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Using community resources to develop an attitude toward the conservation of natural resources in intermediate grade children

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Thesis

USING COMMUNITY RESOURCES TO DEVELOP AN ATTITUDE TOWARD THE CONSERVATION OF NATURAL RESOURCES IN INTERMEDIATE GRADE CHILDREN

Submitted by

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(B. S. Ed., Bridgewater, 1932)

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CHAPTER I
INTRODUCING THE PROBLEM

1. The Problem
How can community resources be used in helping to develop an attitude toward the conservation of natural resources in intermediate grade children?

2. The Purpose
The purpose of this study is to show how a teacher of intermediate grade children may use community resources in helping to develop an attitude toward conservation while teaching a unit on natural resources.

3. Scope and Limitations
This study includes a chapter on the need for developing an attitude toward conservation on the part of intermediate grade children. It includes a unit plan for teaching conservation. A tape recording was made of an assembly program on conservation to show the understandings, attitudes, and learnings that are an outgrowth of children's actual experiences when they supplement their classroom work by using some of the resources on conservation available in their community. A series of Kodachrome slides was made to record the first-hand experiences of children in using the resources available in their environment.
This study was conducted with twenty-nine intermediate grade children in a suburban community within commuting distance of a large city.

4. Justification

The town in which this study was made had a serious water shortage last year. The need for conservation in respect to this resource was experienced by the whole community.

The need for developing an attitude toward conservation on the part of boys and girls as well as by adults has been brought to the attention of the writer in courses taken at Harvard and Boston University; in summer work done at the Nature Study Camp, Lost River, New Hampshire; in visits to such areas as the Desert of Maine; from many readings on the subject in books, periodicals, and magazines.

In developing an attitude toward conservation in the twenty-nine children of ages ten to eleven, it was the writer's aim to acquaint the children with natural resources; to habituate their use of everyday materials without waste; to develop an understanding in them that all nature works together in harmony; to develop in them a desire to use natural resources intelligently; to give them the real meaning of "conservation"; to develop an understanding in them that man must learn to fit into nature's pattern; and to teach a respect for, and intelligent appreciation of the out-of-doors.
CHAPTER II

RELATED READING ON THE NEED FOR CONSERVATION EDUCATION

Conservation of natural resources is necessary to our survival. To conserve natural resources means to use them carefully and wisely. It is most important that the boys and girls in our schools develop an intelligent and cooperative attitude toward the conservation of the resources with which nature has endowed us.

For many millions of years nature got along on our great North American continent without the dominating influence of man. When the white man came he found great areas of fertile land, fine forests, vital stores of water, huge deposits of valuable minerals, and a plentiful supply of wildlife. So abundant were these resources, they were thought to be inexhaustible. Over the years, these resources have been greatly depleted, sometimes by necessity, but more often through indifference, thoughtlessness, or sheer exploitation.

After a little over three hundred years of our continent's being inhabited by the white man, the truth of Benjamin Franklin's warning is clear, "Forever taking out and never putting anything in, soon exposes the bottom of the barrel."

Let us consider some of our vanishing resources.

"Over the last 150 years - chiefly over the last 100 years - we have allowed something like half our farm land to be damaged by erosion, much of it seriously. Millions
of acres have been ruined for any further immediate cul-tivation - around 100 million acres of cropland alone, not counting a tremendous acreage of severely damaged range land. Another 100 million acres of cropland have been damaged by erosion, though somewhat less seriously, and the process continues on additional millions of acres.

The result is that in the United States there remain only about 460 million acres of first-class cropland. This is enough to meet our needs for food, clothing, and industrial processes, including soil sustaining crops and other needs, provided we take adequate care of it from now on."

Originally the forest regions of the United States covered the eastern half of the country. Of the 800,000,000 acres of forest land that were here when the settlers first came, we now have less than 500,000,000 acres of forest land that can produce enough lumber for commercial use.

The forest and its undergrowth serve to bind the soil and prevent it from being washed away by rainfall and streams. Floods and droughts occur when forests are cut and valuable soil is washed away. The rain that falls, instead of being held back to run off slowly, rushes to streams, speeding soil erosion, and consequent floods. Gradually the water table falls. When the springs go dry, there is not enough water for plants, animals; or people who need it.

We take it for granted that there will always be a plentiful supply of water. Such is not the case. Many parts of the country are running short of water for drinking, sanitation, agricultural, and industrial purposes.

The contamination of our rivers, streams, and lakes by dumping into them raw sewage and industrial wastes has become a menace to the health of people as well as to the fish and wild-life that depend on the waters.

Although water, soil, forests, plants, and animals are the natural resources most accessible for human needs, a good supply of minerals is needed for a balanced economy. Modern civilization has been made possible by the ways to use and refine minerals. Our high standards of living are in good part due to the plentiful supplies of coal, copper, lead, zinc, petroleum, nitrogen, phosphate, potash, aluminum, cobalt, gold, silver, and tin. Unless substitutes are developed, the depletion of these minerals may mean economic disaster.

"The coal reserves of this country are estimated to be about 3000 billion tons, or 45 per cent of the world's total supply. Although no one can tell how long coal reserves will last, it has been estimated that, at the present rate of consumption, they should last at least 400 years and with more prudent use should last at least 2000 years."\(^1\)

Our petroleum supplies have been greatly reduced because of military needs in recent years and wasteful practices which have characterized the development and use of oil resources. At our present rate of consumption, our petroleum may last only fifteen to twenty years more.

For iron we will soon have to resort to the use of lower grade ores or depend on imports, as most of our high grade iron ore deposits around the Lake Superior region are approaching the point where economic factors make them poor sources of iron.

A large portion of our original deposits of zinc and copper have been used. It is estimated that we have only a twelve to fifteen year supply of zinc from sources known to us. At our present rate of consumption, we have scarcely a fifteen year supply of copper that can be profitably mined in our country. The story is the same or similar with our other minerals, many of which are quite important to modern industry.

Although civilization has passed from the hunting and fishing stage, we have both an interest and concern in wild plants and animals. The young people of today will never see the passenger pigeon or the heath hen. The bison has been scarcely rescued from extinction. Let us hope our present generation will not be responsible, as our ancestors have been, for the continued destruction of the habitat necessary to the preservation of our wildlife. Natural areas must be preserved, necessary cover and feeding grounds maintained, and protection against reckless killing given to animals and birds.

According to Robert Cushman Murphy in discussing the need for conservation education he says:

"The broad significance of conservation should be made part of the awareness of everyone in daily,

workday life. To understand the importance of the water
table in the ground is just as important in elementary
education as a knowledge of the three R's. American
children should learn why all watersheds need the pro-
tection of plant life, and why the running currents of
brooks and rivers must be made to yield their full ben-
fit to the soil before they finally escape to the sea.
They should be taught the duty of planting trees as well
as cutting them. They should learn the ecological im-
portance of big, mature trees, because living space for
most of man's fellow inhabitants of our planet is to be com-
puted not only in square measure of surface but also in
cubic volume above the earth. They must learn the rela-
tion between the climate, soil, and correct use of land,
because the laws which bind these together cannot be
broken without impunity. They must be made aware of
the fundamental error behind most attempts to control
animals, supposedly objectionable to man...They must
come to see that the more we can keep, the more we shall
have; that many wildflowers are best enjoyed where they
grow, instead of in vases, that game is a crop, of which
we can harvest only the surplus; that nature is most
vigor us and rewarding when as many as possible of its
elements are left in their primeval relation with the
eaters as well as the eaten recognized as desirable
parts of the whole."

