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ABSTRACT

This activities book for the upper elementary grades is the fourth book of a series of six books designed to provide developmental K-12 experiences designed to support the basic environmental philosophy of spaceship earth presented in Book 1. The aims of the four activity sections of this book are to aid in developing students to make them more sensitive to their environment, able to recognize problems, reach a sophistication in using problem solving skills, and inclined to participate in action activities to deal with environmental problems. The Concept Development Activities Section was developed to assist teachers in assisting students to further their understanding of major concepts basic to the development of an environmentally literate citizenry. These concepts are: ecosystem, population, economics and technology, environmental decisions, and environmental ethics. The Skill Developing Activities Section identifies eight skills as being essential to the environmental problem solving process. For each of the eight skills, skill developing activities have been designed. The Values Clarification Activities Section contains sample strategies that teachers have found helpful in assisting students to clarify their values regarding environmental issues. The Environmental Encounters Activities Section contains a series of school-community environmental problem solving activities. (BT)

ENVIRONMENTAL EDUCATION ACTIVITIES MANUAL

William B. Stapp
Dorothy A. Cox

UPPER ELEMENTARY ACTIVITIES

2

ENVIRONMENTAL EDUCATION ACTIVITIES MANUAL

Book 1: CONCERNING SPACESHIP EARTH

Book 2: LOWER ELEMENTARY ACTIVITIES

Book 3: MIDDLE ELEMENTARY ACTIVITIES

Book 4: UPPER ELEMENTARY ACTIVITIES

Book 5: JUNIOR HIGH ACTIVITIES

Book 6: SENIOR HIGH ACTIVITIES

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PREFACE

This grade level activities book is one in a series of six books which provide developmental K-12 experiences designed to support the basic environmental education philosophy of spaceship earth.

The educators who use this activity book are encouraged to thoroughly acquaint themselves with the philosophy, model description, implementing guidelines, and resource opportunities in Book 1.

The aim of the four activity sections of this book is to aid in developing students more sensitive to their environment, who are able to recognize problems, reach a sophistication in using problem solving skills, and are inclined to participate in action activities to deal with environmental problems.

The following pages include only a sample of activities meant to suggest a host of possible spin-offs. To be most effective they will most probably need to be altered to fit individual situations and student backgrounds.

William B. Stapp
Dorothy A. Cox

August, 1974

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Upper Elementary Concept Developing Activities

SECTION I

Concept Development Activities

The following Concept Development Activities were developed to assist teachers in assisting students to further their understanding of five major concepts basic to the development of an environmentally literate citizenry.

The five major environmental education concepts are: ecosystem, population, economics and technology, environmental decisions, and environmental ethics.

For each of the five concepts, specific understandings have been identified as appropriate for lower elementary, middle elementary, upper elementary, junior high, and senior high. Two activities have been developed for each understanding to assist students in furthering their understanding of each of the five concepts. The activities were also designed to enrich existing subject matter.

The concepts, understandings, and supportive activities that have been developed are listed on the following pages of this section.

Concept: Ecosystem

Understandings:

A. Lower Elementary (Kdg, 1st & 2nd)

1. The earth can be thought of as a "spaceship," containing all of the air, water, and land we will ever have.

2. The sun is the basic source of energy for all life in every ecosystem.

3. Plants capture sunlight and use it to help them make the food and oxygen that people and other animals need in order to live.

4. Some animals eat other animals which in turn eat plants; some animals (like people) eat both plants and animals.

B. Middle Elementary (3rd & 4th)

1. An ecosystem consists of all the plants and animals in a given area interacting with each other and their non-living environment.

2. The interaction of plants, animals and their non-living environment form many cycles in an ecosystem (carbon or food cycle, mineral cycles, water cycles, etc.).

3. Some of the sun's energy has been stored in coal peat, petroleum, natural gas, and other fossil fuels.

C. Upper Elementary (5th & 6th)

1. There are different forms of energy (i.e. light, heat, electricity, food, etc.).

2. Energy is neither created nor destroyed, but can be changed from one form into another.

3. With each transfer of energy (i.e., food chain) within an ecosystem, some energy is lost (mainly as heat energy).

4. Humans frequently, knowingly and unknowingly, waste energy.

D. Junior High (7th & 8th)

1. Anything added to the environment which accumulates in sufficient quantity to be unwanted by someone is pollution.

2. Too much pollution normally results in damaging the environment.

3. Natural cycles and systems have limited capacity to cycle or disperse pollutants.

4 Humans and natural resources are distributed unevenly around the earth.

E. Senior High (9th, 10th, 11th & 12th)

1. An ecosystem is complex and is vulnerable to sudden or long-term disturbances.

2. Human beings are capable of strongly altering the cycles and systems of the earth.

3. More diverse communities tend to be more stable.

4. Fission and fusion are two relatively new sources of energy.

Concept: Population

Understandings:

A. Lower Elementary (Kdg., 1st & 2nd)

1. A population is a group of plants and animals of the same kind living in the same area.
2. Populations interact with each other and their environment.
3. Populations are part of a given community.
4. The human community is closely interrelated with its environment.

B. Middle Elementary (3rd & 4th)

1. Populations increase, decrease, or stabilize depending on their interaction with each other and their environment.
2. The life style of a human population can affect the environment in significant ways.

C. Upper Elementary (5th & 6th)

1. Human beings both produce and consume materials.
2. Human populations have different standards of living which produce different environmental consequences.
3. As human populations grow, it becomes more difficult to attain and maintain environmental quality.

D. Junior High (7th & 8th)

1. Population changes like births, deaths, growth rates and migration patterns affect individuals, their surroundings and society.
2. The U.S. consumes a disproportionate amount of the earth's resources.
3. Populations have birth rates, death rates, growth rates, densities, immigration rates, emigration rates and age structures.

E. Senior High

1. As long as a few countries consume a disproportionate quantity of the earth's resources, while other countries need these resources, there will be political instability in the world.
2. Different sectors of populations have varying degrees of access to natural resources they need in order to survive.
3. Any position on human population policy has personal, social, ecological, political, and economic implications.

Concept: Economics and Technology

Understandings:

A. Lower Elementary (Kdg., 1st & 2nd)

1. In our country, people are generally trained to perform certain types of work. Teachers, farmers, factory workers, conservationists, as well as other workers, all have special jobs to perform.

2. The food most people eat, clothes they wear and the homes they live in are paid for by the money they earn from doing their jobs.

3. Industries and business sell some things that people want and need: and encourage people to buy some things that factories have made, but people don't really need.

4. Not all people have enough money to buy all the things they need, want, or are encouraged to buy.

B. Middle Elementary (3rd & 4th)

1. The way people live their lives has an effect on how the earth's resources are used.

2. The way people live their lives has a direct effect upon the amount and type of industrial growth that takes place.

3. Businesses can create a demand for a product through the use of advertising.

C. Upper Elementary (5th & 6th)

1. The cost of producing a particular product includes such things as the resources used, wages of workers, advertising, taxes and improving working and environmental standards.

2. There are two kinds of costs associated with pollution: the cost of preventing pollution, and the cost of (or damage from) pollution once it occurs.

3. Some pollution costs cannot be put into dollars and cents.

D. Junior High (7th & 8th)

1. Usually, the costs (economic, resource and technological) of goods and services vary proportionately to societal demands for those goods and services.

2. Patterns and practices of using the earth's resources are largely determined by people's life styles, and the level of industrialization necessary to meet the demands of such life styles.

3. As the production of goods increases with demand, consumption of resources also increases.

4. Both supply and demand of a product influence the cost of the product.

E. Senior High (9th, 10th, 11th & 12th)

1. Economic systems constitute the societal arrangements for producing and distributing the goods and services that individuals and societies desire.

2. Some businesses and industrial plants in the process of producing marketable products pass on social costs (i.e., air, water, and noise pollution) to society.

3. Satisfaction with the philosophy and functioning of the economic system is a major factor in the quality of life for individuals served by that economic system.

4. Each country has its own particular economic system, but all countries' economic systems are tied together through world markets of raw materials, food, and manufactured goods. Thus economic events that occur in one country affect other countries (i.e., crop failures).

5. Three major ecological trade-offs are (1) between population growth and environmental quality, (2) between levels of production and environmental quality, and (3) between the degree of urbanization and environmental quality.

Concept: Environmental Decisions

Understandings:

A. Lower Elementary (Kdg., 1st & 2nd)

1. To make a decision is to make a c..oice.

2. A decision can be made by one person or by a group of people such as a family or a class.

B. Middle Elementary (3rd & 4th)

1. Environmental decisions should be made only after considering all alternatives and the consequences of each alternative.

2. Your personal feelings and the feelings of others should be considered before you decide to act.

C. Upper Elementary (5th & 6th)

1. Many environmental decisions are made by consumers, governments, businesses, industries, clubs, and various community groups.

2. People working together with similar interests can often be more effective in influencing environmental decisions than individuals working alone.

D. Junior High (7th & 8th)

1. Making effective environmental decisions requires consideration of ecological, economic, political and social and technological aspects of the problem.

2. Effective environmental decision-making includes considering carefully the pros and cons of all possible alternative solutions, policies and actions, and studying the trade-offs among them.

3. Individual or personal decision-making involves one's feelings, attitudes, and values.

4. In many cases it is necessary to change the law in order to prevent environmental abuses.

E. Senior High (9th, 10th, 11th & 12th)

1. Decisions not carefully thought through frequently have unwanted results.

2. People most often affected by environmental abuses may be the least able to bring about effective action to correct them.

3. Environmental decisions should seek to improve the lives of people from all socio-economic classes.

4. Some people and organizations have more power to influence decisions than others.

Concept: Environmental Ethics

Understandings:

A. Lower Elementary (Kdg. 1st & 2nd)

1. Children all over the world have similar basic needs.

2. Every individual has something which he gives and which he receives from society.

B. Middle Elementary (3rd & 4th)

1. If human beings protect the earth it will be able to continue to support a diversity of living things.

2. Humans can be "stewards" of the earth, rather than careless exploiters of it.

3. Humans can develop both a way of thinking and feeling about the earth if we are to live harmoniously with each other and our environment.

C. Upper Elementary (5th & 6th)

1. If humans develop an ecologically sound way of thinking, feeling, and acting toward the earth, then we will be able to live harmoniously with each other and our enviornment.

2. If we protect the earth it will continue to meet the needs of all living things, now and in the future.

D. Junior High (7th & 8th)

1. The earth's resources exist for all living things, not just man.

2. Certain life styles enable man to live as a complimentary part of the environment.

E. Senior High (9th, 19th, 11th & 12th)

1. Only when each of us lives a life guided by respect for the earth and all living things, now and in the future, will we be able to live in harmony with each other and our environment.

2. An essential part of an environmental ethic is a human ethic based on social justice for all individuals and groups.

Upper Elementary

Joannie Robb
Neal Moore

The Different Forms of Energy

1. Concept to be developed: Ecosystems

2. Understanding to be developed: There are different forms of energy (i.e., light, heat, electricity, food, etc.).

3. Time: 5 days - day 1 - Investigate the meaning of energy.
   day 2 - Discover the major forms of energy.
   day 3 - Discussion.
   day 4 - Field trip to plant that makes electricity.
   day 5 - Discussion.

4. Materials:

   a. Pencil and paper.
   b. Films: "Energy and Its Forms", "Food, Energy, and You", and "Machines Do Work".
   c. Data table: one for each student:

Baker's Dozen Choices	Energy I See	Ways I Use Energy

5. Procedure:

   Day 1:

   a. Do the valuing activity called "Baker's Dozen".

   b. Show the film called "Energy and Its Forms".

   c. Students go to the library and find as many definitions of "energy" as possible.

   d. Discuss the definition of energy and ask students to give examples of energy according to the definitions found and from the film.

   Day 2:

   a. Show short films: "Food, Energy, and You" and "Machines At Work". After each film emphasize the form of energy illustrated.

Day 3:

f. Discuss the forms seen on the films the previous day and how those forms compare to the definitions found in the library.

g. Ask students to find a relationship between all the forms shown the previous day and if there is a possible sequence to the forms found on their Baker's Dozen list.

Day 4:

h. Field trip to a plant that produces electricity (such as Detroit Edison).

i. Have students fill in record column on Data Table during field trip.

j. For homework, have students fill in third column on Data Table.

Day 5:

k. Discuss the students findings from the third day with their results on the data tables.

l. Encourage students to find a natural progression sequence in converting one form of energy to another, beginning with solar energy and ending with nuclear energy.

6. Discussion Questions:

a. Why did you make the choices you made in "Baker's Dozen"? What would life be like without your top three choices?

b. What does electricity do and where does it come from?

c. What were some of the energy forms described in the film? Where do they come from? How do they compare to electricity?

d. What energy forms were represented in the films? Where these forms come from? What do they end up as? How are they related?

e. How is a person a source of energy? Where do people get their energy? How is energy in a person utilized? How is energy in people dependent on other forms of energy?

f. Is there a relationship or sequence to the energy forms?

g. What forms of energy were added to your list after visiting the power plant?

h. What additional sources and uses did you find at home?

i. What are ways of converting one form of energy into other forms?

j. What alternatives are there for the different ways you can use this material?

Forms Of Energy

1. Concept to be developed: Ecosystem

2. Understanding to be developed. There are different forms of energy (i.e. light, heat, electricity, food, etc.)

3. Time: 4 days - day 1 - Present ideas of energy and set up research groups
   day 2 - Group research and experiments
   day 3 - Sharing of research and demonstration
   day 4 - Discussion.

4. Materials:

   Elementary science experiment resources such as science texts and school library science experiment books, describing uses of air, heat, electricity, water, etc.

   Other materials suggested by these books for construction of a pinwheel, water-wheel, battery-powered light or bell, simple steam engine, etc. such as:

metal can with screw top	rubber corks with holes for tubing
glass tubing	flashlight batteries
thin wood (berry boxes)	flashlight bulbs
small dowels (or Tinker Toys)	copper wire
candles	scrap wood
hot plate	nails
lightweight cardboard	electric bell
construction paper	
drinking straws	

5. Procedure:

   a. Ask students what energy is and draw out idea of "ability to do work". Discuss kinds of energy and uses of energy that they can think of. Think how kinds of energy might be demonstrated.

   b. Divide class into groups of 3 or 4 to research information about kinds of energy and then to choose one kind they will demonstrate to the class.

   c Let each group plan and present a demonstration and give some information on its chosen kind of energy.

6. Discussion Questions

a. Energy which is stored up is called potential energy. Give examples from the group demonstrations of potential energy.

b. Kinetic energy is energy in use or in motion. Where did you observe this energy?

c. Scientists tell us that all energy comes from the sun originally. Trace each kind of energy demonstrated back to its dependence on the sun. (i.e.e stored energy in fuels formed from vegetation long ago, the hydrologic cycle that constantly replenishes the water power supply, etc.)

d. Are there other kinds of energy that were not demonstrated? Name those you know about. Do these trace their origin to the sun, also? Are there new kinds of energy scientists are discovering and working on?

e. What resources do we use in our homes and businesses to supply most of the energy? Is there a need to be concerned about the supply of these resources? Why?

f. What ideas can you give for helping to conserve energy - giving resources?

7. References:

Science is Discovery #5
Basic Science Program - Scott Foresman

Concepts in Science
Harcourt, Brace & World

Science Teaching Today
National Science Tea. Assoc. (Air, Heat, Water)

It's Our Future
Ecological Science Series - Globe Book Co.

Upper Elementary

Mary Lou Hess

Energy Changes

1. Concept to be developed: Ecosystem

2. Understanding to be developed: Energy is neither created nor destroyed, but can be changed from one form into another.

3. Time: 4 days - Days 1-2 - Explorations and demonstrations
   Day 3 - Film
   Day 4 - Discussion

4. Materials:

   a. For each group of 4 students:
      (4) D cell batteries
      (4) Flashlight bulbs
      (2) buzzers or bells
      (20) wire sections 1' lengths
      (4) bulb sockets
      (1) wire stripper
      (2) screwdrivers
      masking tape

   b. Bunsen burner or hot plate
      Erlenmeyer flask 400 ml.
      (1) hole rubber stopper for flask
      90° bend glass tubing
      250 ml. beaker
      (2) ring stands
      test tube
      centigrade thermometer
      sodium hydroxide crystals
      meter wheel (light weight)
      9" length of 1½" diameter glass tubing

   c. Ammonium dichromate
      Magnesium ribbon fuse
      Ovenware dish or crucible
      Tray to catch ash

   d. Heat-Mechanical
      Light bulb
      Tin can lid
      Tin snips
      Fine wire

5. Procedure:

   a. (1). Divide class into groups of 4 working in pairs. Let each group set up circuits of various complexities, perhaps pooling resources. Encourage students to try different ways of making the lights come on or the bell ring.

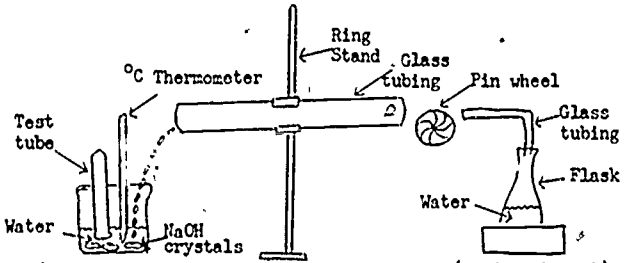
   (2). Suggest "Can you make the light go on and the bell ring in the same circuit?"

   (3). Notice that in some circuits lights are brighter than in others, perhaps the bell will ring but the remaining energy will not be enough to light the bulb (though it may glow in the dark). With several cells in series, lights may blow out.

(4). Although total amount of energy in system remains constant, its form is changed from electrical to mechanical or electrical to heat and light. Eventually energy will have been dissipated in heat and will seem to have been lost, but actually still exists in the atmosphere.

b. (1). Set up demonstration as shown in the diagram. Use caution in handling of the hydroxide.

(2). Set system in motion as water comes to boil with heat energy at 212° F. It forms steam which is directed onto the pin wheel where it causes it to revolve. Water running off the water wheel is directed into the tubing and into the beaker where it combines with the sodium hydroxide in a chemical energy release that heats the water in the test tube.



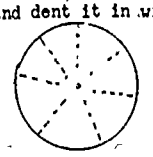
(3). Forms of energy used are electrical (or fossil fuel) → heat energy → chemical energy → heat.

(4). Is some energy "lost" or dissipated in the system? At what points do you believe some is lost and in what form?

c. (1). Place a crucible or small dish on a tray. In the crucible place two tablespoonsful of ammonium dichromate. Place a 2-inch length of magnesium ribbon in chemical and light it.

(2). The resulting display of a "volcanic" eruption will provide a very dramatic display of chemical energy heat and light.

d. (1). Find the center of the can lid and dent it in with a nail. Draw a 1" circle around the center. With the tin snips cut into the circle edge at regular intervals around the edge as:



(2). Bend one edge of each vane blade slightly to one side.

(3). With the wire, form a circle that will fit over the light bulb so that one free end extends to the center of the bulb and projects upward.

(4). Balance the spinner center dent on the projecting wire "pin". When the light is lighted the heat energy from the bulb will warm the air and cause the vane to spin. (If it is not balanced some careful trimming of blades of the vane will help).

e. Show film: Energy and Work (11 min.) Encyclopaedia-Britannica

6. Discussion Questions:

a. What forms of energy have you seen at work? What is the source of all these forms? (the sun)

b. What changes in forms of energy can you see in your classroom? In your school? In your home?

c. Tell how energy forms change in the operation of a sound movie projector; in a power lawnmower; in a pencil sharpener.

7. Reference:

a. Teaching Elementary Science Through Investigation and Colloquium, Meadows, et al., Harcourt, Brace, Jovanovich.

Upper Elementary

Jeannine Bosma

Food Chain and Food Web

1. Concept to be developed: Ecosystem

2. Understanding to be developed: Energy is neither created nor destroyed, but is changed from one form to another.

3. Time: 3 days - day 1 - Introduce concepts and vocabulary of chain.
   day 2 - Introduce concepts of food web.
   day 3 - Field trips.

4. Materials:

   a. Colored paper.
   b. Scissors.
   c. Glue.
   d. String.
   e. Cardboard boxes.
   f. Note cards.
   g. Pencils.
   h. Paper.
   i. Clipboards.

5. Procedure:

   a. Have children pick a recent meal they have eaten (or their favorite food) and using the food chain chart, trace together one or two of the meals back to the green plant. Then have several students trace their own.

   b. From the above activity, introduce the names of the different categories of animals and plants and discuss how energy derived from the sun is transferred to each.

   c. Label the boxes according to categories and put a name of an animal or plant on each note card. Create a game situation by having the students take turns drawing a card and placing it in the correct box.

   d. Expand the concept of a food chain by introducing the food web. Trace the food chain backward from man, students should quickly see that the links can expand in many directions - the more animals involved, the more complicated the chain becomes, hence the name food web.

   e. To dramatize this concept: On a piece of paper that can be "pinned on", have students draw different links in various food chains. Each child then takes one part of the link in the chain. Strands of string connect links. These chains will often interlock to form a web effect.

f. Field Trips:

(1). Take students to a wood lot or some wooded area relatively close by the school. Each student will note as many plants and animals (according to catagories) as he sees while on a 15 to 30 minute observing trip.

(2). If possible, immediately following, take the class to a very different envirenment (empty lot, lake shore, etc.) and have them categorize the plants and animals there.

g. Using the two above data sheets, have the students compare and contrast their findings and finally draw up the different food chains and webs they found.

6. Discussion Questions:

a. How does a plant capture and store the sun's energy? What happens at night or during the winter to this energy?

b. Why are decomposers such small organisms? What does this tell us about the energy level here?

c. How does the way we dispose of our solid wastes differ from the natural food chain?

d. How have we, as humans, broken down the natural food chain and how have we eliminated some links entirely?

e. Using what you have learned about the natural food chain, what might you do if rabbits became a problem in your community?

f. Can you explain this statement using the food chain? "The amount of beef produced in a season depends on the number of cats in the neighborhood of the clover fields."

g. At which end of the chain is the greatest amount of energy? The least?

7. References:

a. Adventures in Environment, National Env. Educ. Development, Silver Burdett Co., 1971

b. Teacher's Curriculum Guide to Conservation Education (4,5,6), J. G. Ferguson Pub. Co., 1968, 69.

c. A Place To Live (Teacher's Manual), National Audubon Society, 1970.

8. Audio-visual sources:

   a. How Plants Help Us, b/w, 12 min., McGraw-Hill (film).

   b. Food Chain chart is available through the Nati .. ' Audubon Society.

9. Independent Activities:

   a. Mobiles or paper chains of food chains can be made.

   b. Make a diorama depicting the food chain of your choice, showing that all animal life ultimately depends on green plants (and sun).

10. Vocabulary to be developed:

Photosynthesis	Herbivore
Phototropism	Omnivore
Food Chain	Carnivore
Tropic level	Decomposer
Food Web	
Energy transfer	

How Much Energy Do You Use?

1. Concept to be developed: Ecosystem

2. Understanding to be developed: With each transfer of energy (i.e. food chain) within an ecosystem some energy is "lost" (mainly as heat energy.)

