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# An Elementary Science Program on the Fourth Grade Level

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# AN ELEMENTARY SCIENCE PROGRAM ON THE FOURTH GRADE LEVEL

BY

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# CHAPTER I

## INTRODUCTION

Elementary science has developed from and, in large measure, has superseded the courses formerly known as Nature Study. Elementary science as outlined in state courses of study embraces those phases or elements of the six major sciences that are judged suited to the child in the elementary school. It is based upon the interests of the child and organized around the "centers of interests" currently accepted as basic for each grade in the teaching of elementary science. While elementary science is more comprehensive in its content and more definitely organized in the major science fields, much that has been written about Nature Study may be applied with equal truth to elementary science.

Jackman, as early as 1904, in speaking of Nature Study said:

Its subject matter lies in the kingdom of earth and sky and water—true nature study is natural science and its methods are scientific. In nature study the aim is to have the pupil investigate phenomena and things for the purpose of determining their relations. Nothing is studied in isolation.[1]

The idea of the importance of contact with nature in the development of the child is not new in educational thinking. Comeneius (1592-1670) demanded that education work through the senses and assigned

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[1] William S. Jackman, Chapter I, "Introduction," Nature Study, National Society for the Study of Education, The Third Yearbook, Part II (Chicago, University of Chicago Press, 1904), p. 11.

great importance to the natural sciences. He taught that even the pre-school child should learn something about the sun, moon, stars, hills, valleys, lakes, rivers, plants, and animals.[2]

John Locke (1632-1804) advocated an appeal to the child's interests in seeking to develop sense perception. He stressed the value of a wide range of sciences:

- - - to accustom our minds and the proper way of examining their habitudes and relations; not to make them perfect in any one of the sciences, but to open and dispose their minds as may best make them capable of any, when they shall apply themselves to it.[3]

Rousseau (1712-1778) preached early contact with nature for the child.[4]

Pestalozzi (1746-1827) "conceived of education as a natural development of innate powers," and stressed the value of observation.[5]

Modern elementary education has been influenced by these earlier educators and reflects their philosophy, both in method and content.

Modern scientists indicate that science must be an integral part of the total elementary program, that it must serve the needs and interests of the pupils, that it is broad in its scoope, and that it must deal with the problems that exist in the communities in which the children live.

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2 Frank P. Graves, A Student History of Education, (New York: The Macmillian Company, 1920), pp. 172, 174.

3 John Locke, as quoted by Graves, op. cit., p. 181.

4 Graves, op. cit., p. 212.

5 Graves, op. cit., p. 276.

Blough, in speaking of the trends in elementary science states:

> The newer concept of science, as developed during the past century, tends to focus more and more on how to understand the world around us. The factual content of science is, and always will be important, but the emphasis is increasingly on scientific methods. The "laws of science" are no longer ends to be finally defined, but means to be used in further scientific study.[6]

Burnett says that this is the purpose and value of sound science teaching in the elementary school; not the facts about the phenomenal world alone, valuable as these facts may be to the child, but that the child may become more nearly a whole child, happy, healthy, and secure--a child that will mature into a happy and useful adult.[7]

Children have many questions in regard to life about them. The teaching of science enables the children to work out the answers--not to be told them by the teacher.

## Purpose

The purpose of this study was threefold: (1) to ascertain what is being done in elementary science on the fourth grade level in the states included in this study; (2) to determine whether the work being done is in keeping with the thinking of the modern authorities on the teaching of elementary science; and (3) to formulate a program of elementary

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[6] Glenn O. Blough and Albert J. Huggett, Elementary School Science and How to Teach It. (The Dryden Press Publishers, New York, 1951), p. 3.

[7] R. Will Burnett, Teaching Science in the Elementary School (Rinehart and Company, Inc., New York, 1953), p. 62.

science on the fourth grade level based on the materials considered most practical and organized around the "center of interest" currently accepted as basic for the teaching of science in the fourth grade.

The present study grew out of the author's experience as a teacher of Fourth Grade in a school where each pupil was provided with a copy of a fourth grade science text from the same series to be used as a reader. Dissatisfaction with the results obtained led to a desire to formulate a program of elementary science on the fourth grade level that would include materials selected on the basis of the objectives wished to be attained, with careful consideration of the children's interests, abilities, and needs.

The problem of the study was: to determine the values of the program and the individual growth of the pupils in the fourth grade, having materials provided for the science program which were selected on the basis of the objectives wished to be attained, and with careful consideration of the children's interests, abilities, and needs.

Summary of Major Objectives

(1) To make use of the child's natural curosity in developing his interest in all phases of his immediate environment.

(2) To develop in the life of the child a broad scientific background for living in a scientific age.

(3) To help the child develop increased feelings of adequacy and security through learning that he can understand and control phenomena.

(4) To develop the idea of law and order in nature, and to combat superstition and inculcate a belief in the law of cause and effect.

(5) To train children in the use of the scientific method of

study and thought through the pursuit of real problems, and to develop the attitude of acting in accordance with the knowledge gained by scientific thinking.

(6) To furnish core-material for the correlation and integration of other school subjects.

(7) To give children a better understanding of the physiology of their own bodies, and to train them in the development of good habits of health and safety.

(8) To teach children the part that science has played in social history and in the transformation of the world in which we live.

# CHAPTER II

## A PROGRAM OF ELEMENTARY SCIENCE ON THE FOURTH GRADE LEVEL

### Viewpoints for Teaching

The materials herein contained have been selected and organized around the "center of interest" currently accepted as basic for teaching elementary science in the fourth grade. Teachers who follow this course can make of science teaching a most interesting and valuable part of the curriculum. Stories and poems in readers and books, oral and written lessons in English, music, art, and lessons in civic and social living can be tied up with the science teaching. Science is not an addition to, but part of, the regular school curriculum.

The ideal time to teach any one of these units is when there is a special need for it.

Besides the tendency to tie together, or integrate, the curricular materials of various subjects and to be timely in the teaching of topics, several other current tendencies in elementary education are illustrated in this program. These are:

(1) Children's interests and abilities to learn develop in stages. Curricular materials should be organized in a sequence determined by the boys' and girls' maturation levels. This program is in accord with the findings of investigations of readiness, maturation, and emerging interests in the realm of natural science.

(2) Progress should be from the familiar and simple to the related aspects of the unfamiliar and more complex. The child's normal activities have much in common with the purposes and methods of science

and the wise teacher will view the teaching of science as an opportunity to utilize the natural drives and potentialities of his pupils.

(3) Interest, thorough understanding, and real appreciation are best achieved through doing.