In teaching conservation to intermediate grade children,
it is important to find ways in which the problems of conserva-
tion mentioned in this chapter fit into the lives of the parti-
cular group being taught. The ways will depend on the conser-
vation needs of the region in which the children live. The
writer feels it is important that the teacher should understand
the seriousness of our conservation problems but that she should
keep in mind that she is teaching children, not a subject, as
she works out with her class the unit that follows.
CHAPTER III
UNIT ON CONSERVATION OF NATURAL RESOURCES

1. Plants

Concepts to be developed. -- Concepts to be developed on plants are:

1. Man and animals depend on plant life for food.
2. The physical environment affects the living things that grow in it.
3. Plants change with the seasons.
4. Plants store food in various parts of themselves.
5. Plants make food out of the raw materials taken from the air and soil.
6. Non-green plants cannot make their own food.
7. Plants depend on other living things in many ways.
8. Plants need air, water, light, material from the soil, and satisfactory temperature in order to grow.
9. Some bacteria are helpful and some are harmful.
10. Seeds are carried from place to place by wind, animals, water, and other helpers.

Overview. -- In the fall, all the plants you see seem to be making changes. You will find many plants have already made seeds. The seed pods and other cases may even be empty, for the contents may have dropped to the ground or been blown elsewhere by the wind. Fruits of many kinds containing seeds may be
seen hanging from the branches. Some already have dried up or are lying on the ground. A collection of different kinds of seeds will show you that many plants pass the winter as seeds. Many of these seed-bearing plants die when winter comes. Then when spring comes, the seeds grow into new plants.

Leaves change from green to red, yellow, orange, brown. These leaves soon fall, leaving bare branches. The plants stop growing during the winter months. If you examine the branches you will find buds for next spring already formed. The inside of the bud is protected by the scales.

Some plants may seem to freeze when cold weather comes, but the part below the ground is alive in the earth.

In the South the leaves may not fall all at one time but if you notice plants carefully, you will see changes in them during the seasons in the South.

While plants are growing, they make food in their leaves. This, they use to make new leaves, longer roots, and stems.

One place plants store food is in their seeds. We use the food stored in peas, beans, and corn when we eat these vegetables. If the seeds are planted, the young plants use the food to grow.

Plants also store food in their roots. The food is made in the leaves and carried to the roots. When we eat root vegetables we are using the food. If roots are left in the ground, the food in the root may later be used for seeds.
Plants also store food in the stems and buds. Potatoes are underground stems that contain much food.

In the spring plants change more than in the autumn. They change from being very inactive to being very active.

When warmer weather comes along with rain, water enters the roots, moves up the plant, and the food that has been stored is used. Flowers or leaves appear from the buds according to the kinds of buds.

Stored-up food in seeds and bulbs is used by the plant part of the seed or bulb and growth begins. Roots are sent into the soil and stems and leaves are sent into the air.

Besides growing plants from seeds or bulbs, a person can grow them from cuttings of stems and from leaves.

Seeds are scattered by the wind, by moving water, and frequently by birds, or on the furry coats of animals.

Green plants contain chlorophyll. There are also plants that are not green. Some of these plants cause disease, some cause cider to ferment, and bread to rise. Some grow on tree trunks, and dead stumps, or on bread.

There are helpful and harmful bacteria. The ones that cause disease are harmful. The helpful ones cause decay of dead plants and animals, and change them so they can go back into the soil and make it fertile.

Yeast is the plant that causes cider to ferment and bread to rise. Mold is a kind of plant that grows on bread. Mushrooms are another kind of non-green plant.
None of these non-green plants make their own food. They grow on something else and take their food from it. Molds take food from such things as bread and fruits. Mushrooms and toadstools take food from logs, dead leaves, and tree trunks.

Although ferns and mosses are green plants, they do not reproduce by seeds but by means of spores.

Most living things on earth need other living things in some way. One important partnership is between flowers and insects. Insects get nectar and pollen which they use for food and other purposes. Flowers need insects to carry their pollen from flower to flower. Best seeds are made when pollen from one plant is carried to another. The pollen sticks to the legs and bodies of the bees when they enter a flower in search of nectar.

Animals help carry seeds. Squirrels bury nuts; birds carry cherries. Furrs, pods, and other seeds stick to the fur of animals and are carried from place to place.

Many non-green plants use animal matter for food. Animals supply fertilizer to the ground which help plants to grow. Earth-worms burrowing through the soil make it more fertile.

All through life there is a dependence on many of the living and non-living things in our environment. Plants use the carbon dioxide in the air for growth and give off oxygen. Man uses the oxygen and gives off carbon dioxide. Man is learning that he must do his part in keeping a balance in nature. One
way of doing this is by a wise use of the plant life on the earth.

Vocabulary. -- adaptation, algae, anther, bud, bulb, carbon dioxide, cell, chlorophyll, cutting, evergreen, environment, fertilization, leaf scar, mildew, mold, mushroom, petal, plant, pistil, pollen, produce, protoplasm, seed, sepal, separation layer, spore, stamen, vein, weed, yeast.

Questions. -- The following questions may be used:
1. How can we find changes in plant life in autumn?
2. Where do plants store food?
3. Where do plants make food?
4. What happens to plants in spring?
5. What are some of the different kinds of plants?
6. Which plants cannot make their own food?
7. How do insects and flowers act as partners?
8. In what other ways do animals help plants?
9. How do bacteria help plants?
10. What are lichens? How do they grow?
11. Of what use are plants?
12. What are the enemies of plant life?
13. What is being done to protect plant life?

Activities. -- Any of the following activities may be worked out in teaching about plant life:
1. Find pictures that show how plants change as cold weather comes.
2. Find out how plants that grow under water spread their seeds.

3. Make a report to the class on how seeds travel.

4. Make a collection of seeds to show how seeds travel.

5. Plant some bean seeds and watch them grow.

6. Draw a picture of a bean seed that will show the food and tiny plant.

7. Write to the State Forest Park Service for a copy of rules for managing a park or reservation.

8. Do this experiment to show plants cannot make food unless they have sunlight. Pin some milk bottle tops to both sides of several leaves of a geranium plant. Put the plant in sunlight for several days. Break off the leaves with the milk bottle covers on them. Remove the covers. Put the leaves in alcohol and the dish in very hot water. Remove the hot water. Wash the leaves in water. Drop some iodine on the leaves. What happens?

9. Find out if there are any wild flowers protected in the state. Tell about them.

10. Take a piece of bread and put it in a dish. Keep the piece of bread slightly damp, and in a dark warm place. What happens? Where did the mold come from?

