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# Implementation of Ecology and Conservation Education in the Findlay Grade School

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IMPLEMENTATION OF ECOLOGY AND CONSERVATION

EDUCATION IN THE FINDLAY GRADE SCHOOL

(TITLE)

BY

RONALD L. HASH

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF

SPECIALIST IN EDUCATION

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY  
CHARLESTON, ILLINOIS

1977

YEAR

I HEREBY RECOMMEND THIS THESIS BE ACCEPTED AS FULFILLING  
THIS PART OF THE GRADUATE DEGREE CITED ABOVE

July 20, 1977  
DATE

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DATE

IMPLEMENTATION OF ECOLOGY AND CONSERVATION  
EDUCATION IN THE FINDLAY GRADE SCHOOL

BY

RONALD L. HASH

B. S. in Ed., Eastern Illinois University, 1965  
M. S. in Ed., Eastern Illinois University, 1970

ABSTRACT OF A FIELD STUDY

Submitted in partial fulfillment of the requirements  
for the degree of Specialist of Education at the Graduate School  
of Eastern Illinois University

CHARLESTON, ILLINOIS  
1977

## ABSTRACT

I started this project to improve the teaching of conservation and ecology in the Findlay Grade School. I wanted more than a paper project. I wanted a workable program that would improve the education of the students and a program that would promote better understanding of conservation and ecology. I wanted more teaching to be ecology oriented.

The students of the Findlay Grade School needed more information, and a better understanding of how our natural resources affect their lives. The students also needed a purpose for conservation. This purpose could only come through better education in the field of conservation. I felt that the students did not understand that resources can be depleted and that we do not have new resources to take the place of the ones being depleted.

It is the obligation of the school to establish conservation education programs. The law mandating such programs has been in effect since 1968. According to Dr. Lance Bedwell, of the Illinois Office of Education, very few schools in the state are fully meeting this obligation. The law states that in every public school there shall be instruction, study and discussion of current problems and needs in the conservation of natural resources, including but not limited to air pollution, water pollution, the affects of excessive use of pesticides, preservation of wilderness areas, forest management, protection of wilderness areas, and humane care of domestic animals. State law strongly suggest the inclusion of outdoor education in conservation education programs.

This project was started to meet a need of the Findlay Grade School. The amount of conservation and ecology being taught would not have passed any minimum standards of the state. Some classes were receiving no education in the field of conservation and ecology.

This project has been successful only because of the work involved in starting it. The project is started and it is working. It looks almost like an old subject to the school.

## I. INTRODUCTION

The purpose of this field study was to describe activities concerning the development of an environmental education program in the Findlay Grade School, where I have served as principal for the past five years. I was appointed Environmental Education Curriculum Coordinator for the Findlay Community Unit School District #2 on September 15, 1975. The superintendent assigned me the responsibility for developing an environmental education program for the Findlay Grade School.

The Findlay Grade School needed a clearly defined curriculum of conservation and environmental education. The major purposes of the program were to encourage conservation of energy and our natural resources and to promote an active concern for the environment among elementary age students. The program was also designed to encourage the development of environmental improvement plans for the school and the community.

This field study report summarizes my activities in providing leadership to the school staff in planning and implementing an environmental education program for the Findlay Grade School.

## II. LOG OF ACTIVITIES

On September 15, 1975, the Superintendent of the Findlay School District #2 asked me to become the Environmental Education Curriculum Coordinator for the District. I was also asked to plan and implement a program on conservation of energy and ecology for the Findlay Grade School.

On October 7, 1975, I contacted J. Robert Sampson, Assistant Director Instructional Services Section, Illinois Office of Education, to arrange for a speaker on Environmental Education, to provide some direction for myself and the teachers in program development. Mr. Sampson made the arrangement for Dr. Lance Bedwell, Educational Specialist on Environmental Education, to provide a workshop for teachers in November.

On November 4, 1975, the need for an environmental education program was explained to the District Advisory Council, a group of parents of school children from the Findlay District.

Dr. Lance Bedwell conducted the environmental education workshop at the Findlay High School on November 5, 1975. Dr. Bedwell gave a slide presentation, a short talk, and passed out free literature to the teachers of Kindergarten through grade 12.



Teacher questions concerning environmental education were discussed.

I attended an all day workshop on Science and Environmental Education at Lake Land Junior College in Mattoon, Illinois on November 21, 1975.

On November 22, 1975, I went to Chicago for three days to the Illinois School Board Association Convention. While there, I visited many of the displays. I also questioned the people at the displays on how their products helped in conservation of energy, and on the pollution effect of their material. I received a lot of material on energy conservation, and I read materials on attempts by businesses to conserve energy.

December of 1975 to June 1976 was spent reading materials, developing ideas about the program, and discussions with teachers.

On June 21, 1976, I started working on the layout of the extra classroom to be used in the program. First I made a scale drawing of the room including all doors, windows, and electrical outlets. Then, I placed tables on the drawing and labelled them for their purposes. I could then look at the drawing and tell how many tables I needed. I placed tables and the portable science laboratory according to the electrical outlets and the purpose of the tables.

At the June meeting of the Findlay Community Unit District School Board, I gave a progress report on the program. The Board promised to provide necessary funds to continue program planning.

On June 29, 1976, I plowed a small garden for the classes to use. The area was about twenty seven feet long and twenty one feet wide, and it was located on the south side of the school building between the old building and one of the additions. I had to dig out an old water pipe after the garden was plowed.

June 30, 1976, was moving day. I moved all science equipment, tables, and ecology materials to the room. I filled the shelves in the closets and set up four aquariums.

I tilled the garden again on July 12, 1976, and planted turnips, parsley, lettuce, radishes, black radishes, mustard greens, marigolds, zinnias, and bachelor buttons. The purpose for this was to determine if the ground could grow anything but grass. The soil had not been tilled for over thirty years. Teachers were encouraged to use the garden for planting projects.

July 16, I started putting up the large bulletin board. I devoted it to plants, wild animals, and fish. I also put a few plants on the table.

Another bulletin board was devoted to energy conservation. Materials for this bulletin board came from the Federal Government.

On August 11, 1976, I built four cages. Each cage was two feet square. Two cages had one inch mesh, and two cages had screen wire over them. We could keep animals, snakes, or insects, depending on what was caught. I also added two large tables to the room for the students to work on, and one large table for more displays.

The Findlay Grade School Workshop was held on August 25, 1976. I devoted much of the time allotted to information on the conservation program. I discussed how the room and equipment could be used. I also informed the teachers of several ways the garden could be used.

On September 15, 1976, I received the rest of my science equipment for the room. My secretary and I set up the equipment for two, ten-gallon aquariums.

On September 20, 1976, I worked with two teachers, Mr. Baker and Mrs. Ryan, setting up workable areas in the room for specific areas of science.

By October 1, 1976, the environmental education program was operating at the Findlay Grade School.

Even though the Ecology and Conservation Room was in use, I felt many of the teachers were having problems with knowing what student activities to initiate. I felt much of their ecology and conservation teaching would come from doing the

projects in science text. I did not believe that the science text had enough of a variety of suggested student projects and activities.

By mid October I started working on an Ecology Conservation Curriculum Guide. The guide was to provide a starting place for research and indepth study of ecological problems. The suggested activities of the guide were designed to meet specific objectives. The guide was completed by mid-December, 1976.

### III. SELECTED ACTIVITY ANALYSES

I used several different agencies to get materials and supplies for this project. We have Eagle Creek and Wolf Creek State Park districts near Findlay. I received help from these areas, only to the point that people volunteered to help with any type of field trip which I might want or to furnish speakers for the classrooms. The people at the park districts also gave me the names and addresses of people to write for help and publications. I contacted Robert M. Cottingham, the District Wildlife Biologist. I was given a list of free materials I could order and also a film list. Richard Morse, from the Soil Conservation office, also contacted me and offered to provide small evergreen trees to each student in the project.

The Illinois Office of Education helped start the project. Lance Bedwell sent me a box of samples of free materials that I could order. These materials ranged from free comic books on conservation to free film lists of conservation films. I received three Curriculum Guides from Mr. Bedwell. These guides were set up by the State of Illinois to show what they wanted taught in conservation. One very helpful guide was

the Environmental Education Handbook for Teachers published by the Illinois Office of Education in 1976.

I also requested materials from the Federal Commission on Energy. One guide provided by that Commission which was especially helpful was titled All Around You. This guide was published by the United States Department of the Interior, Bureau of Land Management. I also received their other guides and several small paperback books pertaining to Conservation and Ecology from the Federal Commission on Energy. Much of the material from these four guides was useful to teachers and myself when we developed the curriculum guide for our district. It was essential that such a guide be developed to provide continuity in our program and to avoid duplication of effort at different grade levels.