This program presents in schematic form the concepts and relationships considered desirable and necessary to an adequate appreciation of science in the education of children at the fourth grade elementary school level. In general, the outline is divided into two sections, namely, Learnings and Activities. The former consists of statements of possible interpretations of the environment, the latter is a list of suggested activities planned to produce or strengthen the desired learnings.

## Suggested Units

I. Social Animals Live in Communities - - How Other Animals Live

Learnings:

1. Many animals are social.
2. Many animals live in communities including man and depend upon one another.
3. Bees and ants are social insects.
4. Many thousands of honeybees live together in one hive.
5. Each ant family has its own anthill. Here, as in a bee family, there are a queen, several males, and many workers.
6. Ants eat food supplied by aphids.
7. Several beaver families often live together in one big pond.
8. Some animals belong to the grass eating herds, and live on land.
9. Large heards of animals are also found in the ocean and are meat-eaters.

10. Some animals, less social than others, do not build homes.
11. Some animals band together for protection, warmth, or food.
12. Many animals come together to hibernate, to migrate, or to hunt.
13. Some animals (frogs, alligators, and many insects are solitary,) or live alone nearly all the time. They have almost no family life.
14. Grasshoppers, May flies, and mosquitoes are common insects that are found in swarms.
15. Termite communities are built partly above the ground and partly below.
16. Prairie dogs build cities that usually have a population of many thousand.
17. Penguins are birds that really live in communities.
18. Man is a social animal. It would be hard for him to live alone.
19. Man is the only social animal who can think and plan.
20. There are some advantages in living alone; there are many advantages in the social way of life.

Activities:

1. Make excursions to study animals in their natural environment, observing which animals are social and to what extent they co-operate.
2. Read "Some Social Animals" and "How Other Animals Live" in Exploring in Science, pp. 76-127.

3. Observe the social ways of ants by bringing an anthill in a glass jar to the classroom. Dig at least a foot deep so that you will be likely to secure the queen. The colony will not work without a queen. Set the jar in a pan of water so the ants will not escape. Keep dark paper around the jar for a few days. Remove it and observe the tunnels made along the inside of the jar. Watch the ants work in these tunnels. Feed the ants a few grains of sugar a week. Do not overfeed them.
4. Compare the ways of man with the ways of other social animals.
5. Collect pictures of animals from the National Geographic Magazine and other periodicals; outline drawings from the Slingerland-Comstock Co., Ithaca, N. Y.
6. Find an empty hornets' nest or wasps' nest. Cut it open and find out how it is made.
7. Discuss the pictures of beavers and other animals.
8. Read "Animals That Live in Herds," "Animals That Hunt Together," "Swarms, Schools and Colonies," "City Dwellers," "Long-Distance Travelers," and "Advantages of Living in Groups" in The Wonder-world of Science, pp. 28-30.
9. Prepare a bulletin-board display showing the different ways in which social animals live.
10. Examine maps showing the migration routes of particular birds.
11. Have the children write to The Audubon Society (1006 Fifth Avenue, New York, N. Y.) for a set of bird pictures.
12. Visit a zoo if one is nearby. Let the children compare life

in the zoo with life in the natural habitat of each animal.

13. Each child might make a picture showing one animal and his way of life. The pictures could then be collected and a frieze made for the room.

14. Encourage individual reports on animals. Let him do research reading about the animal chosen and make a report to the class.

15. Have children write descriptions of animals. Exhibit these on the bulletin board or some convenient place in the room.

16. List the advantages and disadvantages of the social life.

17. Call for voluntary reports on social and on solitary living on such topics as:

    Why Do Animals Migrate?

    Why Do Animals Hibernate?

    What Are Solitary Animals?

    What Advantages Are There In Social Living?

    What Advantages Are There In Solitary Living?

18. Encourage someone to keep a bird calendar. Record return of birds to your local area.

19. Have children keep a list of "Important Science Words" in each unit. Add these from this unit: aphid, larva, nectar, pollen, pupa, social, cicada, hibernate, migrate, solitary.

20. Keep an attractive display of books on the reading table and about the room. A list to be used with this unit may be found in the Bibliography.

21. Play a game with teacher or chosen pupil giving some characteristics of some animals. Then let the other

members of the class try to give the name of the animal.

22. Sing songs about animals. (See list of songs in Bibliography to be used with this unit). Found also, is a list of records to listen to.

23. Use visual aid materials. (See list in Bibliography).

24. Make a mural of herds.

25. Make finger paintings of animal life in the sea.

26. Locate on the map the two countries in which elephant herds are found. India and Africa.

27. Locate the western prairies where buffaloes once roamed.

28. Tell about the food and clothing furnished to the pioneers by the wild herds.

29. Visit the Kentucky Building, located on the Westerr Campus, Bowling Green, Kentucky, to see the mounted specimens of the fox, dog, and wolf and compare them.

30. Dramatize stories of animals that hunt together.

II. Electricity and Magnetism

Learnings:

1. A flash of lightening is like a huge spark of electricity.

2. Electricity made by rubbing certain things together is called frictional electricity.

3. Lightening is frictional electricity.

4. Electricity always travels along the shortest path it can find.

5. Electricity can be obtained from chemicals and from generators.

6. Certain substances are better pathways for electricity than others.
7. Electricity always travels along the shortest path it can find.
8. The pathway, or circuit, for electricity must be complete and unbroken.
9. Copper, steel, and iron are good conductors of electricity.
10. Paper, glass, air, cloth, and rubber are poor conductors of electricity.
11. Electricity is used to produce light.
12. Magnets are used in many electrical machines.
13. A compass needle is a magnet that is free to move about.
14. A compass is used to tell directions.
15. Magnets attract iron and steel.
16. The force of a magnet will pass through many things.
17. The places where the force is strongest in a magnet are called the poles.
18. Every magnet has two poles, a north pole and a south pole.
19. A freely swinging magnet will point in a north-and-south direction.

Activities:

1. Read about "Electricity and Magnetism" from the books listed in the Bibliography under the heading "Electricity and Magnetism"
   A. Purpose of reading.
      (1) As a means of developing leads.
      (2) To assist in orienting the learner to a phenomenon to be studied.

(3) To give the child illustrative information.

(4) For reliable information from authentic material.

(5) To check information gained from activities by authentic sources.

2. Write to General Electric Company for a free copy of The Story of Lightening. Excellent pictures of lightening flashes are given.

3. Make electricity by stroking a comb or a fountain pen with some woolen cloth and then bringing it near torn pieces of newspaper.

