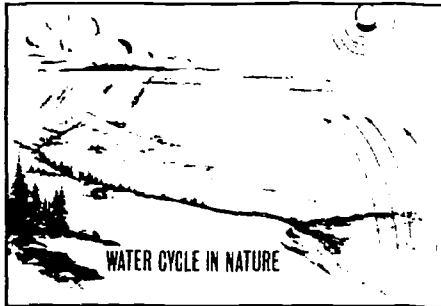


--observe the pictures and state that it is foggy in one picture and clear in the other.

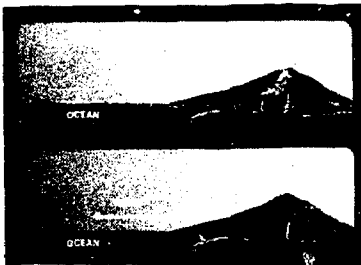
--respond, "A low cloud," "Water drops," "Water in the air."

MATERIALS

Chart 5-2



Slide 5-57



TEACHING STRATEGIES

Direct the students' attention to the *Water Cycle in Nature* chart and ask:

WHERE DID THE WATER IN THE CLOUDS AND IN THE FOG COME FROM?

Project Slide 5-57 and ask:

WHAT DIFFERENCES DO YOU SEE IN THESE TWO PICTURES?

WHERE IS THE WATER COMING FROM TO MAKE THE CLOUDS AND RAIN IN THE TOP PICTURE?

WHY ARE THERE NO CLOUDS IN THE BOTTOM PICTURE?

IN WHAT WAYS CAN WATER THAT IS IN THE AIR CHANGE AIR?

LET'S LIST SOME OF THE THINGS THAT WE HAVE SEEN IN THESE PICTURES THAT BRING ABOUT CHANGES IN THE AIR.

List these factors on the chalkboard. Project the slides again if students do not recall things that produce changes in the air.

TEACHING STRATEGIES

nts' attention to the *Water Cycle in*
ask:

THE WATER IN THE CLOUDS AND IN THE
M?

7 and ask:

NCES DO YOU SEE IN THESE TWO PICTURES?

WATER COMING FROM TO MAKE THE
AIN IN THE TOP PICTURE?

E NO CLOUDS IN THE BOTTOM PICTURE?

CAN WATER THAT IS IN THE AIR CHANGE

OME OF THE THINGS THAT WE HAVE SEEN
TURES THAT BRING ABOUT CHANGES IN

s on the chalkboard. Project the slides
do not recall things that produce

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-28

Students should:

--recall the water cycle model and state that the water comes from lakes, oceans, and rivers and goes into the air, where it forms clouds and/or fog.

--observe the pictures and state that the wind is blowing in different directions, and also that one picture has clouds and rain while the other picture has clear skies.

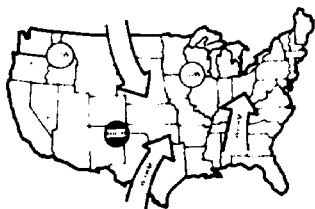
--recall the water cycle studies and infer that the moisture is coming from the ocean.

--infer that there are no clouds because the air has no place to pick up moisture.

--suggest ways that water in the air causes changes in air such as rain, fog, clouds, snow, hail, sleet, ice, and so on.

--recall the pictures and state that the three factors of temperature, movement (wind), and moisture (rain) bring about changes in the air.

slide 5-58



Part II.

DOES AIR EVER CHANGE?

CAN WE TELL WHEN IT'S GOING TO CHANGE?

WHAT KINDS OF THINGS DOES A WEATHERMAN TELL YOU
IN HIS FORECAST?

Project Slide 5-58.

HAS ANYONE EVER SEEN THESE HIGHS AND LOWS ON
A WEATHER MAP?

DOES ANYONE KNOW WHAT THE HIGH AND LOW STAND FOR?

A HIGH ON A WEATHER MAP STANDS FOR HIGH AIR
PRESSURE AND LOW STANDS FOR LOW AIR PRESSURE.

WHAT IS AIR PRESSURE?

Assist students as necessary in recalling the definition
of air pressure.

WHAT KIND OF AIR WOULD YOU FIND IN A HIGH
PRESSURE AREA?

If students do not relate a high pressure area
with heavy air, tell them that if air has a
high amount of pressure it must have a lot of
weight and be very heavy.

WHAT KIND OF AIR WOULD BE IN A LOW PRESSURE
AREA?

HIGH AIR PRESSURE AND LOW AIR PRESSURE HAVE A
LOT TO DO WITH OUR WEATHER.

TEACHING STRATEGIES

EVER CHANGE?

LL WHEN IT'S GOING TO CHANGE?

OF THINGS DOES A WEATHERMAN TELL YOU
RECAST?

-58.

EVER SEEN THESE HIGHS AND LOWS ON
MAP?

E KNOW WHAT THE HIGH AND LOW STAND FOR?

A WEATHER MAP STANDS FOR HIGH AIR
ND LOW STANDS FOR LOW AIR PRESSURE.

R PRESSURE?

as necessary in recalling the definition

OF AIR WOULD YOU FIND IN A HIGH
REA?

udents do not relate a high pressure area
heavy air, tell them that if air has a
amount of pressure it must have a lot of
t and be very heavy.

OF AIR WOULD BE IN A LOW PRESSURE

AND LOW AIR PRESSURE HAVE A
R WEATHER.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--recall slides 5-51 through 5-57 and respond,
"Yes."

--respond, "Yes," "From the weatherman," "Sometimes."

--suggest such things as temperature, wind, rain,
storms, and so forth.

--indicate yes or no.

--speculate what the highs and lows mean.

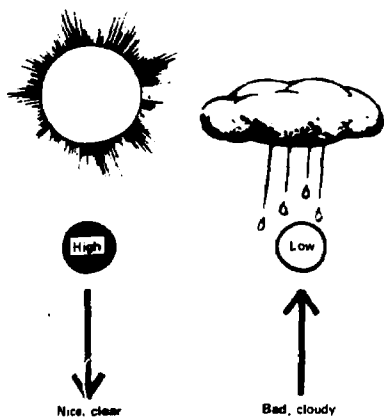
--recall Activity 5-27 and respond, "Weight of the
air," "Air pushing on you," "Force of air."

--respond, "Heavy air," "Air with a lot of force."

--respond, "Light air," "Air that doesn't have much
weight."

MATERIALS

Diagram 5-14



TEACHING STRATEGIES

WHAT KIND OF WEATHER DO YOU THINK WOULD BE IN A HIGH PRESSURE AREA?

WHAT ABOUT IN A LOW PRESSURE AREA?

LET'S SEE IF WE CAN FIGURE IT OUT.

Write "high" on one side of the chalkboard and "low" on the other side. (See Diagram 5-14.)

Then ask:

WHAT KIND OF AIR IS IN A HIGH PRESSURE AREA?

IF THE AIR IS HEAVY WHERE WOULD IT PROBABLY MOVE?

GIVE STUDENTS
TIME
TO
THINK

Ask a volunteer to draw an arrow pointing down under the "high" on the chalkboard. (See Diagram 5-14.)

WHAT KIND OF AIR IS IN A LOW PRESSURE SYSTEM?

IF THE AIR IS LIGHT, WHERE WOULD IT PROBABLY MOVE?

GIVE STUDENTS
TIME
TO
THINK

Ask a volunteer to draw an arrow pointing up under the "low" on the chalkboard. (See Diagram 5-14.)

TEACHING STRATEGIES

WEATHER DO YOU THINK WOULD BE
PRESSURE AREA?

A LOW PRESSURE AREA?

WE CAN FIGURE IT OUT.

the side of the chalkboard and "low"
(See Diagram 5-14.)

AIR IS IN A HIGH PRESSURE AREA?

HEAVY WHERE WOULD IT PROBABLY

**GIVE STUDENTS
TIME
TO
THINK**



draw an arrow pointing down under the
board. (See Diagram 5-14.)

AIR IS IN A LOW PRESSURE SYSTEM?

LIGHT, WHERE WOULD IT PROBABLY MOVE?

**GIVE STUDENTS
TIME
TO
THINK**



an arrow pointing up under the
(See Diagram 5-14.)

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-28

Students should:

--speculate on the types of weather around a high
pressure area, such as good, bad, rainy, clear.

--speculate on the types of weather around a low
pressure area such as good, bad, rainy, clear.

--respond, "Heavy."

--infer that heavy air would go down.

--respond, "Light."

--infer that light air would go up.

MATERIALS

TEACHING STRATEGIES

Display Chart 5-2, the *Water Cycle in Nature*, next to the drawing on the chalkboard and ask:

WHAT IS IN THE AIR OVER OUR LAKES, OCEANS, AND RIVERS?

WHAT CAUSES THE WATER TO GO INTO THE AIR?

WHAT WOULD HAPPEN TO THE LIGHT AIR AS IT GOES UP?

WHAT HAPPENS TO THE AIR HIGH IN THE SKY?

WHAT KIND OF WEATHER MIGHT WE EXPECT IN A LOW PRESSURE AREA?

Ask a volunteer to write "rainy and cloudy" under the "low" on the chalkboard, or draw clouds and rain next to the "low". (See Diagram 5-14.)

WOULD ANYTHING HAPPEN TO OUR HEAVY AIR AS IT COMES DOWN?

THEN WHAT KIND OF WEATHER MIGHT WE EXPECT IN A HIGH PRESSURE AREA?

Ask a volunteer to write "nice and clear" under the "high" on the chalkboard, or draw a sun next to the "high". (See Diagram 5-14.)

Review again this discussion of the upward and downward movement of air.

TEACHING STRATEGIES

5-2, the *Water Cycle in Nature*, next to the chalkboard and ask:

1 THE AIR OVER OUR LAKES, OCEANS, AND

2 ES THE WATER TO GO INTO THE AIR?

3 HAPPEN TO THE LIGHT AIR AS IT GOES

4 NS TO THE AIR HIGH IN THE SKY?

5 OF WEATHER MIGHT WE EXPECT IN A LOW
6 AREA?

7 to write "rainy and cloudy" under the
8 chalkboard, or draw clouds and rain next
9 (See Diagram 5-14.)

10 HING HAPPEN TO OUR HEAVY AIR AS IT
11 ?

12 KIND OF WEATHER MIGHT WE EXPECT IN
13 SSURE AREA?

14 to write "nice and clear" under the
15 chalkboard, or draw a sun next to the
16 diagram 5-14.)

17 is discussion of the upward and downward

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "Water," "Steam."

--recall the water cycle model and state that the sun causes the water to heat and steam or to evaporate.

--observe the *Water Cycle in Nature* chart and state that the air would pick up water.

--observe the *Water Cycle in Nature* chart and recall the water cycle model and state that the air gets colder and the water drops out of the air as rain.

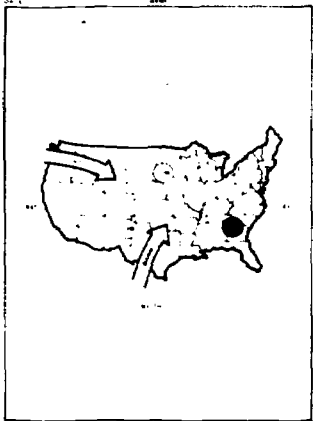
--infer that rainy or cloudy weather might be expected.

--infer that since the moisture in the air is gone, nothing would happen.

--infer that nice, clear weather might be expected.

MATERIALS

Worksheet 5-15



Slide 5-59

TEACHING STRATEGIES

Clues to Success:



LET'S SEE IF YOU COULD TELL WHAT THE WEATHER IS GOING TO BE BY LOOKING AT A WEATHER MAP.

Distribute Worksheet 5-15.

Say:

THIS IS A WEATHER MAP LIKE THE ONES YOU MIGHT SEE IN THE NEWSPAPER OR ON TV.

DRAW A SUN BY THE PARTS OF THE UNITED STATES THAT WILL HAVE NICE WEATHER AND A CLOUD OVER THE PARTS THAT WILL HAVE BAD WEATHER.

ONE COMPASS DIRECTION IS ALREADY ON THE MAP. (Point to south.) THERE ARE BLANK SPACES WHERE THE OTHER THREE COMPASS POINTS SHOULD BE. NEXT TO TWO OF THESE BLANKS ARE WRITTEN THE WORD "COAST" BECAUSE THESE ARE THE TWO SEACOASTS OF THE UNITED STATES. WRITE THE CORRECT COMPASS DIRECTION IN EACH OF THE BLANKS.

When students have completed the worksheets, collect them.

Project Slide 5-59 and discuss the position of each high and low and the weather associated with it.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-28

Students should:



YOU COULD TELL WHAT THE WEATHER
IS BY LOOKING AT A WEATHER MAP.

Set 5-15.

OTHER MAP LIKE THE ONES YOU
SEE IN THE NEWSPAPER OR ON TV.

THE PARTS OF THE UNITED STATES
WITH NICE WEATHER AND A CLOUD OVER
THEM WILL HAVE BAD WEATHER.

DIRECTION IS ALREADY ON THE MAP.
(Each blank space.) THERE ARE BLANK SPACES WHERE
THE COMPASS POINTS SHOULD BE. NEXT
TO THESE BLANKS ARE WRITTEN THE WORDS
WEST AND EAST. THESE ARE THE TWO SEACOASTS
STATES. WRITE THE CORRECT COMPASS
DIRECTION IN EACH OF THE BLANKS.

When the students have completed the worksheets, collect them.

Discuss the position of each high
pressure system and the weather associated with it.

--draw a sun next to each high, a cloud next to
each low, and write "west" in the left blank,
"east" in the right blank, and "north" on the
top.

MATERIALS

TEACHING STRATEGIES

If, after reviewing the worksheets, you see that there are students who have not grasped the concepts presented in this activity, review until all students understand that high pressures are associated with good weather and low pressures with bad weather.

Send the student worksheets to BSCS.

If students seem to understand the basic concepts of high and lows, and seem at all interested in the subject it is strongly recommended that you do Change of Pacer 28.

See Change of Pacers 27, 28, 29, 30, and 31.

✓
CHANG

TEACHING STRATEGIES

When using the worksheets, you see that there are students who have not grasped the concepts presented. If necessary, review until all students understand the concepts. The concepts are associated with good weather and high pressure and low pressure with bad weather.

Use the worksheets to BSCS.

Students who seem to understand the basic concepts of high and low pressure seem at all interested in the subject it is being presented. It is recommended that you do Change of Pacer 28.



CHANGE OF PACER

Use pacers 27, 28, 29, 30, and 31.

ANTICIPATED STUDENT BEHAVIORS

Students should:

Upon completion of this activity, each student should, as a minimum:

- have observed and described Slides 5-51 through 5-58.*
- recognize that a high on a weather map means good weather.*
- recognize that a low on a weather map means bad weather.*
- have completed and discussed Worksheet 5-15.*

UNIT V, CORE F
ACTIVITY 5-28

Teacher _____

Activity name suggested by class:

BSCS USE: Post _____ Tally _____ Rev _____
--

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

1. ERIC slides 5-51 through 5-57 effectively distinguish between different types of weather conditions? Yes No Can you suggest any changes?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Do Slides 5-51 through 5-57 effectively distinguish between different types of weather conditions? Yes No Can you suggest any changes?
13. Were all students successful in identifying the weather conditions associated with high and low pressure areas? Yes No If not, note which students were not successful and work with them individually.

14. Send the completed worksheets to BSCS.

UNIT V, CORE F
ACTIVITY 5-28

Teacher _____

A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

BSCS Evaluation: EMH Feedback Form 10

B at anecdotes of student learning did you see or hear in your classroom?



- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.

Core F Objectives for the Student:

2. Establish that weather conditions are related to the properties of air.
3. Establish that local conditions may be altered by utilizing the physical properties of air.

ENVIRONMENTAL THEME:

Interrelationships of Environmental Components

INQUIRY SKILLS:

Applying

PROBLEM-SOLVING SKILLS:

Interpreting Results

PRACTICAL APPLICATION:

How to Keep Cool (or Warm)

Activity 5-29. Can I Influence Air?

This activity is intended to demonstrate the influence of air movement on temperature through its effect on the evaporation of moisture.

ACTIVITY

Goals for the Student:

- Realize that the quality of air is variable.
- Realize that substances are continually added to air.

Objectives for the Student:

- Establish that weather conditions are related to the properties of air.
- Establish that local conditions may be altered by utilizing the physical properties of air.

LEARNING THEME:

Relationships of Environmental Components

LEARNING OBJECTIVES:

g

LEARNING SKILLS:

Reporting Results

APPLICATION:

Keep Cool (or Warm)

Can I Influence Air?

intended to demonstrate the influence of temperature through its effect on the moisture.



BSCS

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE F.

CHANGES IN THE AIR

ACTIVITY 5-29. CAN I INFLUENCE AIR?

During this activity, each student should:

- recall ways that air can be changed.*
- recall the meaning of evaporation.*
- suggest ways water can be cooling on a hot day.*
- observe the thermometer/fan demonstration.*

MATERIALS

Chart 5-2, *Water Cycle in Nature*

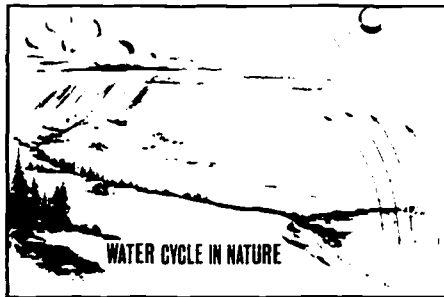
2 Thermometers, metal protected

1 Beaker

*1 Electric fan

*Water

Chart 5-2



*Not furnished in materials kit

TEACHING STRATEGIES

Begin this activity by having the students recall the aspects of weather related to air movement discussed in Activity 5-28.

Ask:

WHAT ARE SOME THINGS THAT CAN CAUSE CHANGES IN THE AIR?

WATER AND WIND ARE TWO THINGS THAT CAUSE CHANGES IN OUR AIR ENVIRONMENT.

HOW COULD YOU USE WATER AND WIND TO CHANGE HOW YOU FEEL ON A HOT SUMMER DAY?

HOW WOULD THESE ACTIVITIES MAKE YOU FEEL?

WHY WOULD WIND HELP YOU FEEL COOLER?

WHY WOULD WATER HELP YOU FEEL COOLER?

Display Chart 5-2, *Water Cycle in Nature*, and ask:

WHAT IS EVAPORATION?

TEACHING STRATEGIES

ity by having the students recall the
er related to air movement discussed in

ME THINGS THAT CAN CAUSE CHANGES IN

IND ARE TWO THINGS THAT CAUSE CHANGES
ENVIRONMENT.

OU USE WATER AND WIND TO CHANGE HOW
A HOT SUMMER DAY?

HESE ACTIVITIES MAKE YOU FEEL?

IND HELP YOU FEEL COOLER?

ATER HELP YOU FEEL COOLER?

2, *Water Cycle in Nature*, and ask:

ORATION?

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- observe that the thermometer in front of the fan is cooler.*
- infer that moving air speeds evaporation and, therefore, cooling.*

Students should:

--recall that wind, temperature, and moisture can cause changes in the air.

--suggest such things as fanning yourself, going swimming, riding a bike, putting a wet cloth on your head, etc.

--respond, "Make you feel cooler," "More comfortable," "Better."

--respond, "The air is moving," "Blows cool air onto your face," "Moves the hot air away."

--respond, "Because it's cold," "It just does," "I don't know."

--recall Activity 5-16 and respond, "Water going into the air."

MATERIALS

TEACHING STRATEGIES

GIVE S
TIME
TO
THINK



WHEN WATER EVAPORATES DOES IT CHANGE THE ENVIRONMENT IN ANY WAY?

If students have difficulty recalling, project Slides 5-56 (fog) and 5-57 (wind over water).

WHEN WATER EVAPORATES FROM SOMEWHERE IT COOLS THAT PLACE. IF YOU HAVE WATER ON YOUR BODY AND THAT WATER EVAPORATES YOU FEEL COOLER. IF THERE IS WATER ON THE SIDEWALK, THE SIDEWALK WILL FEEL COOLER BECAUSE THE WATER ON IT IS EVAPORATING.

WE'VE SAID WIND CAN ALSO COOL YOU. IF WE PUT WIND AND WATER TOGETHER WOULD THEY COOL YOU TWICE AS MUCH?

HOW COULD WE FIND OUT?

Discuss the students' suggestions and then select six students to assist you in setting up the following experiment. Each student will do one of the following tasks:

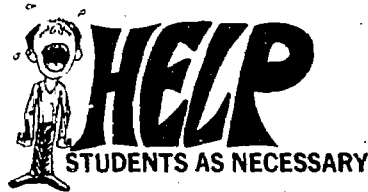
TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-29

Students should:

GIVE STUDENTS
TIME
TO
THINK



EVAPORATES DOES IT CHANGE THE
IN ANY WAY?

difficulty recalling, project Slides
57 (wind over water).

EVAPORATES FROM SOMEWHERE IT COOLS
IF YOU HAVE WATER ON YOUR BODY
EVAPORATES YOU FEEL COOLER.
WATER ON THE SIDEWALK, THE SIDEWALK
COOLER BECAUSE THE WATER ON IT IS

WIND CAN ALSO COOL YOU. IF WE
WATER TOGETHER WOULD THEY COOL
MUCH?

FIND OUT?

Students' suggestions and then select six
that you in setting up the following
that will do one of the following

--recall the discussion in Activity 5-28 and
suggest ways that moisture may change air such
as rain, cooler temperature, fog, cloud, etc.

--speculate about what would happen.

--suggest ways to find out if wind and water cool
twice as much.

MATERIALS

TEACHING STRATEGIES

1. Set out two thermometers.
2. Fill a beaker with water and set the thermometers in the water.
3. Wait a few minutes and read the temperature on both thermometers and record them on the chalkboard
4. Set a fan nearby and turn it on.
5. Take one thermometer out of the water and hold it in front of the fan.
6. Quickly read the temperature of that thermometer and record it on the chalkboard.

Then ask:

IS THERE ANY DIFFERENCE IN OUR THERMOMETER READINGS?

WHAT WAS THE DIFFERENCE BETWEEN THE THERMOMETER THAT READ LOWER AND THE ONE THAT READ HIGHER?

WHAT CAUSED THE THERMOMETER OUT OF THE WATER TO COOL?

WHAT WAS THE FAN DOING TO COOL THE THERMOMETER?

THERE WAS WATER ON BOTH THERMOMETERS. WHAT WAS HAPPENING TO THE WATER ON THE THERMOMETER THAT WAS OUT OF THE WATER?

WAS THE WATER ON THE THERMOMETER IN THE BEAKER EVAPORATING?

TEACHING STRATEGIES

two thermometers.

Fill a beaker with water and set the thermometers in the water.

Wait 5 minutes and read the temperature on both thermometers and record them on the chalkboard.

Turn the fan nearby and turn it on.

Remove the thermometer out of the water and hold it in front of the fan.

Read the temperature of that thermometer and record it on the chalkboard.

WHY IS THERE A DIFFERENCE IN OUR THERMOMETER READINGS?

WHAT IS THE DIFFERENCE BETWEEN THE THERMOMETER IN THE WATER AND THE ONE THAT READ HIGHER?

WHAT DOES TAKING THE THERMOMETER OUT OF THE WATER DO?

WHAT IS THE FAN DOING TO COOL THE THERMOMETER?

WHAT DOES TAKING THE THERMOMETER OUT OF THE WATER DO TO THE WATER ON THE THERMOMETER THAT WAS IN THE WATER?

WHAT DOES TAKING THE THERMOMETER IN THE BEAKER DO TO THE WATER ON THE THERMOMETER?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--set out the thermometers.

--fill the beaker and set the thermometer in the water.

--read and record the temperatures.

--turn on the fan.

--hold the thermometer in front of the fan.

--read and record the temperature.

--respond, "Yes," "They're different," "The one in front of the fan is lower."

--respond, "One was in the water and one was not."

--respond, "The wind," "The fan," "Moving air around it."

--respond, "Helping to cool it down," "Pushing air toward it."

--respond, "Going into the air," "Evaporating."

--respond, "No," "Not as much."

IF EVAPORATION COOLS THINGS ANYWAY, WHAT DID THE FAN DO?

Do the demonstration once again to re-emphasize the points discussed. Use different student assistants this time to involve as many students as possible.

Then ask:

HOW DO YOU FEEL WHEN YOU COME OUT OF A SWIMMING POOL ON A WINDY DAY?

HOW DO YOU FEEL ON A COLD, WINTER DAY WHEN IT'S VERY WINDY?

WHAT DO WIND IN THE AIR AND WATER IN THE AIR HAVE IN COMMON?

HOW DO THEY WORK TOGETHER?

TEACHING STRATEGIES

ION COOLS THINGS ANYWAY, WHAT DID THE

tion once again to re-emphasize the
Use different student assistants
olve as many students as possible.

FEEL WHEN YOU COME OUT OF A SWIMMING
NDY DAY?

FEEL ON A COLD, WINTER DAY WHEN IT'S

IN THE AIR AND WATER IN THE AIR
ON?

WORK TOGETHER?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-29

Students should:

--infer that the moving air hurried the evaporation process and cooled the thermometer more quickly than it otherwise would.

--respond, "Cold," "Chilly."

--respond, "Colder," "Really cold."

--respond, "They both cool things down," "They both change the air."

--infer that wind speeds the evaporation process and cools things rapidly.

Upon completion of this activity, each student should, as a minimum:

*--have observed the thermometer/fan demonstration.
--be able to relate water and wind to keeping cool.*

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE F
ACTIVITY 5-29

Teacher _____

Activity name suggested by class:

BSCS USE: Post _____ Tally _____ Rev _____
--

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

Were students able to recall the things which can cause changes in the air?
 Yes No

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:


12. Were students able to recall the things which can cause changes in the air?
 Yes No
13. Was the experiment successful in demonstrating that air speeds evaporation and therefore cooling? Yes No

UNIT V, CORE F
ACTIVITY 5-29

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

BSCS Evaluation: EMH Feedback Form 1

- B.  at anecdotes of student learning did you see or hear in your classroom?

