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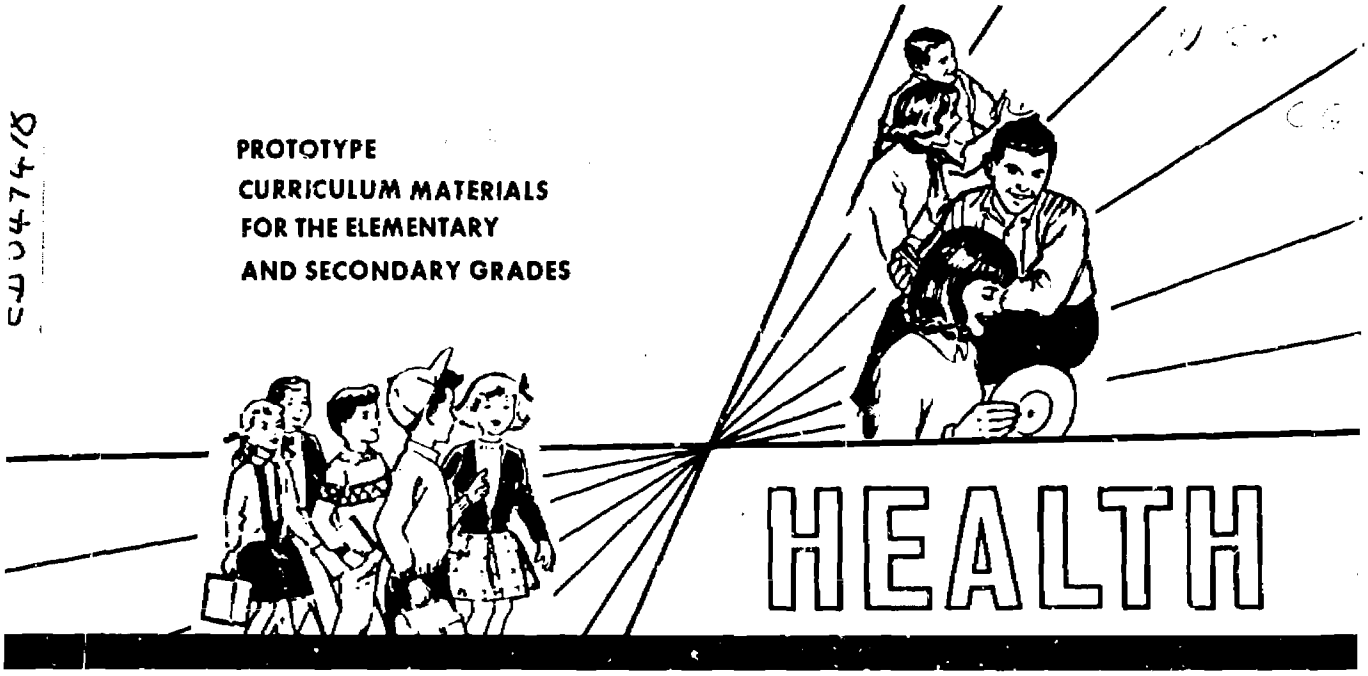
ABSTRACT

This prototypic curriculum is designed to develop awareness of the challenges man faces in his crowded communities to insure clean water, pest control, waste removal, safe food handling and adequate community health facilities. It distinguishes between the prevention of future environmental abuse and compensation for past abuses. Both the gaining of factual knowledge and the elicitation of a personal commitment by the pupil for working against environmental threats are among the purposes of the curriculum. The format is divided as follows: (1) major understandings and fundamental concepts, (2) suggested teaching aids and learning activities, and (3) supplementary information for teachers. (Author/Tl)

PROTOTYPE
CURRICULUM MATERIALS
FOR THE ELEMENTARY
AND SECONDARY GRADES



HEALTH

GRADES 4-6

STRAND IV ENVIRONMENTAL AND COMMUNITY HEALTH
ENVIRONMENTAL AND PUBLIC HEALTH

SPECIAL EDITION FOR EVALUATION AND DISCUSSION

THE UNIVERSITY OF THE STATE OF NEW YORK / THE STATE EDUCATION DEPARTMENT
BUREAU OF ELEMENTARY CURRICULUM DEVELOPMENT / ALBANY, NEW YORK 12224 / 1970

STRAND IV

ENVIRONMENTAL AND COMMUNITY HEALTH

Grades 4-6

THE UNIVERSITY OF THE STATE OF NEW YORK/THE STATE EDUCATION DEPARTMENT
THE CURRICULUM DEVELOPMENT CENTER/ALBANY, NEW YORK 12224

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STRAND IV

ENVIRONMENTAL AND COMMUNITY HEALTH

Environmental and Public Health

Grades 4, 5, 6

OUTCOMES

in grades 4, 5, and 6 should:

realize man is an integral part of his environment

recognize that man has the ability to preserve earth's beauty and benefits through effective planning and appropriate action

understand that contamination of the environment through abuse is a threat to man's health and future existence

become cognizant of the finite resources in the environment which require individuals and communities to handle with care their water sources, food sources, air supply, and waste dispos

gain knowledge of the disease-causing organisms and pests which are dangerous to man

become aware of the health agencies, health services, and environmental programs available to the individual and his community to maintain and improve the environment

contribute to the maintenance of a healthful environment by developing a sense of responsibility for his own and the community's health

recognize that responsible action involves individual care, participation in interested citizen's groups, and cooperation with governmental programs and agencies.

STRAND IV

ENVIRONMENTAL AND COMMUNITY HEALTH

Environmental and Public Health

Overview

Grades 4, 5, 6

In the middle years of childhood, natural curiosity matures into observation and discovery. A child at this juncture seeks to understand the environment which is coming into sharp focus. He needs a knowledge of the factors which sustain personal health and preserve the beauty, comfort, and effectiveness of the environment. He also needs to become aware of the activities by which man threatens his environment.

The pupil needs to become aware of the challenges man faces in his crowded communities to insure clean water, pest control, waste removal, safe food handling and adequate community health facilities. The child needs also to distinguish between the prevention of future environmental abuse and compensation for abuse of the past through repairing and restoring damaged resources.

It is the purpose of this strand to make gaining factual knowledge only a first step for the pupil. The second step is a personal commitment by the pupil for responsible participation in community and governmental programs dedicated to eliminating threats to the environment. In fulfilling this participation, the child will be further committed to attain personal habits which demonstrate respect for man's dependence on his environment.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
I. The Environment and Health Status A. Explanation of the relationship between man, environment, and health B. History of environmental control	Man is in constant interaction with his environment which is capable of improving his health or harming it. Man improves his health status when he understands his environment and uses it wisely. We must constantly adapt to environmental conditions because our environment constantly changes. Many of the devices we have created to improve our way of life have resulted in environmental destruction. Individually and collectively man has tried to control the environment in order to promote healthful conditions.	Present a classroom problem children must solve, such as: the classroom is too warm. Call on children to work through a solution in steps: -What is causing it? -What can cool the room? -By using the window pole (latch, transom, etc.) the teacher will alter the condition which is creating discomfort. Divide the class into two groups. Have one grou state a classroom problem. Second group is to work through solution to problem in steps. Have children identify th luxuries in our environment which are resulting in unhealthy conditions. Place a list on the board or construct a chart of things man can do alone and in groups to gain good health. Call on pupils to describ how health status is affected adversely or beneficially by:

AJOR UNDERSTANDINGS AND UNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
an is in constant interction with his environent which is capable of mproving his health or arming it.	Present a classroom problem children must solve, such as: the classroom is too warm. Call on children to work through a solution in steps:	Environment is the surroundings, conditions and influences which may affect physical development or growth of character.
lan improves his health tatus when he understands his environment nd uses it wisely.	-What is causing it? -What can cool the room? -By using the window pole (latch, transom, etc.) the teacher will alter the condition which is creating discomfort.	Man needs to understand his natural environment in relation to:
e must constantly adapt o environmental conditions because our environment constantly hanges.		-weather factors (sun, rain, snow, wind) -auditory factors (industrial, occupational, residential) -health factors (vision, odor, disease)
lany of the devices we ave created to improve our way of life have esulted in environmental lestruction.	Divide the class into two groups. Have one group state a classroom problem. Second group is to work through solution to problem in steps.	Among the ways man can improve his health are:
Individually and collectively man has tried to control the environent in order to promote healthful conditions.	Have children identify the luxuries in our environment which are resulting in unhealthy conditions.	-disease control -proper housing -safe water supplies -use of safely preserved and prepared food.
	Place a list on the board or construct a chart of things man can do alone and in groups to gain good health.	As an individual, man made clothing, grew and hunted food, and built shelters.
	Call on pupils to describe how health status is affected adversely or beneficially by:	Collectively, man joined together to construct water supply facilities, build communal shelter, and share and/or exchange food supplies.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
		-climate -geography -communal living (family, town).
1. Past	How well men care for themselves and their communities depends on the influences of the past and the geographic area in which they live.	Ask pupils to write a short paper describing th work of a famous scientis -what affect his work has upon control of the environment -how health status has been advanced because of his work. Write an essay or short play describing a day in the life of a pioneer family whose child has a high fever. Ask pupils to select an item or health facility in a home (faucet). Trac the development of this item through the different period of history being studied. Illustrat this development through a series of pictures show ing the use of this item or facility in the home.

IR UNDERSTANDINGS AND IAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	-climate -geography -communal living (family, town).	Children need to realize that in the search for solutions to some environmental problems we have created hazardous conditions, such as the development of DDT.
well men care for mselves and their munities depends on influences of the t and the geographic a in which they live.	Ask pupils to write a short paper describing the work of a famous scientist: -what affect his work has upon control of the environment -how health status has been advanced because of his work. Write an essay or short play describing a day in the life of a pioneer family whose child has a high fever. Ask pupils to select an item or health facility in a home (faucet). Trace the development of this item through the different period of history being studied. Illustrate this development through a series of pictures showing the use of this item or facility in the home.	Knowledge of health care was pioneered by such people as: -Hippocrates -William Harvey -Anton von Leeuwenhoek -Edward Jenner -Florence Nightingale -Louis Pasteur -Joseph Lister -Pierre Curie and Marie Curie -Alexander Fleming -Jonas Salk -Christian Barnard (See appendix for description of their contributions.) Communicable disease declined when man's knowledge increased influencing him to remove refuse, use safe water, refrigerate his food, and immunize against disease.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
		As a culminating activity, this series of pictures could be utilized in a mural, time line illustration, or collage. This activity can be done on an individual, small, or large group basis.
	Civilizations have advanced the most during periods in their history when they have achieved some control over the environment resulting in more healthful conditions and greater comfort.	
2. Present	New environmental hazards are created as man learns to control others.	Discuss with children the means by which man pollutes his environment. What steps are being taken to stop this destruction?
II. Man's Environment and Disease A. Explanation of the relationship	A microorganism is any plant or animal that is too small to be seen by the unaided eye. Many microorganisms are present in man's environment, some of which are harmful to man's health.	Have children bring small jars of pond water collected from several places in the pond. Look at a few drops under a microscope. These microorganisms are generally one-celled animals called protozoa.

UNDERSTANDINGS AND ENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	As a culminating activity, this series of pictures could be utilized in a mural, time line illustration, or collage. This activity can be done on an individual, small or large group basis.	
zations have ad- l the most during is in their history hey have achieved ontrol over the en- ient resulting in ealthful conditions reater comfort.		Man's health status is determined by his ability to: -protect himself from the natural elements, micro-organisms, and certain insects -produce food -raise livestock -secure an adequate supply of usable water -dispose of waste products safely.
nvironmental hazards reated as man learns ntrol others.	Discuss with children the means by which man pollutes his environment. What steps are being taken to stop this destruction?	The major environmental health hazards which are now present are the results of man's activities (air and water pollution).
roorganism is any or animal that is mall to be seen by naided eye. Many organisms are pre- in man's environment, of which are harmful n's health.	Have children bring small jars of pond water collected from several places in the pond. Look at a few drops under a microscope. These microorganisms are generally one-celled animals called protozoa.	

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING A AND LEARNING ACTIVI
		Mount enlarged pictu drawings of microor which cause disease the students label pictures with the na of organisms shown.
		Expose a moist piec bread to the air fo about an hour; divi four pieces and put separate Petri dish Keep dishes in a da for a few days or a The common mold, rh will develop. Plac small portion of th on a microscope sli let the class obser
		Have children bring paper or magazine c which deal with new of preventing disea Group the articles bulletin board undc titles as:
		"Infectious" and "N infectious."
		Have children writ tences using the fo ing words: -protozoa -disease -mold -environ -bacteria -microor

R UNDERSTANDINGS AND AMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	Mount enlarged pictures or drawings of microorganisms which cause disease. Let the students label the pictures with the names of organisms shown.	Disease is any adverse change from the normal condition or functioning of the body.
	Expose a moist piece of bread to the air for about an hour; divide into four pieces and put in separate Petri dishes. Keep dishes in a dark place for a few days or a week. The common mold, rhizopus, will develop. Place a small portion of the mold on a microscope slide and let the class observe.	Four microorganisms that cause disease are protozoa, bacteria, fungi and virus. Some diseases caused by: -protozoa .malaria .amebic dysentery .sleeping sickness -bacteria .diphtheria .tuberculosis .typhoid .tetanus .anthrax -fungi .ringworm .athlete's feet -virus .polio .measles .mumps .smallpox
	Have children bring newspaper or magazine clippings which deal with new ways of preventing disease. Group the articles on the bulletin board under such titles as: "Infectious" and "Non-infectious."	Additional information on disease can be found in Strand I, Disease Prevention and Control, Grades 4-6.
	Have children write sentences using the following words: -protozoa -disease -mold -environment -bacteria -microorganism	

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING A AND LEARNING ACTIVI
B. History of relationship	Man has controlled disease producing microorganisms to some extent by such measures as sanitation, improved sewage treatment, immunization, and the improvement of safe water systems.	Have a class committ find out if the comm uses ground water. out from the company the pumping stations and why they are loc at these particular Have pupils recall t own vaccination agai smallpox. They may member that they we given deeper injecti of toxoid for dipht and tetanus. Lead pupils to discu ways in which they sonally guard again contracting disease. Discuss such terms -immunity (natural acquired) -vaccination and/or oculation -immunization -filtration -toxins. Have children use t words in written ma to indicate their k edge of the term a proper usage.