4. Ask your school custodian to show the children where the electricity enters your school and how it gets to your classroom.

5. Let some child read about Franklin's experiment and explain why it was so important.

6. Thomas Alva Edison, Alexander Graham Bell, and Samuel F. B. Morse are men who experimented with electricity in various ways. Ask for volunteers who will find out about the work of these men and report it to the class.

7. See how electricity works by letting a piece of glass bridge the space between two books and placing pieces of paper under the glass. Watch what happens to the paper when the glass is rubbed.

8. Find out what company submits a bill to the school authorities. Either have a pupil write to this company or send a committee to the company offices, if they are nearby (it is

best to make a definite appointment by telephone with a definite person) to find out where and how electricity is produced.

9. By using a dry cell and two pieces of wire, see how electricity can make a bell ring. See Exploring in Science, pp. 135-136.

10. Make a push button to be used in connecting a bell and a dry cell. See directions on p. 147 of Exploring in Science.

11. Make a short circuit with a light wired to a dry cell as shown on p. 137 of Exploring in Science.

12. Discover good conductors of electricity by laying various objects across wires connecting a bell and a dry cell. Make a chart showing the results of this experiment.

13. Look inside a flashlight to see how a complete circuit is formed between the dry cells and the bulb.

14. Experiment with a magnet to see what things it will attract.

15. Dry cells for flashlights may be obtained at 10-cent stores, electrical stores and hardware shops; old storage batteries from garages.

16. Different kinds of fuses may be obtained from an electrical shop, a hardware dealer, or 10-cent stores. Consult the janitor of the building as to the type of fuses used in the school building. These fuses may be mounted on a board for display.

17. Make a compass by using a big darning needle, a magnet, a cork, and a pan of water. Follow directions on pp. 151-152 in

Discovering Our World.

18. Discuss how the use of electricity has changed people's ways of living.

19. Find out whether the force of a magnet will pass through iron and steel.

20. Try to use a compass to find out which of two magnets is stronger.

21. Make a magnetic theater. Use a cardboard box for the toy stage. Cut figures of the actors out of cardboard and fasten paper clips or tacks to their feet. Move the actors by moving a magnet under the stage.

22. Make a magnetic fish pond. Cut out little paper fish and fasten a paper clip to each. Put these in a box. Tie a magnet to a pole and then see who can catch the most fish.

23. Add these words to the list of "Important Science Words": circuit, compass, conductor, frictional, insulation, magnet. Have each child learn the meaning of each word and learn how to spell the word.

24. Read about generators in Wonderworld of Science, Book Nine. Good reading on generators for the pupils is also found in Parker. The Book of Electricity.

25. Send to General Electric Corporation for pictures of generators. See the generators in Amber and Amperes, a Westinghouse Little Science Series Booklet, sent on request.

III. The Sun and Its Relation to the Earth

Learnings:

1. The earth gets its light and heat from the sun.
2. The earth is shaped like a ball.
3. The earth rotates on its axis.
4. Because the earth is a ball, only half of the earth is lighted at one time by the sun.
5. The turning of the earth on its axis causes day and night.
6. The earth's journey around the sun makes a year.
7. The sun is used for telling time.
8. When the sun is highest in the sky, it is twelve o'clock noon.
9. We watch the sun and stars to see how far the earth has turned on its axis.
10. Since the earth is turning on its axis from west to east, you must turn your watch ahead when you travel from west to east, and back when you travel east to west.
11. Each year is divided into four seasons, one for each quarter of the distance around the sun.
12. Summer days have more hours of daylight than winter days.
13. Daylight begins when we first see the sun in the east and ends when we no longer see the sun in the west.
14. Because the days are longer in summer, we get more heat from the sun.
15. Because the sun is more nearly straight overhead in summer, the earth gets more heat.
16. Many materials give off light if they get hot enough.

17. The sun is a huge ball of hot gases.

18. The sun looks small because it is so far away.

19. The sun is more than a million times as large as the earth.

Activities:

1. A candle could be used to show the children that if a thing is hot enough, it will give off light. Have the children feel the cold top of the candlewick before it is lighted. Then light the candle. The children know that it is now too hot to touch. Now have the children read pages 91-93 in Discovering Our World, Book One.

2. Have a pupil hold a small boat on a globe. The boat should be on the opposite side of the globe from you so that you cannot see it. Then have the boat moved slowly around the globe toward you. Which part of the boat do you see first?

   Now take the boat from the globe and put it at one end of a long table. Think of this table as a flat earth. Go to the other end of the table and stoop down until your eyes are on a level with the top of the table. Watch the boat as someone moves it toward you. Do you see first just the top of it? Or do you see all parts of it at the same time?

3. Encourage a discussion about the earth, writing upon the blackboard questions raised by the children. This will stimulate interest in reading the Supplementary Reading Material listed in the Bibliography.

4. Have some pupil read the life of Christopher Columbus and give a report on his belief about the earth.

5. Dramatize rotation and revolution of the earth by having one child representing the earth walk about another child who pretends to be the sun. As he walks he should turn around and around--always in an easterly direction.

6. Have the children see the spinning of a top, the turning of a globe, the rolling around of an orange in various directions, and the spinning of the orange in one direction around the wire. They should then understand that the wire is the axis on which the orange turns. By spinning a quarter, they can see how an object can keep turning in the same direction on an imaginary line as does the earth.

7. Have the children find the North Pole and the South Pole on a globe. They should observe that the globe turns on an axis that passes through these poles.

8. Use a globe, flashlight, and a piece of chalk to show why we have day and night every twenty-four hours. Darken the room and hold the flashlight near the globe. Make a large chalk mark on the globe to show where you live on the earth. Turn the globe from west to east all the way around once on its axis. Do this slowly. Have children read from authenic sources to check their findings. Discuss the facts they have learned and compare with the reasons they had believed to have caused daylight and darkness.

9. Ask children to bring in evidences of time variations from their experiences in listening to radio broadcasts. To explain the reason for variations in time, repeat the experiment

of rotating a globe with a flashlight shining upon it.

10. Play a time game, using a flat map of North America upon which time belts have been marked. One child asks, "When it is 6 P.M. in Montreal, what time is it in Vancouver?" The child who answers uses the map to show the differences in time by locating the two cities in their respective time belts.

11. Let the children tell how their activities in summer and in winter differ because of the length of day.

12. Have the class keep a record of daylight and darkness.

13. Have the children make charts giving the time of sunrise and of sunset on the first day of each month for the remainder of the school year. This information can be found in newspapers, almanacs, and sometimes on calendars.