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?

UNIT V
REACTIONS TO CORE F

1. Was the background information for this core clear and useful? Yes No
Comment:

2. Was there too much preparatory reading and too many directions given to the teacher? Yes No
Comment:

3. Was it clear to you why these particular activities were chosen and the direction they were leading? Yes No

4. How would you increase the clarity of this core for students? (Help them understand why they are doing these activities.)

5. Is there a practical (take-home) value for your students in these activities?
 Yes No If yes, what do you see as the "take-home" lesson? If no, what is needed?

6. In these materials, what things did your students find difficult to do?

7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?

8. Were the Clues to Success and Student Record of Progress helpful in this core?
 Yes No If helpful, how are they helpful?

9. Did you make use of the Planning Guide included in the introductory material for this core? Yes No
Comment:

10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? Yes No
Comment:

11. If you could teach your way, rather than following the Guide, how would you do it?

Did the activities fulfill the purposes described by the core objectives and rationale? Yes No
Comment:

6. In these materials, what things did your students find difficult to do?
7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?
8. Were the Clues to Success and Student Record of Progress helpful in this core?
 Yes No If helpful, how are they helpful?
9. Did you make use of the Planning Guide included in the introductory material for this core? Yes No
Comment:
10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? Yes No
Comment:
11. If you could teach your way, rather than following the Guide, how would you do it?
12. Did the activities fulfill the purposes described by the core objectives and rationale? Yes No
Comment:
13. Which of your students do you believe were unsuccessful in achieving the objectives of this core of activities? Explain:

NEW STUDENTS ENTERING DURING THIS C

Date Entered	Last Name	Name Used	Ethnic Group	Sex	Birthdate	Test Date	Te
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B

W = white
 B = black
 S = Spanish-
 American
 O = other

W=WIS
 B=Bir
 O=Oth
 (Na

STUDENTS DROPPED IN THIS PERIOD

Date Dropped	Last Name	First	Reason for Dropping

NEW STUDENTS ENTERING DURING THIS CORE

ID	Sex	Birthdate	Test Date	Test	Total	Verbal	Performance	Previous Test Score
	M F			W B O				
	M F			W B O				
	M F			W B O				
	M F			W B O				
	M F			W B O				
	M F			W B O				

W=WISC
 B=Binet
 O=Other
 (Name)

for Dropping



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE G. ADDITIVES IN OUR AIR

AIMS FOR ME AND MY ENVIRONMENT

1. DEVELOPMENT IN EACH CHILD OF A SENSE OF IDENTITY AS A PERSON WHO HAS SOME DEGREE OF CONTROL OVER AND CAN ACT ON HIS ENVIRONMENT. This will lead to a degree of self-determination based on a rational coping with situations rather than on a passive compliance or an impulsive response to problems.
2. DEVELOPMENT IN EACH CHILD OF A SUCCESS SYNDROME. More than anything else, each activity is intended to be a success experience for each child. It is the teacher's responsibility -- almost obligation -- to see that each child succeeds at a level that is challenging to his abilities and that preserves his self-respect. It is a further responsibility of the teacher to point out his achievement. The students as a group should help each individual fit what he has done into a pattern of accomplishment.
3. DEVELOPMENT IN EACH CHILD OF AN INTEREST THAT COULD BECOME A HOBBY OR AVOCATION OVER A LIFETIME (through an exposure to an array of experiences in science). It is hoped that many children will find some area -- perhaps growing plants, caring for animals, identifying flowers, collecting things, or simply enjoying outings into the country -- that they feel strongly about and can develop some competence or knowledge in. This would provide a means of self-expression, and (perhaps) allow some degree of sharing or involvement with others.
4. DEVELOPMENT IN EACH CHILD OF A SENSE OF RELATIONSHIP AND EMPATHY WITH OTHER LIVING THINGS. It is hoped that this will lead to a positive regard and caring about what affects them as individuals and as a group, because what affects them affects the community of man.
5. DEVELOPMENT IN EACH CHILD OF AN UNDERSTANDING OF ENVIRONMENTAL CONDITIONS that will lead to a sense of responsibility for the environment and actions that protect or improve it.

The two parts of this unit will use air and water as major components.

Part 1 emphasizes the importance of the environment by helping the student

1. Understand the need for water
2. Recognize the sources of water
3. Realize the problems associated with water
4. Realize the problems associated with air
5. Recognize the impact of water
6. Understand the broad problems

Part 2 emphasizes the nature of air by helping the student to:

7. Understand the composition of air
 8. Realize that the quality of air is important
 9. Realize that substances are carried in air
 10. Comprehend the impact of air on the environment
- CO
1. Establish that substances are carried in air
 2. Establish that an additive is a substance that is added to a mixture
 3. Establish that some things are added to air

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE G. ADDITIVES IN OUR AIR



BSCS

UNIT V GOALS

A
ACT The two parts of this unit will serve to develop an appreciation of the roles of air and water as major components of our environment.

Part 1 emphasizes the importance of water as a vulnerable component of our environment by helping the student to:

1. Understand the need for water.
2. Recognize the sources of water.
3. Realize the problems associated with the preparation of usable water.
4. Realize the problems associated with the disposal of waste water.
5. Recognize the impact of water pollution.
6. Understand the broad problems of water management.

Part 2 emphasizes the nature of air as a complex component of our environment by helping the student to:

7. Understand the composition of air.
8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.
10. Comprehend the impact of air pollution on our environment.

CORE G OBJECTIVES

1. Establish that substances are added to natural air because of man's activities.
2. Establish that an additive need not be seen to be present.
3. Establish that some things added to air are harmful to living things.



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE G. ADDITIVES IN OUR AIR

CORE G RATIONALE

At this point, air has been established as an important environmental component. The most important features of natural air have already been examined. This core will serve to demonstrate that air is also susceptible to changes in quality because of additives resulting from human activity. Two general classes of additives (visible and invisible) are examined in specific activities. The student will relate the increase of such additives to the increase in human activity.

Modern societies are suspended as smoke at least when concentrations are high. We recognize by our actions that just because we are free of harmful additives is a classic example.

The most common (5-33) involve collection of auto exhausts. They are supervised carefully. Students must be instructed not to rush the time and to move the collection device to be collected.

In Activity 5-33, the solution is quite simple. The test solution is directly related to the actual measurement required to achieve fewer strokes than less concentrated to reach the end point.

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CORE G. ADDITIVES IN OUR AIR



BSCS

BACKGROUND INFORMATION FOR THE TEACHER

Important environmental
have already been
is also susceptible
from human activity.
e) are examined in
ease of such additives

Modern society deposits many things into the air. Particles suspended as smoke, fumes, sprays, and dusts tend to be visible -- at least when concentrated near the source. Most gases or vapors tend to be invisible, even at the source. Many of these invisible additives we recognize by odor. It is very important that the students understand that just because air is colorless and odorless, it is not necessarily free of harmful additives. Carbon monoxide, a product of auto exhaust, is a classic example of an odorless, tasteless, invisible poison!

The most complicated activities in this core (Activities 5-32 and 5-33) involve collecting and detecting some of the invisible components of auto exhausts. Naturally it is extremely important that students be supervised carefully during the collection of the emissions. They should be instructed not to stand in the direct stream of exhaust fumes at any time and to move away from the immediate area as soon as the sample has been collected.


In Activity 5-33, the mechanical aspects of the pollution test are quite simple. The air to be tested is drawn through an indicator (test) solution with a hand vacuum pump. The additive (pollutant) reacts with the test solution resulting in a color change. The rate of this change is directly related to the concentration of the additive in the air. The actual measurement is made in terms of the number of strokes of the pump required to achieve the color change. The more pollutant there is, the fewer strokes that will be required to develop the color change. The less concentrated the pollutant, the more strokes will be required to reach the end point.



Me and my Environment

UNIT V
CORE G

PLANNING GUIDE

NOTE: Some activities (indicated in italics and an  in the margin) should be prepared several days or weeks in advance. Use this guide to develop a teaching and preparation schedule. All supplies are listed in the margin.

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		<i>(Italic)</i>
	Materials You Furnish	Materials in Supply Kit	
5-30. What Do We Put in Our Air? Days needed: 2	Bulletin board Pins		For making
5-31. What Is in Our Air? Days needed: 2	35 mm Slide projector 3 X 5 Index cards Transparent tape Scissors	Microscopes Slide 5-60 Slide 5-61 Slide 5-62 Slide 5-63 Slide 5-64 Worksheet 5-16	Four City smog Small town Rural scene Worksheet 5 Worksheet 5 Clue to Success About twenty Several rolls One per student
5-32. Altered Air and Life Days needed: 2+	Car One-quart jars with lids Paper Pencil Glass jars with lids At least five of the following substances: Vinegar Turpentine Gasoline Kerosene		Two per pair At least five One drop of

PLANNING GUIDE



BSCS

Activities (*indicated in italics and an arrow in the margin*) must be prepared several days or weeks in advance. Use this summary as a planning and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher
Materials in Supply Kit	<i>(Italics and Arrow Indicate Advance Preparation Directions)</i>
	<p>For making a class bulletin board display</p>
<p>Microscopes Slide 5-60 Slide 5-61 Slide 5-62 Slide 5-63 Slide 5-64 Worksheet 5-16</p>	<p>Four City smcg Small town Rural scene Worksheet 5-16A Worksheet 5-16B Clue to Success - one worksheet per student About twenty Several rolls One per student</p>
	<p><i>Two per pair of students</i></p> <p><i>At least five, any size</i></p> <p><i>One drop of each of the five you pick</i></p>

UNIT V
CORE G

PLANNING GUIDE



Me and my Environment

NOTE: Some activities (*indicated in italics and an arrow*) be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		(Italics indicate materials to be prepared several days or weeks in advance)
	Materials You Furnish	Materials in Supply Kit	
5-32. Altered Air and Life (continued)	Glue Perfume Aftershave Air freshener Deodorant Ammonia Bulletin board display Cassette tape recorder Blank tapes Picture of car Masking tape	Bean seeds	From Act. Two per activity
5-33. Do We Need a Filter on Our Town? Days needed: 2	35 mm Slide projector Distilled water Chalk Ruler or yardstick Bottle of rinse water Paper towels	Slide 5-65 Worksheet 5-17 Water pipe with an extra vial Solid cap for water pipe Mityvac hand pump Vinyl tubing, 1/4-inch inside diameter Broad range indicator solution, Hach Chem. #443 Large beakers	About one Two pieces Two Tap water To wipe vial Worksheet Pad of 20 One per group One per group One per group Two twelve One dropper To carry

PLANNING GUIDE



BSCS

Activities (indicated in italics and an arrow in the margin) must be prepared several days or weeks in advance. Use this summary as a planning and preparation schedule. All supplies needed are listed.

Supplies Needed

Notes and Suggestions to Teacher

(Italics and Arrow Indicate Advance Preparation Directions)

Materials in Supply Kit

Bean seeds

From Activity 5-29

Two per pair of students. Plant seeds four to six days before activity begins. A two-to three-inch sprout will be needed.

Slide 5-65

Worksheet 5-17

Water pipe with an extra vial

Solid cap for water pipe

Mityvac hand pump

Vinyl tubing, 1/4-inch inside diameter

Broad range indicator

solution, Hach Chem. #443

Beakers

About one pint

Two pieces

Two

Tap water, about one pint

To wipe water pipe after it is rinsed

Worksheet 5-17

Pad of 20 sheets; one worksheet per student

One per group of students

One per group of students

One per group of students

Two twelve-inch pieces per pair of students

One dropping bottle per pair of students


To carry equipment outside



Me and my Environment

UNIT V
CORE G

PLANNING GUIDE


NOTE: Some activities (indicated in *italics* and an  in be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		<i>(Itali</i>
	Materials You Furnish	Materials in Supply Kit	
5-34. Clues to Success: Understanding Days needed: 1	35 mm Slide projector Huge box Variety of art materials Cassette tape recorder(s) Blank tape(s)	Worksheet 5-18A, B, C, D, E Sub Unit Assessment 2, Air in the Environment Slide 5-66 Slide 5-67 Slide 5-68 Slide 5-69 Slide 5-70	Refrigerat For TV pro For audio One worksh Of Workshe Of Workshe Of Workshe Of Workshe Of Workshe
5-35. What Do You Think? Days needed: 3+		Slides 5-71, 5-72 Slides 5-73, 5-74 Slides 5-75, 5-76 Slides 5-77, 5-78 Slide 5-79 Slides 5-29 through 5-34 Tallysheet 5-10 Chart 5-2, <i>Water Cycle in Nature</i>	Worksheet Worksheet Worksheet Worksheet Worksheet Part II di

PLANNING GUIDE



BSCS

Activities (indicated in italics and an  in the margin) must be prepared several days or weeks in advance. Use this summary as a planning and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher (<i>Italics and Arrow Indicate Advance Preparation Directions</i>)
Materials in Supply Kit	
<p>Worksheet 5-18A, B, C, D, E Sub Unit Assessment 2, Air in the Environment</p> <p>Slide 5-66 Slide 5-67 Slide 5-68 Slide 5-69 Slide 5-70</p>	<p>Refrigerator size, or student-made box For TV production For audio part of TV production</p> <p>One worksheet per student</p> <p>Of Worksheet 5-18A Of Worksheet 5-18B Of Worksheet 5-18C Of Worksheet 5-18D Of Worksheet 5-18E</p>
<p>Slides 5-71, 5-72 Slides 5-73, 5-74 Slides 5-75, 5-76 Slides 5-77, 5-78 Slide 5-79 Slides 5-29 through 5-34 Tallysheet 5-10 Chart 5-2, <i>Water Cycle in Nature</i></p>	<p>Worksheet 5-19 Worksheet 5-20 Worksheet 5-21 Worksheet 5-22 Worksheet 5-23 Part II discussion</p>



Me and my Environment



BSCS



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.

Core G Objectives for the Student:

1. Establish that substances are added to natural air because of man's activities.

ENVIRONMENTAL THEME:

Ecological Trade-offs

INQUIRY SKILLS:

Divergent Production

PROBLEM-SOLVING SKILLS:

Discussion and Treatment of Group Data --
Comparing Results

PRACTICAL APPLICATION:

Communicating to a Group

Activity 5-30. What Do We Put in Our Air?

This activity will utilize information collected by the students related to how man adds things to the air. It is meant to be an open-ended activity to learn how many sources of air pollution the students can discover. The activity may be a continuing class project concerned with the concept of air pollution. The information collected



BSCS

UNIT V. AIR AND WATER IN
MY ENVIRONMENT

CORE G. ADDITIVES IN OUR AIR

ACTIVITY 5-30. WHAT DO WE PUT
IN OUR AIR?

During this activity, each student should:

- collect items that prove man adds things to the air.*
- identify what is being added to the air and where it is coming from.*
- participate in making a bulletin board display of items brought into class.*

ACTIVITY

Goals for the Student:

8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.

Objectives for the Student:

1. Establish that substances are added to natural air because of man's activities.

TOPICAL THEME:

Ecological Trade-offs

SKILLS:

Group Production

LEARNING SKILLS:

Discussion and Treatment of Group Data --
Reporting Results

APPLICATION:

Communicating to a Group

What Do We Put in Our Air?

All utilize information collected by the teacher to how man adds things to the air. It is an open-ended activity to learn how many pollutants the students can discover. The activity is a continuing class project concerned with air pollution. The information collected

MATERIALS

TEACHING STRATEGIES

for this activity will be expanded and reviewed in Activity 5-32 of this core, and at that time the consequences of air pollution will be emphasized.

Begin by saying:

WHAT ARE SOME THINGS THAT CAN CHANGE AIR?

THOSE ARE NATURAL CHANGES IN THE AIR.

DOES MAN CHANGE AIR IN ANY WAY? DOES HE PUT THINGS IN THE AIR THAT DON'T BELONG THERE AND THAT ARE OUT OF PLACE?

At this time tell the students that their job will be to find and bring to class something that shows that man puts things in to the air. Tell them they can find pictures in magazines and newspapers that show this. They can draw pictures, write descriptions, use the camera, or use any ideas of their own. Remind the students that for each item brought to class, they must be able to explain what is being put into the air, and where it is coming from.

Allow the students as much time as necessary to collect their proof that man puts things into the air.

In the next science class period ask each student to display and explain his item. Accept any logical idea.

ENCOURAGE
CREATIVITY
IDEAS



TEACHING STRATEGIES

ity will be expanded and reviewed in
of this core, and at that time the
f air pollution will be emphasized.

g:

SOME THINGS THAT CAN CHANGE AIR?

NATURAL CHANGES IN THE AIR.

CHANGE AIR IN ANY WAY? DOES HE PUT
THE AIR THAT DON'T BELONG THERE AND
OUT OF PLACE?

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lain what is being put into the air,
s coming from.

ENCOURAGE
CREATIVE
IDEAS



ents as much time as necessary to collect
at man puts things into the air.

ence class period ask each student to
plain his item. Accept any logical idea.



ANTICIPATED STUDENT BEHAVIORS

Students should:

--list wind, water, and temperature as some ways air
can be changed.

--speculate whether man changes air.

MATERIALS

TEACHING STRATEGIES

When all the students have completed their explanations, ask them to create a bulletin board display of the clippings, photos, drawings, and other items brought to class. These items will be discussed and utilized again later in Activity 5-32.

The drawings, photos, or pictures that the students bring to class might have one of the themes suggested below:

- Bus or auto exhaust
- Smoke from chimneys (home, factory)
- Garbage burning
- Leaves burning
- Dust
- Pesticide sprays
- Aerosol sprays (air freshener, hair spray, etc.)
- Lawn sprinkler
- Airplane exhaust
- Clothes dryer
- Campfires
- Fumes from gasoline and paint cans
- Tobacco smoke

Some advanced students might even suggest that humans and plants put something into the air -- carbon dioxide and oxygen!

TEACHING STRATEGIES

Students have completed their explanations, create a bulletin board display of the items, drawings, and other items brought to class. Items will be discussed and utilized in activity 5-32.

Photos, or pictures that the students might have one of the themes suggested

exhaust
chimneys (home, factory)
smoking
smoking

prays
sprays (air freshener, hair spray, etc.)
filter
exhaust
filter

gasoline and paint cans
cans

Students might even suggest that humans and animals are breathing into the air -- carbon dioxide and

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-30

Students should:

Upon completion of this activity, each student should, as a minimum:

--have collected two or three items that show man adds things to the air.

MATERIALS

TEACHING STRATEGIES

CHAN

See Change of Pacers 32 and 33.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

~~CHANGE OF PACER~~
CHANGE OF PACER

Pacers 32 and 33.

—

UNIT V, CORE G
ACTIVITY 5-30

Teacher _____

Activity name suggested by class:

BSCS USE: Post _____ Tally _____ Rev _____
--

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Please make a list of things which students suggest that man puts into the air and send the list to BSCS.

13. Were all students able to suggest some things which...



7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Please make a list of things which students suggest that man puts into the air and send the list to BSCS.
13. Were all students able to suggest some things which man puts into the air?
 Yes No

14. If possible, send a picture of the bulletin board the students constructed.

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

DSCS Evaluation: EMH Feedback Form 1c

E What anecdotes of student learning did you see or hear in your classroom?

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

7. Understand the composition of air.
8. Realize that the quality of air is variable.
9. Realize that substances are continually being added to air.

Core G Objectives for the Student:

1. Establish that substances are added to natural air because of man's activities.

ENVIRONMENTAL THEME:

Population Dynamics

INQUIRY SKILLS:

Describing

PROBLEM-SOLVING SKILLS:

Explaining, Defending, Answering Why Questions

PRACTICAL APPLICATION:

How to Keep the Air Clean, Practice in Grouping, Seriation, Describing Things

Activity 5-31. What Is in Our Air?

This activity will serve to introduce visible suspended particles in the air as a component of air. A demonstration will be based on the scattering of airborne

TIVITY

als for the Student:

Understand the composition of air.

Realize that the quality of air is variable.

Realize that substances are continually being added to air.

Objectives for the Student:

Establish that substances are added to natural air because of man's activities.

THEME:

on Dynamics

S:
ng

NG SKILLS:

ng, Defending, Answering Why

s

LICATION:

Keep the Air Clean, Practice in
, Seriation, Describing Things

What Is in Our Air?

serve to introduce visible suspended
ir as a component of air. A demon-
eed on the scattering of airborne



BSCS

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE G.

ADDITIVES IN OUR AIR

ACTIVITY 5-31. WHAT IS IN OUR AIR?

During this activity, each student should:

- observe and discuss Slides 5-60 through 5-64.*
- observe dust particles in the classroom air.*
- prepare several air collecting cards.*

ACTIVITY
5-31

MATERIALS

Microscopes, 4
Slides 5-60 through 5-64
Worksheet 5-16
*35 mm Slide projector
*3 X 5 Index cards (about 20)
*Transparent tape
*Scissors

Slide 5-60



furnished in materials kit

TEACHING STRATEGIES

dust in light, after which students will collect air samples and examine them under the microscope. This activity will relate the amount of such dust directly to the degree of local human activity.

Begin by referring to the collection of examples from Activity 5-30 that show additions to the air. Discuss some of the common features of these examples by asking:

HOW ARE SOME OF THESE ADDITIONS TO THE AIR ALIKE?

Then ask:

WHAT IS THE AIR LIKE WHERE THE ADDITIONS ARE PUT INTO THE AIR?

WHAT HAPPENS AFTER THESE ADDITIONS ARE PUT INTO THE AIR?

Project Slide 5-60 (city smog). Then ask:

WHY IS ALL THIS STUFF IN THE AIR?

WHY IS THERE SO MUCH STUFF IN THE AIR IN THIS CITY?

Project Slide 5-61 (town), and ask:

HOW IS THIS PICTURE DIFFERENT FROM THE LAST?

TEACHING STRATEGIES

, after which students will collect air and examine them under the microscope. This will relate the amount of such dust directly to local human activity.

Referring to the collection of examples from the tape that show additions to the air. Discuss common features of these examples by asking:

SOME OF THESE ADDITIONS TO THE AIR ALIKE?

THE AIR LIKE WHERE THE ADDITIONS ARE PUT INTO THE AIR?

WHAT HAPPENS AFTER THESE ADDITIONS ARE PUT INTO THE AIR?

5-60 (city smog). Then ask:

IS THERE MORE OF THIS STUFF IN THE AIR?

IS THERE SO MUCH STUFF IN THE AIR IN THE CITY?

5-61 (town), and ask:

IS THE AIR QUALITY DIFFERENT FROM THE LAST?

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- examine the tape on the collecting cards before and after they have been set out.
- compare the air in the classroom to the air in a city.
- suggest ways that air pollution might bother people.
- suggest ways that air pollution might be reduced.
- complete and discuss Worksheet 5-16.

Students should:

--observe that many are dark, light, bright, dull, and so forth.

--respond, "It's smoky," "It's thick," "It's smoggy."

--respond, "They go up," "They spread out," "They disappear."

--recall Activity 5-30 and respond, "Because people put it in," "Because a lot of cars and factories put stuff in the air."

--infer that because a city has many people there will be many additives in the air.

--respond, "Less smoke," "Less smog," "Less stuff in the air."

MATERIALS

Slide 5-61



Slide 5-62



TEACHING STRATEGIES

WHY DOES THERE SEEM TO BE LESS STUFF IN THE AIR?

Project Slide 5-62 (rural scene), and ask:

HOW IS THIS SLIDE DIFFERENT FROM THE LAST?

WHY DO YOU SUPPOSE THERE IS LESS STUFF IN THE AIR HERE?

HOW GOOD IS THE AIR WE HAVE IN OUR COMMUNITY?

WHY IS THE AIR THIS WAY?

WHAT DO YOU THINK ABOUT THE AIR IN THIS ROOM?

LET'S LOOK IN THIS ROOM TO SEE HOW MUCH STUFF IS IN THE AIR.

Darken the room and turn on the slide projector without a slide in place.

Dust particles should be easily visible in the light of the projector. As soon as the students have observed the dust particles in the beam of light, ask:

WHAT DO YOU THINK ABOUT THE AIR IN THIS ROOM?

HOW DOES IT COMPARE WITH THE PICTURE OF THE AIR IN THE LARGE CITY?

IN WHICH PLACE WOULD YOU RATHER LIVE?

TEACHING STRATEGIES

HERE SEEM TO BE LESS STUFF IN THE AIR?

62 (rural scene), and ask:

SLIDE DIFFERENT FROM THE LAST?

SUPPOSE THERE IS LESS STUFF IN THE

THE AIR WE HAVE IN OUR COMMUNITY?

AIR THIS WAY?

THINK ABOUT THE AIR IN THIS ROOM?

IN THIS ROOM TO SEE HOW MUCH STUFF
IR.

and turn on the slide projector without

ould be easily visible in the light of
As soon as the students have observed
es in the beam of light, ask:

THINK ABOUT THE AIR IN THIS ROOM?

COMPARE WITH THE PICTURE OF THE
LARGE CITY?

PLACE WOULD YOU RATHER LIVE?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-31

Students should:

--respond, "There are fewer people," "There are not as many cars."

--respond, "Clean air," "No smog."

--respond, "No factories," "Fewer people," "Fewer cars."

--respond variously, "Smoggy," to "Clean."

--respond, "Lots of people," to "Not so many people." (Responses will depend upon the local situation.)

--respond, "It's clean," "We have no dust," "No cars."

--respond, "There's dust in our air," "It's not as clean as I thought."

--indicate that the city had many more additives in its air than the classroom.

--indicate their preferences, probably stating that the relatively clean air of the smaller town would make it a better place to live.

