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ABSTRACT

This curricular guide, designed for grades one through six, was prepared by a writing committee from the Rock Hill, South Carolina, public schools. Five major themes (living things, the earth, matter and energy, the universe, the human body) provide continuity and direction for the elementary school science program. The guide contains a list of objectives for teaching elementary school science; a statement of the philosophy underlying the program; as well as lists of major concepts, filmstrips, and activities for each one of the five themes as it is developed at each of the six grade levels. The guide also includes a brief section on methods of evaluation, a discussion of safety in the science program, and a list of resources categorized as books and as community resources. (PEB)

CURRICULUM GUIDE - GRADES 1-6

ROCK HILL SCHOOL DISTRICT NUMBER THREE

ROCK HILL, SOUTH CAROLINA

S C I E N C E C U R R I C U L A R G U I D E

G R A D E S 1 - 6

ROCK HILL SCHOOL DISTRICT NUMBER THREE

W R I T I N G C O M M I T T E E

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INTRODUCTION

This guide has been developed to give the teachers in this district a sense of direction and continuity for their science programs. These are suggestions to which each individual teacher may add to or rearrange to suit her situation. If a teacher feels she has an inadequate background in science or she is a beginning teacher, this guide may be useful as a starting point for her science program.

Filmstrips from the district office are listed to go with each section. Each school library also has filmstrips and supplementary books available which are not listed in this guide. Also films are available from the educational film service in Columbia. Each principal has a catalog.

This committee recommends that each teacher make use of the conservation guides, People and Their Environment. These guides have detailed lesson plans to supplement the science class and an excellent bibliography in the back. Since these guides have been developed by the South Carolina teachers and have been highly acclaimed by educators in other parts of the world, they should be pertinent to our situation.

Finally each teacher has her textbook to help her plan her science program.

We would like to express our appreciation to Dr. Lucille Shaw of Miami, Florida, and Mr. Reginald Morton who worked with us in the early stages of this guide and whose inspiration enabled us to finish it.

MAJOR EMPHASES

GRADE	LIVING THINGS	THE EARTH	MATTER AND ENERGY	THE UNIVERSE	THE HUMAN BODY
1	Observing Living Things	Appearance of the Earth	Discovering Matter and Energy	Observing the Sky	Senses of the Body
2	Effects of Seasonal Change on Living Things	Characteristics of the Earth	Properties of Materials	Relationship of Earth to the Solar System	Growth and Change of the Body
3	Interdependence of Living Things	Regions of the Earth	Changing Energy Affects Matter	Moon, Planets and Stars	Interdependence of the Bones and Muscles, and Blood
4	Insects and Flowering Plants	Composition of the Earth	Nature of Matter and Energy	Nature of the Universe	Importance of Skin and Sensory Organs
5	Types of Plants And Animals	Formation of the Earth	Forms of Energy	Space Explorations	Systems of the Body
6	Reproduction and Development of Plants and Animals	Oceans of the Earth; Geologic History	Physical, Chemical and Nuclear Matter	Theories of Astronomy	The Nervous System

OBJECTIVES

1. To develop in children awareness, understanding and appreciation of their environment and the role that science plays in individual lives.

2. To develop skills and techniques necessary to acquire scientific attitudes, ways of working, and problem solving.

3. To acquaint them with leaders of science, their accomplishments and the opportunities for careers in scientific fields.

4. To acquire knowledge and practices of personal and community health.

5. To develop an awareness of the urgency of conservation as a way of life.

SCIENCE PHILOSOPHY

We believe that the science program in any school system is vitally important to the total development of the child. We further believe that the program should take into consideration the individual differences, abilities and interests of the child, and that he should be provided with and surrounded by the things that are necessary to enhance his greatest potential.

Since science is so vital to everyone's daily living, children should be encouraged to be curious so that they can understand and appreciate the effects on their daily lives. They should also be encouraged to observe, work, and think critically in order to reach intelligent conclusions. A background of useful scientific information should begin in the lower grades and develop into a broader and deeper program throughout the years of elementary school.

L I V I N G T H I N G S

G R A D E O N E

MAJOR CONCEPTS

1. There are many different kinds of animals.
2. All animals are born, eat, move, grow, and become adults.
3. We can learn about animals by taking care of them or observing them.
4. Most plants grow from seeds.
5. Seeds are scattered in many ways.
6. Under proper conditions, seeds will develop into young plants.

FILMSTRIPS

S- 7 Living Things

S- 8 Living Things Need Food

S-11 Look About You

S-12 Looking for Animals

S-66 The Story of Seeds

S-67 Seed and Seed Travels

S-82 Animal Care

S-84 Animal Babies

S-89 Pets

ACTIVITIES

1. Visit a pet shop.
2. Observe the many different types of animals in the neighborhood.

3. Encourage children to talk about their pets.

4. Plant seeds in the classroom and watch them develop into plants.

5. Make a seed collection.

6. Discuss proper care of plants and pets.

G R A D E T W O

MAJOR CONCEPTS

1. Many changes occur in a repeating order during the four seasons.
2. Living things are affected by changes.
3. Some animals hibernate.
4. Most animal babies are born in the spring.
5. Most plants grow best in loose, rich topsoil.
6. Trees provide lumber, an excellent building material.

FILMSTRIPS

S- 40 Animal Homes

S- 55 Plant Life and the Soil

S- 56 Animal Life and the Soil

S- 82 Animal Behavior

S- 71 Trees

S- 73 Trees: Man's Best Known Plants

S- 45 Ann Visits the Zoo

S-118 Birds of the Garden

S-128 Birds

S-372 Nature in the Four Seasons

S-373 Animals in the Four Seasons

S-370 Trees and Flowers in the Four Seasons

ACTIVITIES

1. Experiment with conditions for growing plants such as the amount of water and sunlight required.
2. Find out which animals hibernate.
3. Compare plants grown in different types of soil.
4. Notice seasonal changes.
5. Find out how different types of animals have their young.
6. Display various products of trees.
7. Take walks in the neighborhood to identify trees.
8. Visit the Nature Museum.