R UNDERSTANDINGS AND AMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
has controlled dis- producing micro- nisms to some ex- by such measures as tation, improved ge treatment, im- zation, and improvement of safe r systems.	Have a class committee find out if the community uses ground water. Find out from the company where the pumping stations are and why they are located at these particular spots.	
	Have pupils recall their own vaccination against smallpox. They may remember that they were given deeper injections of toxoid for diphtheria and tetanus.	Immunity is the ability of the body to resist the invasion of germs and to prevent the development of a disease. Acquired immunity is temporary or permanent, depending on how it is acquired and the specific disease against which it protects.
	Lead pupils to discuss ways in which they personally guard against contracting disease.	Active immunity is brought about in two ways. One way is by recovering from the disease process itself. A second way is by injecting the germ itself (in a dead or weakened state) or by injecting the weakened waste product of the germ. Injections of a killed or live germ are known as vaccines. Injection of the waste product itself is called a toxide.
	Discuss such terms as: -immunity (natural and acquired) -vaccination and/or inoculation -immunization -filtration -toxins.	
	Have children use these words in written material to indicate their knowledge of the term and its proper usage.	

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
		Have pupils prepare a list of common disinfectants used to kill microorganisms that are commonly found at home and in the school. Conduct the following experiment to show how disinfectants work: Equipment: alcohol, Lysol iodine, dried beans, 4 test tubes, sterile absorbent cotton. Process: (a) soak the beans in cold water, (b) number the test tubes, (c) put several beans in each test tube and cover beans with water, (d) do not add anything to test tube 1, (e) add a little iodine to test tube 2, (f) add a little Lysol to test tube 3, (g) add a little alcohol to test tube 4, (h) stopper all the test tubes with cotton and put them in a warm place for 2 days. Follow-up: (1) remove the cotton and smell the contents of the test tubes. Discuss: Do any of the test tubes have an odor?

NDERSTANDINGS AND NTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	Have pupils prepare a list of common disinfectants used to kill microorganisms that are commonly found at home and in the school.	
	Conduct the following experiment to show how disinfectants work: Equipment: alcohol, Lysol, iodine, dried beans, 4 test tubes, sterile absorbent cotton. Process: (a) soak the beans in cold water, (b) number the test tubes, (c) put several beans in each test tube and cover beans with water, (d) do not add anything to test tube 1, (e) add a little iodine to test tube 2, (f) add a little Lysol to test tube 3, (g) add a little alcohol to test tube 4, (h) stopper all the test tubes with cotton and put them in a warm place for 2 days. Follow-up: (1) remove the cotton and smell the contents of the test tubes. Discuss: Do any of the test tubes have an odor?	Note: In the experiment on disinfectants, let the pupils get used to the odor of iodine, Lysol, and alcohol if they are not already familiar with these chemicals. When the pupils test the results of the experiment, there may be a trace of the odor of these substances in the tubes. The class will easily identify the odor of decay in test tube 1. As a check on the experiment, let them compare a test tube of boiled water, left stoppered and standing for several hours, with test tube 1. There will be no odor from the boiled water. (From: Science for Tomorrow's World. The Macmillan Series - Grade 5. Macmillan Company, New York)

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AND LEARNING ACTIV
		What does the prese an odor indicate? can you make certa microorganisms caus odor?
III. Water A. Need for water	Water is a vital part of all living things.	Perform the follow periment which sho water makes up a l portion of food (1 things). Material needed: knife, sliding sca plastic bag, paper Process: (1) weigh apple (suspend in bag), (2) enter the in a notebook, (3) apple into small p on the paper towel sunlight and leave for several days, (weigh the pieces o and enter the weig calculate the weig water lost by the Weight of apple Weight of apple af drying Weight lost by app Weight of water in
1. Sources of water	The water cycle is unchanging. It is a constant, resupplying source of water.	Discuss the questi "Why is the water used up?" Make a mural showi entire water cycle

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	What does the presence of an odor indicate? How can you make certain that microorganisms caused the odor?	
Water is a vital part of all living things.	Perform the following experiment which shows water makes up a large portion of food (living things). Material needed: apple, knife, sliding scale, plastic bag, paper towel Process: (1) weight the apple (suspend in plastic bag), (2) enter the weight in a notebook, (3) cut the apple into small pieces on the paper towel in the sunlight and leave there for several days, (4) weigh the pieces of apple and enter the weight, (5) calculate the weight of water lost by the apple. Weight of apple _____. Weight of apple after drying _____. Weight lost by apple ___. Weight of water in apple _____.	Water is needed by living things in order for them to carry on the complex activities of life. Most tissues of organisms are made of 70 to 95 percent water.
The water cycle is unchanging. It is a constant, resupplying source of water.	Discuss the question: "Why is the water not used up?" Make a mural showing the entire water cycle.	The constant changing of water from liquid to vapor and then back to liquid again is called the water cycle. The two forces that furnish the energy for the

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AND LEARNING ACTIVI
		Make a simple terra with small plants. watering and placin cover over the top. water cycle will b denced on a small A gallon mayonnais makes a good terra
	Communities obtain their water supply from ground and surface water sources. These sources are sustained by rain and snow.	Have a child write water company or t water supply depar of the city governm to ascertain the s of the community w Locate these areas map.
		Obtain a map of th New York City rese system. Discuss t meaning of the wor servoir" and "wate and how they relat water sources.
		Draw a mural depic the water table.
		On a sand table, m model of a reserv and its watershed. the hills, valleys streams, and the re
2. Uses of water	A dependable water source is essential to public health, safety, and recreation.	Have pupils make of all the ways i they use water fo hour period. Hav

NDERSTANDINGS AND NTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	Make a simple terrarium with small plants. After watering and placing a cover over the top, the water cycle will be evidenced on a small scale. A gallon mayonnaise jar makes a good terrarium.	cycle are the sun and gravity. The sun warms the water, giving energy for evaporation. Gravity pulls the water droplets back to earth.
ties obtain their upply from ground face water sources. ources are sus- by rain and snow.	Have a child write to the water company or the water supply department of the city government to ascertain the source of the community water. Locate these areas on a map.	Nationwide, about 80 percent of the water supply comes from surface sources and 20 percent from ground water.
	Obtain a map of the New York City reservoir system. Discuss the meaning of the words "reservoir" and "watershed" and how they relate to water sources.	A watershed is an area that collects and drains off water to a collection center, such as a stream, a lake, or an ocean.
	Draw a mural depicting the water table.	
	On a sand table, make a model of a reservoir and its watershed. Show the hills, valleys, streams, and the reservoir.	
dable water source ntial to public safety, and rec-	Have pupils make a list of all the ways in which they use water for a 24-hour period. Have pupils	The amount of water we use depends on: -the amount of water available

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING A AND LEARNING ACTIVIT
		compare their comple list and ascertain t most common use of w listed.
		Have a committee dec and report: -how much the popula in the community ha increased since 190 -the amount of wate needed daily in th munity in 1900 as c pared to the amount water needed today chart may be made o the findings.
		Have children make circle graph showin way water is used b person (information given under supplem information for tea

AJOR UNDERSTANDINGS AND UNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	compare their completed list and ascertain the most common use of water listed. Have a committee decide and report: -how much the population in the community has increased since 1900. -the amount of water needed daily in the community in 1900 as compared to the amount of water needed today. A chart may be made of the findings. Have children make a circle graph showing the way water is used by one person (information is given under supplementary information for teachers).	-the number of modern conveniences we own and how much we use them -how many people use the supply. Some home uses of water and the average amounts used are: -shower - 25 to 30 gallons per use -bath tub - 12 to 30 gallons per use -washing machine - 25 to 50 gallons per load -cooking and drinking - 5 gallons per day -dishwasher - 9 1/2 to 15 1/2 gallons per load To meet all the needs of an average community, 140 gallons of water must be supplied every day for every person living in the community. Of the 140 gallons, 50 gallons are used in the home. An additional 50 gallons are used by industry. Water needed for firefighting, street sprinkling, swimming pools, and public fountains accounts for another 10 gallons. Businesses use 20 gallons for the operation of stores and offices. Ten gallons

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHIN AND LEARNING ACTI
B. Management for clean water	Man must protect his limited sources of water.	Discuss such ques -What are the thr drains on the wa supply? -Why does man nee tect water sourc about 70 percen earth is compose water?
1. Methods of management	Man has numerous methods of purifying water.	Make a model of a purifying plant. Needed: funnel, s cotton, about a h inch of garden so quart jar, anoth quart jar. Process: Add abou quart of water to with the soil in shake it up so th water is full of let the water sta awhile. Discuss pupils what happe the water as the settle to the bot Place some cotton funnel. Put a la sand about an inc over the cotton. funnel in the .e

NDERSTANDINGS AND NTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
		are lost through leaks and breaks in underground pipes.
st protect his d sources of water.	Discuss such questions as: -What are the three major drains on the water supply? -Why does man need to protect water sources if about 70 percent of the earth is composed of water?	Proper management of present water sources is imperative because: -pure water resources are not inexhaustible -protection is less costly than attempting to reclaim polluted water -greater demands are made on the present water resources as the population expands.
s numerous methods ifying water.	Make a model of a water-purifying plant. Needed: funnel, sand, cotton, about a half an inch of garden soil in a quart jar, another clean quart jar. Process: Add about a quart of water to the jar with the soil in it, and shake it up so that the water is full of soil. Let the water stand for awhile. Discuss with pupils what happens to the water as the particles settle to the bottom. Place some cotton in the funnel. Put a layer of sand about an inch deep over the cotton. Put the funnel in the clean jar.	The use of modern technological processes helps to free the environment from harmful microorganisms. These processes include the use of settling tanks and filtration systems and the addition of chemicals to the water.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AI AND LEARNING ACTIVITI
		Gently pour some wate from the settling jar to the funnel. Discu with pupils what happ to the water in the fu nel. (From: Concep in Science Grade 4. H court Brace and World New York)
		Discuss with children following: - Filtration often doe remove harmful bacte from water. Why? -In what ways can bac be destroyed? -What would be effect in a large reservoir
		Perform the following periment: Needed: microscope, a culture of some micro ganisms, chlorine ble medicine dropper, mic scope slides. Process: Prepare a c of microorganisms. O a pint jar of pond wa Crumble a piece of eg yolk (about the size pea) from a hard-cook egg into the jar of p water. Keep the jar from the sun, but in warm place. After a days, the culture shou

UNDERSTANDINGS AND MENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	Gently pour some water from the settling jar into the funnel. Discuss with pupils what happens to the water in the funnel. (From: Concepts in Science Grade 4. Harcourt Brace and World. New York)	
	Discuss with children the following: - Filtration often does not remove harmful bacteria from water. Why? -In what ways can bacteria be destroyed? -What would be effective in a large reservoir?	
	Perform the following experiment: Needed: microscope, a culture of some microorganisms, chlorine bleach, medicine dropper, microscope slides. Process: Prepare a culture of microorganisms. Obtain a pint jar of pond water. Crumble a piece of egg yolk (about the size of a pea) from a hard-cooked egg into the jar of pond water. Keep the jar away from the sun, but in a warm place. After a few days, the culture should	

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACH AND LEARNING AC
		swarm with mic Examine sample culture under scope until yo containing a l of living micr As you watch t under the scop drop of liquid the water on t Discuss with p How long does bleach to kill organisms? In further how m is really nece kill the bacte drop of water. (From: Concep Science Grad court, Brace New York)
2. Role of government	All levels of government must be active in the protection of water resources.	Using a map of States, locate bodies of wat are common to communities, s nations. Disc portance of co among all grou
a. National	Laws have been passed by the National Government to protect water resources.	Discuss the fo with the class -Why is it nec have national the protecti resources?

UNDERSTANDINGS AND ENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	swarm with microorganisms. Examine samples of the culture under the microscope until you find one containing a large number of living microorganisms. As you watch them moving under the scope, add a drop of liquid bleach to the water on the slide. Discuss with pupils: How long does it take the bleach to kill all the organisms? Investigate further how much bleach is really necessary to kill the bacteria in a drop of water. (From: Concepts in Science Grade 6, Harcourt, Brace and World. New York)	
evels of govern- ust be active in rotection of Water rces.	Using a map of the United States, locate large bodies of water which are common to several communities, states, or nations. Discuss the importance of cooperation among all groups involved.	Large bodies of water such as the Great Lakes and the coastal waters of the United States are common to many areas, thereby requiring broad governmental jurisdiction.
have been passed e National Govern- to protect water rces.	Discuss the following with the class: -Why is it necessary to have national laws for the protection of water resources?	Key dates relating to national laws: -1899 Rivers and Harbor Act prohibited discharge of refuse into navigable water unless in liquid state.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
		-How are these laws helpful? -Should only the National Government be concerned with the protection of water resources? If not who else should be involved?
b. State	New York State plays an important role in the management of water resources.	Have a class committee write to various State agencies asking for materials concerning water resources and their management.

JOR UNDERSTANDINGS AND INDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	-How are these laws helpful? -Should only the National Government be concerned with the protection of water resources? If not, who else should be involved?	-1912 Public Health Service Act authorizing an investigation of diseases spread by pollution of navigable lakes and streams. -1924 Oil Pollution Act prohibited damaging amounts of discharge of oils into coastal waters. -1948 Federal Water Pollution Control Act (made permanent in 1956) provided money for research and construction of waste treatment plants. -1965 Water Quality Act enlisted aid of the states to: .set water quality standards for all interstate and coastal waters, and .established a Federal Water Control Administration which (since 1966) is in the Dept. of the Interior).
ew York State plays an mportant role in the anagement of water re- ources.	Have a class committee write to various State agencies asking for materials concerning water resources and their management.	The following agencies are active in the protection of water resources: -The New York State Environment Board. This agency helps communities in programs of water development, management, and utilization.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AI AND LEARNING ACTIVITI
c. Local	Local governments are active in clean water management.	Have class make a visi to a water purificatio plant to see filtratio and treatment of water
C. Pollution of water		
1. Definition of water pollution	Polluted water is water which contains harmful substances in quantities which endanger health and limit its use.	Collect and display pi tures and articles abo polluted water.

