

Science

Grade 6

Program Goal:

Students will develop a curiosity for and understanding of our universe, including a sense of stewardship toward God's creation and dwindling natural resources. They will develop critical and independent thinking skills and a knowledge base which will enable them to solve (scientific) problems and to create new and ethical solutions for the future of our world.

Grade Level Goal:

In sixth grade, students will develop a knowledge base of life, physical, earth, and space science. They will use this knowledge to expand their curiosity of science and enhance problem-solving skills.

Program Goal Objectives:

Scientific Curiosity:

1. The learner will make observations in order to generate questions about the world around them.
2. The learner will conduct experiments and make observations relating to every day life.
3. The learner will demonstrate scientific curiosity by building and constructing scientific models.
4. The learner will use their senses, prior experiences and other resources to make observations and generate questions.

Stewardship:

1. The learner will demonstrate responsibility by taking care of their own environment and becoming life long stewards of God's creation.

2. The learner will show respect for *God's* creation by recognizing the responsible use of natural resources.
3. The learner will recognize and value the unique characteristics of *God's* creation.
4. The learner will act as a responsible and global citizen through conservation and preservation efforts of our natural resources.

Problem Solving/Critical Thinking:

1. The learner will apply critical thinking skills independently using a variety of strategies.
2. The learner will apply critical thinking skills within small groups using a variety of strategies.
3. The learner will compare and contrast data.
4. The learner will take measurements to interpret data and draw conclusions.
5. The learner will identify or state a problem utilizing prior knowledge and scientific resources.
6. The learner will develop questions, make hypotheses and conduct experiments to draw a conclusion.
7. The learner will use the scientific method to collect, organize, analyze, and interpret data.

Ethical Perspective:

1. The learner will use *Catholic Faith* values when making scientific decisions and/or evaluating the decisions of others.
2. The learner will show respect for all forms of life including the environment.
3. The learner will act responsibly during labs and group work while using resources wisely.

Content Criteria:

Earth Science:

Geosphere:

1. The learner will describe and identify the history, structure and composition of the earth's features.
 - a. The learner will compare and contrast the compositions of rocks and minerals.
 - b. The learner will explain how rocks and fossils are used to understand the history and structure of the earth.

Weather/Atmosphere:

1. The learner will describe and explain what makes up weather and interpret the causes of different weather patterns.
 - a. The learner will describe the composition and characteristics of the atmosphere.
 - b. The learner will use data and information about atmosphere to predict and explain changes in weather.

Hydrosphere:

1. The learner will describe the water cycle and its impact on the earth.
 - a. The learner will trace and describe the path of the water cycle.
 - b. The learner will evaluate the impact of the water cycle on the various ecosystems.

Life Science:

1. The learner will design an ecosystem that provides for the needs of a variety of organisms.
 - a. The learner will illustrate food webs.

- b. The learner will diagram natural cycles (water, carbon dioxide, oxygen and nitrogen.)
 - c. The learner will describe ways in which humans alter the environment.
 2. The learner will create a model of a plant and an animal cell and differentiate between them based on their structure and function.
 - a. The learner will identify and label the parts of an animal/plant cell.
 - b. The learner will describe the function of the cell components.
 - c. The learner will compare and contrast plant/animal cells.
 3. The learner will explain cell division and cell reproduction.
 - a. The learner will explain mitosis and meiosis.
 4. The learner will explain how various organs work together to form specific body systems.
 - a. The learner will trace the path of the various systems within the human body.
 5. The learner will identify the interrelationship of body systems.
 - a. The learner will explain how selected systems and processes work together in the human body.
 6. The learner will identify characteristics passed from generation to generation.
 - a. The learner will identify single traits that have been passed from parent to child or one generation to the next.
 7. The learner will describe how heredity and environment may influence/determine characteristics of an organism.
 - a. The learner will describe heredity.
 - b. The learner will describe environment.
 - c. The learner will identify characteristics that change.

Physical Science:

1. The learner will measure and classify matter.
 - a. The learner will measure matter in terms of length, mass, weight, density, area, volume or temperature using correct scientific units.
 - b. The learner will classify matter as a solid, liquid or gas and explain its molecular composition.
2. The learner will classify changes in matter as chemical or physical and justify the decisions when given.
 - a. The learner will describe common physical changes in materials: evaporation, condensation, thermal expansion and contraction.
 - b. The learner will describe common chemical changes in terms of properties of reactants and products.
 - c. The learner will distinguish between physical and chemical changes in natural and technological systems.
3. The learner will observe and demonstrate how light energy relates to matter.
 - a. The learner will describe transmission, reflection and absorptions of light.
 - b. The learner will explain how objects or media reflect, refract, transmit, or absorb light.
 - c. The learner will explain how light helps us to see.
 - d. The learner will identify and describe the parts of the eye.

Space:

1. The learner will investigate the historical significance of constellations.
 - a. The learner will research the historical significance of different constellations.
2. The learner will explain how technology helps us learn about the universe.
 - a. The learner will describe characteristics of telescopes and satellites.

- b. The learner will explore the history of space technology.