G R A D E T H R E E

MAJOR CONCEPTS

1. Living things have adaptations for living in their environments.
2. There are living things in the desert, ponds, and oceans.
3. Plants may be grown from seeds, roots, stems, or leaves.
4. Plants manufacture food necessary for man and animals.
5. Plant and animal materials are used in the manufacture of cloth.
6. Living things depend upon each other.

FILMSTRIPS

S-42 Animals Fit Themselves to Their Surroundings

S-35 Deserts

S-26 Oceans

S-27 Animals of Sea and Shore

S-13 Animals of the Ponds

S-19 Keeping an Aquarium

S-15 Life in Ponds, Lakes and Streams

S-38 Animals Struggle to Live

ACTIVITIES

1. Grow plants from a sweet potato placed in water.
2. Make a collection of pictures of plants and animals used in the manufacture of cloth.
3. Grow cacti in the classroom.

4. Examine pictures of animals that show how their color blends into their environment.

5. Have a balanced aquarium in the classroom.

6. Root an African Violet from a leaf.

7. Find out how different plants and animals have adapted themselves to their environment.

8. Notice the varieties of animals that share the same environment.

9. Watch the division of labor in an ant colony or a bee hive.

G R A D E F O U R

MAJOR CONCEPTS

1. Insects are the largest and most widespread group of animals.
2. Some insects are harmful while others are useful.
3. Flowering plants produce seeds which are scattered in a variety of ways.
4. Living things require water.
5. Plants obtain soil minerals dissolved in water.

FILMSTRIPS

S- 63 Plants and Water

S- 64 Life Cycle of a Plant

S- 65 Parts of a Flowering Plant

S- 91 The Honeybee

S- 92 The Mosquito

S- 93 The Ant

S- 95 Some Useful Insects

S-106 Insects and Their Way of Life

S-100 Insect Homes

S-107 Insects

S- 99 Finding Out About Insects

S- 96 Insects That Destroy Plants

S- 62 Basic Food of Life

ACTIVITIES

1. Have pupils bring samples of seeds to class.
2. Examine a flower under a magnifying glass.
3. Draw and label a flower and a tree.
4. Collect pictures and leaves of trees and identify them.
5. Examine a cross section of a tree or a woody plant.
6. Illustrate the stages or life cycle of ants, wasps, flies, and mosquitos.
7. Bring cocoons to class for observation.
8. Set up an ant colony.
9. When fruit trees are in bloom, observe the blossoms. After the petals have fallen off, observe the fruit that has begun to form. Open fruit later to find the seeds.
10. Examine the roots of a plant.
11. Place a stalk of celery in colored water and observe how the stem transports water.
12. Make a leaf collection.
13. Have students search for eggs of insects.

G R A D E F I V E

MAJOR CONCEPTS

1. Living things are alike in many ways.
2. Living things differ in many ways.
3. There are thousands of different kinds of living things.
4. Scientists have classified thousands of living things according to their structure, method of reproduction, etc.

FILMSTRIPS

S- 72 Telling Trees Apart

S-108 The Common Vertebrates

S-123 Looking at Birds

S-121 American Birds

S-113 Mammals of North America

S- 69 Kinds of Plants

ACTIVITIES

1. Make a chart of the various animals man has domesticated. Point out uses and products obtained from these animals.
2. Grow mold on potato slices.
3. Find out how man has improved plants: examples - grafting, hybrids.
4. Watch an egg hatch in an incubator
5. Find out how plants are useful to man.
6. Try to identify all trees and shrubs around the school.

7. Watch different animals eat and drink.

8. Make spatter prints of various shaped leaves for art. Use toothbrush, screen wire, and paint.

9. Make a terrarium in a large jar. Use ferns and other plants that grow well in moist air.

G R A D E S I X

MAJOR CONCEPTS

1. Photosynthesis occurs in green plants when substances which are not food are combined with the energy of sunlight to form food.
2. No materials are lost or consumed in the normal processes of life.
3. All animals depend on green plants.
4. Scientists know much about prehistoric plants and animals from fossils.
5. Agriculture freed man from the constant search for food.

FILMSTRIPS

S- 68 Plant Factories

S- 3 Living Matter

S- 58 Man's Use and Control

S- 64 Life Cycle of a Plant

S-266 The Beginnings of Life

ACTIVITIES

1. In the spring, obtain frog eggs and watch the life cycle of egg-larva-tadpole-adult frog take place.
2. Look at pond scum under the microscope to observe one-celled plants and animals.
3. Grow some mold and examine it under the microscope.
4. Find mosquito larvae during warm weather and keep them in jars of water in which they are collected. Cover the jars with netting and watch their development.

5. Make collections of pressed flowers, leaves, and plants.
6. Construct dioramas showing the results of good and bad land management.
7. Sprout some seeds and observe their root hairs.
8. Observe a portion of a lettuce leaf under a microscope.
9. Examine fossils of plants and animals.
10. Keep a record of the types of birds observed in this area.
11. Find out what happens to a plant or animal when it dies.
12. Prove that all animals depend on green plants.
13. Give examples of food chains.
14. Test foods for starch by adding iodine.
15. Make reports on domestic animals found in other parts of the world.
16. Collect several kinds of pollen and examine them under the microscope.
17. Visit a green house.

RESEARCH TOPICS

CONSERVATION LEADERS

Ding Darling
Jack Miner
John Muir
Theodore Roosevelt
Fairchild Osborn
Gifford Pinchot
Paul B. Sears
Charles R. Van Hise

OTHER TOPICS

Luther Burbank
George Washington Carver
Asa Gray
Anton van Leeuwenhoek
Sir Francis Darwin
Charles Darwin
Gregor Johann Mendel

Audubon Society
Hybrids
Mutations
Graftings
Pedigrees
Plant Pests
Animal Pests

THE EARTH

GRADE ONE

MAJOR CONCEPTS

1. The earth's appearance is different from different points of view.
2. As the earth turns, day changes to night and night changes to day.
3. There are four seasons in our part of the earth.
4. Air is a real substance all around us.