MATERIALS

TEACHING STRATEGIES

HOW COULD WE FIND OUT WHAT IS IN THE AIR
IN OTHER PLACES?

CAN WE ALWAYS SEE JUST BY LOOKING AT THE
AIR WHAT IS IN IT?

WHAT HAVE WE USED TO LOOK AT THINGS WE
CAN'T SEE WITH JUST OUR EYES?

WE ARE GOING TO COLLECT SOME AIR SAMPLES
AND LOOK AT THEM WITH THE MICROSCOPE TO
SEE IF THERE IS ANYTHING IN THAT AIR.

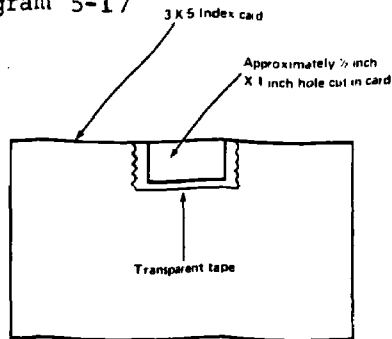
WHAT ARE SOME GOOD PLACES TO COLLECT AIR
SAMPLES?

Write the suggestions on the chalkboard.

Divide the students into four groups. Distribute four 3 X 5 index cards, transparent tape, and scissors to each group. Tell each group to choose four of the places suggested and written on the chalkboard from which to collect air samples. Direct them to write the name of one place on each of their cards and also to put their own names on the cards. Instruct them to make their air collecting cards by following these directions:

1. On the long side of each card, cut a square approximately one inch down, one inch across, and one inch up. (See Diagram 5-17.)

Diagram 5-17



TEACHING STRATEGIES

DO WE FIND OUT WHAT IS IN THE AIR
PLACES?

ALWAYS SEE JUST BY LOOKING AT THE
IS IN IT?

WE USED TO LOOK AT THINGS WE
WITH JUST OUR EYES?

HOW DO WE GO ABOUT COLLECTING SOME AIR SAMPLES
AT THEM WITH THE MICROSCOPE TO
SEE IF THERE IS ANYTHING IN THAT AIR.

WHAT ARE SOME GOOD PLACES TO COLLECT AIR

Questions on the chalkboard.

Divide students into four groups. Distribute four
cards, transparent tape, and scissors to
allow each group to choose four of the
questions read and written on the chalkboard from
to collect air samples. Direct them to write the
answers on each of their cards and also to
write their names on the cards. Instruct them to
begin collecting cards by following these

On the long side of each card, cut a square
approximately one inch down, one inch across,
and one inch up. (See Diagram 5-17.)

ANTICIPATED STUDENT BEHAVIORS

Students should:

--suggest such things as using the slide projector,
looking at the air, and so forth.

--respond, "No, we need to use something to help us
look."

--respond, "The microscope."

--suggest such places as outside, another
classroom, air vents, parking lot, near a
window, and so forth.

MATERIALS

TEACHING STRATEGIES

2. Place a piece of transparent tape over this opening.

Caution students not to touch the tape to anything or with anything.

Distribute microscopes. Instruct students to examine at least one piece of tape before they take the collecting cards to their places. Discuss how the tape looks now and tell the students that they will examine the tapes once again after they have been sitting out for twenty-four hours.

When the collecting cards have been prepared and examined under the microscope, have students take them to the places they have chosen and written on their cards. If the cards are to be placed outdoors, tell the students to put a small rock carefully on the card so it won't blow away. If the cards are to be placed indoors, caution students to place them where they will not be disturbed or moved. Leave the collecting cards in their places overnight.

The next day allow students to collect the cards and examine them under the microscope. They should notice a variety of specks, lines, and things that were not present the day before.

Ask:



TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-31

Students should:

piece of transparent tape over this

not to touch the tape to anything or

scopes. Instruct students to examine at
of tape before they take the collecting
places. Discuss how the tape looks now
students that they will examine the tapes
they have been sitting out for twenty-

ing cards have been prepared and examined
scope, have students take them to the
chosen and written on their cards. If
be placed outdoors, tell the students to
carefully on the card so it won't blow
cards are to be placed indoors, caution
them where they will not be disturbed
the collecting cards in their places

- prepare air collecting cards.
- examine the cards under a microscope.



students to collect the cards and
the microscope. They should notice
marks, lines, and things that were not
before.

- re-examine cards with the microscope.

MATERIALS

TEACHING STRATEGIES

ARE THERE THINGS PRESENT IN THE AIR THAT WE
CAN'T SEE?

WHAT ARE THESE THINGS THAT WE SEE THROUGH THE
MICROSCOPES?

WHICH PLACE HAD THE MOST THINGS IN THE AIR?

WHY?

WOULD THIS STUFF IN THE AIR BOTHER PEOPLE?

HOW?

DO YOU KNOW ANYONE WHO IS BOTHERED BY THINGS
THAT ARE IN THE AIR?

WHAT COULD BE DONE TO GET RID OF ALL THE STUFF
WE PUT INTO THE AIR?

CLUES



TEACHING STRATEGIES

THINGS PRESENT IN THE AIR THAT WE

THESE THINGS THAT WE SEE THROUGH THE
S?

WE HAD THE MOST THINGS IN THE AIR?

WHAT STUFF IN THE AIR BOTHER PEOPLE?

HOW MANY PEOPLE WHO IS BOTHERED BY THINGS
IN THE AIR?

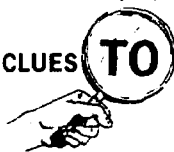
WHAT CAN BE DONE TO GET RID OF ALL THE STUFF
IN THE AIR?

ANTICIPATED STUDENT BEHAVIORS

Students should:

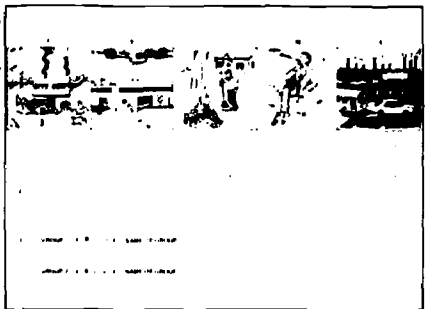
- indicate that there are things present in the air that cannot be seen.
- suggest dust, dirt, smoke, and such as the things they saw through the microscopes.
- indicate which place had the most things in the air.
- suggest such reasons as more people around, more air movement, and so forth.
- suggest that it might.
- suggest such effects as respiratory problems, visibility problems, ugliness, and so on.
- relate their personal knowledge of relatives and friends who are bothered by additives in the air.
- suggest many ways to cut down on air pollution, such as cleaning the smoke, fewer cars, not burning garbage, well-tuned cars, using car pools and public transportation, not burning leaves, and filters on smoke stacks.

CLUES **TO** SUCCESS



MATERIALS

Worksheet 5-16



Slide 5-63

TEACHING STRATEGIES

Clues to Success

The purpose of this Clue to Success is to have the students discuss various types of air pollution, to practice serial ordering, to practice grouping, and to observe and describe things in the environment. Discussing this activity is as important as completing the worksheet.

Distribute Worksheet 5-16. You may want to provide practice in following directions and in knowing left and right. Instruct the students to put their names and the date in the spaces provided.

Say:

READ THE QUESTION TO YOURSELF AS I READ IT
ALoud. THEN MARK YOUR ANSWER TO EACH QUESTION.
DO NOT TELL ANYONE WHAT YOUR ANSWERS ARE UNTIL
WE TALK ABOUT THEM LATER.

Project Slide 5-63.

WHAT IS IN PICTURE A?

Proceed in this manner with Pictures B through E. Do not elicit detailed descriptions at this time.

DISTRIBUTE

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-31

Students should:

This Clue to Success is to have the various types of air pollution, to ordering, to practice grouping, and to describe things in the environment. Discussion is as important as completing the

sheet 5-16. You may want to provide following directions and in knowing left instruct the students to put their names in the spaces provided.



DISTRIBUTE MATERIALS

QUESTION TO YOURSELF AS I READ IT
MARK YOUR ANSWER TO EACH QUESTION.
NO ONE WHAT YOUR ANSWERS ARE UNTIL
GET THEM LATER.

3.

PICTURE A?

anner with Pictures B through E. Do
ed descriptions at this time.

--respond, "A garbage dump."

--respond for other pictures: B. "A factory with a
smokestack," C. "A person burning leaves," D.
"A person smoking a cigarette," E. "Many factories
and vehicles."

MATERIALS

TEACHING STRATEGIES

Draw the students' attention to the blank boxes below the pictures for Question 1.

Say:

EACH OF THESE PICTURES SHOWS THAT SOMETHING IS BEING ADDED TO THE AIR. LOOK AT THEM CAREFULLY AND DECIDE IN WHICH PICTURE THERE ARE THE MOST THINGS BEING ADDED TO THE AIR. PUT A 1 IN THE BOX BELOW THAT PICTURE. THEN DECIDE WHICH PICTURE SHOWS FEWER THINGS BEING ADDED TO THE AIR, AND PUT A 2 BELOW THAT PICTURE. GIVE EACH OF THE PICTURES A NUMBER FROM 1 TO 5 TO PUT THEM IN ORDER FROM THE ONE WITH THE MOST TO THE ONE WITH THE LEAST THINGS ADDED TO THE AIR.

See if there are any questions and circulate around the room to verify that the students are following the instructions.

Continue to project Slide 5-63. Direct the students' attention to the blank lines of Question 2 on their worksheets.

Say:

WRITE AS MANY WORDS AS YOU CAN THINK OF TO DESCRIBE THE THINGS IN THE PICTURES.

Assist the students as necessary with spelling. Provide dictionaries if your students are able to use them.

Continue to project Slide 5-63.

TEACHING STRATEGIES

nts' attention to the blank boxes below
or Question 1.

THESE PICTURES SHOWS THAT SOMETHING IS
ED TO THE AIR. LOOK AT THEM CAREFULLY
E IN WHICH PICTURE THERE ARE THE MOST
ING ADDED TO THE AIR. PUT A 1 IN THE
THAT PICTURE. THEN DECIDE WHICH
SHOWS FEWER THINGS BEING ADDED TO THE
PUT A 2 BELOW THAT PICTURE. GIVE
THE PICTURES A NUMBER FROM 1 TO 5
EM IN ORDER FROM THE ONE WITH THE MOST
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HE THINGS IN THE PICTURES.

ents as necessary with spelling. Provide
your students are able to use them.

ject Slide 5-63.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--number the pictures from most to least:

- A. 3
- B. 2
- C. 4
- D. 5
- E. 1

--write descriptive words on the lines provided.

MATERIALS

Slide 5-64

1. CIRCLE THE WORDS YOU SEE IN EACH

WET	WATER	WIND	WAVE
WELL	WINDY	WAVE	WAVE
WAVE	WAVE	NATURAL	WAVE
WAVE	WAVE	WAVE	WAVE
WAVE	WAVE	WAVE	WAVE

2. WRITE A NAME FOR EACH GROUP THAT BELONGS TO THE LINE

WET	WATER	WIND	WAVE
WELL	WINDY	WAVE	WAVE
WAVE	WAVE	NATURAL	WAVE
WAVE	WAVE	WAVE	WAVE
WAVE	WAVE	WAVE	WAVE

TEACHING STRATEGIES

Ask:

DO YOU THINK THESE FIVE PICTURES CAN BE PUT INTO TWO GROUPS?

WILL THERE BE THE SAME NUMBER OF PICTURES IN EACH GROUP?

After establishing that one group will have more pictures than the other, tell students to think of a way to group the pictures. Remind them that there is often more than one way to group.

Now direct their attention to Question 3. Instruct them to circle the letter of each picture that belongs in one of the groups they have made.

Then say:

NOW WRITE A NAME FOR THAT GROUP ON THE LINE NEXT TO THE LETTERS YOU HAVE CIRCLED.

Instruct students to do the same for Group 2.

Have students turn their worksheets over to continue with Questions 4 and 5.

Project Slide 5-64.

Say:

TEACHING STRATEGIES

ASK THESE FIVE PICTURES CAN BE PUT
GROUPS?

BE THE SAME NUMBER OF PICTURES IN

ing that one group will have more
e other, tell students to think of
he pictures. Remind them that there is
one way to group.

attention to Question 3. Instruct them
tter of each picture that belongs in
s they have made.

NAME FOR THAT GROUP ON THE LINE
LETTERS YOU HAVE CIRCLED.

s to do the same for Group 2.

in their worksheets over to continue with

4.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-31

Students should:

--respond, "Sure."

--respond, "No."

--circle the letter of each picture that belongs
in one of the groups they have made.

--write the name of a group, such as, "People in
the picture," or "Shows less pollution."

--circle the letters for each picture in the other
group, such as B, C, and E; name the group such
as, "No people in the picture," or "Shows the
most pollution."

FIND THE LIST OF WORDS FOR NUMBER 4. I WILL READ THE WORDS. CIRCLE ANY WORDS YOU DO NOT UNDERSTAND.

Once students have located the list of words, you may wish to shut off the projector so they are not distracted by the slide. Be sure to repeat each word.

Project Slide 5-63 again.

Read the instructions and tell the students to look again at the pictures projected on the screen. Read and repeat each word. Tell the students to circle any word that describes something in the pictures.

When the students are finished, collect their worksheets. Discuss each question and use the slide to assist in the discussion.

Interpretation and Scoring:

Question 1 was designed to assess whether students are able to order serially a set of pictures "in their heads" without any physical manipulation. If you have a spare worksheet, provide the opportunity for students who experienced difficulty with this task to cut out and manipulate the pictures. This question also assesses the students' ability to observe and react to the gradations of additives to the air. Review Activities 5-30 and 5-31 as necessary.

Question 2 reflects the students' background in observing and describing without being cued by written suggestions (as in Question 5). Most students will be able to

TEACHING STRATEGIES

LIST OF WORDS FOR NUMBER 4. I WILL
WORDS. CIRCLE ANY WORDS YOU DO NOT

ave located the list of words, you may
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Be sure to repeat each word.

-63 again.

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ty to observe and react to the gradations
the air. Review Activities 5-30 and
y.

ects the students' background in observing
without being cued by written suggestions
5). Most students will be able to

ANTICIPATED STUDENT BEHAVIORS

Students should:

--circle the words in Question 4 they do not
understand.

--mark an X on each word that describes something
in the pictures, probably omitting natural,
pretty, funny, bright, furry, wet, and clean.

--explain and defend their choices.

MATERIALS

TEACHING STRATEGIES

generate at least a few descriptive words. Compare these results with Tallysheet 5-3 in Activity 5-10.

Question 3 assesses the students' background in creating and labeling groups. While the number of objects in each group is smaller than in previous groups, greater difficulty will be encountered in generating ideas for grouping. Compare the results with Activities 5-10 and 5-24.

Question 4 provides a guideline for vocabulary development. Use your initiative to help the students enrich their vocabularies!

Question 5 is another assessment of the students' background in describing. Students who mark less than six words may be considered low in describing and need many experiences in describing. Students who mark six to ten words have medium background, while those who have more than ten words marked have a high level of describing skills.

Specific instructions for scoring are on Tallysheet 5-8. Complete the tallysheet and send it to BSCS. Instructions are also given on the Tallysheet for recording the results in the Student Record of Progress.

TEACHING STRATEGIES

st a few descriptive words. Compare these
Tallysheet 5-3 in Activity 5-10.

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groups. While the number of objects in each
group than in previous groups, greater
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groups. Compare the results with Activities 5-10 and

provides a guideline for vocabulary develop-
ment initiative to help the students enrich
their vocabularies!

Other assessment of the students'
describing. Students who mark less than
three are considered low in describing and need
more practice in describing. Students who mark six
or more are considered medium background, while those who
mark seven or more are considered high background.

Directions for scoring are on Tallysheet
5-3. The tallysheet and send it to BSCS.
A key is also given on the Tallysheet for
recording results in the Student Record of Progress.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-31

*Upon completion of this activity, each student
should, as a minimum:*

- have observed Slides 5-60 through 5-64.*
- have noticed dust in the air in the classroom.*
- have participated in collecting air samples.*
- have examined the tape on the collecting cards,
using the microscope.*
- have completed and discussed Worksheet 5-16.*

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE G
ACTIVITY 5-31

Teacher _____

Activity name suggested by class:

BSCS USE: Post ____ Tally ____ Rev ____

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

Did students have any problems in using the microscope? Yes No If so, what types of problems did they have?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Did students have any problems in using the microscope? Yes No If so, what types of problems did they have?
13. What problems, if any, did students have in preparing the air sample collection cards?
14. Were students able to understand the instructions for the serial numbering task on Worksheet 5-16?

Complete and send Tallysheet 5-8 to BSCS.

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

7. Understand the composition of air.
8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.
10. Comprehend the impact of air pollution in our environment.

Core G Objectives for the Student:

1. Establish that substances are added to natural air because of man's activities.
2. Establish that an additive to air need not be seen to be present.

ENVIRONMENTAL THEME:

Complementarity of Organisms and Environment,
Ecological Trade-offs

INQUIRY SKILLS:

Predicting, Applying

PROBLEM-SOLVING SKILLS:

Organizing Data, Recognizing a Problem and
Formulating a Question

PRACTICAL APPLICATION:

Knowledge That Noxious Gases Exist, Following
Directions, Communication Skills



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

7. Understand the composition of air.
8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.
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Core G Objectives for the Student:

1. Establish that substances are added to natural air because of man's activities.
2. Establish that an additive to air need not be seen to be present.

ENVIRONMENTAL THEME:

Complementarity of Organisms and Environment,
Ecological Trade-offs

INQUIRY SKILLS:

Predicting, Applying

PROBLEM-SOLVING SKILLS:

Organizing Data, Recognizing a Problem and
Formulating a Question

PRACTICAL APPLICATION:

Knowledge That Noxious Gases Exist, Following
Directions, Communication Skills

ACTIVITY

Goals for the Student:

- Understand the composition of air.
- Realize that the quality of air is variable.
- Realize that substances are continually added to air.
- Comprehend the impact of air pollution in our environment.

Objectives for the Student:

Establish that substances are added to natural air because of man's activities.

Establish that an additive to air need not be seen to be present.

GENERAL THEME:

Interdependency of Organisms and Environment,
Societal Trade-offs

OBJECTIVES:

Identifying, Applying

LEARNING SKILLS:

Collecting Data, Recognizing a Problem and
Formulating a Question

APPLICATION:

Recognizing That Noxious Gases Exist, Following
Procedures, Communication Skills

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE G.

ADDITIVES IN OUR AIR

ACTIVITY 5-32.

ALTERED AIR
AND LIFE



BSCS

MATERIALS

- *2 Growing bean plants per pair of students
- *Car
- *2 One-quart jars with lids per pair of students
- *Paper
- *Pencil
- *Glass jars with lids, at least five, any size
- *1 Drop of at least five of the following:
 - Vinegar
 - Turpentine
 - Gasoline
 - Kerosene
 - Glue
 - Perfume
 - Aftershave
 - Air freshener
 - Deodorant
 - Ammonia

(continued on next page)

furnished in materials kit

TEACHING STRATEGIES

Activity 5-32. Altered Air and Life

The purpose of this activity is to have the students determine that the invisible additives in air affect the quality of the air. Plants and car exhaust will be used to illustrate this concept. Also in this activity, the students will choose one of the pictures (drawings or photographs) from the display in Activity 5-30 and analyze it. They will identify what is being added to the air, the source of the additive, the form it has taken, and whether or not it will do any harm.

Teacher Preparation:

1. Obtain at least five glass jars with lids. Into each glass jar put one drop of one of the following substances and screw the lid on tightly. These drops will put an odor into the air contained in the jars. Display the jars somewhere in the classroom where they can be easily seen by all students.

Vinegar	Perfume
Turpentine	Aftershave
Gasoline	Air freshener
Kerosene	Deodorant
Glue	Ammonia

2. To germinate the bean seeds, plant them in small containers such as paper drinking cups that will fit inside the quart jars. Fill the container with a three-inch layer of dirt, and plant the bean seed about one-inch below the surface. In four to six days, the plant should be approximately two- to three-inches tall.

TEACHING STRATEGIES

1. Altered Air and Life

of this activity is to have the students at the invisible additives in air affect the air. Plants and car exhaust will be illustrate this concept. Also in this activity, will choose one of the pictures (drawings is) from the display in Activity 5-30 and They will identify what is being added to source of the additive, the form it has ether or not it will do any harm.

Preparation:

at least five glass jars with lids. Into glass jar put one drop of one of the ng substances and screw the lid on . These drops will put an odor into contained in the jars. Display the newhere in the classroom where they easily seen by all students.

Perfume
Aftershave
Air freshener
Deodorant
Ammonia

minate the bean seeds, plant them in small ers such as paper drinking cups that will ide the quart jars. Fill the container three-inch layer of dirt, and plant the ed about one-inch below the surface. In six days, the plant should be approxi- two- to three-inches tall.

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- recall the various components of air.
- categorize the components of air as natural or man-made.
- smell several jars of air.
- define fumes as unseen additives to the air.
- perform the exhaust experiment.
- participate in developing an observation sheet.
- record his observations of the plants in Jars 1 and 2.
- conclude that fumes can be harmful to living things.
- choose an item from the bulletin board display and identify what is being added to the air, its source, its form, and what harm it might do.

MATERIALS

- *Masking tape
- *Picture of a car
- *Bulletin board display from Activity 5-30
- *Cassette tape recorder
- *Blank tapes

*Not furnished in materials kit

TEACHING STRATEGIES

Begin this activity by asking:

WHAT IS FOUND IN THE AIR IN OUR ROOM?

WHICH OF THESE ARE NATURAL AND WHICH ARE MAN-MADE?

List the students' responses on the chalkboard in two categories: those that are natural and those that are man-made. It may be necessary to explain to the students that natural refers to something meant to be in the air.

Natural

Oxygen
Carbon Dioxide
Water

Man-made

Smoke
Dust
Dirt

Ask:

CAN YOU ALWAYS SEE WHAT IS IN THE AIR?

Draw the students' attention to the jars on the table.

Then ask:

DO YOU SEE ANYTHING IN THESE JARS?

DO YOU SEE ANYTHING IN THE AIR CONTAINED IN THE JARS?

Ask several students to open the jars on the table, sniff the air in them and try to identify what, if anything, is in the air. After the students have attempted to

TEACHING STRATEGIES

activity by asking:

WHAT IS FOUND IN THE AIR IN OUR ROOM?

WHICH OF THESE ARE NATURAL AND WHICH ARE MAN-MADE?

Record students' responses on the chalkboard in two columns: those that are natural and those that are man-made. It may be necessary to explain to the students the difference between natural and man-made. Refer to something meant to be in the air.

Man-made

Smoke

Dust

Dirt

DO YOU ALWAYS SEE WHAT IS IN THE AIR?

Draw students' attention to the jars on the table.

IS THERE ANYTHING IN THESE JARS?

IS THERE ANYTHING IN THE AIR CONTAINED IN THE JARS?

Ask students to open the jars on the table, sniff the air, and try to identify what, if anything, is in the air. After the students have attempted to

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY

5-32

Students should:

--recall and state the components of air discussed previously, such as, "Dirt," "Carbon dioxide," "Oxygen."

--categorize the components as natural or man-made.

--respond, "No," "Only sometimes," "I don't know."

--respond, "No," "They're clear," "Nothing but air."

--respond, "I don't see anything," "Doesn't look like it."

MATERIALS

TEACHING STRATEGIES

identify what is in the air contained in the jars,
continue the discussion by asking:

HOW DID WE KNOW THAT THERE WAS SOMETHING ADDED
TO THE AIR IN THE JARS?

CAN YOU ALWAYS SMELL TO FIND OUT IF SOMETHING
IS IN THE AIR?

WHAT THINGS ARE ADDED TO THE AIR THAT WE CANNOT
SEE OR SMELL?

ADDITIONS TO THE AIR THAT WE CANNOT SEE ARE
CALLED FUMES.

Write the word "fumes" on the chalkboard.

CAN FUMES IN THE AIR BE DANGEROUS TO LIVING
THINGS?

Set on a table the one- quart glass jars, bean plants,
masking tape, and a picture of a car.

Then ask:

HOW COULD WE USE THESE THINGS TO FIND OUT IF
FUMES ARE DANGEROUS TO LIVING THINGS?

TEACHING STRATEGIES

is in the air contained in the jars,
discussion by asking:

DO YOU KNOW THAT THERE WAS SOMETHING ADDED
TO THE AIR IN THE JARS?

HOW DO YOU ALWAYS SMELL TO FIND OUT IF SOMETHING
IS IN THE AIR?

WHAT GASES ARE ADDED TO THE AIR THAT WE CANNOT
SMELL?

WHAT GASES IN THE AIR THAT WE CANNOT SEE ARE
DANGEROUS TO LIVING THINGS?

Write "fumes" on the chalkboard.

WHAT GASES IN THE AIR BE DANGEROUS TO LIVING
THINGS?

Use the one- quart glass jars, bean plants,
and a picture of a car.

HOW DO WE USE THESE THINGS TO FIND OUT IF
GASES ARE DANGEROUS TO LIVING THINGS?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "We smelled inside the jars," "We
sniffed."

--speculate on how often additives in the air can
be smelled.

--suggest such things as gases, water vapor, sprays.


**ACCEPT ALL
ANSWERS**

--speculate about how dangerous fumes are to living
things.

--suggest various ways to use the bean plants, jars,
and car to find out if fumes are dangerous to
living things.

MATERIALS

TEACHING STRATEGIES

ENCOUR
CREATI
IDEAS

Incorporating the students' ideas into the experiment as much as possible, follow the directions below to set up the investigation.



1. Distribute a quart jar and a bean plant to each student pair. Instruct the students to place a bean plant in one of the jars and cap it. Label it "Jar 1" and set it aside.