11. Bring in a piece of bread with mold on it. Tell how the mold lives.

12. Ask a gardener how he prepares his garden for the winter.
13. Do this experiment. Put a little water in a glass. Dissolve as much sugar as you can in the water. Now open a package of yeast. Put a piece of yeast about the size of an eraser on the end of a pencil in the glass. Put the glass of water, yeast, sugar in a warm place. What happens?

14. Make a collection of milkweed seeds or cockleburs. Be sure you make your collection with care so as not to injure the plant. Invite your classmates to see the seeds float when you throw them in the air.

15. Plant narcissus bulbs in pebbles five or six weeks before Christmas. Leave them in a dark cool place about two weeks or until they are well rooted. Be sure they have plenty of water.

16. Plant cuttings from a geranium plant. Look closely at a geranium plant. Notice there are many small branches growing from the largest part of the plant. Use a sharp knife and cut off some of the smaller parts. After you cut off these parts, take some of the large leaves off them. Fill a shallow box with sand, and plant these small plants in the sand. Be sure to pack the sand around the plants and then keep the sand moist. Set the box in a sunny window. When the young plants have made some new leaves and roots, they are ready to be put in small flower pots. Fill the flower pots
with rich soil. Then carefully lift the plants out of the sand and plant them in the soil. Plant only one geranium in each pot. Keep the soil moist and set the plants where they can get plenty of sunlight.

17. Read about desert plants. Tell how they differ from swamp plants.

18. Give a report on how the earthworm helps plants.

19. Give a report on how the bees and flowers are partners.

20. Find pictures of seed plants, molds, ferns, mosses, and toadstools. Find out where each kind gets its food.

21. Make a collection of pictures to show where food is stored in plants.

22. Make a list of different things plants do as cold weather approaches.

23. Put some bird seed or grass seed on a moistened sponge. Hang the sponge in a glass fruit jar. Cover the jar. After the seeds have sprouted, what do the roots do?

24. Do this experiment to show where roots go. Put two or three beans on a wet blotting paper. Cover them with another piece of moist blotting paper. Then put them in a covered dish. When the root of a bean is about an inch long, mark it off into equal parts. Return the bean to the moist blotters in the dish. After a couple of days look at the root. Where has it grown?
25. Do this experiment to show that leaves transpire or give off water in the sunshine. Take any young plant growing in a flower pot. Cover the plant with a glass jar and place it in a sunny window. Look for small drops of water inside the jar. From where did the water come? How did it come?

26. Try to find out how plant insects and plant diseases are being controlled.

27. Find out which wild flowers in this vicinity may be picked and which should never be picked.

28. Make a terrarium. Take a trip to the woods to gather moss, a few roots of ferns, various other plants, and some rich soil. Cover the bottom of the container with gravel and then cover the gravel with rich soil to the depth of two inches. Bury several small pieces of charcoal in the soil. If you cannot obtain the charcoal, use the black pieces left from a wood campfire. Moisten the soil and plant the moss and other plants you gathered. Plant some small cuttings of house plants, too. Begonia plants often blossom. If you wish to keep a small turtle, snake or frog, place a dish of water in the soil to look like a pool. Cover the terrarium with glass. You will not need to add water very often for water will evaporate from the soil, leaves, and pool, and will condense inside. The cover keeps the moisture in and maintains a fairly even
28. Do this experiment. Fill a jar with water. Turn it upside down over some plants in an aquarium. Put the aquarium in the sun for a few days. Some of the water will flow out of the jar into the aquarium. Lift the jar and quickly put a glowing splinter into it. What happens? What does that show?

29. Bury a potato in the soil in a plant jar. When shoots come up above the ground, dig away the soil. Notice that each shoot comes from one of the eyes of the potato. These eyes are really buds on the stem. Why does the potato get smaller?

30. Bring in enough lima bean seeds for each classmate to have one. Be sure they have been soaked overnight. Put your seed on a sheet of paper so you won't lose any part. Open the seeds with a toothpick or something else that is pointed. See if you can find the three important parts of a seed. Find the part that will grow into a new plant. What are the two halves for? What is the coat for?

31. Take a shallow wooden box about a foot square and four inches deep to the woods and fill it with black soil from a place where many plants have been growing. Keep the soil in the schoolroom for a month or more and moisten it frequently. Notice the number of tiny
plants that will come from the seeds and roots buried in the soil.

33. Find out how mushrooms are grown in mushroom cellars.

34. Scrape some of the material from the side of an aquarium and look at it under the microscope.

Test. -- Complete the following statements from the list of words which follow the statements:

1. A small plant which grows on decaying plants is the ...
2. The yellow dust produced by seed producing plants is ...
3. The part of the plant in which egg cells grow is the ...
4. When plants rot away they decay and make good ...
5. The green coloring matter in plants used in making food is ...
6. There is a young plant in every ...
7. Non-green plants cannot make their own ...
8. Man depends on plants for ...
9. A plant that causes cider to ferment and bread to rise is the ...
10. A kind of plant that does not reproduce by seeds but by spores is the ...
11. An important partnership in life is between flowers and ...
12. Earthworms burrowing through the soil make it more ...
13. A place where wildflowers are protected in their growth is a ...
14. The important part of the plant carried from plant to plant by bees as they seek out nectar is ....

15. Man can promote plant life by adding to the soil good ....

a. mold, b. pollen, c. food, d. sanctuary, e. seed, f. pistil, g. chlorophyll, h. yeast, i. insects, j. fertilizers, k. flies, l. mushroom, m. fertile, n. fern, o. humus, p. protoplasm.

2. Trees

Concepts to be developed. -- Concepts to be developed on trees are:

✓ 1. Forests are one of our most valuable resources.
✓ 2. The United States National Forestry Service is trying to preserve our forests by helping to fight forest fires and by replanting trees.
✓ 3. Forests help to bind the particles of soil together and hold it in place.
✓ 4. Forests help to control the amount of water the streams receive.
✓ 5. Cutting down forests often causes floods which destroy all kinds of living things, cities, and villages.
6. Forest streams may be depended on to supply water for many purposes.
7. The soil of the forest floor is called humus. It is rich, black, and spongy.
8. Forests are the homes of many birds and other animals.
9. Forests help make the country beautiful.

Overview. - In a world without trees there would be no lumber for houses, pulp for paper making, or wood for the many things for which we need it.

Forests growing along rivers help prevent floods. When heavy rains fall or when snow melts quickly, there is likely to be so much water all at once that it will overflow the river banks. Trees help hold back the water so it drains more slowly into the river.

Leaves that fall to the ground make rich soil which is not packed so closely together as in open fields. When rain or snow falls it soaks into the ground and doesn't go at once into the river. Floods have been caused by cutting down forests.

Man has been the forest's worst enemy. Until recently, the forests seemed to be so large there was not much interest in taking care of them. Trees were cut before they were fully grown, they were carelessly cut, and hundreds of young trees died when larger trees fell on them.

Fires, started by careless campers and hunters, have been another enemy of forests. Full grown timber and young timber have been destroyed in these fires. Much of the vegetable matter which is important as plant food and helps soil hold water is ruined in a forest fire.

Insects that attack the leaves, flowers, buds, bark, branches, trunk, and roots are hard to fight. Unfortunately man has been responsible for spreading some of the insects when he
transplanted trees from place to place.