FILMSTRIPS

S-369 Seasons

S-286 Air Around Us

S-359 The Air Around Us

ACTIVITIES

1. Collect rocks and fossils.
2. Collect shells.
3. Draw pictures showing seasonal change or weather conditions.
4. Discuss seasons using pictures to show examples.
5. Point out water and land on a globe.
6. Discuss ways we use air.
7. Use a globe as a model and explain that the earth is round like a ball.

G R A D E T W O

MAJOR CONCEPTS

1. The earth rotates on its axis and revolves around the sun.
2. Gravity pulls things down toward the earth.
3. Many changes occur in a repeating order during the four seasons.
4. Soil contains minerals, air, and water.
5. Building materials such as iron, concrete, and glass come from rock formations.
6. There is invisible water vapor in the air which condenses when it is cooled to form clouds, fog, rain, snow, hail, or sleet.

FILMSTRIPS

S-289 Air and Water

S-278 Rocks, Soil, and Minerals

S-260 Measuring Time

S-257 Force Called Gravity

S-362 Adventures of a Raindrop

S-250 Our Home, the Earth

S-254 Our Earth Is Moving

ACTIVITIES

1. Make a diorama of the four seasons.
2. Use a lamp and a globe to show what causes day and night.
3. Keep a record of rainy, cloudy, and sunny days.

4. Observe seasonal changes. Compare our changes to those in other parts of the country.

5. Keep a temperature record.

6. Make a mural showing activities during the four seasons.

7. Show that air is present in soil by pouring some water into a jar of soil. Bubbles of air will appear at the surface as the water seeps into the soil.

8. Collect rocks.

G R A D E T H R E E

MAJOR CONCEPTS

1. The earth is lighted unevenly by the sun.
2. The surface of the earth is always changing.
3. The ocean is a large part of the earth's surface.
4. Study of the water cycle helps man make wise use of water.
5. Most materials in the world are used over and over again.
6. The study of rocks and fossils tell us much about the history of the earth.

FILMSTRIPS

S- 26 Oceans

S-357 Clouds, Rain, and Snow

S-258 Everything Changes

S-255 Our Changing Earth

S-264 Story of Mountains

S-278 Rocks, Soils, and Minerals

S-274 Stories that Fossils Tell

ACTIVITIES

1. Encourage children to find broken pieces of rock and try to discover what broke them off from larger rocks.
2. Find out how mountains are formed.
3. Examine sedimentary rocks and find out how they were formed.

4. Examine fossils.

5. Make a rain guage.

G R A D E F O U R

MAJOR CONCEPTS

1. The inner regions, the crust, and the atmosphere of the earth are in layers.
2. Air takes up space and has weight.
3. The chief factors in weather are the sun's heat, the movement of air, and the movement of water.
4. Mountains, bodies of water, and the slant of the sun's rays affect climate.
5. The motion of the earth is our measure of time.

FILMSTRIPS

S-290 Air and Water

S-279 Rocks, Soils, and Minerals

S-260 Measuring Time

S-355 What Makes Weather

S-358 Our Ocean of Air

S-356 Climate

ACTIVITIES

1. Blow up a balloon to show that air takes up space.
2. Submerge a glass jar in a container filled with water. Place one end of a rubber hose in the jar so that it reaches the bottom. Invert the jar and blow through the other end of the hose. This experiment shows that air takes up space.

3. Show that air has weight by using a yardstick to balance two balloons. Blow up one of the balloons and show how the balance is affected. Be sure there are no drafts in the room to upset the balance.

4. Show air has weight be weighing an inflated football. Let the air out and weigh the football again.

5. Find out what kind of instruments weathermen use to predict the weather.

6. Test gravity by dropping two objects of different weights at the same time from the top of a step-ladder.

G R A D E F I V E

MAJOR CONCEPTS

1. Studying the changes taking place in the earth provides clues to the nature of the earth and the changes it has undergone.

2. Valuable minerals formed long ago are used by man to improve his way of life.

3. In order to maintain our natural resources, everyone must help through the conservation of soil, water, and air.

4. Meteorologists can predict weather conditions by interpreting data gathered over the world.

FILMSTRIPS

S- 52 How Man Has Used the Soil

S- 46 Water Resources

S- 47 Mineral Resources

S- 49 How Soil Is Formed

S-269 Up Through the Coal Age

S-351 A Visit to a Weather Station

ACTIVITIES

1. Make a model volcano. Use ammonium bichromate crystals to make it erupt.

2. Heat a sample of salt water to show that salts are formed after the water evaporates.

3. Grind a piece of rock into powder. Add humus to it and see if plants will grow in it.

4. Look for examples of soil erosion.

5. Study weather fronts to find out how they help weathermen predict weather.

6. Keep up with weather reports.

7. Make a list of weather superstitions.

8. Collect pictures showing the effects of storms, hurricanes, tornadoes, and other unusual weather conditions.

9. Report on the work of the United States Weather Bureau.

G R A D E S I X

MAJOR CONCEPTS

1. The oceans of the earth undergo constant change.
2. Oceanography is a rapidly developing field for scientists.
3. The history of the earth can be discovered through the study of fossils and rock layers.
4. Conservation must become a way of life if man is to have resources for the future.

FILMSTRIPS

S- 23 Man's Use and Control

S-273 Hunting Fossils

S-274 Stories that Fossils Tell

S-280 Rocks, Soils, and Minerals

S-291 Air and Water

ACTIVITIES

1. Find out about wind erosion.
2. Find out about air and water pollution in Rock Hill and what is being done about it.
3. Examine fossils.
4. Make rock and fossil collections.
5. Find out about careers in oceanography.