14. Ask a jeweler how he finds out the correct time. How often does he get the correct time?

15. Lay a sheet of paper where the sun will shine on it all day. Have the long way of the paper pointing north and south. Stick a pin straight up and down in the paper at the south edge. Draw a line right on the shadow. Keep on drawing lines along the shadow every hour. How does the length of the shadow change? Can you tell about what time of day it is in this way?

16. Have the children measure their shadow in the morning, then at noon, and again in late afternoon. Ask them to explain what they find out.

17. Have someone volunteer to find out how people told time before they had clocks. Also, whether people still use any of these ways of telling time.
18. Have each child write down as many things as he can think of that would happen on the earth if the sun did not shine at all.
19. The children might invite their parents or another class to hear their own reports upon topics relating to their study of the sun and earth.
20. Have the children add the following words to their list of science words: axis, rotate, revolve, and pole.

IV. The Moon and Other Heavenly Bodies Seen in the Sky at Night.

Learnings:

1. A star is a ball of hot gases.
2. When materials are heated very hot they give off light.
3. Groups of stars are called constellations.
4. The constellations seem to move in the sky because the earth turns on its axis.
5. The moon is nearer to the earth than anything else in the sky.
6. The moon is solid like the earth, but it has no water, air, or people on it.
7. The moon is much smaller than the sun; it is smaller than the earth.
8. The moon revolves around the earth.
9. The moon turns around, or rotates, once in about 30 days.
10. The moon is not hot like the sun; it gives light by

reflecting sunlight.

11. The moon appears to have different shapes because, as it moves around the earth, we can see only the part of it that is lighted by the sun.
12. Planets differ from stars in that they do not give off light and they travel around the sun.
13. The earth is a planet.
14. Shooting stars are really meteors.

Activities:

1. Read some stories about the constellation. (See Bibliography).
2. Read "The Sun and the Moon" in Exploring in Science, pp. 150-177.
3. Have pupils use field glasses to look at the full moon and see if they can find plains, valleys, and mountains on it.
4. Make a chart showing the pictures of the constellations you can find as you face north. Monthly star charts and information about how to find the stars and constellations can be found in some of the science magazines such as Nature Magazine and Junior Natural History.
5. Show the film, This Is The Moon (YAF). This film explains how the moon gets its light, the phases of the moon, and its physical characteristics. Another good film to show is What Makes Night and Day (YAF).
6. Make a chart showing the pictures of the constellations you can find as you face south.
7. Have pupils read Discovering Our World Book I, pp. 115-136.
8. Keep a record on a calendar of the different shapes of the

moon as you watch it for a month.

9. Read The Wonderworld Of Science Book Four, pp. 131-147.
10. Draw a diagram on the board to illustrate what happens when there is an eclipse of the moon or of the sun.
11. Use a strong light, a basketball and an indoor baseball to show how an eclipse of the moon takes place.
12. Let one boy or girl play being the sun, another the moon and another the earth. Show the motions of the earth and moon.
13. Have children look up the sizes of the earth, sun and moon.
14. Find the distances of the sun and moon from the earth.
15. Find pictures of the moon taken through large telescopes.
16. Make a list of sayings about the moon. Give reasons why you believe or do not believe them.
17. Find pictures of eclipes of the sun and moon.
18. Learn to find Mars, Venus, Jupiter, and Saturn during the months when they can be seen.
19. Look in the Geographical Magazine for pictures of metecrites.
20. Use different ways to show the constellations you know. Here are two ways you can try.
    (a) Get a large piece of blue cardboard. Cut holes in the positions of the stars in each constellation. Put Christmas-tree lights in the holes.
    (b) Cut holes in blue paper to show the positions of the stars in each constellation. Slip the paper into the open end of a box. Then hold an electric light bulb or flashlight inside the box.

21. Have a child report to the class on how to find the North Star (Polaris), Little Dipper, and the Big Dipper.
22. Add these science words to their list: meteor, meteorite, Mars, Mercury, Venus, Jupiter, Saturn, Uranus, Neptune,

V. Weather

Learnings:

1. Weather may change from day to day.
2. The thermometer tells us the changes in temperature.
3. Heat comes from the sun and makes the mercury in a thermometer go up.
4. Ice melts faster in the sun than in the shade.
5. Heat makes water evaporate faster.
6. Water evaporates faster when the air can get to it freely.
7. Water vapor (evaporated water) changes back into water when it is cooled.
8. There is water vapor in the air all of the time.
9. There is more water vapor in the air on some days than on others.
10. Air expands (takes more space) when heated.
11. Heated air rises.
12. Air is warmed when it is compressed, and cooled when it expands.
13. The shapes of clouds indicate what the weather is likely to be.
14. Weather is produced by many factors. These factors are measured by instruments which can be used to predict weather.
15. The average of the weather conditions of a certain place over a period of time is known as climate.

Activities:

1. Have pupils keep a weather calendar for two or more weeks. Use such symbols as an open umbrella for rainy days, a kite for windy days, a snowman for snowy days, a sun for sunshiny days, etc. These symbols may be used on a large calendar. Study the calendar when you have completed it. What happens to the weather from day to day?
2. See that each child learns to read the thermometer. Keep a record of daily thermometer readings in the morning, at noon, and in the evening.
3. Place a thermometer in the shade for a few minutes. Mark the place where the top of the liquid (mercury) column sinks to. Then move the thermometer into the sunlight. Notice what happens to the column of mercury.
4. Place some ice in the sunlight and an equal amount in the shade. Observe from time to time what happens to each piece.
5. Fill two pans of the same size and shape with water. Place one near the stove or radiator and the other some distance away. Measure the water in each pan from day to day. Which loses water more rapidly? Why?
6. Moisten two equal areas of the blackboard. Hold a source of heat near one. What difference does heat make in the time it takes water to evaporate?
7. Cut a piece of cloth into two pieces of equal size. Wet both pieces and squeeze out as much water as you can. Leave one in a crumpled mass so that very little air will get to some

parts of it. Spread the other out. Observe which dries first.