Every teacher in grades Kindergarten through six was involved in the development of the curriculum guide. I worked with each teacher individually in developing a guide for his grade level. We worked on the guide just after school or when teachers had a break during school, such as recess, noon, or music periods.

The general plan was to set general objectives for the grade level and then to develop specific objectives and methods to accomplish these specific objectives. I felt this approach would make the guide easily understood and simple to use.

My first teacher conference was with the kindergarten teacher, Mrs. Eadie. After talking to Mrs. Eadie a short while, I felt she had a reasonable amount of knowledge about the subject of ecology and conservation, but she needed help in developing the curriculum. We first worked on a general objective for kindergarten. This was to be an awareness program of what ecology and conservation was all about. Children of kindergarten age are not able to read or even carry on a very long conversation about any subject. The awareness program would have to be based on their natural curiosity.

To teach children of kindergarten age, you must rely on their curiosity and have programs set up so the children discover answers. We may use any or all of their senses, such as sight, smell, hearing, taste, and most of all their sense of touch. This approach was the major focus of our kindergarten program.

We set the program up by not having specific goals but rather specific areas to work on. The last part was easy. We worked on different things that could be done to make the children aware of their environment. Field trips, nature walks, certain types of movies and films strips and books with stories about animals or conservation projects were used.

I felt the kindergarten project was off to a good start. My work with Mrs. Eadie also provided me with a better knowledge of what to expect of the first graders.

After finishing with the kindergarten, I decided to combine teacher conferences. The next areas I worked with were the first and second grades. The two teachers were Miss Lockhart and Mrs. Van Keuren.

At our first conference Miss Lockhart and Mrs. Van Keuren both agreed that they would not have a great deal of time to spend on conservation and ecology. They felt the best program for them would be a year long program that involved only one or two and never more than three areas per month. Each teacher described what she felt she could do, and we divided this by nine to give the general objectives for the month. The second grade had more general objectives than the first grade. One reason for this is that most of the time in first grade is devoted to reading. The second area of time in the first grade is devoted to number concepts. After the first two priorities, comes conservation and ecology. I do feel the first grade teacher is doing all that is necessary to teach conservation and ecology in the first grade.

The next conference was held with Mrs. Leonard and Mrs. Tice, third and fourth grade teachers. I found they used many



of the same books and equipment, and have often felt that the classes could benefit by being together for certain subjects. Many of the general objectives developed worked for both grade levels. Even though the general objectives might be alike, the approach and method of attaining these general objectives were different as were the experiments and activities. Ecology and conservation had different meanings to these two teachers. Mrs. Leonard felt that ecology was trees, plants and ways to stop pollution. Mrs. Tice had a lot of self-energy devoted to recycling products, conserving energy, and not wasting food. Each teacher was eventually able to adopt some of the ways of the other teachers. I still know that each will emphasize what she knows and does best when the material gets to the classroom.

My last teacher conference was with Mrs. Ryan, the fifth grade teacher, and Mr. Baker, the sixth grade teacher. Mr. Baker, in his first year of teaching, had strength in the science area which is very closely related to conservation and ecology. Mrs. Ryan and Mr. Baker had been using the ecology and conservation room more than any of the other teachers. Both Mrs. Ryan and Mr. Baker had fewer general objectives, and fewer specific objectives than my other teachers. I feel that one of the reasons for this was that each one tried to set up situations so the students had to develop and test hypotheses.

Both teachers tried to present related ideas and enough material so the students could set up an hypothesis, and then test the hypothesis. This scientific method works well in conservation and ecology. Both teachers are very good with the scientific approach and use this method in other subjects as well, in example, art, social studies, and science.

Many of the teachers also included book lists and film lists in their suggestions for the curriculum guide. A few of the teachers included lists of materials needed for the suggested activities. The ideas and materials suggested by teachers were invaluable in the development of the curriculum guide.

The Findlay School District has been declining in enrollment for the last six years. The grade school staff was reduced by two teachers at the end of the 1975-76 school year. This reduction of staff left two classrooms vacant for the 1975-76 school year. It was decided to use one of these rooms for science, ecology, and conservation projects and activities in the environmental education program.

The room was thirty five feet long and twenty one feet wide. The North wall had six large windows that measure a total of twenty six feet by six feet, eight inches high. The West wall had two large closets and two coat closets. The

shelves in the closets provided storage for the equipment needed for the room. The South wall had a bulletin board, twenty one and one-half feet by four feet high. This has been useful for displays and pictures pertaining to one of the subject areas. It was also useful to display student work. The East wall had a large chalk board four and one-half feet high by thirty five feet long. This was very useful for the teachers to use while teaching. Above the chalk board there are hooks for a portable movie screen.

We were able to show movies, film strips or use an overhead projector or an opaque projector in the room. The room had three electrical outlets, one on each wall with the exception of the West wall. This room was in the first addition to the original building. The addition was built in 1951. Many of the rooms had only one electrical outlet. One outlet was used for the large portable science laboratory. One outlet was used for the pumps on the five aquariums. The other outlet was used for the projector or electric microscopes that were used in the room.

The floor of the room was dark tile with a black kick siding all around the room. The tile were easy to clean up and wax. We have had to wax the floor more than usual. I believe that this is one of the best types of floors that we could have

for this type of room. Spills wiped up easily and did not affect the floor or discolor it.

The lights were not the best type for this room. They were the type that hang from the ceiling on a rod, with a 200 watt bulb at the end. The bulb is surrounded by several circles that diffuse the light and stop glare. The white ceiling helps in reflecting light down. The tube fluorescent would be the best type of light.

The color of the room was light green. This helped keep light in the room. The only windows were on the north side of the room, so the room never got direct sunlight. The room did get enough light to keep all of the many plants alive.

#### IV. CONCLUSION

I started this project to improve the teaching of conservation and ecology in the Findlay Grade School. I wanted more than a paper project. I wanted a workable program that would improve the education of the students and a program that would promote better understanding of conservation and ecology. I wanted more teaching to be ecology oriented.

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in every public school there shall be instruction, study and discussion of current problems and needs in the conservation of natural resources, including but not limited to air pollution, water pollution, the affects of excessive use of pesticides, preservation of wilderness areas, forest management, protection of wilderness areas, and humane care of domestic animals. State law strongly suggests the inclusion of outdoor education in conservation education programs.

This project was started to meet a need of the Findlay Grade School. The amount of conservation and ecology being taught would not have passed any minimum standards of the state. Some classes were receiving no education in the field of conservation and ecology.

This project has been successful only because of the work involved in starting it. The project is started and it is working. It looks almost like an old subject to the school, however, I still remember the work involved in starting the program. I remember using the garden tiller for several hours to till the sod for a garden, moving large wood tables, moving science equipment, setting up aquariums, and all the many other labors involved. A project of this kind takes not only mental labors, but also physical labor.

Although this project consumed many hours of my time, the cost for new equipment was less than \$400.00. We have used much of the equipment we had on hand, including tables and laboratories. The equipment and supplies are now organized and easier to find, therefore, more teachers are making use of them.

If anyone else were to start a project such as this I would have several recommendations. I feel you should get as much new equipment as possible. New equipment will work better and give fewer problems to the teachers because it can meet specific needs of the program. Desks and tables, for example, should have scratch and burn resistant tops.

Water and electricity should be easily accessible. If an old room is to be used, an old science room would be best. The services of a plumber and an electrician may be required for minor modifications of a room.

Plants should be one of the major subject areas. Artificial light for growing plants and for experimenting with plants, should be used. The teachers have control over artificial light but not over sunlight.

I think the teachers should make use of speakers from the community who have knowledge of conservation areas. Many people in a community have expertise in areas that apply to

conservation or ecology. These people are usually willing to share their knowledge with students.

Evaluation should also be a major area for a program of this type. One should try to improve the program each year.

Student, teacher, and administrator should, be a part of the evaluation. Evaluation goals and objectives should be set up. I would want to know to what extent goals are being accomplished. I would want to know what could be done to increase the degree of accomplishment of goals.

I found that teacher in-service training is a must in a conservation and ecology project. Many teachers do not understand ecology or conservation. They need help figuring out what to teach, how to teach it, and how far to go with each grade level.

In an ideal situation, an outdoor education laboratory would benefit all concerned. This would involve acquiring land which is expensive. Land can be used to some degree, however, by using state parks or state conservation areas.

I also support community involvement in a conservation project. The more people you have interested the more good ideas that will come to the project and the more successful it will be. I have heard of using community advisory counsels in projects of this type.



Although the planning of the conservation and ecology program has been completed, the work of the Findlay School Staff on the program has just begun. It is hoped that each year will bring evaluation of the program and further refinements and modifications in it.