RESEARCH TOPICS

FAMOUS GEOLOGISTS

James D. Dana
William M. Dana
Adolph Knopf
John W. Powell
Charles R. Van Hise

OTHER TOPICS

Magnetism
Gravity
Oceanography
Seismology
Volcano
Contour Plowing
Terraces
Faulting
Irrigation
Effects of Wind
Effects of Water
Avalanches
Igneous Rocks
Metamorphic Rocks
Sedimentary Rocks
Erosion
Geology

MATTER AND ENERGY

GRADE ONE

MAJOR CONCEPTS

1. Matter exists in different forms.
2. There are many kinds of materials or matter in our community.
3. Energy is required to move matter.
4. Heat and light are forms of energy.
5. Machines help make work easier or faster.

FILMSTRIPS

S-188 Simple Machines

S-221 Light in Our Daily Lives

S-233 Heat

S-240 The Sounds We Hear

S-294 What Things Are Made Of

ACTIVITIES

1. Find as many different materials in the classroom as you can.
2. Observe properties of materials with your senses.
3. Group materials according to their properties.
4. Have children look for various types of energy outside the classroom.
5. Make a chart illustrating things that give us light.
6. Have a listening period so that children can realize there are many different sounds.

7. Experiment with magnets to see what they will attract.

8. Look for machines that we use everyday.

G R A D E T W O

MAJOR CONCEPTS

1. Materials that form matter are solids, liquids, or gases.
2. Heat, sound, light, and electricity are all forms of energy.
3. Heat and light are closely related forms of energy.
4. The earth's heat and light come from the sun.
5. When we move somethings we do work.
6. Magnets attract things made of iron.

FILMSTRIPS

S-307 All Matter Has Three Forms

S-233 Heat

S-243 Sound

S-223 Light

S-202 Electricity

S-188 Simple Machines

ACTIVITIES

1. Group materials according to state -- solid, liquid, or gaseous.
2. Have class look out the window to see examples of energy.
3. Find as many ways as possible that heat is formed.
4. Discuss how fires may be caused by heat.
5. Place several objects in the sunlight to see which gets hot quicker.

6. List things light can pass through.

7. Take a listening walk and make a list of sounds heard

8. Make a chart showing ways sound helps us.

9. Experiment to see if magnets will attract iron through glass, wood, paper, etc.

10. Give examples of uses of magnetism.

11. Give examples of uses of electricity.

12. Demonstrate the three forms of water by heating an ice cube until it changes to steam.

13. Prove that jobs are easier to do with machines. example -- cutting an apple in two or using a pulley to life a weight.

G R A D E T H R E E

MAJOR CONCEPTS

1. Heat energy can be transferred.
2. Matter changes if heat is gained or lost.
3. Each moving thing moves because of forces acting upon it.
4. Fire produces both heat and light energy.
5. Energy causes many chemical changes.
6. All matter is made of molecules which are always vibrating.
7. Sound is a form of energy produced by vibrating matter.
8. Sound travels through matter.
9. Gravity is the force of the earth pulling on objects.
10. Electric current has many uses.
11. Most machines make work easier by increasing either force or speed.

FILMSTRIPS

S-231 How Heat Travels

S-230 How Heat Causes Expansion

S-232 The Thermometer

S-239 How Sound Travels

S-257 Force Called Gravity

S-189 Simple Machines

S-296 Atoms and Molecules

S-295 Elementary Chemical Changes

ACTIVITIES

1. Look for examples of simple machines in common objects such as toys.
2. Make reports on primitive man's discovery of fire, how the first fire may have started, or some uses we make of fire.
3. Make booklets on subjects related to fire: lamps, safety, fire myths, fire prevention, etc.
4. Make a magnet by rubbing a needle in one direction on a magnet.
5. Learn to use a compass.
6. Show a magnetic field by using iron filings and a bar magnet.
7. Show how static electricity is generated by sliding across a car seat, drying clothes, or combing your hair.
8. Wire a circuit using a dry cell and a flashlight bulb.
9. Experiment with Christmas tree lights. Try to find out why all the lights go out when one bulb burns out.
10. Discuss how heat changes the taste and appearance of foods.
11. Place a thermometer near the floor and one near the ceiling. Compare the temperatures.
12. Find out how sound is made with musical instruments.
13. Make an electromagnet.

G R A D E F O U R

MAJOR CONCEPTS

1. Matter is made up of molecules.
2. Heat affects the motion of the molecules in matter.
3. Changes in state can be explained in terms of molecules and energy.
4. Physical and chemical changes are taking place all the time.
5. Electricity is a form of energy.
6. Magnets are used in many ways.
7. Sound is caused by a vibrating object that sets up vibrations that travel in all directions through the air in waves.
8. Light comes to us from the sun and other incandescent substances.
9. We see most objects by reflected light.
10. Heat comes from the sun, fire, electricity, and friction.
11. Machines are tools that work against gravity.
12. Rapid advances in the forms of transportation have been made possible by the use of machines.

FILMSTRIPS

S-234 Heat

S-227 Light and How It Travels

S-203 Electricity and Magnetism

S-189 Simple Machines

S-198 Machines for Daily Use

S-229 The Cause and Nature of Heat

S-244 Sound

S-297 Properties of Matter

ACTIVITIES

1. Trace the history of artificial light.
2. Find out what is inside a dry cell.
3. Experiment with different shaped magnets showing their magnetic fields with iron filings.
4. Make an electromagnet.
5. Find out how magnets are used in doorbells, telephones, etc.
6. Speculate on why the earth behaves as a magnet
7. Collect and display simple tools used by early man.
8. Find out how simple machines help us.
9. Classify modern machines according to the basic types of simple machines.
10. Prepare a report on the origin of horsepower.
11. Give examples of chemical changes. example - Dip a silver spoon in salad dressing. Why does the spoon turn black?
12. Make booklets on simple machines and friction.
13. Do experiments to show what is necessary for burning. (fuel, heat, oxygen)
14. Demonstrate how magnets repel or attract each other.
15. Make a compass with a floating cork and a magnetized needle.
16. Examine the insides of old electrical appliances.
17. Make a musical instrument by filling eight soda bottles with varying amounts of water. Tap them with a spoon.