NOTE: The entire paper cup that contains the plant can be placed in the jar. It is not necessary to replant the bean sprout into the larger jar.

2. Distribute another quart jar to each student pair. Tell them to take this quart jar with them when they go outside. Take students into the school parking lot and start your car or one you've arranged to use. Before the students continue, allow the car to run until there is no black smoke coming from the exhaust.
3. Direct the students to hold their open jars close to or over the exhaust pipe and collect some exhaust. Immediately cap the jars.
4. When all the student pairs have collected their exhaust samples, return to the classroom and

TEACHING STRATEGIES**ANTICIPATED STUDENT BEHAVIORS**ACTIVITY
5-32

Students should:

**ENCOURAGE
CREATIVE
IDEAS**

Put the students' ideas into the experiment as follows. Follow the directions below to set up the experiment.

**HAVE STUDENTS
WORK IN PAIRS**

Give each student pair a quart jar and a bean plant to each pair. Instruct the students to place the plant in one of the jars and cap it. Label the jar "Jar 1" and set it aside.

Give each student pair the paper cup that contains the plant placed in the jar. It is not necessary to place the bean sprout into the larger jar.

Give each student pair another quart jar to each student pair. Instruct them to take this quart jar with them when they go outside. Take students into the schoolyard and start your car or one you've never used before. Before the students continue, let the car run until there is no black smoke coming from the exhaust.

Instruct the students to hold their open jars close to the exhaust pipe and collect some air. Immediately cap the jars.

When the student pairs have collected their air, have them return to the classroom and

MATERIALS

TEACHING STRATEGIES

instruct them to place a bean plant in the jar quickly and immediately to cap it. Label this jar, Jar 2.

5. Direct the students to put their names on the jars and place both of them in the sunlight.

Ask:

WHAT KIND OF AIR IS IN JAR 1?

WHAT KIND OF AIR IS IN JAR 2?

Tell the students that each day during science class they will be replenishing the air in Jar 2 with more car exhaust, and the natural air in Jar 1 with more natural air. They will also need to water the bean plants daily.

WHAT DO YOU THINK WILL HAPPEN TO THE PLANT IN JAR 1?

WHAT DO YOU THINK WILL HAPPEN TO THE PLANT IN JAR 2?

HOW COULD WE KEEP TRACK OF WHAT IS HAPPENING TO THE PLANTS EACH DAY?

Assist the students in developing some type of observation sheet, such as:

Jar 1 (natural)

Jar 2 (exhaust)

Day 1:

Day 2:

Day 3:

Day 4:

Day 5:

TEACHING STRATEGIES

them to place a bean plant in the jar and immediately to cap it. Label this 2.

the students to put their names on the place both of them in the sunlight.

OF AIR IS IN JAR 1?

OF AIR IS IN JAR 2?

ants that each day during science class replenishing the air in Jar 2 with more car the natural air in Jar 1 with more natural also need to water the bean plants

YOU THINK WILL HAPPEN TO THE PLANT

YOU THINK WILL HAPPEN TO THE PLANT

WE KEEP TRACK OF WHAT IS HAPPENING TO S EACH DAY?

ments in developing some type of observation

(natural)

Jar 2 (exhaust)

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "Natural air," "Regular air."

--respond, "Air with fumes in it," "Man-made air," "Bad air," "Car air."

--predict that it will live.

--predict that it will die, wither, get sick.

--suggest recording what they look like, taking pictures of the plants, drawing them.

MATERIALS

TEACHING STRATEGIES

Use student suggestions! There are many ways to record observations!

The plant exposed to the car exhaust should die within a week. When this happens, ask:

WHAT HAS HAPPENED TO THE PLANTS?

WHY DID THE PLANT IN JAR 2 DIE?

WHICH AIR IS BETTER FOR THE PLANTS? WHY?

ARE FUMES IN THE AIR HARMFUL TO PLANTS?

IF FUMES CAN BE HARMFUL TO PLANTS, COULD THEY ALSO BE HARMFUL TO US?

WHAT TYPES OF FUMES DID WE PUT IN THE JAR?

WE COULD SMELL THE FUMES IN THE CAR EXHAUST. THERE ARE SOME FUMES THAT ARE ESPECIALLY DANGEROUS BECAUSE THEY CANNOT BE SEEN OR SMELLED.

WHAT ARE SOME OTHER TYPES OF FUMES THAT MIGHT BE HARMFUL TO LIVING THINGS?

At this point in the discussion, be sure to mention carbon monoxide (car exhaust) if it is not mentioned by the students. Other fumes that many times cause accidental deaths and deserve special mention are those from gas stoves or heaters, camp stoves, sewers (methane gas), and burning coal (hydrogen sulfide).

TEACHING STRATEGIES

uggestions! There are many ways to record

ed to the car exhaust should die within a
e happens, ask:

APPENED TO THE PLANTS?

PLANT IN JAR 2 DIE?

S BETTER FOR THE PLANTS? WHY?

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N BE HARMFUL TO PLANTS, COULD THEY
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(car exhaust) if it is not mentioned by
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and deserve special mention are
oves or heaters, camp stoves, sewers
ing coal (hydrogen sulfide).

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-32

Students should:

- observe that the plant in the natural air is still healthy and that the plant in the man-made air is dying.
- state that the plant died because the exhaust fumes present in the air.
- infer that the natural air is better for the plants because the man-made air caused it to die.
- respond, "Yes," "The plant died," "It makes things die."
- respond, "Yes," "We'd probably die, too."
- respond, "Car fumes," "Exhaust."

- suggest other types of fumes that might be harmful to humans or to other living things.

As a culminating activity to assess informally the students' understanding of what man adds to the air, proceed with the following:

WE HAVE BEEN DISCUSSING AIR AND WHAT WE PUT IN IT.

Point to the bulletin board display from Activity 5-30.

WHAT DOES OUR BULLETIN BOARD DISPLAY SHOW US?

WHAT HAVE WE LEARNED ABOUT THE THINGS THAT ARE PUT IN THE AIR?

Write the following on the chalkboard:

1. What is being added to the air?
2. Where is it coming from?
3. Can you see it?
4. Will it do any harm?

Tell the students that their job for this class period is to take the role of an air pollution inspector.

To do this they will choose one of the pictures on the bulletin board. (They may bring the picture to their

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

Students should:



ng activity to assess informally the
rstanding of what man adds to the air,
ne following:

EN DISCUSSING AIR AND WHAT WE PUT IN

ulletin board display from Activity 5-30.

OUR BULLETIN BOARD DISPLAY SHOW US?

WE LEARNED ABOUT THE THINGS THAT ARE
AIR?

owing on the chalkboard:

being added to the air?

it coming from?

ee it?

o any harm?

ts that their job for this class period
role of an air pollution inspector.

will choose one of the pictures on the
may bring the picture to their

--recall Activity 5-30 and say, "Air pollution,"
"Things in the air," "Proves that there's stuff
in the air."

--respond, "What they are," "What they do," "That
they are bad for us," "That some you can see
and some you can't," "You can't smell some."

MATERIALS

TEACHING STRATEGIES

desk if they choose.) They will inspect the place in the picture for air pollution by answering the questions on the chalkboard. The air pollution report made for this place may be written, taped, or given to the teacher orally.

Do not give any guidance to the student at this point. If he has been successful with this core of activities, he should be able to choose a picture and analyze it as suggested.

Encourage any students who might wish to give their air pollution report to the class, to do so. If any students wish to analyze more than one picture, encourage them also.

CHANGE

See Change of Pacer 36, 37, and 38.

TEACHING STRATEGIES

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students who might wish to give their air to the class, to do so. If any students more than one picture, encourage them

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-32

Upon completion of this activity, each student should, as a minimum:

- have participated in setting up the plant experiment.*
- have observed that the plant in the exhaust jar died.*
- have stated that fumes can be harmful to living things.*
- have chosen an item from the bulletin board display and identified what is being added to the air, its source, its form, and what harm it might do.*



CHANGE OF PACER

cer 36, 37, and 38.

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE G
ACTIVITY 5-32

Teacher _____

Activity name suggested by class:

BSCS USE:	Post _____	Tally _____	Rev _____
-----------	------------	-------------	-----------

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes preparing for each day's science class						
4.	Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

Did students suggest workable experiments using the plants, the jars, and the car? Yes No Comment.

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Did students suggest workable experiments using the plants, the jars, and the car? Yes No Comment.
13. Did the students have any problems in conducting the bean plant experiment?
 No Yes If so, what problems did they have?
14. How much help did the students require in devising an observation record? Comment.
15. Select several written or taped pollution reports and send them to BSCS.

Teacher _____

A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

BSCS Evaluation: EMH Feedback Form 10

B. at anecdotes of student learning did you see or hear in your classroom?



- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.
10. Comprehend the impact of air pollution on our environment.

Core G Objectives for the Student:

1. Establish that substances are added to natural air because of man's activities.
2. Establish that an additive to air need not be seen to be present.
3. Establish that some things added to air are harmful to living things.

ENVIRONMENTAL THEME:

Population Dynamics, Finiteness of Resources

INQUIRY SKILLS:

Translating, Value Judging

PROBLEM-SOLVING SKILLS:

Drawing Conclusions

PRACTICAL APPLICATION:

Making a Graph, Safety, Motor Skills

ACTIVITY

Goals for the Student:

8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.
10. Comprehend the impact of air pollution on our environment.

Objectives for the Student:

1. Establish that substances are added to natural air because of man's activities.
2. Establish that an additive to air need not be seen to be present.
3. Establish that some things added to air are harmful to living things.

GENERAL THEME:

Population Dynamics, Finiteness of Resources

ATTITUDES:

Comparing, Value Judging

TEACHING SKILLS:

Drawing Conclusions

APPLICATION:

Using a Graph, Safety, Motor Skills

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE G.

ADDITIVES IN OUR AIR

ACTIVITY 5-33. DO WE NEED A FILTER
ON OUR TOWN?



BSCS

MATERIALS

Worksheet 5-17
Slide 5-65
Water pipe, 1 per pair of students, with extra vial
Mityvac hand pump, 1 per pair of students
Vinyl tubing, 2 twelve-inch pieces of 1/4-inch inside diameter, per pair of students
Broad range indicator solution, Hach Chem. #443
*Distilled water
*Chalk
*Ruler or yardstick
*Bottle of rinse water
*35 mm Slide projector
*Paper Towels

*Not furnished in materials kit

TEACHING STRATEGIES

Activity 5-33. Do We Need a Filter on Our Town?

This activity will relate directly to Activity 5-32 and will involve testing for the actual pollutants produced by auto exhausts. The amount of pollutants in the air will be measured at varying distances from the exhaust pipe. The test will enable the student to relate dilution as an important factor in the ability of the environment to absorb pollutants.

The students should still be involved in Activity 5-32, Altered Air and Life, as far as the daily collection of exhaust is concerned. Before the students prepare for their next collection of exhaust fumes to replenish the plant jars, explain:

BESIDES COLLECTING EXHAUST FOR YOUR PLANT JARS, TODAY WE WILL ALSO DO A TEST TO FIND OUT HOW WELL FUMES MIX INTO THE AIR.

WHAT ARE FUMES?

Hold up the hand pump and water pipe, and say:

TEACHING STRATEGIES

Do We Need a Filter on Our Town?

will relate directly to Activity 5-32
ive testing for the actual pollutants
to exhausts. The amount of pollutants
l be measured at varying distances from
pe. The test will enable the student to
m as an important factor in the ability
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d Life, as far as the daily collection of
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lection of exhaust fumes to replenish the
plain:

COLLECTING EXHAUST FOR YOUR PLANT JARS,
WILL ALSO DO A TEST TO FIND OUT HOW
S MIX INTO THE AIR.

FUMES?

nd pump and water pipe, and say:

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- continue to collect exhaust in the plant jars for Activity 5-32.*
- help to assemble the water pipe-pump apparatus.*
- make tests for fumes in the air at one, two, three, and four feet from the tail pipe of a car.*
- record the number of strokes required to change the color of the solution at each mark on Worksheet 5-17.*
- graph his results on Worksheet 5-17.*
- contribute his data to a class graph.*
- conclude that the farther away from the source of fumes, the fewer fumes are present in the air.*
- guess how many strokes it would take to turn the test solution yellow at ten feet.*
- realize that it is dangerous to run a car in a closed garage.*
- define pollution as something in the air that is out of place.*

Students should:

- recall that fumes are additions to the air that we cannot see.*

MATERIALS

TEACHING STRATEGIES

THIS IS THE EQUIPMENT WE WILL USE TO FIND OUT IF FUMES COMING FROM THE EXHAUST ARE STILL IN THE AIR.

WHAT ARE THESE PIECES OF EQUIPMENT?

Review the filling of the water pipe chamber with the students and direct them to assemble the apparatus as in Activity 5-25. Explain that the pump will pull air into the chamber just as it did in Activity 5-25. As the air enters the chamber, it will bubble through the test solution. The test solution will change from green to yellow if fumes (pollution) are in the air. The more fumes present, the quicker the solution will change. The amount of fumes in the air can be measured by counting the number of pump strokes needed to cause the color change. The fewer the strokes needed to change the color, the more fumes in the air. Write these directions on the chalkboard, read them to the students, and direct them to begin assembling the apparatus.

1. Fill the water pipe up to the top mark with distilled water.

NOTE: Distilled water is used because there is too much variability in the quality of tap water throughout the country. Use of distilled water ensures a predictable outcome of the experiment.

2. Add five drops of test solution to the water.



TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-33

Students should:

--identify the pump and water pipe as pieces of equipment used in Activity 5-25.

EQUIPMENT WE WILL USE TO FIND OUT
MING FROM THE EXHAUST ARE STILL IN

ESE PIECES OF EQUIPMENT?

ng of the water pipe chamber with the
ect them to assemble the apparatus as in
Explain that the pump will pull air into
as it did in Activity 5-25. As the air
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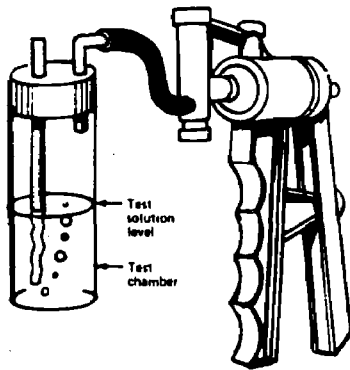
--fill the water pipe.

--add the test solution.

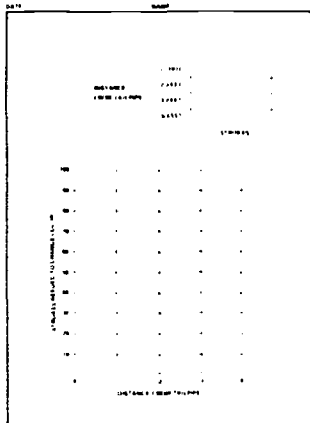
MATERIALS

TEACHING STRATEGIES

Diagram 5-15



Worksheet 5-17



3. Put the cap on the bottle.
4. Connect the tubing from the pump to the bent tube of the water pipe.

The water pipe apparatus should look like the one in Diagram 5-15 when assembled.

Help the students assemble the water pipes as necessary.

Distribute Worksheet 5-17 to each student pair. Explain that they will be using only the top part of the worksheet for their exhaust collecting. Point to the upper part of the worksheet and say:

YOU WILL BE TESTING FUMES ONE FOOT, TWO FEET, THREE FEET, AND FOUR FEET FROM THE TAILPIPE OF A CAR. TO DO THIS YOU WILL HOLD THE WATER PIPE IN THE PATH OF THE CAR EXHAUST, BEGIN PUMPING TO DRAW THE AIR THROUGH THE TEST SOLUTION, AND COUNT HOW MANY STROKES OF THE PUMP IT TAKES TO TURN THE TEST SOLUTION FROM GREEN TO YELLOW. THEN YOU WILL WRITE THE NUMBER OF STROKES IT TOOK IN THE BOX ON THE WORKSHEET, NEXT TO WHERE IT SAYS ONE FOOT IF YOU WERE AT THE ONE-FOOT MARK; NEXT TO WHERE IT SAYS TWO FEET IF YOU TESTED AT THE TWO-FOOT MARK, AND SO FORTH.

I WILL GIVE YOU THE DIRECTIONS AGAIN WHEN WE GO OUTSIDE.

Allow the students to ask any questions they might have about the worksheet or the testing procedure.

The students should carry with them the plant jars from Activity 5-32, the water pipe apparatus with the extra

TEACHING STRATEGIES

cap on the bottle.

the tubing from the pump to the bent
the water pipe.

the apparatus should look like the one in
when assembled.

students assemble the water pipes as necessary.

Worksheet 5-17 to each student pair. Explain
be using only the top part of the work-
r exhaust collecting. Point to the upper
Worksheet and say:

BE TESTING FUMES ONE FOOT, TWO FEET,
T, AND FOUR FEET FROM THE TAILPIPE
TO DO THIS YOU WILL HOLD THE WATER
THE PATH OF THE CAR EXHAUST, BEGIN
TO DRAW THE AIR THROUGH THE TEST
AND COUNT HOW MANY STROKES OF THE
TAKES TO TURN THE TEST SOLUTION FROM
YELLOW. THEN YOU WILL WRITE THE
STROKES IT TOOK IN THE BOX ON THE
, NEXT TO WHERE IT SAYS ONE FOOT IF
AT THE ONE-FOOT MARK; NEXT TO WHERE
TWO FEET IF YOU TESTED AT THE TWO-FOOT
SO FORTH.

REVEAL THE DIRECTIONS AGAIN WHEN WE
E.

students to ask any questions they might have
sheet or the testing procedure.

should carry with them the plant jars from
the water pipe apparatus with the extra

ANTICIPATED STUDENT BEHAVIORS

Students should:

--cap the bottle.

--connect the tubing.

MATERIALS

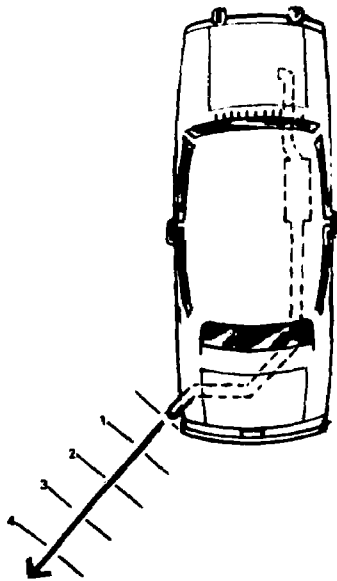
TEACHING STRATEGIES

bottle, the test solution, paper towels, rinse water, Worksheet 5-17, and a pencil. A large beaker can be used to carry the equipment outside.

DISTRIBUT

You should carry outside two pieces of chalk and two rulers. Take the students outside to one or more autos that you have arranged to use. Start the engines. Have the students first collect the auto exhaust to replenish their plant jars as required for Activity 5-32. Set the jars aside.

Diagram 5-16



With a piece of chalk, mark a line on the pavement directly below the end of the tailpipe on the car. Then direct two students (preferably those who need practice measuring) to mark a chalk line one foot from the end of the tailpipe (or the first mark), two feet, three feet, and four feet. (See Diagram 5-16.)

Each pair of students should now proceed to make their tests. Review with them the procedure outlined below so that all students understand what they are to do.

1. Hold the open end of the straight tube of the water pipe directly in the exhaust stream above the one-foot mark on the pavement.
2. Begin pumping slowly.
3. Count the strokes.
4. Stop pumping immediately when the test solution changes from green to yellow.

TEACHING STRATEGIES

t solution, paper towels, rinse water,
and a pencil. A large beaker can be
the equipment outside.



DISTRIBUTE MATERIALS

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ot mark on the pavement.

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strokes.

ng immediately when the test solution
om green to yellow.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-33

Students should:

--measure and mark off chalk lines.

--collect exhaust samples..

--begin pumping.

--count the strokes.

--stop pumping.

MATERIALS

TEACHING STRATEGIES

5. Record the number of strokes required for the color change on Worksheet 5-17.
6. Remove the top from the water pipe and cap the bottle part of the pipe with a solid cap. Keep this for a comparison.
7. Fill the second bottle to the mark with distilled water and add five drops of test solution. Put the water pipe cap on the bottle.
8. Repeat the test at the next mark (two feet).
9. Stop pumping when the test solution matches the yellow color of the first bottle that was saved.
10. Record the strokes required on Worksheet 5-17.

Repeat the same procedure at the third (three-foot) and fourth (four-foot) mark. Remember to rinse the bottle with tap water between each use. Also remind the student to hold the water pipe about the same distance above the ground for each test.

Students should exchange jobs each time they test. If Student A pumped at the one-foot mark while Student B filled and assembled the water pipe, then they should switch jobs at the two-foot mark.

Direct the students to begin their testing.

When all the tests have been made, reassemble the student in the classroom.

Say:

TEACHING STRATEGIES

the number of strokes required for the
range on Worksheet 5-17.

the top from the water pipe and cap the
end of the pipe with a solid cap. Keep
a comparison.

the second bottle to the mark with distilled
water and add five drops of test solution. Put
the pipe cap on the bottle.

the test at the next mark (two feet).

the color when the test solution matches
the color of the first bottle that was

the strokes required on Worksheet 5-17.

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four-foot mark. Remember to rinse the bottle
between each use. Also remind the students
to hold the water pipe about the same distance above the
test.

the students exchange jobs each time they test. If
Student A is at the one-foot mark while Student B
is at the two-foot mark, then they should
exchange the two-foot mark.

the students begin their testing.

the tests have been made, reassemble the students
at the one-foot mark.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--record their count.

--cap the comparison bottle.

--reassemble the water pipe for use again.

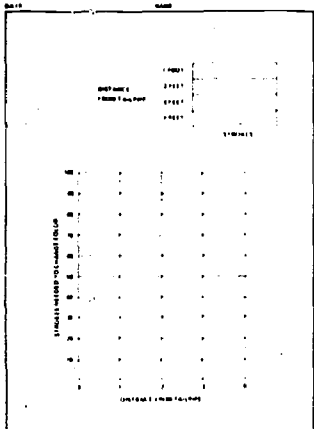
--start pumping at the two-foot mark.

--stop pumping.

--record their count.

MATERIALS

Slide 5-65



TEACHING STRATEGIES

IN ORDER TO BETTER UNDERSTAND THE RESULTS OF OUR EXPERIMENT, WE ARE GOING TO GRAPH WHAT WE FOUND.

WHAT IS A GRAPH?

A GRAPH SHOWS US SOMETHING WITHOUT WRITING IT OUT IN WORDS.

Project Slide 5-65.

Using the data collected by some of your slowest students, show the class on the projected graph how to plot their results.

Now have each pair of students plot their results on the graph located on the bottom half of Worksheet 5-17. Remember to erase the demonstration graph.



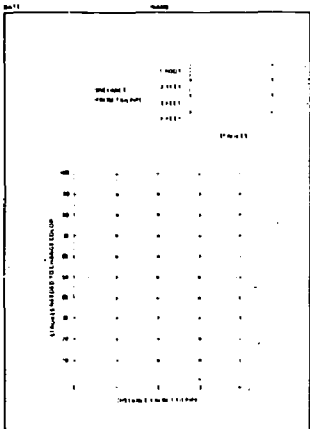
When the student have completed the worksheet, ask one member of each pair to go to the chalkboard and mark the point of their first (one-foot) count on the projected graph. (Read Change of Pacer 40 at this time.)

This should result in a cluster of marks above the one-foot point of the graph.

Then ask:

MATERIALS

Slide 5-65



TEACHING STRATEGIES

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This should result in a cluster of marks above the one-foot point of the graph.

Then ask:

TEACHING STRATEGIES

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T, WE ARE GOING TO GRAPH WHAT WE FOUND.

GRAPH?

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RDS.

5-65.

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pair of students plot their results on the
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se the demonstration graph.



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pair to go to the chalkboard and mark the
first (one-foot) count on the projected
change of Pacer 40 at this time.)

ult in a cluster of marks above the one-
ne graph.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-33

Students should:

--respond, "A bunch of lines," "A thing with some
dots on it," "It has a line across it," "A
picture to show something."

MATERIALS

TEACHING STRATEGIES

BY LOOKING AT THE FIRST GROUP OF POINTS ON THE GRAPH, ABOUT HOW MANY STROKES DID IT TAKE TO CHANGE THE COLOR OF THE TEST SOLUTION WHEN WE WERE ONLY ONE FOOT AWAY FROM THE EXHAUST?

GIV
TIM
TO
THI

Review with the students that the fewer strokes of the pump it took to change the color of the test solution, the more fumes in the air.

Ask:

WERE THERE MANY FUMES IN THE AIR ONE FOOT AWAY FROM THE EXHAUST?

HOW DO YOU KNOW?

Then have the other member of each pair go to the chalkboard and mark the point of their second (two-foot) test on the projected graph.

Then ask:

BY LOOKING AT THE SECOND GROUP OF POINTS ON THE GRAPH, ABOUT HOW MANY STROKES DID IT TAKE TO CHANGE THE COLOR AT THE TWO-FOOT MARK?

TEACHING STRATEGIES

NG AT THE FIRST GROUP OF POINTS ON
H, ABOUT HOW MANY STROKES DID IT
CHANGE THE COLOR OF THE TEST SOLUTION
WERE ONLY ONE FOOT AWAY FROM THE

**GIVE STUDENTS
TIME
TO
THINK**



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to change the color of the test solution,
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EXHAUST?

DU KNOW?

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mark the point of their second (two-
the projected graph.

NG AT THE SECOND GROUP OF POINTS ON
, ABOUT HOW MANY STROKES DID IT TAKE
THE COLOR AT THE TWO-FOOT MARK?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond with an estimate of the average number of strokes required.

--respond, "Yes."

--indicate that there were many fumes in the air because it didn't take many strokes to make the color change.

--record their second point on the projected graph.

--respond with an estimate of the average number of strokes required.

