

# Science

## Grades K-2

1. Students explain and apply the Catholic Church's teachings as they relate to issues in science.
2. Students identify themes, relationships, and characteristics that unify science processes and concepts.
  - A. Systems, order and organization
  - B. Evidence, models and explanation
  - C. Constancy, change, and measurement
  - D. Evolution and equilibrium
  - E. Form and function
3. Students demonstrate an understanding of scientific principles, which govern physical, life and earth sciences.
4. Students relate past scientific accomplishments and the evolution of theories to the process of a better understanding of the principles of our universe
  - A. Science as a human endeavor
    - 1) Give examples of contributions made by scientists throughout the history of science and technology.
    - 2) Explain why the body of scientific knowledge will continue to expand and will never be finished.
    - 3) Give examples of people who chose science as a career.
  - B. Historical perspective
    - 1) Recognize that diverse cultures have contributed scientific knowledge and technological inventions throughout history.
    - 2) Conclude that changes in science occur in small modifications to existent knowledge.
5. Students demonstrate their ability to think critically, to pose significant questions, to draw conclusions, and to apply those conclusions to everyday life.
  - A. Nature of science
    - 1) Recognize that people continue inventing new ways of doing things, solving problems, and getting work done.
    - 2) Show how science and technology have greatly improved food quality and quantity, transportation, health, sanitation, and communication.
  - B. Understanding scientific inquiry
    - 1) Categorize questions into what is known, what is not known, and what questions need to be explored.
    - 2) Use appropriate experiments depending on the questions to be explored.
    - 3) Choose appropriate equipment and tools to conduct an experiment.
    - 4) Develop explanations by using observations and experiments.
    - 5) Present the results of experiments.

- C. Application to daily life
  - 1) Use scientific knowledge to influence decisions about personal health.
  - 2) Distinguish between new ideas and inventions that are helpful and those that are harmful.
  - 3) Distinguish between objects that occur in nature and those designed and made by people to solve human problems and to enhance the quality of life.
  
- 6. Students use appropriate skills, tools, and technology to design and conduct scientific investigations and to draw conclusions from these investigations.
  - A. Abilities necessary to do scientific inquiry
    - 1) Ask appropriate questions about organisms and events in the environment.
    - 2) Design and conduct a scientific investigation.
    - 3) Use five senses to make observations.
    - 4) Employ equipment and tools to gather data and extend the sensory observations.
    - 5) Use data, including numbers and graphs, to explain observations and experiments.
    - 6) Communicate observations and experiments in oral and written formats.
    - 7) Utilize safety procedures during experiments.
  - B. Abilities of technological design
    - 1) Identify a simple problem.
    - 2) Propose a solution.
    - 3) Implement proposed solutions.
    - 4) Evaluate a product or design.
    - 5) Communicate a problem, design, and solution.
  - C. Understanding about science and technology
    - 1) Explore ways that people, alone or in groups invent new ways to solve problems and get work done.
    - 2) Emphasize technology in the classroom by solving problem based on knowledge construction.
  
- 7. Students communicate scientific information effectively in the written, graphic and verbal form, using technology when appropriate.
  - A. Communication skills
    - 1) Draw and label diagrams.
    - 2) Keep accurate records of experiments – data collection.
    - 3) Write reports.
    - 4) Make charts and graphs.
    - 5) Give oral presentations
    - 6) Create displays.
  - B. Use of modern technology in communication