G R A D E F I V E

MAJOR CONCEPTS

1. Chemical energy and mechanical energy may be transferred into electrical energy.
2. Energy is required to cause vibrations.
3. Energy is necessary to a changing environment.
4. Heat makes liquids, solids, and gases expand; cooling causes them to contract.
5. Heat travels by radiation, conduction, and convection.
6. Molecules, elements, and compounds are matter.
7. Magnetism, electricity, and sound are forms of energy.
8. Some materials are better conductors of sound waves than others.
9. Light, a form of energy, is made in different ways and travels in straight lines.
10. Light may be reflected, absorbed, or it may pass through an object.
11. Man's first machines were tools and weapons.
12. Machines increase man's productivity.
13. Scientist have discovered ways of releasing the energy contained in the nuclei of certain kinds of atoms.
14. Matter can neither be created or destroyed.

FILMSTRIPS

S-235 Heat

S-238 The Cause and Nature of Sound

S-297 Properties of Matter

S-191 Machines and Tools to Help Us Work

S-199 Magnetism and Electricity

S-227 Light and How it Travels

ACTIVITIES

1. Make models of compound molecules using clay balls to represent the atoms.
2. Observe the difference between a solution (sugar and water) and a suspension (sand and water).
3. Separate sunlight into its colors with a prism.
4. Separate some salt and pepper with static electricity.
5. Make an exhibit showing older types of telephones, telegraphs, radios, and pictures of unusual methods of communications.
6. Heat slowly a pan filled with water. As the water expands the water will overflow.
7. Observe different methods of heating.
8. Focus a bright spot of sunshine on some paper with a magnifying glass. The paper will catch on fire.
9. Find as many uses of magnetism as possible.
10. Find out how animals communicate.
11. Take an old clock apart and notice the gears.
12. Prepare charts and collect model cars and planes to show how streamlining is used to reduce air resistance.
13. Make a telegraph set.

G R A D E S I X

MAJOR CONCEPTS

1. Matter exists as elements, compounds, or mixtures.
2. Mass, porosity, volume, and density are properties of matter.
3. Energy is required to affect changes in matter.
4. All elements are composed of atoms.
5. Atoms are tiny parts of molecules.
6. Energy is released when an atom is broken.
7. The total amount of matter remains constant.
8. We use electricity to run many of our machines and for communications.
9. Sounds differ in pitch.
10. New kinds of heating and lighting devices improve the conditions under which we live.
11. All machines in use today are combinations of a few simple machines.
12. The energy obtained from atomic fuels has enabled man to develop new and more efficient machines.

FILMSTRIPS

S-204 Electricity and Magnetism

S-224 Light

S-228 Light and Energy

S-235 Heat

S-245 Sound

S-248 Light, Heat, and Sound

S-298 Properties of Matter

ACTIVITIES

1. Separate sunlight into its colors with a prism.
2. Generate static electricity by rubbing an inflated balloon against your clothing. Stick the balloon against the wall.
3. Create a machine to do a particular job.
4. Light a candle. Hold metal, glass, and wooden objects over it to see which are best heat conductors.
5. Listen to the sound of your voice over a tape recorder.
6. Find out what steps Rock Hill is taking to reduce unnecessary noise.
7. Make a list of objects that will act like a mirror.
8. Put a piece of wax on a coat hanger. Place the hanger in the fire. The hanger conducts heat and melts the wax.
9. Do research on peaceful uses of nuclear energy.
10. Examine the sound track of a portion of a sound motion picture film.
11. Wire door bells, lamps, and switches to dry cells.
12. Learn to read an electric meter.
13. Make a cigar box violin.
14. Make an electric questioner using a flashlight cell, a bulb, and some bell wire. Wire a question board so that the correct answer to a question completes a circuit.
15. Make a periscope.
16. Make an electromagnetic crane.
17. Wire circuits parallel and in a series.

RESEARCH TOPICS

Alessandro Volta
Andre M. Ampere
George S. Ohm
Michael Faraday
James Watt
Samuel F.B. Morse
James C. Maxwell
Alexander Graham Bell
G. Marconi
Luigi Galvani
Thomas Edison
Hans Christian Oersted
Steinmetz
Joseph Henry
De Forest
Benjamin Franklin
A. A. Michaelson
Sir Isaac Newton
Democritus
Marie and Pierre Curie
Albert Einstein
Antoine Lavoisier
Thales
Enrico Fermi
Robert Boyle
Joseph Priestly
Robert Fulton

THE UNIVERSE

GRADE ONE

MAJOR CONCEPTS

1. The sun, moon, and stars are actually in space.
2. The sun warms and gives light.
3. Shadows are seen on sunny days.

FILMSTRIPS

S-336 Universe and Solar System

S-323 The Sky Above Our Earth

S-326 Moon, Sun, and Stars

S-324 Constellations

ACTIVITIES

1. Observe the sky during the day and at night.
2. Tell stories of the constellations.
3. Find out how a sundial works.
4. Measure shadows at different times of day.
5. Notice difference in warmness when standing in the sunshine and in the shade.
6. Leave objects in sunshine for a while and have children feel how warm they become.

G R A D E T W O

MAJOR CONCEPTS

1. The earth is round, revolves, and rotates.
2. The earth receives light and heat from the sun.
3. Objects in space move and change.

FILMSTRIPS

S-336 Universe and Solar System

S-328 Our Sizzling Sun

S-334 The Earth in Space

ACTIVITIES

1. Make a model of a sundial.
2. Tell how the sun helps us.
3. Act out the earth's revolution around the sun and the moon's revolution around the earth.
4. Discuss the size and shape of space.

G R A D E T H R E E

MAJOR CONCEPTS

1. The sun releases great amounts of energy.
2. Instruments (telescopes, cameras, rockets, satellites, etc.) are used to obtain information.
3. The solar system is made up of the sun, nine known planets, and their moons.