8. Place two or three cups of water in a teakettle and heat to boiling. This will cause the water to evaporate very fast from water vapor. Notice that the water vapor which leaves the spout cannot be seen until it is two or three inches from the spout. Then you can see it as a cloud made up of fine drops of water. Take a cold pan and hold it in the cloud. What happens? Remove the teakettle from the fire, let it cool, and then look into it. Observe that much of the water is gone. What has happened to it?
9. Dry the outside of a tin can and put some water into the can. Observe the outside of the can to see if there is a film of water on it. If there is not, drop small pieces of ice into the water and stir. Continue until a film of water appears on the outside of the can. Where does the film of water come from?
10. Repeat the above activity each day for several days. As soon as the film of water appears on the outside of the can, take the temperature of the water. Is it the same each day? Why? Dew drops form on grass just like drops of water on the sides of the can.
11. Blow a little air into a toy balloon near a radiator. Does the balloon get bigger or smaller? Now place the balloon in a cool place. Does it get bigger or smaller?
12. Hold a piece of smoldering wood or paper above a radiator,

then at one side and near the bottom of the radiator. In what direction does the smoke travel? Why?

13. Hold a piece of cloth tightly over the end of the hose of a bicycle pump. Work the pump quickly to compress the air within the barrel. Fill the barrel in a little while. What do you notice? Why? Let the air out of the valve of a bicycle tire. Feel the temperature of the air as it escapes. How does it feel? Why?

14. To emphasize the importance of weather, help the children make a list of daily events and human needs which depend upon definite kinds of weather.

15. Have each pupil make a list of people whose occupation depends primarily upon the weather.

16. Arrange a field trip to a local weather bureau.

17. Read in various textbooks on weather. (See Bibliography).

18. Collect weather superstitions from the pupils.

19. Have pupils write letters to the Electric Storage Battery Company, Philadelphia, Pennsylvania, for a free copy of Facts and Fallacies About the Weather by George S. Bliss.

20. Have pupils write Thank You Letters for free material.

21. Study materials secured from the U. S. Weather Bureau and all books provided for this study. (See Bibliography).

22. Discussion of how weather affects our lives:

    (1) Wind carries seed.

    (2) Rain helps plants to grow.

    (3) Rain spoils ball games.

(4) Rain ruins crops.

23. Have children draw pictures to illustrate the above effects and others.

24. Appoint a committee to study air and make a report to the class.

25. Another committee might take heat as a subject and report to the class.

26. Another committee might take water as their subject to report on.

27. Add these words to the "Important Science Words" to be learned: vapor, evaporate, and molecules.

VI. How Your Body Works

Learnings:

1. The human body has many parts, each of which has certain work to do.

2. Your body is somewhat like a machine. It has many parts that work together to make it run.

3. All human bodies have parts that are alike.

4. Your body needs food to make it run.

5. Your body must be kept in good condition in order to run properly.

6. Your body is different from a machine because it can do many things that a machine cannot do.

7. Your body has a framework made of bones called the skeleton, which holds it up and gives it shape.

8. The bones of the skeleton are held together by ligaments. Cartilage between the bones keeps them from grinding together when they move.
9. The bones protect the soft parts inside your body.
10. Joints and muscles make it possible to move the various parts of your body.
11. There are joints in your body at every place where the bones can move.
12. Muscles are fastened to the bones and pull on the bones to make them move.
13. Most muscles work in pairs.
14. Food is carried to all parts of your body.
15. The blood carries the food through blood vessels to all parts of your body.
16. Your heart keeps the blood moving.
17. When you breathe, air is taken into your body through the nose and goes to the lungs.
18. In the lungs, oxygen is taken from the air and passed into the blood to be carried to all parts of your body.
19. Your skin is a waterproof covering for your body.
20. Your skin protects your body from dirt and germs and allows some water materials to escape from your body.
21. Your skin should be kept clean. Breaks should be protected so that germs cannot enter.
22. Perspiration is a waste that your body gives off through pores in your skin.

23. There are five senses that help you know what is going on around you.

24. Certain parts of your body provide the five senses.

    (1) Your eyes give the sense of light.

    (2) Your ears give the sense of hearing.

    (3) Your nose gives the sense of smell.

    (4) Tasters in your mouth give the sense of taste.

    (5) Feeling things with your hands and other parts of your body gives the sense of touch.

25. Your brain is the director of your body; it keeps the parts of your body working together.

26. Your body can send messages from one part of itself to other parts.

    (1) The nerves are the message carriers.

    (2) Some nerves carry messages from your brain to different parts of your body.

Activities:

1. Have the class make a list of the ways in which the human body is like an automobile.
2. Have the children tell all the things that their bodies have done since getting out of bed this morning.
3. Have the children bring bones to school that they have obtained at the meat market or found in the woods or fields. The bones will help the pupils understand that bones protect and give shape to the body.

4. Make frequent use of pictures in health books and Encyclopedias as the pupils are reading and learning about their own bones.
5. Read about the teeth in the books provided for this study and have them find these different teeth in their own mouth.
6. Have the pupils write to some toothpaste company and ask for a chart on teeth. (Ipana, Bristol-Myers Company, Hillside, New Jersey).
7. Study a diagram of the blood vessels and read about them.
8. Have the children feel their hearts beat.
9. Have pupils look closely at the back of their hand to see how bloodvessels branch out.
10. Have pupils write down the route of digested food to all parts of the body.
11. Show the pupils how to find their pulse and how to use the pulse to count how fast their heart is beating. Have them take their pulse while sitting down. Then have them jump up and down a few minutes and count their heartbeats again. What happens? Can you see how this helps your body?
12. Have the children read to find out how oxygen gets to the lungs and from the lungs into the blood.
13. Have the children breathe in air through the nose and then push it out through the mouth.
14. Have them hold their ribs as they breathe as deeply as possible.
15. Have the children count how many breaths they take in a minute when they are sitting down. Have them jump up and down a few

times and count the number of breaths. Ask them: What happens? How do you think this helps your body?

16. Have children report on injuries they have had such as: scratches, cuts or burns. If any caused an infection, that will show how germs may get into your body.
17. Organize a "Keep Clean" squad to check on the personal cleanliness of all the children in the class.
18. Show the filmstrips for this unit. (See Bibliography).
19. Have the pupils look at the eyes of others in the class. To observe the change in size of pupils, let one child stay in a dark closet for several minutes and have the others notice the difference in the pupils of his eyes before he goes in and after he comes out. Let him see the difference in a mirror.
20. Ask different children to demonstrate the use of their five senses.
21. Have the children discuss and give examples to show that the brain is an excellent director, as when a driver quickly turns his automobile to avoid an accident.
22. Add the following words to the list of "Important Science Words." Learn to spell and learn the meaning of each. ligament, joint, heart, cartilage, blood vessel, and brain.
23. Have each child write a story telling how some of the bread you eat is changed and how it travels through the body until it gets into your big toe.

# CHAPTER III

## EVALUATION

Evaluation should always lead to improvement. Good methods of evaluation are necessary if one is to become a better teacher.

