Science
Grade 5

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 fifth grade, the students will continue building a knowledge base, through investigation in the areas of life, physical, and earth science. Using this knowledge base, they will begin to apply scientific concepts to the world around them.

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 hypothesis and conduct experiment 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 other.
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 identify processes that alter the earth's surface, and demonstrate cause and effect relationships.
    a. The learner will describe and identify surface features.
    b. The learner will identify basic minerals.
    c. The learner will identify and explain the formation of rocks.
    d. The learner will investigate how rocks are broken down to form soil.
    e. The learner will classify the different types of erosion and weathering.

Weather/Atmosphere:

1. The learner will investigate what makes up weather and identify causes of different weather patterns.
    a. The learner will investigate the composition and characteristics of the atmosphere.
    b. The learner will describe the conditions of changing weather.
    c. The learner will describe the components of the water cycle.

Hydrosphere:

1. The learner will describe the types and effect of human activities on the hydrosphere.
    a. The learner will describe the origins of pollution in the hydrosphere.
    b. The learner will describe how pollution affects the hydrosphere.
    c. The learner will identify man-made structures that impact the hydrosphere.

Life Science:

1. The learner will examine the relationship of living and non-living things within various ecosystems and biomes.
    a. The learner will classify living and non-living things within an ecosystem and biome.
    b. The learner will describe common patterns of relationships among living and non-living things
    c. The learner will predict the effects of population changes within the food web.
    d. The learner will describe the likely succession of a given ecosystem over time.
2. The learner will describe the function and structure of various systems within multi-celled organisms.
    a. The learner will identify the organs and their functions with the endocrine and reproductive systems.
    b. The learner will identify all the major structures and their basic functions within the skin, skeletal, muscular, nervous, digestive, excretory, reproductive, circulatory and endocrine systems.
    c. The learner will compare and contrast how selected systems work together in plants and animals.

3. The learner will compare and contrast animals using a classification system.
    a. The learner will classify organisms into major groups based on their structure.

Physical Science:

1. The learner will classify types of matter and the changes they undergo.
    a. The learner will identify and explain common physical changes in materials.
    b. The learner will identify and explain common chemical changes in materials.
    c. The learner will classify substances as elements, compounds, mixtures or solutions.
2. The learner will investigate the different energy waves.
    a. The learner will identify light, sound, and electrical waves and explore movement of energy.
3. The learner will investigate the laws of motion to design and create a machine to solve an everyday problem.
    a. The learner will create compound machines.
    b. The learner will identify complex machines.
    c. The learner will use scientific measurements to describe the size of an object using length, weight, mass, area or volume.
    d. The learner will design strategies for moving objects by application of forces.
4. The learner will investigate how magnetism and electricity are related.
    a. The learner will design an electromagnet.

Space:

1. The learner will investigate the effect of the Earth and Moon on each other.
    a. The learner will illustrate how ocean tides are affected by the moon.
    b. The learner will describe the effect of Earth's

gravitational pull on the moon.

2. The learner will identify the major constellations and their relationship to each other in the night sky.
   a. The learner will describe the relationship between the constellations in the night sky and the seasons of the year.
3. The learner will compare and contrast space phenomenon.
   a. The learner will investigate characteristics of meteors.
   b. The learner will investigate characteristics of comets.
   c. The learner will investigate characteristics of asteroids.
4. The learner will research space exploration.
   a. The learner will use technology to create a research project involving space exploration.