**CONSERVATION AND ECOLOGY CURRICULUM**  
**FOR**  
**THE FINDLAY GRADE SCHOOL**

## KINDERGARTEN

### I. GENERAL OBJECTIVES

The kindergarten age child has a natural curiosity about his surroundings. He loves to experiment, explore and discover. This interest in his physical, as well as social, environment indicates the place nature study and science should have in the learning experiences the school provides. The natural world in which the child lives yields limitless possibilities for seeing, hearing, smelling, tasting and touching. Through these sensory experiences the young child becomes a part of his world.

In addition, the young child needs to learn to appreciate his environment and to become aware of the importance of controlling and protecting it. Through nature walks, field trips, discussions and projects, the school can do much toward guiding the child in the role he and his parents must play to accomplish the task of saving our world.

## II. ACTIVITIES

### A. Plant life.

1. Have children place seeds (beans or corn) on wet paper towels in a jar. Observe how roots & seed leaves form.  
Break open one to see embryo.
2. Discuss what would happen if seeds are not planted.
3. Demonstrate with celery stalk & colored water the purpose of a stem.
4. Place radish seeds in small dish on wet paper towel, cover with Saran wrap and after a few days observe root hairs.
5. Experiment with several plants the effect of no water and no light versus sufficient water and light.  
Also turn one on side to show plant will grow up.
6. Discuss importance of plant life and why we must insure its existence.

B. Insects

1. Make a collection of insects.
2. Illustrate and name parts of insect body.
3. Discuss importance of insects.
4. Show appropriate filmstrips.
5. Use appropriate transparencies.
6. Find an anthill and observe activities.

C. Animals & Birds

1. Take a field trip. Observe birds and animals in their natural habitat.
2. Discuss how birds differ from mammals, e.g. body covering, feet, bone structure, reproduction, etc.
3. If possible, have a class pet (bird or animal) and have each responsible for its care.
4. Discuss which animals take care of their babies.
5. See movies of animal life.

D. Water

1. Discuss why we need water to live.
2. Take a field trip to a pond and observe different species of life found there.

3. Discuss and emphasize with pictures how pollution is ruining our fresh water and killing its life.

4. Go to the lake and observe and collect some of the litter found on the shore.

#### E. Land

1. Take "nature walk" and find evidence of soil erosion.

2. Discuss what can be done to conserve our land.

3. Explain and discuss how a dam is a way of protecting farm land (flood control).

4. Make a small hill and pour water over it each day to observe the amount of erosion which occurs.

#### F. Air

1. Discuss advantage of fresh air.

2. Show appropriate movies.

3. Take a walk and try to find examples of air pollution (trash burning, cars, trucks, ect.)

4. Discuss and distribute the booklet "Air Pollution."

5. Have children draw pictures of ideal atmosphere and one polluted with smoke and smog.

## FIRST GRADE

### I. GENERAL OBJECTIVES

- A. Energy must be used to set an object in motion or to alter its motion.
- B. Energy must be used to do work.
- C. Force is used to counteract force.
- D. Matter exists in various forms and states.
- E. Evaporation and condensation are changes in the state of matter.
- F. The sun is the source of our light energy.
- G. Organisms (living things) reproduce their own kind.
- H. There is an interchange of matter and energy between living things and their environment.
- I. The environment must be protected.



## II. SPECIFIC OBJECTIVES

## ACTIVITIES

A. Mechanical energy may be used to set an object in motion.

1. Begin the lesson by using an unwound clock.

Discuss with the class why a clock will run when it is wound and why it will not run when unwound.

2. Introduce the work energy materials.

3. Discuss the reasons why a toy dog moves and a real dog moves.

4. Begin a Science Vocabulary Chart with the words energy, food, and science.

5. Have the children make pictures of people or animals or moving things.

B. Food is a source of people energy.

1. Review with class the idea that food is a source of energy.

2. Have children demonstrate different ways of

moving a tri-cycle.

3. Discuss the type of energy used to make a bi-cycle move and a motorcycle move.

4. Help the children to understand that food and gasoline are both sources of energy.

5. Add fuel and gasoline to the Science Vocabulary Chart.

C. The energy in moving air may be used to set an object in motion.

1. Introduce the lesson by having the class toss a ball and a balloon to one another.

2. Discuss how a balloon can move without anyone touching it.

3. Help the children understand that the wind is a form of energy.

4. Help the children to make pinwheels of colored paper.

D. The energy in moving water may be used to set an object in motion.

E. Energy must be used to do work. The more work done the more energy is required. The

5. Add wind to Science

Vocabulary Chart.

6. List ways the wind is used to do work.

1. Introduce the lesson by putting a toy boat in a pan of water. Ask the children to name two ways the toy boat could be made to move.

2. Have the children name some things that can be moved by water.

3. Help the children to make aluminum pinwheels and let them see how moving water makes the pinwheels turn.

4. Add water to the Science Vocabulary Chart.

1. Use roller skates to compare rolling friction and sliding friction.

rate of doing work is determined by the rate at which energy is used.

F. Energy must be used to do work. Work is done against the force of gravity when a force is applied.

2. Have the children lift one, two, three, and four 1-pound boxes of sugar to determine the amount of energy required to lift the boxes of sugar.

3. Add investigation, wheels, friction, work, gears, pull, pulley, and pulling to the Science Vocabulary Chart. Have individuals explain the meaning of different words.

4. Play with the class an Oral Word Game.

5. Play with the class a Word-Recognition Game.

1. Use the globe and small toys to demonstrate the direction in which the Earth's gravity pulls in the opposite direction.

2. Have the children tell

and demonstrate things they have done that required them to lift, jump, push, or pull against the force of gravity.

3. Demonstrate the use of magnet.

4. Add gravity, Earth, force, lift, push, rocket, opposite, metal, magnet, iron, and steel to the Science Vocabulary Chart.

5. Watch film on magnets.

6. Play a Word Game with the class.

G. Matter exists in various forms.

1. Explain to the class how a thermometer works. Discuss with them that the freezing point is 32 degrees ( $0^{\circ}$  metric).

2. Have them describe the scenery when it is  $32^{\circ}$ , above  $32^{\circ}$ , and below  $32^{\circ}$ .

3. Discuss with class the

three states of matter:

solid, liquid, and gas.

4. Add air, rock, solid, liquid, gas, ice, heat, melt, degree, thermometer, temperature, water, vapor, and evaporate to the Science Vocabulary Chart.

5. Bring in a bottle of ginger ale and open it in front of the class. Ask children to find three different solids, one liquid, and one gas.

H. Evaporation and condensation are changes in the state of matter. Changes in the state of matter are determined by a lessening or gaining of heat (heat exchange).

1. Have the children bring in pictures of different types of clouds.

2. Have the class keep a daily weather window.

3. Bring in a cactus for the class to examine.

4. Have class collect and display pictures of deserts.

I. Organisms (living things)  
reproduce their own kind. New  
plants are produced from seeds  
and spores or from parts of the  
old plant.

5. Add cloud, droplet,  
drop, fog, rain, sun, and  
desert to the Science Vo-  
cabulary Chart.

6. Show filmstrips on  
weather to the class.

1. Bring in different  
types of beans for display.  
Help the class to develop  
the idea that each kind of  
bean grows on its own kind  
of bean plant.

2. Let the children make  
an observation jar to see  
the sprouting of beans.

3. Bring in a plant and  
have the class see its  
three parts.

4. Make a vegetable gar-  
den at school.

5. Let the children sow  
seeds of cereal plants on  
damp sponges.

6. Add plant, seed pod, seed, sprout, soil, roots, stem, leaves, mold, grass, and fruit, to the Science Vocabulary Chart.

7. Display books on seeds and plants.

8. Help the children make a seed display.

9. Show filmstrips pertaining to plants and seeds.

J. Organisms (living things)  
reproduce their own kind.

1. Discuss the types of eggs and their different usage.

2. Bring in a chicken egg for the children to examine.

3. Have books on insects available for the class to look at.

4. Have the children bring to class captured caterpillars. Put in jar or cage to observe the spinning of its cocoon.



5. Help the children find pictures to make an animal scrap book.

6. Discuss the different animals found on a farm and why they are important to us.

7. Take the children on a field trip to a farm where they can observe the different animals.

8. Have children make pictures of different animals and their babies and use the pictures for a classroom exhibit.

9. After discussion of the different types of birds, make a bird mobile.

10. Put out a bird feeding tray.

11. Take the class for a short "bird walk" in nature area.

12. Collect and display pictures of birds and their eggs.

13. Add egg, hatch, chicken, bird, parent, turtle, snake, lizard, reptile, scales, insects, grasshoppers, caterpillar, cocoon, moth, fish, salmon, gills, tadpole, frog, lungs, cow, rabbit, pig, horse, sheep, goat, mammal, fur, zoo, gazelle, lion, bear, kangaroo, giraffe, zebra, and other words to the Science Vocabulary Chart.

K. There is an interchange of matter and energy between living things and their environment. Adequate amounts of both are required for optimum growth.