Various techniques of evaluation should be used rather than the overuse of the quiz or formal examination. When quizzes are used, care should be taken in formulating questions that call for thinking and association of ideas rather than just the recalling of minute specific facts.

Experienced teachers often evaluate learnings in terms of changes in children's behavior. These teachers value changes in children's behavior above minute fact-gethering. In evaluating desirable behavior changes, ask yourself such questions as the following:

In what ways have children's attitudes toward other members of the class been affected by this experience?

What evidence do I see that children are observing more accurately?

What evidence do I see that children are using printed materials more intelligently?

What evidences do I see that children are making clear-cut associations between new subject matter and earlier learnings?

What evidences do I see that interests started in school are being carried on independently both in school and outside? (Additional trips, exhibits, collections, and scrapbooks are objective evidence).

Another way of evaluating learnings that might be used, is plan to invite another class to hear reports about things pertaining to the Unit they have been studying. Allow the children to choose what they

would like to report on.

The accuracy of these reports will give you an opportunity to know the nature and extent of the children's learning. Furthermore, the preparation of the reports will force the pupils to check the thoroughness and accuracy of their learnings, to correct misconceptions, and to supplement inadequate information.

To measure informational growth of children, the teacher may develop tests and other ways of measuring information at the time when it seems important for the children to be familiar with certain information.

A good checklist is valuable to the teacher who wishes to appraise her own effectiveness as a teacher of elementary science.

The following checklist was prepared by Glenn O. Blough and Paul E. Blackwood, Specialists for Elementary Science, for the purpose of measuring the effectiveness of school practices and procedures in teaching science in the elementary school.

## Teacher's Checklist in Elementary Science[1]

1. In my teaching is there opportunity or provision for children to:

| | None | Some | Much |
|---|---|---|---|
| (a) Raise questions and problems of importance or interest to them? | ___ | ___ | ___ |
| (b) Study these questions and problems? | ___ | ___ | ___ |
| (c) Help plan "things" to do in studying science problems? | ___ | ___ | ___ |
| (d) State clearly the problems on which they are working? | ___ | ___ | ___ |
| (e) Make hypotheses to be tested? | ___ | ___ | ___ |
| (f) Gather accurate data (information) in a variety of ways: | | | |
| Through reading on the subject? | ___ | ___ | ___ |
| Through taking field trips? | ___ | ___ | ___ |
| Through watching demonstrations? | ___ | ___ | ___ |
| Through doing experiments? | ___ | ___ | ___ |
| Through talking to resource persons? | ___ | ___ | ___ |
| (g) Analyze the data (information) to see how they relate to the problem? | ___ | ___ | ___ |
| (h) Think about the applications of their science learnings to everyday living? | ___ | ___ | ___ |
| (i) Think about science relationships and processes instead of merely naming things and learning isolated facts? | ___ | ___ | ___ |
| (j) Bring science materials of different kinds to school for observation and study? | ___ | ___ | ___ |
| (k) Engage in individual science interests? | ___ | ___ | ___ |

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1 Glenn O. Blough and Paul E. Blackwood, Evaluating Teaching Practices in Elementary Science, U. S. Office of Education, Bulletin, 1951, No. 21 (Washington, D. C., U. S. Office of Education, 1951), pp. 30-4.

II. In my teaching do I periodically and systematically check on the children's growth in:

| | None | Some | Much |
|---|---|---|---|
| (a) Ability to locate and define problems right around them? | ___ | ___ | ___ |
| (b) Acquiring information on the problem being studied? | ___ | ___ | ___ |
| (c) Ability to observe more accurately? | ___ | ___ | ___ |
| (d) Ability to make reports on or record their observations? | ___ | ___ | ___ |
| (e) Ability to solve problems? | ___ | ___ | ___ |
| (f) Ability to think critically? | ___ | ___ | ___ |
| (g) Ability to explain natural phenomena? | ___ | ___ | ___ |
| (h) Ability to distinguish between facts and fancies? | ___ | ___ | ___ |
| (i) Suspending judgment until evidence is collected? | ___ | ___ | ___ |
| (j) Being open-minded, or willing to change belief? | ___ | ___ | ___ |
| (k) Cooperating with others? | ___ | ___ | ___ |
| (l) Understanding the cause and effect relationships of events? | ___ | ___ | ___ |
| (m) Skill in using some common scientific instruments (Thermometers, scales, rulers, etc.)? | ___ | ___ | ___ |

# CHAPTER IV

# SUMMARY

## The Problem

The problem of the study was to determine the value of the program and the individual growth of the pupils in the fourth grade, having materials provided for the science program which were selected on the basis of the objectives wished to be attained, and with careful consideration of the children's interests, abilities, and needs.

## The Procedure

This study was made with a fourth grade class in Todd County High School, Elkton, Kentucky. A careful study was made of the twenty-nine pupils.

All six units listed in the program were taught, since a special need for each was shown by the pupils during the year.

Various techniques of evaluation were used to judge the results of the fourth grade science program, such as those suggested in the chapter on Evaluation in this study. Each method of evaluation had specific advantages.

## Results

Some of the most significant results of the science program were these:

1. Children were given opportunities for self expression.
2. Science had a new meaning.
3. Children became more interested in their environment through direct contact with it.

4. Some found new interests which will make life fuller and richer in the years to come.
5. Some children developed science hobbies.
6. There was more evidence of the scientific attitude in children.
7. Some children changed their attitudes toward school. No longer was it a dull place where one had to go; it was an interesting place where one wanted to go.
8. The teacher experienced great satisfaction from the real interest observed in the children.
9. Science had made the parents more interested in school.

## Evidence of Growth

Growth in science was evident as pupils brought objects for study and observation. Children became increasingly aware of their surroundings. Birds, snakes, bees, ants, grasshoppers, all provided interesting material for study. The interest was in finding answers to "What is it?" "Where did it come from?" "Of what use is it?"

Many children came early and stayed late after school was dismissed. Some always asked permission to stay in the room at recess time and work on some special interest.

The children gained information through reading and study that helped them to feel that they "belonged" to the family group discussing scientific subjects in the living room or around the dinner table.

Such a program provided for individual differences, kept children working up to the level of their ability, and enabled the teacher to give individual aid to those who needed it most while superior students went ahead on their own. The classroom teacher became a guide and

consultant, seeking information with the child, and student and teacher grew together in scientific knowledge and appreciation as they listened to the reports of doings in the world of science.

