

**Science
2006
Grade Three**

COURSE DESCRIPTION: (The course description sets the parameters, scope and sequence for the course:

I. Earth and Space Science

A. Properties of Earth

1. Explain the properties of materials that make up the Earth; rocks, minerals, soil and fossils.
2. Explore how the materials that make up the Earth are formed.
3. Identify the natural sources of water.
4. Describe the three different states of water (liquid, solid, gas).
5. Describe how water can be used in both domestic and public capacities.

B. Natural Resources

1. Understand that air water and soil are natural resources.
2. Understand that natural resources are used to make additional resources such as food or fuel.
3. Understand that material resources cannot always be renewed and need to be conserved.
4. Identify techniques for conserving natural resources.

B. Astronomy

1. Develop and understanding of the various changes to the Earth and sky.
2. Understand the Earth's size relative to other planets, the moon, and the sun.
3. Develop an understanding of the objects in the sky.
4. Observe and describe the day and night sky.
5. Understand that time passages cause objects in the sky to change in appearance. For example, over the period of a month, the moon appears to change shape.
6. Relate the motion of the Earth, moon, and sun to units of time such as days or seasons.
7. Understand that the temperature on the Earth is affected by the sun's heat and light.
8. Understand the components of the solar system (the sun, nine planets and their moons, asteroids and comets) and develop a model.

9. Understand that stars, planets, and moons are components of the universe.
10. Compare the appearance of stars and planets.
11. Understand that the sun appears to move across the sky in the same pattern everyday, but the pattern changes slightly over the seasons.

C. Maps and Globes

1. Identify and use various kinds of maps.

II. Life Science

A. Living Things

1. Compare and contrast living and non-living things.
2. Demonstrate that living things have different levels of organizations,
3. Develop and understanding of organisms and the environment in which they live.
4. Understand the basic needs an organism requires for survival.
5. Understand that some living things, such as humans, have senses.
6. Describe the life cycle of living things.
7. Understand that within every species there are individuals.

B. The Environment

1. Understand that there are many different environments.
2. Understand that an environment is the space, conditions, and factors that affect a species survival and quality of life.
3. Understand changes in the environment.
4. Understand that humans alter the environment both positively and negatively for themselves and other organisms.

D. The Human Body

1. Identify the different systems of the human body.
2. Describe how different functions of the major systems of the human body are interrelated.
3. Understand that the body's defense systems, or immune system, can aid in preventing or overcoming a disease.
4. Understand how communicable diseases may be transmitted.

E. Plants and Animals

1. Understand that plants and animals depend on each other for survival.

2. Identify and describe the external features of animals that help survive in various habitats.
3. Identify and describe the external features of plants that help them survive in various habitats.

III. Physical Science

A. Motion

1. Understand the meaning of the position of an object.
2. Investigate the concept of motion relative to change of position over time.
3. Explore the relationship between the action applied to an object and the subsequent changes to the object. For example, a balloon will expand when it is filled with air.
4. Demonstrate that pushing or pulling an object can change the motion and position of that object.

B. Energy

1. Light
 - a. Develop and understanding of light.
 - b. Understand that light travels in a straight line it reaches an object.
 - c. Perform experiments to better understand how light travels.
 - d. Understand and object can absorb light.
 - e. Describe what happens when light contacts an object.
2. Heat
 - a. Develop an understanding of heat.
 - b. Explore sources of heat.
 - c. Demonstrate how heat can be transferred from one place to another.
 - d. Understand that different objects and processes produce heat.
3. Sound
 - a. Demonstrate how vibrating objects produce sound.
 - b. Understand that the pitch of a sound can be altered by changing the rate of vibration.

C. Matter

1. Identify and classify the properties of matter.
2. Describe and organize objects in terms of physical properties and the matter from which they are made.
3. Use appropriate tools to observe and measure the properties of matter.
4. Observe the various compositions of matter.

5. Understand the matter exists in three different states (solid, liquids, and gases).

D. Forces

1. Understand that some forces are invisible.
2. Understand that some forces can act at a distance.
3. Understand that the strength of a force between objects is affected by distance. For example, the force of a magnet will be stronger as it moves closer to an object.
4. Understand that magnets attract and repel other magnets as well as other types of materials.
5. Predict the results of a scientific investigation a magnet.

CORE CURRICULUM CONTENT STANDARDS:

Standard 5.1 (Scientific Processes) all students will develop problem-solving, decision-making and inquiry skills, reflected by formulating usable questions and hypotheses, planning experiments, conducting systematic observations, interpreting and analyzing data, drawing conclusions, and communicating results.