1. Make an animal book.
2. Make an observation sprouting garden with the class.
3. Show the film "What Plants Need For Growth."
4. Have the children bring

in pictures and books about deserts, desert plants, and desert animals. Prepare a desert display.

5. Discuss the foods of different animals.

6. Invite the children to tell about the care they give their pets at home.

7. Help the class write a short story about their favorite animal and illustrate the story.

8. Make an aquarium for the classroom.

9. Take the children on a short trip around the neighborhood where they can see many plants.

10. Add aquariums, whales, seals, penguins, elephants, dachshund, and Great Dane to the Science Vocabulary Chart.

L. There is an interchange of matter and energy between living things and the environment. Adequate amounts of both are required for optimum growth.

1. Have the children make picture of one of their hands and compare them with pictures of a sixth graders' hands.

2. Have children bring in pictures of older boys and girls engaged in active sports. Use the pictures for a bulletin board.

3. Make a collection of materials on keeping clean. Call on children to explain what the different materials are used for.

4. Let each child choose his favorite meal and make a picture of the things that he or she thinks are good to eat at that meal.

5. Make a class weight and height chart.

6. Make a life size figure of each child and display in the room.

7. Add food, fresh air, exercise, sleep, breakfast, lunch and dinner to the Science Vocabulary Chart.

M. To protect our environment from pollution.

1. Discuss the different types of pollution.

2. Make a chart showing the major cases for each type of pollution.

3. Discuss and list what children can do to help stop pollution.

4. Have the children bring in pictures showing the land before and after pollution.

5. Have the children draw pictures to show the ways to stop pollution. Display in school hallways.

6. Show films and filmstrips.

### III. EVALUATION

Most of the evaluation will be done through class discussion and participation. The childrens' pictures and other work will be checked to see if they have understood the main idea of each section.

### IV. MATERIALS

1. Films and filmstrips.
2. Resource books.
3. Materials to make an aquarium.
4. Materials to make a garden.
5. Clay for models.
6. Pictures.

## SECOND GRADE

### I. GENERAL OBJECTIVES

- A. Children should learn that summer, winter, spring, and fall are our seasons.
- B. Fall, winter, spring, and summer are characterized by many changes.
- C. The length of daylight changes with the seasons.
- D. We get heat from several sources.
- E. Things get hot in several ways.
- F. We use heat in several ways.
- G. The earth is always turning.
- H. The sun is always shining.
- I. The sun cannot shine through some objects.
- J. Various animals move in different ways.
- K. Some animals hatch from eggs and some are born alive.
- L. There are six general classifications for animals.
- M. There are specific characteristics of mammals, birds, reptiles, amphibians, fish, and insects.
- N. Some insects have eight legs and some have six legs.

- O. There are four types of animals homes.
- P. Differentiate between green plants that make their own food and other plants.
- Q. Differentiate the parts of a green plant as stem, root, and leaves.
- R. Describe the functions of the stem, root, and leaves of green plants.
- S. Name two ways in which plants produce new plants.



## UNIT I.

### HOW DO SEASONS CHANGE?

#### SPECIFIC OBJECTIVES

#### ACTIVITIES

##### A. Fall

##### 1. Plants

a. Leaves change color and fall off.

b. Plants produce seeds.

c. Terminal and lateral buds have formed.

d. Evergreens do not change very much in fall.

##### 2. Animals

a. Some animals store food for winter.

b. Some animals prepare to hibernate.

c. Some make chrysalises or cocoons in fall and spend the winter in them.

1. Children collect pictures for a bulletin board display, titled "Signs of Fall." Later these pictures may be used to start a class scrapbook, "How the Seasons Change."

2. Children examine with a magnifying glass tree and bush buds.

3. Class start exhibit of signs such as cocoons, nuts, leaves, cattails, etc. Keep milkweed and cattail seeds in glass jars or screen covered boxes.

4. Take class on an

- d. Some animals migrate in fall.
  - e. Some animals that will not live through the winter lay eggs that will hatch the following spring.
  - f. Some animals change color in fall.
3. People.
- a. People prepare for winter by buying warm clothes.
  - b. They provide warm shelter.
  - c. They provide winter protection.
- B. Winter.
- 1. In winter animals' activities change.
  - 2. In winter peoples' activities change.
  - 3. In winter plant life changes.
  - 4. In winter, weather changes.
  - 5. There are some places where winter changes are not great.

excursion to collect plants for a fall exhibit.

5. Early in October mark a spot with masking tape where the sun can shine through a window. Measure the length of the shade at various intervals.

6. Make and mount a leaf collection noting coloration.

7. Have children bring flowering plants from their gardens. Observe withering flowers and formation of seeds.

8. Observe the numbers of insects around as the weather changes.

9. Collect 4 or 5 houseflies. Put in a quart jar with ice cubes. Note activity of insects as air around them becomes colder.

C. Spring.

1. In spring peoples' activities change.
2. In spring animals' activities change.
3. In spring plant life change.
4. In spring, weather changes.

D. Summer.

1. In summer peoples' activities change.
2. In summer animals' activities change.
3. In summer plant life changes.
4. In summer, weather changes.

E. Ways summer is different from winter.

1. In winter there is less daylight.
2. In summer there is more daylight.

10. Observe migration of birds.

11. Make a bird feeder to feed winter birds. Read about and observe which birds stay through the winter.

12. Keep a weather chart to note changing temperatures.

13. Use the almanac to find the longest and shortest day of the year.

14. Collect insect cocoons. Try to observe the emergence of the adult insects.

15. Keep a class calendar of "First Season".

16. Cut twigs early in the spring. Place some in cool dark place. Place some in warm sunny place. Observe difference.

17. Collect frogs eggs and

keep a record of their development.

18. Collect pictures for a bulletin board on each season.

19. Make a diagram showing how plants and animals change in each season.

20. Children may show another class their home-made movie, exhibits, and class scrapbook as various individuals explain how things change from one season to another.

21. Children summarize unit by dividing into four committees. Each committee will plan and make a scene depicting one of the four seasons. Scenes are put together to form a large mural.

## UNIT II.

### WHERE DO WE GET HEAT?

#### SPECIFIC OBJECTIVES

Children should learn:

- A. We get heat from the sun.
- B. It is warmer in the sun than in the shade.
- C. Clouds cut off some of the heat from the sun.
- D. It usually gets warmer during the day when the sun shines and cooler at night when the sun sets.
- E. We get heat from fires.
- F. When something burns, it gives off heat.
- G. A fire needs air fuel to burn.
- H. We get heat from electricity.

#### ACTIVITIES

- 1. Children use thermometers to prove that sun gives heat.
- 2. Read thermometer in sun and one in shade.
- 3. Read one in sun in daytime and one at night.
- 4. Experiment: Use 2 wax crayons or 2 candles. Put one candle or crayon in direct sunlight and the other in a shady place. Observe both after several hours. The one in sunlight is soft or slightly melted, other one in shade hasn't

- I. Heat will travel quickly.
- J. Heat will travel quickly through metals.
- K. When air is heated, it moves upward.
- L. To review concepts studied.

changed much. Using discussion in science book to develop concept that fire gives off heat.

5. Experiment: Place a jar upside down over a lighted candle. Why does fire go out? Then place different sized jars over same size candles. Tell what happens.

6. Have children explain why fire goes out when a person whose clothes are afire rolls up in a rug or blanket; a person steps on a lighted cigarette or rubs it out in an ash tray; a jack-o-lantern has openings that are too small; a cover is put on a pan in which grease is afire.

8. Develop concept that we get heat from electricity

by discussing pictures and situations in book.

9. Children tell different ways we use the heat made such as to keep us warm, to cook, etc. by electricity. Write them on the board.

Following this, children may list electric appliances that belong under each heading.

10. Experiment: Heat water in a pan. Put a metal spoon in the hot water. Will the spoon get hot? Find out. Heat the water. Put a fork made of wood in the water. Does the fork get hot? Find out. Boys and girls suggest experiments to help them find out if heat moves quickly through various objects.

11. Children make a big chart of things that heat does and does not move through quickly.

12. Discuss situations pictured in book.

13. Experiment: Make a paper spiral. Attach to a pencil with string. Hold over a candle burning inside a chimney. Is air moving? Yes, because spiral is turning. Is the air warm? Hold a hand over chimney to see. Hold tissue streamers attached to pencil over candle heat that is not lighted. Is air moving? No, streamers aren't moving. Will it move if it is heated?

14. Children show another class the charts and bulletin board displays they



made as they worked on this unit.

15. Demonstrate and explain experiments by means of which they discovered important things about heat.

They make signs to accompany their displays and experiments.