3. Time: 3 days - day 1 - Experiment with inclined plane
   day 2 - Plan and assign "How much energy do you use?"
   day 3 - Discussion

4. Materials:

   Experiment #1
   board approx. 24" x 4"
   cigar box
   sand
   screw eye
   spring balance
   ruler
   petroleum jelly
   sand paper (large piece)
   3 dowels of same diameter - 10" wide

   Experiment #2
   Energy Expenditure table for each child:

Energy Used by 100# person in Calories per hour

Sewing	10-30	Running	530-670
Writing	15	Bicycling 5 mph	190
Sitting at rest	10	10 mph	300
Standing relaxed	15	14 mph	470
Dressing and Undressing	20-30	Horseback riding	
Ironing	40	walking	100
Dishwashing	40	trotting	340
Sweeping or dusting	50-85	galloping	400
Polishing	100-150	Dancing	150-270
Housepainting	100-150	Gymnastics	150-340
Carpentering	100-150	Playing tennis	270-340
Sawing wood	270-400	Playing Soccer	350
Walking 2 mph	130	Wrestling	600-700
3 mph	160	Sleeping	10-100
4 mph	230		

Calorie Chart (or inexpensive purchased one)

Meats	Calories
Bacon - slices	95
Beef Roast	210
Hamburger 4 oz.	250
Bologna 1 slice	85
Chicken 3 oz.	180
Frankfurter	155
Ham 3 oz.	290
Lamb lean only 2.5 oz.	140
Pork roast 2.5 oz.	175
Sausage 4 oz.	340
Fish 3 oz.	140
Vegetables (1 cup)	
Baked Beans	320
Beets	70
Broccoli, cabbage carrots, green beans	40
Squash, tomatoes	40
Corn	170
Lima Beans	150
Lettuce - 2 large leaves	5
Potatoes (mashed)	150
Desserts	
Cake 1 slice	180
Chocolate layer	420
Candy - chocolate 1 oz.	145
Doughnuts, plain each	135
Ice Cream 1/2 cup	200
Pie 1 slice	300

Fruits	Calories
Apple-med.	70
sauce	185
Bananas	85
Cantaloupe 1/2	40
Fruit cocktail 1 cup	195
Orange	65
juice (1 cup)	110
Dairy	
Butter 1 square	50
Cheese 1 oz.	100
Cottage Cheese 1 oz.	30
Eggs - each	90
Milk (1 cup)	165
Salad dressings (1 tablespoon)	110
Breads	
Bread 1 slice	60
Cereals 1 cup	105
Macaroni-spaghetti - 1 cup	155
Pancakes 4" each	55
Rice, noodles - 1 cup	200
Miscellaneous	
Carbonated beverages 8 oz.	100
Cocoa	235
Peanuts 1/2 cup	420
Peanut butter 1 tablespoon	90
Pizza 6" wedge	200

5. Procedure:

a. Set up board as an inclined plane with one end resting on a pile of books about 6" or more above table level. Fill cigar box with sand until it weighs one pound.

b. Fasten screw eye to front of box and attach string. Pull the box up the inclined plane by the spring balance, reading the "pull" required after it has started moving. Measure the distance along the board that will lift the base 4" from the table.

c. Potential energy in a raised object is equal to the distance it was lifted x its weight. Energy needed to raise it is equal to distance it was moved x force used to move it. If no energy is "lost", the two products should be the same. 1/3 ft. (4 in.) x 1 lb. = 1/3 foot pound of potential energy. Why is there a difference? Some energy is aways "lost" in every transfer of energy - usually as heat. Was this true in your experiment?

d. Ask what ideas students have to modify the experiment for different results. Some ideas might be: sandpaper fastened to the inclined plane, petroleum jelly applied to the board, or dowels placed under the box. Try suggestions and compare results with first ones.

e. Plan "How much energy do you use?" Each child will keep two records for one full day totaling 24 hours. (One record will use the Energy Expenditures chart to record everything the student does and the length of time he does it. The other will chart the amount and kind of foods eaten during the day with the energy value of each item.

6. Discussion Questions:

a. How did your energy input compare with your energy output?

b. What ideas do you have for any differences between them?

c. Can you think of any further experiment you can carry out to test your ideas?

d. If you are consuming more Calories than you are using, what does your body do with that potential energy?

7. References:

Science 5 Mallinson & Brown
Science Program Silver Burdett

BFA Ecology Activity Cards
BFA Educational Media

Additional Reading:
Diet for a Small Planet Lappe
Ballantine Books

Upper Elementary

Karen Kline
Karen Lilley

Energy Transfer and Loss

1. Concept to be developed: Ecosystem

2. Understanding to be developed: With each transfer of energy (i.e., food chain) within an ecosystem, some energy is lost (mainly as heat energy).

3. Time: 1 hour

4. Materials:

   a. 1 package yeast
   b. 1 test tube and a cork stopper
   c. Warm water
   d. Sugar
   e. Vaseline

5. Procedure:

   a. Crumble the package of yeast between your fingers into the test tube.

   b. Add enough warm water to fill the test tube 3/4 full.

   c. Add 1/4 teaspoon sugar to the test tube.

   d. Smear Vaseline on the cork and stopper the test tube firmly but not tightly.

   e. Observe the following reaction: As the yeast cells use the sugar, it produces a gas. Soon you should notice bubbles of gas forming. As the gas is produced, it presses against the sides of the tube and the cork. As the pressure gets higher, the cork should pop off.

6. Discussion Questions:

   a. What has happened to the cork? Why?

   b. Why d'd we place Vaseline on the cork? Did it serve its purpose?

   c. Was any "work" performed by the cork? Where did the energy come from?

   d. What helped the yeast cells obtain their energy?

e. What kinds of things do you do that burn up energy?

f. Is your body working while going through the digestive process? Is this using energy?

g. How do you supply your body with the energy it needs?

h. Can you think of another example showing a loss of energy during a transfer of energy?

i. Why is it nice to have a brother or sister to snuggle up next to in bed on a cold night?

j. Where is energy lost in a food chain as opposed to the energy being transferred?

k. Give another example of a food chain showing transfer and loss of energy.

l. Name some examples of energy transfer and loss in:

(1). A water ecosystem.
(2). A meadow ecosystem.
(3). A mountainous ecosystem.
(4). A desert ecosystem.
(5). An artic ecosystem.

m. How will this energy loss affect an ecosystem?

7. References:

a. Brandwein, Paul F.; Beck, Alfred D.; Strahler, Violet; Hollingworth, Leland G.; Brennan, Matthew J., The World of Living Things. Harcourt, Brace, and World, Inc., 1964.

Energy Investigation

1. Concept to be developed: Ecosystem

2. Understanding to be developed: Humans frequently, knowingly and unknowingly, waste energy.

3. Time. 3 days - day 1 Introduction of subject and explanation of project and materials
   day 2 Compile data and write suggestions
   day 3 Discussion

4. Materials:

   a. pencil
   b. paper
   c. copy of chart for each child

How Many	Energy-using Machine or Appliance	Kind of energy	Ave. Time used daily	Check One Necessary	Check One Helpful

5. Procedure:

   a. Discuss with your class the sources of energy we use generally in our homes, schools and businesses, including internal combusion engines.

   b. Give each student a chart to take home and gather data on use of energy. If appliance is not used every day the weekly time it is used might be divided by 7 to give an approximate daily use time.

c. Things like an electric stove used for cooking would be checked "Necessary", as would electric lights. "Helpful" would indicate "work-savers" whose jobs could be done with manpower, such as a mixer or garbage disposer.

d. "Kind of energy" refers to source such as electrical, natural gas, etc.

e. After gathering the data each student should write 4 or 5 suggestions for conserving energy at his house.

f. When the class discusses the data they may want to compile a list of suggestions to be taken or sent home with the class or perhaps the whole school.

6. Discussion Questions:

a. What source of energy is most used in your homes? What fuels are used in generating electricity?

b. Some experts think we will need double the amount of electricity by 1980. What will that mean in terms of our fossil fuels?

c. What are some ways we can conserve energy so less will be wasted?

d. Does careless use of materials such as paper have any relation to use of energy?

e. How has the concern about air and water pollution affected the production of electricity?

f. What new sources for electricity are being used or considered? Do they have any harmful effects on the environment?

g. How might your school engineer help in compiling your energy-conserving suggestions?

7. References:

Environmental Education in the Elementary School, Sale and Lee, Holt Rinehart & Winston

It's Our Future - Knight and Moore Globe Book Co.

Ecology Activity Cards - BFA Educational Media Ecology Series I

Upper Elementary B. Diane Boyd

You and Energy

1. Concept to be developed: Ecosystem

2. Understanding to be developed: Humans frequently, knowingly and unknowingly, waste energy.

3. Time: Approximately 1½ hours

4. Materials:

   a. Pencils
   b. Paper

5. Procedure:

   a. Discuss different forms of energy found in our environment (electricity, heat, light, food, etc.) and give common examples of each.

   b. Instruct the children to answer the following questions:

      (1). Your father is driving you to the movies and is traveling 10 miles an hour over the speed limit. Would you say anything?
      I would _____
      because _____.

      (2). You and a friend go into a nearby store to buy some pop. The store sells only disposable cans. Your friend knows of a store two blocks away that sells returnable bottles and asks if you want to walk to the other store. What would you do?
      I would _____
      because _____.

      (3). You're watching your favorite television program and discover that you're very chilly. You know if you go to your room to find a sweater that you might miss the good part. The thermostat is right next to where you are sitting and would only take a second to turn it up. Which would you do?
      I would _____
      because _____.

      (4). You just climbed into bed and You're very tired. Just as you close your eyes you remember that you left the porch light on. What would you do?
      I would _____
      because _____.

(5). You have decided to go to a friend's house who lives nearby. You're half way to your friend's home when you realize that you left the television on. No one else is home to turn it off. What would you do?
I would _____
because _____.

(6). You are with a friend who, in a similar situation, leaves his television on. Would you say or do anything?
I would _____
because _____.

(7). Your father decides to buy a new car. He wants to know your opinion. One car is a luxury car that uses a lot of gasoline. The other car he's considering is not as luxurious and uses less gas. What would you say?
I would _____
because _____.

c. Tell the children to take the papers home to discuss with friends or their family.

6. Discussion Questions:

a. Take each question individually and discuss the responses in class.

b. Ask the students for examples that they know of where humans waste energy.

c. Discuss ways of correcting wasteful behavior.

d. Discuss why humans are knowingly and unknowingly wasteful.

GROWING A GARDEN

1. Concept to be developed: Population.

2. Understanding to be developed. Human beings both produce and consume materials.

3. Time: Several weeks in spring of year. 1/2 hour twice a week.

4. Materials: Garden plot, garden utensils, seed, fertilizer, and the following films- "Food Supply: Its Effect on Civilization", "Miracle of Feeding America"

5. Procedure:

   Background. Previous research of soil conditions and food productions followed by testing the soil nutrients and its possible productivity.

   a. Discuss what crops could be planted on the soil and divided into two or three groups. Each group will pick a crop and develop a chart to show growth.

   b. Review the procedure for planting a garden and what tools are going to be needed.

   c. Prepare and plant the garden. Take turns at maintenance about twenty minutes a day, twice a week.

   d. Show the film 'Food Supply: Its Effect on Civilization", and discuss main points.

   e. Give the class a one week assignment to research various aspects of the population-food relationship.

   f. Show the film "Miracle of Feeding America".

   g. Harvest crop.

6. Discussion Questions:

   a. What are some other foods we eat besides what is in our garden?

   b. How long can we enjoy the fresh produce we are growing?

   c. How does this compare with our yearly intake of food?

   d. How much would we have to increase our crops to feed the entire town?

   e. How much garden space do we need for each crop?

   f. Why is it necessary to mass produce food in the U.S.?

g. Why are some people going hungry in America?

h. What can we do about this?

i. As the population increases, how does it affect our food supply?

j. What can we do about it as individuals?

k. Which do you prefer, growing your own food or buying it in the store?

l. Was our garden worth all the time and energy spent?

7. Resources

a. "Food Supply: Its Effect on Civilization"(Journal, 1967)

b. "Miracle of Feeding America" (Swift, Sterling, 1955)

The Poor Pay More

1. Concept to be developed: Population,

2. Understanding to be developed. Human beings both produce and consume materials.

3. Time: 3 days.

4. Materials:

   a. Film: Poor Pay More: 60 min-looking at special hardships faced by the poor in the area of consumer purchasing.

   b. Chart paper and magic markers.

   c. Cameras

   d. Cassette tape recorder.

5. Procedure:

   a. Discuss with class prior to showing the film the issue of who controls the making of various kinds of products like:

      1. shoes
      2. homes
      3. food
      4. transportation
      5. electric power, etc.

   b. Have students form triads to come up with some ideas as to how people are persuaded to buy and sell all kinds of products. Have students record their ideas on chart paper and have each triad briefly explain the information they have developed.

   c. Have a group of students compile a list of all the natural resources used by man to produce the materials that the public consume. Have group place their list on chart paper for all to see. Discuss the terms renewable and non-renewable resources.

   d. Discuss how poor people in the cities and rural areas suffer special problems when it involves the purchasing of materials to consume. Show the film: Poor Pay More. 60 minutes.

   e. After viewing film have the class form into research teams to do an investigation of the consumer pricing in the school cafeteria and compare the pricing of items there with prices of the same items at the neighborhood store. Have teams report back their findings to the class.

f. Discuss the reasons why there are differences in prices on items from the cafeteria and the neighborhood stores.

g. Discuss how the population in the school has influence on the amount of food available in the cafeteria each day. Compare the number of people living in the neighborhood to the number of food chain stores, drug stores, corner markets, etc.

h. Ask students how do poor people survive the increase in price of consumable materials that are made available to them.

i. Have students interview store owners and community people: asking them the following: Have students take pictures and record interviews on tape.

1. How do you as a store owner determine the price of items in your store?

2. Are the prices in the neighborhood stores cheaper than those at the large food chain stores?

3. How much of your weekly income goes towards the purchasing of consumer goods?

4. What do you suggest as ways to fight the increase in demand and prices of consumer goods?

5. Does T.V. ads have any influence on what you buy?

6. Is your monthly income of a nature that will provide enough money to purchase good quality food and other consumer goods?

j. Have students compile data and present it to other classes in the school. Display different kinds of ads by having students make a large collage with magazine cutouts of consumer ads.

5. Discussion questions:

a. What are renewable and nonrenewable resources?
b. What does consumer mean?
c. What does poor mean?
d. How many students are there in the building?
e. How many people in your family?
f. Who buys the food in your house?
g. How much of your families income goes towards purchasing consumer products?
h. What does the term over-production mean?
i. What does the term under-production mean?
k. What does population mean?
l. What does conservation mean?
m. What does a neighborhood mean?
n. What does quality mean?

7. References: Poor Pay More, 60 minute, color N.E.T. Film Service Indiana University, Audio-visual Center, Bloomington, Indiana 47401. Poor Pay More - 60 minute, University of Michigan, Audio-visual center, Ann Arbor, Michigan.

NEEDS VS. WANTS

1. Concept to be developed: Population

2. Understanding to be developed: Human populations have different standards of living which produce different environmental consequences.

3. Time required for activity: Four class periods

4. Materials needed: Three dittoed charts for each child, pencils, chalk, chalkboard, encyclopedias, and extra dittoes.

5. Procedure:

   a. Hand out ditto #1. Instruct children to:

      1. (Individually) List the 5 most important possessions of your family and yourself. (10 minutes)

      2. (Individually) Number these in the order of importance to you. (5 minutes)

      3. (Small group) Make a list of possessions important to most of the group. (15 minutes)

      4. One member of each group copy results onto a single ditto to give to the class the next day.

      5. (Next day) Hand out ditto. Class, working in the same small groups, will look up and list the natural resources that went into one favorite possession of each member of the group. They might also look up whether these resources are available in the United States. (30 minutes)

   b. Hand out ditto #2 (could be on some sheet as #1) Instruct children to:

      1. (Working individually) List things you really must have in order to survive. (10 minutes)

      2. (In small groups) Consolidate your lists and try to group the items into three or four categories. One person in each group will write these down on paper. (15 minutes)

      3. (Whole class) One member of each group will write his categories and list on the board. The class will come up with "food, shelter, and clothing" or something similar. They can then write these categories at the top of ditto #2; they can complete the ditto. (5 minutes)

   c. (Next class period) Hand out ditto #3 and instruct class to fill in blanks and answer questions. (15 minutes)

   d. (Next class period) Discussion of meaning of findings for the individual and his feelings about the implications (One period)

Ditto #1:

List your important possessions.	List them again with the most important first	What natural resources are needed for the first three?
	1.	1.
	2.	
	3.	2.
	4.	
	5.	3.

Ditto #2:

List things you need to survive.	Categories they fall into:			
1.				
2.				
3.				
4.				
5.				
6.				
7.				

Ditto #3:

Copy your important possessions from ditto #1	Which could you give up Completely	Twice a week?	(Check one square for each item) Occasionally?	Never?
1.				

If you did the above, how would you feel?_____

_____

(see next page)

If many people did, what difference would it make in your city? _____

_____

in your country? _____

in a poor country? _____

_____

based on what we have discussed, what possible decisions might you make? _____

_____

_____

_____

Have you made any decisions? What are they? _____

_____

_____

Here is something additional which you might want to think about. It is one detail in a very large problem:

The United States contains about 5% of the world's people. We use close to 30% of the world's resources.

For example, each person in the United States uses about one ton (2000 pounds) of grain a year. In poor countries, many people individually use about 400 pounds of grain per year? Would these facts change your decision above?.....
Something to think about!!

Upper Elementary

Mary Lou Hess

Who Needs What

1. Concept to be developed: Population.

2. Understanding to be developed: Human populations have different standards of living which produce different environmental consequences.

3. Time: 5 days - day 1 - movie
   day 2-3 - research and fill charts
   day 4-5 - discussion

4. Materials:

   movie "Had You Lived Then" (or another movie that depicts early American standards of living)
   wide-tip felt markers - 12
   charts headlined on large sheets of butcher paper (2 of each title)

TRANSPORTATION 1800 (or 1974)			
Ways	Power Used	Kind of road or route used	Environmental Effect
1. 2. 3.			

FARMING 1800 (or 1974)			
Acreage and crops	Tools	Power Sources	Environmental Effect
1. 2. 3.			

MANUFACTURING 1800 (or 1974)				
Products	Tools	Power Sources	Packaging & Advertising	Environmental Effect
1. 2. 3.				

AVERAGE HOME AND FURNISHINGS 1800 (or 1974)					
Size of House	Building Materials	Light & Heat	Amount & kind of Furniture	Appli-ances	Environ-mental Effect
1. 2. 3.					

PERSONAL POSSESSIONS 1800 (or 1974)				
Amt-kind Clothing	Appliances	Amt-kind Toys	Books	Environmental Effect
1. 2. 3.				

LEISURE TIME USE 1800 (or 1974)			
Hobbies	Entertainment	Education	Environmental Effect
1. 2. 3.			

5. Procedure:

   a. Show movie Had You Lived Then and discuss meaning of "standard of living" - (Population size had a great influence on the environment, too, of course. In 1800, U.S. had less than 10,000,000 people; in 1974 there were more than 200,000,000.)

   b. Divide class into 12 teams of 2 or 3 students. Give each of the first 6 teams one of the large charts for 1800 to research, discuss and fill in; the second 6 teams get the 1974 charts. All teams get marking pens.

   c. Each team will meet and talk over its topic using the movie input and library research to fill in its chart as completely as possible.

   d. Meet together and let the two teams who have the same topic present their charts and lead the discussion of the differences between the standards of living in 1800 and 1974, emphasizing the environmental effects.

6. Discussion Questions:

   a. In addition to the topics assigned to your teams, might health and medical care have had an effect on the standards of living in 1800 and 1974? Would this difference have an environmental effect?

   b. Are the sizes of families about the same now as in 1800? Can you think of any reasons for the differences?

   c. Is there a difference in the amount of waste materials connected with an improved standard of living?

   d. Can you suggest some ways we in 1974 may be able to fight back against the bad environmental effects of our good standard of living? What can you and your family do?

Upper Elementary — Kathy Page

The Price of Progress?

1. Concept to be developed: Population

2. Understanding to be developed: As human populations grow, it becomes more difficult to attain and maintain environmental quality.

3. Time: 1 day

4. Materials: the following cards

a. Profession cards:

mayor	artist/writer
doctor	editor of local paper
housewife	service station operator
grocery store owner	restaurant owner
telephone company manager	electric/gas company manager
high school teacher	women's liberation leader
local playboy	

b. Hobbie cards:

skiing	boating
fishing	astronomy
car racing	photography
hiking	swimming
bee keeping	people - watching
singing	loafing
sleeping	writing novels
reading	violin playing

c. Health cards:

hay fever	heart murmur
no ailments	overweight
asthma	arthritis
smoker's hack	high blood pressure
	hard of hearing

d. Attitude & Quirk cards:

loves animals	is optimistic
fears heights	is pessimistic
ambitious for wealth	believes in progress
wants convenience	distrusts progress
desires prestige	distrusts those over 30
desires peace & beauty	loves to gamble
loves people	just moved from large city
is solitary	hates taxes
is a health nut	

5. Procedure:

   a. The class divides into small groups which randomly draws 1 profession card, 2 hobby cards, one health card and two attitude cards.

   b. A city/town is described to the students on the blackboard. Pertinent facts may include population size, unemployment, major industries, geography, general health, education, culture and entertainment. The scenario can vary with each game.

   c. The groups make decisions about situations 1,2 or another situation, arguing with the other groups that represent different interests.

      1. The ABC Container Company, largest manufacturer of boxes and cartons in the country, wants to build a $20 million plant 5 miles outside the city limits. Shall we support them?

      2. The state university wants to purchase 5,000 acres of shoreline north and east of the city limits as a conservation area. They will build 2 beaches and a large picnic/campground for public use, which will draw thousands of people from neighboring areas. Shall we oppose?

   d. Discuss the game and their reactions to it afterwards.

6. Discussion:

   a. Did everyone in the group work together?

   b. Did you get frustrated when others didn't have the same opinion you did? Can this happen in real situations?

   c. What were some of the problems that these situations posed for the city/town involved?

7. References:

   a. Environmental Quality Resource Kit (Middle School) Consumers Power Company. 1971.

Upper Elementary

Maria A. Simpson
Thelma Wurzelbacher

The Automobile

1. Concept to be developed: Population

2. Understanding to be developed: As human population grows, it becomes more difficult to attain and maintain environmental quality.

3. Time: One period with partners

4. Materials:

   a. Investigation sheet with data dump, graph and discussion questions
   b. 2 colored pencils
   c. Ruler, lead pencil, and scrap paper

Data Dump
Around the year 1900, U.S. population was 76 million and that same year, gasoline cars were just starting to be mass produced. In the year 1950, there were 150 million people. Population in the U.S. increased to 180 million in the year 1960 and 55 million cars were produced at that time. 205 million people and 80 million cars are in the U.S. today per 1970 census. Population is expected to grow about 10% between 1970 and 1980. Car ownership is expected to jump about 25% between 1970 and 1980.

(Above facts are written on cards to give to students)

5. Procedure:

   a. Each student chooses a partner. Partners receive data fact cards.