MATERIALS

TEACHING STRATEGIES

WERE THERE MORE OR LESS FUMES IN THE AIR AT THE SECOND MARK THAN AT THE FIRST MARK?

HOW DO YOU KNOW?

Repeat this procedure, alternating students, for the remaining three and four-foot distances. When all the points have been plotted on the class graph and discussed, ask:

WHY DID IT TAKE MORE STROKES TO CHANGE THE COLOR AT THE FOUR-FOOT MARK THAN IT DID AT THE ONE-FOOT MARK?

WHY SHOULD THERE BE FEWER FUMES IN THE AIR FARTHER AWAY FROM THE EXHAUST?

IF WE HAD MADE A MARK TEN FEET AWAY FROM THE EXHAUST, HOW MANY STROKES DO YOU THINK IT WOULD TAKE TO TURN THE SOLUTION TO YELLOW? WRITE YOUR GUESS ON THE BACK OF YOUR WORKSHEET.

Discuss the students' guesses and collect the worksheets so you can look them over later to detect if any students will need review and/or extra help.

Then ask:


GIVE STUDENTS
TO RE

TEACHING STRATEGIES

MORE OR LESS FUMES IN THE AIR AT
MARK THAN AT THE FIRST MARK?

KNOW?

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and four-foot distances. When all the
plotted on the class graph and discussed,

TAKE MORE STROKES TO CHANGE THE COLOR
-FOOT MARK THAN IT DID AT THE ONE-

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GUESS ON THE BACK OF YOUR WORKSHEET.

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them over later to detect if any
ed review and/or extra help.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-33

Students should:

--indicate that there were fewer fumes in the
air at the second mark than at the first mark.

--respond, "Because it took more pumps to change
the color of the test solution."

--respond, "It's farther away," "Farther from the
tailpipe," "Not as many fumes in the air."


**GIVE SEVERAL
STUDENTS A CHANCE
TO RESPOND**

--respond, "It's more spread out," "It blows away."

--indicate that it would take a great many strokes
to turn the solution to yellow at ten feet.

MATERIALS

TEACHING STRATEGIES

WHAT WOULD IT BE LIKE IF ALL OF THE CARS IN THE PARKING LOT WERE RUNNING AT THE SAME TIME?

WHY WOULD IT BE LIKE THAT?

WHAT DO YOU SUPPOSE IT IS LIKE ON BUSY CITY STREETS WHEN THERE ARE MANY CARS RUNNING?

HOW MANY STROKES OF THE PUMP WOULD IT TAKE YOU TO TURN THE SOLUTION YELLOW IF YOU TESTED THERE?

WHAT WOULD HAPPEN IF YOU RAN THE ENGINE OF YOUR CAN IN A CLOSED PLACE LIKE A GARAGE?

WOULD A CLOSED GARAGE WITH A CAR RUNNING IN IT BE A SAFE PLACE FOR YOU TO BE?

IT IS VERY DANGEROUS FOR A PERSON TO BE IN A CLOSED PLACE AND BREATHE IN CAR EXHAUST FOR A LONG PERIOD OF TIME. PEOPLE CAN DIE FROM BREATHING IN TOO MUCH CAR EXHAUST. YOU SHOULD ALWAYS HAVE THE GARAGE DOOR OR WINDOW OPEN IF YOU ARE IN A CAR AND THE CAR IS RUNNING INSIDE A GARAGE.

WOULD YOU RATHER BE CLOSE OR FAR AWAY FROM A LOT OF CARS THAT ARE RUNNING?

ARE THESE EXHAUST FUMES WE'VE BEEN TALKING ABOUT POLLUTION?

TEACHING STRATEGIES

WOULD IT BE LIKE IF ALL OF THE CARS IN THE CITY WERE RUNNING AT THE SAME TIME?

WOULD IT BE LIKE THAT?

DO YOU SUPPOSE IT IS LIKE ON A BUSY CITY WHEN THERE ARE MANY CARS RUNNING?

HOW MANY STROKES OF THE PUMP WOULD IT TAKE YOU TO FIND THE SOLUTION YELLOW IF YOU TESTED THERE?

WHAT WOULD HAPPEN IF YOU RAN THE ENGINE OF A CAR IN A CLOSED PLACE LIKE A GARAGE?

WOULD YOU BE IN A CLOSED GARAGE WITH A CAR RUNNING IN IT? WHERE WOULD YOU PLACE FOR YOU TO BE?

IS IT DANGEROUS FOR A PERSON TO BE IN A GARAGE AND BREATHE IN CAR EXHAUST FOR A LONG PERIOD OF TIME. PEOPLE CAN DIE FROM BREATHING IN TOO MUCH CAR EXHAUST. YOU SHOULD ALWAYS MAKE SURE THE GARAGE DOOR OR WINDOW IS OPEN IF THERE IS A CAR AND THE CAR IS RUNNING INSIDE.

WOULD YOU RATHER BE CLOSE OR FAR AWAY FROM A CAR WHEN THE CARS ARE RUNNING?

WHAT ABOUT THE EXHAUST FUMES WE'VE BEEN TALKING ABOUT?

ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "Smelly," "Really bad," "There would be lots of fumes in the air."

--respond, "There would be too many fumes in the air," "They would not blow away as fast."

--infer that too much pollution in one place may not be readily absorbed by the environment and respond, "There would be lots of fumes in the air," "It would be really bad."

--respond, "Just a few," "Only one."

--respond, "The garage would fill up with fumes," "It would not blow away," "The fumes would stay in the air."

--respond, "No," "We would have to breathe in all those fumes."

--indicate that they would rather be far away.

--respond, "Yes," "Of course."

MATERIALS

TEACHING STRATEGIES

WHAT IS POLLUTION?

DO EXHAUST FUMES REALLY BELONG ANYWHERE?


GIVE S
STUDENTS
TO RE


CHANGE

Change of Pacers 39, 40, and 41.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-33

Students should:

--recall from Activity 5-20 that pollution is something that doesn't normally belong there, something that is out of place.

--probably indicate that there is really no place that exhaust fumes belong.


**GIVE SEVERAL
STUDENTS A CHANCE
TO RESPOND**

Upon completion of this activity, each student should, as a minimum:

--have collected and tested fumes in the air at one, two, three, and four feet from the source of the exhaust.

--have concluded that the farther away from a running car a person is, the better the air will be.

--have concluded that pollution is something in the air that shouldn't be there.


CHANGE OF PACER

POLLUTION?

EXHAUST FUMES REALLY BELONG ANYWHERE?

39, 40, and 41.

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE G
ACTIVITY 5-33

Teacher _____

Activity name suggested by class:

BSCS USE:	Post _____	Tally _____	Rev _____
-----------	------------	-------------	-----------

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

Were the students able to successfully carry out the experiment to test the diffusion of the exhaust? Yes No Comment.

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Were the students able to successfully carry out the experiment to test the diffusion of the exhaust? Yes No Comment.
13. Did the students have any difficulties in graphing the number of strokes for each distance from the exhaust pipe? Yes No
14. Were all the students able to infer that the farther away from a running car one gets, the better the air will be? Yes No

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

BSCS Evaluation: EMH Feedback Form 1c

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student

5. Recognize the impact of water pollution.
7. Understand the composition of air.
8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.
10. Comprehend the impact of air pollution on our environment.

Core G Objectives for the Student:

1. Establish that substances are added to natural air because of man's activities.
2. Establish that an additive need not be seen to be present.
3. Establish that some things added to air are harmful to living things.

ENVIRONMENTAL THEME:

Complementarity of Organisms and Environment

INQUIRY SKILLS:

Translating, Value Judging

PROBLEM-SOLVING SKILLS:

Interpreting Results

PRACTICAL APPLICATION:

Using Data, Making Value Judgments

ACTIVITY

Goals for the Student

5. Recognize the impact of water pollution.
7. Understand the composition of air.
8. Realize that the quality of air is variable.
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1. Establish that substances are added to natural air because of man's activities.
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3. Establish that some things added to air are harmful to living things.

TAL THEME:

ementarity of Organisms and Environment

ILLS:

lating, Value Judging

LVING SKILLS:

preting Results

APPLICATION:

Data, Making Value Judgments



BSCS

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

CORE G.

ADDITIVES IN
OUR AIR

ACTIVITY 5-34.

CLUES TO SUCCESS:
UNDERSTANDING

MATERIALS

Slides 5-66 through 5-70
Worksheet 5-18; A, B, C, D, E
*Huge box
*Various art materials
*Tape recorder(s)
*Blank tape(s)
*35 mm Slide projector

Worksheet 5-18 (Cover)



*Not furnished in materials kit

TEACHING STRATEGIES

Activity 5-34. Clues to Success: Understanding

The purpose of this activity is to help students discover how much they have learned about air in this unit. Part I, Worksheet 5-18, assesses concepts and higher level inquiry and problem-solving skills. Part II provides an opportunity for students to be creative and to apply environmental concerns about air and water to their daily lives.

Part I.

Begin this activity by telling students that they are going to use some of the things they have been learning about to answer questions in a booklet. Remind them to put their names and the date on the booklet and to look only at their own work.

Discuss the cover and have a student read the title. Direct the students' attention to Questions 1 and 2. Read and repeat the questions. Allow adequate time for students to examine the graph.

Read and repeat Questions 3 and 4. Draw attention to the results of both groups on Day 6 (i.e., one plant in Group 1 is dead and all plants in Group 2 are dead. Circulate around the room to be sure students are responding to the right question.

DISTRI

TEACHING STRATEGIES

Clues to Success: Understanding

of this activity is to help students discover what they have learned about air in this unit. Meet 5-18, assesses concepts and higher order thinking and problem-solving skills. Part II provides an opportunity for students to be creative and address environmental concerns about air and water to improve their lives.

Activity by telling students that they are going to discuss some of the things they have been learning about air quality in a booklet. Remind them to bring their booklets and the date on the booklet and to look at their own work.



DISTRIBUTE MATERIALS

Hand out the booklet and have a student read the title. Draw students' attention to Questions 1 and 2. Discuss the questions. Allow adequate time for students to examine the graph.

Discuss Questions 3 and 4. Draw attention to the results of the groups on Day 6 (i.e., one plant in Group 1 and all plants in Group 2 are dead. Circulate around the room to be sure students are responding to the questions.

ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- complete Worksheet 5-18.*
- defend his choices.*
- make value judgments about air and water pollution.*
- participate in making a class television show.*

Students should:

- write their names and the date on the cover.*

- write 20 in the blank for Question 1.*
- mark an X on B for Question 2.*

- mark an X on B for Question 3.*
- mark an X on B and/or D for Question 4.*

MATERIALS

Slide 5-66, Worksheet 5-18A

1. ANALYZE EACH A CHOICE OF THE BEST ANSWER TO THE QUESTION ASKED. WRITE TO YOURSELF THE REASON FOR YOUR CHOICE.

HEIGHT OF THE SUN **DATE OF SUN TEST**

	NO. TO BE MARKED	POINTS
1. TO BE MARKED	1 POINT	
2. TO BE MARKED	1 POINT	
3. TO BE MARKED	1 POINT	
4. TO BE MARKED	1 POINT	
5. TO BE MARKED	1 POINT	
6. TO BE MARKED	1 POINT	
7. TO BE MARKED	1 POINT	
8. TO BE MARKED	1 POINT	
9. TO BE MARKED	1 POINT	
10. TO BE MARKED	1 POINT	
11. TO BE MARKED	1 POINT	
12. TO BE MARKED	1 POINT	

2. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

3. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

4. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

5. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

6. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

7. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

8. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

9. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

10. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

11. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

12. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

MARK SHEET 5-18A

Slide 5-67, Worksheet 5-18B

1. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

2. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

3. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

4. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

5. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

6. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

7. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

8. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

9. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

10. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

11. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

12. HAVE EACH STUDENT WRITE TO YOU THE REASON FOR EACH CHOICE. WRITE TO THE REASON FOR EACH CHOICE.

MARK SHEET 5-18B

TEACHING STRATEGIES

Read and repeat Question 5, checking that students are writing yes or no for each statement.

Read and repeat Question 6.

Read and repeat Question 7. This is a difficult question. Allow plenty of time for the students to respond. Encourage them to think hard about each choice.

Say:

FOR QUESTIONS 8 THROUGH 12 YOU WILL NEED TO THINK OF WHAT YOU WOULD DO. DO NOT TRY TO PICK A "RIGHT ANSWER." WE WILL TALK ABOUT YOUR CHOICES AFTER WE FINISH.

Assist students as necessary so they are able to follow this type of question format.

Collect the booklets. Project Slides 5-66 to 5-70 and read the questions again. Have the students explain and discuss the choices they marked as well as why they did not mark other choices. When possible, have students clear up misunderstandings for other students.

Of particular importance for discussion are the choices in Questions 8-12 relating air and water concepts to value judging. Encourage the students to respond honestly, while pointing out the difficulty of doing what is best for the environment.

TEACHING STRATEGIES

Question 5, checking that students are
o for each statement.

Question 6.

Question 7. This is a difficult question.
time for the students to respond.
o think hard about each choice.

NS 8 THROUGH 12 YOU WILL NEED TO
AT YOU WOULD DO. DO NOT TRY TO
BT ANSWER." WE WILL TALK ABOUT
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relating air and water concepts to
ncourage the students to respond
ointing out the difficulty of doing
the environment.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-34

Students should:

--write their answers to each statement:

- A. Yes
- B. Yes
- C. Yes
- D. Yes
- E. No
- F. No

--mark an X on A.

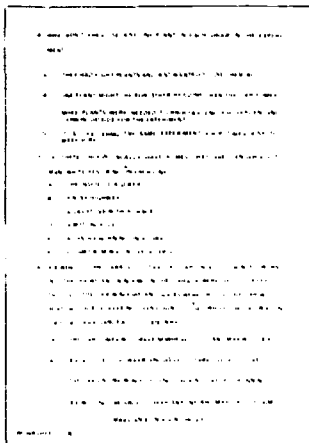
--mark an X on D.

--mark an X on their choices for Questions 8-12.

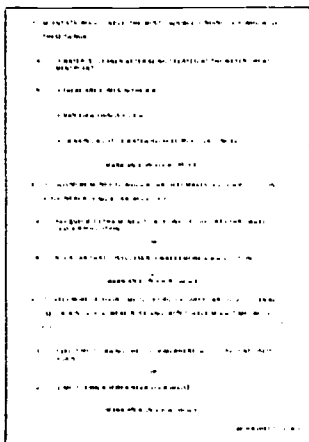
--continue to make value judgments on air and water
pollution.

--explain and defend their choices for each question.

Slide 5-68, Worksheet 5-18C



Slide 5-69, Worksheet 5-18D



Complete Tallysheet 5-9 and send it to BSCS. Directions are given on the tallysheet for scoring and recording results in the Student Record of Progress.

Interpretation and Scoring:

Question 1 provides a guideline for you to determine if a student is able to read a graph. Provide additional practice in constructing and reading graphs for students who answered this question incorrectly.

Question 2 requires a student to translate what is on the graph and apply it to data on the feeding chart. Students who completed 1 correctly but missed 2 need experiences in applying data.

Question 3 assesses a student's understanding that fumes can be harmful to living things. Review Activity 5-32 as necessary with students who have difficulty. In addition, this question assesses the higher level problem-solving skills of interpreting results and drawing conclusions. Students are expected to decide that other variables may have caused one plant in Group 1 to die and that, overall, it was the fumes that caused the living things in Group 2 to die. This is a very difficult problem. Students who experienced difficulty will continue to require many experiences to be able to answer questions involving this level of problem-solving skill.

Question 4 assesses a students' understanding of the need to control for other variables. This may be a

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS



HAVE YOU
INVOLVED
ALL
STUDENTS?

sheet 5-9 and send it to BSCS. Directions
the tallysheet for scoring and recording
Student Record of Progress.

and Scoring:

vides a guideline for you to determine if
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nstructing and reading graphs for students
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be able to answer questions involving this
em-solving skill.

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l for other variables. This may be a

MATERIALS

Slide 5-70, Worksheet 5-18E

The image shows a worksheet with several numbered items. The text is very small and difficult to read, but it seems to be a list of questions or activities. Some of the visible text includes "1. ...", "2. ...", "3. ...", "4. ...", "5. ...", "6. ...", "7. ...", "8. ...", "9. ...", "10. ...", "11. ...", "12. ...". The items appear to be related to environmental science or health, possibly involving air pollution and human behavior.

TEACHING STRATEGIES

difficult question for many students. Help the students to understand the need for controlling for other variables in an experiment.

Questions 5 and 6 assess understanding of the concept that fumes are dangerous to man. This information has very practical knowledge for survival. Refer to Activities 5-31 and 5-32 for students who need additional help.

Question 7 assesses higher problem-solving skills. Each choice must be considered and thought of in terms of identifying variables and speculating on how to set up an experiment. The first three choices will be relatively easy to consider since students can relate class experiences to each choice. The last choice will be the most difficult to consider, particularly in conceptualizing the difficulty of controlling variables in human activity. Many of your students will be unable to respond correctly, but praise their efforts and continue to provide problem-solving opportunities as they arise.

Questions 8-12 are indicators that involve personal value judgments of the time, money, and effort involved in decisions on air and water pollution. The items focus on the importance of personal decision making. It may be fun to quiz yourself on each of the items and relate the items to your personal behavior over the last six months!

Part II.

This part of the assessment is designed to culminate the unit. It encourages student creativity and divergent production. You may go as far as you have time for with this activity.

Obtain a huge box and make the necessary alterations to convert it to a television screen. If wood and tools

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-34

tion for many students. Help the students
the need for controlling for other
experiment.

6 assess understanding of the concept
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knowledge for survival. Refer to
and 5-32 for students who need additional

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importance of personal decision making.
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s to your personal behavior over the last

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rages student creativity and divergent
u may go as far as you have time for with

ox and make the necessary alterations to
television screen. If wood and tools

MATERIALS

TEACHING STRATEGIES

are available, you may suggest that some of your students make the television screen "from scratch."

Whichever type of screen is available, make provision for two round holders that will hold the two ends of the roll of "TV film."

Have the cassette recorder and some blank tapes available for taping music, poems, and other sound materials to accompany the visual presentation.

The topic of the class TV show centers around this question: Is there anything you, your parents, family, and friends can do to make the environment better?

The materials present in the room and your own enthusiasm should help to generate an exciting result.

Instruct each student to make several pictures, posters, poems, and so on to answer the central question. Tape the pictures together to make one long roll. You may wish to mark various sections to the film such as: Part I, Water; Part II, Air; or Ways I can Make the Environment Better; Ways My Family Can Make the Environment Better.

Tell students that their production will need an audience. Elicit ideas of persons they would like to invite. Have students write invitations or mimeograph a letter.

ENCOURAGE
CREATIVITY
IDEAS

TEACHING STRATEGIES

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the television screen "from scratch."

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holders that will hold the two ends of the
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ANTICIPATED STUDENT BEHAVIORS

**ENCOURAGE
CREATIVE
IDEAS**



MATERIALS

TEACHING STRATEGIES

If possible, have a party the day of the show. Congratulate students for their efforts and point out how much they have learned about air and water.

TEACHING STRATEGIES

Have a party the day of the show.
Praise students for their efforts and point out
what they have learned about air and water.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-34

*Upon completion of this activity, each student
should, as a minimum:*

- have completed Worksheet 5-18.*
- have defended some of his choices.*
- have discussed value judgments about air and
water pollution.*
- have contributed to the class television production.*

MATERIALS

TEACHING STRATEGIES

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

UNIT V, CORE G
ACTIVITY 5-34

Teacher _____

Activity name suggested by class:

BSCS USE:	Post _____	Tally _____	Rev _____
-----------	------------	-------------	-----------

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Did the "TV" activity work out well? Yes No Comment.

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
- | | | | |
|-------------------------------------|--|--|------------------------------------|
| <input type="checkbox"/> Worthwhile | <input type="checkbox"/> Of value--needs the | <input type="checkbox"/> Worth salvaging--make | <input type="checkbox"/> Worthless |
| --keep as is | revision suggested | major changes described | --drop it |

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. Did the "TV" activity work out well? Yes No Comment.
13. Did all students participate in the "TV" activity? Yes No
14. What comments do you have about the assessment of the air section of the unit?
15. Complete and send Tallysheet 5-9 to BSCS.

UNIT V, CORE G
ACTIVITY 5-34

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



Me and my Environment

FOCUS FOR THIS ACTIVITY

CONTENT:

Unit Goals for the Student:

1. Understanding the need for water.
2. Recognize the sources of water.
3. Realize the problems associated with the preparation of usable water.
4. Realize the problems associated with the disposal of waste water.
5. Recognize the impact of water pollution.
6. Understand the broad problems of water management.
7. Understand the composition of air.
8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.
10. Comprehend the impact of air pollution on our environment.

ENVIRONMENTAL THEME:

Interrelationships of Environmental Components

INQUIRY SKILLS:

Applying

PROBLEM-SOLVING SKILLS:

Interpreting Results

PRACTICAL APPLICATION:

Using What Has Been Learned



BSCS

UNIT V.

AIR AND WATER IN
MY ENVIRONMENT

ACTIVITY 5-35. WHAT DO YOU THINK?

ACTIVITY

Goals for the Student:

1. Understanding the need for water.
2. Recognize the sources of water.
3. Realize the problems associated with the preparation of usable water.
4. Realize the problems associated with the disposal of waste water.
5. Recognize the impact of water pollution.
6. Understand the broad problems of water management.
7. Understand the composition of air.
8. Realize that the quality of air is variable.
9. Realize that substances are continually added to air.
10. Comprehend the impact of air pollution on our environment.

GENERAL THEME:

Relationships of Environmental Components

SKILLS:

Understanding

OPERATING SKILLS:

Interpreting Results

APPLICATION:

What Has Been Learned

Slides 5-29 through 5-34
Slides 5-71 through 5-79
Worksheets 5-19 through 5-23
Chart 5-2
*35 mm Slide projector

*Not furnished in materials kit

Activity 5-35. What Do You Think?

This activity reviews the variety of things students have done in Unit V. It provides an indication of the students' interest in science and identifies those activities that were most popular. Some major skills and concepts are assessed to provide an indication of the students' understanding of this unit. A repeat of favorite activities and a review of difficult concepts then follows. Student responses are scored and recorded in the Student Record of Progress as a summary of each student's progress in Unit V.

Part I. (First Day)

Distribute Worksheet 5-19 and say:

WE HAVE DONE A GREAT MANY THINGS IN SCIENCE THIS YEAR. LET'S LOOK BACK AT SOME OF THE THINGS WE HAVE DONE. AS I READ THE DESCRIPTION OF AN ACTIVITY WE DID, MARK WHETHER YOU LIKED IT, WERE NOT INTERESTED, DISLIKED IT, OR DON'T REMEMBER IT. FOR SOME ACTIVITIES, YOU WILL HAVE A CHANCE TO SHOW WHAT YOU LEARNED. AFTER WE FINISH THE WORKSHEET, YOU WILL HAVE A CHANCE TO TALK ABOUT THE ACTIVITIES, AND WE CAN DO SOME OF THEM AGAIN IF YOU WOULD LIKE.

The activities listed on Worksheets 5-19, 5-20, 5-21, 5-22, and 5-23 do not correspond to the numbering of activities in the Teacher's Guide. Some activities have been combined. Clues to Success are not listed. Each of the following worksheet activities is keyed to the Guide. Read the brief description of each activity that is on the worksheet to remind students of the activity. Be sure to add comments calling upon personal experiences in your class. If you wish to dramatize the activities, you could set up and display some equipment used in the activity. For example, the equal-arm balance and food slices could be set up. If you do this, be sure to make a sign to identify it, using the same label that appears on Worksheet 5-19.

TEACHING STRATEGIES

What Do You Think?

reviews the variety of things students have . It provides an indication of the interest in science and identifies those that were most popular. Some major skills are assessed to provide an indication of understanding of this unit. A repeat of activities and a review of difficult follows. Student responses are scored and the Student Record of Progress as a summary of student's progress in Unit V.

(t Day)

Worksheet 5-19 and say:

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T'S LOOK BACK AT SOME OF THE THINGS WE
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HAT YOU LEARNED. AFTER WE FINISH THE
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ACTIVITIES, AND WE CAN DO SOME OF
IF YOU WOULD LIKE.

listed on Worksheets 5-19, 5-20, 5-21,
do not correspond to the numbering of
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could set up and display some equipment
activity. For example, the equal-arm
and slices could be set up. If you do
a sign to identify it, using the
s on Worksheet 5-19.

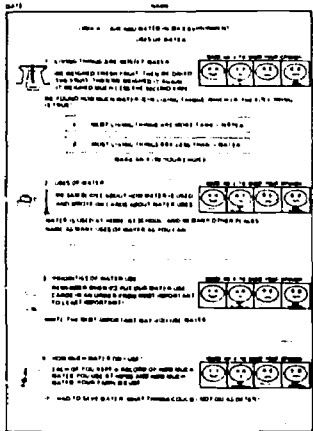
ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- recall each described activity in Unit V and rate his opinion of it.
- answer each of the questions on Worksheets 5-19, 5-20, 5-21, 5-22, and 5-23.
- review the questions on Worksheets 5-19, 5-20, 5-21, 5-22, and 5-23.
- repeat selected activities.

MATERIALS

Slide 5-71, Worksheet 5-19A



TEACHING STRATEGIES

Now project Slide 5-71 of Worksheet 5-19A and explain what the student will be doing and how they should mark their opinions and answer the questions.

Have the students begin the worksheets by finding the side that starts with "1. Living Things Are Mostly Water." Have them put the date and their names on the worksheets.

Turn off the projector.

Then say:

AT THE FIRST OF THE YEAR WE STARTED INVESTIGATING WATER IN OUR ENVIRONMENT. HOW MANY REMEMBER WEIGHING FOOD SLICES BEFORE AND AFTER THEY WERE DRIED?