Scientists are working to learn about controlling insects and diseases that infect trees. Sometimes it helps to bring a certain bird or insect enemy into a region.

The government is now establishing great national forests where young plants are protected and more are planted. In these preserves the trees stand close together and must climb high to reach the sunlight. Such crowding produces tall, straight trees which are more valuable as lumber. Little seedlings are protected and more are planted. Misshapen and diseased trees are cut out. Logging is done with the least amount of waste and destruction.

Although it is still best to prevent forest fires, much progress is being made in controlling them. The forest ranger is continually on the alert to watch for, and control forest fires.

Vocabulary. -- ash, balsam, birch, branches, cambium, carbohydrates, carbon dioxide, cell, chlorophyll, conifers, crown, decay, deciduous, diameter, elm, energy, evaporation, evergreen, fir, fungus, hemlock, insects, leaves, maple, mold, molecule, needles, oak, photosynthesis, pine, protoplasm, root, sap, shade, spruce, starch, stem, soil, sugar, sunlight, temperature, tree, trunk, transpiration.

Questions. -- The following questions may be used:

1. Of what use are our trees?
2. What are the enemies of trees?
3. What is being done to protect our forests?
4. Why do leaves fall in autumn?
5. What can you find out about the buds, flowers, seeds, and parts of a tree?

Activities. -- Any of the following activities may be worked out in teaching about tree conservation:

1. Bring to the class leaves and seeds from trees. Mount them for display.
2. Make spatter prints of leaves.
3. Tell a fairy story or a legend that mentions a tree.
4. Find out about the Druids.
5. Make a report to the class of five ways in which man is an enemy of trees. Tell the responsibility of boys and girls to prevent unnecessary damage to trees.
6. In art work paint trees and illustrate different shapes of trees studied.
7. Make a booklet of trees including in it stories and poems that appeal to you.
8. Identify as many trees as you can that are on the school grounds.
9. Read to the class the poem "Woodman, Spare That Tree."
10. Find the poem "Trees" by Joyce Kilmer to read to the class.
11. Make a collection of leaves from different kinds of
trees. Press the leaves under a heavy pile of books and then paste them on pages you can put together in a booklet.

12. Write an imaginative story about some tree you particularly like.

13. Make a list of fire prevention rules to follow when on a picnic.

14. Write the State Forestry Department to find out how much forest land is owned by our state or by the national government in our state.

15. Examine some bare branches of trees to find the buds.

16. Find the story of Johnny Appleseed. Tell the story of his purpose in planting seeds.

17. Collect and mount the seeds that are produced by the trees on the school grounds. Label each kind of seed.

18. Make a map showing the location of various trees in the schoolyard.

19. List ways the forests help people earn a living.

20. Make some transparencies by placing the most beautifully colored leaves between two sheets of waxed paper. Press lightly with a warm iron. Mount in a frame of colored paper.

21. Plant some acorns, some maple seeds, or any other tree seeds in a box or other container at school, or in a sheltered spot out of doors. Keep a record of what happens. If the seeds grow, transplant the
young trees in the spring before school closes.
22. Find out whether chestnut blight or Dutch elm disease have killed any trees in our vicinity.
23. Do this experiment to show that geranium leaves make starch. Heat some water to the boiling point. Put some green leaves in a test tube and fill it nearly full of alcohol. Place the test tube in hot water. The alcohol will soon boil. Let it boil several minutes. All the coloring matter in the leaves will come out in the alcohol. Wash the leaves in water. Drop some iodine on the leaves. The color of the leaves will be dark blue if there is starch in the leaves.
24. Write to the United States Forestry Service, Milwaukee, Wisconsin to find out about the Children's Forest.
25. Give a report about a special tree such as the Charter Oak, General Sherman Tree, Washington Elm or about a group of special trees such as the Cedars of Lebanon, or the Sequoias of California.
26. Tell an imaginative story of an acorn that fell to the ground from an oak tree.
27. Collect branches of fruit trees, horse chestnuts, maples, or oaks for spring bouquets. Cut the small branches from the trees. Do not take too many from any one place. Examine the branches for buds and for leaf scars. If you wish to force the buds, immerse them,
top down, in warm water and leave them for several hours. This will hasten the opening of the leaf and flower buds. Arrange the branches in a vase.

Test. -- Complete the following statements from the list of words which follow the statements:

1. The soil of the forest floor is called ....
2. The forest's worst enemy has been ....
3. The forest trees supply us with ...
4. The person continually on the alert to watch for and control forest fires is the ...
5. People who are learning about controlling insects and diseases that infect trees are ....
6. The green coloring matter in leaves used in making food is....
7. A mark left on a stem after a leaf has fallen is a ....
8. A thin layer of cells which grows between the leaf and the stem in the late summer or early fall is the ....
9. A tube in a leaf which carries liquid is a ....
10. The careful and wise use of trees is ....
11. A cone bearing tree is a ....
12. In winter evergreen trees do not lose their ....
13. Roots of trees take up moisture and help prevent....
14. One kind of refuge set aside by our government to protect trees is the ....
15. Rows of trees planted for protection from sharp, cold winds are called ....
16. People plant trees near their homes for beauty and ...
17. Trees give off a gas that man can use. It is ....
18. Man breathes out a gas that trees can use. It is ....
19. Trees that lose their leaves in winter are ....
20. A tree that does not lose its leaves in winter is the ....

a. chlorophyll, b. vein, c. conservation, d. conifer, e. National Parks, f. wind breaks, g. floods, h. oxygen, i. helium, j. leaves, k. deciduous, l. shade, m. carbon dioxide, n. humus, o. man, p. ranger, p. scientists, q. leaf scar, s. bud, t. bulb, u. separation layer, v. hemlock.

3. Non-living Things

Concepts on soil to be developed. -- Concepts to be developed on soil are:

1. Many forces are at work to give us soil.
2. Fertile soils are valuable.
3. Soil is made up of organic and inorganic materials and these are constantly undergoing changes.
4. Soil is normally composed of more or less distinct layers. These layers differ in color, texture, structure, water-holding capacity, organic content, and fertility.
5. The formation of soil depends on the action of natural forces constantly at work over a long period of time.
6. Soil, water, and vegetation are interdependent, and all are essential to the welfare of man.

7. Soils have been misused, and such abuse contributes to poverty.

8. Man's actions have developed conditions that damaged the soil and impaired its fertility.

9. Soil is a reservoir which holds water.

10. Man must adjust himself toward the right use of water.

Concepts on water to be developed. -- Concepts to be developed on water are:

1. Man is dependent on water for his life and living, for transportation, power, and fishing.

2. Our streams should be safeguarded from floods and pollution.

3. Water contributed greatly to the early exploration and development of the country.

4. Water contributes to man's recreational life.

5. Streams, lakes, rivers, ponds contribute greatly to the beauty of our world.

6. Water is our friend or our foe according to our adaptations to the present water conditions.

Concepts on minerals to be developed. -- Concepts to be developed on minerals are:

1. Human welfare depends on mineral resources in this age of power and machinery.
2. We should carefully use things in every day life so that our reserves will be available for a larger number of people over a longer period of time.