RSTANDINGS AND L CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
		-Department of Environmental Conservation. This Department was empowered under Pure Water Bond Act of 1965. It conducts state wide, intermunicipal water pollution prevention and abatement programs, conducts water planning programs and sets standards and supervises public water supplies. -New York State Conservation Department. -Interstate Sanitation Commission. -Local health departments operate under Public Health Law Article 12. They supervise and regulate sanitary aspects of public water sources and enforce the state sanitation code at the local level. -County Department of Public Works. -Special Districts.
ernments are . clean water it.	Have class make a visit to a water purification plant to see filtration and treatment of water.	
water is water itains harmful es in quantities anger health t ...	Collect and display pictures and articles about polluted water.	Pollutants may be organic or inorganic. Examples of undesirable pollutants are.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AID AND LEARNING ACTIVITIE
2. Cause of water pollution	Water pollution has many causes, most of which are the results of man's carelessness and abuse.	Have s committe rese d report o sa er polluti and ce of the form (radio, TV, etc.)
a. Communities	The extensive use of detergents and the lack of adequate sewage treatment facilities in many communities is a contributing factor in water pollution.	Have class committe find t how sewage i treate in the commun him answers to s quest s as: -What s done with th heavy ge? -Where the liquid d after t

JOR UNDERSTANDINGS AND NDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
		-domestic wastes .human wastes .detergents .household greases -industrial and commercial wastes .grit chemicals .alkalies .dyes .lubricants .metals -agricultural wastes .silt .nitrates .fertilizers .pesticides .insecticides .herbicides .animal wastes
:er pollution has many ıses, most of which ' the results of man's 'elessness and abuse.	Have a class committee research and report on cause of water pollution and the source of the information (radio, TV, etc.)	Some of the factors contributing to water pollution: -growth in population, industry, cities -increased demand for water due to the growth in population, industry, and cities -rapid technological expansion in the use of chemicals -inadequate and outdated treatment facilities -man's attitude.
: extensive use of cergents and the lack adequate sewage treatıt facilities in many ımunities is a contribıng factor in water llution.	Have a class committee find out how sewage is treated in the community. Find the answers to such questions as: -What is done with the heavy sewage? -Where is the liquid sewage released after treatment?	Water affected by pollution may be identified by these visible characteristics: -scum on top -odor -floating and submerged trash

	REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHI AND LEARNING AC
			Have a child wr New York State Department for concerning dete Have a committe detergent adver Make a bulleti display using t mation obtained least to the wo tion offenders.
b.	Industries	The industrial use of water is a major cause of pollution.	Discuss with pu implications of lowing statemen "Most organisms water need oxyg ing amounts for The amount of d oxygen that wat depends on the ture of the wat Ask: -Would you be m find brook tro mountain strea streams near l -Can more waste be decomposed water or in co
c.	Improper use of land areas through highway construction, farming, forestry	Soil cover removal causes erosion and siltation of streams.	Have children d lowing experime erosion: Process: Get a box and remove

UNDERSTANDINGS AND MENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	Have a child write to the New York State Conservation Department for materials concerning detergents. Have a committee collect detergent advertising. Make a bulletin board display using the information obtained from the least to the worst pollution offenders.	-gas bubbles -types of life in bottom (benthos).
industrial use of r is a major cause ollution.	Discuss with pupils the implications of the following statement: "Most organisms living in water need oxygen in varying amounts for breathing. The amount of dissolved oxygen that water can hold depends on the temperature of the water." Ask: -Would you be more apt to find brook trout in mountain streams or in streams near large cities? -Can more waste materials be decomposed in warm water or in cool water?	Industries use vast amounts of water in making their products. Water is used for processing and cooling purposes, and the heated water is then returned to the streams. The warmer water becomes, the less oxygen it is able to hold. When water is 34°F., it can hold 14.2 ppm (parts per million) of dissolved oxygen. When water is 79°F., it can hold 8.2 ppm of dissolved oxygen. As the amount of pollution increases in a stream, more dissolved oxygen is needed to decompose the waste.
cover removal causes ion and siltation of ams.	Have children do the following experiment on soil erosion: Process: Get a wooden box and remove one end.	Rain washes soil off land that has had trees and ground cover plants removed through such activities as highway construction, improper farming, and forestry.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
		Replace this end with w screening. Shape a fun nel-type pathway out of aluminum foil and faste it to the open end of t box. Fill the box with soil, and place it on a slant above a large wid mouthed jar. Sprinkle water on the soil. The water will run out thro the screening and fall to the jar. Discuss: -How much soil does it carry along with it? -What could you do to reduce the erosion?
3. Effects of pollution	Water pollution affects man and his environment in many ways. It affects health, natural beauty, recreation, and property values.	Have pupils create stor skits, poems, songs, wh tell of a child or an a imal whose environmenta water became polluted. Take a field trip to a area blighted by water pollution. Discuss: -What is the cause of t pollution? -What is being done to restore the area? Discuss with class: -Why we need beauty in our natural surroundin

ÐR UNDERSTANDINGS AND ÐAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	Replace this end with wire screening. Shape a funnel-type pathway out of aluminum foil and fasten it to the open end of the box. Fill the box with soil, and place it on a slant above a large wide-mouthed jar. Sprinkle water on the soil. The water will run out through the screening and fall into the jar. Discuss: -How much soil does it carry along with it? -What could you do to reduce the erosion?	
er pollution affects and his environment nany ways. It affects health, natural uty, recreation, and perty values.	Have pupils create stories, skits, poems, songs, which tell of a child or an animal whose environmental water became polluted.	Water borne diseases include: -hepatitis -typhoid fever -dysentery -cholera -gastroenteritis
	Take a field trip to an area blighted by water pollution. Discuss: -What is the cause of the pollution? -What is being done to restore the area?	Other consequences of water pollution are: -diminishes sources of water supply -increases cost of necessary treatment of public water supply -discourages industrial expansion (which may result in lower employment, underdeveloped towns, and lowered state revenues)
	Discuss with class: -Why we need beauty in our natural surroundings?	

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AND LEARNING ACTIV
		-How water enriche lives?
		Have children draw "before" and "afte lution picture.
This section is basically for use at the intermediate level due to the technical aspects of the information.		
IV. Air		
A. Composition of air	Air is composed of gases--mainly nitrogen, oxygen, and carbon dioxide. The composition of air determines its usefulness in maintaining plant and animal life.	To demonstrate tha is composed of mor one gas, remove ox from a sample of a show that about fo of the air still r Process: Wash a wad of stee in detergent to re the oil which was it to prevent rust. Push this wad of wool into the bott a test tube. Inve test tube in a sha pan of water and h children observe i casionally for the few days. As the begins to combine the steel wool to

INDERSTANDINGS AND NTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	-How water enriches our lives? Have children draw a "before" and "after" pollution picture.	-destroys water recreation (boating, fishing, swimming) -lowers water frontage and property values -robs areas of their natural beauty -destroys wildlife (fish, plant life, bird and water animals).
t the intermediate of the information.		
composed of gases -- nitrogen, oxygen, bon dioxide. position of air nes its useful- maintaining plant mal life.	To demonstrate that air is composed of more than one gas, remove oxygen from a sample of air and show that about four-fifths of the air still remains. Process: Wash a wad of steel wool in detergent to remove the oil which was put on it to prevent rusting. Push this wad of wet steel wool into the bottom of a test tube. Invert the test tube in a shallow pan of water and have the children observe it occasionally for the next few days. As the oxygen begins to combine with the steel wool to form	

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
		rust, the water will ris in the test tube to take its place. After the water has risen about one-fifth of the way up the tube, no further change will occur, because the oxygen will have been exhausted, leaving only the other gases which are in the air.
B. Need for air	All living things require a constant supply of oxygen varying in amounts according to body size, physical activity, and basic rate of metabolism. Green plants require certain amounts of carbon dioxide to carry on the food making process of photosynthesis.	Determine, with the cla the individual amount o air needed to meet daily requirements. (See supplementary information) Assume that the average person inhales approximately 8 liters of air per minute. A liter is a measure of volume tha is just slightly larger than one quart. If each liter of air weighs about 1.2 grams, what is the weight of air inhaled in one minute? Determine the volume an then the weight of air that would be inhaled i a 24 hour period. If one pound is equal t 454 grams, how many pounds of air does the

UNDERSTANDINGS AND MENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	rust, the water will rise in the test tube to take its place. After the water has risen about one-fifth of the way up the tube, no further change will occur, because the oxygen will have been exhausted, leaving only the other gases which are in the air.	
iving things require istant supply of n varying in its according to size, physical ity, and basic of metabolism. plants require in amounts of carlioxide to carry on ood making process otosynthesis.	Determine, with the class, the individual amount of air needed to meet daily requirements. (See supplementary information) Assume that the average person inhales approximately 8 liters of air per minute. A liter is a measure of volume that is just slightly larger than one quart. If each liter of air weighs about 1.2 grams, what is the weight of air inhaled in one minute? Determine the volume and then the weight of air that would be inhaled in a 24 hour period. If one pound is equal to 454 grams, how many pounds of air does the	Not all the air taken in by an organism is used to maintain life. Only a small amount is used for this purpose. The remaining air that leaves an organism is different from the air that enters it. The composition of the air changes in accordance with the kind of metabolic activities carried on by the organism. (Metabolism is the group of chemical reactions that take place in an organism.)

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
		average person inhale each day? (From: Science Through Discovery, Grade 6. L. Singer Company, Inc. New York)
C. Pollution of air		
1. Definition of air pollution	Polluted air is air which contains harmful substances in quantities which endanger health and limit its use.	
2. Causes of air pollution	There are two common causes of air pollution: burning, which releases solid particles and gases into the air, and other industrial processes which fill the atmosphere with a great variety of materials.	Obtain a map of the community. Discuss with the class the possible sources of air pollution in the community (industry, etc. Show the location (in general) of the sources of air pollution on the map.

DERSTANDINGS AND TAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	average person inhale each day? (From: Science Through Discovery, Grade 6. L. W. Singer Company, Inc. New York)	
air is air which harmful sub- in quantities danger health t its se.		Substances that pollute or contaminate the air are called pollutants. Most pullutants are formed by the incomplete burning of fuels or are the dust and chemical by-products released during industrial operations.
e two common f air pollution: which releases rticles and to the air, and dustrial pro- hich fill the re with a great of materials.	Obtain a map of the community. Discuss with the class the possible sources of air pollution in the community (industry, etc.). Show the location (in general) of the sources of air pollution on the map.	Pollutants may be classified into three categories: -Gases - sulfur dioxide, hydrogen sulfide, nitrogen dioxide, and many others. -Liquids and aerosols - finely divided particles and fumes of many substances. -Solids - dust, metal particles, ashes, etc. When small particles are suspended in a gaseous medium such as air, the mixture that results is called an aerosol.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES.
a. Residential	Trash and leaf burning by the individual or community create problems of air pollution.	Have a class committee determine if there are ordinances prohibiting the burning of trash an or leaves. If there ar such ordinances, discus with the class how they are being enforced.
b. Industrial	The release of pollutants into the air by industry is a major problem. The most important chemical change that produces air pollutants is the burning of combustible materials.	The smoke that is produced when coal and oth fuel burns is an aeroso containing carbon parti cles. These carbon pa ticles are called soot. Soot often collects on surfaces as a black de posit. Perform the following experiment: Process: -Obtain a candle, match an alcohol lamp, thre clean test tubes of th same size, a test tub holder, and a test tub rack. -Hold test tube 1 in th flame of a candle for 10 seconds. Place i in the test tube rack -Hold test tube 2 in th flame of a match for seconds. Place in rac -Hold test tube 3 in th

NDERSTANDINGS AND NTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
nd leaf burning individual or ty create prob- air pollution.	Have a class committee determine if there are ordinances prohibiting the burning of trash and/ or leaves. If there are such ordinances, discuss with the class how they are being enforced.	
lease of pollutants ne air by industry ajor problem. The nportant chemical that produces air ants is the burn- combustible als.	The smoke that is produced when coal and other fuel burns is an aerosol, containing carbon particles. These carbon particles are called soot. Soot often collects on surfaces as a black deposit. Perform the following experiment: Process: -Obtain a candle, matches, an alcohol lamp, three clean test tubes of the same size, a test tube holder, and a test tube rack. -Hold test tube 1 in the flame of a candle for 10 seconds. Place it in the test tube rack. -Hold test tube 2 in the flame of a match for 10 seconds. Place in rack. -Hold test tube 3 in the	Most combustible materials are composed chiefly of carbon and of compounds containing carbon, hydrogen, and oxygen. Many combustible materials also contain small amounts of additional elements such as sulfur, nitrogen, and phosphorus. Compounds containing these elements are released into the air when combustion takes place.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AND LEARNING ACTIVI
		flame of the alcoho burner for 10 seco Place in rack. -When the test tube cooled, examine th soot deposit. -Which produced the soot? .the flame of the .the flame of the .the flame of an a burner
c. Automotive	The burning of gasoline and diesel fuel adds pollutants to the air. The exhaust fumes from a gasoline or a diesel engine usually contain a high concentration of carbon monoxide.	Discuss with childr answers to the foll questions: -How much carbon mo is produced by a co munity in which th are 10,000 cars? -Suppose each of th 10,000 cars travel 20 miles per day. many pounds of carb monoxide are disch into the air each -If a pound of carb monoxide occupies volume of 14 cubic feet, how many cub feet of this gas a discharged into th each day? -If the distance ea travels is increas 100 miles per day, effect would this h on the amount of ca monoxide that is r