Standard 5.2 (Science and Society) all students will develop an understanding of how people of various cultures have contributed to the advancement of science and technology, and how major discoveries and events have advanced science and technology.

Standard 5.3 (Mathematical Applications) all students will integrate mathematics as a tool for problem solving in science, and as a means of expressing and/or modeling scientific theories.

Standard 5.4 (Nature and Process of Technology) all students will understand the interrelationships between science and technology and develop a conceptual understanding of the nature and process of technology.

Standard 5.5 (Characteristics of Life) All students will gain an understanding of the structure, characteristics, and basic needs of organisms and will investigate the diversity of life.

Standard 5.6 (Chemistry) all students will gain an understanding of the structure and behavior of matter.

Standard 5.7 (Physics) all students will gain an understanding of natural laws as they apply to motion, forces, and energy transformations.

Standard 5.8 (Earth Science) all students will gain an understanding of the Earth structure, dynamics, and geophysical systems of the Earth.

Standard 5.9 (Astronomy and Space Science) All students will gain an understanding of the origin, evolution, and structure of the universe.

Standard 5.10 (Environmental Studies) all students will develop an understanding of the environment as a system of interdependent components affected by human activity and natural phenomena.

CUMULATIVE PROGRESS INDICATORS:

Cumulative Progress Indicators:

Standard 5.1

A. Habits of Mind

1. Raise questions about the world around them and be willing to seek answers through making careful observations and experimentation.
2. Keep records that describe observations, carefully distinguish actual observations from ideas and speculations, and are understandable weeks and months later.
3. Recognize that when a science investigation is replicated, very similar results are expected.
4. Know that when solving a problem it is important to plan and get ideas and help from other people.

B. Inquiry and Problem Solving

1. Develop strategies and skills for information–gathering and problem-solving, using appropriate tools and technologies.
2. Identify the evidence used in an explanation.

C. Safety

1. Recognize that conducting science activities requires an awareness of potential hazards and the need for safe practices.
2. Understand and practice safety procedures for conducting science investigations.

Standard 5.2

A. Cultural Contributions

1. Describe how people in different cultures have made and continue to make contributions to science and technology.

B. Historical Perspectives

1. Hear, read, write, and talk about scientists and inventors in historical context.

Standard 5.3

A. Numerical Operations

1. Determine the reasonableness of estimates, measurements, and computations of quantities when doing science.
2. Recognize and comprehend the orders of magnitude associated with large and small physical quantities.
3. Express quantities using appropriate number formats, such as:
 - integers.
 - fractions.

B. Geometry and Measurement

1. Select appropriate measuring instruments based on the degree of precision required.
2. Use a variety of measuring instruments and record measured quantities using the appropriate units.

C. Patterns and Algebra

1. Identify patterns when observing the natural and constructed world.

D. Data Analysis and Probability

1. Use tables and graphs to represent and interpret data.

Standard 5.4

A. Science and Technology

1. Distinguish between things that occur in nature and those that have been designed to solve human problems.

B. Nature of Technology

1. Demonstrate how measuring instruments are used to gather information in order to design things that work properly.

C. Technological Design

1. Describe a product or device in terms of the problem it solves or the need it meets.
2. Choose materials most suitable based on their characteristics to make simple mechanical constructions.
3. Use the design process to identify a problem, look for ideas, and develop and share solutions with others.

Standard 5.5

A. Matter, Energy and Organization in Living Systems

1. Identify the roles that organisms may serve in a food chain.
2. Differentiate between the needs of plants and those of animals.
3. Recognize that plants and animals are composed of different parts performing different functions and working together for the well being of the organism.

4. Describe the basic functions of the major systems of the human body including, but not limited to:
 - digestive system
 - circulatory system
 - respiratory system
 - nervous system
 - skeletal system
 - muscular system
 - reproductive system

B. Diversity and Biological Evolution

1. Develop a simple classification scheme for grouping organisms.
2. Recognize that individuals vary within every species, including humans.

C. Reproduction and Heredity

1. Identify different stages in the lives of various organisms.

Standard 5.6

A. Structure and Properties of Matter

1. Sort materials based on physical characteristics that can be seen by using magnification.
2. Observe that water can be a liquid or a solid and can change from one form to the other and the mass remains the same.
3. Recognize that water, as an example of matter, can exist as a solid, liquid or gas and can be transformed from one state to another by heating or cooling.
4. Show that not all materials respond in the same way when exposed to similar conditions.

B. Chemical Reactions

1. Combine two or more materials and show that the new material may have properties that are different from the original material.