3. Our government has a responsibility in reference to mineral conservation.

Overview on soil. -- Rocks are broken up into soil by the action of air, winds, growing plants, moving water, and chemicals. This action is called weathering. It takes a long time.

Rocks are heated and cooled many times as they are broken into smaller pieces and finally into soil. During the day the warm sun shines on a rock and makes it very hot. This causes expansion. At night the outer surface of the rock contracts as the cool night air cools it off. This alternate action of heating and cooling, causing more rapid changes in the outer surface of the rock, makes cracks in the outer surface from which pieces of rock become loose and finally break off.

When water in rocks freezes, then thaws, it causes the rocks to break into smaller pieces and finally into soil. When rain falls on the rock some of it gets down into the cracks and in cold weather it freezes. Water expands just before it freezes to ice and as it expands it pushes against the sides of cracks and makes the cracks larger, until finally the rocks break.

Wind and water blowing against and pounding against rocks gradually wears them away. Both wind and water often carry sand
which cuts as a cutting tool. The fine particles worn away by this action are soil.

While wind and water help make soil, they also work to destroy it. Very often it is the carelessness of man that gives these two forces of nature an opportunity to work destruction on the soil. Rain and melting snow can carry off valuable topsoil. Trees and plants help hold the soil in place. When the soil is left uncovered, the wind carries it away as dust. When there is a heavy rain, the soil cannot soak up much water and most of the water flows over the land, carrying away a great deal of topsoil. Water running from a roof wears little furrows across lawns and yards. In like manner water moving over fields makes furrows. Soon these furrows grow larger and become gullies, then streams, and finally rivers. Soil carried off by water flowing down gullies, streams, and rivers is lost to its owner forever. This destruction of our soil by wind and running water is called erosion.

Overview on water. -- We take it for granted there will always be a plentiful supply of water. Such is not the case. Many parts of our country are running short of water for drinking purposes, for sanitation purposes, for agricultural, and for industrial purposes. We must protect our water supply from pollution and from eroded silt so that health of humans and wildlife depending on water will not be menaced.

Overview on minerals. -- Our high standards of living are due in good part to a plentiful supply of minerals in this
age of power and machinery. We need coal, copper, lead, zinc, petroleum, potash, phosphate, nitrogen, aluminum, gold, silver, and tin. Because of the military needs of recent times, and the wasteful practices we have used in developing our mineral resources, some of our minerals may not last much longer. Unless we can find suitable substitutes this could bring economic disaster to our country.

Vocabulary. -- Chemicals, clay, conserve, contour, crumble, decay, delta, erosion, expand, fertilizer, freeze, glacier, gravel, great ice sheet, gully, heat, humus, loam, natural resources, organic matter, preserve, sand, silt, soil, subsoil, topsoil, weathering, wind.

Questions. -- The following questions may be used:

1. What is soil?
2. How is soil made?
3. How are living things dependent on soil?
4. What are the enemies of soil?
5. How can we conserve soil?
6. Of what importance is water to life on the earth?
7. Why are floods worse after forests have been destroyed?
8. How can water be conserved?
9. In what ways do living things need non-living things?
10. Why should minerals be conserved?

Activities. -- Any of the following activities may be worked out in teaching about the conservation of soil, water, minerals:
1. Find out how the government is trying to stop dust storms.

2. Find pictures of the Grand Canyon of the Colorado River. Give a report on how it was formed.

3. Find out how the Mississippi Delta was formed and how it changes.

4. Find places in your neighborhood where water has changed the earth's surface. Tell the class about them.

5. Find pictures to show how we use materials from the earth.

6. Find pictures to show how wind and water have worn rocks into strange shapes.

7. Make a list of the useful things from the earth that are in your home.

8. Look at sand and other kinds of soil through a magnifying glass.

9. Bring in for comparison soil from a garden, from the cellar of a house, and from any other place you can visit.

10. Make a list of things we get from the earth's storehouse.

11. Draw a design of a house and a yard. Show where you would plant shrubs for making birds welcome or for holding the water after a rain.
12. Describe some conservation work you have seen, a fish hatchery, a forest preserve, or a power dam. Tell if it had any real value.

13. In the latest World Almanac find the list of great dams of modern times. Use the index. Find their location on a map.

14. Write to the State Conservation Department to find out if there are any problems on soil erosion in the state, and if so what is being done about preventing further erosion and about restoring this eroded land to its former condition.

15. Take several samples of different kinds of soil, mixing each with a little water in separate glass jars. Let the jars stand for a week or so until the soil settles and the water becomes clear or nearly so. Notice the various layers of soil.


17. Write to the Department of the Interior for a list of their publications on conservation.

18. Give a report on the Grand Coulee Dam.


20. Find pictures and descriptions of how irrigation is carried on.

22. Over 50 million acres of soil in the United States have been destroyed by erosion. There are 640 acres in a square mile. Find the states that would equal an area as large as this.

23. Give a report on Niagara Falls.


25. Give a report on Boulder Dam.

26. Give a report on T.V.A.

27. Develop a balanced aquarium in the classroom. Show how water, fish, and vegetation may be kept in balance.

28. Visit a water supply plant. Obtain information as to its source and distribution of water. Be able to explain its service.

29. Find the name of the company from which a filling station receives its oil products. Write the company for literature on the source, the refining, and distribution of oil.

30. Explore the school and list the kinds of minerals used in the building.

31. Write the Bureau of Mines, United States Department of Interior, for a list of publications.

32. Bring to the class as many kinds of metals as you can find for later identification.

33. Find out how much it costs to heat your home for a year.
34. Go to a hardware store or a plant and garden store where fertilizer is sold. Examine the printed labels on different bags of fertilizer. Tell what essential elements plants might get if you used a certain bag of fertilizer.

35. Get some samples of muddy water from a stream and put it in glass jars. Let these stand for several days to see how much soil will settle to the bottom.

36. Visit a stream which is near your home. Are there any fish in it? Is the stream dirty or clean? What could be done to make the water clear?

37. Give a report on the kinds of work that water does. Tell which kinds of work help man and which kinds do harm to the earth and to man.

38. Tell the story of a raindrop till it comes down a second time.

39. Find out what the State Board of Health does to test water for impurities.

40. Find out how much the water bill is in your family per month and per year.

41. Give a talk on the value of lakes as recreational centers.

42. Find out where the water you use comes from.

43. Find out how much fuel is used to heat your school each year.
44. Find out what needed mineral products are brought into the community and from where they come.

45. Make a survey to find out what building materials are available around your community.

46. Give a report on how coal is formed.

47. Begin a collection of rocks and small pieces of metal.

48. Tell the story of how a drop of rain fell on a hill and came out in a spring.

49. Find places in your community where rivers or small streams have built up deltas or islands.

50. Tell the story of a river. Tell of its source in the high lands; how it passes through cities, and its contribution to each; of the life which it maintains; of the unwise treatment which it receives along the way, and of the better use which could be made of it with proper treatment.

Test. -- Complete the following statements from the list of words which follow the statements:

1. The wearing away or washing away of the soil by wind or water is called ....

2. Soils carried along by great rivers build up to ....

3. Deep furrows made by flowing water is called ....

4. Farmers can help save soil by using .... farming.

5. Certain minerals must be conserved if we are to meet our .... needs in years to come.
6. Water running over the bare land carries much of the .... with it.