FILMSTRIPS

S-337 Universe and Solar System

S-318 Solar System

S-319 Sun's Family

S-320 The Sun's Family

S-317 Our Neighbor the Moon

S-315 Man Becomes an Astronomer

ACTIVITIES

1. Find out how far away some stars are.
2. Find out how the days and weeks got their names.
3. Keep a record of sunrise and sunset for a month.
4. Collect pictures of rockets.
5. Plan an imaginary trip to Mars.
6. Find out what man has put into space.

G R A D E F O U R

MAJOR CONCEPTS

1. Scientists have found out much about location, size, and composition of the solar system.
2. The universe is in constant change.
3. Moon's gravity is the chief cause of tides.
4. Man's ideas have changed.

FILMSTRIPS

S-337 Universe and Solar System

S-321 Interesting Things About the Planets

S-329 Our Silvery Moon

S-350 Earth Satellite

S-347 Destination Moon

S-331 Sky Patterns

ACTIVITIES

1. Find out why planets do not twinkle.
2. Find out where constellations appear at different times during the year.
3. Observe distant objects with and without binoculars.
4. Make mural depicting some thrilling moments of scientific discoveries.
5. Write a "You Are There" story of some important incident in astronomical history.

6. Make a time line of important events in the history of astronomy.

7. Study tide charts and try to predict the tides.

8. Pretend you are back in the time of Columbus and want to prove the world is round.

9. Draw pictures showing various phases of the moon.

10. Keep up with news of the Apollo moon trips.

11. Locate constellations.

12. Do research on planets.

G R A D E F I V E

MAJOR CONCEPTS

1. Earth and space navigation is a reality.
2. Man has devised many special instruments.
3. Man has successfully solved space problems.

FILMSTRIPS

S-340 Man Learns to Fly

S-342 Airplanes and How They Fly

S-343 Man in Space

S-344 Flight Into Space

S-348 Flight Around the Moon

S-333 Laws of the Sky

ACTIVITIES

1. Compare the difference in size between early rockets and newer rockets.
2. Role-play a conversation between an astronaut and the ground control station.
3. Find out about food for spacemen.
4. Find out how a sextant works.
5. Make up an original story or poem about space-flight experiences.
6. Make a cross-staff and an astrolabe.
7. Make a mural showing the steps in a space flight.

8. Trace an outline of important constellations and tell the legends and myths that go with them.

9. Make a time dial showing the time all around the world.

10. Show evidence of the earth's shadows.

11. Chart the surface gravity of the planets.

12. Determine the number of miles in a light year.

13. Demonstrate an eclipse of the moon.

14. Find directions with a magnetic compass.

15. Research theories of the origin of the universe.

G R A D E S I X

MAJOR CONCEPTS

1. There are many theories of astronomy.
2. Patterns in space have helped man to understand the universe and measure time.

FILMSTRIPS

S-338 Universe and Solar System

S-350 Earth Satellite

S-349 Flight to Mars

S-335 Time, Space, and Energy

S-332 Life on Other Planets

ACTIVITIES

1. Do class reports on lives and contributions of scientists.
2. Find out about the vibrations of the moon.
3. Find out how mathematics are used in preparing a rocket for launch.
4. Make a time zone chart of the earth.
5. Role-play the advantages and disadvantages of the Gregorian Calendar.
6. Make wooden or construction paper model of early astronomical instruments.
7. Use Aristotle's method to solve some problems.
8. Build a reflecting and refracting telescope.
9. Make a pendulum and demonstrate Galileo's discovery of its time-keeping qualities.

10. Illustrate surface features of celestial bodies by making dioramas.

11. Draw Roman Stone Calendar, Aztec Calendar, or Eskimo Calendar.

12. Watch sky on moonless night for "shooting stars".

13. Make a list of all superstitions you can find that have to do with the universe. Talk about why they are not scientifically sound.

14. Find out about Leap Year.

15. Find out why the full moon is always overhead at midnight, the first quarter is overhead at 6:00 P.M., and the last quarter is overhead at 6:00 A.M.

16. Make a chart of the solar system.

17. Make a sundial.

18. Make a list of first magnitude stars.

RESEARCH TOPICS

Eratosthenes
Aristarchus
Empedocles
Ptolemy
Copernicus
Tyche Brahe
Galileo
Johannes Kepler
Sir Isaac Newton
Lavoisier
Sir J. F. W. Herschel
Jean B. L. Foucault
Albert Einstein
Tsiolkvosky
Robert H. Goddard
Oberth
Dryden
Pickering
John Watts Young
Weather Satellites

Gilruth von Braun
Van Allen
Neil A. Armstrong
Frank Borman
M. Scott Carpenter
Charles Conrad, Jr.
Leroy G. Cooper
Yuri A. Gagarin
John H. Glenn, Jr.
Virgil I. Grissom
James A. Lovell, Jr.
James A. McDivett
Walter M. Schirra, Jr.
Alan B. Shepard, Jr.
Donald Kent Slayton
Valentina V. Tereshkova
Wernher von Braun
Edward H. White II
Communications Satellites
Navigation Satellites

THE HUMAN BODY

GRADE ONE

MAJOR CONCEPTS

1. We use our senses to find out about our environment.
2. Proper food, rest, and care help children to grow from newborn babies into strong and healthy adults.

FILMSTRIPS

S-129 You and Your Five Senses

S-166 Playing Safely

S-155 Food for Health

S-161 Rest and Sleep

S-162 Keeping Well

ACTIVITIES

1. Make a class chart of good health rules.
2. Make a bulletin board display of baby pictures of your class.
3. Make a food chart.
4. Collect pictures of children sleeping.
5. Discuss with the class ways that they know they are growing bigger.
6. Ask children to tell what they see, hear, feel, and smell as they sit in the classroom. Let them taste something to include the sense of taste.
7. Have children look at a plant or animal that is new to them and tell everything they see.
8. Have children discuss the smells they like and do not like.