### UNIT III.

#### WHAT MAKES DAY AND NIGHT?

##### SPECIFIC OBJECTIVES

##### ACTIVITIES

- |   |   |
|---|---|
| A. Explore childrens ideas of what makes night and day.   | 1. Discuss material and pictures in the science book.   |
| B. Explore childrens ideas about the size and shape of the earth.   | 2. Globe is available for free-time exploration.  |
| C. Develop concept that earth is like a very big ball.  | 3. Boys and girls find places with which they are familiar and trace trips they have taken, comparing how far they went with the distance around the earth. |
| D. Help children understand that earth is always turning and the sun is always shining.                                     | 4. Discuss material presented in science book.  |
| E. Help them discover it is day on the side of the earth on which the sun shines. It is night on the side of the earth that | 5. Experiment: Mark side of globe with piece of modeling clay to show where   |

is turned away from the sun.

F. Children discover that sometimes we cannot see the sun during the day because clouds hide it.

G. Children discover that when the sun cannot shine through an object it makes a shadow.

H. Shadows are long in the morning, short at noon, and long in the afternoon.

I. Children learn that shadows are cast in different directions at different times.

we live. Shine a flashlight where the mark is.

Its day or night. Turn the ball. Where is the mark now? Is it day or night? Two children arrange the globes and light to show that our side of the earth is having day.

Display cutouts of clouds.

A third child holds clouds to show that our side of

the earth is having a cloudy day. Can people on

our side of earth see the sun now? Another child

holds the tiny toy airplane on the globe while the light and cloud cutouts are arranged to show a cloudy day.

6. Discuss material presented in science book.

7. Children have a shadow play. Hang a sheet on a clothesline in front of a sunny window for a "screen". A bright light may be substituted for sunshine.

Children take turns performing behind the sheet, using various actions with simple properties or costumes. Children observe their own shadows in the morning, at noon, and in the afternoon.

8. Each child makes a sequence of three drawings showing what happens to his own shadow or to the shadow of some landmark during the day. Children make a shadow stick as described in book.

## UNIT IV.

### HOW DO ANIMALS AND PLANTS GROW?

#### SPECIFIC OBJECTIVES

#### ACTIVITIES

Children should learn:

- A. There are many different types of animals.
- B. Animals eat different things.
- C. Young animals are hatched from eggs or are born alive.
- D. Animals live in various kinds of homes.
- E. Animals can be identified by their characteristics.
  - a. By their appearance.
  - b. Ways they move.
  - c. Ways they grow and change.
- F. Mammals: have fur or hair on their bodies and are born alive. Most mammals

- 1. Make or draw a picture collection of living and non-living things.
- 2. Make a picture collection of animals' homes.
- 3. Care for various pets in the classroom.
- 4. Collect pictures of mammals for individual booklets.
- 5. Make a picture collection of adult mammals with their young.
- 6. Show filmstrip "What is a Mammal?"

are cared for by their mother. Mammals resemble their parents.

G. Birds: have feathers covering their bodies. Most birds can fly. Birds have wings instead of front feet.

The feet and bills of birds are especially designed to help them get food. Young birds hatch from eggs laid in nests. Young birds are cared for by their mothers.

H. Reptiles have dry scales covering their bodies. Most reptiles live on land. Young reptiles hatch from eggs which are laid on land. Reptiles do not care for their young. Young reptiles resemble their parents.

I. Amphibians: have moist skin. Live on land and in water.

7. Hatch baby chicks.

8. Make a chart of developmental process.

9. Make a birdfeeder.

Observe which birds use feeder. Watch movements of birds.

10. Observe a real bird nest to find out what nest is made of.

11. Collect feathers.

Observe under magnifying glass.

12. Write stories about birds.

13. Show filmstrip "What is a Bird?"

14. Observe a snake-skin or an exoskeleton from a cicada. Explain how such animals grow larger.

15. Make a terrarium for a lizard.

J. Fish: have slippery scales covering their body. Fish live in water. Most fish hatch from eggs laid in water.

K. Insects: have 3 body parts. Insects have 6 legs.

L. Animal homes include the following types:

1. Nests.
2. Lodges.
3. Webs.
4. Hills.

16. Show filmstrip "What is a Reptile?"

17. Make a woodland terrarium for a salamander or toads. Observe their habits.

18. Demonstrate how cold affects them by putting a frog in a jar with air holes in the lid. Put jar in refrigerator overnight. Take out of jar and observe their activity as they grow warm.

19. Collect frog eggs. Observe their development from hatching to tadpole to frog. Make a chart of progress.

20. Show filmstrip "What is an Amphibian?"

21. Observe fish in an aquarium. How do they get air? How do they swim?

22. Make a scrapbook of fish. Describe size, shape, color.

23. Show filmstrip "What is a Fish?"

24. Set up an antfarm.

Observe how colonies work together.



## UNIT V.

### PLANTS

#### SPECIFIC OBJECTIVES

#### ACTIVITIES

- |  |   |
|--|---|
| A. There are many kinds of plants, green and not green.  | 1. Take a field trip.<br>Get wide variety of plants.  |
| B. Plants grow in many different places in water, on other plants, on rocks, in soil.  | 2. Scrape green algae from tree bark. Observe under microscope. Compare with plants growing in soil.  |
| C. Most plants that grow in soil have leaves, roots, and stems.  | 3. Compare two kinds of root systems-dandelion vs. grass.   |
| D. Leaves, stems, and roots vary greatly in different plants, but each part of a plant does certain things. Most plants use only one method of reproduction. | 4. Prepare bulletin board display of foods we eat showing pictures of plant parts.<br>5. Group into leaves, stems, roots, fruit, and seeds. |
| E. Green plants make food from water and carbon dioxide,   | 6. Observe buds on autumn branches.   |

- using energy from sunlight.
- F. Many plants store food in their parts.
- G. Plants use the food they make for growing and producing new parts.
- H. Food made by green plants is also used as a source of food for people and for animals.
- I. Buds grow on stems of plants.
- J. Buds contain parts that grow into leaves, flowers, or extensions of the stems.
- K. A plant gets bigger by the growth of parts from its buds.
- L. Many green plants have flowers.
- M. Flowers produce seeds.
- N. Most seeds are scattered from the plant that produced them.
- O. Seeds are scattered by wind, by water, and by animals and by man.
7. Dissect to identify various parts.
8. Soak lima bean seeds. Observe inside. Draw diagram illustrating structure.
9. Plant seeds. Observe growth of plants.
10. Bring a variety of vegetable samples to class.
11. Classify into roots, stems, leaves, fruits, and seeds.
12. Put a sweet potato (point down) in a small jar. Observe growth of roots and stems.
13. Bring edible fruits to class. Dissect and observe seeds.
14. Bring samples of various seeds. Observe how seeds are spread.
15. Plants need light.

Put growing plants in a dark place. Put other plants in a sunny place.

Compare.

16. Put celery stalks with leaves in water colored with food coloring. Observe.

## THIRD GRADE

### I. INTRODUCTION

The third grade concerns itself with the natural world, the living world of plants and animals and the physical world of materials. Our aims are threefold, first, to lead the child into a greater understanding of the world around him; secondly, to foster effective thinking habits about that world; thirdly, to help him develop ecological attitude toward it.

## II. GENERAL OBJECTIVES

The general objectives of science curriculum are given to help the children to gain an understanding and appreciation of the following concepts:

- A. Events in natural environment happen in an orderly way.
- B. Lawful change is characteristic of events in natural environment although living things tend to produce living things like themselves over millions of years the earth and living things on the earth have changed; and diversified forms of life have evolved.
- C. To find order in natural environment, the scientist seeks basic units that can be put together in an almost infinite variety of ways; the cell and the atom are examples of such units. When equilibrium is upset in organism environment interactions; regulatory mechanism go to work to restore equilibrium.
- D. There is a relationship between structure and function; the structure of parts of living organisms determine the function of those parts.

- E. There is a basic tendency toward stability or equilibrium in the universe; thus, energy and matter maybe transformed, but the sum total of matter and energy conserved.
- F. Man has changed and continues to change the natural environment; but because he is often ignorant of long range consequences, his actions may have harmful effects for himself and for other living organisms.
- G. Man needs to recognize the importance of our natural resources, the problems of conserving them, the causes and solutions of pollution, the community involvement, and the opportunities for employment. All men should have pride in our country and community and work toward that end.

### III. SPECIFIC OBJECTIVES

### ACTIVITIES

A. In the animal kingdom the children will learn this:

1. Plants and animals are made up of cells.
2. Living things are classified into different groups.
3. Living things have common needs such as food, air, getting rid of wastes, having babies.
4. Living things adapt to different kinds of environment.
5. Man provides special care to animals in zoos and on farms.

B. The children will learn that:

1. The human body is made up of different kinds of cells.
2. Cells use energy in doing their work; to get this energy they need food and oxygen.

1. Use microscope to show the difference in plant and animal cells.

2. Make a diarama of animals homes.

3. Make aquarium.

4. Use bulletin board displays to help better understand the relatedness of living things.

5. Visit a zoo.

6. Make comparisons and test ideas.

7. Read books about dif-

ferences and the characteristics of animals.