Standard 5.7

A. Motion and Forces

1. Recognize that changes in the speed or direction of a moving object are caused by force and that the greater the force, the greater the change in motion will be.
2. Recognize that some forces can act at a distance.
 - gravity
 - magnetism
 - static electricity

B. Energy Transformations

2. Identify sources of light and demonstrate that light can be reflected from some surfaces and pass through others.

3. Use devices that show electricity producing heat, light, sound, and magnetic effects.
4. Show that differences in sound (loud or soft, high or low) can be produced by varying the way objects vibrate.

Standard 5.8

A. Earth's Properties and Materials

1. Observe that most rocks and soils are made of several substances or minerals.
2. Observe that the properties of soil vary from place to place and will affect the soil's ability to support life.
3. Recognize that fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at that time.

B. Atmosphere and Water

1. Recognize that air is a substance that surrounds us, takes up space, and moves around us as wind.
2. Recognize that most of Earth's surface is covered by water and be able to identify the characteristics of those sources of water.
 - oceans
 - rivers
 - lakes
 - underground sources
 - glaciers
3. Observe weather changes and patterns by measurable quantities such as temperature, wind direction and speed, and amounts of precipitation.
4. Observe that when liquid water disappears, it turns into a gas (vapor) in the air and can reappear as a liquid when cooled, or as a solid if cooled below its freezing point.
5. Observe that rain, snow, and other forms of precipitation come from clouds, but that not all clouds produce precipitation.
6. Recognize that clouds and fog are made of tiny droplets of water and possibly tiny particles of ice.

C. Processes that Shape the Earth

1. Recognize that some changes of the Earth's surface are due to slow processes such as erosion and weathering, and some changes are due to rapid changes such as landslides, volcanic eruptions, and earthquakes.
2. Recognize that moving water, wind, and ice continually shape the Earth's surface by eroding rock and soil in some areas and depositing them in other areas.

D. How We Study the Earth

1. Use maps to locate and identify physical features on the Earth.

Standard 5.9

A. Earth, Moon, Sun System

1. Observe patterns that result from the Earth's position relative to the sun and rotation of the Earth on its axis.

2. Recognize and describe the phases of the moon.

B. Solar System

1. Describe Earth as one of several planets that orbit the sun and the moon as a satellite of the Earth.

C. Stars

1. Observe that stars are not all the same in brightness, size, and color.

D. Galaxies and Universe

1. Recognized that images of celestial objects can be magnified and seen in greater detail when observed using binoculars and light telescopes.

2. Observe and record short-term and long-term changes in the night sky.

Standard 5.10

A. Natural Systems and Interactions

1. Differentiate between natural resources that are renewable and those that are not.

B. Human Interactions and Impact

1. Explain how meeting human requirements affects the environment.

SUGGESTED ACTIVITIES THAT ADDRESS THESE STANDARDS MAY INCLUDE BUT ARE NOT LIMITED TO:

Standard 5.1

Penny Experiment
Scientific Method
Science Fair Project

Standard 5.2

Development of Space Travel
Advancement of Vaccines
Cell Development

Standard 5.3

Measure Solids, Liquids and Gases
Shadow Measurement (Revolution of Earth Relation to Time)
Body Graph (Characteristics)

Standard 5.4

Measuring Rain/Snow

Standard 5.5

The Brain Hat

Forearm Muscle Diagram
Circulatory System

Standard 5.6

Matter Sort
Solid, Liquid, Gas
Copper Reaction

Standard 5.7

Gravity on Earth and Moon
Sun's Heat

Standard 5.8

Layers of the Earth
Balloon Experiment (States of Matter)
Map Study

Standard 5.9

Solar System Unit

Standard 5.10

Faces of New Jersey

INSTRUCTIONAL STRATEGIES:

Direct Instruction
Cooperative Learning
Team Learning
Reciprocal Style Learning

EVALUATION/ASSESSMENT OF STUDENTS:

Tests
Study Guides
Projects
In Class Assignments

EVALUATION/ASSESSMENT OF CURRICULUM:

This course of study will be evaluated/assessed by instructional staff during the first year of implementation for the purpose of necessary revision at the end of the first year. In addition, the course of study will be reviewed according to the Five-Year Curriculum Review schedule.

RESOURCES/BIBLIOGRAPHY:

Course Book:

Science. Silver Burdett and Ginn, 1985

You, New Jersey and the World. Afton Publishing Co, 1999

Teacher Supplements:

Space. Teacher Created Materials, 1996

Exploring the Planets. Scholastic, 2000

The Body Book. Scholastic, 1993

Mysteries of the Universe. Aladdin Books, 1995

Space: Stars, Planets and Spacecrafts. DK Publishing, 1998

Hopatcong Science Solar System Unit: Grade Three