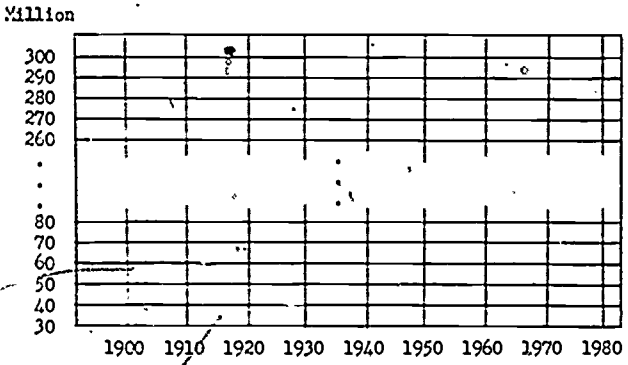
   b. Students discuss and analyze the data and try to define the problem. The problem is written on the board. Ex. Is there a relationship between increases in population and car ownership and environmental quality?

   c. Partners compute answers to the following on ditto sheet:

      (1). In 1900, how many cars were there in the U.S.? ____
      How many people were there? _____
      (2). In 1950, How many cars were there? _____
      What was the population? _____
      How many people were there for every car? _____
      (3). How many people were there in 1960? _____
      How many cars were there in 1960? _____
      How many persons per car is this? _____
      (4). What was the U.S. population in 1970? _____
      How many cars in 1970? _____
      How many cars per person were there then? _____

(5). How many people are expected in 1980? _____
How many expected cars in 1980? _____
How many cars per person will this be? _____
(Clue: To determine the above questions (#5) you will need to say to yourself, "If the population is expected to grow 10% by 1980, how much is 10% of the current population?" Therefore, 10% of _____ million people equals ____ people. The total population by 1980 would be _____.) Would you use the same process to find out how many more cars there will be in 1980?

d. Partners determine: For each of the years listed below, graph the number of people and cars. Use an O for cars and an X for people. Use different colored pencils.



6. Discussion Questions:

a. What message does the graph contain?
b. How many cars does your family have?
c. What are the consequences of the above two facts?
d. Have you ever experienced street congestion? Noise from cars? Exhaust fumes?
e. Why is the population increasing?
f. Do you think the U.S. should have all these cars? Why or why not?
g. Has the population and cars in the U.S. increased in the same way?
h. Make a list of the different ways the increased number of cars affect our environment?
i. List all the ways you can think of to change the effect of cars on our environment?
j. The car is only one thing which influences our environmental quality. Do you know of others?

7. References:

a. Options: A Study Guide to Population and the American Future, published by The Population Reference Bureau, Inc.; Library of Congress, 1973

Upper Elementary

Darrell Donelson

Classroom Newspaper

1. Concept to be developed: Economics and Technology.

2. Understanding to be developed: The cost of producing a particular product includes such things as the resources used, wages of workers, advertising, taxes and improving working and environmental standards.

3. Time: 10 days -- day 1 - discussion of planned field trip and what to look for.
   day 2 - field trip
   day 3 - discussion, compile data, break into groups
   day 4 - 7 - work in particular area
   day 8 - Publish and sell paper
   day 9 - compile data, draw graphs
   day 10 - make conclusions, discuss comparisons to regular newspaper and how to improve ours.

4. Materials: Newspaper plant and access to it. Special emphasis on resources used, wages, advertising, etc. (City-county-local trade union-high school newspapers are possibilities)

Note pads	Ditto machine
Pencils	Poster board/construction paper
Ditto masters	Magic markers/crayons
Ditto paper	Rulers
Graph paper	Dictionary/old newspapers

5. Procedure:

   a. Choose the most commercial newspaper within the vicinity.

   b. Discuss what to look for when visiting the newspaper. (Emphasis on cost and working conditions.)

   c. Students should take notes and take any hand-outs available during tour.

   d. Back in classroom, data should be discussed and compiled. Interest groups should be formed. (A student mini-newspaper should be started.)

e. Students should spend next several days working in their assigned interest area:

Advertising	News	Circulation
Publishing	Features	Accounting
Editing	Sports	Reporting
Editorials	Entertainment	Etc.

f. Students should purchase all needed materials on credit from supply room or teacher (and set wages - if any)

g. The accounting sheet and statistics should be charted every day.

h. The Advertising department should be buying time on the school P.A. system or putting posters in the halls.

i. After editing and publication, class should look at the financial outlay and determine the cost of paper and volume to be circulated.

j. Circulation of newspapers with money brought in tabulated.

k. An accounting of all materials used, the money spent and received should be charted.

l. A discussion of the differences between our newspaper and a regular commercial newspaper should be conducted at this point.

m. Various conclusions should be discussed and ways of improving any future editions should be drawn.

n. An understanding should be reached that commercial newspapers have to pay taxes on profits and meet certain environmental standards in their working conditions.

o. A final comparison of OUR environmental safeguards concerning OUR waste materials etc. should be discussed in concluding this unit.

6. Discussion Questions:

A. Planning a Field Trip:

1. What are the reasons for OWNING a newspaper?
2. What are the costs of running a newspaper?
3. What departments does a newspaper have?
4. What should a person look for that wants to work for a newspaper (wages, working conditions, feeling of accomplishment, etc.)

5. How does a newspaper help or hurt the community? (Jobs-taxes-commerce, etc.)
6. What role does a newspaper play in environmental affairs and education?

B. Field Trip.

1. Most questions asked here will be precipitated by remarks made by guide or people we are listening too.

C. Post Field Trip

1. Re-ask some of the earlier questions. Children will now have a different perspective.
2. Which aspect of newspaper work interests you the most? Why?
3. Now that you have chosen a particular area of newspaper work, what do you feel your role is?
4. How do you feel you can most effectively handle your role?
5. Are there any places we can cut costs in your area? Will this hurt the overall quality of our newspaper?
6. Do you feel there are any particular articles in your field that need to be in our newspaper?
7. What issues need to be covered editorially by us?

D. Day of Publishing and Selling.

1. What do we need to charge to break even or make money?
2. Will people pay that much?
3. How much of the cost does our advertisements pay?

E. Final Conclusions.

1. What waste materials do we have? What can we do with them?
2. Are you satisfied with the finished copy? Why?
3. Can we improve our next issue? How?
4. Can we improve our working conditions? How?
5. What conclusions can we draw from our accounting tables?
6. How do you think our newspaper has done compared to a regular newspaper? Why?
7. What would the introduction of taxes do to our newspaper?
8. What would we have to do to counter-act this?
9. Can you think of any other hidden costs?
10. One final question--Would you do it again? Why?

7. References:

Most newspapers have newspaper units available to classroom teachers.

Most encyclopedias will give material that will aide a teacher in gaining background information on the outlay and role of newspapers in America.

Upper Elementary

Richard H. Willhite

Costs of Production

1. Concept to be developed: Economics and Technology

2. Understanding to be developed: The cost of producing a particular product includes such things as the resources used, wages of workers, advertising, taxes, and improving working and environmental standards.

3. Time: One day

4. Materials:

   a. Access to a car made in the U.S.A.
   b. Colored string or yarn.
   c. Several large sheets of poster paper.
   d. Thumbtacks.
   e. Shoebox or similar-sized container.
   f. Scissors.
   g. Paper and pencil for each student.
   h. Crayons or colored ink markers.
   i. Access to an encyclodedia and dictionary.

5. Procedure:

   a. Have the students prepare a large outline map of the world on one of the sheets of poster paper using different colored crayons or markers for different countries.

   b. Examine the car and develop with the students a list of all the major raw materials needed to build an automobile.

   c. On the world map, have the students find the sources (countries) of these materials with the help of the encyclodedia and dictionary.

   d. Locate Detroit on the map, and using thumbtacks and colored string, have the students connect Detroit with the countries from which the raw materials originated.

   e. Have each student write his or her name on a slip of paper suitable for use in a name-drawing.

   f. Place the names in the shoebox.

   g. Draw names out of the shoebox so as to randomly divide the class up into groups of three.

   h. To each group of three, distribute one large sheet of poster paper and a crayon or ink marker.

i. Assign each group one of the raw materials which was included in the list of automobile component materials.

j. Have each group develop a "worker chain" on a sheet of paper, tracing the jobs which have to be done to process the raw material and finally deliver it as part of an automobile to the consumer. Example: Rubber - rubber tree grower - tree plantation helper - latex collector - raw rubber truckdriver - latex processing plant worker - etc. - tire for automobile.

k. When each group has finally developed what seems like a complete chain, have them transfer their worker chain to a sheet of poster paper.

l. Have each group explain their worker-chain to the entire class.

6. Discussion Questions?

a. How many countries contribute to a car "made in U.S.A."?

b. How do carmakers determine the cost of a car to the public?

c. How would the cost of a car be affected if the cost of processing rubber were to double?

d. How would the cost of a car be affected if workers in a major auto-glass factory demanded that equipment be installed in their plant which would reduce the level of glass-dust in the air?

e. What will happen to the cost of automobiles in the United States if other countries begin making and using as many cars as we do? Why?

f. Would there be a change in the cost of autos in the U.S. if this country and a major foreign supplier of an important raw material for cars were to have a trade agreement lowering import and export taxes?

g. How does advertising affect the cost of cars to buyers?

h. How has car-production in the U.S. changed over the last 60 years?

i. What are the kinds of pollution that cars produce?

j. How does the car buyer pay for the pollution that cars produce?

7. References:

a. Environmental Educational Instructional Activities for Grades K-6, New York State Education Department

Upper Elementary

Richard H. Willhite

Pollution Costs

1. Concept to be developed: Economics and Technology

2. Understanding to be developed: There are two kinds of costs associated with pollution: the cost of preventing pollution, and the cost of (or damage from) pollution once it occurs.

3. Time: two days - day 1 - site cleanup and telephone contacts.
   day 2 - compiling data and discussion.

4. Materials:

   a. Your school site and access to it.
   b. Large paper or plastic trash bags.
   c. Telephone directory and access to a telephone.
   d. Paper and pencil for each student.
   e. Large sheet of poster paper.
   f. Crayons or colored ink markers.
   g. Bathroom scale.
   h. Old newspaper.
   i. Scissors.
   j. Shoebox or similar-sized container.

5. Procedure:

   a. On the poster paper, draw a map of your school site and the streets immediately adjacent to it. Ask students to help think of features which should be included, i.e. buildings, paved areas, planted areas, etc.

   b. Divide the students into groups of five.

   c. Distribute one trash bag to each group.

   d. Have the groups collect as much litter from the total site area as possible over a one or two hour period. If appropriate, also extend the pick up to the streets immediately adjacent to the school site, as mapped on the poster.

   e. Upon returning, have the students write their names on equal-sized slips of paper as can be used in a name drawing.

   f. Place these in the shoebox.

   g. Have one student draw three names from the shoebox.

   h. These three will contact:

      (1). The school's custodian.

(a). Have them tell the custodian that their class is doing a study of the cost of cleaning up litter.

(b). Have them ask him how much time it takes him to pick up litter from the site.

(c). Does he consider littering to be a problem at the school?

(d). Do outdoor trash cans at the school (if any) help, or are they used only occasionally?

(2). The school system's Building Maintenance office.

(a). Have them phone the office and explain their purpose.

(b). Have them ask for the number of custodial personnel employed system-wide.

(c). Is school site littering one of the major problems the office must deal with?

(d). Can the office give them an idea of how much money of their annual budget goes to litter pick up and disposal?

(e). How does the office dispose of litter after it is picked up?

i. Have the other students sort the litter on sheets of newspaper according to what it is made of, i.e. paper, glass, metal, etc.

j. Have them weigh and record the weight of each pile:

k. On the map, have the students indicate with small "x" marks those locations where litter was picked up.

l. Have the three students chosen to contact the school's custodian and the Building Maintenance office report their findings to the class.

6. Discussion Questions:

a. Did you find any concentrations of litter when all the "x"s were placed on the map?

b. How can you account for these?

c. What was the total weight of the litter you picked up?

d. If each of you was paid $3.00 per hour to pick up litter around your school, what would be the cost per pound of the litter you picked up?

e. At that cost, how many pounds of litter would the Buildings Maintenance office be paying for each year, according to their budgeted amount for litter pick-up?

f. Judging from the "x"s you placed on your map, where might all this trash come from?

g. What kinds of litter did you pick up?

h. Were the pieces of litter you found designed to be disposable by their manufacturers?

i. List the names of the different kinds of materials that went into making the litter in the different piles.

j. Judging from the weight of the piles, which material was used most of in making the things that ended up as litter?

k. If your school has outdoor trash containers, are they used regularly? Why or why not?

l. How does your school dispose of the litter that the custodian collects?

m. Is this disposal method different from that used in other schools? Why or why not?

n. Judging from the way that litter is disposed of at your school, how many jobs are involved between the time the litter is tossed out by someone and finally disposed of in the place it ends up in?

o. Why is the disposal of litter so costly?

p. Would you enjoy the job of picking up litter for a living? Why or why not?

q. What would your school site look like if litter was never picked up and disposed of?

r. What are some of the reasons why people litter?

s. Who are some of the people who pay for litter pick up and disposal?

t. Would it be cheaper to continue littering or for everyone individually to dispose of his trash?

u. Could the materials used in manufacturing the things we dispose of be used to manufacture other things?

v. Is this being done now in your own community? Why or why not?

Who Pays

1. Concept to be developed: Economics and Technology.

2. Understanding to be developed: There are two kinds of costs associated with pollution: the cost of preventing pollution, and the cost of (or damage from) pollution once it occurs.

3. Time: 6 days - day 1 - Best Day is Friday - Discussion of understanding to be developed and what type of things we should be looking for. Homework: Walk through building and grounds and immediate neighborhood. Talk to parents-teachers-neighbors.
   day 2 - Compile and chart data obtained. Discuss conclusions drawn. Plan for guest speakers.
   day 3 - Panel composed of principal-school engineer-custodian-parent-community worker-lunch room staff member (all or some of the above). Requires pre-planning on your part.
   day 4 - Discussion of what was presented day before. Conclusions that are drawn. Plan a Positive Action Day.
   day 5 - Positive Action Day
   day 6 - Discussion P.A.D. and future goals and plans.

4. Material . School grounds, neighborhood panel, staff and community members, note pad, pencil/pen, magic markers, construction paper/poster board.

5. Procedure:

   a. Discussion of pollution and the costs associated with its prevention and cure.

   b. Assign students the homework of going through the school/ grounds/home/ and neighborhood gathering data on pollution preventitives and pollution cures.

Sample Card

SCHOOL			
Preventitives	Cost	Cures	Cost
Waste Baskets 28	$140	Custodial staff	
Incinerator 1		Incinerator	
Lunch waste con. 6		Alum. Recycling Center	
Air filters/blowers		Waste Paper Collection Center	
Window screens		Painting of bathroom	
Custodial staff		Chlorine added to pool	
Accoustical tiles			

c. Have students turn in list of and discuss what their family does in the area of pollution prevention and pollution cures. (Make sure they add cost and time involved.)

Sample Card

FAMILY			
Preventitives	Cost	Cures	Cost
Waste containers Use recycling centers Use returnable bottles Save and reuse paper bags Use hand mower Cut down use of air conditioner		Painting gutters (rustproof) Pick up litter in yard Bundle newspapers Keep air pollution controls on car Wash windows Compost grass shavings	

d. Compile list for entire class. (Give copies to rest of school).

e. Have principal-school engineer-custodian-parent-member of lunch staff-community worker give panel presentation on what they are doing in this area.

f. Students will have a question and answer period with panelists at conclusion of program.

g. Have students discuss their notes of the day's activit after panel has left.

h. Have students update their lists from 'd'.

i. Discuss how pollution preventitives and aesthetical quality go hand in hand.

j. Discuss the role of us-school-community-state-nation and world in preventing pollution and the cost involved in preventing and curing pollution.

k. Plan a Positive Action Day.

l. Have the Positive Action Day.

Example of one Positive Action Day

NEIGHBORHOCD AND SCHOOL LITTER BRIGADE

1. Chart and plot neighborhood.
2. Assign clean-up area by grade level (kindergarten--halls; oldest children greatest distance)
3. Have kids bring litter bags from home. School will provide large receptacle. City will haul litter to dump.
4. Pick up litter only. Note location of large items and give to city.
5. Weigh litter collected and invite community to see it. (Advertise day and time of brigade.)
6. Invite city officials and newspapers to be on hand.
7. Try to get an estimate of the cost it would have taken to have the city/community do this.
8. Publicize results and statistics obtained.

m. Discuss the benefits to each person the school and community from the Positive Action Day.

n. Compare what we have done to industry and their problems.

6. Discussion Questions:

a. Name some examples of the costs associated with preventing pollution?

b. Name some examples of the costs associated with damage caused by pollution.

c. What are the examples of pollution preventitives or cures in and around our school and neighborhood?

d. Who do you think could help us in finding what is being done here at school? Why?

e. Who do you think could help us in finding what is being done at home and in the neighborhood? Why?

f. Can you think of any questions to ask our panel members? Why?

g. What would you do in this area if you had their job?

h. Do you think our panel members help us in understanding this area better? Why?

i. What did you learn?

j. Where do we go from here?

k. What can we do to have a Positive Action?

l. Was our Positive Action Day a success? Why?

m. Do you think industry would handle their problems the way we did? Why?

n. What can and does industry do in this area?

o. What Positive Action Day should we have next?

7. References:

People mentioned would be best references. See them before hand.

There are many worksheets available on what homes and schools can do in preventing and curing pollution within their area.

Upper Elementary Richard H. Willhite

Not For Sale

1. Concept to be developed: Economics and Technology

2. Understanding to be developed: Some pollution costs cannot be put into dollars and cents.

3. Time: 60 minutes.

4. Materials:

   a. Recording of Debussey's "Clair de Lune" (readily available from the classical music section of your Public Library's record collection).
   b. Cassette tape recorder and blank tape.
   c. Record player.
   d. Paper and pencil for each student.
   e. Access to a busy traffic intersection.
   f. A clock or a watch.

5. Procedure:

   a. Obtain a recording of "Clair de Lune" and check the time length of the recording (usually 14 minutes).

   b. Play the recording for yourself if you have never heard "Clair de Lune" before.

   c. Prior to the exercise, stand on the corner of the busy intersection with the tape recorder and record ten minutes of traffic sounds.

   d. In the classroom, set up the record player and recording.

   e. Explain to the students that they will be listening to some quiet music. The music they will hear was written over fifty years ago by a man who wanted to express his feelings in music about moonlight on a quiet spring night.

   f. Set the tape recorder up several feet away from the record player, and stand by it so that you can see a clock or a watch as the music is playing.

   g. The room light may be dimmed to enhance the feeling Debussey was trying to evoke in his music.

   h. Start the music, adjust the volume to a comfortable level, and note the time carefully.

   i. Allow the music to continue until it approaches the final four or five minutes.

j. Then, start playing the tape recording of the traffic noise and adjust the volume until it is louder then the volume of the music.

k. Allow the music to end, turn the record player off, then turn the tape recording off.

6. Discussion Questions:

a. How do you think the composer felt when he wrote the music?

b. Do you think that the composer would have felt like writing the music inside a factory or on a busy corner? Why or why not?

c. What did the music make you think of before the tape recorder was turned on?

d. Did the music make you feel good or bad? Why or why not?

e. Did you feel differently when the tape recorder was turned on? In what way?

f. Would you enjoy living in a house at a busy corner? Why or why not?

g. Why do some people live in some places like that?

h. Does it cost more or less to live in a peaceful and quiet place? Why?

i. Can money buy back a beautiful thing once it has been destroyed, so that it is as nice as it was before? Why or why not?

j. What are some reasons why some people destroy beautiful things which other people enjoy?

k. Is it important to have beautiful things around us? Why or why not?

l. Imagine the most beautiful thing you can think of. Would it still be beautiful if it were in a junkyard?

Upper Elementary Ruth Fox

PHOTOGRAPHIC ESSAY ON URBAN BLIGHT

1. Concept to be developed: Economics and Technology

2. Understanding to be developed. Some pollution costs cannot be put into dollars and cents.

3. Time: Five class periods to be spread over two weeks and a 1/2- or 1-day field trip.

4. Materials: Cameras, slide film, projector, screen, school bus.

5. Procedure:

   a. Discuss with class various kinds of pollution and their effects.

      1) What are the kinds of pollution? Air, water, litter, garbage, noise, and visual may be listed, as well as others the class might think of.

      2) What are some of the results of these kinds of pollution? (accept what the children offer--aiming for some of the following)

         a) poor physical health

         b) tree problems

         c) rusting

         d) peeling paint and deteriorating paint

         e) dirty drapes

         f) poor mental health

         g) deafness

         etc.

   b. Discuss trip downtown (with possible trips around child's neighborhood, schoolyard, etc.) to identify Urban blight problems.

      1) Problems to look for downtown

         a) Repeat list from yesterday

         b) Add billboards, signs over stores, other ugliness.

      2) c) How about store windows, air-conditioners, heat, discomfort?

         d) Listen for noises; be aware of odors.

      3) Have children pick out specific subjects and/or areas to photograph to avoid duplication. They can then work in teams.

c. Take-trip downtown

1) Walk around downtown area if small, or take the school bus to pre-planned areas.

2) Have children look at and photograph signs of urban blight as they detect it on heir tour.

3) Have students take pictures of what they like, or what interests them, also.

d. Have slides developed.

1) Form a committee to organize slides.

2) Project slides and dicuss kinds of blight shown. What kinds of blight didn't (or couldn't) we photograph?

e. Have students calculate actual costs of harm caused by some of the kinds of pollution. (math problems)

1) Bring up possibility of not being able to measure some of the costs.

2) Is it still harmful if intangible?

a) [redacted]rental illness?

b) visual blight?

c) (others children bring up)

f. Work up program to show others.

1) Other classes who might then become involved.

a) What changes might we be able to make or cause to be made?

b) What is good about our town?.

2) Consider discussing your results with the school board.

3) If the class is motivated, they might be able to talk to the city council or the mayor.

Upper Elementary — Glen Erickson

School and City Government

1. Concept to be developed: Environmental Decisions.

2. Understanding to be developed. Many environmental decisions are made by consumers, governments, businesses, industries, clubs, and various community groups.

3. Time: One to two weeks.

4. Materials. Telephone Directory, telephone, letter writing materials, access to a Public Library.

5. Procedure:

   a. Draw an organizational plan (flow chart) for the school's administration.

      1) Trace the decision making process from the classroom to the principal.

      2) Trace this process from the school to the school system administration.

      3) Place on the flow chart the various clubs and organizations, custodians, parents, etc. that participate in the school's operations.

   b. Make another chart or organizational plan for the city, (county, state, etc.) administration, including the chart for the school system in this larger plan.

      1) Discuss with the class the different departments, divisions, boards or commissions, and the City Manager and Mayor, to get some idea of as to the kinds of questions and misinformation, that the students have.

      2) Have a City Councilman or Comcilwoman come to the class to explain what they do in the organization. If a visit is not possible, ask your questions by writing a letter.

      3) Chart this new information on the organizational plan.

   c. From the information gathered from the students in activity #2, set up small (no more than five students) groups to find answers to certain questions raised by the class.

      1) Each group may write letters, make telephone calls, invite people to talk with the class, talk with their teacher, or use printed (newspapers, booklets, charts, etc.—obtainable from the library) material.

2) All groups should report their findings to the whole class.