8. Use films.

9. T.V. National Geographic.

10. Keep a pet hamister and observe its ways of feeding.

3. Different parts and systems of the body help to maintain the cells.

C. The children will learn that:

1. Foods are classified into four groups based upon the type of nutrients they contain.
2. You get the nutrients you need if you eat enough food from each group every day.

D. The purpose to establish the idea of ecology and understanding of how all living and non-living fit together on the earth. It is divided into four main concepts:

1. Diversity.
2. Adaptation.
3. Interrelationship.
4. Change.

These four concepts show the roll that humans, plants,

11. Make a chart of animals habits.

12. Observe cells by using a microscope.

13. Write words on chalk-board and ask questions about the location of each.

14. Compare the body with machine or electric clock.

15. Measure and compare with thermometer.

16. List foods then discuss the transformation of the body.

17. Experiment with breathing-inhale, exhale.

18. Feel the heart pumping.

19. Make a stethoscope.

20. Make a chart of four food groups.

21. Make menues to show the right foods should be eaten.

22. Experiment to show what



animals, and organisms play in the web of life.

E. The children will learn that we should have:

1. Pride in country, community, and ourselves.
2. Awareness of and desire to improve existing conditions and to promote interest in nature.
3. Change to bring attention to job possibilities and conservation practices.
4. Related fields.

Namely:

- a. Kinds.
- b. Location.
- c. Possible supplies.
- d. Depletion.

F. Pollution.

1. Types.
2. Causes and affects.
3. Possible solution.

foods contain fats, starches, raw foods and cooked foods.

Make a report on what they learned.

23. List the foods they eat in one day then place them in the correct group.

24. Visit food market or farm.

25. Make vegetable garden.

26. Unscramble words.

27. Class discussion on balance diet.

28. Collect newspaper clipping.

29. Cartoons.

30. Field trips.

31. Chart-Physical features.

32. Encyclopedia.

1. trees.

2. animals.

33. Make bulletin board of animals that look like plants.

G. Water Resources.

1. Water cycle.
2. Storage.
3. Water sheds.
4. Table.
5. Purification.
6. Uses.

H. Soil Resources.

1. Erosion.
2. Conservation practices.
3. Glaciation.
4. Level of land.
5. Farming practices.

I. Mineral Resources.

1. Kinds.
2. Location.
3. Reserves.
4. Possible substitutes.
5. Conservation practices.

J. Forest Resources.

1. Kinds.
2. Location.
3. Uses.

34. Make a thumb print with ink pad.

35. Name all students listen to their voices.

36. Throw a hula hoop then look and see how many organisms record throw.

37. Plant seeds and compare the plants.

38. Find out how some plants and organisms protect themselves.

39. List the different regions.

40. Check for pollution by putting a piece of white paper outside the window. Look at it in a few days.

41. Select pictures showing different work and how it is related to our well being.

42. Research reading.

4. Danger of misuse.

5. Conservation practices.

K. Natures Resources.

1. Animals.

2. Plants.

3. Uses and value.

4. Preservation and protection.

L. Human Resources.

1. Importance.

2. Man's role in nature.

43. Reporting oral and  
written.

44. Oral discussion.

45. Recognition of words  
and terms.

46. Increased vocabulary.

47. Field trips.

48. Planting trees.

## BOOKS

1. Ruchlis, Hy. - Your Changing Earth
2. Podewdorf, Illa - The True Book of Animals of the Sea  
and Shore
3. Selsam, Mellicent E. - See Through the Forest
4. Shannon, Terry - Desert Dwellers
5. Lauber, Patricia - Your Body and How It Works
6. Zim, Herbert - Your Food and You
7. Gates, Richard - True Book on Conservation

## FILMS

1. Animals at Night
2. Animals at Their Food
3. Animals at Their Home
4. Animals in Water
5. Animals at Work in Nature
6. Animals Ways They Eat
7. Common Animals of Woods
8. How Animals Defend Themselves
9. How Nature Protects Animals
10. Looking at Amphibians
11. Looking at Birds
12. Looking at Fishes
13. Looking at Reptiles

FIELD TRIPS

Shelbyville Dam

East and West State Parks

People: Park Rangers

## FOURTH GRADE

### GENERAL OBJECTIVES

- A. Events in the natural environment happen in an orderly way; man searches for laws to explain this order by observing, hypothesizing, checking ideas, and rejecting those which do not square with reality.
- B. There is a lawful change in characteristic of events in the natural environment; although living things tend to produce living things like themselves, over millions of years the earth and living things on the earth have changed, and diversified forms of life have evolved.
- C. Order in the natural environment is discovered by seeking basic units that can be put together in an almost indefinite variety of ways; the cells and the atoms are examples of such units.
- D. The motion of particles helps to explain such phenomena as heat; light, electricity, magnetism, and chemical changes.
- E. There is a basic tendency toward stability or equilibrium in the universe; this, energy and matter may be transformed, but the sum total of matter and energy is conserved.

- F. When equilibrium is upset in organism-environment interactions regulatory mechanisms go to work to restore equilibrium.
- G. There is a relationship between structure and function; the structure of parts of living organisms determines the function of those parts.
- H. Man has changed and continues to change the natural environment, but because he's often ignorant of long range consequences of his actions that may have harmful effects for himself and for other living organisms.
- I. In science natural resources are recognized for their importance in problems of conservation, causes of pollution and its solutions, involvement of communities, job opportunities and our pride in our country and community.



## SPECIFIC OBJECTIVES

## ACTIVITIES

A. The children learn that energy is the ability to do work, energy comes from foods and fuels; most sources of energy on earth can be traced to the sun; energy may be changed from one form to another; and that it takes force to start, move, or stop.

B. Children learn that; All things are dependent upon green plants for food. Green plants carry on photosynthesis. The structure of green plants make it possible for them to carry on food making process. Green plants are adapted to different environments. Man protects some unfavorable plants and natural enemies of his crops. Man provides materials needed for plants.

1. List different kinds of energy.
2. Use pictures to show different forms of energy.
3. List different work done by machines.
4. Use live demonstrations.
5. List foods and name from what sources they are derived.
6. Experiment on the removal of chlorophyll from green leaf.
7. Make a cross section of plant to show how water and materials travel through the stem.
8. Use microscope to examine plant cells.
9. Raise plants from cuttings and bulbs.
10. Bring different kinds

C. Children learn that to keep alive:

All living things are made up of cells. There are ways of distinguishing between plants and animals. The kinds of animals range from very simple to highly complex. Animals are adapted to the environments in which they live. The classification of animals is based upon comparative structure.

D. Children learn that:

1. Light is a form of energy.
2. Many objects are seen by the light reflected from them.
3. Materials may transmit, re-reflect or absorb light.
4. The eye collects light from objects and projects their

of soil and discuss the differences.

11. Complete sentences.
12. Make a terrarium.
13. Use magnifying glass.
14. Make an aquarium.
15. Compare animals.
16. Discuss food in relation to environment of animals and man.
17. Classify animals.
18. Make a scrapbook of animals.
19. Use library for books.
20. Bulletin board display of animals.
21. Write a report on some animals.
22. Show how sunlight can change colored paper.
23. Build a periscope.
24. Watch your iris.
25. Show how water bends

image on the retina?

5. Light is bent as it passes from one media into another.
6. Seeing with our brain.
7. Some defects in vision can be corrected by wearing glasses (lenses).

E. Children learn that:

1. The forecasting of weather is necessary to know about temperature of air, air pressure, and water vapor in the air since these determine the weather.
2. Molecules of air occupy space and have weight.
3. When molecules of air and water are heated, their movement increases and they occupy more space. When cooled the reverse happens.

F. Children learn that ecology

light by putting a pencil in a glass of water.

26. Experiment with light by using transparent, translucent, and opaque glass.

27. Use corrective lenses to show what eye defects are like.

28. Show how eyesight and automobile safety are connected.

29. Conduct poster contest on good eye habits.

30. Keep calendar of weather conditions.

31. Collect daily weather maps.

32. Experiment if an empty bottle is really empty.

33. Use thermometer for temperature, barometer for moisture.

34. Make a weather vane.

has four aims:

1. Diversity - children learn that no two organisms are alike; will help them have a better concept of the world.
2. Adaption - man and all organisms must adjust to their environment in order to survive.
3. Interrelationship - as long as living things need food, seek shelter and protection in their environment they will need each other.
4. Change - man and all organisms change according to their needs; when their change stops, life ends.
- G. Children learn pride in country, community, and themselves.
1. Awareness of and desire to improve existing conditions.