## Values

Many values were realized from the program of science. Every pupil, no matter how immature or lacking in native ability, had some obligation to the class. He gained status in the class because he alone was responsible for some phase of the topic, and class approval was often enough to make sure he did his best.

The pupil proceeded to gather material on his reading level at his own best rate, and he presented it, when prepared, to the class.

As children gathered material and arranged it to present to the class, they accomplished purposeful activity in language arts. Reading was done purposefully as the child selected material suited to his level of reading ability or from available texts. The classroom was provided with texts not only for the fourth grade level of instruction, but also for grades above and below. Science texts were based on an ascending spiral with the same topic being repeated each year, no stigma was attached to the child who searched for material at a lower grade level. Children sought books on a higher level when they had absorbed the other material at hand. Superior children were guided into contact with more detailed work and more challenging topics.

Note taking, a language art skill, was introduced as a tool to be used in acquiring scientific knowledge. Letter writing became real as students wrote requests for materials and answers were eagerly awaited.

The motivation was sufficient to stimulate all but the most dull.

Communication skills were acquired as children strove for variety and effectiveness of presentation. By means of reports, talks, panel discussions, plays, charts, pictures, movies, filmstrips, and illustrated talks, students effectively presented the science information to their classmates without danger of talking over the heads of various members.

Speech habits, writing habits, spelling, and penmanship were improved by conscious attention given at the time the material was being readied for presentation. Time was provided for adequate practice.

Science helped the children to see relationships between the customary academic learnings of the elementary school and the world about them. It gave them opportunities for self-direction and for cooperation.

Vocabularies grew rapidly in science activities, although this was not the major goal for the activities.

## Anecdotal Records

At the end of our very first unit, Kathi commented: "It was nice to go home and talk about something my older sister didn't know. Mother and Daddy will listen to me now, and let me talk when they are discussing something at the dinner table or in the living room."

Donnie, a retarded pupil, beamingly remarked about mid-term: "I like school now. The pupils from other rooms who come to see our science table and bulletin board listen when I tell them about everything. I wonder why nobody would ever listen to me before."

Chris, a superior student who always wanted to go ahead on his own, said: "Mother told Dad that she had begun to think she was foolish to

buy all those reference books for me, but not any more, because I used them every night and could find information better than she could when she started to college."

At the beginning of our study of animals, the boys would bring in insects, lizards, frogs, toads, etc., for observation. When they got too close to some of the girls with them, the girls would shriek and say, "Ooh! Get that creepy, slimy thing away from here." Before the study was completed, however, those same girls were seen handling those same insects and animals and were making such comments as: "Oh, I think this is one of the most interesting living things we have studied. It can do a lot of things I never knew about before. We were silly to think that toads made warts on your hands if you touched them."

At the close of a unit, another class was invited to hear reports and to see the exhibits. Each child was allowed to choose what he wanted to report upon. Donnie chose, "Locating The North Star." He made a chart to use in giving his report and gave an accurate report.

The children were discussing the program the next morning and Peggy said, "I was never so surprised when Donnie gave his report. It was good. He didn't do a thing last year but sleep and go to the rest room. He likes science."

Ronald was talking to his classmates one day after we had completed our study on "Electricity and Magnetism" when he exclaimed: "Oh, boy! I fixed mother's ironing cord when it burned out last night. It worked, too! And I didn't have to ask a single person how to do it either."

## Outcomes

1. Greater enjoyment of, and skill in, pupil-teacher planning.
2. A greater knowledge of how to work in small groups and how to share the results of group work with others.
3. A keener interest in classroom work on the part of slow learning children.
4. An expanded understanding of community life and community work.
5. Improvement of research skills of pupils.
6. A greater awareness of, and interest in, the local physical environment.
7. A greater interest in the school program among laymen of the community who helped us.
8. A new willingness on the part of the teacher to try something new and different in the classroom.

## Learning From Other Children

From the standpoint of scientific information, the pupil was brought into contact with far more material than if he had been required to read it in a single text. He developed a respect for opinions when he found that authors disagreed on some scientific ideas, and he learned to respect copyright dates as he searched for the latest information. The pupil not only acquired material on his own phase as he prepared his report, but also acquired information as he listened to the reports of others. Thus he acquired far in excess of that which he would have been able to obtain by himself. The speakers, movies, pictures, models, and other aids produced and used by others served to provide the motivation for remembering scientific facts.

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# APPENDIX

## Suggested References for Boys and Girls

Wide reading in science as in other learning areas is important to children. They need the opportunity to explore in books the interests which have been aroused through observations and discussions in school, in the home or on the playground. Children deserve science books that are authoritative, up to date, accurate and interesting, and written especially to suit their needs and abilities.

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Morgan, Alfred P., Things A Boy Can Do With Electricity, New York, Charles Scribner's Sons, 1940.

Parker, Bertha M., Electricity, Evanston, Illinois, Row, Peterson and Company, 1950.

_____, Magnets, Evanston, Illinois, Row, Peterson, and Company, 1949.

Stevenson, Augusta, Ben Franklin, Printer's Boy, Bobbs-Merrill Company, 1941.

Writers' Program, Pennsylvania, Lightning and Electricity, Whitman Publishing Company, 1941.

Yates, Raymond F., A Boy and A Battery, Harper and Brothers, 1942.

Yates, Raymond F., How to Make Electric Toys, New York, Appleton-Century, 1937.

The Human Body

Baruch, Dorothy and Reiss, Oscar, My Body and How It Works, New York, Harper and Brothers, 1934.

Parker, Bertha M., Community Health, Evanston, Illinois, Row, Peterson and Company, 1948.

_____, Foods, Evanston, Illinois, Row, Peterson and Company, 1948.

_____, How We Are Built, Evanston, Illinois, Row, Peterson and Company, 1947.

_____, and Downing, M. Elizabeth, Keeping Well, Evanston, Illinois, Row, Peterson and Company, 1948.

_____, You As A Machine, Evanston, Illinois, Row, Peterson and Company, 1947.

## Magazines

American Forester, The American Forestry Association, 919 17th Street, N.W., Washington 6, D. C.

Audubon Magazine, 100 5th Avenue, New York 28, New York.

Current Science and Aviation, 400 S. Front Street, Columbus 15, Ohio.

Frontiers, The Academy of Natural Sciences, 19th and the Parkway, Philadelphia 3, Pa.

Junior Natural History Magazine, American Museum of Natural History, 79th at Central Park West, New York 24, New York.

National Geographic Magazine, National Geographic Society, Sixteenth and M Streets, Washington 6, D. C.

Natural History Magazine, American Museum of Natural History, 79th at Central Park West, New York.