3) The groups should be arranged to explore different parts of the city's government:

a) City Council

b) Commissions and divisions

c) Boards (i.e. Pollution Control Board, Public Health, etc)

d) Clubs (consult yellow pages of Telephone Directoty under "clubs", for those which may be interested and helpful in your activity. There are service clubs, sports clubs, union clubs, and private clubs).

e) Chamber of Commerce - (business, and industries).

f) Political Parties.

g) Leagues - (i.e. Junior League, League of Women Voters).

h) Any other groups that play a role in your city's government, such as Consumer groups, Ecology Center, etc.

d. The information gathered from each group about the functioning of the city's government should be placed on the organizational chart.

e. Field trips to any of the various organizations would help complete your chart.

6. Discussion Questions:

a. Who runs the school? If the answer comes back, "the principal," then ask, "does he (or she) run the school alone?"

b. Where do students fit into the decision-making in your school?

c. Do parents have a say in the operation of your school? Does the custodian have a say? If so, how do they involve themselves in making decisions about the school?

d. Do groups of students, or clubs have the same or greater effect on the decisions and operation of your school?

e. Who runs the city (county, state, school system, etc.)? If the answer comes back, "the Mayor", then ask, "does he or she run the city alone?" If the answer is "City Council", then ask, "are they the only ones?"

f. Does your city have ordinances for air pollution, water pollution, noise pollution?

g. How does zoning work?

h. What are millages and millage elections? How do they affect the operation of the school system, and, in particular, your own school?

i. What role do newspapers and television play in the running of your city? How can you, as an individual, or as a group voice your concerns? Through newspapers and television?

j. Do political parties play a part in city government?

k. How do businesses and industries affect or determine the operation of your city government?

l. Does your city have a Planning Commission? If so, how might you become involved in their role?

Why That Decision?

1. Concept to be developed: Environmental Decisions

2. Understanding to be developed. Many environmental decisions are made by consumers, governments, businesses, industries, clubs, and various community groups.

3. Time: 5 days - day 1 - Discuss understanding to be developed. Plan field-trip to local industrial (or other) plant.
   day 2 - field trip
   day 3 - Compile data, draw charts.
   day 4 - Discuss conclusions drawn concerning this particular plant.

   Homework: have students research area - writing down any apparent environmental considerations that went into the layout of neighborhood streets, city planning, industrial parks, etc.

   day 5 - Compile and discuss data collected. Draw conclusions as to the way various segments of our community are handling the understanding we have developed. Decide what future actions we might be able to undertake.

4. Materials.

   - Pencils/pens
   - Note Pads
   - Industrial or Commercial site for field trip
   - Tour Guide (knowledgeable in our area)
   - Construction Paper/Poster Board
   - Magic Markers
   - Empty Wall Space

5. Procedure:

   a. Discuss understanding to be developed.

   b. Plan trip to applicable industrial, commercial, or governmental site.

   c. Pre-plan some of the questions students will ask the tour guide.

d. Field trip to selected site.

e. Compile data gathered and draw charts showing what environmental decisions the people considered when planning and doing their particular work.

SAMPLE CARDS

ROMA BAKERY
Environmental Decision: To have cleaner grounds and good waste control. Action: Installed more outside waste receptacles adequate for their wastes and patronizers of bakery.

ROMA BAKERY
Environmental Decision: To cut down on early morning neighborhood noise. Action: Now have truckers use alternate route. Fewer homes on that road.

ROMA BAKERY
Environmental Decision: Promote neighborhood clean-up campaign. Action: Bought Advertising time on local radio station stating day and time of campaign.

f. Not all data is expected to be of good decisions. If class feels wrong decisions were made they should state these along with what they consider the right decisions.

g. Draw conclusions on how effective we feel the particular place we visited is doing in various areas of environmental decision making.

ROMA BAKERY	Very Good	Good	Fair	Poor	Very Poor
General Appearance					
Interior Appearance					
Exterior Appearance					
Grounds Appearance					
Window Display (Clutter)					
Noise Level (General)					
Aroma Emitted					
Community Involvement					
Waste Control					
Other					
Overal Environmental Concern					

h. Have students research area and fill in to the best of their knowledge charts on neighborhood buildings and the community in general.

i. Compile and chart data brought in by students.

j. Draw conclusions as to the overall environmental concern shown by the community.

k. Discuss the right and wrong environmental decisions made by the community and commercial concerns within it.

l. Plan where to go from here. Also, what should be done with the compiled data.

m. An alternative approach would be for the child as a consumer to appraise the environmental decisions he makes in buying particular products.

Examples: RETURNABLE/UNRETURNABLE BOTTLES
COLD WATER/HOT WATER DETERGENTS
BIODEGRADEABLE/NON-BIODEGRADEABLE

6. Discussion Questions:

a. Are environmental concerns involved in many decisions we make? Name some.

b. Is environment involved in decisions made by consumers, government, business, industry, and consumer groups? Name some.

c. Are there places in our community you feel have followed a strict environmental ethic in making decisions? Which places? What decisions?

d. Would you like to visit_____?

e. What should we look for and what questions should we ask on our field trip?

f. What data have you collected on our trip?

g. What type of environmental decision making was involved in the data we collected?

h. Can we compile and chart the collected data?

i. Do you feel the place we visited has a sound environmental ethic? Why or why not?

j. Are there other places in your immediate neighborhood that we can chart?

k. How did the places you observed compare with our field trip visitation?

l. What conclusions can we draw about the overall environmental ethics and decisions being made by our community?

m. Where do we go from here?

7. References:

None needed - Major concern should be pre-planning involved with your tour guide. He should be told what your goals are in having the field trip. He can then place most emphasis on environmental decisions they have made and why they made them.

Upper Elementary

Nancy Rhodes
Marilyn Ryden
Gail Agne

Effects of Group Pressure

1. Concept to be developed: Environmental Decisions

2. Understanding to be developed: People working together with similar interests can often be more effective in influencing environmental decisions than individuals working alone.

3. Time: 1 day

4. Materials: Copy of value related statements for each student:

   1. Anyone who litters should pay a stiff fine.
   2. Cigarette smoking is allright for people who enjoy it.
   3. Snowmobiles should not be allowed on any public land.
   4. School should be operated year round to save energy.
   5. People should never use air conditioners in the summer because they waste energy.
   6. All students should have a say in deciding school rules.
   7. People who smoke are bothering people who don't smoke and should be made to smoke in a separate area.
   8. It is the job of the students and teachers to keep their school playground looking nice and clean.

5. Procedure:

   a. Distribute copy of statements to each student.

   b. Students decide whether they agree or disagree and mark their papers accordingly.

   c. Students are divided into groups to air their feelings about each question.

   d. Students should discuss their answers and the reasons for them. They should attempt to convince each other that their own opinion is correct.

   e. After all questions have been discussed, have students re-vote to see if their opinions have changed.

6. Discussion Questions:

   a. Did your opinion change after you talked with your group? Why or why not?

   b. If you were the only one with your opinion in your group, how did you feel?

   c. If you were one of several in your group with the same opinion, how did you feel?

   d. Given an environmental problem such as a factory putting too much waste into a river, who do you think would have a better chance of making a change, an individual or group? Why?

Upper Elementary — Glen Erickson

Helping Litter Find a Better Home

1. Concept to be developed: Environmental Decisions

2. Understanding to be developed. People working together with similar interests can often be more effective in influencing environmental decisions than individuals working alone.

3. Time: 1-2 weeks.

4. Materials. Blackboard, chalk, typewrite, dittomaster or stencil, telephone, Telephone Directory.

Introductory Remarks. This activity requires good planning, aimed at creating greater involvement and committment in the school and in the community. The activity can be broken down into five separate steps:

a. Developing a permission slip for field-trip

b. Developing a checklist for types of litter

c. Developing an Interview form

d. Developing a Litter Data report

e. Developing a plan of action and carrying that plan out

5. Procedure:

a. Developing a permission slip for field trip:

1) Community relations are very important in any school-community activity, and informing parents through the permission slip, especially if it is designed by the children, is an excellent way to inform and involve parents.

2) Present the class with the idea of taking a clean-up field trip. The class should suggest various things to include in their permission slip such as:

---purpose of trip
---date of trip
---place for parent's name
---destination of the trip
---date by which permission is needed in order to construct a role of attendees
---place for child's name, and teacher's name

3) One group of student's can design the slip, with suggestions and approval from the rest of the class.

b. Developing a checklist for types of litter:

1) Explain to the class that information can be collected in many ways:

---observation and interviews
---recording and classifying (grouping) information
---defining the problem

2) Have the class suggest items they want to place on their checklist:

---types of litter
---places where litter is found
---different kinds of litter
---kinds of animals observed (rats, squarrels, mice, etc.)

3) One or more groups of students can then design the checklist, again relying on the whole class for suggestions and approval.

4) After the checklist is completed, have the students all complete their own checklist by visiting a location where litter is present, and recording their observations. (Several locations should be surveyed, so that one or more areas can then be selected for the final phase of actual clean-up).

c. Developing an Interview form:

1) Discuss with class the importance of finding out what other people feel are problems and their ideas for involvement and solution.

2) List on the board, as with steps "a" and "b", suggestions for an Interview form:

---Do you think the streets are clean enough?
---Do you think the parks and playgrounds are clean enough?
---What area do you think needs cleaning up the most?
---What do you think should be done about it?
---Will you help my class clean it up?
---What do you think we can get other students involved?
---What local organizations or agencies might cooperate in our clean-up campaign?
(Garden Club, P.T.A., individual parents, City, Ecology Center, etc.)

3) Have one or more groups of students design the final form for everyone to use.

4) Have each student fill out several forms by going to other classrooms, and also to parents.

d. Developing a Litter Data report:

1) After completing the checklists, taking one or maybe two days to finish, tabulate the results.

2) From this accumulated data, have the class decide on the specific area or areas to be cleaned up, as well as, who else to involve (besides your class) and the best ways of getting involvement.

e. Developing a plan of action and carrying that plan out:

1) The plan should be constructed using the information gathered throughout this whole-activity.

2) Basic plans should include such things as:

---How much time can be spent on the clean-up?
---Number of people involved
---What will the litter be placed in, and who will be in charge of obtaining the containers?
---What tools, if any, will be needed, and who will be in charge of getting them?
---What organizations and agencies should be contacted, and who will be in charge of that?
---How will the litter be disposed of?
---Publicity from local newspapers, radio, and television
---If area is privately owned, has permission from owner been obtained?
---When will clean-up take place?

3) Litter bags or receptacles can probably be obtained either through the City Department of Public Works (D.P.W.) or through the school system's maintenance department, or local organizations like the Garden Club.

4) Disposal of the litter can be taken care of either through the D.P.W. or through the aid of parents with trucks.

5) Civic groups (Jaycees, etc.) might help in recycling glass. if a recycling center is close by.

6) Carry out the clean-up campaign.

6. Discussion Questions:

a. What did we as a class accomplish?
b. Could any one person gather this information as well?
c. Who has more impact, a large group or one person?

7. References:

a. Environmental Learning Experiences: for Grades Five and Six. Ohio Department of Education, 1973.

Upper Elementary — Talbert Spense

Investigating Pollution Controls

1. Concept to be developed: Environmental Ethics

2. Understanding to be developed: If humans develop an ecologically sound way of thinking, feeling, and acting toward the environment, then we will be able to live harmoniously with each other and our environment.

3. Time: Several days.

4. Materials needed:

   a. Graph and Chart paper.
   b. Cameras.
   c. Cassette tape recorder
   d. Slide projector.

5. Recommended procedure:

   a. Have students take a tour in the neighborhood around the school and take pictures of what types of environmental problems they identify.

   b. Discuss with the students who are basically affected by this type of environmental problem.

   c. Discuss and identify strategies to combat the problems identified in the community.

   d. Develop with the students a plan for the collection of information on the alternative solutions to the changing of the environmental issues identified.

   e. Assist students in the development of an environmental ad campaign to inform the neighborhood of the environmental problem in the community.

   f. Have students contact several community leaders to help spear head the campaign and collection drive.

   g. Tabulate and publish these results in the local newspaper.

   h. Have students contact city officials urging them to push for stronger enforcement of existing environmental control laws and develop new ones where needed.

6. Discussion questions:

   a. How can an individual bring attention to a major environmental issue in the community to the citizens?

   b. What are the steps to problem solving?

   c. What is environmental quality?

   d. What are the duties of the Environmental Protection Agency?

   e. Who is responsible for the enforcement of local environmental pollution legislation?

   f. What is a Mass Media environmental advertising campaign?

   g. Are there any social cost in environmental pollution?

   h. Who benefits from industries over production of natural resources?

   i. What are the major forms of environmental pollution?

Comparison Between Local Creek or River and Au Sable River

1. Concept to be developed: Environmental Ethics

2 Understanding to be developed. If humans develop an ecologically sound way of thinking, feeling, and acting toward the earth, then we will be able to live harmoniously with each other and our environment.

3. Time: 3 days Day 1 - film and discussion
Day 2 - field trip
Day 3 - discussion

4. Materials Movie projector and screen, Movie - "The River That Came Back", Clipboards or something suitable to write on, paper and pencils. Access to local creek or river.

5. Procedure:

a. Introduce the Au Sable River and its history.
b. Show movie, "The River That Came Back", with discussion following.
c. On field trip to local river or creek, have children write words positively describe the river or creek, such as "pretty" or "clear".
d. After trip, compile the positive and negative words onto the blackboard and discuss.
e. Lead into possible ways to change the negative feelings.

6. Discussion questions:

a. Day 1

1) Does anybody know where the Au Sable River is?
2) Something happened to make the Au Sable very dirty. What was it?
3) What the Au Sable River like before the lumbermen came?
4) Was it the same after the lumbermen left? What happened?
5) What did the people do to correct it?
6) Do you think it was worth their effort?

b. Day 3

1) What were the positive words that you wrote about the creek (river)?
2) What were the negative words about the creek (river)?
3) Are there more positive or negative words?
4) How, do you suppose, this creek (river) got negative aspects?
5) Can you compare the creek (river) with the Au Sable? How?
6) Was the Au Sable cleaned up? How?
7) Can your creek (river) be cleaned up? How? By whom?
8) Can we do something?

7. References:

a. Film: The River That Came Back, Consumers Power Co., available through Department of Natural Resources

Land Use and Protection Study

1. Concept to be developed: Environmental Ethics

2. Understanding to be developed. If we protect the earth it will continue to meet the needs of all living things, now and in the future.

3. Suggested time. 1 - 2 weeks preferably in the spring (length of time depends on the number of field trips made and follow-up activities.)

4. Materials:

For field trips.	For displays, fair booth, etc.	For school site development
notebooks and/or sketchbooks pencils, and camera	Photographs, oaktag, poster board, felt pens, tempera paints	Garden tools, trees, shrubs, outdoor plants flower seeds

5. Procedure:

   a. Fieldtrips

      1) Make arrangements for fieldtrips to following sites:

         a) Industrial plant
         b) Manufacturing plant
         c) Farm

      2) Observe first-hand and interview personnel.

         a) Take notes
         b) Make sketches or take pictures of site

      3) Evaluate fieldtrip.

   b. School

      1) Tour school site.
      2) Discuss and evaluat observations.
      3) Plan and execute follow-up activities:

         a) Hall display using photographs, charts, reports, models of sites, etc.
         b) Ecology Fair for your school.
         c) Prepare Environmental Booth for local county fair.
         d) Select, plan, and develope a school site, i.e., garden, court, nature study.

6. Discussion questions:

   a. Fieldtrips.

      1) How is the land being used by the facility?
      2) What kinds of vegetation is found on the site?
      3) What is the condition of the soil?
      4) What steps are taken to protect the land?
      5) What is used to replace the nutrients taken from the soil?
      6) What are future plans for protection of the land?
      7) What is the effect of the facility on the surrounding land?

   b. School site:

      1) How is the land being used and protected?
      2) What are the possible alternatives for land sue and protection?
      3) What steps can be taken to improve the school site?

      a). Call in D.N.R personnel, county or district agriculture agents and members of environmental groups such as Audubon Society, Sierra Club, an local garden club, as resource people.

7. References:

   a. Environmental Education in the Elementary School, N.S.T.A., 1972, Washington, D. C.

   b. The Do-It-Yourself Environmental Handbook, Baton Museum of Natural History, 1972, Little, Brown, and Co., Boston.

Upper Elementary — Darrell Donelson

Future Environments

1. Concept to be developed: Environmental Ethics

2. Understanding to be developed: If we protect the earth it will continue to meet the needs of all living things, now and in the future.

3. Time: 3 days
   - day 1 - discuss understanding to be developed. Homework: Have students work on study cards with parents.
   - day 2 - Compile and chart data collected. Discuss implications of data. Show a movie to further define and help explain the understanding to be developed.
   - day 3 - discuss how we can do more to protect the earth. Plan future projects.

4. Materials

Pens/pencils	movie projector
Note Pads	screen
Construction paper/Poster board	empty wall space
movie	study cards

5. Procedure:

   a. Discuss the understanding to be developed.

   b. Give students study cards to work on at school and with parents. There should be master cards and specific area cards.

The following are examples:

MASTER CARD

As people needed or made more	People did	Results	Cures
Homes	cut down trees	erosion, animals moved	plant trees
food	used more land	-	-
to kill insects	used poisons	-	-
materials	built factories	-	-
cars	made more	-	-
noise	construction	-	-
litter	waste materials	-	-
energy	-	-	-
gas	-	-	-
etc.	-	-	-
etc.	-	-	-
etc.	-	-	-

STUDENTS FILL IN

This card can be made up by teacher/or teacher and students. More of card done by students the better.

SPECIFIC AREA CARD		
More People Needed:	More cars.	
People Did:	Made more cars.	
Results:	Fumes put poisons into air. Trees and plants died. More Noise. Abandoned cars unsightly.	(Students fill in.)
Cures:	Engineers work to design better motors. Cleaner air helped plants and animals. More people riding bikes. Tighter laws on abandoned cars.	
Result:	When we protect the earth it will continue to meet all the needs of all living things, now and in the future.	(Teacher should put this at the bottom of all cards.)

c. Compile and chart what students have on their Master Cards.

d. Display all Specific Area Cards on wall.

e. Discuss the results of all the work the students turned in.

f. Discuss the understanding described.

g. Show a movie that goes into detail on the understanding developed. In most cases you should be able to get a quality film on this subject from local AVI sources.

h. Review what was discussed in the movie. Relate movie to the understanding.

i. Discuss how we can do more to cure and protect our environment.

j. Plan future projects:

(1). Find out about community pollution control ordinances. Are they enforced?
(2). Find out about local industries, government, and commercial operations concerning air pollution control.
(3). Find out how your community gets rid of trash, garbage, and other solid wastes.
(4). Find out about local food inspection and consumer-protection laws.

6. Discussion Questions:

a. If we protect the earth will it continue to meet the needs of all living things, now and in the future? Explain.

b. Can you think of any things that have been done in the past that have hurt the environment?

c. What has been done to right the past wrongs?

d. What can we learn from studying the Master Cards?

e. What can we learn from the Specific Area Cards?

f. Why should we have our parents help us on this project?

g. What trends and results do you see when looking over, the compiled and charted study cards?

h. How did the movie help us to develop the understanding we are studying?

i. How can we do more to cure and protect our environment?

j. Where do we go from here? What are some future projects we can undertake?

7. References:

a. There are many books on this subject in local libraries. The resource section in Book 1 lists suggestions for earth-keeping materials for students and teachers.

Section II

Upper Elementary Skill Developing Activities

83/84

SECTION II

Introduction to Skill Developing Activities

The development of problem solving skills is essential if students are going to actively participate in environmental problem solving as responsible citizens.

Eight skills have been identified as being essential to the environmental problem solving process and for each of the eight skills, skill developing activities have been designed for each of the following grade categories: early elementary (K-2); middle elementary (3-4); upper elementary (5-6); junior high; and senior high.

The eight problem solving skills are the ability to:

1. listen with comprehension;
2. recognize environmental problems;
3. define environmental problems;
4. collect information;
5. organize information;
6. analyze information;
7. generate alternative solutions; and
8. develop a plan of action.

After becoming acquainted with the following skill developing activities, you may want to develop some of your own, keeping in mind that they should be designed to be integrated into and coordinated with your existing curriculum rather than be used as units by themselves.

Upper Elementary

James Obernour
Ron Garner
Dave Sandys
Dick Sandys

Bang, Ring and Do Re Mi

1. Skill areas to be developed:

   a. The ability to collect data.
   b. The ability to organize data.
   c. The ability to analyze data

2. Time involved:

   a. 1st. day; 30 minutes (Parts 4a-4d)
   b. 2nd. day; home survey (Part 4e)
   c. 3rd. day; 45 minutes (Parts 4f-4g)

3. Materials needed: Class made survey sheets

   EXAMPLE:

SOUNDS	LIKE	DON'T LIKE	LOUD BUT NEEDED
School bells			
Wind blowing			
Car brakes squealling			
Birds singing			
Police sirens			
Children playing			
Soft music			
Moon whistle			
Rock music			

4. Recommended procedure:

   a. Divide class into small groups.
   b. Have students make a list of sounds they like to hear.
   c. Make a list of sounds they don't like to hear, and a list of loud but needed sounds.
   d. Develop a survey list from the students lists. Be sure to mix up like, don't like and loud lists. Include a place for the people being surveyed to add their own sounds.
   e. Take a survey of parents and other students.
   f. Make a graph to show results of survey.
   g. Analyze data.

5. Discussion questions:

   a. What sound was liked and disliked by most people? Why?
   b. Are some sounds problems?
   c. Does our survey represent the feelings of most people?
   d. Does our survey list all the sounds?
   e. Can we improve our survey?
   f. What should we do with the data we have gathered?

Upper Elementary

David Sandys
Richard Sandys
Ron Garner
James Obenour

Introductory Data Collecting Exercise

1. Skill area to be developed:

   a. The ability to collect data.

2. Time involved: 30 minutes.

3. Materials needed:

   a. Question Sheet:

> **Question Sheet**
>
> 1. Title of book:
> 2. Author of book:
> 3. Publisher of book:
> 4. Copyright date:
> 5. Does the book have an index? If so, where located?
> 6. Does the book have a glossary? If so, where located?
> 7. Does book have a table of contents? If so, where located?
> 8. How many chapters?
> 9. Which chapter is longest? Which one is shortest?

   b. Textbook

4. Recommended Procedure:

   a. Give each person a question sheet.
   b. Give the following directions for the exercise:

      (1). Answer the questions on the answer sheet using your textbook as a resource.

   c. Give each person about 15-20 minutes to fill in his answer sheet.
   d. Discuss correct answers.

5. Discussion Questions:

   a. None. The answers to this simple introductory exercise and its immediate feedback of correct answers should help greatly in future data collection activities.

Blanche Edelman
Doris Jones
Demetra Balmer

Fill It Up
(Survey of Use of Cars and Buses)

1. Skill areas to be developed:

   a. The ability to collect data.
   b. The ability to organize data.

2. Time involved: one week using 1 1/2 hours per day.

3. Material needed:

   a. Paper for collecting data.
   b. Squared paper for tabulating data.

