

# Science

## Grade 4

### **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 fourth grade, the students will identify and explore a variety of topics in life, physical, earth and space sciences. Their scientific curiosity will be fostered through active participation, critical thinking and problem solving.

### **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 land formations, natural resources and their practical uses with the world.
  - a. The learner will identify various land formations by using pictures and maps.
  - b. The learner will define what natural resources are.
  - c. The learner will describe practical uses for the natural resources.

#### **Weather/Atmosphere:**

1. The learner will identify the layers of the atmosphere and recognize where weather occurs.
  - a. The learner will compare and contrast the four layers of the atmosphere: troposphere, stratosphere, mesosphere, and thermosphere.
  - b. The learner will distinguish that weather only occurs in the troposphere.

#### **Hydrosphere:**

1. The learner will identify the locations, sources and uses of water.
  - a. The learner will describe how rain water in Michigan reaches the ocean.
  - b. The learner will identify oceans, rivers, lakes, ground water, and glaciers using maps, diagrams, and charts.
  - c. The learner will identify the Great Lakes and explain their impact on Michigan.
  - d. The learner will describe the uses of water.

## **Life Science:**

1. The learner will demonstrate an understanding of the parts of plants and their functions including photosynthesis.
  - a. The learner will identify edible plant parts.
  - b. The learner will discover how plants make their own food.
2. The learner will describe the parts of a single cell.
  - a. The learner will identify the parts of an animal cell.
  - b. The learner will identify the parts of a plant cell.
3. The learner will identify and locate tissues, organs and systems within a multi-celled organism.
  - a. The learner will describe the relationship between cells, tissues, and organs.
  - b. The learner will identify the human body systems, the main organ in each system.

## **Physical Science:**

1. The learner will explore different forms of energy.
  - a. The learner will identify the energy source and the real world application.
2. The learner will investigate how mass effects various forms of motion.
  - a. The learner will describe or compare motions of common objects in terms of speed and direction.
  - b. The learner will describe that forces (pushes or pulls) are needed to speed up, slow down, stop or change direction of an object.
3. The learner will identify simple machines and how they relate to everyday life.
  - a. The learner will use simple machines to make work easier.

- b. The learner will construct a simple machine and explain its practical applications to everyday life.
4. The learner will compare and contrast current and static electricity.
  - a. The learner will understand the difference between the positive and negative charges.
  - b. The learner will explain how static electricity creates lightening.
  - c. The learner will investigate conductors and insulators.
  - d. The learner will describe possible electrical hazards to be avoided.

## **Space:**

1. The learner will investigate the reason for seasons, phases of the moon and the planets.
  - a. The learner will understand why seasons occur.
  - b. The learner will understand how and why lunar phases occur.
  - c. The learner will identify the planets of the solar system.
  - d. The learner will compare and contrast the characteristics of the planets.

## **Scope:**

### **Earth Science:**

#### **I. Geosphere:**

##### **A. Formations**

1. Mountain
2. Mountain range
3. Plateau - mesa
4. Plain
5. Basin
6. Valley

7. Island
8. Sand dunes
9. Peninsula
- B. Natural resources
  1. Definition - useful things the earth produces
  2. Practical uses
  3. Oil -> gasoline
  4. Natural gas
  5. Sand -> glass
  6. Ores -> metal
  7. Gravel -> concrete
  8. Coal for energy
  9. Plants and trees
  10. Animals

## **II. Weather/Atmosphere**

### **A. Atmosphere**

#### **1. Layers**

- a. troposphere
- b. stratosphere
- c. mesosphere
- d. thermosphere

#### **2. Weather**

- a. troposphere

## **III. Hydrosphere:**

### **A. Location - sources**

1. Wells
2. Ground water
3. Springs
4. Great Lakes
5. Rivers
6. Oceans
7. Glaciers
8. Precipitation

### **B. Uses**

1. Domestic

- a. Drinking
- b. Cleaning
- c. Food preparation
- d. Cooling
- 2. Public
  - a. Recreation
  - b. Generate electricity
  - c. Irrigation
  - d. Transportation
- 3. Michigan
  - a. Path of rainwater to ocean (water cycle).
  - b. Great Lakes.
    - 1. Impact.
      - a.) Generate weather patterns.
      - b.) Ecosystems.

## **Life Science:**

### **I. Plants**

#### **A. Parts**

- 1. Roots
- 2. Stem
- 3. Leaves
- 4. Flowers
- 5. Fruits
- 6. Seeds

#### **B. Processes**

- 1. Pollination
- 2. Photosynthesis

### **II. Single cell**

#### **A. Plant/animal**

##### **1. Parts**

- a. Cell wall
- b. Cell membrane
- c. Nuclear
- d. Cytoplasm
- e. Chloroplast

### **III. Multi-cell**

#### **A. Tissue**

- B. Organ
- C. System
  - 1. Nervous-brain
  - 2. Circulatory - heart
  - 3. Respiratory - lung
  - 4. Digestive - stomach/intestine
  - 5. Skeletal - bones/muscles
  - 6. Excretory - kidneys
  - 7. Skin - skin

## **Physical Science:**

### **I. Energy sources and application**

- 1. Solar energy - heat
- 2. Sound - music
- 3. Food energy - exercise
- 4. Electrical - appliances
- 5. Wind - windmill
- 6. Water - dams, waterwheels
- 7. Mechanical energy - wind-up toy

### **II. Motion**

- 1. Forces - pushes/pulls
- 2. Inertia
- 3. Gravity
- 4. Friction - resistance to motion

### **III. Work**

- 1. Distance x effort = work

### **IV. Simple Machines**

- 1. Incline plan - stairs
- 2. Levers - spoon
- 3. Pulleys - window blinds
- 4. Gears - bike

5. Wheel and axle - door knob
6. Screw - jar lid
7. Wedge - knife

## V. Electricity

1. Current
  - a. Positive - negative charges
  - b. Magnetic poles (repel, attract)
  - c. Insulators, conductors
  - d. Magnetic field
  - e. Open/closed circuits
2. Static
  - a. Lightening
3. Safety

## Space:

### I. Seasons

#### A. Earth

1. Tilt
2. Rotation
3. Revolution

#### B. Lunar phases

1. New moon
2. Crescent moon
3. Quarter moon
4. Gibbous moon
5. Full moon
  - a.) Waxing - getting larger
  - b.) Waning - getting smaller
6. Eclipse

#### C. Planets

1. Mercury
2. Venus
3. Earth
4. Mars
5. Jupiter
6. Saturn
7. Uranus

8. Neptune
9. Pluto

## Instructional Criteria

1. Students will use research techniques (internet, periodicals, and reference books) to investigate scientific concepts.
2. Students will have the ability to compare and contrast.
3. Students will perform experiments independently and within group settings.
4. Students will experience an actual or virtual dissection of a plant
5. Students will construct and explain a multi-dimensional project.
6. Students will comprehend vocabulary.
7. Students will use charts, graphs, and tables to illustrate scientific data.
8. Students will use maps to analyze the earth's features.
9. Students will develop note taking and outlining skills.
10. Students will demonstrate the ability to use laboratory equipment.
11. Students will apply the use of the metric system including units and approximate sizes.

## Textbook Recommendations

**McGraw – Hill      “Science”      Rating: 5.0 out of 5.0**

**Strengths:**

Flows extremely well with the revised curriculum  
It contains inclusive materials such as school to home activities, reading in science resources and addresses many learning styles.

**Weaknesses:**

Some questions were too challenging for the students  
Assessments are good, but because this series offers too much information, a teacher will need to create a new assessment