ERSTANDINGS AND AL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	flame of the alcohol burner for 10 seconds. Place in rack. -When the test tubes have cooled, examine them for soot deposit. -Which produced the most soot? .the flame of the candle .the flame of the match .the flame of an alcohol burner	
g of gasoline fuel adds pol- the air. The mes from a r a diesel ally contain centration of oxide.	Discuss with children the answers to the following questions: -How much carbon monoxide is produced by a community in which there are 10,000 cars? -Suppose each of the 10,000 cars travels 20 miles per day. How many pounds of carbon monoxide are discharged into the air each day? -If a pound of carbon monoxide occupies a volume of 14 cubic feet, how many cubic feet of this gas are discharged into the air each day? -If the distance each car travels is increased to 100 miles per day, what effect would this have on the amount of carbon monoxide that is released?	A moving automobile discharges exhaust fumes containing about 2 1/2 pounds of carbon monoxide for every 20 miles that it travels. Seven percent of the fuel used in an automobile emerges as unburned hydrocarbons.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
d. Natural	The air may become polluted by natural events such as dust storms, volcanic eruptions, and forest fires.	Have class committees research and report on forest fires or volcanic eruptions. Consider thei effects on the air. Pictures of such events may be collected for a bulletin board display.
e. Atmospheric conditions	Conditions that produce changes in the speed and direction of the wind indirectly affect the dispersal of pollutants in the air.	Discuss such questions as -How can the temperature of air affect the dispersal of pollutants? -How does the weather co dition known as an

ERSTANDINGS AND AL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
may become pol- natural events dust storms, eruptions, and ires.	Have class committees research and report on forest fires or volcanic eruptions. Consider their effects on the air. Pictures of such events may be collected for a bulletin board display.	Fine dust from violent volcanic eruptions has been known to be carried around the earth by air currents. Some years ago, smoke from a large forest fire in North America was later detected in several countries of northern Europe. During the 1930's, several years of drought created a dust bowl area in mid-western United States. Dust from the drought-stricken states was carried by the wind to some cities located as far away as the Atlantic coast. (From: Science Through Discovery, Grade 6, L. W. Singer Company, Inc., New York)
ons that produce in the speed and on of the wind tly affect the al of pollutants air.	Discuss such questions as: -How can the temperature of air affect the dispersal of pollutants? -How does the weather condition known as an	Weather factors that influence the wind are temperature, barometric pressure, amount of sunlight, and precipitation. The topography of the region,

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
		"inversion" occur? -How does an inversion condition affect air pollution? -What affect does preci itation have on pol- lution? -How does the topograph of the land affect ai pollution? Perform the following e periment to demonstrate an "inversion." -Take a tall, narrow co tainer, such as an oli jar, and fill it half full of motor oil. In troduce water through tube on the surface o the oil. If this is done carefully, it may be possible to fill th cylinder to the top. Normally the water wou be below the motor oil In a like manner, warm air should be found nearer the ground than cold air. However, under certain conditio there is an "inversion of normal affairs and the cold air, like the water, is found on to

DERSTANDINGS AND AL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	"inversion" occur? -How does an inversion condition affect air pollution? -What affect does precipitation have on pollution? -How does the topography of the land affect air pollution?	whether it is level, hilly, or mountainous, also affects air movement.
	Perform the following experiment to demonstrate an "inversion." -Take a tall, narrow container, such as an olive jar, and fill it half full of motor oil. Introduce water through a tube on the surface of the oil. If this is done carefully, it may be possible to fill the cylinder to the top. Normally the water would be below the motor oil. In a like manner, warm air should be found nearer the ground than cold air. However, under certain conditions, there is an "inversion," of normal affairs and the cold air, like the water, is found on top.	Temperature of the air affects the dispersal of pollutants. The unequal heating of the earth's surface by the sun's rays causes the formation and movement of large masses of air. Under normal daytime conditions, the temperature of the air decreases as the altitude above the surface of the earth increases (approximately 5.4°F. for every 1000 feet). A reversal of this condition, as illustrated in the experiment, causes an "inversion" condition. The inversion will last until some change in atmospheric conditions makes it possible for the lower layer of air to move. Precipitation in the form of rain or snow has a cleansing effect on polluted air. Suspended particles of dust and other materials are removed from the air when they collide with raindrops or snowflakes and are carried to the ground.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
3. Harmful effects of air pollution	There is an economic loss, estimated to exceed 11 billion dollars yearly caused by damage of air pollution. In addition, there are serious harmful effects on the health of people.	
a. Health	Air pollutants create harmful effects to people's health.	Perform the following experiment to produce smog: -Smog can be produced by the condensation of water vapor (or other vapors) on solid particles like smoke. -Insert a lighted match in a gallon jug to make small amount of smoke. Blow, with your mouth pressing firmly on the mouth of the jug, and release the compressed air quickly. A smog should form in the jug. Try this blowing activity without the smoke from the match.
b. Agriculture	Many plants are extremely sensitive to the toxic effect of some common air contaminants and may be	You can observe the effect of smog, dust, and exhaust gases on plants.

;R UNDERSTANDINGS AND)AMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
		Many gaseous pollutants dissolve in rain and are removed from the air.
re is an economic loss, imated to exceed billion dollars year- caused by damage of pollution. In ad- ion, there are seri- harmful effects on health of people.		
pollutants create nful effects to ple's health.	Perform the following experiment to produce smog: -Smog can be produced by the condensation of water vapor (or other vapors) on solid particles like smoke. -Insert a lighted match in a gallon jug to make a small amount of smoke. Blow, with your mouth pressing firmly on the mouth of the jug, and release the compressed air quickly. A smog should form in the jug. Try this blowing activity without the smoke from the match.	Some contaminants are actually toxic, e.g., fluorides, hydrogen sulfides, and arsenic. Most commonly, the results are respiratory: irritation of the throat and lungs, coughing, lesions of the respiratory tract, and in severe cases, death from respiratory failure. Some pollutants such as pollen show primarily an allergenic effect. The radioactive pollutants, and a few other types may cause cancer. In the case of ionizing radiation, mutations may be found.
ny plants are extreme- sensitive to the toxic fect of some common air ntaminants and may be	You can observe the effect of smog, dust, and exhaust gases on plants.	An important pollutant that causes damage to vegetation is sulfur dioxide. Sulfur dioxide and oxygen combine

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHI AND LEARNING ACT
	eaten by animals with fatal results.	-Compare the con of trees, shrub other plants gr near a heavily t road with simili shrubs, and plant are growing some tance from the r -With a hand lens amine individual from plants in t cations. Note t sence of dust pa on the surface o leaves. Which l have more dust o to them? Why? -Note any differe the size and col leaves on the pl both locations. -Give a possible tion for any dif that you can fin Science Through Grade 6, L. W. S Inc., New York) Perform the foll periment: to sh pollutants may c stomata or openi leaves of green t and interfere wi passage of water and other gases i out of the leaf.

UNDERSTANDINGS AND ENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
y animals with esults.	-Compare the condition of trees, shrubs, and other plants growing near a heavily traveled road with similiar trees, shrubs, and plants that are growing some distance from the road. -With a hand lens, examine individual leaves from plants in both locations. Note the presence of dust particles on the surface of the leaves. Which leaves have more dust clinging to them? Why? -Note any difference in the size and color of leaves on the plants in both locations. -Give a possible explanation for any differences that you can find. (From: Science Through Discovery Grade 6, L. W. Singer Co., Inc., New York) Perform the following experiment: to show that pollutants may clog the stomata or openings on leaves of green plants and interfere with the passage of water vapor and other gases in and out of the leaf.	with water vapor in the air to form sulfuric air mist. In addition to coniferous and hardwood trees, other plants that are sensitive to sulfur dioxide include leafy vegetable crops, alfalfa, barley, wheat, oats, and trees such as aspen, poplar, and birch. Gaseous pollutants that accumulate on the leaves of plants interfere with photosynthesis, retard growth, and cause destructive changes in the plant tissue. Because of the accumulative nature of these poisons, the animals feeding on these plants also are poisoned. The animals develop a disease that results in decay of the teeth and gums, loss of weight, bone deformities, and eventually death.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
		-Select two or three leaves of a healthy ge nium plant. Coat them with petroleum jelly m ing sure that all surf are covered. Observe condition of these lea on the same plant ove period of time. -An interesting variat of this experiment wo involve coating one le on the bottom surface only, one leaf on the top surface only, and leaf on both sides. conclusions can be dr from this experiment? (From: Air Pollution New York State Educat Dept.)
c. Reduced visibility	Dense layers of smoke and haze over a city may absorb as much as 90 percent of the sunlight in that area and are a frequent cause of traffic accidents.	Discuss with class the following: -How are airlines affe by excessive smoke ov cities? -Find out from the Nat Safety Council what h of the day most auto accidents occur. -Obtain a photographi light meter. Use the to show differences light intensity on d when the air is clea and on days when the is fog or overcast.

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	-Select two or three leaves of a healthy geranium plant. Coat them with petroleum jelly making sure that all surfaces are covered. Observe the condition of these leaves on the same plant over a period of time. -An interesting variation of this experiment would involve coating one leaf on the bottom surface only, one leaf on the top surface only, and one leaf on both sides. What conclusions can be drawn from this experiment? (From: Air Pollution, New York State Education Dept.)	
Dense layers of smoke and haze over a city may absorb as much as 90 percent of the sunlight in that area and are a frequent cause of traffic accidents.	Discuss with class the following: -How are airlines affected by excessive smoke over cities? -Find out from the National Safety Council what hours of the day most auto accidents occur. -Obtain a photographic light meter. Use this to show differences in light intensity on days when the air is clear and on days when there is fog or overcast. Be	

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AND LEARNING ACTIVI
		sure to make the te at the same locatio the room and at th time of day.
D. Control of air pollution		
1. Need for control	The need for control of air pollution is a national concern. Attempts to control pollution of the air are really attempts to prevent pollutants from getting into the air in objectional amounts.	
2. Devices for control	Numerous devices for the control of air pollution are available for use by individuals and industry.	
a. Automotive	Devices are available that reduce to acceptable levels the pollutants produced by motor vehicles.	Discuss the follow. If automobiles we driven by electric instead of gasolin gines, how would a lution be affected -How does an after work to reduce ai lution?

ERSTANDINGS AND AL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	sure to make the tests at the same location in the room and at the same time of day.	
for control of tion is a concern. At- control pol- the air are tempts to pre- utants from nto the air in al amounts.		
devices for ol of air pol- e available for dividuals and		
re available ce to accept- els the pol- roduced by motor	Discuss the following: If automobiles were driven by electric motors, instead of gasoline engines, how would air pollution be affected? -How does an afterburner work to reduce air pollution?	One device for the control of automotive pollution is a canister containing a special chemical. When placed in the car's exhaust system, the special chemical decomposes most of the pollutants. An afterburner consists of a spark plug and an air supply device which are placed in the exhaust system. A spark from the spark plug helps to destroy

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
b. Industrial	Methods have been developed to control air pollution from industrial processes.	Discuss with class an industrial air pollution control system. (See supplementary information) -Have class draw an example of this system, labeling the various components (appendix)

JOR UNDERSTANDINGS AND NDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
		unburned fuel and other contaminates.
thods have been developed to control air pollution from industrial ocesses.	Discuss with class an industrial air pollution control system. (See supplementary information) -Have class draw an example of this system, labeling the various components (appendix)	Methods have been developed to remove the harmful materials discharged into the air through smokestacks. This type of equipment can remove either solid or liquid particles, depending on the size and other physical properties. -Coarse particles of ash and dust are removed by means of a settling chamber. In this chamber, the larger particles fall out of the smoke and fumes because of the influence of gravity. -Smaller particles have to be removed by more effective equipment. In this equipment, the stream of smoke and fumes is rotated at very high speed. This causes many of the fine particles to be removed by collecting on the walls of the device. Water sprays are often used to assist in the removal of fine dust particles. Some of these particles can be collected by passing the smoke and fume stream through a filter of wool, paper, fiber glass, or some suitable material.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING A AND LEARNING ACTIVIT

UNDERSTANDINGS AND ENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
		The electrostatis precipitator is used to remove aerosol particles. This device causes the aerosol particles to become electrically charged. The charged particles are then attracted toward metallic tubes that have an opposite charge. The particles collect on the outside of the tubes. Periodically, the collected material is removed from the tube. -Gaseous pollutants are removed by bubbling them through certain types of solution. The gas either dissolves in the solution or reacts chemically with it. Some gases are removed by passing them through porous materials such as powdered charcoal. The gas molecules are attracted to the surface of the charcoal particles. Other gases can be removed by passing them through or over solid materials which promote chemical reactions. (From: Science Through Discovery, Grade 6. L. W. Singer Company, Inc., New York)

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
3. Measurements of pollution	Special methods have been developed to measure the amounts of different kinds of air pollutants.	
a. Ringelmann chart	The density of smoke coming from a chimney or smokestack is determined with the aid of a Ringelmann chart.	Have class committee est mate the density of smok coming from smokestacks or chimneys in the area. Compare with the Ringelmann chart.