4. Recommended procedure:

   a. Divide the class into four teams. Tabulate the size and number of cars and buses passing corners of the school and the number of people in each vehicle. Team will work in groups of two - one will observe and count, the other will record. Each pair will record data as small cars, large cars and buses, the number of passengers in each. All teams use the same code: S 1 (small car and driver only) S 3 (small car, driver and two passengers) L 2 (large car and two people) BL (Bus light load) B F (Bus full load) etc.

   b. For more accuracy, different times of the day should be used and several days ought to be used for sampling.

   c. The whole class should have a briefing session before the tabulating is done so that all are in agreement on code used and how to judge the fullness of bus and size of car.

   d. When teams return they will record their data on nine different master sheets. Example:

      1. Friday 8.30 - 8:50 a.m.
      2. Friday 10.45 - 11.10 a.m.
      3. Friday 12:30 - 12:50 p.m.
      4. Monday 8:30 - 8:50 a.m.
      5. Monday 10:45 - 11:10 a.m.
      6. Monday 12·30 - 12·50 p.m.
      7. Tuesday 8:30 - 8.50 a.m.
      8. Tuesday 10:45 - 11.10 a.m.
      9. Tuesday 12:30 - 12:50 p.m.

e. On the day that organizing of data is to be done, form the class into nine groups. Each group will take one master sheet of data and organize it by counting each classification. Example: S1; S2 or 3; S4 or more; L 1; L 2 or 3; L4 or more; B L; B M; B F. Total of tabulations should equal total of cars listed. When each group finishes the count and checks, the talleys can be put on squared paper and some totals can be figured.

5. Discussion questions:

a. Can you form any conclusions about how people are using their cars?

b. Can you suggest some ways we can use cars and buses to economize or save gasoline?

c. Did you have any difficulty with the collecting of data? If so, can you suggest how the method can be improved?

d. Did you meet with any reactions from people as you collected your data?

e. Did you find any better way to organize your data which you could share?

f. Did you have any difficulty in working together?

Demetra Balmer
Blanche Edelman
Doris Jones

Turn Off That Radio
(Relationship of Noise to Learning)

1. Skill to be developed.

   a. Ability to organize data.

2. Time involved: one hour

3. Materials needed

   a. Record player and recording of raucous music (rock?) or radio tuned into local rock station.

   b. Have at least 12 sheets of construction paper (12 x 18) on which you have pasted at random: circles (2 1/2 in. diameter) squares (2 1/2 in.), and triangles (2 1/2 in. sides) cut from different colored construction paper (see sample). (This could be done by students some weeks before as an art project or math symbol identification project) or 8 to 10 transparencies on which you have drawn circles, squares and triangles in different colors.

   c. Tally sheet for student data.

   d. Clock or watch with second hand.

4. Recommended procedure:

   a. Divide class into groups of 6 or 8 students, giving each student a tally sheet.

   b. Put four of the figured construction paper sheets on table in center of each group, face down; select one student to turn over a sheet at teacher's signal.

   c. Instruct the class in a manner similar to this: I would like to see how well you can remember what you see. I am going to show you different colored circles, squares and triangles. Write down the number and color of each that you see. We'll play some music for background as we go through this exercise.

   d. Turn on the record or radio loudly.

   d. Give signal for figured side to be shown.

   f. Wait 20 seconds and tell studen to turn over sheet. (these can be set aside for exchanging later)

g. Give students a few seconds to write down what they saw.

h. Give signal to turn over each succeeding sheet allowing 20 seconds exposure for each sheet until all four sheets have been shown.

i. Swap sheets from one group to the next and turn off radio.

j. Go through exercise again (no noise).

k. Exchange sheets again and go through with no noise the second time.

l. Turn on radio again and exchange sheets go through exercise again. (Noise is last in order to eliminate the possible advantage of experience).

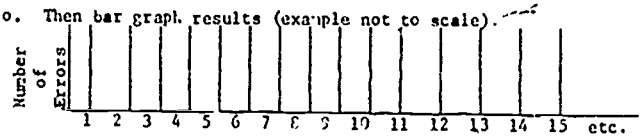
m. Have students check their results, noting the number of mistakes per page. Example:

sheet 1 5 mistakes
sheet 2 3 mistakes,
sheet 3 7 mistakes etc.

n. Ask each group to organize data by adding their individual scores for total errors for each sheet: example:

sheet 1 27 mistakes
sheet 2 35 mistakes
sheet 3 45 mistakes etc.

o. Then bar graph results (example not to scale).



p. A master graph could also be made showing results of entire class.

5. Discussion questions:

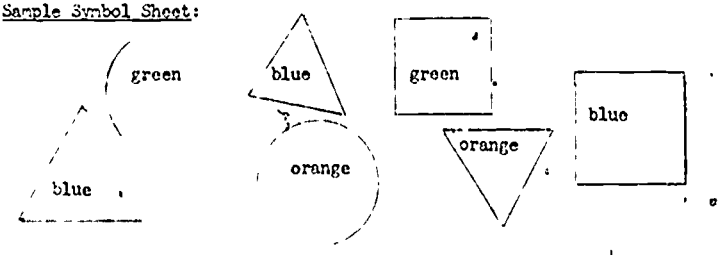
a. What does the graph show us?
b. What could have made the difference in the number of mistakes made?
c. Can you think of other times that noise makes a difference in your life?
d. Should you study with the radio playing?

Variation - have students count number of circles, squares and triangles. without differentiation of color. Cut down time to about 5 seconds.

TALLY SHEET

Sheet #	Squares				Circles				Triangles			
	Total	ed	Green	Blue	Total	ed	Green	Blue	Total	ed	Green	Blue
1												
2												
3												
4												
5												
6												
7												
8												
9												
10.												
11.												
12.												
13.												
14.												
15.												
16.												

Sample Symbol Sheet:



Students Must Know How to Read Bar Graphs

Upper Elementary

Tim Kreps
Don Hellinger
Tim Kardatzke

Hot, Cool or Cold?

(Air & Water Temperature of Lake Environment)

1. Skill area to be developed:

   a. The ability to analyze data.

2. Time involved: 30-40 minutes.

3. Materials needed: One sheet of paper with two bar graphs represented (one for each student).

   a. Bar graph #1

      Shows the temperature of the air a few inches from the lakes surface on different days.

   b. Bar graph #2

      Shows the temperature of the lake taken the same days and at the same time the air temperature was taken.

4. Recommended procedure:

   a. Form the class into groups of five.

   b. Pass out the sheets with the two bar graphs represented (one sheet for each member of the group).

   c. Give the following directions for the exercise:

      1. Each group member has the same information on their information sheet.

      2. Notice that there are two bar graphs on your information sheet.

      3. The readings for the air temperature graph were taken a few inches above the surface of the lake.

      4. The readings for the water temperature graph were taken a few inches below the surface of the lake.

      5. What can your group learn from these graphs? Someone in your group may want to take brief notes so you will be able to remember your ideas in a little while

d. Give the groups a few minutes to bring forth some ideas. During that time the teacher (and aides) will circulate among the groups. If, after giving a group 3 to 5 minutes, they have not begun to generate any ideas whatsoever, then suggest one or more if necessary "idea stimulators" found below. Hopefully one or two "idea stimulators" will ignite the group and they will continue with ideas on their own.

e. Give the groups about 15 minutes to generate ideas from these graphs.

f. Bring the groups close together to share their findings. Ask each group to share one idea and continue around until all ideas have been brought forth. (The teacher may want to tape this session so that the combined analysis of all groups could be heard or seen at a later date).

g. Analysis of this data should bring forth these ideas:

1. Air temperature fluctuates much more than water temperature.

2. Air temperature fluctuates to greater extreems, both high and low.

3. Air temperature is dependent upon weather systems which can change very quickly.

4. Water temperature remains more stable because it takes time to change the temperature of such a large mass.

5. Idea Stimulators (discussion questions):

a. Which graph has the highest temperature. Why?

b. When is the warmest temperature AM or PM? Always?

c. If the PM air temperature goes up, does the PM water temperature go up?

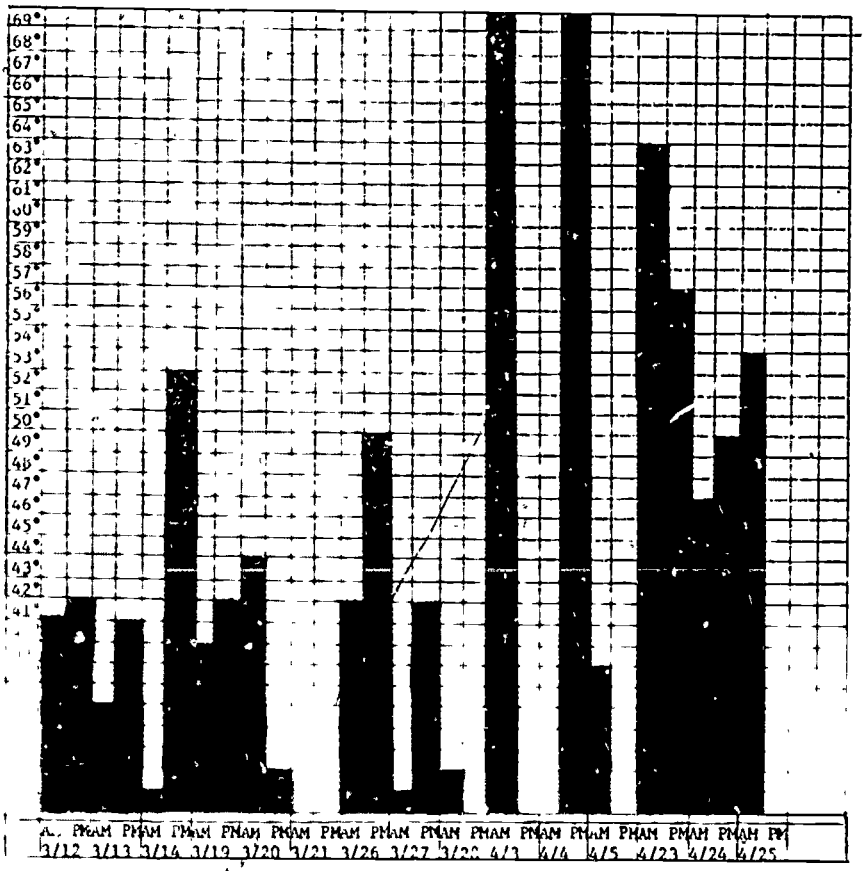
d. Which graph has the lowest temperature? Why?

e. Which graph shows the greatest difference in temperature from AM to PM in the <u>same</u> day? Why?

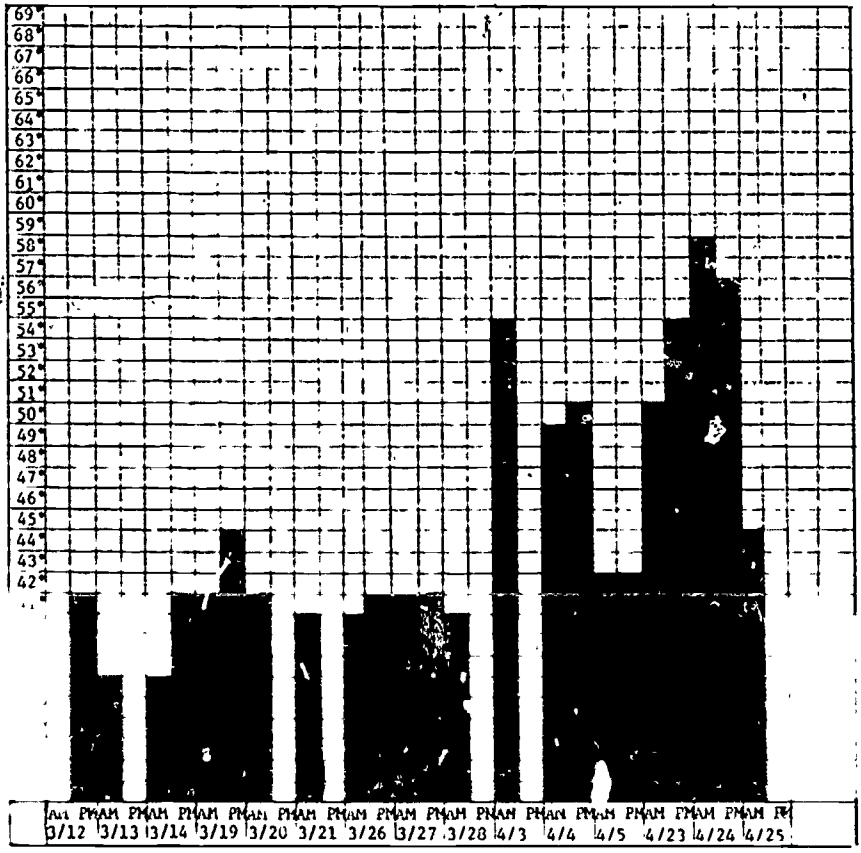
6. References.

Data provided by the fifth grade students of the extended classroom experiences at Camp Miakonda, Sylvania, Ohio.

Air Temperature
Above Sawyer Lake-Camp Niakonda, Sylvania, Ohio



Water Temperature
Sawyer Lake-Camp Miakonda, Sylvania, Ohio



Upper Elementary

Tim Kreps
Donn Hellinger
Tim Kardatzke

PRECIPITATION/TURBIDITY RELATIONSHIPS

(Does rain effect the distance you can see down into a lake?)

1. Skill area to be developed:

   a. The ability to analyze data.

2. Time involved: approximately 30 minutes.

3. Materials needed: Data sheet for each student.

4. Recommended procedure:

   a. Form the class into groups of five.
   b. Pass out a data sheet to each student.
   c. Give the following directions for the exercise:

      1. Each group member has the same information on his data sheet.

      2. Ask the question: "Does anyone know what turbidity means?

      3. Allow responses to the question. (Turbidity is basically how far one can see down into the water. It is measured by lowering a white, eight inch disk (called a secchi disk) into the water until it just disappears. A one inch turbidity reading means the water is very muddy or turbid. A greating reading i.e. 15" shows the water to be less turbid, although it is still brownish or muddy in appearance.)

      4. The first column of numbers on your data sheet represent the days from March 1, 1974 through May 20, 1974.

      5. Next to those dates are numbers which represent the amount of precipitation for that day. The letter T represents precipitation greater than zero, yet less than.01 and stands for TRACE of precipitation.

      6. In the third column are the turbidity readings (given in inches) for certain days.

      7. What can your group learn about the relationship of turbidity to precipitation? Someone in your group should take brief notes so you will be able to share your ideas with the class when we reconvene.

      8. Based on what your group can learn about the relationship between turbidity and precipitation, can you make some educated guesses as to what the turbidity reading could have been for some of the dates which do not have a turbidity reading?

d. Give the groups a few minutes to begin to come out with some ideas. During that time the teacher (and aides) will circulate among the groups. If, after giving a group 3 to 5 minutes, they have not begun to generate any ideas whatsoever, then suggest one or more (if necessary) discussion questions found below. Hopefully, one or two questions will ignite the group and they will continue with ideas on their own.

e. Give the groups about 15 minutes to generate ideas from their data.

f. Bring the groups together for a sharing of their findings. Ask each group to share one idea and continue around until all ideas have been brought forth. (The teacher may want to tape this session so that the combined analysis of all groups could be heard or seen at a later date.)

5. Discussion questions:

a. What have you learned?
b. What does turbidity mean?
c. What does a secchi disk measure?
d. How would a lake in or around your community become turbid?

hints. 1. It's a man made lake?
2. Ground water seepage runs into it?
3. Other streams flow into it?
4. A large stream also helps to fill it?
5. It's not a deep lake?

e. Was it possible to make educated guesses for the turbidity reading on those days it was not given? Why?
f. When was the lake most turbid? Why? What was the turbidity reading? What was the precipitation reading?
g. When was the lake the clearest or least turbid? Why?
h. Is there anything wrong with a lake which is very turbid?
i. What kind of figh do you think could live in this kind of environment?
j. Could Lake Erie be compared to this lake? How? (Shallow lake, many turbid streams and rivers flow into it. Use a map to illustrate.)

ANALYSIS OF THE DATA SHOULD BRING FORTH THESE IDEAS:

1. Given more than average rain fall for a week (especially 3/3 to 3/9, note 3/4) the following week with zero rain fall will show the water becoming less turbid.

2. After light showers 3/16 to 3/19 the turbidity increases (3.19 14 to 3/20:12') but because of this being a very light amount of precipitation the silt and other particals begin settling out much faster as shown by 3/20 12" to 3/21.13".

3. The clearest water as seen for three consecutive days 3/26 to 3/28 of 17 turbidity. The reason being, very light amounts of rainfall the preceeding week and zero precipitation on 3/26 to 3/28.

4. After one of the heaviest amounts of precipitation shown 4/3, the turbidity reading shows 1" on 4/4. The 15" reading of 4/3 was taken before rainfaill began. Interesting note: 4/3 was date that tornados and floods swept the midwest United Staes killing more than 300 people. Locally, Zenia, Ohio was almost totally leveled.

5. Even after such a storm on 4/3 the water shows signs of beginning to clear on 4/5 i.e., from 4/4:1" to 4/5:3".

ON-GOING ACTIVITY:

Have the class make some sechhi disks (9 pie tins or gallon paint can lids work well) and measure the turbidity of streams, rivers or lakes in the surrounding area. The students could record data and compare it to previous turbidity information.

6. References.

a. Turbidity readings provided by the fifth grade students of the Extended Classroom Experiences Program at Camp Miakonda, Sylvania, Ohio.

b. Precipitation readings provided by the Toledo, Ohio Weather Service.

Precipation/Turbidity Relationship Data Sheet

Date	Amount of Precipitation	Turbidity	Date	Amount of Precipitation	Turbidity	Date	Amount of Precipitation	Turbidity
MARCH 1974			APRIL 1974			MAY 1974		
1)	T		1)	.18		1)	0	9"
2)	.05		2)			2)	0	10'
3)	T		3)	.90	15"	3)	.01	10"
4)	1.31		4)	.03	1"	4)	0	10
5)	.01		5)	.03	3	5)	.08	9
6)	0		6)	0		6)	.03	8
7)	.29		7)	.30		7)	0	10
8)	.34		8)	.02		8)	1.00	14
9)	.21		9)	0		9)	T	6"
10)	0		10)	0		10)	0	10"
11)	0		11)	.02		11)	.58	11'
12)	0		12)	.16		12)	.09	6'
13)	0	8'	13)	0		13)	T	4'
14)	0	11"	14)	.03		14)	.35	8
15)	0	14	15)	T		15)	.46	8'
16)	.23	14"	16)	0		16)	.05	6
17)	.01		17)	0		17)	.41	8"
18)	0		18)	.18		18)	0	
19)	.09	14"	19)	T		19)	T	
20)	T	12"	20)	T		20)	0	
21)	T	13'	21)	0				
22)	.14		22)	T				
23)	0		23)	.17	8"			
24)	.03		24)	T	8			
25)	.02		25)	0	8			
26)	0	17'	26)	0				
27)	0	17"	27)	0				
28)	0	17	28)	0				
29)	.03		29)	.23				
30)	.05		30)	T	10"			
31)	.07							

Law Breaking

1. Skill areas to be developed:

   a. The ability to comprehend data presented.
   b. The ability to analyze the data.
   c. The ability to help solve problem.
   d. The ability to generate alternate solutions.

2. Time involved: 30 minutes.

3. Material needed: The three cases on law breaking, plus questions for brainstorming on alternate solutions.

   a. Case #1

      Mr. A. doesn't drive a car and he never goes anywhere. He refuses to pay taxes because he doesn't want his money to be spent on highways for speeding cars.

   b. Case #2

      Mrs. B. often drives over the speed limit. She says it's safe. After all Mrs. B. says, she's never been caught by the police, so she really isn't speeding.

   c. Case #3

      Mr. C. says that police are unfair to all people whose names begin with C. He refuses to listen to policeman and throws rocks at them when they patrol his neighborhood for burglars.

   d. Following are questions for brainstorming on the cases above:

      Do you think any of these responses are correct? Why?

      Does it make any differences what they do? To whom?

      Is violence right for some people and not for others? Who is to say?

      Can you demand rights without being violent? How?

      What other alternatives do each of these people have?

4. Recommended procedure:

   a. Form class in groups of four.

   b. Pass out information with three cases on law breaking. Also the questions to generate alternate solutions.

5. Discussion questions:

   a. Did leadership unfold during the activity.

   b. How effective did group function.

   c. Did opportunity arise for all participants to contribute alternate solutions to each case.

   d. How might the group have functioned more effectively.

Upper Elementary

Leslie Green
Bill Wirick
Charlie Mae Rose

Personal Use of Energy

1. Skill areas to be developed:

   a. The ability to write a questionnaire.
   b. The ability to evaluate data.
   c. The ability to devise a plan of action.

2. Time involved: six class periods.

3. Materials needed:

   a. Dittos and paper.
   b. Film or filmstrip on usage of energy.

4. Recommended procedure:

   a. Show film/filmstrip and follow with class discussion on the kinds of energy that individuals utilize and for what purposes.

   b. Students will prepare a survey on the usage of energy to be passed out in pre-arranged classes. Questions should include source of energy used each day (such as TV, car, radio, toothbrush, stove, furnace), whether the energy is a necessity, and the time or amount of each source of energy is used.

   c. Students will distribute the surveys to the appointed classrooms to be completed by the students.

   d. Collect and evaluate the data surveys. The information can be presented on a chart or in graph form.

   e. Students may want to propose ideas for conserving energy. These ideas could be put in letter form, dittoed, and given to students who participated in survey.

5. Discussion questions:

   a. How do students use different energy sources?
   b. How can we conserve our energy?

Upper Elementary Talbert B. Spence

Alternative Brainstorming

1. Skill areas to be developed:

   a. The ability to generate alternatives.
   b. The ability to listen with comprehension.
   c. The ability to evaluate suggested alternatives for clarity and relevance with relationship to topic-area being discussed.
   d. The ability to draw conclusions.

2. Time involved: 30 minutes.

3. Materials needed:

   a. Topic areas for discussion:
      1. Urban housing.
      2. Community Recreation facilities and programs.
      3. Solid waste management (school, community, home).
      4. Urban mass transportation.
      5. Community water quality.

   b. Chart paper and markers.

4. Recommended procedure:

   a. Form the class into groups of 4 or 5's.
   b. Provide each group with list of problem topics in which to generate alternative solutions to the problem.
   c. Each group is provided chart paper and markers to record the alternatives generated.
   d. Provide each group with 20 minutes to develop alternatives. One member of the group records the alternatives.
   e. The recorders of each group share with the other groups their list of alternatives.
   f. During the sharing out activity additional alternatives can be added to each group's list.

5. Discussion questions:

   a. How did leadership unfold during the activity?
   b. How were decisions made?
   c. How effectively did the group function?
   d. How realistic were the alternatives generated by your group to the topic area of discussion?
   e. How might the group have functioned more effectively?
   f. Were there any new strategies gained by sharing out your group's alternatives with the rest of the class?

Upper Elementary and Junior High

Ervin Doman

Area of a Cube

1. Skill areas to be developed:

   a. Ability to recognize solutions.
   b. Ability to find alternate solutions.
   c. Ability to work with group.

2. Time involved: depends on grade level.

3. Materials needed: Solution cards, cube, centimeter ruler, ruler.

   a. Solution Card #1

      Find the area of a cube.

      You may not use a ruler.

      You may not find the area by measuring all six sides of the cube.

      Try to find two alternate solutions in finding the area of a cube.

   b. Solution Card #2

      Find the area of a cube.

      You may not use a centimeter ruler.

      You may not find the area of a cube my measuring one side and multiplying by six.

      Try to find two alternate solutions in finding the area of a cube.

   c. Solution Card #3

      Find the area of a cube.

      You may not use the estimate procedure.

      You may not take the cube apart and measure to find the area of a cube.