7. Water is our friend or our .... according to our adaptations to the present water conditions.

8. Human welfare depends on .... resources in this age of machinery.

9. Our streams should be safeguarded from floods and ....

10. Water contributes greatly to man's .... life.

11. Soil, water, and vegetation are interdependent and all are necessary to the .... of man.

12. Soils have been misused and such abuse contributes to ....

13. Alternate heating and cooling of rocks helps to break them into smaller pieces and finally into ....

14. When the soil is left uncovered the wind carries it away as ....

15. It is through the proper use of soil that .... is obtained.

a. industrial, b. erosion, c. topsoil, d. gravel, e. conserve, f. deltas, g. pollution, h. welfare, i. contour, j. food, k. recreational, l. dust, m. mineral, n. poverty, o. gullies, p. soil, q. fertilizing, r. foe.

4. Animals

Concepts to be developed. -- Concepts on animals to be developed are:
1. Fur bearing animals and birds are important in maintaining a natural balance in nature.
2. We should take care of many animals.
3. Most birds and animals help us more than they harm us.
4. Animals are well fitted for living in the environment where they are found.
5. The government is passing laws and setting up sanctuaries to protect animals.

Overview. -- As man needs more land, he reclaimed it from lakes and cut down trees. The swamps and lakes had sheltered small forms of life, which had furnished food for fish and wild fowl. The animals had been used as food for man. With the drainage of swamps and ponds, the nesting places disappeared. With their habitats gone, ducks, geese, and other water fowl had to find other homes.

Fur-bearing animals and birds are important in maintaining a natural balance in nature. Man has caused a decrease in these valuable creatures, but state game laws are now giving them protection.

Several states have undertaken conservation projects to increase aquatic plant and animal life. Today the government is using the beaver as soil conservationists by carrying them to sections where their dams are needed. In other places artificial lakes are being stacked with fish.

Some states have passed protective game laws for animals, birds, and fish. Forest preserves and sanctuaries have been set
aside for birds and animals, and fish hatcheries are maintained. At the Bonneville Dam, fish ladders have been built to help fish return to their spawning grounds.

A special study of the snake, toad, and bat makes one appreciate the usefulness of these little creatures in our environment. The bat is a strange looking mammal, mostly because of its wings. He is a fine flier because his wings are so sensitive to sound, they inform him of any obstructions in his path. As he darts about, he catches insects in his open mouth and scoops them up in his wings. This net enables him to ensnare many nocturnal insects. In this way he serves gardeners and farmers.

A good friend of ours is the toad. He is born in the water and lives on land. In the water the tadpole lives on plants. As a toad on land he feels dry and cold to touch. The warts on his back are glands that give off a disagreeable substance when he is attacked by an enemy.

It is fun to watch a toad eat. His tongue is attached to the lower jaw at the front edge of his mouth so that it can reach quite a distance. There is a sticky substance on it to help trap near-by insects. When his prey is too big to swallow, he uses his front toes to stuff the food into his mouth. When he wants a drink, he stretches himself out in shallow water and absorbs it through his skin. We should help protect the toad as he lives entirely on small animals, especially harmful insects.

Snakes are backboned animals that creep. That is why they are called vertebrate animals. They are cold blooded. That
means their temperature gets the same as that of their surroundings. A snake is graceful and has beautiful coloring. He has many ribs. His ribs really serve as legs.

The skin of a snake is shed several times a year according to how fast he grows. The skin can stretch but not grow so it has to be cast off when it becomes too tight. The snake then crawls out of the old coat, turning it wrongside out as he does so. Snakes can swallow things larger than themselves because of their elastic bodies and large-hinged jaws.

Some snakes are poisonous, such as rattlers, cooperheads, and water moccasins. The garter snake and the little green garden snake are timid creatures that make nice pets, but are happier when free.

Snakes deserve protection. The garter snake and green garden snake like to eat insects, spiders, and garden slugs. Larger snakes eat field mice and other small animals that disturb the farmer. They also eat frogs, toads, lizards, and other snakes.

**Vocabulary.** -- Amphibian, aquarium, cocoon, cold blooded animal, domesticated, gill, hibernation, hibernator, insect, larva, mammal, migrate, open season, protoplasm, reptile, sanctuary, vertebrate, warm blooded animal.

**Questions.** -- The following questions may be used:

1. How has animal life changed since the coming of the white man to this continent?
2. Of what use are our wild animals?
3. Why should any wild life be destroyed?
4. How are wild animals protected?
5. How are birds fitted to their environment?
6. What can you find out about bats?
7. What can you find out about snakes?
8. What can you find out about toads?

Activities. -- Any of the following activities may be worked out in teaching about the conservation of animals:

1. Find out which animals in this region are protected by law.
2. Collect pictures of various animals that need protection.
3. Make some rules for protecting wild animals.
4. Find out which animals have become very scarce in this region.
5. See if you can find any description of a monument to an animal. Report to the class on what you find.
6. Make a list of all the birds you know and tell one interesting story about one of them.
7. Get some copies of Nature Magazine from the library and read the pages on conservation. Tell what animals are in need of protection according to the magazine.
8. Make a birdhouse to put up around your house.
9. Write the State Game Commission to learn which wild
animals are protected in this state. Ask for the
dates of the open season for hunting certain animals.
Ask how many of each animal a hunter may take.

10. Model animals of clay and paint them in their proper
colors. Place them in a cut-away box or crate with
proper background, grass, and trees to show their habi-
tat.

11. Write to the United States Department of the Interior
for a chart showing the seasons for migratory game
birds in different states.

12. Make a chart picturing the bat and the insects that it
destroys.

13. Read about radar. Tell the class what similarities
there are in the ability of the bat to fly without
bumping into anything and the use that is made of radar.

14. If you can find a bat, keep it in a suitable cage for
a few days. Feed it bits of raw meat and milk. Note
its teeth and the way it moves and rests.

15. Place some toad eggs in a balanced aquarium. Keep a
record of the changes that occur as the eggs develop.

16. Make a chart showing the injurious insects that the
toad and snake eat.

17. Arrange and maintain a suitable cage in which a garter
or a grass snake can be held comfortably for a few
weeks.
18. Arrange and maintain a terrarium to house a toad or several toads.

19. Tell how to balance an aquarium.

20. Write to Fish and Wildlife Service, Chicago, 54, Illinois, for Poster 72. This will give you conservation material for a bulletin board.

21. Find out about the statue in Salt Lake City dedicated to seagulls.

22. List ways in which birds have been helpful to you.

23. Plan a game similar to a spelling bee. Choose teams. Say "migrator" to a classmate. He must name a migrating animal. Use other words such as "hibernator", "partial hibernator", "changes coat color," and so on. If a classmate misses he sits down. Finally the winner or winners will remain standing.