OR UNDERSTANDINGS AND DAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
cial methods have n developed to measure amounts of different ds of air pollutants.		Write to Mr. Harry Hovey, Division of Air Resources, New York State Dept. of Environmental Conservation, 50 Wolfe Road, Albany, New York 12201; for a sample Ringelmann chart.
density of smoke ing from a chimney smokestack is de- mined with the aid a Ringelmann chart.	Have class committee estimate the density of smoke coming from smokestacks or chimneys in the area. Compare with the Ringelmann chart.	A Ringelmann chart consists of a series of grids composed of black lines ruled on a white background. When viewed at arm's length, the grids appear as graduated shades of gray that vary between all white and all black. Each shade of gray represents a certain smoke density. By matching as closely as possible the shade of smoke to the shades of gray on the Ringelmann chart it is possible to estimate the density of the smoke. The lightest shade of gray represents 20 percent density; second grayest, 40 percent; third grayest, 60 percent; and darkest gray, 80 percent. Air pollution control agencies consider a smoke density of no more than 20 percent to be permissible. (From Science Through Discovery, Grade 6. L. W. Singer Company, Inc. New York)

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
b. Dustfall	Dustfall measurement determines the amount of soot, dust, and other particles that settle out of the air.	Perform the following experiment to find out which has more dustfall - the air in the classroom or the air outside of the school: Equipment needed: 2 glass plates (same size), petroleum jelly, microscope, or hand lens. Process: -Evenly cover one side of each glass plate with a layer of petroleum jelly. -Put one of the glass plates on an outside window ledge and the other glass plate in the room where it will not be disturbed. -After one day's exposure, examine the deposit of dustfall on each glass plate with a microscope or hand lens. Note the size, color, and shape of the particles. -Compare the amount of dustfall deposited on each of the plates. Discuss: .Which has more dustfall, the air in the classroom or the air outside? .Can this difference be explained?

RSTANDINGS AND L CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
easurement s the amount of , and other that settle e air.	Perform the following experiment to find out which has more dustfall - the air in the classroom or the air outside of the school: Equipment needed: 2 glass plates (same size), petroleum jelly, microscope, or hand lens. Process: -Evenly cover one side of each glass plate with a layer of petroleum jelly. -Put one of the glass plates on an outside window ledge and the other glass plate in the room where it will not be disturbed. -After one day's exposure, examine the deposit of dustfall on each glass plate with a microscope or hand lens. Note the size, color, and shape of the particles. -Compare the amount of dustfall deposited on each of the plates. Discuss: .Which has more dustfall, the air in the classroom or the air outside? .Can this difference be explained?	To determine the amounts and kinds of particles that settle out of the air, dustfall collection jars are placed on low, flat roofs at several locations. The jars contain distilled water, and in the winter, distilled water and antifreeze. They are exposed for a period of 1 month after which the dustfall is collected and analyzed. The amount of dustfall is usually expressed in tons per square mile per month. Some cities have experienced dustfall deposits of over 300 tons per square mile per month. Recently the dustfall in these cities has decreased to about 50 to 75 tons per square mile per month. The dustfall deposit in rural areas is much less. It amounts to only about five tons per month over each square mile.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
4. Laws and regulations for air pollution control	Numerous laws and regulations regarding air pollution control have been enacted by cities counties, states, and the Federal Government.	
a. Federal	Efforts by the Federal Government to control air pollution have been chiefly in the provision of funds to assist state and local governments.	Discuss with class the following statement and its implications for air pollution control: -A recent Federal law requires that all new motor vehicles sold in the United States must be equipped with devices which limit the escape of exhaust pollutants such as carbon monoxide and unburned fuel.
b. State	The laws and regulations adapted by states have, in general, attempted to define standards of air quality.	Collect and display current articles from newspapers and magazines, concerning air pollution in New York State. Discuss the reasons why the metropolitan area of New York City and the Niagara-Frontier area of western New York are the worst areas of air pollution.
c. Local	Many of the laws and regulations of cities and counties relate to	Discuss with the class: -Are there regulations regarding the burning of

NDERSTANDINGS AND NTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
s laws and regu- regarding air on control have acted by cities s, states, and eral Government.		
by the Federal ent to control lution have been in the provision s to assist state al governments.	Discuss with class the following statement and its implications for air pollution control: -A recent Federal law requires that all new motor vehicles sold in the United States must be equipped with devices which limit the escape of exhaust pollutants such as carbon monoxide and unburned fuel.	The following are key acts passed by Congress: - Research and Technical Assistance Act - 1955 - Clean Air Act - 1963 - Solid Waste Disposal Act - 1965 - Air Quality Act - 1967
s and regulations l by states have, eral, attempted to standards of air .	Collect and display current articles from newspapers and magazines, concerning air pollution in New York State. Discuss the reasons why the metropolitan area of New York City and the Niagara-Frontier area of western New York are the worst areas of air pollution.	To a considerable extent, New York State's problems are interstate. In New York City and its environs, the prevailing winds bring smoke and pollutants from New Jersey and deposit them in New York. Because of the heavy concentration of industry and the large population, the metropolitan area of New York City and the Niagara-Frontier area of western New York are the worst areas of air pollution.
f the laws and tions of cities untics relate to	Discuss with the class: -Are there regulations regarding the burning of	

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
	the burning of fuels, the use of incinerators, and other operations that create air pollution problems.	soft coal as a fuel in the community? -What specific action is being taken in the community regarding air pollution control? -Is this action adequate or inadequate? Why? -What action can students take regarding air pollution?
V. Food Protection		
A. Importance for health	Safe, adequate, nutritious food is necessary for good health.	Discuss with pupils the four basic food groups. Have pupils make a picture collection for a bulletin board display of examples of food from the four groups. Label as to group designation. See Strand I, Nutrition Grades 4, 5, 6.
B. Food handling	Proper food handling produces safe, attractive, and nutritious food.	
1. Definition of food handling	Food handling means all the things that happen to food from the time it is grown until the time it is eaten.	Have class committee research a specific food from its source to the table. Draw a mural illustrating this process.

UNDERSTANDINGS AND MENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
urning of fuels, se of incinerators, ther operations that e air pollution prob-	soft coal as a fuel in the community? -What specific action is being taken in the community regarding air pollution control? -Is this action adequate or inadequate? Why? -What action can students take regarding air pollution?	As more and more citizens become aware of the dangers and the increasing seriousness of air pollution, there will be an increased demand for more adequate laws controlling the release of pollutants.
adequate, nutri- food is necessary ood health.	Discuss with pupils the four basic food groups. Have pupils make a picture collection for a bulletin board display of examples of food from the four groups. Label as to group designation. See Strand I, Nutrition Grades 4, 5, 6.	The four basic food groups include: -milk -vegetable-fruit -meat -bread-cereal. Man depends on food: -to sustain life -to provide energy -to prevent deficiency diseases e.g., rickets, scurvy, and pellagra.
r food handling pro- s safe, attractive, utritious food.		
handling means he things that hap- to food from the it is grown until time it is eaten.	Have class committee research a specific food from its source to the table. Draw a mural illustrating this process.	Handling includes the following processes: -farming (planting - harvesting) -processing .freezing

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
2. Contamination problems	Food becomes contaminated through improper handling.	Discuss the potential sources of food contamination in one or more areas of food handling (farming--use of insecticides; canning--improper cooking temperature)
	Rapidly perishable foods are more difficult to keep free from contamination.	Ask children to describe and draw conclusions on the following experiment: Keep some milk unrefrigerated in the room and an equal amount under refrigeration. After a few days compare the differences between the milk samples. -What happened? -Why? -What is the cause? A chart can be kept on the length of time that passes before the refrigerated sample of milk sours.

JOR UNDERSTANDINGS AND IDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
		.drying .canning .freeze-drying .smoking .pickling -packaging -storage -distribution -preparation for eating.
od becomes contaminated rough improper hand- ng.	Discuss the potential sources of food contamination in one or more areas of food handling (farming--use of insecticides; canning--improper cooking temperature)	Microorganisms need warmth, food, water to live. They are injured or destroyed by sunlight, drying, extremes of temperature, and a variety of chemicals.
pidly perishable foods e more difficult to ep free from contami- tion.	Ask children to describe and draw conclusions on the following experiment: Keep some milk unrefrigerated in the room and an equal amount under refrigeration. After a few days compare the differences between the milk samples. -What happened? -Why? -What is the cause? A chart can be kept on the length of time that passes before the refrigerated sample of milk sours.	Examples of rapidly perishable foods are: -milk and milk products -salads and food combinations -food from the meat group (meat, fish, poultry, eggs) -pasteries, custards, pies.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
	Milk is pasteurized to destroy the microorganisms that cause disease.	Have a committee of children research the life of Louis Pasteur or teacher may read story to the class. A skit can be written and acted out of the discovery of pasteurization. -Was this an example of a carefully planned scientific experiment? -What was the motivation? Was it critical? Explain. -Does it still apply today? -Was it a group effort or primarily the work of an individual?
3. Additive problems	Additives which are sometimes used during handling may be a source of potential contamination.	Have children bring food wrappers/labels to find out what ingredients have been added for color, flavor, or preservation.

RSTANDINGS AND L CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
steurized to e microorgan- cause disease.	Have a committee of children research the life of Louis Pasteur or teacher may read story to the class. A skit can be written and acted out of the discovery of pasteurization. -Was this an example of a carefully planned scientific experiment? -What was the motivation? Was it critical? Explain. -Does it still apply today? -Was it a group effort or primarily the work of an individual?	Two major methods of pasteurization are: .holding method .milk is heated and held at 145°F. for 30 minutes and rapidly cooled at 45°F. -flash method .milk is heated to 161°F. for 15 seconds and then rapidly cooled. Examples of diseases that may be incurred from food sources include: -milk borne .tuberculosis .typhoid .brucellosis .septic sore throat .scarlet fever -meat borne .parasitic (trichinosis, tapeworm) .septemia .pyemia -other food borne .salmonellosis .botulism food poisoning .staphylococcus poisoning .clostridium perfringens
which are used during ay be a source al contamina-	Have children bring food wrappers/labels to find out what ingredients have been added for color, flavor, or preservation.	Additives are used in food for the purpose of preserving coloring, thickening and flavoring. These additives may or may not be harmful.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
C. Supervision of food		
1. Agencies-laws	Laws, regulated by various governmental agencies. require that food stores and food handlers maintain high sanitary standards to avoid transmission of disease.	Have class committee invite local food business operator to talk to the class about sanitation regulations in the operation of his business. Visit the school cafeteria or invite the dietician to speak to the class concerning the procedure required to safeguard food production and service, as well as nutritional value.

UNDERSTANDINGS AND ENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
		Some additives are: -iodine in salt -coloring -non-nutritive sweeteners -preservatives (sodium benzoate)
regulated by vari- overnmental agencies, re that food stores ood handlers main- igh sanitary stan- to avoid transmis- of disease.	Have class committee invite local food business operator to talk to the class about sanitation regulations in the operation of his business. Visit the school cafeteria or invite the dietician to speak to the class concerning the procedure required to safeguard food production and service, as well as nutritional value.	Sanitary codes require routine inspection of establishments where food is: -sold -manufactured -prepared -processed -stored -served. Examples of governmental agencies: -Food and Drug Administration .enforces pure food and drug law .implements the law for products other than meat and poultry .conducts extensive animal tests with additives before these can be released for human use -Public Health Service .investigates epidemics .teaches home sanitation technique

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AI AND LEARNING ACTIVITI
2. The consumer	Each person must accept the responsibility of safeguarding his food against contamination.	Have children clip pi tures and articles pe taining to food handl Discuss these pictur and articles with th Ask pupils to: -itemize foods lefto at home for 2 days -tell how leftovers handled.

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
		.supervises shellfish growing, shopping, storing .prints informative publications -U.S. Department of Agriculture .inspects meat through the Bureau of Animal Industry -State Health Department .investigates epidemics .teaches home sanitation technique .prints information publications .develops standards and trains sanitarians .makes inspections and evaluates local programs -state departments of agriculture -county health departments .cooperate with state agencies .speak to groups .inspect .train operators and food handlers
Each person must accept the responsibility of safeguarding his food against contamination.	Have children clip pictures and articles pertaining to food handling. Discuss these pictures and articles with the class Ask pupils to: -itemize foods leftover at home for 2 days -tell how leftovers were handled.	When handling food at home: -keep hands clean -minimize hand-food contact -use clean utensils and dishes -refrigerate cold foods after purchasing -remove leftovers (food cooked and uneaten) from table promptly,

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
		- How can this be improved?
VI. Water Treatment A. Improvement to health	Effective treatment of human wastes is important to the maintenance of health.	Have class committee find out what the local facilities and methods are for collection and disposal of sewage and refuse. Discuss with children what makes up sewages. (toilet wastes, bath wastes, sink wastes, excretion)

JOR UNDERSTANDINGS AND NDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	- How can this be improved?	cover to exclude insects and rodents, refrigerate without cooling. Guidelines for eating away from home: -choose restaurants carefully -report to health department restaurants which are not clean -report to health department an illness suspected to have come from contaminated food.
fective treatment of nan wastes is important to the maintenance health.	Have class committee find out what the local facilities and methods are for the collection and disposal of sewage and refuse.	Wastes are classified as: -sewage (liquified wastes discharged into community sewers, septic systems or cess pools) -refuse(solid wastes not carried by sewers).
	Discuss with children what makes up sewages. (toilet wastes, bath wastes, sink wastes, excretion)	Treatment of wastes involves process of: -collection -transportation -storage -discharge -decomposition Accumulated wastes affect healthful living standards by: -creating offensive odors -destroying natural beauty of land -attracting insects, rodents, and disease-causing organisms

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AND LEARNING ACTIVITIES
B. Sewage (liquid waste)	The effective treatment and safe discharge of sewage is a primary health concern.	Discuss with children t following terms in connection with sewage tre ment: -tertiary treatment -secondary treatment -primary treatment (See supplementary information.) Arrange a field trip t sewage treatment plant. Ask the tour guide to explain the treatment process used at the pla Have a committee write letter to a local indus try asking them to explain how they safely dispose of their sewag and industrial wastes. Have class make a diagram of a sewage treatment plant showing how sewage is treated. (Th can be prepared on a transparency for class work.)