1. (Activity 5-3) Living Things Are Mostly Water.

WE WEIGHED FRESH FRUIT. THEN WE DRIED THE FRUIT. THEN WE WEIGHED IT AGAIN. IT WEIGHED MUCH LESS THE SECOND TIME.

WHAT WAS YOUR OPINION OF THAT ACTIVITY? MARK AN X ON THE RIGHT SIDE OF YOUR PAPER TO SHOW IF YOU LIKED IT, IF YOU WERE NOT INTERESTED, IF YOU DISLIKED IT, OR IF YOU DON'T REMEMBER THAT ACTIVITY. IF YOU WERE ABSENT, YOU MIGHT HAVE MISSED SOME OF THESE ACTIVITIES.

NOW LET'S TEST YOUR MEMORY. CHOOSE THE CORRECT ANSWER TO QUESTION 1. WE FOUND HOW MUCH WATER IS IN LIVING THINGS. WHICH OF THE FOLLOWING IS TRUE?

TEACHING STRATEGIES

e 5-71 of Worksheet 5-19A and explain
will be doing and how they should mark
and answer the questions.

s begin the worksheets by finding the
with "1. Living Things Are Mostly
em put the date and their names on the

jector.

T OF THE YEAR WE STARTED INVESTI-
R IN OUR ENVIRONMENT. HOW MANY
IGHING FOOD SLICES BEFORE AND
WERE DRIED?

-3) Living Things Are Mostly Water.

FRESH FRUIT. THEN WE DRIED THE FRUIT.
GHED IT AGAIN. IT WEIGHED MUCH LESS
TIME.

R OPINION OF THAT ACTIVITY? MARK
RIGHT SIDE OF YOUR PAPER TO SHOW
IT, IF YOU WERE NOT INTERESTED,
KED IT, OR IF YOU DON'T REMEMBER
Y. IF YOU WERE ABSENT, YOU MIGHT
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ST YOUR MEMORY. CHOOSE THE
ER TO QUESTION 1. WE FOUND
ER IS IN LIVING THINGS. WHICH
WING IS TRUE?

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-35

Students should:

--write their names and the date on the worksheets.

--respond by raising hands.

--mark X's in the appropriate columns to indicate
their opinions.

MATERIALS

TEACHING STRATEGIES

A. MOST LIVING THINGS ARE MORE THAN ONE-HALF WATER.

OR

B. MOST LIVING THINGS ARE LESS THAN ONE-HALF WATER.

MARK AN X ON YOUR CHOICE.

If necessary, direct students not to share their answers until the worksheets have been completed.

2. (Activity 5-4) Uses of Water.

WE SAW SLIDES ABOUT HOW WATER IS USED AND WROTE ON CARDS ABOUT WATER USES. MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

LET'S SEE HOW MANY WATER USES YOU CAN REMEMBER. IN THE SPACE BELOW QUESTION 2, NAME AS MANY USES OF WATER AS YOU CAN.

Assist students with spelling as necessary.

GIVE
TIME
TO
THIS

TEACHING STRATEGIES

MOST LIVING THINGS ARE MORE THAN ONE-HALF WATER.

OR

MOST LIVING THINGS ARE LESS THAN ONE-HALF WATER.

X ON YOUR CHOICE.

direct students not to share their
the worksheets have been completed.

7 5-4) Uses of Water.

CLIDES ABOUT HOW WATER IS USED AND
CARDS ABOUT WATER USES. MARK AN
YOUR OPINION OF THIS ACTIVITY.

HOW MANY WATER USES YOU CAN REMEMBER.
FACE BELOW QUESTION 2, NAME AS MANY
WATER AS YOU CAN.

s with spelling as necessary.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--mark an X on Answer A.

--mark X's in the appropriate columns to indicate
their opinions.

--list as many water uses as they can think of.

**GIVE STUDENTS
TIME
TO
THINK**

**WORK
TIME**

MATERIALS

TEACHING STRATEGIES

3. (Activity 5-5) Priorities of Water Use.

REMEMBER WHEN WE PUT OUR WATER USE CARDS IN AN ORDER FROM MOST IMPORTANT TO LEAST IMPORTANT?

MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

CAN YOU REMEMBER WHAT SOME OF THE MOST IMPORTANT WATER USES ARE? WRITE THE MOST IMPORTANT WAY YOU USE WATER UNDER QUESTION 3.

Assist students with spelling as necessary.

4. (Activity 5-6) How Much Water Do I Use?

IN THIS ACTIVITY EACH OF YOU KEPT A RECORD OF HOW MUCH WATER YOU USE AT HOME AND HOW MUCH WATER YOUR FAMILIES USE.

MARK AN X ON YOUR WORKSHEET TO SHOW YOUR OPINION OF THIS ACTIVITY.

IF WE HAD A WATER SHORTAGE AND HAD TO SAVE WATER, WHAT THINGS COULD WE NOT DO AS OFTEN? WRITE YOUR ANSWER UNDER QUESTION 4.

TEACHING STRATEGIES

5) Priorities of Water Use.

IF WE PUT OUR WATER USE CARDS IN AN ORDER FROM MOST IMPORTANT TO LEAST IMPORTANT?

SHOW YOUR OPINION OF THIS ACTIVITY.

NUMBER WHAT SOME OF THE MOST IMPORTANT WATER USES ARE? WRITE THE MOST IMPORTANT WAY TO SAVE WATER UNDER QUESTION 3.

Write with spelling as necessary.

6) How Much Water Do I Use?

IF YOU EACH OF YOU KEPT A RECORD OF HOW MUCH WATER YOU USE AT HOME AND HOW MUCH YOUR FAMILIES USE.

USE YOUR WORKSHEET TO SHOW YOUR RESULTS OF THIS ACTIVITY.

IF THERE WAS A WATER SHORTAGE AND HAD TO SAVE WATER, WHAT THINGS COULD WE NOT DO AS OFTEN? ANSWER UNDER QUESTION 4.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-35

Students should:

--mark X's in the appropriate columns to indicate their opinions.

--write the most important way they use water.

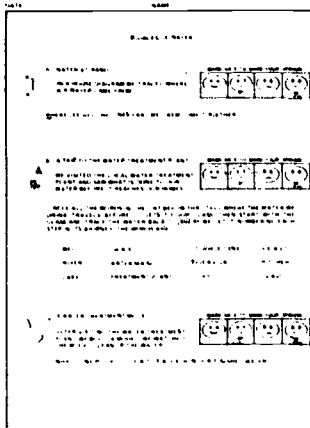


WORK
TIME

--mark X's in the appropriate opinion columns.

--write ways to save water that include stopping lawn watering, carwashing, automatic dishwashing, or other activities that use large amounts of water.

Slide 5-72, Worksheet 5-19B



5. (Activity 5-7) Water at Hand.

REMEMBER THE HOUSE DIAGRAMS? ON A HOUSE DIAGRAM WE TRACED WHERE OUR WATER CAME FROM. MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

NOW LOOK AT QUESTION 5. IT ASKS, "WHERE DID ALL THE LINES THAT WE DREW COME TOGETHER?" WRITE YOUR ANSWER IN THE SPACE.

6. (Activity 5-8) A Trip to the Water Treatment Plant.

REMEMBER OUR FIELD TRIP? WE VISITED THE WATER TREATMENT PLANT AND SAW WHAT IS DONE TO OUR WATER BEFORE IT REACHES OUR HOMES. MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

CIRCLE ALL THE WORDS IN THE LIST BELOW THAT TELL WHERE THE WATER WE DRINK TRAVELS BEFORE IT GETS TO OUR GLASS. THEN START WITH THE GLASS AND TRACE THE WATER BACK TO WHERE WE GET IT, NUMBERING EACH STEP IN IT'S JOURNEY. THE WORDS ARE WELL, RIVER, LAKE, TRUCK, WATER MAIN, TREATMENT PLANT, STORAGE TANK, RESERVOIR, CLOUD, FAUCET, PITCHER, AND GLASS.

TEACHING STRATEGIES

5-7) Water at Hand.

THE HOUSE DIAGRAMS? ON A HOUSE DIAGRAM WHERE OUR WATER CAME FROM. MARK AN YOUR OPINION OF THIS ACTIVITY.

AT QUESTION 5. IT ASKS, "WHERE DID LINES THAT WE DREW COME TOGETHER?" OR ANSWER IN THE SPACE.

5-8) A Trip to the Water Treatment Plant.

OUR FIELD TRIP? WE VISITED THE WATER PLANT AND SAW WHAT IS DONE TO OUR BEFORE IT REACHES OUR HOMES. MARK AN YOUR OPINION OF THIS ACTIVITY.

THE WORDS IN THE LIST BELOW THAT THE WATER WE DRINK TRAVELS BEFORE OUR GLASS. THEN START WITH THE TRACE THE WATER BACK TO WHERE WE NUMBERING EACH STEP IN IT'S JOURNEY. ARE WELL, RIVER, LAKE, TRUCK, WATER TMENT PLANT, STORAGE TANK, RESERVOIR, CET, PITCHER, AND GLASS.

ANTICIPATED STUDENT BEHAVIORS

Students should:

--mark X's in the appropriate opinion columns.

--write an answer such as main water pipe, water main, water hookup, water pipe, and so on.

--mark X's in the appropriate opinion columns.

--choose the following words from the list: well, river, or lake; treatment plant; storage tank or reservoir; faucet or pitcher. Number the glass as first, the treatment plant in between the glass and the natural source, and a natural source (well, river, or lake) as last. (All other circled and numbered words may be disregarded.)

MATERIALS

Slide 5-73, Worksheet 5-20A

5. THE MODEL IS BUILT

WE VISITED THE WATER TREATMENT PLANT AND WE BUILT A MODEL. WE WATCHED THE MODEL CLEAN UP THE WATER. MARK AN X TO SHOW WHETHER YOU LIKED THIS ACTIVITY, WERE NOT INTERESTED, DISLIKED IT, OR DON'T REMEMBER IT.

1. I LIKED IT 2. I WAS NOT INTERESTED 3. I DISLIKED IT 4. I DON'T REMEMBER

6. LOOK AT QUESTION 7. WHY DID WE PUT A LITTLE BIT OF BLEACH IN OUR FINISHED WATER? WRITE YOUR ANSWER IN THE SPACE.

1. _____

2. _____

3. _____

4. _____

7. A PROBLEM IN WATER

JOHNNY WAS LOST AND NEEDED SOME WATER TO DRINK. THE ONLY WATER HE COULD FIND WAS FROM A PUDDLE. HE BOILED THE WATER TO MAKE IT SAFE TO DRINK. AFTER DOING THIS, WHAT ELSE COULD HE DO TO MAKE THE WATER BETTER TO DRINK?

1. _____

2. _____

3. _____

4. _____

TEACHING STRATEGIES

7. (Activity 5-9) A Water Treatment Plant Model.

AFTER VISITING THE WATER TREATMENT PLANT, WE BUILT A MODEL. WE WATCHED THE MODEL CLEAN UP THE WATER. MARK AN X TO SHOW WHETHER YOU LIKED THIS ACTIVITY, WERE NOT INTERESTED, DISLIKED IT, OR DON'T REMEMBER IT.

LOOK AT QUESTION 7. WHY DID WE PUT A LITTLE BIT OF BLEACH IN OUR FINISHED WATER? WRITE YOUR ANSWER IN THE SPACE.

Collect Worksheet 5-19. Distribute Worksheet 5-20 and have students put their names and the date at the top. Then continue with Question 8.

8. (Activity 5-12) Microbes in Water.

IN THIS ACTIVITY WE PUT MANY DIFFERENT KINDS OF WATER IN SOME TEST TUBES. THEN WE USED A TEST SOLUTION TO FIND OUT IF MICROBES WERE PRESENT IN THE WATER. MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

QUESTION 8 TELLS ABOUT JOHNNY AND A PROBLEM HE HAD. JOHNNY WAS LOST AND NEEDED SOME WATER TO DRINK. THE ONLY WATER HE COULD FIND WAS FROM A PUDDLE. HE BOILED THE WATER TO MAKE IT SAFE TO DRINK. AFTER DOING THIS, WHAT ELSE COULD HE DO TO MAKE THE WATER BETTER TO DRINK?

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-35

Students should:



-9) A Water Treatment Plant Model.

URING THE WATER TREATMENT PLANT, WE
EL. WE WATCHED THE MODEL CLEAN UP
MARK AN X TO SHOW WHETHER YOU
ACTIVITY, WERE NOT INTERESTED,
, OR DON'T REMEMBER IT.

STION 7. WHY DID WE PUT A LITTLE
CH IN OUR FINISHED WATER? WRITE
IN THE SPACE.

t 5-19. Distribute Worksheet 5-20 and
t their names and the date at the top.
th Question 8.

-12) Microbes in Water.

IVITY WE PUT MANY DIFFERENT KINDS OF
ME TEST TUBES. THEN WE USED A TEST
FIND OUT IF MICROBES WERE PRESENT IN
MARK AN X TO SHOW YOUR OPINION OF
TY.

CELLS ABOUT JOHNNY AND A PROBLEM
NNY WAS LOST AND NEEDED SOME WATER
HE ONLY WATER HE COULD FIND WAS FROM
E BOILED THE WATER TO MAKE IT SAFE
FTER DOING THIS, WHAT ELSE COULD HE
HE WATER BETTER TO DRINK?

--mark X's in the appropriate opinion columns.

--write "To kill microbes" in the space.

--mark X's in the appropriate opinion columns.

MATERIALS

TEACHING STRATEGIES

- A. PUT BLEACH IN IT.
- B. PUT ALUM IN IT.
- C. FILTER IT THROUGH SAND.
- D. EVAPORATE IT.

MARK AN X ON YOUR CHOICES.

9. (Activity 5-13) A Washday Miracle.

IN THIS ACTIVITY WE DID AN EXPERIMENT TO FIND OUT IF DETERGENTS HELPED PLANTS GROW IN WATER. WE FOUND THAT DETERGENTS WITH PHOSPHATES IN THEM HELPED PLANTS TO GROW. MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

QUESTION 9 ASKS, "WHY WOULD IT BE BAD TO HAVE PHOSPHATES FROM DETERGENTS IN THE WATER OF LAKES AND STREAMS?"

- A. THE PHOSPHATES KILL PLANTS.
- B. IT IS HARDER TO CLEAN THE WATER.
- C. THE FISH WOULDN'T HAVE ANY ROOM TO SWIM AROUND.
- D. TOO MANY PLANTS WOULD GROW IN THE WATER.

MARK AN X ON YOUR CHOICES.

TEACHING STRATEGIES

PUT BLEACH IN IT.

PUT ALUM IN IT.

FILTER IT THROUGH SAND.

EVAPORATE IT.

ON YOUR CHOICES.

5-13) A Washday Miracle.

ACTIVITY WE DID AN EXPERIMENT TO FIND
TERGENTS HELPED PLANTS GROW IN WATER.
THAT DETERGENTS WITH PHOSPHATES IN
ED PLANTS TO GROW. MARK AN X TO SHOW
ION OF THIS ACTIVITY.

9 ASKS, "WHY WOULD IT BE BAD TO HAVE
S FROM DETERGENTS IN THE WATER OF
STREAMS?"

THE PHOSPHATES KILL PLANTS.

IT IS HARDER TO CLEAN THE WATER.

THE FISH WOULDN'T HAVE ANY ROOM TO
SWIM AROUND.

TOO MANY PLANTS WOULD GROW IN THE
WATER.

ON YOUR CHOICES.

ANTICIPATED STUDENT BEHAVIORS

Students should:

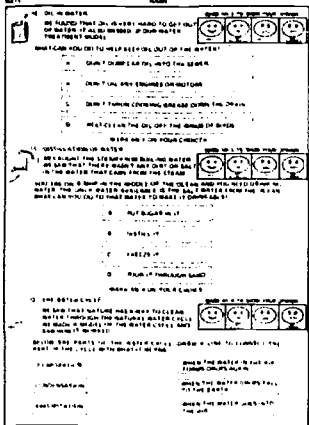
--each mark an X on B, C, or D.

--mark X's in the appropriate opinion columns.

--each mark an X on answer B and/or D.

MATERIALS

Slide 5-74, Worksheet 5-20B



TEACHING STRATEGIES

10. (Activity 5-14) Oil in Water.

REMEMBER THE OILY WATER WE HAD? WE FOUND THAT OIL IS VERY HARD TO GET OUT OF WATER. IT ALSO MESSED UP OUR WATER TREATMENT MODEL. MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

WHAT CAN YOU DO TO HELP KEEP OIL OUT OF THE WATER?

- A. DON'T DUMP CAR OIL INTO THE SEWER.
- B. DON'T OIL ANY ENGINES OR MOTORS.
- C. DON'T THROW COOKING GREASE DOWN THE DRAIN.
- D. HELP CLEAN THE OIL OFF THE WINGS OF BIRDS.

MARK AN X ON YOUR CHOICES.

11. (Activity 5-15) Distillation of Water.

WE CAUGHT THE STEAM FROM BOILING WATER IN THIS ACTIVITY. WE SAW THAT THERE WASN'T ANY DIRT OR SALT IN THE WATER THAT CAME FROM THE STEAM.

MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

SEE IF YOU CAN SOLVE THIS PROBLEM. YOU ARE ON A SHIP IN THE MIDDLE OF THE OCEAN AND YOU NEED DRINKING WATER. THE ONLY WATER AVAILABLE IS THE SALT WATER FROM THE OCEAN.

WHAT CAN YOU DO TO THAT WATER TO MAKE IT DRINKABLE?

- A. PUT SUGAR IN IT.

TEACHING STRATEGIES

5-14) Oil in Water.

THE OILY WATER WE HAD? WE FOUND THAT
IT WAS HARD TO GET OUT OF WATER. IT ALSO
AFFECTS OUR WATER TREATMENT MODEL. MARK AN
X TO SHOW YOUR OPINION OF THIS ACTIVITY.

WHAT DO YOU DO TO HELP KEEP OIL OUT OF THE

DO NOT DUMP CAR OIL INTO THE SEWER.

DO NOT OIL ANY ENGINES OR MOTORS.

DO NOT THROW COOKING GREASE DOWN THE
DRAIN.

HELP CLEAN THE OIL OFF THE WINGS OF
BIRDS.

MARK YOUR CHOICES.

5-15) Distillation of Water.

THE STEAM FROM BOILING WATER IN THIS
EXPERIMENT WE SAW THAT THERE WASN'T ANY DIRT
IN THE WATER THAT CAME FROM THE STEAM.

MARK TO SHOW YOUR OPINION OF THIS ACTIVITY.

HOW CAN WE SOLVE THIS PROBLEM. YOU ARE ON
THE MIDDLE OF THE OCEAN AND YOU NEED
FRESH WATER. THE ONLY WATER AVAILABLE IS
SEA WATER FROM THE OCEAN.

WHAT DO YOU DO TO THAT WATER TO MAKE IT

DRINKABLE WITH SUGAR IN IT.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-35

Students should:

--mark X's in the appropriate opinion columns.

--each mark an X on answers A and C.

--mark X's in the appropriate opinion columns.

- B. DISTILL IT.
- C. FREEZE IT.
- D. POUR IT THROUGH SAND.

MARK AN X ON YOUR CHOICE.

12. (Activity 5-16) The Water Cycle.

REMEMBER THE NATURAL WATER CYCLE? WE SAW THAT NATURE HAS A WAY TO CLEAN WATER THROUGH THE NATURAL WATER CYCLE. WE MADE A MODEL OF THE WATER CYCLE AND SAW HOW IT WORKED. MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

LOOK AT QUESTION 12. IT'S A HARD QUESTION SO THINK CAREFULLY. BELOW ARE PARTS OF THE WATER CYCLE. DRAW A LINE TO CONNECT THE PART OF THE CYCLE WITH WHAT IT MEANS.

ON THE LEFT SIDE ARE THE PARTS OF THE WATER CYCLE: EVAPORATION, CONDENSATION, AND PRECIPITATION. ON THE RIGHT SIDE ARE THE MEANINGS:

- A. WHEN THE WATER IN THE AIR FORMS DROPS.
- B. WHEN THE WATER DROPS FALL TO THE EARTH.
- C. WHEN THE WATER GOES INTO THE AIR.

TAKE YOUR TIME.

TEACHING STRATEGIES

DISTILL IT.

FREEZE IT.

POUR IT THROUGH SAND.

MARK ON YOUR CHOICE.

5-16) The Water Cycle.

THE NATURAL WATER CYCLE? WE SAW
NATURE HAS A WAY TO CLEAN WATER THROUGH
THE NATURAL WATER CYCLE. WE MADE A MODEL OF
THE WATER CYCLE AND SAW HOW IT WORKED. MARK
YOUR CHOICE ON YOUR ANSWER SHEET.
SHOW YOUR OPINION OF THIS ACTIVITY.

QUESTION 12. IT'S A HARD QUESTION SO
ANSWER CAREFULLY. BELOW ARE PARTS OF THE
WATER CYCLE. DRAW A LINE TO CONNECT THE
PARTS OF THE CYCLE WITH WHAT IT MEANS.

ON THE LEFT SIDE ARE THE PARTS OF THE WATER
CYCLE: EVAPORATION, CONDENSATION, AND
PRECIPITATION. ON THE RIGHT SIDE ARE THE

QUESTIONS:
1. WHEN THE WATER IN THE AIR FORMS
CLOUDS.

2. WHEN THE WATER DROPS FALL TO THE
EARTH.

3. WHEN THE WATER GOES INTO THE AIR.

ANSWER
YOUR
ANSWER
SHEET
AT
THE
END
OF
THE
ACTIVITY.

ANTICIPATED STUDENT BEHAVIORS

Students should:

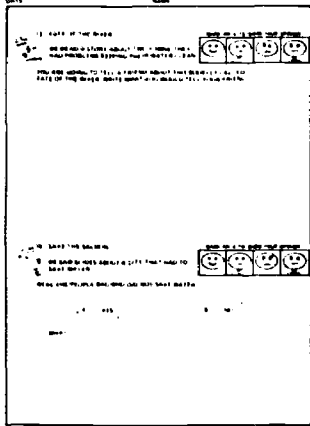
--each mark an X on answer B.

--mark X's in the appropriate opinion columns.

--match evaporation with C, condensation with A,
and precipitation with B.

MATERIALS

Slide 5-75, Worksheet 5-21A



TEACHING STRATEGIES

Collect Worksheet 5-20 and distribute 5-21. Direct students to put their names and the date on the worksheet and locate the side that begins with "13. Fate of the River." Continue with Item 13.

13. (Activity 5-17) Fate of the River.

THIS ACTIVITY WAS A BOOKLET. WE READ A STORY ABOUT TWO TOWNS. THEY HAD PROBLEMS KEEPING THEIR WATER CLEAN. MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

LOOK AT QUESTION 13. YOU ARE GOING TO TELL A FRIEND ABOUT THE BOOKLET CALLED *FATE OF THE RIVER*. WRITE WHAT YOU WOULD TELL YOUR FRIENDS.

14. (Activity 5-18) Save the Salmon.

IN THIS ACTIVITY WE SAW SLIDES ABOUT A CITY THAT HAD TO SAVE WATER. MARK AN X TO SHOW WHETHER YOU LIKED THIS ACTIVITY, WERE NOT INTERESTED, DISLIKED IT, OR DON'T REMEMBER.

WE KNOW ALL PEOPLE THINK DIFFERENTLY. LOOK AT QUESTION 14. IT ASKS, "WERE THE PEOPLE BAD WHO DID NOT SAVE WATER?" MARK YES OR NO AND THEN TELL WHY YOU ANSWERED THE WAY YOU DID.

NOTE: There is no right answer to this question. Tell the students that when you discuss their answers they will be expected to tell their reasons for choosing A or B.

TEACHING STRATEGIES

5-20 and distribute 5-21. Direct their names and the date on the worksheet slide that begins with "13. Fate of the River" with Item 13.

17) Fate of the River.

ACTIVITY WAS A BOOKLET. WE READ A STORY ABOUT TOWN. THEY HAD PROBLEMS KEEPING THE TOWN CLEAN. MARK AN X TO SHOW YOUR OPINION ABOUT THIS ACTIVITY.

QUESTION 13. YOU ARE GOING TO TELL US ABOUT THE BOOKLET CALLED *FATE OF THE RIVER*. WRITE WHAT YOU WOULD TELL YOUR FRIENDS.



18) Save the Salmon.

ACTIVITY WE SAW SLIDES ABOUT A CITY THAT DOESN'T SAVE WATER. MARK AN X TO SHOW YOUR OPINION. DID YOU LIKE THIS ACTIVITY, WERE YOU NOT INTERESTED, DID YOU DISLIKE IT, OR DON'T REMEMBER.

QUESTION 14. IT ASKS, "WERE THE PEOPLE WHO DON'T SAVE WATER?" MARK YES OR NO AND EXPLAIN WHY YOU ANSWERED THE WAY YOU DID.

There is no right answer to this question. Tell students that when you discuss their answers they should be expected to tell their reasons for choosing A or B.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-35

Students should:

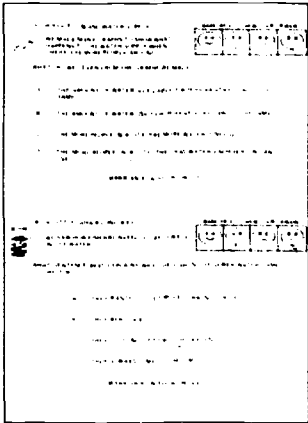
--mark X's in the appropriate opinion columns.

--write one or two sentences about the booklet.

--mark X's in the appropriate opinion columns.

--each mark either yes or no and explain why.

Slide 5-76, Worksheet 5-21B



15. (Activity 5-19) Population Versus Water Supply.