      Try to find two alternate solutions in finding area of a cube.

d. Solution Card #4

Find the area of a cube.

You may not use your index finger or any other artificial instrument as a unit of measure even if you know its measurement.

You may not find the area by measuring three sides and multiplying by two.

Try to find at least two other alternate solutions in finding the area of a cube.

4. Recommended procedure:

a. Form groups of 4 students.
b. Provide group with a cube ruler and centimeter ruler.
c. Pass out cards to each member in the group.
d. Give the following directions for the exercise:

1. Cannot solve problem with method or unit of measure on card. Must find alternate solution.

2. Each group try to have two alternate solutions to the problem.

5. Discussion questions:

a. Did all or part of groups use instruments to solve problem?
b. How was decision to the solutions derived?
c. Was a certain student dominate because he was good in math?
d. Were all in the group able to contribute a solution or help in a solution as a group?

Section III

Values Clarification Activities

SECTION III.

VALUES CLARIFICATION ACTIVITIES

Children and youth of today are confronted by many more choices than in previous generations and will soon be required to make many more environmental decisions affecting their community, nation and world.

The complexity of our times and of environmental decisions has made the act of choosing exceedingly difficult. Ideally, choices are made on the basis of one's underlying values; however, frequently persons (especially young people) are not clear about their own values.

The Values Clarification Process is concerned with trying to help students to become more aware of their own beliefs, attitudes and values; to consider and weigh the pros and cons and consequences of various alternatives; to consider whether their actions match their stated beliefs and if not, how to bring the two into closer harmony; and finally, to try to give students options, in and out of class, for it is only when students begin to make their own choices and evaluate the actual consequences, do they develop their own set of values.

The following are sample Values Clarification strategies that teachers have found helpful in assisting students to clarify their values regarding environmental issues. Though some strategies are recommended as being more appropriate for particular age groups, feel free to change and adapt them for your own uses.

As you become more familiar and comfortable with using the Values Clarification process, you will find that it can easily be included into any kind of teaching unit.

Name Card

1. Time involved: five - ten minutes.

2. Materials needed:

   a. 3 x 5 notecards, one per person.

   b. Pen or pencil.

3. Recommended procedure:

   a. Have participants write their name in center of the card.

   b. Have participants write in the four corners the following information:

      1. Upper left - list 3 things you really value.

      2. Lower left - list 3 figures (alive or dead) that you really admire.

      3. Upper right - list 3 things that you would like to be remembered for after you die.

      4. Lower right - what do you feel are the 3 most serious environmental problems.

   c. Have participants break into groups of 3 and discuss one corner of their cards.

   d. After 2 or 3 minutes, rotate people to other groups, have them then discuss another corner of their cards.

4. Debriefing:

   a. Name Card is a mixer-type activity, used to get participants acquainted.

   b. Helps participants publicly affirm their values.

5. References:

Simon, Sidney; Leland Howe and Howard Kirschenbaum. Values Clarification: A Handbook of Practical Strategies for Teachers and Students. New York: Hart Publishing Co., 1972.

Voting Questions

1. Time involved: 10-30 minutes.

2. Materials needed: none

3. Recommended procedure:

   a. The teacher reads aloud each question by asking "Are you someone who....?"

   b. After each question is read the students take a position by a show of hands:*

      1. Those who strongly agree raise the hand high.
      2. Those who agree raise their hand slightly.
      3. Those who disagree lower their hand slightly.
      4. Those who strongly disagree lower the hand fully.

   c. Discussion can follow either each question or after several questions.

   d. This activity can also be written down on a worksheet.

4. Sample valuing questions: Examples for Lower and Middle Elementary grades. Are you someone who:

   a. Would like to live on a farm?*
   b. Likes to go on long car trips?*
   c. Would like to live in a different city someday?*
   d. Thinks you will smoke cigarettes someday?*
   e. Has a private place to go when you want to be alone?*
   f. Would like to plant something and watch it grow?

   Examples for Upper Elementary - Junior High grades. Are you someone who:

   g. Could live happily without electricity?
   h. Could enjoy living in a rural setting?
   i. Would go to school if you didn't have to?*
   j. Would like to change something about this school?*
   k. Would like to live in another country?*
   l. Would ask your parents or someone else you care about to stop smoking?*
   m. Likes to walk or ride a bicycle to a place rather than be driven?
   n. Would like to ride a motorcycle?*

Examples for Secondary Grades. Are you some one who:

o. Would buy only returnable bottles if both returnable and nonreturnable bottles were present in a store?

p. Feels modern technology will enable man to continue to to enjoy the present standards of living for many decades to come?

q. Feels as long as we have to go through democratic processes to make changes, there is no chance of our moving fast enough to save the environment?

r. Feels that the population problem has a powerful magnifying effect on all our environmental problems?

s. Would prepare your glass, cans and paper for recycling if it were available?

t. Thinks that we should have spent all that money to go to the moon?*

u. Would like to own a snowmoblle?

v. Uses a spray deodorant?

5. Debriefing

a. Voting questions call for public affirmation of one's values.

b. Discussion is very important. You can discuss male and female differences.

c. Example debriefing for spray deodorant issue: The first spray deodorant came out 12 (?) years ago. Now 90% of the population uses spray deodorant. How could we change schools or the race issue as quickly?

d. Just ask each question and go on unless students want to discuss.

6. References:

Simon, Sidney: Leland Howe and Howard Kirschenbaum. Values Clarification A Handbook of Practical Strategies for Teachers and Students. New York: Hart Publishing Co., 1972.

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* Procedure 3b and Sample valuing questions a,b,c,d,e,i,j,k,l,n and t have been reprinted by permission of Hart Publishing Company, Inc., from its copyrighted volume VALUES CLARIFICATION: A Handbook of Practical Strategies for Teachers and Students by Sidney B. Simon, Leland W. Howe and Howard Kirschenbaum.

All Grade Levels

Glen Erickson

Rank Order

1. Time Involved: 10-20 minutes

2. Materials Needed:

   a. pencil and paper

   b. blackboard

3. Recommended Procedure:

   a. Explain to class that you will be reading some questions to them, which they will rank order according to their own value perspective. Each question will consist of 3 or 4 alternative choices.

   b. Read a question, and write the alternative responses on the board.

   c. Have the students write down their rank orders (1 for first choice, 2 for second choice, etc.) for that question on a piece of paper.

   d. After everyone has completed their rank ordering for the first question, allow several students to share out their rank orders and their reasons with the class.

   e. Continue this same procedure for all the questions you wish to use.

4. Sample Valuing Questions:

   a.* Which would you least like to be?

      1. Deaf
      2. Blind
      3. Paralyzed from waist down

   b. Would you rather be a

      1. Flower
      2. Tree
      3. Boulder

   c.* Where would you rather be on a Saturday afternoon?

      1. At the beach
      2. In the woods
      3. In a discount store

d.* Which is most important in a friendship?

1. Loyalty
2. Generosity
3. Honesty

e.* Where would you rather live?

1. On a farm
2. In the suburbs
3. In an inner city

f. Which is the least important to you?

1. A horse
2. A dog
3. A deer

g. How many children would you like to have?

1. 0
2. 1
3. 3

h.* What would it be hardest for you to be?

1. A prison guard
2. A welfare inspector
3. An assembly line worker

i. What is the most serious problem facing society today?

1. Education
2. Pollution
3. Racism

j. Rank the following environmental problems in order of their critical nature.

1. Energy
2. Air and water pollution
3. Housing

k.* Which pet would you rather have?

1. A cat
2. A dog
3. A parakeet
4. A turtle

l.* If you were President, which would you give the highest priority?

1. Space program

2. Poverty program
3. Defense program

m. Which method of transportation do you like the most?

1. Riding in a car
2. Riding a bicycle
3. Walking
4. Flying on an airplane

n.* Which do you like best?

1. Ice cream
2. Pudding
3. Jello

o.* Which would you like to do most?

1. Learn to skin dive
2. Learn to ride a horse
3. Learn to ride a mini-bike

p. Which do we need to train more of? Each group to be ranked separately.

Group I	Group II
Lawyers	Skilled Labor
Doctors	Professional
Teachers	Management

q. Which would you rather own?

1. A motorcycle
2. A backpack
3. A TV set

r. You are hiring for a sales position in a chain store. You have three applicants. Which one would you choose?

1. An exconvict
2. Unmarried pregnant female
3. A released rental patient

s. The largest industry (employer) in town is destroying the main river. What action?

1. Arson (violent protest)
2. Boycotting
3. Petitioning city hall

t. What is the most influential factor of social change?

1. Family
2. Peer group
3. Governmental laws

u. You witness a mugging. Which action would you take?

1. Direct assistance
2. Call police
3. Ignore

v. Have the class make up own rank orders.

5. Debriefing:

a. Publicly affirming one's values helps in clarifying those values.

b. No order is right or wrong.

c. Sharing out students' reasons for their rank orders helps other students clarify their own values by listening to other alternative rankings, along with the students' reasons.

d. Helps students understand that many issues require more careful consideration than we normally give them.

e. Helps demonstrate that to make a decision about an issue requires one to make a choice.

6. Reference:

Simon, Sidney; Leland Howe and Howard Kirschenbaum.

Values Clarification: A Handbook of Practical Strategies for Teachers and Students. New York, Hart Publishing Co., 1972.

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Either-or Forced Choice

1. Time involved: 45-50 minutes.

2. Materials needed:

   a. Two blackboards or large pieces of paper.
   b. Can also be done with two slide projectors and appropriate slides.

3. Recommended procedure:

   a. Have students arrange their desks/chairs so that there is a wide path from one side of the room to the other.
   b. Place blackboards on opposite sides of the room.
   c. Place an either-or question on the blackboards; and ask
      Example: Which do you identify with more
      1. The Four Tops
      2. The Jackson Five
   d. Explain to the students that they are to select one of alternatives and move to that side of the room where it is posted.
   e. Have students form triads to explain briefly why they decided on this choice. Allow 2 minutes per student.
   f. After the 2 minute triads session have students return to the center of the room and ask another either-or question.
   g. Select a student from each opposing views and have them relate to the entire group why they made their particular choice.
   h. This exercise has an unlimited range of alternative questions to ask.

4. Sample of Either-or Forced Choice Questions. "Which do you identify with more:"

   a. Asphalt or grass
   b. Clean air or dirty air
   c. Noisy neighborhood or quiet neighborhood
   d. A clean playground or a littered playground.
   e. Love and understanding or hatred and distrust
   f. New housing or old housing.
   g. Equal rights or no rights
   h. Trees or telephone poles
   i. Expressways or bike routes
   j. Urban community or suburban community
   k. Strip mining or solar energy
   l. Nuclear power plants or steam power plants
   m. Urban farming or high prices
   n. Cooperative living or independent living
   o. Have group suggest other Either-or questions.

5. Debriefing

   a. Note the importance of having individual differences and the free-

dom to evaluate all possible alternatives to an issue or situation.

b. Participants can physically see how their values relate to the values of the group members.
c. No position or alternative is right or wrong.
d. Sharing out reasons for individual choice among group members is important in clarifying individual position.
e. Any two contrasting value statements can be used that apply to the group.

6. References:

Simon, Sidney, Leland Howe, and Kirschenbaum. Values Clarification: A Handbook of Practical Strategies for Teachers and Students. New York: Hart Publishing Co., 1972.

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Upper Elementary
Junior High
Senior School

Glen Erickson

Values Continuum

1. Time involved: 20 - 30 minutes

2. Materials needed: 5 chairs or desks

3. Recommended procedure:

   a. Arrange 5 chairs or desks in a row, leaving several feet in between each so as to form 4 separate areas along a line.

   b. Explain to the class that you are going to read several value-related statements for which they are to respond by walking to the area which represents their position on the statements.

      1) The spaces should symbolize, left to right, strongly agree, agree, disagree, strongly disagree.
      2) Of course, any student may pass, and not respond.

   c. After each question, have a few students share out their reasons for the particular positions.

   d. Continue this same procedure for other statements.

   e. Let the class or yourself suggest other value statements.

4. Sample valueing questions:

   a. More emphasis should be given to problems of environmental nature which are caused by the individual citizen instead of problems which are caused by industrialists.

   b. The concept of cycles is encountered frequently in ecology. Yet, modern society is ignoring this basic law in its uses of natural resources.

   c. It is primarily the responsibility of the government to control air pollution.

   d. The environmental crisis cannot be solved in the context of our present political and economic system.

   e. Any pollution act of a person is an infringement on the rights of another and should be so regarded in the courts.

   f. Local organization is the key to effective environmental action; that is, battles on big national issues are ultimately based on grassroots supports.

g. As long as we have to go through democratic processes to make changes, there is no chance of our moving fast enough to save the environment.

h. There should be commuter taxes levied on persons who live in the suburbs and work in the central city, and the money used for the construction and improvement of public transit.

i. Modern technology will enable man to continue to enjoy the present standards of living for many decades to come.

j. The younger generation in America really does not want to change the basic way of life in this country.

5. Debriefing:

a. If students tend to cluster together because of peer pressure, you can have the students answer the statements on paper.

b. A wide spread of positions usually indicates a good continuum statement, which causes critical thinking.

c. This activity is good for introducing a particular unit by making statements pertaining to that unit.

6. References:

Simon, Sidney, Leland Howe and Howard Kirschenbaum. Values Clarification: A Handbook of Practical Strategies for Teacher's and Students. New York, Hart Publishing Co., 1972.

Physical Continuum

1. Time involved: 10 - 20 minutes.

2. Materials needed.

   a. Two blackboards or large pieces of paper.
   b. Can also be done with two projectors and appropriate slides.

3. Recommended Procedures:

   a. Place blackboards on opposite sides of room.

   b. Clear area between blackboards.

   c. Write pairs of issues on boards.

      Example City (on one board) - Country (on other board).

   d. Explain to group the choices involved, noting that choices exist from one board to the other board.

   e. Have participants place themselves along the imaginary line between the two boards which have opposite values listed on them.

   f. It is best if you eliminate the possibility of someone standing half-way between boards, so participants must make a choice.

   g. After people have aligned themselves, have them discuss amongst those adjacent to them, their reasons for placing themselves where they did along the physical continuum.

   h. Have people readjust their position, with respect to those people nearest them, to more accurately associate their position on the continuum with their personal value.

   i. Select individuals to relate to the group their reasons for their physical position on the continuum.

   j. Go on to next pair of values and repeat procedure.

4. Sample valuing questions:

   a. City - Country

      Which place would you rather live in?
      Which place would you rather work in?

b. Powerboat - sailboat.

Which would you rather own? (both items identical in price.)

c. Snowmobile - cross country skiing.

Which would rather do?

d. Have group suggest other contrasting value statements.

5. Debriefing.

a. Note the importance of people, physcially and publicly affirming their values to better clarify them.

b. Participants can physcially see how their values relate to the values of other group members.

c. No position is right or wrong.

d. Sharing out reasons for individual positions among group members important in clarifying individual positions.

e. Any two contrasting value statements can be used that apply to the group.

6. References.

Simon, Sidney; Leland Howe and Howard Kirschenbaum. Values Clarification: A Handbook of Practical Strategies for Teachers and Students. New York, Hart Publishing Co., 1972.

Public Interview

1. Time involved: 5-10 minutes per interview.

2. Materials needed: none.

3. Recommended procedure:

   a. Ask for volunteers who would permit a public interview about some of their personal beliefs, feelings and actions.
   b. Explain ground rules several times as to safeguard the students personal feelings.
      (1) The teacher may ask any question about any aspect of his or her life and values.*
      (2) If student decides to answer question, she or he must answer honestly.
      (3) The student has the option to decline to answer question.
      (4) The student can end the interview at any time by simply saying "Thank you for the interview".*
      (5) At the completion of the interview the student may pose any of the same questions to the teacher that were put to him or her.
   c. Each interview should be brief. About 5-10 minutes, unless there is a demand by everyone to continue.
   d. You may want to invite other members of the class to answer any of the questions the interviewee was asked.
   e. After some practice at public interviewing you may want the students to choose the topic they want to be interviewed about.
   f. Instead of conducting the interview, you may want to select a student to conduct the interview. It is important to debrief student on ground rules before allowing any interviewing.

4. Sample interview questions: Lower and Middle Elementary grades.

   a. Do you get an allowance? What kind? Do you work for it?*
   b. If you could be any age, what age would you like to be?*
   c. Will you be a cigarette smoker? Why?*
   d. What about the world around do you wonder about?
   e. Do you think people should be allowed to live anywhere they want to?
   f. What are your feelings about people of other races and cultures?
   g. Do you like living in the neighborhood you are presently living in? Why?
   h. Would you want to live in an area where the air was unclean? Why or why not?
   i. Do you like flowers and trees? Why?

   Examples for Upper Elementary - Junior High grades.

   a. What are your feelings about poverty?
   b. Do you feel comfortable about living in the city?
   c. What are the major problems facing young people today?

d. What is your opinion on public welfare?
e. Is there anything special about family meals at home?
f. How do you feel about man's exploitation of our valuable natural resources?
g. What are some of the reasons for environmental pollution in this country?

Examples for Senior High school.

a. Should your school provide classes dealing with population education?
b. What are your views about racism and sexism in your school? Home? Neighborhood?
c. Do you feel that large energy corporations should be allowed to strip mine for coal on Indian lands? Why? Why not?
d. Do you feel communities should have control of their tax monies which they contribute yearly to the state and federal governments?
e. How important is it to the survival of space ship earth and its passengers to maintain a clean environment?
f. Are there some adults outside of school whom you admire intensely? Why?
g. What are your feelings about a world with universial peace?
h. What has turned you off to school? Why?
i. What are some ways students can contribute to their own education?

5. Debriefing:

a. Discussion is very important. You can compare and contrast male and female responses.
b. Sharing out reasons for individual positions or values is a good way of developing good interpersonal relationships among group members.

6. References:

Simon, Sidney; Leland Howe, and Kirschenbaum. Values Clarification: A Handbook of Practical Strategies for Teachers and Students. New York: Hart Publishing Co., 1972.

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* The Recommended Procedure in 3b (1) and (4) and the Sample Interview Questions in 4a,b,c have been reprinted by permission of Hart Publishing Company, Inc., from its copyrighted volume VALUES CLARIFICATION: A Handbook of Practical Strategies for Teachers and Students by Sidney B. Simon, Leland W. Howe and Howard Kirschenbaum.

Upper Elementary
Junior High
High School

Glen Erickson

Baker's Dozen

1. Time Involved: 10-15 minutes

2. Materials Needed:

   a. pencil and paper

3. Recommended Procedures:

   a. Have each student list 13 electrical appliances they use at home (lights, TV, radio, etc.).

   b. After everyone has completed their list, have each student cross out 3 things he or she can do without.

   c. Next have the students check 3 things they feel they couldn't do without.

   d. Now, have each student circle the items which they obtained within the last 5 years (3 things which would not have been on their list 5 years ago).

   e. Allow the students to share their lists and reasons with the class (you can pick several students or just ask for volunteers).

4. Sample Valuing Questions:

   a. The class could list 13 records they own, identifying the 3 most important and the 3 least important records.

   b. The class could list 13 items they have purchased or been given (bicycle, watch, new clothes, book, etc.) identifying the 3 items they would be most willing to give up, and the 3 items they would least like to give up.

5. Debriefing:

   a. Identifying one's priorities is necessary when considering among various alternatives.

   b. Many electrical appliances are luxury items, which are seldom used, and are not very important to one's life style. Perhaps these items might not be purchased if a person thought about whether the item was very important, or just another thing to buy.

c. The U.S. has doubled its energy consumption in the last 20-25 years. With only 6% of the world's population, the U.S. consumes 37% of all the energy used in the world. A large portion of this increased energy consumption is due directly to the purchasing (it takes energy to produce an electrical appliance, as well as, energy to use it) and use of non-essential or luxury appliances.

d. Identifying those items obtained within the past 5 years indicates personal trends in purchasing and consuming behaviors.

e. Looking at the items crossed out as non-essential, the students can begin to think how easy it is to stop using those items once they have identified them.

6. Reference:

Simon, Sidney; Leland Howe and Howard Kirschenbaum.

Values Clarification: A Handbook of Practical Strategies for Teachers and Students. New York, Hart Publishing Co., 1972.

All Grade Levels

Glen Erickson

Twenty Questions

1. Time Involved: 15 minutes

2. Materials Needed:

   a. pencil and paper

   b. blackboard

3. Recommended Procedures.

   a. Ask the students to write on a piece of paper the number 1-20.

   b. Now have them list twenty things they enjoy doing.

   c. Have students evaluate their list according to the code explained in Debriefing.

4. Sample Valuing Questions:

   a. These can be "big" things in life, or "little" things.*

   b. The students might want to think in terms of the seasons of the year.*

5. Debriefing:

   a. Put the following code on the blackboard for the students to use in evaluating their 20 things.

      $ -- anything that costs over $20 to do
      S -- things you learned in school
      P -- things that pollute or degrade the environment
      N -- things you do in the natural environment
      A -- things you do alone
      Pa-- things you do or did with your parents
      5y-- things you didn't do five years ago
      R -- things that involve risk
      F -- things that you do with your friends

   b. Several code items may be used for each of the twenty things.

   c. The code provides a way to evaluate the types of things you like to do.

d. The code also gives you an idea of the trends you are following in doing enjoyable things.

e. It is a good idea to do this activity at different times in the year to show the students how they might have changed during the year.

f. Declaring the things you enjoy doing provides you with a way of identifying and clarifying what you enjoy.

6. References:

* Simon, Sidney; Leland Howe and Howard Kirschenbaum

Values Clarification: A Handbook of Practical Strategies for Teachers and Students. New York, Hart Publishing Co., 1972.

* Sample Valuing Questions a and b in #4 have been reprinted by permission of Hart Publishing Company, Inc., from its copyrighted volume VALUES CLARIFICATION: A Handbook of Practical Strategies for Teachers and Students by Sidney B. Simon, Leland W. Howe and Howard Kirschenbaum.

All Grade Levels

Talbert B. Spence

The Pie of Life

1. Time involved: 45 - 50 minutes

2. Materials needed:

   a. Blackboard or chart paper

   b. Worksheets (for Upper Elementary, Junior High, Senior High) with drawing of a large circle to be used in diagraming a "pie of life" (see example in 3g).

3. Recommended procedure:

   a. Explain to students that this activity is designed to have them investigate our individual lives - to see how we actually do spend our time, our money, etc.*

   b. Group class into teams of 4-5 students. Explain that these teams are for the purpose of having individual and group decisions on how our time, money, etc. can be used more efficiently.