Test. -- Write what you would do if:

1. You saw a man kill an animal out of season.

2. You knew where there was a nest of bobwhite's eggs.

3. You read an interesting story about animals and wondered if it were true.

4. You saw a friend shooting at birds with an air rifle.

5. Someone asked you why songbirds should not be killed.
CHAPTER IV

DESCRIPTION OF MATERIAL ON TAPE RECORDING AND
KODACHROME SLIDES

Recording an assembly program and activities. -- This is a description of an assembly program that was made by using a tape recording machine. It is a summary by the children of some of the many learnings growing out of their study of the conservation of natural resources. The program was presented to approximately two hundred intermediate grade children.

Accompanying the tape recording are slides numbered 27-48 which show the children making use of community resources to develop the proper attitude toward the conservation of natural resources.

Tape recording. -- The following is a recording of the assembly program:

All. -- I give my pledge as an American to save and faithfully to defend from waste the natural resources of my country, its soil and minerals, its forests, waters, and wildlife.

First child. -- These words are America's Conservation Pledge. Every citizen, young or old, should make this pledge, and keep it. We have found out that our natural resources are the most important things in our country. Our very lives depend on them.
This fall we studied about the importance of plants and forests in our lives. Early in winter we found out how we depended on soil, water, and minerals for our existence. This spring we are going to find out how we depend on the careful preservation of animals and birds in our world.

In connection with our study of conservation, we have taken several trips and plan to take more before the end of the year. Before we show you pictures of our trips, we would like to tell you some of the things we have learned about plants, trees, soil, water, and minerals.

Conservation means the careful use of things nature has given us. In our classroom we have tried to use carefully our paper and pencils this year. We are trying to practice some of the things we found out.

First master of ceremonies. — Of what use are our forests?

Second child. — Forests are one of our most valuable resources. They provide lumber for papermaking, and houses, and wood for many things we need it for. They help control floods and are the homes of many birds and other wild animals. Forests help make our country beautiful.

First master of ceremonies. — How much good forest land is left in our country compared with the amount that was here when the settlers first came?

Third child. — Forest regions in our country originally covered the entire eastern half of the country, or about 42 percent of the whole country. This was about 800,000,000 acres
Now less than 500,000,000 acres of good forest land remain.

First master of ceremonies.-- How do trees help prevent floods?

Fourth child.-- Trees growing along rivers help prevent floods. When heavy rains fall or when snow melts quickly there is likely to be so much water all at once that it will overflow the river banks. Trees help hold the water back so it drains more slowly into the river.

Leaves that fall make rich soil that isn't tightly packed together. The water that falls as snow or rain goes slowly into the ground and the rivers can gradually take care of it.

First master of ceremonies.-- How has man been an enemy of the forests?

Fifth child.-- For many years the forests seemed to be so large that there was not much interest in taking care of them. Trees were carelessly cut with lots of younger trees dying when large ones fell on them.

First master of ceremonies.-- How has fire been an enemy of our forests?

Sixth child.-- Fires started by careless campers and hunters are an enemy of the forests. Not only is valuable timber destroyed, but the humus that is made by falling leaves and is used by plants as food is also destroyed. Floods are often caused when forests are burned.

First master of ceremonies.-- What are the safety-first rules for campers to follow in the woods?
Seventh child. -- Be sure that your camp site is well drained, near water for cooking and drinking, away from cliffs and deep water holes, and free from poisonous snakes.

Use caution with fire. To prevent forest fires and accidents from fire keep from under trees with overhanging branches; clean your campfire area of dead branches; don't use flat rocks in your fireplace as they explode; be sure your fire is out when you leave. Leave your campsite clean and in good condition by disposing of cans and garbage. Then put your knife and ax where they belong.

First master of ceremonies. -- How do insects harm our forests?

Eighth child. -- Insects that attack trees are hard to fight. Unfortunately man has been at fault in spreading some insects when he transplanted trees from place to place.

First master of ceremonies. -- What is being done to save our forests?

Ninth child. -- Scientists are working to learn how to control insects and tree diseases. The government is setting aside national forests where young trees are protected and more are planted. They crowd trees together to produce tall, straight trees which are more valuable for lumber. Logging is done with as little waste as possible. Although it is still best to prevent forest fires, much is being done to control them when they do start.
First master of ceremonies. -- What is the poem Joyce Kilmer wrote about trees?

Tenth child. -- I think that I shall never see
A poem lovely as a tree.
A tree whose lovely mouth is pressed
Against the earth's sweet flowing breast.
A tree that looks at God all day
And lifts her leafy arms to pray.
A tree that may in summer, wear
A nest of robins in her hair.
Upon whose bosom snow has lain
Who intimately lives with rain.
Poems are made by fools like me
But only God can make a tree.

Second master of ceremonies. -- I am going to ask some questions on the non-living phase on conservation. The questions will be about soil, water, and minerals.

Why is the conservation of soil important to man?

Eleventh child. -- The conservation of soil is important to man because we get food from soil.

Second master of ceremonies. -- How is soil formed?
Twelfth child. -- Rocks are changed into soil by weathering. This is caused by the action of air, wind, water, growing plants.

Second master of ceremonies. Wind and water help to make soil. How do they help destroy it?

Thirteenth child. -- Wind and water can carry off the topsoil. Plant life helps to hold the soil in place and to prevent erosion.
Second master of ceremonies. -- What can be done to save our forests?

Fourteenth child. -- Farmers, gardeners, and other people including boys and girls can help save the soil from being carried away from lawns, yards, and gardens by rain. If furrows are made by the rain, fill them in. On our schoolgrounds we shouldn’t walk on the ground when it is soft and muddy. Conservation of soil is important to us all because we get our food from the soil.

Second master of ceremonies. -- How is water important to us?

Fifteenth child. -- We all depend on water to live. We also use it for power, for transportation, and for recreation. We catch fish that live in it.

Second master of ceremonies. -- What precautions should be taken about drinking water when on a hike?

Sixteenth child. -- When camping, in using water from an unknown source, you should always boil it for ten minutes. Boiled water tastes flat because its free oxygens is lost. By pouring the water back and forth from one dish to another several times, free oxygen may be put back into it.

Second master of ceremonies. -- Where does our drinking water come from?

Seventeenth child. -- Most of Greenville gets its water from a water tower in the Longview section. In the section east of Old Army Road and north of Ardsley Road, the water
comes from wells.

Second master of ceremonies. -- How is it made safe for drinking?

Seventeenth child. -- In cities and villages the common source of water is a lake or a reservoir which is fed by streams. Such water is unsafe to drink until it is purified.

All lake and stream water collects a certain amount of silt called sediment. When water stands in a reservoir the sediment settles to the bottom. This is called sedimentation.

Another method used to remove sediment from water is filtration. Water is allowed to flow through beds of sand, to which sediment clings.

Bacteria are removed from the water by either chlorination, where chlorine is added to the water, or by aeration where the water is sprayed high in the air. We are planning to visit the Kensico Dam this spring to see how our water is cared for there.

Second master of ceremonies. -- Why is the conservation of our minerals important?

Eighteenth child. -- The United States is the greatest producer, the greatest consumer, and probably the greatest waster of minerals. Our welfare depends on mineral resources in the age of power. Just think of all the mineral products that went into building this school. Mr. Gates told me we use 250 tons of coal a year to heat the building.