9. Allow the children to test their tongues to find the areas that respond to salty, sweet, bitter, and sour tastes.

10. Blindfold a child and have him attempt to identify several objects by touch.

G R A D E T W O

MAJOR CONCEPTS

1. There are reasons for changes that take place in the body.
2. Different kinds of food are necessary for good health.
3. Food is digested and distributed to the body by blood.

FILMSTRIPS

S-169 Health and Safety

S-160 Foods for Health

S-142 You and Your Food

ACTIVITIES

1. Make a scrapbook of foods that should be eaten every day.
2. Make a chart to show proper eating habits.
3. Find out how animals use their teeth
4. Discuss proper dental care.
5. Examine fingernails with a magnifying glass to show children how dirt may lodge under them.
6. Find out how food is protected for human use
7. Discuss how the children have changed since first grade.
8. Measure height and weight of classmates.
9. Discuss haircuts, fingernail cuttings, and loss of baby teeth as aspects of growing
10. Have children draw pictures of themselves showing how they looked in the first grade and how they look now

11. Have school nurse demonstrate safety precautions and first aid procedures appropriate for second grade.

12. Have children draw pictures of "A Good Lunch" or "A Good Dinner".

13. Let children collect pictures to illustrate "Foods for Building", "Foods for Vigor", and "Foods for Keeping Well".

G R A D E T H R E E

MAJOR CONCEPTS

1. The structure and function of the bones, muscles, and blood give children an understanding of how their bodies work.

FILMSTRIPS

S-137 Work of the Blood

S-150 Bones and Muscles

S-165 Safety on the Bicycle

ACTIVITIES

1. If a child has had a broken bone, invite him to describe the experience.
2. Bring bones from home to study their structure.
3. Ask a butcher for bones and other animal body parts to study.
4. Look at blood samples under the microscope.
5. Examine a model of a human body.
6. Listen to the heart with a stethoscope.
7. Measure the pulse before and after exercising.
8. Make pictures showing good health practices such as exercising, eating the right foods, and getting plenty of sleep.
9. Discuss safety measures third graders can practice to protect their bones, muscles, and blood.
10. Compare muscles, tendons, and fat of meat brought to class.

G R A D E F O U R

MAJOR CONCEPTS

1. Proper care of skin and sense organs keep the body living and functioning.

FILMSTRIPS

S-170 Health and Safety

S-131 You and Your Ears

S-133 You and Your Eyes

S-134 Your Senses of Smell and Taste

S-135 Your Sense of Touch

S-149 Skin, Hair, and Nails

ACTIVITIES

1. Find out about garbage and sewage disposal and water purification in Rock Hill.
2. Visit a food processing plant and observe sanitary practices in preserving and handling foods.
3. Make booklets on care of the sense organs.
4. Find out about the functions of the skin.
5. Learn first aid for cuts and bruises.
6. Find out how good health habits affect your skin and sense organs.
7. Find out how communicable diseases are spread and what the public health service does about control.
8. Find out about skin diseases.

9. Discuss good grooming.

10. Find out about germ-bearing insects and pests.

G R A D E F I V E

MAJOR CONCEPTS

1. The circulatory, digestive, skeletal, muscular, and respiratory systems work together.

FILMSTRIPS

S-152 You, the Human Being

S-141 Digestive System

S-140 Human Respiration

S-139 Respiratory System

S-136 Circulatory System

ACTIVITIES

1. Gather information about heart disease.
2. Have children listen to each other's heart beats and feel each other's pulse beats.
3. Draw diagrams of the human circulatory system and trace blood through the heart and lungs.
4. Find out how the circulatory system works with the digestive and respiratory system.
5. Count the bones in a human skeleton.
6. Make diagrams of the digestive system.
7. Let the children disassemble and assemble a model of a human torso.
8. Examine joints, muscle tissue, tendons, and bone marrow of animals.
9. Find out about tooth decay and gum diseases.

10. Find out the purpose and methods of inoculation against diseases.

11. Compare lung capacities by blowing up balloons.

12. Find out about the basic food groups.

13. Find out how air pollution affects health.

14. Have children examine the biceps and triceps in their arms.

15. Practice taking body temperatures.

G R A D E S I X

MAJOR CONCEPTS

1. The nervous system received information, processes it, and directs the body to action.

FILMSTRIPS

S-151 Kinds of Cells

S-147 The Nervous System

S-129 You and Your Five Senses

S-153 You, the Living Machine

S-171 Health and Safety

ACTIVITIES

1. Find out how alcohol affects the nervous system.
2. Obtain a beef brain from a butcher. Study it closely. Observe the different parts.
3. Make clay models of eye and ear.
4. Find out how eye glasses are used to correct vision.
5. Have the school nurse check children's hearing with an audiometer.
6. Find out about diseases that affect the nervous system.
7. Find out about the braille alphabet for the blind.
8. Cut open the eye of a cow.
9. Examine different types of cells under the microscope.
10. Test your skin for sensitivity to touch and temperature.