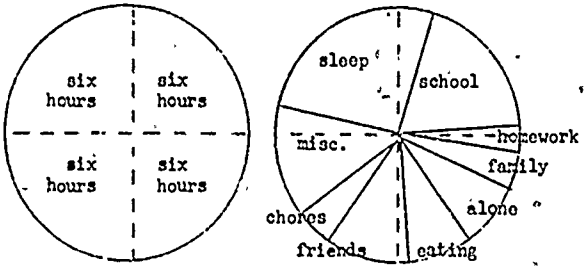
   c. Ground rules: Teacher draws on blackboard/chartpaper or on worksheets a large circle and says, "This circle represents a part of your life".* Explain that the group will be doing several such pies of life.

   d. Have students divide their circles into four quarters using dotted lines. Note: For lower elementary and middle elementary this portion of the activity should be done by the teacher at the blackboard.

   e. Explain that each slice represents six hours. Discuss with groups that they are now going to try to estimate how many hours or parts of an hour are spent on the following:

      (1). On sleep?*
      (2). On school?*
      (3). On eating?
      (4). With friends, socializing, playing sports, etc.?*
      (5). Alone, playing, reading, etc.?*
      (6). On homework?*
      (7). Etc. (Any others you can think of)?

f. Have students divide up the time spent in their individual pies of life. Explain that their allotted times will differ from one another. Have them draw slices in their pies to represent proportionately the part of the day they spend on each category. An example might be:



g. After students have completed individual pies (about 10-15 minutes) have the group work toward a group pie of life with the same categories. Have students take about 10 minutes to do this and then have groups share out their results to the rest of the teams.

h. Discuss the importance of using time wisely and efficiently. Emphasize that a large majority of our time spent in a 24 hour period is wasted time; most by sleeping (a reasonable amount is needed) and by doing nothing.

i. Have students develop a list of ways to use their time, money, etc. more wisely and efficiently.

j. Examples of other categories that could be used in the Pie of Life strategy:

(1). How does society spend its money?

(2). How much time is spent on cleaning up the environment?

(3). How much money is spent on cleaning up the environment?

(4). How much time is spent by people destroying the environment?

(5). How much time is given to students to plan and make decisions?

(6). How do urban children spend their time daily?

4. Debriefing:

   a. It is important that students start to evaluate how their time and money are spent by them and by others. Also to think about and develop ways of better utilization of their time and money, etc.

   b. Might be a way to discuss alternative life styles, also a way to clarify individual and societal values on time and money.

   c. For lower and middle elementary levels, this strategy could be a way of strengthening knowledge and skills of telling time and understanding what it is all about.

5. References:

   a. Simon, Sidney: Leland House and Howard Kirschenbaum. Values Clarification: A Handbook of Practical Strategies for Teachers and Students. New York: Hart Publishing Co., 1972.

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* Procedure in 3a,c and e have been reprinted by permission of Hart Publishing Company, Inc., from its copyrighted volume VALUES CLARIFICATION: A Handbook of Practical Strategies for Teachers and Students by Sidney B. Simon, Leland W. Howe and Howard Kirschenbaum.

Agree-Disagree-Undecided

1. Time involved: one class period, 40 - 50 minutes.

2. Materials needed:

   a. ditto
   b. blackboard

3. Recommended procedures:

   a. Prepare a ditto with the following suggested statements dealing with population. Put half the statements on each half of the ditto and cut out each "card" with 1 statement on each.

      1) Population education concepts should be integrated into all the grades and most of the courses taught in primary and secondary school.

      2) Human population increases throughout the world are serious. Even with a rate of four births for every two deaths, science and technology cannot provide means for survival (without limiting population growth).

      3) Overpopulation is the basic cause of the environmental crisis.

      4) America's population poses a greater threat to the world ecosystem than India's.

      5) Generally, families should be limited by law to no more than three children.

      6) People should be allowed to have as many children as they want without being told in any way by the government how many they should have.

      7) The government should provide tax and welfare benefits and penalties that would discourage childbearing rather than encourage it, as present systems tend to do.

      8) Due to the controversy connected with "sex" education, it would be self-defeating to link population education with sex education.

   b. Divide the class into groups of 3, 4 or 5 and give each group a set of statement cards.

   c. Have each group decide, as a group, whether their group agrees, disagrees or is undecided for each statement.

d. Have each group sort their cards into stacks for agreeing, disagreeing, or being undecided.

e. After each group has decided on all the statements, tabulate on the board the number of groups agreeing, disagreeing, or being undecided on each statement. Allow about 20 minutes.

f. Discussion of the reasons for different groups' positions can then take place.

4. Sample value questions:

a. Statements concerning a particular issue like housing, pollution coats, or environmental responsibility or ethic.

b. Any statements concerning a particular lessor activity the class is doing.

5. Debriefing:

a. This activity is good to introduce a specific unit, as in the case, population. It helps the class become more sensitive to the unit before doing any encounter or activity.

b. Group decision-making is different from individual decision-making, because a consensus must be reached in a group, with people compromising their positions. All the group members benefit by listening to other member's feelings, and attitudes, which helps the indivudual re-evaluate his or her own position.

Upper Elementary
Junior High
Senior High

Talbert B. Spence

Ways to Live

1. Time involved: 2 sessions of 45 minutes each

2. Materials needed:

   a. Blackboard or worksheets

   b. Chart paper and markers

   c. Pencils

3. Recommended procedure:

   a. Explain to students that this activity will deal with the formulation of their own philosophy of life by responding to a variety of ways to live.

   b. Generate a list of 10 - 13 different life style by asking students to describe a kind of life style they now live, have read about, heard about, seen, or possibly dreamed about. Be sure extreme views are represented.

   c. Expand this list of life styles into philosophy statements by asking questions such as the following:

      (1). In this life style, does the individual person have a say in how his town is run?

      (2). Is money important in this life style? How important?

      (3). Is education important?

      (4). Do people care about other people?

   d. List these life style description statements on the blackboard, on chart paper (or on a ditto for a second session). A sample statement might be (complexity depends on the age group):

      Way 1: The individual actively participates in the political and social life of the community, to be a primary change agent in altering the present political system of his country. In this life, excessive monetary desires are avoided and moderation or a natural living is sought. Life is marked by physical and mental discipline, love, and friendship. Life is to have clarity, balance, intelligibility and respect for cultural differences.*

e. Have students respond to the 10 - 13 Ways to Live statements by ranking each statement from first desire to least desire using the following key:

7 - I like it very much.
6 - I like it quite a lot.
5 - I like it slightly.
4 - I am indifferent to it.
3 - I dislike it slightly.
2 - I dislike it quite a lot.
1 - I dislike it very much.*

Be sure students understand that their ranking does not depend on what kind of life they lead now, or the kind of life they think is unnatural to live in our society, but simply the kind of life that they personally would like to live.

f. After students have completed their ranking, about 10-15 minutes, have students team up with another student and discuss their individual rankings. Allow about 5 minutes for this discussion.

g. Ask volunteers to give their individual rankings and record their responses on the chart paper.

h. Group students into teams of 5-6 individuals. Instruct them that within a 15 minute period they must come up with a group decision onthe ranking of the 10 - 13 ways to live. Have each group record their rankings on chart paper.

i. Have students write out their own way of life statement. This should reflect their philosophy of life at this point in their lives.

j. Finally, have students think and list ten things they have done in the last week that that are consistent with their philosophy of life (e) or the way they live described in (i).*

5. Debriefing:

a. Do you think there is any one life style that is right for all people?

b. Are you satisfied with your life style?

c. Did the group find it difficult or easy to agree on ranking?

d. Did the group decide your way? or did you give in to the group?

e. What did you learn about yourself?

f. Add any other observations or questions about the dynamics going on during the group decision-making session.

g. Discussion on alternative life styles is important because the student is exposed to other cultural and noncultural ways of living.

6. References:

a. Simon, Sidney; Leland Howe and Howard Kirschenbaum. Values Clarification: A Handbook of Pratical Strategies for Teachers and Students. New York: Hart Publishing Co., 1972.

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* The Recommended Procedures 4d (a condensation of Way 1), e and j have been reprinted by permission of Hart Publishing Company, Inc., from its copyrighted volume VALUES CLARIFICATION: A Handbook of Practical Strategies for Teachers and Students by Sidney B. Simon, Leland W. Howe and Howard Kirschenbaum.

Upper Elementary
(Transportation)

Oak Park Schools

Role Playing

1. Time Involved: One class period

2. Materials Needed: Pencil and Paper

3. Recommended Procedure:

   a. Present the following situation to the class: A major corporation in conjunction with the state government is planning to construct a mono-rail system. The mono-rail will start in a rural area, pass through several suburbs and end in the center of a large city. It is expected that many people who now drive into the city to work will take the mono-rail instead. A number of residential areas in the suburbs and the city will be eliminated due to the mono-rail construction.

   b. Put the following questions on the board: What would you do if;

      (1). You met the State Governor at a party?
      (2). You drove into the city to work everyday?
      (3). Your home would be destroyed during the construction?
      (4). You were the owner of a parking lot in the city?
      (5). You were in charge of an Air Pollution Control office?

   c. Have each child in the class select one role and give an answer in writing or orally to the class or have two children select a pair of roles and role-play in front of the class.

4. Debriefing:

   a. Do any of the roles conflict? If so, why?

   b. Which role will lose the most from the mono-rail? Which will gain the most?

   c. How did you feel in the role you played?

   d. Did you have choices in your role? Did you consider what would happen as a result of those choices?

   e. Did you try to convince anyone else that your way was the right way? Were you successful? Did someone else change your mind?

Section IV

Upper Elementary Environmental Encounters

SECTION IV

Environmental Encounters

This section contains a series of sample school-community environmental problem solving activities (Environmental Encounters). In these environmental encounters students (with guidance from the teachers) actively become involved in exploring and critically evaluating their environment and existing environmental problems. The students may then begin to develop alternatives and plans of action for solving environmental problems. As students become actively involved in environmental problem solving they gain the opportunity to acquire both knowledge and skills necessary to deal with current and future environmental problems.

Included are sample environmental encounters relating to all grade levels and disciplines starting with early elementary encounters, which concentrate mainly on developing a basic awareness and appreciation for the environment, and ending with senior high encounters, in which students may actually become involved in the political process in trying to implement the designed plans of environmental action.

You may find it helpful to adapt some of the sample encounters for use in your particular classes. However, you will probably find that the "best" environmental encounters are ones jointly developed with your students around their environmental interest and concerns.

Environmental encounters are included for each of the five grade levels. Within each level there are sample encounters for the following topics:

1. Ecology and Pesticides
2. Water Quality
3. Air Pollution

4. Recreation

5. Policy and Planning (soils, land use, planning, and environmental law)

6. School Site Development

7. Transportation

The encounters represent a wide diversity, so that some are applicable to inner city, and some to suburban and rural situations.

Upper Elementary
Air Pollution

Irene Muirhead

INVESTIGATION OF THE ENFORCEMENT OF THE TOWNSHIP ORDINANCE ON OPEN BURNING

BEHAVIORAL OBJECTIVES:

At the completion of a successful encounter, the student should be able to.

1. State the contents of the open burning ordinance for the local township.
2. Identify who is responsible for enforcing this ordinance.
3. Identify authority to be consulted if local ordinance is not enforced by local official.
4. Deseribe (number) instances in the community where the ordinance is violated.
5. Describe in writing a plan for informing the public of the ordinance.
6. Develop a plan for reducing open burning in the community.

ACTIVITIES:

1. A visit by someone representing the local fire department. Ask him: What types of burning are restricted? Back yard barrels? leaves? trash piles? barbeque grills? grass, etc.? Why is this law necessary? Are there other reasons why this law should be necessary? What should be done if you know an offender? What happens to someone if they violate this ordinance? Has this been proven effective?
2. Whose job is it to enforce this ordinance locally and county wide? Is it strictly or liberally enforced?
3. Using information gotten from the fire official's presentation, make a general survey of the neighborhood. Record different types of abuse you see within one week in and around the community.
4. Evaluate the survey in class discussion. How many kinds of offenses were observed? Which was the most common? From your observation, do you think the public is aware of the open burning ordinance? If not what do you suggest? Could your local paper be of service? Can you suggest another really effective way to inform the public?

5. Write (as individuals or as a class) to the editor of the local newspaper expressing your survey findings and concerns about the communities awareness of the open burning ordinance.

6. Summarize in writing just how effective the ordinance is. Is it working as it should be? If you are dissatisfied what can you do? What would you suggest to make the ordinance more effective?

7. Develop a plan as a class to reduce the open burning in your community.

8. Carry out the plan.

Upper Elementary
Air Pollution

Wilma Forry

INVESTIGATING THE AUTOMOBILE AND ITS EFFECT ON THE AIR WE BREATHE

BEHAVIORAL OBJECTIVES:

At the completion of a successful encounter, the student should be able to:

1. Identify in writing the (number) main components of clean air.
2. Describe in writing the respiratory tract which is affected by the quality of air which a person breathes.
3. List in writing (number) health problems which medical research as linked to automobile exhaust emissions.
4. Identify in writing (number) automobile exhaust emissions that are harmful to our health.
5. Name in writing (number) automobile exhaust emissions you feel are most harmful and describe the affect of each on human health.
6. Identify in writing (number) ways the federal government has attempted to control air pollution caused by automobiles.
7. Identify in writing (number) ways our state government has attempted to control air pollution caused by automobiles.
8. Describe in writing (number) improvements the automobile industry has made that were not required by law.
9. List in writing (number) ways the public might influence automobile manufacturers to do more towards pollution control.
10. Develop a plan of action to reduce the amount of air pollution caused by automobiles.

ACTIVITIES:

1. Research information to make a circle graph showing what makes up the clean air of the atmosphere before man adds pollutants.
   a. What gas takes up the greatest percentage of space?
   b. How much oxygen is there?
   c. What are the trace gases?
   d. What are other substances?
   e. How wide is the band around the earth that holds these gases?
   f. Can any of these gases go beyond this into space?

2. Use a chart of the human respiratory system to start discussion on this topic.

   a. What is the path of air after it enters the nose?
   b. How does oxygen get into the blood?
   c. How much air is taken into the lungs?
   d. How much surface is covered by all the branches of the lungs?

3. Invite a guest speaker from the county health department.

   a. What are some harmful exhaust pollutants from automobiles that affect human health?
   b. What are these harmful effects?
   c. Which do you feel are the most harmful?

4. Interview a resource person from the automobile industry.

   a. What federal regulations must the automobile industry follow in controlling automobile pollution?
   b. What are the state regulations for controlling automobile pollution?
   c. What improvements beyond these has the industry made?
   d. What are some possible future plans for improvement?
   e. What possibility would there be in using the gas-turbine engine? Are there other alternative types of engines?
   f. What would that cost the industry and what would it cost the public to switch from the present type of engine?

5. Make a fact sheet of important information gathered.

   a. How are automobile exhaust emissions harmful to people?
   b. What evidence is there that people have been harmed?
   c. What are the laws controlling this kind of air pollution?
   d. Has the automobile industry done all it can?
   e. What can the citizen do about this air pollution problem?

6. Make a plan for reducing the pollution from automobiles.

   a. How could you inform people about the problem?
   b. What can the citizen do about laws?
   c. What can the citizen do about purchasing automobiles?
   d. What can he do about the operation of his present auto?
   e. Are there other individual citizen actions possible?

7. Incorporate this information from #6 into a plan which can be used to inform others and themselves about what can be done to reduce harmful auto emissions.

Upper Elementary
Ecology and Pesticides

W. Forry

INVESTIGATING PESTICIDE LEVEL IN THE FISH OF A SUBURBAN POND

BEHAVIORAL OBJECTIVES:

At the completion of a successful encounter, the student should be able to:

1. Describe in writing the definition of a pesticide.
2. Trace pesticide from source of application through a food chain.
3. Describe in writing the level and kinds of pesticides found in the fish life of a pond.
4. List in writing (number) ways in which pesticides get into the pond.
5. List (number) disadvantages to the residents around the pond of a pond contaminated with pesticides.
6. Describe in writing a plan for informing the residents of the level of pesticide contamination, sources of contamination and adverse effects of contamination on residents.
7. Describe in writing the major steps of a plan for eliminating one of the sources of pesticide contamination.

ACTIVITIES:

1. Seek information from reliable sources on pesticides.
   a. What is a pesticide?
   b. What are insecticides, herbicides, and fungicides?
   c. What pesticides are long lived and pass from one link of the food chain to another?
   d. What pesticides are available to replace these long lived pesticides?
   e. How does the use of the long lived pesticides affect man?
2. Study the Pond Food Chains. Draw and illustrate on paper two food chains--one including only pond life and the other including man.
3. Determine the amount and types of pesticides found in the fish of the pond by sending a sample specimen to an appropriate laboratory such as that of the Bureau of Commercial Fisheries.
   a. Does the test show any presence of the long lived pesticides such as DDT or dieldrin?
   b. How much of this long lived pesticide can an animal have before it is harmful to their reproduction capacities or before it is unsafe to use this animal as human food?
   c. What would traces of pesticides in the fish indicate about the pond?
   d. How does the presence of pesticides in the fish limit the use of the pond?

3. (continued)
   e. Does presence of pesticides in the fish mean anything to residents who want to enjoy fishing in the pond?
   f. How does the fisherman who fishes just for sport feel?
   g. How does the fisherman who fishes for food feel?
   h. Where did the fish obtain this pesticide?

4. Take a field trip to the pond and the area that drains into the pond with the Soil Scientist from the Soil Conservation Service.

   a. Where does the water come from that drains into the ponds?
   b. Is there any evidence of pesticides getting into these sources?
   c. Where do the residents around the pond apply pesticides on their property?
   d. Have any pesticides been applied directly to the pond?

5. From the data gathered thus far make a .act sheet describing:

   a. Location, age, size and name of pond.
   b. Kind and level of pesticide contamination.
   c. Sources of pesticide contamination.
   d. Adverse effects upon residents.

   Distribute this fact sheet to residents around the pond, township officials and other interested persons.

6. Make a plan for eliminating one source of pesticide pollution in this pond.

   a. Would such organizations as "Home Owners' Associations", or the local "Lake Association" be concerned with these problems?
   b. Would home owners around the pond change the type of pesticides they use if they realized the ones they used were polluting their pond?
   c. How would you find out what pesticides are being used by home owners around the pond?
   d. If home owners are concerned about their pond, which source of pollution should they pursue first?

Upper Elementary
Ecology and Pesticides

Irene Muirhead

INVESTIGATION OF THE "EDGE EFFECT" WHERE GRASSLAND AND BRUSHLAND JOIN

BEHAVIORAL OBJECTIVES:

At the completion of a successful encounter, the student should be able to:

1. State (number) physical characteristics of the grassland.
2. Describe (number) types of plants you would find living in the grassland ecosystem.
3. Identify in writing (number) animals that would be found in a grassland ecosystem.
4. State (number) physical characteristics of the brushland.
5. Describe (number) types of plants inhabiting the brushland ecosystem.
6. Identify in writing (number) types of animal life found in the brushland.
7. Explain in writing an "edge effect."
8. Illustrate the physical components of an edge where grassland and brushland join.
9. Identify (number) types of living things he would find in this edge.
10. State what he feels are the benefits of the existence of an edge effect in terms of types and numbers of living things.
11. Plan an edge within this community.

ACTIVITIES:

A field trip to a grassland and brushland area. (If not possible, view a film study of these two areas.)

1. Grassland field study: Carry out a site inventory of the physical features of the grassland. What is its life form? Is it all grasslike? Is the ground flat or rolling countryside? Is it moist or very dry? Does the soil seem to be rich deep soil or is it hard with a thin layer of top soil? Is the sunlight intense? Does it seem windy here? Do you think it is sometimes? Why or why not? Are there hot summers here? Long, cold winters? Do you think blizzards occur here? (relate all ecological aspects which are further possible at the site.)

2. Predict what kinds of living things would be found in this ecosystem.

   a. Would there be moisture-loving plants? Plants with broad thin leaves? What kind of root systems do most of the plants have? Do they grow close under the surface of the ground or deep in the soil? Do you think all plants would live for only one year?

   b. Would there be tree climbing mammals or tree nesting birds? Why or why not? What kinds of mobility might you see in the animals inhabiting this area? Jumping animals? Running animals? Why? Do you think you would see animals adapted for digging? Why? Do any of these animals hibernate? Where would a good place be? Can they do this here? How?

   c. Would you see birds with webbed feet? Why or why not? Would the birds tend to be seed eating? How do you explain your answers? How about the coloration of birds and animals of this area? Do you think brightly colored birds or tan colored birds would live in this area? Explain why? Are any of these birds migratory birds? If they don't migrate how and where do they spend their winter?

3. Research Activity: Can be done in groups or individual activity but information should all be brought together for total summary of inhabitants of grassland ecosystem.) List specific plants, animals and birds you would expect to find, according to the previous inventory, in the grassland community.

4. Make a bulletin board showing all 3 aspects the plant life, animals and birds life that you found inhabited the grassland.

5. Brushland field study:

   Conduct a similar inventory of plant life, animal life and bird life for the brushland area.

6. Make adjoining bulletin board (or long mural if bulletin board is not available) depicting brushland ecosystem.

7. Knowing what a grassland consists of and what a brushland consists of, do you think there are any inhabitants which you listed that enjoy both ecosystems? What are they? (Remember their food needs, nesting needs, reproducting habits and physical characteristics.) Where would these animals be most content? Where might you find an area that has some features from both the grassland and brushland areas? Make (individuals) an illustration of an area including as many characteristics from both ecosystems as you possibly can. (This new ecosystem made up of features both the grassland and the brushland ecosystem is called an edge or ecotone.)

8. Make a list of all the wildlife you might find inhabiting the edge between a grassland and brushland.

9. Now a group can add this illustration to join the grassland and brushland areas on the class mural.

10. Discuss the importance of the edge. We have learned that some birds and animals require both brushland and grassland in approximately equal amounts. What would some animals do without an area such as this? Would they move? Where would they go? Which area would you find more animals? Does the edge effect have more or fewer living things than the grassland or woodland? Are there more or fewer types of living things in the edge?

11. Explain in writing what you think the function of an edge is in terms of creating living conditions, providing food, making nesting possible, providing protection and insuring reproduction for certain animal and bird species.

12. Does man ever create an edge effect? How would you do this? Could this be a project to help certain types of animal life? How would you go about it?

(At the edge of a grassland and brushland an ecotone could be created by planting shrubs and other wildlife brushes as a class project.)

Dorothy Cox

OPERATING MINIBIKES IN THE COMMUNITY

BEHAVIORAL OBJECTIVES:

At the completion of a successful encounter, the student should be able to:

1. Describe in writing (number) problems minibike operation creates in the community.
2. List in writing existing regulations for minibike operation at school and in the community.
3. Draw an accurate map of streets in your immediate area showing location of fields, woods, and school.
4. Identify power structure (school officials, governmental policy makers, governmental committees) of his community who influence and make policy on minibike rules and regulations.
5. Describe in writing alternate solutions for safe, legal minibike operation.

ACTIVITIES:

1. Visit home of nearby minibike owner for observation of:
   a. What is size of minibike? In relation to rider? In relation to size of ordinary vehicular traffic?
   b. What is speed and maneuverability of a minibike?
   c. Note noise level of bike when starting and in operation.
2. Tour nearby streets from _____ to _____ to include woods trails and note following:
   a. What is surface of roads? Is this a hazard to minibike rider?
   b. Is there a visual problem at crossroads? What effect would an unseen car have? What effect on unseen child walking or riding a bike? Would sound level of minibike allow rider to hear either one?
   c. What is effect of bike trails in woods? Note hard pack trails. What animals do you see? What birds do you see or hear? Do you think noise and trails effect them in any way?

3. Draw a map of area locating fields and woods.

4. Survey residents of area obtaining their opinions on:

   a. Any objection to minibikes?
   b. Where do they think owners could or should ride?
   c. What hazards do they see for rider? for the community?

5. Seek information by visit (either at school by officer, or by class at police department) from police on rules and regulations regarding minibikes:

   a. What does ordinance say?
   b. Are regulations enforced? What are penalties?
   c. Are there any existing or proposed areas for riding?