35. Inflate a balloon, tie securely, measure circumference, put in sunlight for 10 minutes, measure again.

36. Make a cloud.

37. Experiment about vapor by washing blackboard.

38. Use rain gauge.

39. Field trips.

40. Make a chart titled (What Is Ecology?).

41. Collect newspaper clippings about environment on conservation city planning etc.

42. Have study of advertising messages.

43. Keep a journal of things that have been seen, heard, or experienced that relate to ecology.

44. Research reading.

45. Reporting both oral and

2. Promote interest in nature. written.
3. Bring to attention job possibilities in conservation and related fields. 46. Oral discussion.
4. Natural resources - kinds, location, possible supplies, and depletion. 47. Recognition of words and terms.
5. Pollution - types, causes and affects and possible solutions. 48. Increase vocabulary.
6. Water resources - water cycles, water sheds, water table, water purification, and uses. 49. Use films and film-strips.
7. Soil resources - erosions, conservation practices, glaciation. 50. Lectures by personnel of A.S.C.
8. Mineral resources - kinds location of reserves, possible substitutes and conservation practices. 51. Field trips.
9. Forest resources - kinds, location, uses, danger of

misuse and conservation

practices.

10. Nature resources - animals,  
plants, uses and value,  
preservation and protection.
11. Human resources - importance  
and mans' role in nature.

## FIFTH GRADE

### GENERAL OBJECTIVES

- A. Children will learn that events in the natural environment happen in an orderly rather than a haphazard way: man searches for laws to explain this order by observing, hypothesizing, checking his ideas, and rejecting those which do not square with reality.
- B. The children will learn lawful changes in characteristic of events in the natural environment; although living things tend to produce living things like themselves; over millions of years the earth and living things on the earth have changed, and diversified forms of life have evolved.
- C. Children will develop an understanding that when equilibrium is upset in organism environment interactions, regulatory mechanisms go to work to restore equilibrium.
- D. Children will learn there is a relationship between structure and function; the structure of parts of living organisms determines the function.

- E. Children will learn how man has changed and continues to change the natural environment; but because he is often ignorant of long range consequences, his actions may have harmful effects for himself and for other living organisms.
- F. Children will become familiar with diversity, adaptation, interrelationships and change in and among the ecosystems of the earth.



## UNIT I.

### SYSTEMS OF THE BODY

#### SPECIFIC OBJECTIVES

- A. All forms of life must carry on certain activities to stay alive.
- B. Scientists conduct studies to find out how environmental conditions affect life processes.
- C. The circulatory system maintains a suitable environment for cells of the body.
- D. By the process of digestion, food is prepared for use by cells of the body.

#### ACTIVITIES

- 1. Decide what activities are necessary for man to live.
- 2. Become aware of scientist contributions to man's present day society.
- 3. Read about circulatory system and diffusion. Learn about the ants' heart. Learn to check pulse. Listen to a heartbeat. Make a stethoscope. Compare the heartbeats at different times.

4. Discover length of small intestine. Compare digestive systems of man to those of other organisms.

## UNIT II.

### PROBING THE ATMOSPHERE

SPECIFIC OBJECTIVES	ACTIVITIES
A. Weather takes place in the earth's atmosphere; heat and water produce changes in the atmosphere that result in changes in weather.	1. Take several temperature readings of the air. Find out if air has weight. Compare density of air at different temperatures. Make a model of air molecules.
B. The atmosphere may be divided into layers based upon the characteristics of the atmosphere at different altitudes.	Test to see if warm or cold air holds more water vapor.
C. Radiation from the sun heats the earth, and the earth heats the atmosphere.	2. Discuss chart of atmosphere. Read about the divisions of atmosphere.
D. Evidence regarding air temperature, relative humidity, wind speed and direction, and atmospheric	3. Experiment to find out why some places on earth are warmer than others. Compare the temperature of a mirror and black paper. Test some

pressure is used in describing and predicting weather.

E. Many methods are used in obtaining evidence regarding the atmosphere.

hypotheses about water evaporation.

4. Take thermometer readings of air temperature.

Listen to a weather report to learn barometric pressure reading. Find out how a mercury barometric works.

5. Make a rain gauge. Compare temperatures taken by different kinds of thermometers. Keep a visibility and precipitation record. Collect and compare newspaper weather maps. Learn the meanings of weather symbols.

### UNIT III.

#### PROBING THE OCEANS

SPECIFIC OBJECTIVES	ACTIVITIES
A. There are many reasons why scientists study the ocean, but the most important one is because they are curious.	1. Study a photograph of the planet earth and discuss surface characteristics.
B. Much of the earth is covered with water, and not much is known about what lies beneath it.	2. Discuss the ideas and reasons for the little known facts about the ocean.
C. Scientists believe that the earth is very old and that oceans formed from water in the earth's atmosphere.	3. Read and discuss this theory.
D. Because of great pressures at the bottom of the ocean, much of the evidence regarding it has been obtained indirectly.	4. Report on vessels used for exploring the seas. Make a model of the ocean. Discuss text pictures of means for exploring the ocean.
	5. Look at a globe of the earth and discuss it.
	6. Find out how much salt

- E. There are many environments in the ocean, and they are constantly changing.
- F. Ocean currents result from differences in temperature of water and surface winds.
- G. There are many substances dissolved in ocean water.
- H. Ocean life is adapted to the conditions in which it lives.
- I. Scientists believe that life on earth got its start in the oceans.
- J. There is a great variety of life in the ocean, and it exists in great abundance.
- K. Oceans may someday be used as a major source of food and minerals.

and other minerals sea water contains. Evaporate water to get rid of the dissolved minerals. Write a report on ancient and modern ways of evaporating sea water. Use chemicals to collect minerals from the ocean.

7. Dissect a fish to show its adaptation to sea life.

8. Report on ocean forms.

9. Make a bulletin board of foods we get from the ocean.

## UNIT IV.

### ECOLOGY AND CONSERVATION

#### SPECIFIC OBJECTIVES

#### ACTIVITIES

- |   |   |
|---|---|
| A. Establish a picture of life at a particular place on the plains here and now its physical environment, inhabitants and their activities. | 1. Study Council Bluffs, Iowa, and introduce elements of living and non-living environment. List uses for a river and flat-         |
| B. Develop an understanding of what adaption is.  | land. Discuss basic needs and relate to the student.  |
| C. Provide a framework for study of the grasslands in earlier periods.  | 2. Study pictures and tell how living things have adapted to their environment.   |
| D. Develop the concept of change illustrating that change is continually occurring as a natural process through the total environment.      | 3. Study the grasslands of the present to develop an understanding of how man has changed the environment.<br><br>4. View a film on |

E. Develop the concept of a balanced prairie community and an understanding of the effects of rapid change on the community; develop the concept of adaptation through natural selection.

F. Certain land is best used for crops, other land for pasture, etc. Some land is wasteland.

G. Certain natural processes are always active in forming soil. Each plays a definite role in making soil productive.

H. Certain forces in nature caused destruction of our resources; wind and water erode soil and insects and disease destroy plants.

adaptation. Observe animals in the area to see how they have adapted. Take a tour of the school yard and look for decay, rust, and weathering which causes change. Investigate the effect of rain on bare soil, grassed areas, and a garden area.

5. Study grassland biomes of other countries. Select an area of the playground and map it out for a nature trail observing animals life signs of decay and man's influence. Take an imaginary environment and adapt an animal to it.

6. Discuss the various uses for which land is needed in our community and the surrounding countryside. Take



a field trip into the surrounding countryside to see the different uses land is being put to.

7. Examine topsoil and subsoil samples from the area. Collect soil samples from different areas and plant seeds in the soil to see which soils are most productive. Discuss the role of fertilizers for soils. Grow seeds using fertilizers and control groups.

8. Go on a field trip to find evidence of wind and water erosion. Discuss how man adds to the problem of erosion or prevents it. Construct a model farm to show how soil may be conserved. Visit a farm in the country and observe soil conservation practice.

## SIXTH GRADE

### GENERAL OBJECTIVES

- A. Children must learn that plants are the first in a line of food chains that effect their lives.
- B. Plants and animals must adapt to the environment in which they live. Humans also adapt (but in different ways) to their environment.
- C. Children must develop the concept of life patterns based on physical surroundings.
- D. People are dependent on plants, animals, and nature. The survival of people in certain areas depends on the nature of the area and how the people can adapt to the area.
- E. Students must understand the difference between nature and environment.
- F. Students must understand that to control our environment we must also protect the environment. We must protect and conserve our resources.