11. Measure reaction times to different situations.

12. Study part of a spinal column obtained from a butcher. Examine an individual vertebra.

13. Try to obtain some old x-rays from a doctor to study.

14. Make a study of the great men in the field of health.

15. Find out how tobacco and narcotics affect the nervous system.

16. Have children prepare for display large chromosomes with parts labeled.

17. Compare various tissues and organs.

18. Find statistics on the number of people injured or killed each year by accidents.

RESEARCH TOPICS

Walter Reed
Alexander Fleming
Jonas Salk
Louis Pasteur
Edward L. Trudeau
Emil Von Behring
Edward Jenner
Sir Frederick G. Banting
Albert B. Sabin
Lazzaro Spallanzani
Joseph Lister
Mayo family
Menninger family
Crawford W. Long
Elizabeth Blackwell
August von Wasserman
William H. Harvey
William C. Gorgas
Camillo Golgi
Clara Barton
Marie and Pierre Curie
Florence Nightingale
Aesculapius
Quarantine
Bloodletting
Leech
Plastic Surgery
Iron Lung
Sanitarium
Inoculation
Mental Illness
Transplanting Organs
Red Cross
Veterans' Hospitals
Walter Reed Army Medical Center
World Health Organization
Seeing Eye Dogs

METHODS OF EVALUATION

1. Oral expression of ideas
2. Expression of scientific phenomena in art work
3. Creative writing
4. Observation of attitudes (open-mindedness, critical-mindedness, reactions to new situations, etc.)
5. Practical application of scientific attitudes and skills
6. Displays, exhibits, etc.
7. Assembly programs
8. Classroom games
9. Written tests

SAFETY IN YOUR SCIENCE PROGRAM

Acquaint your class with poisonous plants. Some poisonous plants in this area are:

Poison Ivy	Locoweed
Poison Oak	Mountain Laurel
Poison Sumac	Jimson Weed
Poke Berry	Yellow Jessamine
Azalea	Vetch
Buttercup	Certain mushrooms

Unidentified plants should never be tasted

When working with electricity, work with dry cells of 1-1/2 volts. Destroy batteries that show signs of wetness. Disconnect batteries after use. When using bell wire, remove insulation only at the connecting points.

Never touch dry ice with bare hands.

Keep all chemicals labeled and in a safe place. Do not taste any chemical. Be familiar with the hazardous properties of chemicals you use. Some dangerous chemicals are ether, phosphorus, and sodium. Do not add water to a concentrated acid. Use weak acids such as vinegar if possible. If acid is spilled on the hands, flush with water immediately.

Be careful of burns when working with heat and heat conductors.

Heat things slowly.

Carbon tetrachloride should only be used in a ventilated room.

When heating test tubes, keep the open end pointed away from the class. Exercise caution when working with breakable utensils.

Be organized, neat, sensible, and inventive.

RESOURCES FOR THE TEACHER

Beauchamp, Wilbur L. Basic Science Handbook K-3. Scott, Foresman, 1961.

Blough, Glenn O., and Julius Schwartz. Elementary School Science and How to Teach It. Holt, Rhinehart, and Winston, 1964.

Blough, Blenn O. and Marjorie H. Campbell Making and Using Classroom Science Materials in the Elementary School. Dryden, 1954.

Burnett, R. Will. Teaching Science in the Elementary School. Holt, Rhinehart, and Winston, 1958.

Craig, Gerald D. Science for the Elementary School Teacher. Ginn, 1962.

Gega, Peter C. Science in Elementary Education. John Wiley and Sons, 1966.

Hennessy, David E. Elementary Teacher's Classroom Science Demonstrations and Activities. Prentice-Hall, 1964.

Hone, Elizabeth, et al. Teaching Elementary Science: A Sourcebook for Elementary Science. Harcourt, Brace, and World, 1962.

Kambly, Paul E. and John E. Suttle. Teaching Elementary School Science, Methods, and Resources. Ronald Press Company, 1963.

Lewis, June and Irene C. Potter. The Teaching of Science in the Elementary Schools. Prentice-Hall, 1961.

Navarra, John S. and Joseph Zafforoni. Science Today for the Elementary School Teacher. Row, Peterson, 1961.

Stone, George K. Science You Can Use. Prentice-Hall, 1964.

Tannenbaum, Harold and Nathan Stillman. Science Education for Elementary School Teachers. Allyn and Bacon, 1960.

Victor, Edward. Science for the Elementary School. Macmillan, 1965.

Zim, Herbert S. Science for Children and Teachers. Association for Childhood Education International, 1953.

Guide for Teaching Science Grades 1 - 6. State Department of Education, Columbia, South Carolina, 1962.

People and Their Environment Teachers' Curriculum Guide to Conservation Education: Outdoor Classroom and Camping; People and Their Environment Grades 1 - 2 - 3; People and Their Environment Grades 4 - 5 - 6. J. G. Ferguson Publishing Company, 1969.

RESOURCE MATERIALS

Aubrey, Ruth H. Selected Free Materials for Classroom Teachers Rev. Ed. Fearon Publishers, 1967.

Free and Inexpensive Learning Materials Fourteenth Biennial Edition. George Peabody College for Teachers, Nashville, Tennessee, 1968.

COMMUNITY RESOURCES

I. Services

A.	Chamber of Commerce	327-4342
B.	Juvenile and Domestic Relations Court	327-5573
C.	Health Department (Chest X-Rays, Immunization)	327-2920
D.	Police Department (Worthy Boy's Camp)	327-4114
E.	Fire Department (Fire Prevention Week)	327-4111
F.	Rescue Squad. (First Aid)	327-4111
G.	City Recreation Department (Luther Glenn, Director)	327-3342
H.	State Highway Department (Official Maps)	327-3020
I.	U. S. Agriculture Department (York, South Carolina)	684-4711
J.	Post Office	--
K.	Men's Clubs (Lions, Kiwanis, Optimist, American Legion)	--
L.	Metropolitan Insurance Company (Beaty Shopping Center -- Free Pamphlets)	327-4168

II. Educational Tours

A.	Children's Nature Museum (Art Program, Piedmont Players, and Tours)	327-2423
B.	Winthrop College Library. (Artists and Lectures)	328-2471
C.	Evening Herald Newspaper. (Tours arranged)	327-7161
D.	Coca-Cola Bottling Company.	328-2406
E.	Water Filter Plant. (Charlotte Highway)	366-4412
F.	Rock Hill Public Library.	327-3630
G.	WRHI Radio Station.	327-2085
H.	WTYC Radio Station. (Highway 21-A)	366-4148
I.	York County Tec (Adult Education)	328-3843

III. Industry

A. Celanese Fibers Company 366-2421
B. Bowaters Carolina Corporation 328-0131
C. Rock Hill Printing and Finishing Company. 327-4171