6. Interview school principal to determine school policy on minibike riders. If principal does not determine policy, who does?

7. Visit township offices to interview personnel to determine:

   a. Who makes rules for minibikes?
   b. Is there an area available for minibike riding?
   c. Is there an area proposed?

8. What can the class do to help solve problem?

   a. What are possible alternate solutions?
   b. Who can be contacted to facilitate solutions?

9. Develop a plan from chosen alternatives and carry it out.

Emily Klopfenstein

PLANNING A BEAUTIFICATION PROJECT FOR A SHOPPING CENTER

BEHAVIORAL OBJECTIVES:

At the completion of a successful encounter, the student should be able to:

1. List (number) ecological and aesthetic concerns relating to the present plan of a particular shopping center.
2. List (number) improvements which could occur to minimize the issues listed in behavioral objective number one.
3. Describe the ecological reasoning for each of these improvements.
4. Build a model of the shopping center with movable parts in order to show its present status and its status with improvements.
5. Demonstrate the best possible arrangement in terms of ecology and aesthetics.
6. Plan a presentation of the ideas concerning the shopping center with an explanation of the model to the shopping center managers and various city officials.

ACTIVITIES:

1. Take a field trip to the site. Use a camera so slides can be taken in case it is necessary to refer to them later. Are there any plantings? Do the signs blend in with the environment? Is there any area for relaxation? Does the area provide for the separation of people and cars. Have litter baskets been provided for waste disposal? Does the water stand in the parking lot or is there good drainage? Is there good access to the highway? Is there access for mass transit?
2. Suggest ways to beautify the site. What plantings could be brought in? Could they be planted directly in the ground or would they need a planter? Design an attractive sign for the store front. Could a courtyard area with benches be designed? Where could walkways from the parking rows be placed? Where could litter baskets be placed? Observe the parking lot after a rain? Does the water run off toward a drain? Where are the main roads? Is there at least one wide entrance and exit at each. Where could bus stations be placed?

3. What are the benefits of plantings? Why is a sign that blends in with the environment more aesthetically pleasing? Why would it be beneficial to provide some recreation? What safety and aesthetic benefit is there in separating people and cars? Why are litter baskets needed? What are the hazards and inconveniences of a parking lot with poor drainage? Why should access be convenient? Would a mass transit station encourage more people to come by bus?

4. Using cardboard make a model of the building and existing areas. Small boxes could serve as benches and planters. Minature bushes and flowers could be bought at a dime store. Allow the improvements to be movable so they can be changed around in order to get the feeling of design and different points of view.

5. Try different locations for the beautification features of the improvements. Mark drain areas and road and mass transit access. Rearrange the model until the arrangement corrects the faults using the space efficiently.

6. Secure a location for display of the model in the school. Go to the office of the shopping center with the list of problems and improvements and explain how the model was built. Ask permission to display the model to the public.

INVESTIGATING THE LEGAL CATCH LIMIT ON FISH

BEHAVIORAL OBJECTIVES:

At the completion of a successful encounter, the student should be able to:

1. List (number) reasons in writing why he feels there is a legal catch limit on game fish.
2. Identify in writing the number of years there has been a legal catch limit.
3. Identify in writing the governmental agency which enforces this law.
4. Describe in writing the penalty for breaking this law.
5. Name in writing your local law enforcement officer and where you can contact him.
6. List (number) reasons you feel this law is necessary.
7. Write (number) steps to a plan to: a) support this law if you agree with it; or b) change this law to what you believe it should be.

ACTIVITIES:

1. Have the class participate in a fishing experience.
   a. How many fish are we allowed to catch?
   b. Is the number different for children than for adults?
   c. Why is there a limit to the number of fish we can take?
   d. Is there a shortage of fish in this lake?
   e. Does it have anything to do with sharing?
   f. What is meant by good sportsmanship and does it apply here?
2. Invite the local Conservation Officer as a resource person.
   a. What are the reasons for fish catch limits?
   b. When did this become a law?
   c. Are the reasons for the law the same today as they were then?
   d. What governmental agency is responsible for enforcing this law?
   e. What is the penalty for breaking this law?
   f. How do you feel about this penalty?
   g. Who enforces this law in our area and where can he be contacted?

3. Make a plan to support or change the legal fish catch law.

   a. If you agree with this law and support it:

      1. Should you obey it?
      2. Can you remind law breakers of the law and why it is to their benefit to obey it?
      3. Can you report law breakers who do not listen to reason?

   b. If you would like to see a change in the law:

      1. What should be changed and why?
      2. What is the governmental process for a change to occur?
      3. What is the first step towards this change?
      4. What can you do to start this change?

Upper Elementary
Recreation

Raye Klopfenstein

A SURVEY OF POSSIBLE RECREATIONAL USES OF A GRAVEL PIT AREA

BEHAVIORAL OBJECTIVES:

At the completion of a successful encounter, each student should be able to:

1. List (number) natural resources of the area.
2. List (number) possible recreational uses of the area.
3. List (number) ecologic or economic results of each of these uses listed in objective #2.
4. State the most urgent community recreational need.
5. State one recreational use of the area for each of the following age groups: children, teenagers, young adults, middle-age persons, retirees.
6. Describe what the owner of the potential site would want in exchange for use of the property (if any).
7. Describe the development and maintenance costs of each of the uses listed in objective #2.
8. Describe (number) sources of economic and political aid in initiating recreational use of the area.
9. Plan a presentation of facts and plans for use of the area.
10. Carry out plan.

ACTIVITIES: A visit to the gravel pit site.

1. Visit the site of the gravel pit. Is there water in the pit? What is the source of the water in the area? How pure is the water? What is the average depth of water? What organisms live in the water? Are any ecological problems in evidence? What plant and animal life live around the pond? What is the soil type? Is the area flat or hilly? Is access good? Is there an area suitable for parking?
2. Consider the recreational uses which various age groups would like to make of the area. Students interview parents, relatives, or friends. Do older, middle-aged, and young people all want the same recreational use? Could the site provide multiple uses for different age groups? What would each group prefer? Does it fit into the natural features present?
3. Consult a member of the local planning commission as to community recreation needs. What types of recreation are now available? Are the facilities adequate for the present population? For future growth? What type of recreation is most needed by the community? What types are completely lacking?

4. Consult a member of the local planning commission as to community recreational use. Will he sell or lease the land outright? If so at what price? Does it matter to him what the site would be used for?

5. Each student makes a scale drawing or model of the potential site showing various plans for recreational use. Why does each student think his plan is good?

6. Compare the models to what is known about the resources of the proposed site. What effects would each of the ideas proposed in models have on the ecology of the site and the surrounding area? What would be the effects on the economy of the community?

7. Have a man from the maintenance department of a local park unit visit the class. As he views the model plans of the area, what maintenance problems would he foresee? Which recreational use would be most practical from a maintenance standpoint? What would be the approximate initial development costs of each of the possible recreational use plans?

8. Consult a local or state recreational administrator about finances. What government agencies or private groups might give financial aid for purchase or development? What can be done to bring the area to recreational use? How does one get the proper publicity?

9. Plan a strategy to present the students' findings and plans for recreational use of the site. What persons could put the plans into action? What persons are also trying to influence use of the site? Can other groups or individuals be teamed with to help provide the desired recreational uses?

10. Carry out the plan. How do you think this can be done to gain the most support and cooperation to insure the success of your plan?

Upper Elementary
Recreation

Wilma Forry

INVESTIGATING DEVELOPMENT OF NEW RECREATIONAL AREAS IN OUR NEIGHBORHOOD

BEHAVIORAL OBJECTIVES

At the completion of a successful encounter, the student should be able to:

1. Label in writing on a large scale map of the neighborhood each of the (number) recreational areas.
2. Classify each recreational area based upon the type of recreation it provides.
3. Label in writing on the same large scale map of the neighborhood, each undeveloped parcel of land.
4. Identify and record, in order of preference, (number) types of recreation wanted by people of the neighborhood.
5. List (number) types of recreation most preferred on the survey which would be possible on some of the undeveloped parcels of land in the neighborhood.
6. Describe in writing the local recreation plan.
7. Identify (number) problems of the local recreation plan.
8. Identify who pays for recreation in the neighborhood.
9. Identify who is responsible for implementing the recreational plan.
10. Describe in writing (number) township ordinances concerning recreational areas.
11. Describe in writing a recreation plan for developing one of the undeveloped openland parcels of land and present it to the proper authorities.

ACTIVITIES:

1. Survey the neighborhood to locate the recreational areas and record their locations on the neighborhood map.
2. Visit each recreational area and prepare a written description of each.
   a. Is this a publicly or privately owned?
   b. How much acreage is there?
   c. Are activities directed or not-directed?
   d. What ages can participate or use the area?
   e. Is there a cost to use the area?
   f. What kinds of recreation are there?

3. Label in writing, on the same large scale map, each undeveloped parcel of land.

4. Survey by questionnaire and record in order of preference, ten types of recreation wanted by people of the neighborhood.
   a. What types of question will you ask?
   b. Which is the most common type of recreation desired?
   c. Do the present parks provide this recreation?
   d. Are there enough parks?
   e. Could a new park provide more of the desired recreation?

5. List three types of recreation that are both preferred by citizens and also possible to develop on the present undeveloped land.
   a. What does the survey reveal about citizen wants?
   b. What were suggested land uses as revealed in the encounter "Investigating Land Use in the Neighborhood"?
   c. Are there any ordinances that apply to land development for recreational purposes?
   d. Who would you ask about these ordinances?

6. Invite representatives from the county and township planning commissions to speak to the class on the topic of recreation.
   a. What is the plan for the township and the county?
   b. What is the projected need for recreation in this area?
   c. Are the plans for recreational areas adequate to meet those needs?
   d. If some types of recreational area are lacking, what are they?
   e. How are recreational areas purchased and who pays for them?
   f. Who pays for the operation of the areas?
   g. What are the ordinances dealing with recreation?

7. Make a recreational plan for one of the undeveloped parcels of land in your neighborhood.
   a. What kind of recreational area does the neighborhood need?
   b. Which of the undeveloped areas is available and would fit this need?
   c. What would the area and its development cost?
   d. Who would pay for this?
   e. Who has to approve of the plan?

8. Present the plan to the appropriate persons or agencies.

Upper Elementary
School Site

Irene Muirhead

INVESTIGATING A MISMANGED AREA ON AN EXISTING SCHOOL SITE

BEHAVIORAL OBJECTIVES:

At the completion of a successful encounter, the student should be able to:

1. Describe in writing the history of the use of the school site area.
2. Describe in writing (number) of the natural features that should be considered in determining the particular use of the area.
3. Identify (number) of the problems that exist because of the present use plan.
4. Identify the individuals or groups of individuals that have the authority to determine the use of the area.
5. List (number) criteria that should be accounted for in determining a particular use of the area.
6. Write out a plan for the use of the area showing how it improves upon the existing use.
7. Describe in writing the major actions needed in order to have the desired area use plan adopted.

ACTIVITIES:

A walk in and around the area on the school site that is in question.

1. Carry out a site inventory of characteristics of the land. Is there water present? Does it appear frequently? Is the land on a slope or level? What kind of soil is there? What is its present use? Does the area appear to have been used for another purpose at some other time? How long has it been used for the present purpose? One group could research this question. Sources of information:

   a. Interview a teacher working in the building the longest.
   b. Interview older students who attended the school in the past.
   c. Interview a community resource person knowledgeable in this field.

   The group then reports back to the class on the collected data.

2. List the problems existing because of the present use of this area:

   a. Compatibility of use to natural characteristics.
   b. Compatibility of use to location of area (noise factor, traffic etc.).
   c. Cause for danger or accidents.
   d. Effect on surrounding activities now taking place.

3. Enumerate any present features you would not want to be destroyed.

4. Interview teachers and students throughout the building to obtain their attitudes about this area and its present use. Areas to investigate:

   a. Major concerns or complaints of present use.
   b. Suggestion of an alternate use for the area.

   Compile a list of these suggestions in order of degree of concern.

5. Obtain information regarding who has the authority to approve a new plan of use for the area.

   a. Meet with the principal to discuss the possibility of your class making a plan they think more beneficial than the present plan.
   b. Meet with other interested parties and record reason for their interest.

6. Based on collected information and suggestions, natural features, and the needs of the concerned persons, determine desired alternative uses for the area.

7. Design a plan including these alternative land uses. (This could be done by dividing into groups, each working on a particular plan of use.) Select a design the class feels is most satisfactory in fulfilling the needs and desires of the majority of the concerned people, taking into consideration the compatibility of use to the natural characteristics of the area.

8. List reasons for deciding on the design you did and give rational behind your reasons.

9. Choose an alternative plan and support with reasons why it could be used.

10. Present the design and plan to principal. This could be done through Student Council representation or as a group representing not just your class but with support of any other interested persons as well.

11. Decide how the class can be most effectively involved in the carrying out of the plan.

12. Carry out the plan of action.

Upper Elementary
School Site

Wilma Forry

INVESTIGATING THE TRAFFIC PATTERNS OF THE SCHOOL PARKING LOT

BEHAVIORAL OBJECTIVES:

At the completion of a successful encounter, the student should be able to:

1. List (number) types of pedestrian traffic occurring in the parking lot.
2. List (number) types of vehicular traffic occurring in the parking lot.
3. Make a diagram of the parking lot and show the present pedestrian and vehicular traffic patterns.
4. Describe in writing (number) conflicts between pedestrian and vehicular traffic patterns.
5. Identify what he believes is the best reason why conflicts should be reduced or eliminated.
6. Describe in writing a plan for eliminating or reducing the conflicts in the parking lot.
7. List (number) major steps of implementing your plan to 'Improve the Traffic Flow in the School Parking Lot".

ACTIVITIES:

1. Initiate a class discussion about the traffic in the school parking lot.
   a. What kinds of traffic are there in the parking lot?
   b. Who are some of the pedestrians who have to walk there?
   c. Who are some of the drivers of vehicles that drive there?
   d. Have there ever been any accidents or near accidents in the parking lot?
   e. Do people and vehicles ever get in each others way?
   f. Do you think anything could be done to improve the traffic patterns?
2. Visit the parking lot to make a drawing of the lot and its traffic patterns.
   a. Where do the people walk when leaving their cars?
   b. Where do children walk when leaving the buses?
   c. Do children walking from home have to cross any part of the parking lot?
   d. Where do the buses drive?
   e. Where do the people coming to work drive and park?
   f. Where do parents bringing children to school drive?
3. Study the pedestrian and vehicular traffic patterns on the drawings of the parking lot.

3. (continued)

   a. Do the paths of pedestrians and vehicles cross?
   b. Could these crossings be possible accident scenes?
   c. Are these patterns more congested on days of bad weather?
   d. Do pedestrians watch for traffic as carefully during rainy, weather?
   e. Would fewer crossings mean less chance of accidents?
   f. Would a parking lot with no crossings of pedestrian and vehicle traffic be an ideal situation?
   g. Is it possible to plan the traffic flow of the parking lot so that pedestrians and vehicles do not cross paths?

4. Each student make a plan for "Improving the Traffic Flow in the School Parking Lot".

   a. Can pedestrians from the parking lot take a route that will not cross vehicle traffic?
   b. Can vehicle traffic be rerouted so as not to conflict with pedestrians?
   c. Can the lane for pedestrians be marked so persons driving vehicles will know where to expect the walkers?
   d. Can the pedestrian lanes have a natural screen of shrubs or trees to keep out traffic sights and sounds?
   e. Should you try to also make the area attractive?

5. Students make a three dimensional model of the plan they believe to be the best and decide on the steps for implementation.

   a. Should the plan be presented to students, teachers and principal?
   b. Who will make the final decision?
   c. Who will do the work?
   d. How will the work be done?
   e. Who will pay for the materials?

6. Implement the plan if permission is granted.

Upper Elementary
Transportation

Raye Klopfenstein

INVESTIGATE THE DECAY OF RAILROAD PASSENGER SERVICE (COMMUTER)

BEHAVIORAL OBJECTIVES:

At the completion of a successful encounter, the student should be able to:

1. List (number) advantages of railroad passenger service to the community.
2. List (number) advantages that railroad passenger service provides to individuals within the community.
3. List (number) community disadvantages of railroad passenger service.
4. List (number) disadvantages to individuals who use railroad transportation.
5. Describe the facilities, the upkeep of the facilities, and the amount of railroad commuter service in the metropolitan area.
6. List (number) of the railroads, noneconomic reasons for the present level of service.
7. List (number) reasons which commuters cite for the present services the railroad is providing.
8. List (number) cost factors of operation and maintenance of equipment for commuter service.
9. Compare the factors listed in objective #8 to (number) similar cost factors for local freight service.
10. List (number) improvements in equipment or service of the railroad which would encourage greater commuter use.
11. List (number) improvements in equipment of service of related transportational systems which would encourage greater use of the railroad.
12. Plan a strategy to inform railroad officials of suggested improvements in commuter service.

ACTIVITIES A visit to the railroad station. Interviews with railroad officials and random commuters.

1. In a visit to a railroad station, interview 4 railroad officials and 4 commuters. Take complete written or tape recorded notes. Ask each person for their opinions on the following:
   a. What advantages does the railroad offer the community?
   b. What disadvantages does the community suffer because of the railroad?
   c. What advantages does the railroad offer the individual?
   d. What disadvantages are there to individuals who use railroad transportation?

2. Tour the station and take a ride on the train which a commuter might take each day to go to work. Observe carefully the services provided. What condition is the equipment in, clean, neat, sanitary? Are the confort and health needs of the passenger provided for? Obtain a complete schedule of passenger services offered.

3. In an interview with a railroad public relations man, list the non-economic factors that he feels are determining the services and the conditions of the services that the railroad is offering.

4. Interview 3 random commuters as to why they feel the railroad is offering the services and schedules that they are offering presently.

5. If there is more than one railroad company providing commuter service in the metropolitan area, repeat each of the first four activities for each additional company. How do the companies compare in services offered--rationales for their services?

6. List cost factors (3) for commuter service and (3) for freight service as gained by reading and interviewing railroad experts. (officials or employees). Which service is more profitable for the railroad? What are the reasons? What would make commuter service more profitable? Is there a possible use of equipment for profit during non-commuting hours? Are new types of equipment available which would require less expense for maintenance?

7. In group discussion, consider ideas for improvement of equipment in design or quantity which would be beneficial to the railroad. How can the railroads cut costs yet provide good, attractive services?

8. In group discussion, consider ideas for improvement which would result in more use of the railroads by commuters. What do commuters want? What are they willing to pay? What promotional techniques would help 'sell' the mass transit idea to car-driving workers?

9. Using the facts and ideas gained in the previous activities form a report which could be presented to railroad officials or interested groups.

10. Plan a method of presenting the report. How can it be used most effectively? Who wants the information? Who can act on the information? What railroad official(s) should receive a copy?

11. Present the report to the railroad officials and other interested parties decided upon in activity #10.

Upper Elementary
Water Quality

Carl Landt

INVESTIGATING OIL POLLUTION IN THE COMMUNITY

BEHAVIORAL OBJECTIVES:

At the completion of a successful encounter, the student should be able to:

1. List (number) needs which are supplied by water.
2. Describe in writing (number) ways the ecological system is altered by oil pollution.
3. List (number) effects, other than ecological, to a community whose water is polluted by oil.
4. List (number) sources of oil pollution in his neighborhood.
5. Describe in writing the major steps for a plan of action to reduce oil pollution in the community.

ACTIVITIES: Discuss the properties and necessities supplied by water:

1. Why do we need water? Why must water be safe? How long could we live without water? Are animals and plants dependent upon water?
2. Obtain an aquarium. Place within the aquarium a number of aquatic plants and two gold fish. Place the aquarium by a window. Then pour oil into the aquarium. How does the oil affect the vegetation? Can sunlight reach the plants? What will happen to the water? How will the fish be affected? How will animals that drink from oil polluted-water be affected. How does all this affect man?
3. Have students research about oil pollution in other areas of the country. What were the results to animal life and vegetation? Are there other problems associated with oil pollution besides to the ecological system? What are they?
4. Investigate sources of oil in the community. Where does the oil come from which gets into the water? Does oil leak from cars? How? Find some traces of oil spots in driveways and parking areas. What happens to the oil when it rains? What other sources of oil pollution can you find in your neighborhood?
5. Having located the major areas in the community which contribute to the oil pollution of the water, determine the following:
   a. How could they cut down on the polluting?
   b. What can you do as a class?
   c. What can you do as an individual?

   (Suggested plan of action: prepare a fact sheet on the sources and effects of oil pollution in the community and distribute this fact sheet)

Upper Elementary
Water Quality

Raye Klopfenstein

INVESTIGATING SEPTIC SYSTEMS

BEHAVIORAL OBJECTIVES:

At the completion of a successful encounter, the student should be able to.

1. Describe in writing the history of human waste disposal in the last 100 years.
2. List 3 techniques of sewage disposal which have been used in the last 100 years.
3. Identify one advantage and one disadvantage for each of the listed techniques in No. 2.
4. Describe in writing how an efficient septic disposal system functions.
5. List 3 effects septic systems can have on the ecological system.
6. Describe 3 neighborhood ecological conditions as related to its method of sewage disposal.
7. Identify 3 individuals or groups of individuals who have authority to control placement and/or maintenance of septic systems.
8. List 3 local (township, city, or county) laws regulating septic disposal systems.
9. Describe an accurate test of septic system efficiency.
10. Demonstrate proficiency in performing the test described in objective number 7.
11. Plan a neighborhood septic information service.
12. Implement a neighborhood septic testing service.

ACTIVITIES. A visit to a home with a septic system.
A visit to an installation site of a septic system.
A visit to the classroom or above site by an expert on septic systems.

1. Examine the history (last 100 years) of disposal of human waste. What techniques have been used in the past? What are the advantages (economic and ecological) of each of these techniques?

2. If possible, witness the installation of a septic system. What happens biologically in a septic system? What happens mechanically? What are the components necessary to the system? What are the characteristics of a system operating at peak efficiency? What are the characteristics of a poorly functioning system? What soil and water conditions are most conducive to installation of an efficient septic system?

3. What are the effects of septic systems on ground water? How do soil types influence the effect on water? What happens to the soil itself? What are the effects on organisms living in the soil? What are the effects on the general ecological system?

4. Investigate the neighborhood situation. How many homes are using septic systems? Are the systems capable of handling the capacity they are being required to handle? Are any of the effects listed in number 3 in evidence? Would homeowners accept a different type of disposal system if it was proven to be needed?

5. Who controls the installation and maintenance of septic systems? Ask the local public health department. Is the control by state, county, township or city? What individual or group of individuals set the legal policies? Who enforces the legal policies?

6. Visit the local department of public health. (Or invite an official of the department to visit the class.) What laws are there to control septic systems? What penalties do the laws carry? Are there any new or more strict regulations which would be helpful ecologically? Do the costs of a sewer sewer system (e.g. Detroit's) outweigh the disadvantages of septic systems?

7. What tests can be made to show the condition of a septic system? What materials are necessary to perform such tests? Is digging necessary? Would fifth grade students be able to use these tests? Which test(s) are conclusive, yet easy to perform? Select the best test(s) for student use.

8. Plan a neighborhood septic testing service to be carried out by students on request of homeowners. How would this be organized? Who would be responsible for carrying out the tests?

9. Plan a strategy to inform neighborhood homeowners of the study results and testing skills available.

10. Carry out information and testing services.