Nature Magazine, 1214 Sixteenth Street, N.W., Washington 6, D. C.

## Equipment for Units

The equipment here suggested can be secured by the teacher and her pupils in almost any community. Let the children help collect equipment.

Aquarium
Balls
Balloons
Bell wire
Blotters
Bottles (nursing bottles)
Candles
Colored chalk
Comb
Compass
Corks
Dry cells
Electric bell or buzzer
Electric fuses (burned out)
Electric switch
Flashlight
Fur for rubbing friction rods
Globe
Hammer
Hard rubber friction rod
Insect cage
Insulated copper wire
Jars (fruit jars)
Knitting needles
Magnets
Medicine dropper
Milk bottles
Mirror
Rubber bands
Rubber stoppers
Saucers
Scissors
Scraps of cloth
Shallow pans
String
Thermometer (Fahrenheit)
Tin cans
Window glass
World map

## Films

This list of educational films is offered as a suggestive list of available films appropriate for the units suggested in this program.

The teacher should become familiar with the content of the film and its suitability for classroom instruction before it is secured. In the case of films used to illustrate industrial products or processes, one should scrutinize them for any possible objectionable advertising.

Air All Around Us, Young American Films, Inc., 18 East 41st Street, New York 17, New York.

Beavers, Encyclopaedia Britannica Films, Inc., 1150 Wilmette Avenue, Wilmette, Illinois.

City of Wax, Encyclopaedia Britannica Films, Inc., 1150 Wilmette Avenue, Wilmette, Illinois.

Frog, Encyclopaedia Britannica Films, Inc., 1150 Wilmette Avenue, Wilmette, Illinois.

Honey Bee, Encyclopaedia Britannica Films, Inc., 1150 Wilmette Avenue, Wilmette, Illinois.

How Animals Defend Themselves, Young American Films, Inc., 18 East 41st Street, New York.

How Nature Protects Animals, Encyclopaedia Britannica Films, Inc., 1150 Wilmette Avenue, Wilmette, Illinois.

Jungle Grants, American Museum of Natural History, Central Park West at 70th Street, New York 28, New York.

Life of an Ant, Commonwealth Picture Corp., 723 Seventh Avenue, New York 19, New York.

Life of Thomas A. Edison, General Electric Company, Educational Service, Publicity Department, 1 River Road, Schenectady 5, N. Y.

Magnets, Young American Films, Inc., 18 East 41st Street, New York.

Marine Circus, American Museum of Natural History, Central Park West at 79th Street, New York 28, New York.

Moon, Encyclopaedia Britannica Films, Inc., 1150 Wilmette Avenue, Wilmette, Illinois.

Seashore Animals, American Museum of Natural History, Central Park West at 79th Street, New York 28, New York.

Snapping Turtle, Encyclopaedia Britannica Films, Inc., 1150 Wilmette Avenue, Wilmette, Illinois.

Sun's Family, Young American Films, Inc., 18 East 41st Street, New York.

The Weather, Encyclopaedia Britannica Films, Inc., 1150 Wilmette Avenue, Wilmette, Illinois.

This Is the Moon, Young American Films, Inc., 18 East 41st Street, New York.

Thunder and Lightening, Young American Films, Inc., 18 East 41st Street, New York.

What Makes Day and Night, Young American Films, Inc., 18 East 41st Street, New York.

## Filmstrips

Air (SVE)
A Multitude of Suns (JH)
Day and Night (YAF)
Electricity (SVE)
Magnetism (EBF)
Migration of Birds (JH)
What Makes Rain (YAF)
Your Ears (YAF)
Your Eyes (YAF)
Your Teeth (YAF)

## Legend to Producers and Distributors

EBF Encyclopaedia Britannica Films, Inc.
JH The Jam Handy Organization.
SVE Society for Visual Education.
YAF Young American Films, Inc.

## Elementary Songs About Nature

(May be used with units suggested)

New Music Horizons. Book Five, edited by Osborne McConathy, Russell V. Morgan, James L. Mursell, Marshall Bartholomew, Mabel E. Bray, W. Otto Miessner, and Edward B. Birge. Silver Burdett Company. Grades 4-6.

Bird Calls
Fish Tale, A
Frog and the Crow, The
Morning Sunshine
Old Zip Coon
Paul and the Fox
Pigeons, The
Sheep on the Hillside
Shoo, Fly, Don't Bother Me!
Song of the Ants
South Wind and the Rose, The
Whale Song, The

Our Land of Song. A Singing School Series, edited by Theresa Artimage, Peter W. Dykema, Gladys Pitcher, David Stevens, and J. Lillian Vandervere, C. C. Grades 4-6.

Bees in Winter
Break of Day, The
Carol of the Creatures
Clever Cricket
Elephant's Lullaby
First Star
Fog
For a Rainy Day
Ride a Sea Horse
Sea Gull
South Wind
Windy Night

The American Singer Series, Book Three, edited by John W. Beattie, Josephine Wolverton, Grace V. Wilson and Howard Hinga, American Book Company. Grades 2-4.

Autumn Is Here
Birds Skyway, The
Cardinal, The
Frost Pictures
It Rained a Mist
Lady Bug

Polliwog
Rain
Turtle, The
Tiger, The
Zebra, The

## Instrumental and Vocal Phonographic Recordings

Music can be correlated through the use of this suggestive list of Recordings as well as the Nature Songs.

| Title | Description | Record No. |
|---|---|---|
| Animal Fair | Vocal (song) | Capitol 25012 |
| Animals | Actual Sounds | Columbia YB25 |
| Bear | Actual Sounds | Columbia YB20 |
| Bee and the Butterfly | Instrumental | Victor 20348 |
| Bozo Under the Sea | Vocal (story) | Capitol Album DXB-99 |
| Cold Winter Days | Voice and piano | Victor 25311 |
| Deer, The | Voice and piano | Victor 25312 |
| Dogs | Actual Sounds | Columbia YB21 |
| Fox, The | Vocal (song) | Decca 23506 |
| Hymn to the Sun | Violin | Decca 24129 |
| Insect Pictures in Music | Instrumental | Decca A-84 |
| Dance of the Grasshoppers | (Massenet) | |
| I Dance with a Mosquito | (Leadono) | |
| Song of the Flea | (Moussorgsky) | |
| Lions | Actual Sounds | Columbia YB20 |
| Storm | Instrumental | Victor 20606 |
| Thunderstorm | Actual Sounds | Columbia YB4 |
| What Makes Rain | Vocal (story) | Decca CV107 |