Scope:

Earth Science:

GEOSPHERE:

- A. Earth's features
 1. History
 2. Eras
 3. Ice Age
 4. Determination of age of rocks (half-life)
 5. Glaciers
- B. Earth's structure
 1. Igneous
 2. Sedimentary
 3. Metamorphic
- C. Earth's composition
 1. Minerals
 2. Fossils
 3. Factors that cause rocks to change

WEATHER AND ATMOSPHERE

- A. Composition and characteristics
 1. Fronts
 2. Air pressure
 3. Wind
 4. Humidity
 5. Temperature
- B. Types of weather phenomena
 1. Tornado
 2. Hurricane
 3. Thunder storm
 4. Blizzard

- C. Weather forecasting
 - 1. Equipment
 - 2. Thermometer
 - 3. Barometer
 - 4. Anemometer
 - 5. Interpreting weather maps
- D. Technology
 - 1. Satellite
 - 2. Doppler

HYDROSPHERE

- A. Water cycle
 - 1. Evaporation
 - 2. Precipitation
 - 3. Condensation
 - 4. Impact on life
 - 5. Transpiration

LIFE SCIENCE:

- A. Ecosystems
 - 1. Food Web
 - a. Producers
 - b. Consumers (Primary, Secondary, Tertiary)
 - c. Decomposers
 - d. Scavengers
 - e. Interdependence
 - 2. Natural cycles
 - a. Water
 - b. Carbon dioxide/oxygen
 - c. Nitrogen
 - d. Energy cycle
 - 3. Human impact
 - a. Pollution
 - b. Limited/renewable resources
 - 4. Symbiotic relationships

- a. Parasitism
 - b. Mutualism
 - c. Commensalisms
- B. Cells (compare and contrast)
- 1. Plant cells (structures and functions)
 - a.) Cell wall
 - b.) Cell membrane
 - c.) Chloroplasts
 - d.) Nucleus
 - e.) Cytoplasm
 - f.) Organelles
 - 2. Animal cells
 - a.) Cell membrane
 - b.) Nucleus
 - c.) Cytoplasm
 - d.) Organelles
 - 3. Cell and reproduction and growth
 - a.) Meiosis
 - b.) Mitosis
 - 4. Body systems - how organs work to make a system
 - a.) Circulatory
 - b.) Respiratory
 - c.) Digestive
 - d.) Nervous
 - e.) Reproductive
 - f.) Excretory
 - g.) Endocrine
 - h.) Muscular
 - 5. Interrelationship of body systems
 - a.) Skeletal/muscular
 - b.) Circulatory/respiratory
 - c.) Nervous system and sensory organs.
 - 6. Heredity
 - a.) Genetic/genes
 - 1.) DNA
 - 2.) Single trait (i.e. hair color)
 - 3.) Environment
 - a. Mutation

- b. Dominant
- c. Recessive
- d. Hybrid

PHYSICAL SCIENCE:

- A. Measurement
 - 1. Length (cm, mm, m, km)
 - 2. Mass (grams, kg)
 - 3. Weight
 - 4. Density (mass/volume=density)
 - 5. Area
 - 6. Volume
 - 7. Temperature (Celsius)
- B. Classifications
 - 1. Solid
 - 2. Liquid
 - 3. Gas
 - 4. Mixture
 - 5. Solution
- C. Physical changes
 - 1. Evaporation
 - 2. Condensation
 - 3. Thermal expansion and contraction
 - 4. Sublimation
 - 5. Melting
 - 6. Freezing
- D. Chemical changes
 - 1. Burning
 - 2. Photosynthesis
 - 3. Digestion
 - 4. Acid base reactions
 - 5. Reactants and products
- E. Light energy
 - 1. Reflection
 - 2. Refraction
 - 3. Transmission

4. Absorption
- F. Parts of the eye
 1. Retina
 2. Liquid humor
 3. Lens
 4. Cornea
 5. Pupil
 6. Iris
 7. Optic nerve

SPACE:

- A. Constellations
 1. History of constellations
 2. Using outside resources for research
- B. Technology
 1. Satellites
 2. Telescopes
 3. Advances in technology
 4. Robotics

Instructional Criteria

1. Students will demonstrate the ability to use basic lab equipment to use basic lab equipment (triple beam balance, graduated cylinder, thermometer, ruler, etc.)
2. Students will apply the metric system in measurement.
3. Students will be able to correctly use a microscope.
4. Students will develop note taking and outlining skills.
5. Students will be able to determine basic atmospheric conditions (barometric air pressure, temp, humidity, etc.)
6. Students will be able to create and interpret graphs and charts.
7. Students will be able to explain the "paths" of the human body systems.
8. Students will conduct and write research papers using various sources.

9. Students will use outside materials and research techniques to answer scientific concepts.
10. Students will write essay-style answers to various scientific questions.
11. Students will work cooperatively in the classroom setting.
12. Students will create diagrams and flow charts to illustrate various cycles.
13. Students will be able to compare and contrast various scientific concepts.

Textbook Recommendation

Scott Foresman "Science" Rating: 4.5 out of 5.0
ISBN: 328 03426 6

Strengths:

Lab activities are awesome.

Assessments require higher critical thinking skills, especially the essay questions.

Weaknesses:

Covers some topics not in curriculum.

Body systems section was a little weak.