Scope:

Earth Science:

I.GEOSPHERE:

A. Surface features
   1. Mountains
      a) Ranges
      b) Volcanoes
   2. Plains
   3. Plateaus
   4. Deserts
   5. Glaciers

B. Earth materials
   1. Minerals
   2. Rocks
      a.) Formation
   3. Soil

a.) Formation
b.) Erosion
c.) Weathering

II. WEATHER AND ATMOSPHERE

A. Atmosphere
1. Composition – layers
a.) Stratosphere
b.) Mesosphere
c.) Thermosphere
d.) Exosphere
e.) Troposphere
f.) Ionosphere
2. Characteristics
a.) Oxygen
b.) Nitrogen
c.) CO_2
d.) Density
e.) Water vapor

B. Weather
1. Conditions
a.) Temperature
b.) Precipitation
c.) Wind
d.) Pressure
e.) Air masses
f.) Fronts
2. Water Cycle
a.) Evaporation
b.) Precipitation
c.) Condensation
d.) Transpiration

HYDROSPHERE

A. Human activities
   1. Pollution (air, water, land)
   2. Man made structures
      a.) Dams
      b.) Filtration

LIFE SCIENCE:

A. Ecosystems
   1. Components
      a.) Living
      b.) Non-living
   2. Ecological relationships
      a.) Predator/prey relationships
   3. Energy flow
      a.) Population
      b.) Food web/food chains
      c.) Energy pyramid
      d.) Producers/consumers
   4. Biomes
      a.) Habitats
      b.) Climate
         1.) Taiga
         2.) Tundra
         3.) Desert
         4.) Rain forest
         5.) Temperate forest
         6.) Grasslands
   5. Succession
      a.) Changes over time
      b.) Extinction
      c.) Endangerment

B. Multi-celled organisms
   1. Human body
      a.) Organs
      b.) Organ functions
         1.) Reproductive
         2.) Endocrine
      c.) Structures and functions
         1.) Skin
         2.) Skeletal
         3.) Muscular
         4.) Nervous
         5.) Digestive
         6.) Excretory
         7.) Reproductive
         8.) Circulatory
         9.) Endocrine
   2. Plants and animals
      a.) Reproductive
   3. Classification of animals
      a.) Structure
         1.) Family
         2.) Skeletal
         3.) Covering
         4.) Habitat

PHYSICAL SCIENCE:

A. Matter
   1. Changes
      a.) Chemical
      b.) Physical
   2. Substances
      a.) Elements
      b.) Compounds
      c.) Mixtures
      d.) Solutions

3. Energy waves
    a.) Light
    b.) Sound
    c.) Electrical
    d.) Movement
4. Motion
    a.) Compound machines
    b.) Complex machines
    c.) Measurements
        1.) Lengths
        2.) Weight
        3.) Mass
        4.) Area
        5.) Volume
    d.) Application of forces
5. Magnetism and electricity
    a.) Electromagnet

SPACE:

A. Earth and Moon
    1. Ocean tides
    2. Gravitational pull
B. Major constellation according to seasons
    1. Big Dipper
    2. Little Dipper
    3. Cassiopeia
    4. Orion
    5. Cepheus
C. Night sky viewing
    1. Spring rotation
    2. Summer rotation
    3. Autumnal rotation
    4. Winter rotation
D. Space Phenomenon
    1. Meteors
    2. Comets
    3. Asteroids

E. Space Exploration
(Research opportunity)

Instructional Criteria

1. Students will recognize and use laboratory equipment responsibly.
2. Students will develop note taking and outlining skills.
3. Students will apply the scientific method to lab experiments.
4. Students will use measurement devices.
5. Students will apply the use of the metric system in scientific conversions.
6. Students will develop strategies and skills for information gathering and problem solving.
7. Students will construct charts and graphs and prepare summaries of observations.
8. Students will generate scientific questions about the world based on observations.
9. Students will develop solutions to unfamiliar problems through reasoning.
10. Students will group or organize objects or events into categories based on specific criteria.
11. Students will make a physical model or representation of a process or structure.
12. Students will use technology to investigate a scientific concept.

Textbook Recommendation

Harcourt Brace "Science" Rating: 4.625 out of 5.0

Strengths:

- Virtual field trips
- Science news stories
- Video introductions
- Hands-on experiments

Weaknesses:

- Doesn't include some of the layers of the atmosphere.
- Doesn't discuss soil formation
- Doesn't discuss constellations, night sky viewing, and seasonal rotation.