We are going to show you some slides of the Audubon Center in Greenwich, Connecticut where we spent a day studying
conservation on the trails and in the museum there. There are also some pictures of our trip to the Museum of Natural History.

**Slide 1.** -- This first picture is the museum headquarters where there is a very good nature library and many interesting exhibits.

**Slide 2.** -- A labelled nature trail starts from the museum and guides the visitors through the sanctuary.

**Slide 3.** Wildlife abounds. Most of the animals are shy or are active only at night. Trail signs call attention to their presence.

**Slide 4.** -- The trail reaches a five acre pond called Mead Lake.

**Slide 5.** -- The American Egret drops in occasionally. He is most frequently seen in Florida.

**Slide 6.** -- The Louisiana water thrush builds his nest in the bank of a river.

**Slide 7.** -- A stone wall provides a pathway into the swamp where many ferns and orchids grow. This is where we saw poison sumac.

**Slide 8.** -- The yellow warbler is the only all yellow bird. It prefers thickets but may also be found in the orchard.

**Slide 9.** -- This is a chestnut - sided warbler. This bird was rare one hundred years ago but is now abundant in the area.

**Slide 10.** -- The blue winged warbler also chooses brushy places to live. Its buzzy song is a familiar sound at the Center.
Slide 11. -- The yellow-breasted chat is the most spectacular bird at the center.

Slide 12. -- The big hemlocks in this picture are more than two hundred years old.

Slide 13. -- The birds of the forest find less food and cover than do those of the thickets and are less numerous. There are four common woodland species at Greenwich. One is the veery which eats seeds of the shrubs and insects.

Slide 14. -- This is the wood thrush.

Slide 15. -- This is the ovenbird whose familiar tea-cher song is heard in every part of the woodland.

Slide 16. -- The red-eyed vireo is more often seen than heard.

Slide 17. -- At the edge of the trail grows a colony of red puff balls which is a kind of fungus.

Slide 18. -- This is a black wood frog.

Slide 19. -- This is a tree frog or tree toad which can change its color from pale grey to green or dark grey.

Slide 20. -- This is the red spotted newt. These little salamanders live for a year or two on land before changing to a drab olive-green and entering the water where they will spend the rest of their lives.

Slide 21. -- On the fields bordering the Audubon Center where light and heat are more abundant, you can see the different birds like the bobolink. This is the male.
Slide 22. -- We have learned that plant cover prevents erosion.

Slide 23. -- A gallon of rain falling on the bare field quickly runs off, carrying a large amount of topsoil.

Slide 24. -- Wildlife is an important natural resource. The red fox plays an important part in maintaining a balance in nature.

Slide 25. -- Among the insect-eating mammals is the mole. Notice their huge shovel-like front feet.

Slide 26. -- Ferns grow in abundance along the trails. Almost forty different kinds can be found at the Center.

Slide 27 and 28. -- Mr. Mohr is one of the conservationists at the Audubon Center. He is telling us about the importance of the turtle in maintaining a balance in nature at the pond.

Slide 29. -- We are studying the turtle at close range.

Slide 30. -- We start out on the trail to make our observations.

Slide 31. -- Here, Mr. Mohr points out one of the signs telling us what to look for on the trails.

Slide 32. -- We are studying the aquatic or pond life at Mead Lake which is part of the Center.

1/ Slides numbered 1 through 26 may be obtained free of charge on loan from National Audubon Society, 1000 Fifth Avenue, New York.
Slide 33. -- After our picnic lunch at the Center we tidy up and leave the picnic tables clean for the next group.

Slides 34, 35, 36. -- The next three pictures were taken at the Museum of Natural History in New York where we spent a day studying about conservation, seeing movies on conservation, studying the exhibits, and taking part in the activities on conservation.

Additional Slides. -- The following slides are not described on the tape recording:

Slides 37, 38, 39. -- These slides record a trip taken to a local greenhouse to study plant life at close range.

Slides 40, 41, 42. -- A naturalist from a near-by zoo brought a collection of snakes to the school for the children to study at close range. Here they learn to handle the snakes.

Slides 43, 44. -- In the classroom the children study an exhibit of insects borrowed from the Museum of Natural History.

Slide 45. -- At the water works the children see water purified by aeration.

Slide 46. -- On the schoolgrounds a trip to study trees is conducted by a faculty member interested in tree identification.

Slides 47, 48. -- After the early spring thaw and rains, soil erosion is studied on the schoolgrounds.
CHAPTER V
SUMMARY

1. Community Resources Used

Trips, lectures, and demonstrations. -- The following is a list of community resources used in developing an attitude toward the conservation of natural resources while teaching the unit to a group of intermediate grade children:

1. Trip to Audubon Sanctuary where plant life and animal life was studied for a day under the direction of a conservationist at the sanctuary.

2. Trip to Museum of Natural History where movies and exhibitions on conservation were studied under the direction of a naturalist.

3. Trip around schoolgrounds to study trees on grounds.

4. Trip around schoolgrounds to study erosion after spring rains.

5. Trip to reservoir and filtration plant.

6. Trip to greenhouse to study plant life.

7. Trip to nearby pond to study aquatic plant and animal life.

8. Lecture and demonstration on snakes by a naturalist from a nearby museum.

9. Lecture and demonstration on attracting and feeding birds by a parent in the community.
10. Lecture and demonstration on precious minerals by the friend of a parent in the community.

11. Lecture and demonstration on trees and how to identify them by a tree surgeon in the community.

2. Community Resource File

Locating interested citizens. -- A community resource file in a school is an excellent help in locating parents and interested citizens who have materials, experiences, lectures, and skills in any field connected with conservation. It has been the writer's experience that such interested citizens are a valuable resource and one that should be more widely used by educators.

3. Outcomes Noted

Developing an attitude toward conservation. -- These are the outcomes noted by the writer as she worked through this unit on conservation with twenty-nine intermediate grade children:

1. A development of a keener appreciation of the significance of balance in nature was indicated by answers to questions.

2. Critical thinking on the part of the students was evidenced when they discussed their own wildlife responsibilities.

3. An eagerness to engage in practical conservation projects was noted.
4. Extended reading was done by the group.
5. Many related studies and hobbies were developed.
6. The beginnings of individual collections of conservation material were made.
7. The children voluntarily pursued helpful enterprises for the benefit of the group.
8. There were evidences of a growing capacity to see conservation principles in other subject areas.
9. It was apparent that school supplies such as pencils, papers, erasers, and crayons were used without waste.
CHAPTER VI

BIBLIOGRAPHIES

1. Bibliography for Children


   Number 104 Story of Seeds
   Number 105 Animal Families
   Number 107 Pets
   Number 204 Plants That Give us Food
   Number 207 Where Animals Live
   Number 407 Trees
   Number 501 Our Land of Plenty
   Number 512 Balance in Nature
   Number 607 Lumber
   Number 615 The Earth


   Number 9 Trees
   Number 16 Natural Resources
   Number 39 Plant Life
   Number 47 National Parks
   Number 51 The Earth's Surface
   Number 79 Conservation


2. Bibliography for Teachers


6. Fink, Ollie, The Teacher Looks at Conservation. Ohio Division of Conservation of Natural Resources, Columbus, 1940.