## UNIT I.

### LIFE ON THE EARTH

#### SPECIFIC OBJECTIVES

#### ACTIVITIES

- |  |   |
|--|---|
| A. Green plants link the earth's elements, the sun's energy, and living things.          | 1. Plant radish seeds.<br>2. Try to collect oxygen from a green plant.        |
| B. Plants and animals are adapted to the environments where they are found.              | 3. Make a lichen garden.<br>4. Find what soil contains.<br>5. Make a balanced |
| C. Develop the concept of biomes as a pattern of life based on the physical environment. | aquarium.<br>6. Observe water plants.<br>7. Observe grass roots.              |
| D. Patterns of life make up ecosystems (transfer of energy, food webs, chemical cycles.) | 8. List daily uses of water.<br>9. Study a given area and                     |
| E. Develop an understanding of the vocabulary used to discuss patterns of life.          | record animal life found.<br>10. Study extinction of animals.                 |

F. Develop an awareness of our dependence upon a variety of limited resources that we need to use wisely.

G. Develop an understanding of environment problems that are of concern not only in specific localities but that also have effects on the international scene.

H. Man must understand the work of nature if he or she is to be able to use resources without destroying them or allowing nature to destroy them.

11. Discuss hunting and fishing laws.

12. Study pictures of different biomes around the world.

13. Discuss the biome in which we live.

14. Study the world to see where these biomes are found.

15. Study photosynthesis to see how it relates to plants and animals.

16. Discuss make-up of a leaf.

17. Study a food web and the relationship of all living things involved.

18. Make a food web on a bulletin board.

19. Discuss how energy is transferred from one living thing to another and how sun light is the source of that

energy.

20. Learn meaning of words used in text which are unfamiliar.

21. Discuss the use of conservation of water. Look for water pollution in the community.

22. Discuss the need for oxygen.

23. Look for signs of air pollution.

24. Discuss the conservation of nature's energy sources and how we can substitute energy sources.

25. Look for articles on how insecticides endanger the environment. Study the effects of insecticides on food chains.

26. Look for ways in which man has upset his environment.

27. Invite a soil conservationist from the country to speak on what conservation practices are being carried out in the community.

28. Discuss the value of trees to man and the biome in which we live.

29. Visit a nearby woods to see what type of trees exist there and study the soil type.

30. Make a list of local, state, and federal agencies or offices you might contact to obtain technical help in developing or improving resources in the community.

## UNIT II.

### HOW ANIMALS BEHAVE

#### SPECIFIC OBJECTIVES

- A. Scientists are learning about the behavior of animals through careful observations of them under controlled conditions: they look for relationship between observed behavior and conditions under which it occurs.
- B. Scientists attempt to develop ideas about animal's behavior that will apply to many animals.
- C. Animals respond to environmental conditions only as they sense the conditions.

#### ACTIVITIES

- 1. Locate animals to observe such as pets or livestock. If a class pet is available observe it.  
Record habits and routines the animals developes.
- 2. Discuss children's report on observations of their own pets that apply to scientists observations on territory.
- 3. Read books pertaining to observation of different animals and their habits.  
Make reports on these animals.

D. Animals adjust to changes in their environment.

E. There is a significant relationship between the structures of animals and their behavior.

4. Read text and discuss animals fighting behavior.

5. Observe feeding behavior of cats and dogs and compare.

6. Find out if light or smell help ants find food.

7. Experiment to find out if some insects see differences in color.

8. Experiment to find out if lady bugs prefer smooth or rough surfaces.

9. Find out if a gold fish can hear.

10. Experiment to find out if temperature effects the appetite of a goldfish.

11. Experiment to find out if temperatures affect the animals.

12. List ways animals adapt to change.



13. Invite dog breeders to  
class to speak on behavioral  
differences among dog  
breeds.

## CURRICULAR MATERIALS FOR TEACHERS

### "Environmental Education and Your School Site"

Author: Donn Paul Werling

Source: Illinois Institute for Environmental Quality  
Samuel G. Booras, Director

### "A Decade of Outdoor Teacher Education"

Author: William P. Froom

Source: Northern Illinois University

### "National Listing of Environmental and Outdoor Education Projects"

Source: New Jersey State Council for Environmental  
Education

### "Environmental Exchange: A Beginning..."

Source: President's Environmental Merit Awards Program  
U.S. Environmental Protection Agency

### "Creative Learning Experiences in Conservation"

Source: Soil Conservation Service  
U.S. Dept. of Agriculture

### "Outdoor Activities in Conservation Study"

Author: Robert M. Ring, Director

Source: Michael Bakalis, Supt. of Public Instruction

### "Teacher Science With Garbage: An Interdisciplinary Approach to Environmental Education from the Points of View of Science, Mathematics, and Social Studies"

Author: Albert Schatz and Vivian Schatz

### "Environmental Handbook"

Garrett DeBell, ed.

### "Pure Water, Clean Air and Quality Outdoor Recreation" A Comprehensive Program for Illinois

Source: State of Illinois

### "An Outline for Teaching Conservation in Elementary Schools"

Source: U.S. Department of Agriculture

"An Outline for Teaching Conservation in High Schools"  
Source: U.S. Dept. of Agriculture

"Outdoor Classrooms on School Sites"  
Source: Dept of Agriculture

"Assistance Available From the Soil Conservation Service"  
Source: U.S. Department of Agriculture

"Dictionary of Conservation Terms"  
Source: Illinois Office of Education

"Pollution: A Handbook for Teachers"  
Author: Dorothy Needham

"People and Their Environment: Teacher Curriculum Guide  
To Conservation Education Grades 4-5-6"  
Matthew Brennan, ed.

"Outdoor Laboratory"  
Source: Southern Illinois University

"The Community School Site: A Laboratory for Learning"  
Source: Soil Conservation Service

"Guidelines for Conservation Study in Illinois Schools"  
Source: Office of the Superintendent of Public Instruction  
State of Illinois, Ray Page, Supt.

"Soil Conservation at Home"  
Source: U.S. Dept. of Agriculture

"Sullivan Outdoor Education Program"  
Ron Hash, ed.

"Environmental Education Handbook for Teachers"  
Source: Illinois Office of Education  
Joseph M. Cronin, State Supt. of Education

"All Around You: An Environmental Study Guide"  
Source: U.S. Dept. of Interior  
Bureau of Land Management

"Energy Activities With Energy Ant"

Source: Federal Energy Administration

Office of Communications and Public Affairs

These films may be acquired from:

ENVIRONMENTAL FILM SERVICE  
408 East Main, P.O. Box 855  
League City, Texas

<u>Title</u>	<u>Time</u>	<u>Date</u>
Adventures of Junior Raindrop	8 minutes	1948
Agriculture, U.S.A.	29 "	1962
Approach to School Site Development, An	19 "	1966
A-Way With Waste	14 "	1970
Beyond Tomorrow	23 "	
Bring Back The Grass	26 "	
Brush Creek Bounces Back	20 "	1970
Community Lake	27 "	1961
Conservation: A Job for Young America	19 "	1968
Conserve Our Heritage, To	35 "	1955
Earth Is The Lord's, The	17 "	1960
Eighth Day, The	12 "	1971
Energy vs. Ecology: The Great Debate	27½ "	1973
Environmental School, The	7 "	1971
Erosion	10½ "	1968
ERTS - Earth Resources Technology Satellite	29 "	1973

Eternal Forest, The	21	"	1970
Farmer and the Sportsman, The	28	"	
Farm, The	28	"	
First Pollution, The	26	"	1972
5000 Dumps	21	"	1971
From the Ground Up	13	"	1955
From The Ridge To The River	26	"	1955
Grass, The Elko Way	25	"	
Grassland, The	20	"	
Green Box, The	17	"	1971
Green City, The	22	"	1963
Heritage of the Plains	19	"	1968
Lakes-Aging and Pollution	15	"	1971
Land Awash	22	"	1971
Man Belongs to the Earth	22	"	
Mud	20	"	1968
Mulch Tillage: Erosion Problem Solver	8½	"	1970
New Look At An Old Problem, A	12	"	1974
Place to Live	17	"	1964
Problems of Conservation: Soil	14	"	1969
Problems of Conservation: Water	16	"	1969
Realities of Recycling, The	38	"	1971
Realm of the Wild	25	"	1961

<b>Recycling</b>	<b>22</b>	<b>"</b>	<b>1971</b>
<b>River, The</b>	<b>32</b>	<b>"</b>	<b>1939</b>
<b>Sand and Gravel Resources</b>	<b>17</b>	<b>"</b>	
<b>Soil and Water Conservation Demonstration</b>	<b>22</b>	<b>"</b>	
<b>There's More to Mining</b>	<b>25</b>	<b>"</b>	<b>1975</b>
<b>To Care for This Land</b>	<b>20</b>	<b>"</b>	
<b>Waterbill U.S.A.</b>	<b>26</b>	<b>"</b>	<b>1960</b>
<b>Water - Its Many Voices</b>	<b>20</b>	<b>"</b>	<b>1965</b>
<b>We Share This Land</b>	<b>14</b>	<b>"</b>	<b>1962</b>
<b>World At Your Feet, The</b>	<b>22</b>	<b>"</b>	<b>1954</b>
<b>Your Environment Is The Earth</b>	<b>13</b>	<b>"</b>	<b>1969</b>