UNDERSTANDINGS AND ENTAL CONCEPTS	SUGGESTED TEACHING AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
		-contaminating water supplies and water recreation areas. See Appendix A.
fective treatment fe discharge of is a primary concern.	Discuss with children the following terms in connection with sewage treatment: -tertiary treatment -secondary treatment -primary treatment (See supplementary information.)	Sewage treatment involves the following processes: -Basic treatment .Entering raw sewage passes a bar screen which removes large metal, wooden, and plastic items. The sewage then flows to a grit chamber where other solid material is scraped from the bottom and taken to a dump.
	Arrange a field trip to a sewage treatment plant. Ask the tour guide to explain the treatment process used at the plant.	The sewage then flows to a primary sedimentation tank. Remaining suspended solids are allowed to settle in a tank or separated from the liquids by centrifugal action. Floating solids are skimmed from the top. The sludge is then pumped to a tank known as a digestor. Here the temperature is raised to allow decomposition by bacterial action. After such decomposition, the material is pumped to drying beds where the remaining water is drained off or evaporated.
	Have a committee write a letter to a local industry asking them to explain how they safely dispose of their sewage and industrial wastes.	
	Have class make a diagram of a sewage treatment plant showing how sewage is treated. (This can be prepared on a transparency for class work.)	

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
		Conduct the following experiment on the action of a settling tank: Mix some soil, sawdust, and pieces of food in a gallon of water. Stir the mixture well. Pour through a screen into four quart jars. Use a screen with larger holes than a window screen. Each quart jar is a settling tank. Let the jars stand for a day or two. Discuss: -What comes to the top? -What settles to the bottom? Notice that the water is still very cloudy because of the very fine particles that are still in it.

JOR UNDERSTANDINGS AND NDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	Conduct the following experiment on the action of a settling tank: Mix some soil, sawdust, and pieces of food in a gallon of water. Stir the mixture well. Pour through a screen into four quart jars. Use a screen with larger holes than a window screen. Each quart jar is a settling tank. Let the jars stand for a day or two. Discuss: -What comes to the top? -What settles to the bottom? Notice that the water is still very cloudy because of the very fine particles that are still in it.	-Primary treatment .This involves taking the water which has been through the basic treatment, chlorinating it, and then releasing it into a suitable waterway. -Secondary treatment .This involves allowing the liquid portion from the settling tanks to trickle through a filter bed of crushed stone. This removes the fine, suspended solids from the liquid portion and renders a more highly purified effluent. These remaining solids are degraded by bacterial action and digested by algae growing on the stones. The water that filters through the bed is drawn from the bottom and, after chlorination, is fed to a stream. -Tertiary treatment .This treatment consists of holding the water in a final sedimentation tank and then aerating it before chlorination and discharge into a receiving stream. This

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHI AND LEARNING ACT
	Many problems of municipal sewage treatment remain.	Ask a local hous oper to speak to concerning the t sewage system pr for in the devel the kind of trea being conducted; ance of the syst the provisions f pansion. Invite an operat septic tank clea cern to speak to to discuss opera maintenance of s tanks.

UNDERSTANDINGS AND MENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
		step renders water suitable for recirculation and reuse. (From: Water Pollution, State Education Department) Sewage can be a cause of a dangerous form of water contamination by micro-organisms contained in human wastes resulting in serious disease such as: -cholera -dysentery -hepatitis -parasitic infections -typhoid fever.
problems of municipal sewage treatment in.	Ask a local housing developer to speak to the class concerning the type of sewage system provided for in the development; the kind of treatment being conducted; maintenance of the system; and the provisions for expansion. Invite an operator of a septic tank cleaning concern to speak to the class to discuss operation and maintenance of septic tanks.	New York State Department of Health took action in 1965 to encourage communities to update sewage treatment facilities. It provided for the establishment of minimum standards for treated wastes discharged into New York State waters. Some unsolved problems of modern sewage treatment include: -population growth which makes existing systems grossly inadequate, -lack of available funds .new facilities not installed .old facilities in disrepair

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AID AND LEARNING ACTIVITIE
C. Refuse (solid wastes)	Refuse is defined as the trash, garbage, and other materials which no longer have a use.	Discuss the three majo classes of refuse (ga bage, combustible rubb noncombustible rubbish Discuss questions as: -What does combustibl mean? -How can you get rid o things that won't bu -What problems does b ing cause? -What are some advant and disadvantages of "no deposit" bottles
	There are many methods of treating refuse such as: -burning -burying -compaction -decomposition.	Invite the school mai tenance man to discus with the class how sc refuse is collected a disposed and what par the students can play
		Have class committees search and report to -how residential comm refuse is collected disposed of -how commercial commu (shopping centers, o building,etc.) refu collected and dispo of

R UNDERSTANDINGS AND AMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
		-lack of large enough land areas -combined sewers (sanitary sewers and storm sewers).
se is defined as the n, garbage, and other rials which no lon- nave a use.	Discuss the three major classes of refuse (garbage, combustible rubbish, noncombustible rubbish) Discuss questions as: -What does combustible mean? -How can you get rid of things that won't burn? -What problems does burning cause? -What are some advantages and disadvantages of "no deposit" bottles?	Refuse amounts to 18 million tons of trash and garbage a year in the State of New York - one ton per person per year.
e are many methods reating refuse such ning ying ipaction composition.	Invite the school maintenance man to discuss with the class how school refuse is collected and disposed and what part the students can play. Have class committees research and report to class: -how residential community refuse is collected and disposed of -how commercial community (shopping centers, office building, etc.) refuse is collected and disposed of	Refuse treatment procedures: -storage in receptacles -collection .public works department .private company licensed by state to collect refuse disposal methods .sanitary landfill (a) refuse compacted (b) covered with earth daily (c) efficient, inexpensive when land is available .incineration .open dumping

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AID AND LEARNING ACTIVITIE
		-types of receptacles able for refuse stora and the advantages a disadvantages of the ious types.
		Discuss with children advantages and disadva tages of the methods o disposal presently use the community. Ask such questions as: -Is it adequate? -Will it need to be changed to take care community changes wit the next 10 years?
		Have pupils determine amount of trash dispos of by their family fo day (number of sacks, How much does the enti class represent?
	Inadequate disposal of refuse produces unhealthy, unsanitary, and unsightly environmental conditions.	Have children make a c lage of pictures of ar blighted by dumps, unc lected refuse, etc.
		Form a class cleanup campaign to clean up t school. This committe could work in conjunct with committees from o classes.

AJOR UNDERSTANDINGS AND UNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	-types of receptacles available for refuse storage and the advantages and disadvantages of the various types.	(a) unsanitary (b) source of pollution, odor, disease .compaction (a) for reusable material (b) in experimental stage . compositing organic refuse converted to humus-like material . recycling cans, glass bottles, etc.
	Discuss with children the advantages and disadvantages of the methods of disposal presently used in the community. Ask such questions as: -Is it adequate? -Will it need to be changed to take care of community changes within the next 10 years?	aws concerning sanitary efuse treatment: -New York State Sanitary Code (1963) (part 19) - sets standards for operation and maintenance of refuse disposal facilities. -Federal Solid Wastes Act (1965) provides funds for research and demonstration projects.
adequate disposal of fuse produces unalthy, unsanitary, and sightly environmental nditions.	Have pupils determine the amount of trash disposed of by their family for a day (number of sacks, etc.) How much does the entire class represent? Have children make a collage of pictures of areas blighted by dumps, uncollected refuse, etc. Form a class cleanup campaign to clean up the school. This committee could work in conjunction with committees from other classes.	Problems of inadequate refuse disposal arise because: -increases in population result in increased amounts of waste -industry has created almost indestructible packaging materials -historic methods are ineffective .space for dumping is becoming unavailable

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
VII. Insects and Rodents	Many insects and rodents cause or contribute to unhealthful conditions. By changing these conditions that encourage the breeding, feeding, and watering of rodents and insects, man can inhibit their number.	Discuss with children the conditions which contribute to increases in the numbers and kinds of pests. Have committee list areas in the school, home, and community which are potential breeding places for pests.
A. Rodents	Rodents contribute to unhealthy conditions.	Have individual children or committees research and report on such items as: -habits and behavior of rats: eating, nesting, travel routes -abilities of rats: hearing, sight, agility

STANDINGS AND CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
		.incineration methods pollute the air Hope for the future rests with: -materials being recycled (aluminum cans) -materials being recovered (sewage sludge for fertilizer) -materials being reused (glass bottles) -discovery of new disposal systems -consumer demand for refuse-free packaging from industry.
s and rodents ntribute to conditions. these con- iat encourage ig, feeding, ig of rodents s, man can eir number.	Discuss with children the conditions which contribute to increases in the numbers and kinds of pests. Have committee list areas in the school, home, and community which are potential breeding places for pests.	Conditions which favor the survival and multiplication of pests are: -improper individual and community disposal of sewage, animal droppings; -throwing trash in empty lots, along streets, etc.; -unprotected food supplies; -stagnant water.
ntribute to conditions.	Have individual children or committees research and report on such items as: -habits and behavior of rats: eating, nesting, travel routes -abilities of rats: hearing, sight, agility	Recognizing common rodents: 1. Rats Norway rats .most common infesting homes and businesses .largest (a) length - 7 to 10 in. (b) weight - 3/4 lb. .usually gray, also reddish brown and black

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AND LEARNING ACTIV
B. Insects	Insects contribute to unhealthy environmental conditions.	Discuss with clas ious common insec the conditions un they are prevalen Take a field trip a stagnant pond o insect breeding a discover the cond conducive to the of insects.
C. Need for control	It is necessary to control insects and rodents as they are an annoyance to comfortable living and may transmit diseases.	Discuss with pupi potential consequ uncontrolled insc rodent population

UNDERSTANDINGS AND MENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
		Roof rats .smaller than Norway rats (a) length - 6 to 8 in. (b) weight - 1/2 lb. .gray or black 2. House mouse .half length of rat .large ears Common signs of rodent infestation: -gnawing -burrows -droppings -runways -footprints or tail marks -rat odor from urine -old nests -live or dead rodents.
s contribute to thy environmental ions.	Discuss with class various common insects and the conditions under which they are prevalent. Take a field trip to see a stagnant pond or other insect breeding area to discover the conditions conducive to the breeding of insects.	Common household insects include: -household fly -mosquito -bedbug -ant -cockroach -flea -moth.
necessary to control insects and rodents ey are an annoyance fortable living and transmit diseases.	Discuss with pupils the potential consequence of uncontrolled insect and rodent population.	Potential consequences of uncontrolled fly population: -diseases

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING A AND LEARNING ACTIVIT
		Have class committee search and report on pests have affected h tory by infecting ma with yellow fever, malaria, plague, and c diseases. These repo may be skits or well oral reports.
D. Methods of control	Man uses various methods to control or destroy rodents and insects. This battle must be a persistent one for all people.	Discuss with class the various methods of rod and insect control. Discuss with children statement: "Sanitatio is the safest and most effective means of con trolling insects." Have class make a chai for the bulletin board

OR UNDERSTANDINGS AND DAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	Have class committee research and report on how pests have affected history by infecting man with yellow fever, malaria, plague, and other diseases. These reports may be skits as well as oral reports.	.worm infection .infection on skin .dysentery .other communicable diseases carried from contaminated sources -annoyance: .biting .buzzing .destruction of food supplies. Potential consequences of uncontrolled rat population: -diseases, such as, .murine typhus fever .rat bite fever .salmonellosis .hemorrhagic jaundice .plague - pneumonic, bubonic leptospirosis -annoyance .damaging food .frightening people -damage to buildings - wiring.
uses various methods ontrol or destroy nts and insects. battle must be a istent one for all ple.	Discuss with class the various methods of rodent and insect control. Discuss with children the statement: "Sanitation is the safest and most effective means of controlling insects." Have class make a chart for the bulletin board	Methods of rat control: -proper sanitation .adequate refuse and sewage treatment (most effective because result is to starve the rats and deprive them of breeding places) -use of .poisons/pesticides .traps .fumigation

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHIN AND LEARNING ACT
		listing various p their proper use tential harm.
		Have class commit sign leaflet and ters for homeowne encourage and ex pest control and tion.

OR UNDERSTANDINGS AND DAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
	listing various pesticides, their proper use and potential harm.	.rat proofing .port regulations by Public Health Services.
	Have class committee design leaflet and/or posters for homeowners to encourage and explain pest control and prevention.	Methods used for fly control: -prevent breeding by: .protecting food .adequate refuse and sewage treatment -insecticides -fly traps - swatters -screening. Methods used for mosquito control -during larval (acquatic) stage: .remove stagnant water (drainage, filling with dirt, oil application to standing water) .stock lakes with larvae-eating fish; -during adult stage: .screening .aerosal sprays .DDT residual sprays (outlawed in some areas) -mosquito bars. Pesticides have played an important role in controlling insects in: -improved agricultural yields -improved national nutritional status.

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES
E. Responsibility for control	Individual citizens, private agencies and government share a responsibility for the control of insects and rodents.	Discuss with class such questions as: -What can you do at hom to help in controllin insects? -Why are flies and mos quitos a summertime pr lem? -Why do cities have greater rodent problem than suburbs? Invite an operator of a exterminating company t speak to the class con cerning insect and rode control. -How does he guard against polluting the environment? -What kinds of technic does he use?

UNDERSTANDINGS AND ENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
		Recently alternative approaches have been sought because: -contamination is accumulating and the ecological balance is upset.
dual citizens, e agencies and ment share a re- bility for the l of insects and s.	Discuss with class such questions as: -What can you do at home to help in controlling insects? -Why are flies and mosquitos a summertime problem? -Why do cities have greater rodent problems than suburbs? Invite an operator of an exterminating company to speak to the class concerning insect and rodent control. -How does he guard against polluting the environment? -What kinds of technique does he use?	Individuals can control insects and rodents by: -keeping garbage cans clean and closed -keeping food protected -not allowing water to collect in drains, ditches, containers -rat proofing food storage areas -keeping screens in good repair -filling all crevices in and around buildings -using insecticides and pesticides carefully Agencies can control insects and rodents by: -enforcing laws .against open dumping .regulating hog feeding .pertaining to health and building codes -furnishing services, such as .garbage disposal .pest control .information distribution.