## **PHYSICAL SCIENCE**

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- A. Properties of objects and materials
  - 1) Observe, describe, and classify objects by properties (size, weight, shape, color, texture, and temperature).
  - 2) Measure properties of objects using appropriate materials, tools, and technology.
  - 3) Observe and describe the objects by the properties of the materials from which they are made (paper, wood, metal).
  - 4) Describe the properties of the different states of matter and identify the conditions that cause matter to change states.
- B. Position and motion of objects
  - 1) Observe and describe the position of an object relative to another object or the background.
  - 2) Explore and recognize that the position and motion of objects can be changed by pushing or pulling (force) over time.
  - 3) Describe an object's motion by tracing and measuring its position over time.
  - 4) Investigate and describe how the motion of an object is related to the strength of the force (pushing or pulling) and the mass of the object.
  - 5) Experiment and communicate how vibrations of objects produce sound and how changing the rate of vibration varies the pitch.
- C. Light, heat, electricity, and magnetism
  - 1) Investigate and describe how light travels and what happens when light strikes an object (reflection, refraction, and absorption).
  - 2) Investigate and describe how electricity travels in a circuit.
  - 3) Explore and describe simple energy transformations.
  - 4) Explore and describe the uses of energy at school, home, and play.

## **LIFE SCIENCE**

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- A. Characteristics of organisms
  - 1) Distinguish between living and nonliving things.
  - 2) Identify the needs of plants and animals, based on age-appropriate recorded observations.
  - 3) Locate and compare major plant and animal structures and their functions.
  - 4) Recognize that there is great diversity among organisms.
  - 5) Locate major human body organs and describe their functions.
  - 6) Recognize the food groups necessary to maintain a healthy body.
- B. Life cycles of organisms
  - 1) Observe and describe the life cycles of some plants and animals.
  - 2) Observe, compare and group plants and animals according to likenesses and/or differences.
  - 3) Observe and record how the offspring of plants and animals are similar to their parents.
  - 4) Observe, record and graph student growth over time using a variety of quantitative measures (height, weight, linear measure of feet and hands, etc.).

- C. Organisms and environments
  - 1) Examine the habitats of plants and animals and determine how basic needs are met.
  - 2) Describe how the features of some plants and animals enable them to live in specific environments.
  - 3) Observe plants and animals and describe interaction or interdependence.
- D. Characteristics and changes in populations (taught in social studies)
- E. Changes in environment
  - 1) Explain that environments are the space, conditions, and factors that affect an individual's and a population's ability to survive and their quality of life.
  - 2) Distinguish between changes that occur slowly and those that occur rapidly.
  - 3) Describe the living and non-living components of an ecosystem.
  - 4) Illustrate the components of a food chain.
  - 5) Identify natural changes and ways in which humans have altered their environment, both in positive and negative ways, either for themselves or for other living things.
- F. Types of resources
  - 1) Explain that resources are things that we get from the living and nonliving environment to meet the needs and wants of a population.
  - 2) Describe different types of resources.
  - 3) Look at ways that resources can be extended through recycling and decreased use since supplies of many resources are limited.

## **EARTH AND SPACE SCIENCE**

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- A. Properties of earth materials
  - 1) Recognize earth materials as rocks, minerals, and soils.
  - 2) Explain how weather patterns and climate are influenced by the fact that approximately three-fourths of the earth's surface is covered with water.
  - 3) Observe and describe variations in soil.
  - 4) Investigate fossils and describe how they provide evidence about plants and animals that lived long ago and the environment in which they lived.
  - 5) Observe and graph daily weather.
- B. Objects in the sky
  - 1) Observe and describe the characteristics of objects in the sky.
  - 2) Demonstrate how the relationship of the earth, moon, and sun causes eclipses and moon phases.
  - 3) Observe and record the changing appearances and positions of the moon in the sky at night and determining the monthly pattern of lunar change.
  - 4) Model changes that occur because of the rotation of the earth (night and day) and the revolution of the earth around the sun (seasons).
  - 5) Identify the effects of the sun as a source of heat and light energy.
  - 6) Show ways that space travel has expanded our knowledge of the earth as well as of the universe.
- C. Changes in earth and sky
  - 1) Investigate, observe, and describe how water changes from one form to another and interacts with the atmosphere.

- 2) Investigate, observe, measure and describe changes in daily weather patterns and phenomena.
- 3) Explain how erosion affects changes in the earth.