REMEMBER ALL THOSE GRAPHS WE MADE? WE MADE MANY GRAPHS TO SHOW WHAT HAPPENS TO THE WATER SUPPLY WHEN THERE ARE MORE PEOPLE AROUND. MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

WHAT DID WE LEARN FROM THE GRAPHS WE MADE? MARK AN X ON YOUR CHOICES.

- A. THE AMOUNT OF WATER AVAILABLE EACH YEAR STAYS ABOUT THE SAME.
- B. THE AMOUNT OF WATER USED EACH YEAR STAYS THE SAME.
- C. THE MORE PEOPLE IN A CITY, THE MORE WATER IS NEEDED.
- D. THE MORE PEOPLE IN A CITY, THE LESS WATER EACH PERSON CAN USE.

16. (Activity 5-20) A Little Goes a Long Way.

REMEMBER THE FISH WE USED IN THIS EXPERIMENT? WE SAW HOW FISH ARE AFFECTED BY SEWAGE IN THE WATER. MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

WHAT SENTENCE BEST EXPLAINS WHY THE FISH IN THE SEWER WATER CAME TO THE TOP? MARK AN X ON YOUR CHOICE.

- A. THEY WANTED TO GET MORE CARBON DIOXIDE.
- B. THEY WERE DEAD.

TEACHING STRATEGIES

y 5-19) Population Versus Water Supply.

ALL THOSE GRAPHS WE MADE? WE MADE MANY
O SHOW WHAT HAPPENS TO THE WATER SUPPLY
RE ARE MORE PEOPLE AROUND. MARK AN X
YOUR OPINION OF THIS ACTIVITY.

WE LEARN FROM THE GRAPHS WE MADE? MARK
YOUR CHOICES.

THE AMOUNT OF WATER AVAILABLE EACH
YEAR STAYS ABOUT THE SAME.

THE AMOUNT OF WATER USED EACH YEAR
STAYS THE SAME.

THE MORE PEOPLE IN A CITY, THE MORE
WATER IS NEEDED.

THE MORE PEOPLE IN A CITY, THE LESS
WATER EACH PERSON CAN USE.

5-20) A Little Goes a Long Way.

THE FISH WE USED IN THIS EXPERIMENT?
W FISH ARE AFFECTED BY SEWAGE IN THE
MARK AN X TO SHOW YOUR OPINION OF THIS

ENCE BEST EXPLAINS WHY THE FISH IN
WATER CAME TO THE TOP? MARK AN X
HOICE.

THEY WANTED TO GET MORE CARBON DIOXIDE.

THEY WERE DEAD.

ANTICIPATED STUDENT BEHAVIORS

Students should:

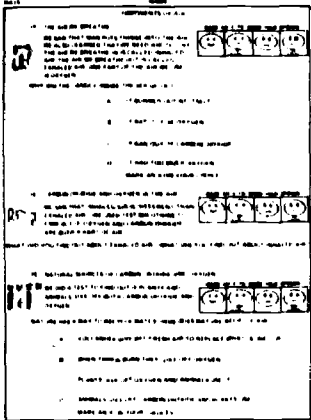
--mark X's in the appropriate opinion columns.

--mark X's on answers A, C, and D.

--mark X's in the appropriate opinion columns.

MATERIALS

Slide 5-77, Worksheet 5-22A



TEACHING STRATEGIES

C. THEY COULDN'T GET ENOUGH OXYGEN.

D. THEY ALWAYS COME TO THE TOP.

Collect Worksheet 5-21. Distribute Worksheet 5-22 and have students locate the side which starts with "17. The Air We Breathe." Have them write their names and the date in the spaces provided.

Then say:

WE HAVE REALLY DONE A LOT OF THINGS WITH WATER!
THE SECOND PART OF THE UNIT HAD TO DO WITH AIR.
HOW MANY REMEMBER SOME OF THE THINGS WE DID WITH AIR?

17. (Activity 5-22 and 5-23) The Air We Breathe.

WE SAW THAT MAN PUTS THINGS IN THE AIR. WE ALSO LEARNED THAT WE NEED AIR TO LIVE. THE AIR WE BREATHE IN IS CALLED INHALED AIR. THE AIR WE BREATHE OUT IS CALLED EXHALED AIR. ONE PART OF THE AIR WE USE IS OXYGEN. MARK AN X TO SHOW YOUR OPINION OF THESE ACTIVITIES.

QUESTION 17 ASKS, "WHY DID THE CANDLE INSIDE THE JAR GO OUT?" MARK AN X ON YOUR CHOICE.

- A. IT BURNED OUT BY ITSELF.
- B. IT RAN OUT OF OXYGEN.
- C. IT RAN OUT OF CARBON DIOXIDE.
- D. IT HAD TOO MUCH OXYGEN.

TEACHING STRATEGIES

THEY COULDN'T GET ENOUGH OXYGEN.

THEY ALWAYS COME TO THE TOP.

5-21. Distribute Worksheet 5-22 and indicate the side which starts with "Breathe." Have them write their names in the spaces provided.

ALREADY DONE A LOT OF THINGS WITH WATER!
PART OF THE UNIT HAD TO DO WITH AIR.
REMEMBER SOME OF THE THINGS WE DID WITH

5-22 and 5-23) The Air We Breathe.

MAN PUTS THINGS IN THE AIR. WE
KNOW THAT WE NEED AIR TO LIVE. THE
AIR WE INHALE IS CALLED INHALED AIR.
THE AIR WE EXHALE IS CALLED EXHALED AIR.
THE AIR WE USE IS OXYGEN. MARK
YOUR OPINION OF THESE ACTIVITIES.

ASKS, "WHY DID THE CANDLE INSIDE THE
CUP BURN OUT BY ITSELF.

IT BURNED OUT BY ITSELF.

IT RAN OUT OF OXYGEN.

IT RAN OUT OF CARBON DIOXIDE.

IT HAD TOO MUCH OXYGEN.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-35

Students should:

--mark X's on answer C.

--raise hands to show who remembers.

--mark X's in the appropriate opinion columns.

--each mark an X on answer B.

18. (Activity 5-24 and 5-25) Carbon Dioxide and Oxygen in the Air.

IN THIS ACTIVITY WE SAW THAT INHALED AIR IS DIFFERENT FROM EXHALED AIR. WE USED TEST SOLUTIONS TO FIND OUT IF OXYGEN AND CARBON DIOXIDE ARE BOTH A PART OF AIR. MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

HERE ARE TWO EASY QUESTIONS. WHAT DID YOU FIND OUT ABOUT EXHALED AIR? AND, WHAT DID YOU FIND OUT ABOUT INHALED AIR? WRITE YOUR ANSWERS IN THE SPACES BELOW QUESTION 18.

19. (Activity 5-26) Natural Sources of Carbon Dioxide and Oxygen.

REMEMBER THE SNAIL AND THE PLANT? WE DID A TEST TO FIND OUT IF PLANTS AND ANIMALS GIVE OFF BOTH CARBON DIOXIDE AND OXYGEN. MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

YOU'LL HAVE TO THINK HARD ON QUESTION 21. IT SAYS, "NATURE HAS A WAY TO RECYCLE WATER. HOW DOES NATURE RECYCLE AIR?" MARK AN X ON YOUR CHOICES.

- A. VOLCANOES GIVE OFF FRESH AIR TO REPLACE WHAT IS USED UP.
- B. WHEN THINGS BURN THEY GIVE OFF OXYGEN.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

Students should:

--mark X's in the appropriate opinion columns.

--write, "It has mostly carbon dioxide in it,"
and, "It is mostly oxygen."



--mark X's in the appropriate opinion columns.

5-24 and 5-25) Carbon Dioxide and Oxygen

ACTIVITY WE SAW THAT INHALED AIR IS
FROM EXHALED AIR. WE USED TEST
TO FIND OUT IF OXYGEN AND CARBON
DIOXIDE BOTH A PART OF AIR. MARK AN X
TO SHOW YOUR OPINION OF THIS ACTIVITY.

ASK SOME EASY QUESTIONS. WHAT DID YOU FIND
IN EXHALED AIR? AND, WHAT DID YOU FIND
IN INHALED AIR? WRITE YOUR ANSWERS IN
THE SPACE BELOW QUESTION 18.

5-26) Natural Sources of Carbon Dioxide

THE SNAIL AND THE PLANT? WE DID A
TEST TO FIND OUT IF PLANTS AND ANIMALS GIVE
OFF CARBON DIOXIDE AND OXYGEN. MARK AN X
TO SHOW YOUR OPINION OF THIS ACTIVITY.

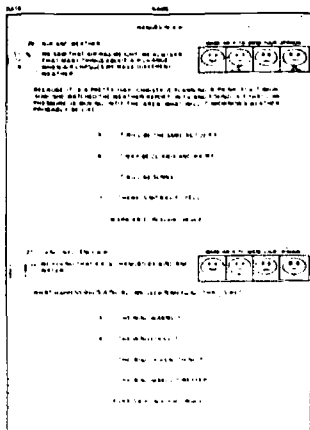
THINK ABOUT QUESTION 21. IT
TURNS OUT THERE IS A WAY TO RECYCLE WATER. HOW
CAN WE RECYCLE AIR?" MARK AN X ON YOUR

CANALS GIVE OFF FRESH AIR TO
REPLACE WHAT IS USED UP.

WHAT THINGS BURN THEY GIVE OFF

MATERIALS

Slide 5-78, Worksheet 5-22B



TEACHING STRATEGIES

- C. PLANTS GIVE OFF OXYGEN AND ANIMALS USE IT.
- D. ANIMALS GIVE OFF CARBON DIOXIDE AND PLANTS USE IT.

20. (Activities 5-27 and 5-28) Air and Weather.

REMEMBER WHEN WE WEIGHED BALLOONS? WE SAW THAT AIR HAS WEIGHT. WE ALSO SAW THAT MANY THINGS ABOUT AIR CHANGE. WHEN THE AIR CHANGES WE HAVE DIFFERENT WEATHER. MARK AN X TO SHOW YOUR OPINION OF THESE ACTIVITIES.

HERE IS A PROBLEM FOR YOU TO FIGURE OUT. QUESTION 22 SAYS, "BECAUSE IT IS A PRETTY DAY, CHRISTY IS PLANNING A PICNIC FOR TOMORROW. SHE WATCHED THE WEATHER REPORT ON TV AND FOUND OUT THAT LOW PRESSURE IS MOVING INTO THE AREA. WHAT WILL TOMORROW'S WEATHER PROBABLY BE LIKE? MARK AN X ON YOUR CHOICE.

- A. IT WILL BE THE SAME AS TODAY.
- B. IT MAY BE CLOUDY AND RAINY.
- C. IT WILL BE SUNNY.
- D. THERE IS NO WAY TO TELL.

GIVE S
TIME
TO
THINK

TEACHING STRATEGIES

PLANTS GIVE OFF OXYGEN AND ANIMALS
USE IT.

ANIMALS GIVE OFF CARBON DIOXIDE
AND PLANTS USE IT.

s 5-27 and 5-28) Air and Weather.

WHEN WE WEIGHED BALLOONS? WE SAW
AS WEIGHT. WE ALSO SAW THAT MANY
UT AIR CHANGE. WHEN THE AIR
HAVE DIFFERENT WEATHER. MARK
OW YOUR OPINION OF THESE ACTIVITIES.

PROBLEM FOR YOU TO FIGURE OUT.
2 SAYS, "BECAUSE IT IS A PRETTY
TY IS PLANNING A PICNIC FOR
SHE WATCHED THE WEATHER REPORT
FOUND OUT THAT LOW PRESSURE IS
D THE AREA. WHAT WILL TOMORROW'S
BBABLY BE LIKE? MARK AN X ON YOUR

T WILL BE THE SAME AS TODAY.

T MAY BE CLOUDY AND RAINY.

T WILL BE SUNNY.

HERE IS NO WAY TO TELL.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-35

Students should:

--mark X's on answers C and D.

**GIVE STUDENTS
TIME
TO
THINK**



--mark Xs in the appropriate opinion columns.

--each mark an X on answer B.

Slide 5-79, Worksheet 5-23

The image shows a worksheet with two numbered activities. Each activity has a short paragraph of text followed by a scale of four smiley faces (happy, neutral, sad, very sad) for marking an opinion. Activity 22 is titled 'WHAT IS IN THE AIR?' and Activity 23 is titled 'WHAT HAPPENS WHEN WIND BLOWS OVER SOMETHING THAT IS WET?'. The worksheet is titled 'POLLUTION IN OUR AIR' at the top.

21. (Activity 5-29) Can I Influence Air?

IN THIS ACTIVITY WE FOUND THAT AIR IS CHANGED BY WIND AND WATER. MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

WHAT HAPPENS WHEN WIND BLOWS OVER SOMETHING THAT IS WET? MARK AN X ON YOUR CHOICE.

- A. THE WIND WARMS IT.
- B. THE WIND COOLS IT.
- C. THE WIND DOES NOTHING TO IT.
- D. THE WIND MAKES IT WETTER.

Collect Worksheet 5-22. Distribute Worksheet 5-23 and have the students locate Number 22, "Pollution in our Air." Have them write their names and the date in the spaces provided.

22. (Activities 5-30 and 5-31) What Is in Our Air?

REMEMBER WHEN WE MADE A BULLETIN BOARD? WE COLLECTED PICTURES THAT SHOWED WHAT WE PUT INTO THE AIR. WE ALSO STUDIED THE AIR IN OUR ROOM. MARK AN X TO SHOW YOUR OPINION OF THESE ACTIVITIES.

WE FOUND MANY DIFFERENT THINGS IN THE AIR. WHICH OF THESE THINGS ARE SOMETIMES IN THE AIR? MARK AN X ON YOUR CHOICES.

- | | |
|-------|----------------|
| WATER | MICROBES |
| DUST | OXYGEN |
| SMOG | CARBON DIOXIDE |
| FUMES | POLLUTION |

TEACHING STRATEGIES

5-29) Can I Influence Air?

ACTIVITY WE FOUND THAT AIR IS CHANGED
AND WATER. MARK AN X TO SHOW YOUR
OF THIS ACTIVITY.

CHANGES WHEN WIND BLOWS OVER SOMETHING
HOT? MARK AN X ON YOUR CHOICE.

THE WIND WARMS IT.

THE WIND COOLS IT.

THE WIND DOES NOTHING TO IT.

THE WIND MAKES IT WETTER.

Sheet 5-22. Distribute Worksheet 5-23 and
students locate Number 22, "Pollution in our
Environment" and write their names and the date in the
margin.

Pages 5-30 and 5-31) What Is in Our Air?

WHEN WE MADE A BULLETIN BOARD? WE
POSTED PICTURES THAT SHOWED WHAT WE PUT
IN THE AIR. WE ALSO STUDIED THE AIR IN
THE ENVIRONMENT. MARK AN X TO SHOW YOUR OPINION
ON THESE ACTIVITIES.

WHAT ARE MANY DIFFERENT THINGS IN THE AIR.
WHAT ARE THESE THINGS ARE SOMETIMES IN THE
AIR? MARK AN X ON YOUR CHOICES.

MICROBES
OXYGEN
CARBON DIOXIDE
POLLUTION

ANTICIPATED STUDENT BEHAVIORS

Students should:

--mark X's in the appropriate opinion columns.

--each mark X on answer B.

--mark X's in the appropriate opinion columns.

--mark X's on all choices.

MATERIALS

TEACHING STRATEGIES

23. (Activities 5-32 and 5-33) Altered Air and Life.

REMEMBER WHEN WE COLLECTED EXHAUST? WE COLLECTED CAR EXHAUST IN A JAR TO SEE IF PLANTS COULD LIVE IN THE JAR WITH THE EXHAUST. WE ALSO TESTED CAR EXHAUST AT SEVERAL DISTANCES FROM THE TAILPIPE. MARK AN X TO SHOW YOUR OPINION OF THESE ACTIVITIES.

QUESTION 25 ASKS, "WHY ARE PEOPLE SO CONCERNED ABOUT AIR POLLUTION?" THINK OF THE ACTIVITIES WE HAVE DONE AND WRITE YOUR ANSWER IN THE SPACE.

24. (Activity 5-35) Review of Unit V.

NOW WE HAVE HAD A REVIEW OF UNIT V. THINK ABOUT WHAT WE HAVE DONE AND MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

Collect Worksheet 5-23. Tell the class that tomorrow they can talk about the answers to the questions on the five worksheets. Then if they want to work again on any activity they talked about today, they may do so.

After class, turn to the Responsibilities and Accomplishments Section of the Student Record of Progress and enter your judgment of each student's interest and involvement in science. Then, use an extra set of worksheets for Part I to tally the student ratings of each of the activities.

Look for the most popular and least popular activities. Then look over each worksheet to find out which students indicated the least interest in science. Compare this with your own ratings of each student's interest.

If you have students who frequently indicated disinterest, dislike, or no memory for a number of activities, it is possible that they are trying to indicate personal,

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-35

5-32 and 5-33) Altered Air and Life.

Students should:

WHEN WE COLLECTED EXHAUST? WE COLLECTED
IN A JAR TO SEE IF PLANTS COULD LIVE
WITH THE EXHAUST. WE ALSO TESTED CAR
SEVERAL DISTANCES FROM THE TAILPIPE.
TO SHOW YOUR OPINION OF THESE

--mark X's in the appropriate opinion columns.

ASKS, "WHY ARE PEOPLE SO CONCERNED
POLLUTION?" THINK OF THE ACTIVITIES
AND WRITE YOUR ANSWER IN THE SPACE.

--write why people are concerned about air pollution.

5-35) Review of Unit V.

--mark X's in the appropriate opinion columns.

HAD A REVIEW OF UNIT V. THINK
WE HAVE DONE AND MARK AN X TO
OPINION OF THIS ACTIVITY.

5-23. Tell the class that tomorrow
out the answers to the questions on the
Then if they want to work again on any
asked about today, they may do so.

to the Responsibilities and Accomplish-
the Student Record of Progress and enter
each student's interest and involvement
, use an extra set of worksheets for
the student ratings of each of the

popular and least popular activities.
each worksheet to find out which students
most interest in science. Compare this
ratings of each student's interest.

students who frequently indicated disinterest,
memory for a number of activities, it is
trying to indicate personal,

social, or emotional problems rather than simply that they don't like science. Bear in mind that part of the problem might be you -- a personality conflict that may not be easily resolved. Whatever the cause, these students need attention and understanding. Look at your records of background and understanding for clues. Visit their homes. Review their school placement. In the next unit try to draw them into the activities.

Use the guidelines that follow (preceding Part II of this activity) to summarize and record responses to the Questions on Worksheets 5-19, 5-20, 5-21, 5-22, and 5-23. As you record the results, write occasional comments or words of praise on the worksheets (which should be returned to the students the next day).

Guidelines for Scoring Worksheets 5-19, 5-20, 5-21, 5-22 and 5-23.

The outline below will assist you in scoring student responses on Tallysheet 5-10.

Questions 1, 8, 9, 10, 11, 15, 17, 19, 20, and 21:
Circle the letters that each student marks.

Question 2: Circle the number of water uses each student lists. Circle M if the student lists more than six uses.

Question 3: Circle YES if the student writes drinking as the most important use. Circle NO if the student lists another use or fails to answer.

Question 4: Circle YES if the student's response mentions one of the following: watering lawns, using washing machines (clothes or dishes), or washing cars.

TEACHING STRATEGIES

ional problems rather than simply that science. Bear in mind that part of the e you -- a personality conflict that may resolved. Whatever the cause, these attention and understanding. Look at background and understanding for clues. es. Review their school placement. In y to draw them into the activities.

nes that follow (preceding Part II of to summarize and record responses to the rksheets 5-19, 5-20, 5-21, 5-22, and record the results, write occasional s of praise on the worksheets (which ed to the students the next day).

Scoring Worksheets 5-19, 5-20, 5-21, 5-22,

ow will assist you in scoring student llysheet 5-10.

9, 10, 11, 15, 17, 19, 20, and 21:
ers that each student marks.

rcle the number of water uses each student if the student lists more than six uses.

rcle YES if the student writes drinking as nt use. Circle NO if the student lists fails to answer.

rcle YES if the student's response the following: watering lawns, using (clothes or dishes), or washing cars.

ANTICIPATED STUDENT BEHAVIORS

MATERIALS

TEACHING STRATEGIES

Question 5: Circle YES if the student has written main water pipe, water main, water hookup, water pipe, or another similar answer.

Question 6: Circle YES if the student circled the treatment plant and a natural water source and numbered the glass first, the natural source last, and the treatment plant between. (All other circled and numbered words may be disregarded for scoring purposes.)

Question 7: Circle YES if the student answered that the bleach was added to kill microbes.

Question 12: Circle the number of items that the student matched correctly.

Question 13: Rate each student's responses to this question based on the following criteria:

1. The location of the two cities (one near the mountains, one near the ocean.)
2. A river flows between the two cities.
3. Oceanview has strong pollution laws, keeps city clean, and so on.
4. Mountainview polluted the clear river.
5. Mountainview's pollution has affected the city of Oceanview.

Rate students as HIGH if they mention all five items. Rate students as SOME if they mention three or four of the items. Rate students as LOW if they mention less than three of the items.

Question 14: Circle the answer that the student marked on his sheet.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-35

Circle YES if the student has written main
or main, water hookup, water pipe, or
answer.

Circle YES if the student circled the treat-
natural water source and numbered the
natural source last, and the treatment
(All other circled and numbered words
used for scoring purposes.)

Circle YES if the student answered that the
to kill microbes.

Circle the number of items that the student
y.

Rate each student's responses to this
on the following criteria:

Location of the two cities (one near the
one near the ocean.)

Relationships between the two cities.

City that has strong pollution laws, keeps city
so on.

City that has polluted the clear river.

City whose pollution has affected the city
so on.

HIGH if they mention all five items.

SOME if they mention three or four
Rate students as LOW if they mention
of the items.

Circle the answer that the student
set.

Question 18: Circle YES if students respond that inhaled air has mostly oxygen in it and exhaled air has mostly carbon dioxide.

Question 22: Circle YES if the student marks an X on all choices. Circle NO if he fails to mark any choices.

Question 23: Circle YES if you feel the student's response indicates an understanding of at least one reason people are concerned about air pollution.

Guidelines for Recording in the Student Record of Progress:

The items in this review assess an understanding of the concepts in this unit. Some assess a higher level of abstract thinking and are used to identify the students who have developed these reasoning skills.

The following instructions will help you interpret scores and record results from the review in the Student Record of Progress:

Question Number 1 assesses the student's understanding of the concept of the water content of living things. Turn to the concept page in the Student Record of Progress and find the column marked Activity 5-35, Water Content. Circle YES if the student marked A.

Questions Number 2 and 3 assess the student's understanding of concepts regarding water use. Find the column marked Activity 5-35, Water Use, on the concept page of the Student Record of Progress and circle YES if the student lists at least four water uses and names drinking as the most important way he uses water.

Question Number 4 assesses the student's understanding of the concept of saving water. Find the column marked Activity 5-35, Saving Water, on the concept page of the Student Record of Progress and circle YES if YES is circled on the tallysheet. A YES indicates that the student has at least some understanding of the concept.

TEACHING STRATEGIES

Circle YES if students respond that inhaled oxygen in it and exhaled air has mostly nitrogen.

Circle YES if the student marks an X on all choices. Circle NO if he fails to mark any choices.

Circle YES if you feel the student's responses indicate an understanding of at least one concept. Circle NO if you are concerned about air pollution.

For Recording in the Student Record of

After this review assess an understanding of the concepts of this unit. Some assess a higher level of reasoning and are used to identify the students who have developed these reasoning skills.

The following instructions will help you interpret scores and results from the review in the Student Record

Item 1 assesses the student's understanding of the concept of the water content of living things. Turn to the next page in the Student Record of Progress and in the column marked Activity 5-35, Water Content. Circle YES if the student marked A.

Item 2 and 3 assess the student's understanding of concepts regarding water use. Find the column marked Activity 5-35, Water Use, on the concept page of the Student Record of Progress and circle YES if the student lists at least four water uses and names the most important way he uses water.

Item 4 assesses the student's understanding of the concept of saving water. Find the column marked Saving Water, on the concept page of the Student Record of Progress and circle YES if YES is marked on the worksheet. A YES indicates that the student has some understanding of the concept.

ANTICIPATED STUDENT BEHAVIORS

MATERIALS

TEACHING STRATEGIES

Questions 5 and 6 assess the student's understanding of the concept of the source of water. Find the column marked Activity 5-35, Water Source, on the concept page of the Student Record of Progress and circle YES if YES is circled for both Questions 5 and 6 on the tallysheet. A YES indicates that the student understands the source of his water.

Questions 7 through 11 assess the student's understanding of the concept of water treatment. Find the column marked Activity 5-35, Water Treatment, on the concept page of the Student Record of Progress and circle HIGH if YES is circled for Question 7 on the tallysheet and if the student marked all of the correct alternatives for Questions 8 through 11. Circle LOW if NO is circled for Question 7 or if the student marks any incorrect responses for Questions 8 through 11. Circle SOME if YES is circled on the tallysheet for Question 7 and if the student marked some of the correct alternatives for Questions 8 through 11 without marking any incorrect answers. Students who are rated as LOW in understanding of this concept should be exposed to more activities and experiences regarding water treatment.

Question 12 assesses the student's understanding of the concept of the natural water cycle. Find the column marked Activity 5-35, Water Cycle, on the concept page of the Student Record of Progress. Circle HIGH if the student matched all three of the parts of the water cycle. Circle LOW if he didn't match any correctly. Circle SOME if he matched one correctly. Students who were rated as LOW should be provided with further activities to acquaint them with the water cycle.