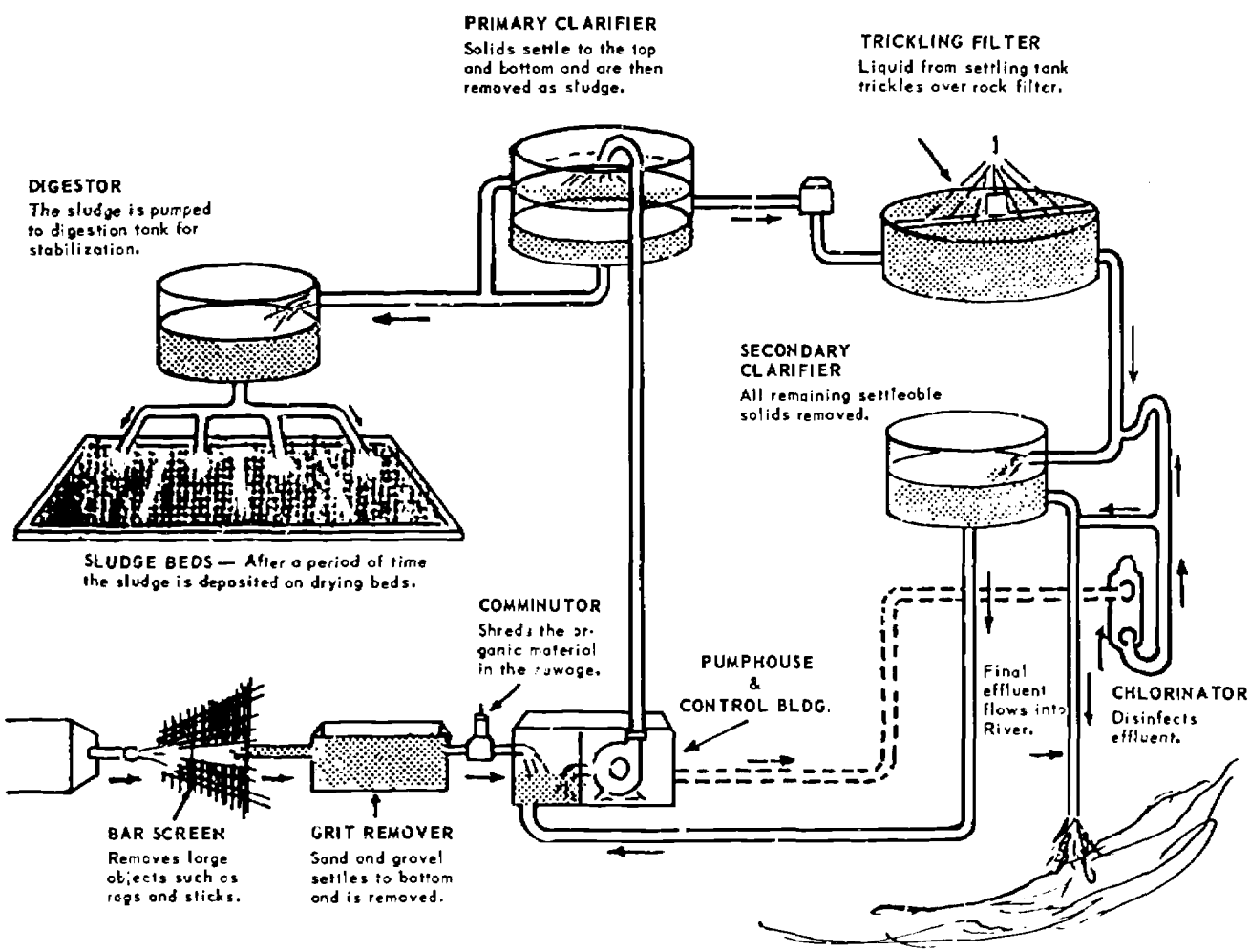
REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHIN AND LEARNING ACTI
VIII. Maintaining a Healthful Environment		
A. In the home	A healthful home environment provides family members with a safe, disease-free place to live.	Research and rep the three compon home environmen clothing, shelt culture differer yours. Illustra report with dra pictures from
1. Purpose		
2. Responsibility	Each family member shares the responsibility of maintaining a safe and healthy home environment.	Have class act showing -the role of a mother, and a -how each role to a healthy h vironment.
B. In the community	A healthful community is one that is a safe, desirable place in which to live and work.	Have pupil story or skit a day/week a serv down (garbage d electricity, pu portation). In these problems the individual community.
1. Purpose		
2. Service-responsibility	Communities need many health services to meet the needs of their members. These services are the responsibility of individuals, voluntary service groups, and governmental agencies at	Have children d mural or collec for a college d services that a for through tax (garbage collec maintenance, et

)R UNDERSTANDINGS AND)AMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
:althful home environ- provides family)ers with a safe, :ase-free place to ?.	Research and report on the three components of home environment (food, clothing, shelter) in a culture different from yours. Illustrate the report with drawings or pictures from magazines.	Components of home environment pertain to food, clothing, and shelter. These components are different in different cultures. See Strand III, Mental Health, 4, 5, 6.
ı family member res the responsibility aintaining a safe and lthy home environment.	Have class act out a skit showing: -the role of a father, a mother, and a child -how each role contributes to a healthy home environment.	
:althful community is that is a safe, desir- place in which to and work.	Have pupils create a story or skit about the day/week a service broke down (garbage disposal, electricity, public transportation). Indicate how these problems affected the individual and the community.	
nunities need many lth services to meet needs of their mem- . These services the responsibility ndividuals, volun- service groups, and rnmental agencies at	Have children draw a mural or collect pictures for a collage depicting services that are paid for through taxes or fees (garbage, water, road maintenance, etc.).	Community health services include: -garbage removal -protection of food, water, air -utilities .gas and oil

REFERENCE	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AI AND LEARNING ACTIVITI
	the Federal, State, and local levels.	

UNDERSTANDINGS AND MENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
ederal, State, and levels.		.water .electricity .telephone -medical .hospital and clinics -transportation .mass transportation .road maintenance -social services .welfare .rehabilitation -recreation. Individuals assume responsibility by: -paying taxes and giving donations -caring for private and public property -joining community groups. Voluntary service groups donate time and money for the betterment of the community. Agencies at the Federal, State and local levels share responsibility for maintaining community health. Teacher reference: See the telephone directory for listing of various agencies.

HOW A SEWAGE TREATMENT PLANT WORKS



SCHEMATIC DIAGRAM WATER TREATMENT PLAN

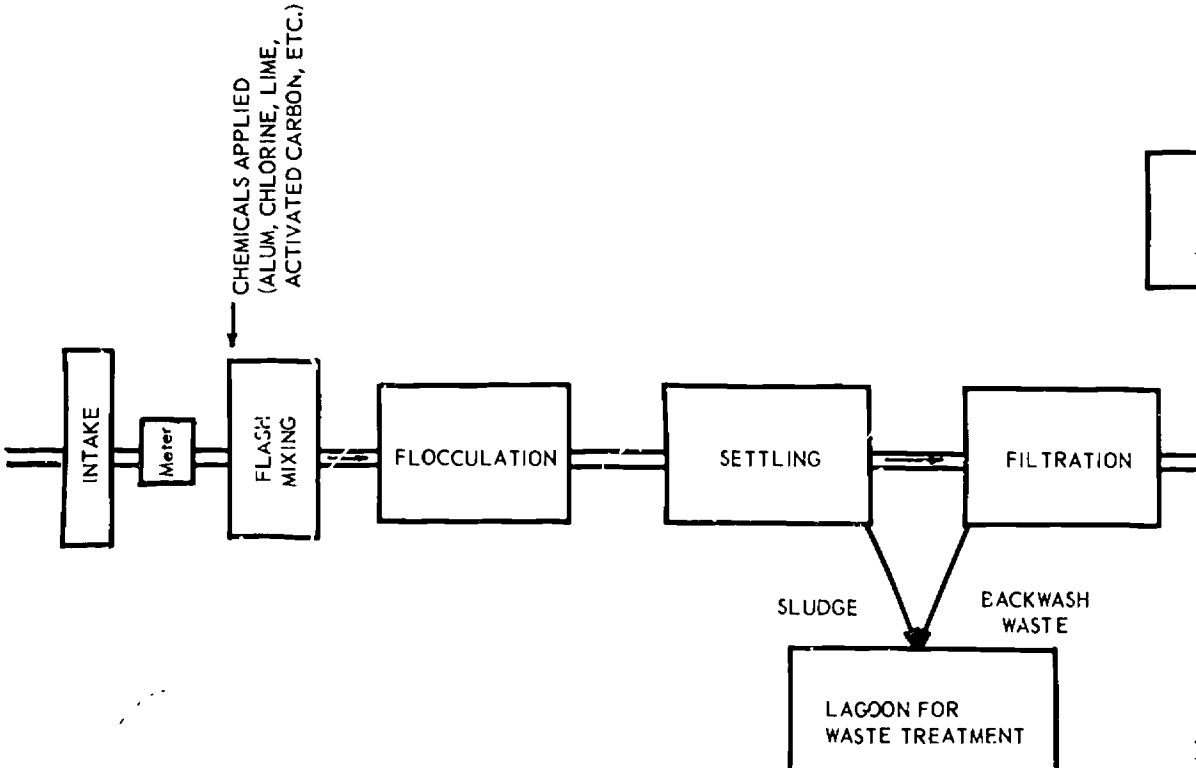
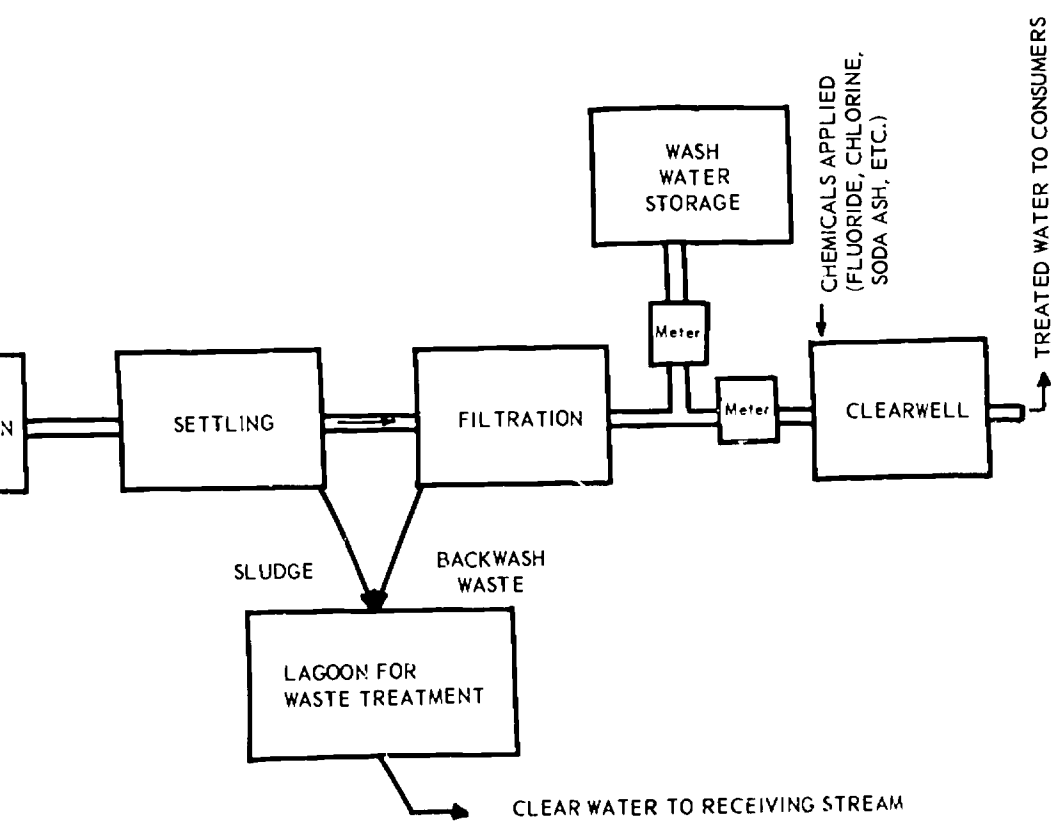
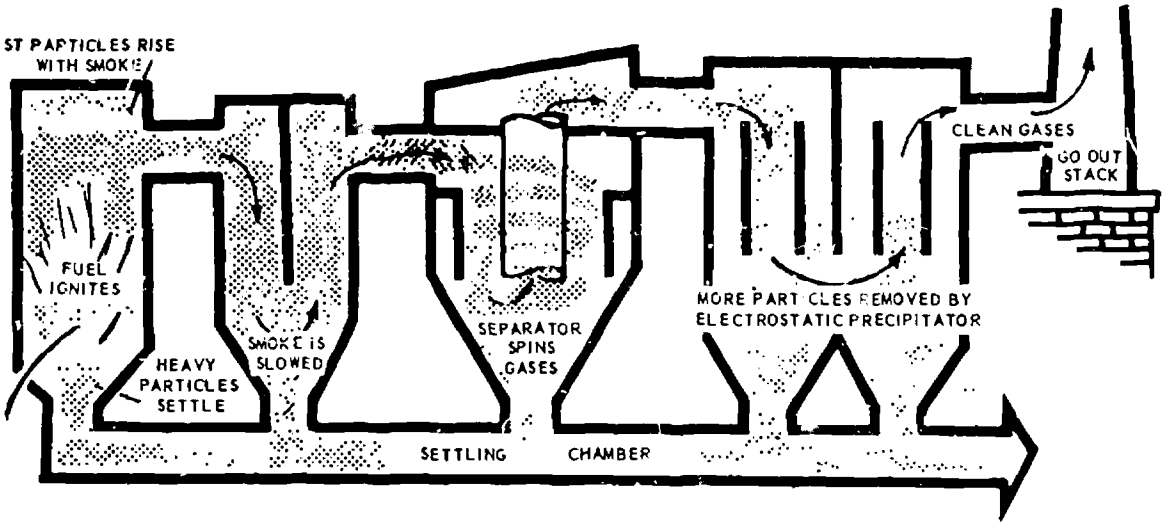


DIAGRAM WATER TREATMENT PLANT





AN INDUSTRIAL AIR POLLUTION CONTROL SYSTEM

APPENDIX D - SCIENTISTS AND THEIR CONTRIBUTIONS

Curie, Marie	A scientist who, with her husband Pierre, won the Nobe discovery of radium.
Fleming, Alexander	A British scientist who discovered that penicillin can
Hippocrates of Cos	A Greek physician whose beliefs constituted the beginn
Jenner, Edward	An English physician who learned how to vaccinate peopl immune to smallpox.
Leeuwenhock, Anton van	The Dutch scientist who made one of the first microscop microorganisms.
Lister, Joseph	An English surgeon who found that carbolic acid spraye the air. Lister's discovery has helped reduce the ri
Pasteur, Louis	A French chemist who discovered that heat can kill bact from the air.
Salk, Jonas E.	An American physician who helped to find a vaccine tha to polio.