Question 13 assesses the student's recall of the story, *Fate of the River*, and their understanding of the concept of water pollution. Find the column marked Activity 5-35, Fate of the River, on the concept page of the Student Record of Progress. Record the rating you recorded on the tallysheet. Students who were rated LOW will need

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-35

6 assess the student's understanding of the source of water. Find the column 5-35, Water Source, on the concept page Record of Progress and circle YES if for both Questions 5 and 6 on the YES indicates that the student understands the source of water.

Through 11 assess the student's understanding of water treatment. Find the column 5-35, Water Treatment, on the concept page Record of Progress and circle HIGH if marked for Question 7 on the tallysheet and if marked all of the correct alternatives for Questions 8 through 11. Circle LOW if NO is circled for any of the student marks any incorrect alternatives for Questions 8 through 11. Circle SOME if marked on the tallysheet for Question 7 and marked some of the correct alternatives for Questions 8 through 11 without marking any incorrect alternatives. Students who are rated as LOW in understanding of water treatment should be exposed to more activities and materials regarding water treatment.

Assesses the student's understanding of the natural water cycle. Find the column 5-35, Water Cycle, on the concept page Record of Progress. Circle HIGH if the student marked all three of the parts of the water cycle. Circle LOW if the student didn't match any correctly. Circle SOME if the student marked one correctly. Students who were rated as LOW should be provided with further activities and materials regarding the water cycle.

Assesses the student's recall of the story, the characters, and their understanding of the concept of water. Find the column marked Activity 5-35, on the concept page of the Student Record of Progress. Record the rating you recorded on the Student Record of Progress. Students who were rated LOW will need

many opportunities to listen to or read stories and then to recall the main points.

Question 14 involves a value judgment and will not be recorded in the Student Record of Progress. All students should, however, be given many opportunities to make value judgments regarding a variety of concepts and ideas.

Question 15 assesses the student's understanding of the concept of population and water. Find the column marked Activity 5-35, Population and Water, on the concepts page of the Student Record of Progress. Circle HIGH if the student marked all of the choices A, C, and D. Circle LOW if the student marked B. Circle SOME if the student marked any of the choices A, C, or D and did not mark B. Students rated LOW should be given further experience relating to this concept.

Questions 16 and 17 assess the student's understanding of the need for oxygen. Find the column marked Activity 5-35, Oxygen, on the concepts page of the Student Record of Progress. Circle YES if the student answered both Questions 16 and 17 correctly.

Questions 18 and 19 assess the student's understanding of the concept that plants and animals use and give off oxygen and carbon dioxide. Find the column marked Activity 5-35, Oxygen and Carbon Dioxide. Circle YES if YES has been circled for Question 18 on the tallysheet and the student has marked choices C and D for Question 19.

Question 20 assesses the student's understanding of the concept of air pressure on weather. Find the column marked Activity 5-35, Air and Weather, on the concepts page of the Student Record of Progress. Circle YES if the student marked Choice B. NOTE: This is a very difficult concept that involves some abstract reasoning abilities. Students who did not grasp the concept will require a large number of experiences in abstract thinking before reaching this developmental level.

TEACHING STRATEGIES

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main points.

volves a value judgment and will not be
e Student Record of Progress. All students
r, be given many opportunities to make
s regarding a variety of concepts and

esses the student's understanding of the
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dent marked B. Circle SOME if the student
the choices A, C, or D and did not mark
ated LOW should be given further experience
is concept.

nd 17 assess the student's understanding
r oxygen. Find the column marked Activity
on the concepts page of the Student Record
Circle YES if the student answered both
nd 17 correctly.

nd 19 assess the student's understanding of
at plants and animals use and give off
on dioxide. Find the column marked
Oxygen and Carbon Dioxide. Circle YES
n circled for Question 18 on the tallysheet
t has marked choices C and D for Question

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pressure on weather. Find the column
y 5-35, Air and Weather, on the concepts
Student Record of Progress. Circle YES if
ked Choice B. NOTE: This is a very
ept that involves some abstract reasoning
dents who did not grasp the concept will
e number of experiences in abstract
ing this developmental level.

ANTICIPATED STUDENT BEHAVIORS

MATERIALS

TEACHING STRATEGIES

Question 21 assesses the student's understanding of the concept of the influence of wind and water on air. Find the column marked Activity 5-35, Wind and Water, on the concepts page of the Student Record of Progress. Circle YES if the student marked Choice B. Students who do not grasp this concept should be given another opportunity to perform the experiment of blowing air over water on their skin.

Question 22 assesses the student's understanding of the concept of things in the air. Find the column marked Activity 5-35, Things in Air, on the concepts page of the Student Record of Progress. Circle YES if YES has been circled on the tallysheet. Students who have not grasped this concept of things in the air should be given additional attention and activities to develop this concept.

Question 23 assesses the student's understanding of the concept of air pollution. Find the column marked Activity 5-35, Air Pollution, on the concepts page of the Student Record of Progress. Circle YES if YES is circled on the tallysheet. Students who have marked NO should be given individual attention regarding air pollution. All students may require many opportunities to express themselves in writing.

Part II.

As you return the worksheets from Part I to the students, congratulate them on what they have learned. Then project Slide 5-71 and say:

FOR A LITTLE WHILE LET'S TALK ABOUT THE
QUESTIONS YOU ANSWERED. AS WE GO ALONG, I
WILL TELL YOU WHICH ACTIVITIES WERE THE
MOST POPULAR. YOU CAN CHOOSE A FEW
FAVORITES TO DO AGAIN IF YOU WOULD LIKE.

TEACHING STRATEGIES

esses the student's understanding of the influence of wind and water on air. Find Activity 5-35, Wind and Water, on the Student Record of Progress. Circle the column marked Choice B. Students who do not do so should be given another opportunity to experiment of blowing air over water on their

esses the student's understanding of the things in the air. Find the column marked things in Air, on the concepts page of the Student Record of Progress. Circle YES if YES has been marked on the worksheet. Students who have not grasped things in the air should be given additional activities to develop this

esses the student's understanding of the air pollution. Find the column marked Air Pollution, on the concepts page of the Student Record of Progress. Circle YES if YES is circled on the worksheet. Students who have marked NO should be given attention regarding air pollution. All students require many opportunities to express them-

worksheets from Part I to the students, and ask them to report on what they have learned. Then discuss the results and say:

WHILE LET'S TALK ABOUT THE
YOU ANSWERED. AS WE GO ALONG, I
YOU WHICH ACTIVITIES WERE THE
BEST.
YOU CAN CHOOSE A FEW
TO DO AGAIN IF YOU WOULD LIKE.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-35

NOW LOOK AT QUESTION 1. WHO WANTS TO TELL THE ANSWER?

GIVE
STUDENTS
TO

Check the answer on the chalkboard image of Slide 5-71, then fill in the number of students who marked each opinion.

If, for Question 1 or later questions, some students have a reasonable justification for an answer that you had scored incorrect, be sure to change your rating and praise their good thinking. Some students may like to refer to their worksheets in their student folders as the different questions are discussed.

Discuss each of the questions, and the popularity of the activity from which it was drawn, for Worksheets 5-19 through 5-23, projecting the slides of the appropriate worksheet.

Refer to the guidelines for scoring the worksheets for acceptable answers to each question. Encourage the students to challenge and question one another's answers.

For Question 2, allow every student to tell what water uses he remembered.

For Question 3, allow students to explain why they chose the water use they listed as being most important.

For Question 4, discuss the ways to save water that each student listed. Encourage them to explain why it would save water.

TEACHING STRATEGIES

ANTICIPATED STUDENT BEHAVIORS

Students should:

--raise hands to explain that most living things are more than one-half water.


**GIVE SEVERAL
STUDENTS A CHANCE
TO RESPOND**

AT QUESTION 1. WHO WANTS TO TELL
R?

er on the chalkboard image of Slide 5-71,
he number of students who marked each

on 1 or later questions, some students
ble justification for an answer that you
orrect, be sure to change your rating and
ood thinking. Some students may like to
worksheets in their student folders as the
tions are discussed.

F the questions, and the popularity of the
which it was drawn, for Worksheets 5-19
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allow every student to tell what water
ered.

allow students to explain why they chose
they listed as being most important.

discuss the ways to save water that each
encourage them to explain why it would

MATERIALS

TEACHING STRATEGIES

For Question 5, discuss the answers students gave and have them again explain the source of water to the house.

For Question 6, discuss each word listed and why it is or is not a part of the route our drinking water takes.

While discussing Question 7, ask students what bleach does to the microbes, and what other ways there are to kill microbes.

For Question 8, have students explain why each choice would or would not apply to Johnny's problem.

For Question 9, review the experiment done in Activity 5-12 and discuss why it would be harder to clean the water with plants in it and why more plants would grow in the water.

In discussing Question 10, have students think of other ways to keep oil out of the water supply.

In discussing Question 11, review the distillation process with the students. It might be helpful to draw Diagram 5-6 on the chalkboard to help students remember the demonstration. Also discuss why the other choices would not take the salt out of the water.

Display Chart 5-2, the *Water Cycle in Nature* while discussing Question 12. Praise any student who was able to match all three definitions correctly.

While discussing Question 13, allow each student who wishes to repeat his explanation of *Fate of the River*.

For Question 14, ask each student to explain and defend why he answered YES or NO. Explain that there is no correct answer for this question because each person has his own opinion.

TEACHING STRATEGIES

discuss the answers students gave and explain the source of water to the

discuss each word listed and why it is or the route our drinking water takes.

Question 7, ask students what bleach does, and what other ways there are to

have students explain why each choice does not apply to Johnny's problem.

review the experiment done in Activity 10, why it would be harder to clean the dishes in it and why more plants would grow

Question 10, have students think of other ways to get water out of the water supply.

Question 11, review the distillation process with students. It might be helpful to draw on the chalkboard to help students remember the process. Also discuss why the other choices do not work. Discuss how to get the salt out of the water.

Question 12, the *Water Cycle in Nature* while working on 12. Praise any student who was able to give three definitions correctly.

Question 13, allow each student to give his explanation of *Fate of the River*.

ask each student to explain and defend their YES or NO. Explain that there is no right answer for this question because each person has a different opinion.

ANTICIPATED STUDENT BEHAVIORS

ACTIVITY
5-35

MATERIALS

TEACHING STRATEGIES

While discussing Question 15, it might be helpful to project Slides 5-29 through 5-34 of the graphs to help the students remember their significance.

For Question 16, be sure students are able to explain why the fish couldn't get enough air.

Discuss the other answers to Question 17 and why they would not be correct.

While discussing Question 18, it might be helpful to review Worksheet 5-12 on the components of inhaled and exhaled air.

Praise any students who answered Question 19 correctly, as it was a difficult concept to grasp. Review the snail and plant experiment while discussing the question.

For Question 20, discuss what the weather would be like if high pressure were moving in.

For Question 21, have students explain why wind cools something that is wet.

For Question 22, be sure students recognize all of the things as sometimes being in air. Encourage students to name other things which may be found in air.

For Question 23, discuss all the reasons given by the students. If there is disagreement among the students, allow them to defend and discuss their answers. Don't interfere.

TEACHING STRATEGIES

g Question 15, it might be helpful to
5-29 through 5-34 of the graphs to help
member their significance.

, be sure students are able to explain why
't get enough air.

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, have students explain why wind cools
s wet.

, be sure students recognize all of the
mes being in air. Encourage students to
s which may be found in air.

, discuss all the reasons given by the
ere is disagreement among the students,
efend and discuss their answers. Don't

ANTICIPATED STUDENT BEHAVIORS

*Upon completion of this activity, each student
should, as a minimum:*

- have participated in a review of Unit V.*
- have responded to Worksheets 5-19 through 5-23.*
- have participated in a discussion of answers to
the question on the worksheets.*

UNIT V, CORE G
ACTIVITY 5-35

Teacher _____

Activity name suggested by class:

BSCS USE: Post _____ Tally _____ Rev _____
--

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? No Yes Obtained by you? No Yes
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:

10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:

11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

What do you feel has been the students' general reaction to assessment activities?

7. Did students have difficulty understanding any concepts or vocabulary?
 No Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? Yes No -- Pages and Problem:
10. Did you omit any parts of this activity? Yes No -- Identify which parts were omitted and WHY:
11. Your rating of this activity:
 Worthwhile Of value--needs the Worth salvaging--make Worthless
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) _____ Comment:

Specific Questions:

12. What do you feel has been the students' general reaction to assessment activities?
13. How would you improve assessment activities?

Teacher _____

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

What anecdotes of student learning did you see or hear in your classroom?

B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff. (We will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?

UNIT V
REACTIONS TO CORE G

1. Was the background information for this core clear and useful? Yes No
Comment:

2. Was there too much preparatory reading and too many directions given to the teacher? Yes No
Comment:

3. Was it clear to you why these particular activities were chosen and the direction they were leading? Yes No

4. How would you increase the clarity of this core for students? (Help them understand why they are doing these activities.)

5. Is there a practical (take-home) value for your students in these activities?
 Yes No If yes, what do you see as the "take-home" lesson? If no, what is needed?

6. In these materials, what things did your students find difficult to do?

7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?

8. Were the Clues to Success and Student Record of Progress helpful in this core?
 Yes No If helpful, how are they helpful?

9. Did you make use of the Planning Guide included in the introductory material for this core? Yes No
Comment:

10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? Yes No
Comment:

11. If you could teach your way, rather than following the Guide, how would you do it?

Did the activities fulfill the purposes described by the core objectives and rationale? Yes No

Comment:

6. In these materials, what things did your students find difficult to do?
7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?
8. Were the Clues to Success and Student Record of Progress helpful in this core?
 Yes No If helpful, how are they helpful?
9. Did you make use of the Planning Guide included in the introductory material for this core? Yes No
Comment:
10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? Yes No
Comment:
11. If you could teach your way, rather than following the Guide, how would you do it?
12. Did the activities fulfill the purposes described by the core objectives and rationale? Yes No
Comment:
13. Which of your students do you believe were unsuccessful in achieving the objectives of this core of activities? Explain:

NEW STUDENTS ENTERING DURING THIS CO

Date Entered	Last Name	Name Used	Ethnic Group	Sex	Birthdate	Test Date	Test
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B

W = white
 B = black
 S = Spanish-
 American
 O = other

W=WIS
 B=Bir
 O=Oth
 (Na

STUDENTS DROPPED IN THIS PERIOD

Date Dropped	Last Name	First	Reason for Dropping

NEW STUDENTS ENTERING DURING THIS CORE

Group	Sex	Birthdate	Test Date	Test	Total	Verbal	Performance	Previous Test Score
O	M F			W B O				
O	M F			W B O				
O	M F			W B O				
O	M F			W B O				
O	M F			W B O				
O	M F			W B O				

W=WISC
 B=Binet
 O=Other
 (Name)

sh-
 can

on for Dropping



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CHANGE OF PACERS

- *Oven
- *Paper muffin cups
- *Several samples of food

*Paste

*Population figures for the city and school

- *A leaking faucet
- *A gallon or cup measure

*Location of the places in the community where citizens can pay their water bills

- *County or state map
- *Pins or tape
- *Bulletin board or chalkboard
- *Colored pen or marker

Polaroid Camera

1. Discuss dried foods commonly used and bought in the groceries, dates, powdered milk, potatoes, and so forth.
2. Try dehydrating (taking the water out of) meats, breads, and be interested in.
3. Students may draw or paste a picture on each index card.
4. Compute the actual total number of gallons of water used. Use the numbers obtained in Activity 5-5 for the computation.
5. Compute the number of gallons of water used by all the families in the school and then the city. First decide on an average size family computed in Change of Pacer 4.
6. Have students measure the amount of water lost in one day.
7. Discuss: How does the city know how much water is used? Where do you go to pay for your water? What happens if there is a leak?
8. If possible, obtain a county map (or state map if it is not available) and pin or tape it to a bulletin board. Assist the students in tracing the water treatment plant, and the main source of water. Using a colored pen or marker, assist the students in tracing the water from its primary source, to the treatment plant, to a holding tank, and finally to the homes. This should give you an indication of the student's knowledge of the treatment of the water. Emphasize also that most communities have a water supply even though they might get it from different sources.
9. Use the Polaroid Camera on the field trip to the water treatment plant.

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CHANGE OF PACERS



BSCS

- foods commonly used and bought in the grocery store, such as raisins, prunes, and milk, potatoes, and so forth. Activity 5-3
- ing (taking the water out of) meats, breads, candy, and other foods students might in. Activity 5-3
- Draw or paste a picture on each index card to illustrate the water use. Activity 5-4
- Actual total number of gallons of water used for a family of four, five, and six. Cards obtained in Activity 5-5 for the computation. Activity 5-5
- Number of gallons of water used by all the families in the classroom, the school, city. First decide on an average size family, probably three, and use the figure Change of Pacer 4. Activity 5-5
- Measure the amount of water lost in one day from a leaking faucet. Activity 5-5
- Does the city know how much water is used? How do you pay for your water? How to pay for your water? What happens if you don't pay your water bill? Activity 5-7
- Obtain a county map (or state map if it is necessary to locate the plant) and post it to a bulletin board. Assist the students in locating their community, the water treatment plant, and the main source of water. Label these places on the map. With a string or marker, assist the students in tracing their drinking water from the source, to the treatment plant, to a holding tank or reservoir, and finally to their homes. This should give you an indication of the students' understanding of the source and use of the water. Emphasize also that most communities treat their water in a similar way, though they might get it from different sources. Activity 5-8
- Bring a camera on the field trip to the water treatment plant. Activity 5-8

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CHANGE OF PACERS



BSCS

- foods commonly used and bought in the grocery store, such as raisins, prunes, and milk, potatoes, and so forth. Activity 5-3
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- btain a county map (or state map if it is necessary to locate the plant) and to a bulletin board. Assist the students in locating their community, the t plant, and the main source of water. Label these places on the map. With or marker, assist the students in tracing their drinking water from the , to the treatment plant, to a holdir tank or reservoir, and finally to their ould give you an indication of the students' understanding of the source and he water. Emphasize also that most communities treat their water in a similar n they might get it from different sources. Activity 5-8
- id Camera on the field trip to the water treatment plant. Activity 5-8



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT CHANGE OF PACERS

Water treatment plant model

Water treatment plant model

*Detergents with both low and high concentrations of phosphates

*Detergents with both low and high concentrations of phosphates

Unit IV, ME AND MY ENVIRONMENT

Polaroid Camera

Polaroid Camera

10. Discuss: Do we ever run out of water?
11. Encourage students to run many different types of water treatment plant model.
12. Send a sample of the water from the water treatment model to have it analyzed for purity.
13. Have some student groups test low phosphate detergent plant growth. Compare the plant growth from the low phosphate to the high phosphate detergents. Use the procedure.
14. Have students design a test to see whether low phosphate or high phosphate detergents.
15. Investigate the laws of your state concerning the use of detergents.
16. Take a survey to find out how people in your community use detergents.
17. Make a scrapbook of clippings about oil spills and what they do to animals.
18. Write a letter to the United States Navy and ask if they use distillation, and if so, how it is done to purify water.
19. Using the sewage mixture instead of the compost, set up a test to show the presence of carbon dioxide similar to the one described in the procedure.
20. Have students use the Polaroid Camera to take pictures of air that show different air conditions.
21. Have students use the Polaroid Camera to take pictures of air that show out undesirable air.

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CHANGE OF PACERS



BSCS

- Do we ever run out of water? Activity 5-8
- Students to run many different types of water samples through the water treatment . Activity 5-9
- le of the water from the water treatment model to the local treatment plant and lyzed for purity. Activity 5-9
- udent groups test low phosphate detergents to see if they encourage any plant ompare the plant growth from the low phosphate detergents with the plant growth gh phosphate detergents. Use the procedure described in Activity 5-13. Activity 5-13
- ts design a test to see whether low phosphate detergents clean as efficiently as ate detergents. Activity 5-13
- the laws of your state concerning the use of phosphate detergents. Activity 5-13
- ey to find out how people in your community dispose of their oil. Activity 5-14
- obook of clippings about oil spills and what effect they have on plants and Activity 5-14
- ter to the United States Navy and ask if they remove the salt from their water illation, and if so, how it is done to provide the large quantities necessary. Activity 5-15
- ewage mixture instead of the compost, set up an experiment to test for the arbon dioxide similar to the one described in Activity 4-15. Activity 5-20
- es use the Polaroid Camera to take pictures of places in their community that ent air conditions. Activity 5-22
- es use the Polaroid Camera to take pictures of people using masks to keep ble air. Activity 5-22



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CHANGE OF PACERS

*Model of the human chest cavity

22. Obtain a model of the human chest cavity (diaphragm, lung department in your school and further develop the student to breathe, how their lungs work, and so forth.

*A variety of art supplies

23. Have your students make a safety poster or diagram to explain old refrigerators, with plastic bags, in old mines, and what may occur.

24. Discuss further the composition of air. Develop a pie chart showing 79% of the circle, oxygen for 20%, and all other gases for 1%. Do not use the part of air that is nitrogen, but only the "other" part. Carbon dioxide is one of the "other"

*Unit III, ME AND MY ENVIRONMENT

25. Review the process of photosynthesis. Refer to Unit III

*Elementary science books

26. Build a simple colored water barometer. Most elementary weather reports will have directions on the construction of a simple

27. Have students watch the weather reports on television and

28. Discuss the general movement of weather from west to east. How weather for their area will be by watching a weather report is to the west of their state.

29. Collect a newspaper weather forecast for each day. Keep a record of whether the forecast was correct or whether it was wrong.

30. Ask a weatherman from a local television station to visit

Thermometer

31. Keep a weather record for several weeks. Record temperature, wind, and humidity. Students can get the information for this record by taking the temperature of the outside air everyday, estimating the wind speed; estimating the cloud cover as cloudy, partly cloudy, clear, rained, snowed, or hailed.

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CHANGE OF PACERS



BSCS

- of the human chest cavity (diaphragm, lungs, and so forth) from the science your school and further develop the students' understanding of how they their lungs work, and so forth. Activity 5-23
- ents make a safety poster or diagram to emphasize the dangers of playing in cors, with plastic bags, in old mines, and in other places where suffocation Activity 5-23
- er the composition of air. Develop a pie diagram with nitrogen accounting for cle, oxygen for 20%, and all other gases less than 1%. Explain that people part of air that is nitrogen, but only the part that is oxygen and a little of rt. Carbon dioxide is one of the "other" parts of air. Activity 5-24
- cess of photosynthesis. Refer to Unit III of ME AND MY ENVIRONMENT. Activity 5-26
- colored water barometer. Most elementary science books with chapters on ave directions on the construction of a simple barometer. Activity 5-27
- watch the weather reports on television and report to the class. Activity 5-28
- neral movement of weather from west to east. Ask students to predict what the eir area will be by watching a weather report and listening to what the weather of their state. Activity 5-28
- paper weather forecast for each day. Keep a chart and record whether the rrect or whether it was wrong. Activity 5-28
- an from a local television station to visit your classroom. Activity 5-28
- record for several weeks. Record temperature, cloudiness, precipitation, and can get the information for this record by collecting weather forecasts, erature of the outside air everyday, estimating the wind as calm, breezy, ng the cloud cover as cloudy, partly cloudy, clear; and telling whether it or hailed. Activity 5-28



Me and my Environment

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CHANGE OF PACERS

*35 mm Slide projector

*Several glass jars with lids

*Art supplies

*Large paper

32. Encourage students to keep adding to the collection
33. Instead of a bulletin board of the pictures brought added to periodically.
34. Using the projected beam of light from the slide projector, project the air of one room to the particles visible in the air of the gym, teacher's room, office, wood shop, janitor's room, etc.
35. If students live in an urban area, have them try to identify the things having the most things in the air to those having fewest.
36. If your students would be more likely to understand a gamelike activity, have them choose several cars to use in the activity as outlined in the activity, except instead of using a pump, award one poker chip for each stroke of the pump. Set the cars on the pavement. The car with the most poker chips wins.
37. Allow students to "bottle" as many smells as they can.
38. Try using the same procedure as described in Activity 5-62 with pollution devices on it and a car without. See how long time it takes for the plant to die.
39. Make a safety poster of fumes that are dangerous to humans and be exposed to them.
40. Before projecting Slide 5-63, attach a large piece of paper to the wall and project the graph onto the paper. After the students have made their graph, you can save the graph and use it for a bulletin board.
41. If a student's family has a pickup truck, panel truck, or passenger car, use it for the fume test described in

UNIT V. AIR AND WATER IN MY ENVIRONMENT

CHANGE OF PACERS



BSCS

- Students to keep adding to the collection of pictures on the bulletin board. Activity 5-30
- A bulletin board of the pictures brought to class, a scrapbook could be made and periodically. Activity 5-30
- Projected beam of light from the slide projector, compare the particles visible in one room to the particles visible in the air of other places in the school such as teacher's room, office, wood shop, janitor's room. Activity 5-31
- live in an urban area, have them try to rate the areas in the city from those with the most things in the air to those having fewer things in the air. Activity 5-31
- Students would be more likely to understand the concepts of Activity 5-33 through a game. In the activity, have them choose several cars to test. Follow the same testing procedure in the activity, except instead of using the worksheet to record the strokes, use a poker chip for each stroke of the pump. Stack the chips at the appropriate marks on the board. The car with the most poker chips wins the pollution game. Activity 5-33
- Students to "bottle" as many smells as they can think of in jars. Activity 5-32
- Use the same procedure as described in Activity 5-32 to test the exhaust from a car with various devices on it and a car without. See if there is any difference in the results for the plant to die. Activity 5-32
- Make a poster of fumes that are dangerous to man and in what situations man might be exposed to them. Activity 5-32
- Using Slide 5-63, attach a large piece of paper to the chalkboard and draw a graph onto the paper. After the students plot their points on the graph, they can save the graph and use it for a bulletin board display. Activity 5-33
- If a student's family has a pickup truck, panel truck, or any vehicle larger than a car, use it for the fume test described in Activity 5-33. Activity 5-33