PPENDIX D - SCIENTISTS AND THEIR CONTRIBUTIONS

cientist who, with her husband Pierre, won the Nobel Prize in 1903 for the iscovery of radium.

ritish scientist who discovered that penicillin can kill certain germs.

reek physician whose beliefs constituted the beginning of medical science.

English physician who learned how to vaccinate people so they would be mmune to smallpox.

Dutch scientist who made one of the first microscopes and used it to study icroorganisms.

English surgeon who found that carbolic acid sprayed in the air will sterilize he air. Lister's discovery has helped reduce the risk of infection in surgery.

rench chemist who discovered that heat can kill bacteria which enters food rom the air.

American physician who helped to find a vaccine that makes most people immune to polio.

APPENDIX C

Full Names, Addresses, and Telephone Numbers of the Regional Offices c

NEW YORK CITY OFFICE

270 Madison Avenue, New York, New York 10016
Area Code 212 689-9070

ALBANY REGIONAL OFFICE

Room 412, Taxation and Finance Building No. 9
The State Campus, Albany, New York 12226
Area Code 518 457-5150

BUFFALO REGIONAL OFFICE

584 Delaware Avenue, Buffalo, New York 14202
Area Code 716 842-4336

ROCHESTER

1122 Comme
Rochester
Area Code

SYRACUSE I

Room 245,
333 East M
Area Code

WHITE PLAI

901 North
Area Code

APPENDIX C

Telephone Numbers of the Regional Offices of New York State Health Department

K, New York 10016

nce Building No. 9
ew York 12226

o, New York 14202

ROCHESTER REGIONAL OFFICE

1122 Commerce Building, 119 East Main Street
Rochester, New York 14604
Area Code 715 546-6556

SYRACUSE REGIONAL OFFICE

Room 245, State Office Building
333 East Washington Street, Syracuse, New York 13202
Area Code 315 474-5951

WHITE PLAINS REGIONAL OFFICE

901 North Broadway, White Plains, New York 10603
Area Code 914 949-6314

ENVIRONMENTAL AND PUBLIC HEALTH

Multimedia Resources (K-6)

These supplemer
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ENVIRONMENTAL AND PUBLIC HEALTH

Multimedia Resources (K-6)

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AUDIOVISUAL AIDS

FILMS

All requests for the following films should be addressed to:

Film Library Supervisor
Office of Public Health Education
New York State Department of Health
84 Holland Avenue
Albany
New York 12208

"Air pollution, everyone's problem." 20 min. Color.
The story of air pollution, its causes and effects.

"Crisis on our rivers." 13 1/2 min. Color.
This up-to-the-minute film deals with a problem common to every state in th
It emphasizes that water pollution is the responsibility of every citizen. Na
personality, John Daly.

"A decent burial." 12 1/2 min. Color.
This is an entertaining sound-color film explaining the simplicity, effecti
sanitary-landfill method of refuse disposal.

"Every drop a safe one." 10 min.
Illustrates the danger of drinking water from streams exposed to pollution.

"The first mile up." 28 min.
This film is a study of the current air pollution problem. Factors involve
discussed.

. McGraw-Hill Book Co. 1969.

Rand McNally. 1968. (Somewhat advanced but very readable.)

AUDIOVISUAL AIDS

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ork 12208

min. Color.
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lor.
th a problem common to every state in the Union - stream pollution.
the responsibility of every citizen. Narration done by TV

film explaining the simplicity, effectiveness, and economy of the
sposal.

water from streams exposed to pollution.

t air pollution problem. Factors involved in air pollution are

"Health and the cycle of water." 20 min.
Dramatic interest is supplied in this film by the trials and tribu
thetical small town in the 1890's when stream pollution was more the

"A healthier place to live." 12 min.
Stresses the basic principles of environmental sanitation and was
farm labor camp. A story of actual camp life demonstrating practices

"Keep 'em out." 10 min.
Shows how rats spoil food, destroy buildings, spread disease. Dem
trapping, and ratproof construction of buildings.

"Key to progress." 20 min. color.
This film is an excellent presentation of community efforts to ob

"Municipal sewage treatment processes." 13 min.
An excellent informative film depicting the basic methods of sewa
from polluting streams or becoming a health menace.

"Safe drinking water from small water supplies." 11 min.
The unsafe features of bored, driven, and drilled wells illustrat
gether with the correct and safe methods of installation and design.

"The third pollution." 23 min. color.
This film demonstrates and explains how burning refuse contribute
refuse contaminates water.

"Water." 14 1/2 min. color.
The general problems related to worldwide water needs and availab
Nations-sponsored film. It shows the need for cooperation among cou

"The waters around us." 25 min.
A documentary film dealing with the problem of water pollution a

"Wise use of water resources." 13 1/2 min. color.
Live science photography diagrams and animation explain and illu
of water, its abundance, its value as a natural resource, and its u
methods are emphasized throughout the presentation.

"With each breath." 28 1/2 min. color.
This film narrated by Hume Cronyn, deals with issues involved in

.er." 20 min.
pplied in this film by the trials and tribulations of the citizens of a hypo-
1890's when stream pollution was more the rule than the exception.

12 min.
ciples of environmental sanitation and was filmed in a typical domestic seasonal
of actual camp life demonstrating practices families can use to stay healthier.

od, destroy buildings, spread disease. Demonstrates control measures by poison,
struction of buildings.

color.
nt presentation of community efforts to obtain a sewage treatment facility.

processes." 13 min.
e film depicting the basic methods of sewage treatment used to prevent sewage
becoming a health menace.

mall water supplies." 11 min.
bored, driven, and drilled wells illustrated diagrammatically and in pictures to-
nd safe methods of installation and design. Intended primarily for rural areas.

min. color.
and explains how burning refuse contributes to air pollution, and how dumping

r.
elated to worldwide water needs and availability are presented in this United
It shows the need for cooperation among countries for a common goal.

min.
ling with the problem of water pollution as it affects the city of New York.

s." 13 1/2 min. color.
hy diagrams and animation explain and illustrate concepts relating to properties
its value as a natural resource, and its use for consumer supply. Conservation
roughout the presentation.

min. color.
Hume Cronyn, deals with issues involved in the fight for clean air. While it

dramatizes and documents the story of New York State Air Pollution Control Prog problem of air pollution in a national context.

OTHER FILMS

"Air pollution - take a deep breath." 54 min. color. ABC. McGraw-Hill.

"Auto, U. S. A." 25 min. Dynamic Films, Inc., 405 Park Ave., New York, New York
Shows how the record breaking increases in motor vehicle use and the resulta threatening the economic and social health of our communities.

"Breathe at your own risk." 58 min. Communicable Disease Center (Audiovisual),
Shows scenes of air pollution at its worst from Los Angeles to New York.

"Clean waters." 24 min. color. General Electric. 113 South Salina St., Syracuse
A forceful story of the $100 million annual ss due to pollution of our wat

"Good riddance." 29 min. color. Ohio River Valley Water Sanitation Commission Ohio 45202.
The dangers of pollution to city ater supply systems, recreational areas, dramatically illustrated.

"New air for New York." 13 1/2 min. color. Association Films, Inc., 374 Madis 10017.

"Our poisoned air." 58 min. Communicable Disease Center (Audiovisual), Atlanta
Answers: What is air pollution? What does it do to us and our environment control air pollution? What further action is required?

"The poisoned air." 50 min. color. CBS. Carousel Films, Inc., 1501 Broadway,

"Radiation in perspective." 43 min. color. U.S. Department of Agriculture, Of Washington, D.C.
Beneficial uses of radioactive materials in medicine, research, industry, a in this film, and the health hazards of radiation exposureable explained.

"Regulation of atomic radiation." 28 min. U. S. Atomic Energy Commission, 376 York 10014

he story of New York State Air Pollution Control Program, it also views the
n a national context.

breath." 54 min. color. ABC. McGraw-Hill.

Dynamic Films, Inc., 405 Park Ave., New York, New York.
reaking increases in motor vehicle use and the resultant traffic congestion are
and social health of our communities.

58 min. Communicable Disease Center (Audiovisual), Atlanta, Georgia 30322.
llution at its worst from Los Angeles to New York.

olor. General Electric, 113 South Salina St., Syracuse, New York
e $100 million annual loss due to pollution of our water supply.

color. Ohio River Valley Water Sanitation Commission, 414 Walnut St., Cincinnati,

on to city water supply systems, recreational areas, fish and wildlife are

1/2 min. color. Association Films, Inc., 374 Madison Ave., New York, New York

. Communicable Disease Center (Audiovisual), Atlanta, Georgia 30322.
pollution? What does it do to us and our environment? What is being done to
hat further action is required?

. color. CBS. Carousel Films, Inc., 1501 Broadway, New York, New York 10036.

" 43 min. color. U.S. Department of Agriculture, Office of Motion Pictures,

dioactive materials in medicine, research, industry, and other fields are explored
alth hazards of radiation exposureable explained.

ation." 28 min. U. S. Atomic Energy Commission, 376 Hudson St., New York, New

The film shows the ways in which radiation sources are regulated
related to design, construction, and wage. The safe handling and d

"River watchers." 18 min. color. Ohio River Valley Water Sanitatio
Ohio 45202.
The role of those who inspect the Ohio River Basin to prevent an
eight neighboring states is shown in this film.

"Sources of air pollution," "Effects of air pollution," "Control of a
Center, Atlanta, Georgia 30322. Three 5-minute, 16 mm. motion pi
Pollution. color. sound. TV cleared 1962.
As a concise introduction to the air pollution problem, each of
viewer with the relationship between our modern, technological way

"The water famine." 54 min. b&w. CBS. Carousel Films, Inc., 1501

"Water: friend or enemy." 9 min. color. Walt Disney Productions,
Indicates that water can be a friend to man if proper precautio

FILMSTRIPS

"Making water safe to drink. McGraw-Hill Book Company.

"Natural resources and you." EBEC. 34 frames. color. Gr. 4-6.
A series of filmstrips to help the class probe further into such
earth's energy, feeding an exploding population, increasing soil fe

"Our health department." EBEC. 48 frames. color. (Community servi
The various activities of community workers serving the public a

"Sanitation department crew." CMGH. 40 frames. color. (Community
A filmstrip visualizing the services and duties of the members o

"Street maintenance crew." CMGH. 40 frames. color. (Community hel
Visualizes the services and duties of community helpers who are

"The water we drink." Young America Films.

he ways in which radiation sources are regulated by standards and licensing procedures
construction, and wage. The safe handling and disposal of radioactive wastes are shown.

min. color. Ohio River Valley Water Sanitation Commission, 414 Walnut St., Cincinnati

e who inspect the Ohio River Basin to prevent and eliminate water pollution in Ohio and
tates is shown in this film.

tion," "Effects of air pollution," "Control of air pollution." Communicable Disease
orgia 30322. Three 5-minute, 16 mm. motion pictures produced by the Division of Air
sound. TV cleared 1962.
troduction to e air pollution problem, each of these films is designed to acquain the
lationship between our modern, technological way of life and air pollution.

54 min. b&w. CBS. Carousel Films, Inc., 1501 Broadway, New York, New York 10036.

nemy." 9 min. color. Walt Disney Productions, Inc. 500 Buena Vista St., Burbank, Calif.
water can be a friend to man if proper precautions are taken to see that it is pure.

o drink. McGraw-Hill Book Company.

nd you." EBEC. 3 frames. color. Gr. 4-6.
nstrips to help the class probe further into such basic problems as utilizing the
eding an exploding population, increasing soil fertility, and conserving water resources.

nt." EBEC. 48 frames. color. (Community services). Gr. K-3.
ivities of community workers serving the public are dramatized.

nt crew." CMGH. 40 frames. color. (Community helpers series). Gr. 2-4.
ualizing the services and duties of the members of the sanitation department.

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services and duties of community helpers who are of significance to the young child.

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Shows how the health, safety, and welfare of towns and cities depend on pub
services.

"Water for the community." EBEC. 52 frames. color. (Our public utilities).
A visual demonstration of how the health, safety, and welfare of towns and
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ADDITIONAL CURRICULUM MATERIALS

"Air pollution experiments for junior and senior high school science classes."
& Wohlers, H. C., PH.D., Chairman. Education Committee, Mid-Atlantic States S
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"Land for learning." Informational material. A Supplementary Educational Cente
Tivoli Lakes Nature Study Sanctuary, Philip Livingston Junior High School, Alb

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"Well of the world." A one-act play by Joan Vail Thorne. Written and produced
partment of Health. (Dramatizes the importance of pure water.)

SOURCES OF ADDITIONAL MATERIALS AND INFORMATION

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"Clean water is everyone's business." Pub. No. 11 - 1950.

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Division of Air Resources, 84 Holland Ave., Albany, New York 12208
Division of Pure Waters, 84 Holland Ave., Albany, New York 12208
Division of General Engineering and Regiological Health - This division is divided i
five bureaus, each of which is located at 845 Central Ave., Albany, New York 122

Bureau of Food and Recreation Sanitation
Bureau of Hospital and Institutional Engineering
Bureau of Radiological Health
Bureau of Solid Wastes, Engineering, and Community Environmental
Bureau of Rodent, Insect, and Weed Control

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ich is located at 845 Central Ave., Albany, New York 12206.

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of Hospital and Institutional Engineering
of Radiological Health
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