

SCIENCE STANDARDS

Grade – Third

Standard

Benchmark

Indicators

**Earth and Space Sciences**

Students demonstrate an understanding about how Earth systems and processes interact in the geosphere resulting in the habitability of Earth. This includes demonstrating an understanding of the composition of the universe, the solar system and Earth. In addition, it includes understanding the properties and the interconnected nature of Earth's systems, processes that shape Earth and Earth's history. Students also demonstrate an understanding of how the concepts and principles of energy, matter, motion and forces explain Earth systems, the solar system and the universe. Finally, they grasp an understanding of the historical perspectives, scientific approaches and emerging scientific issues associated with Earth and space sciences.

By the end of the 3-5 program, students will...

- A. Explain the characteristics, cycles and patterns involving Earth and its place in the solar system.
- B. Summarize the processes that shape Earth's surface and describe evidence of those processes.
- C. Describe Earth's resources including rocks, soil, water, air, animals and plants and the ways in which they can be conserved.
- D. Analyze weather and changes that occur over a period of time.

- 1. Compare distinct properties of rocks (e.g., color, layering and texture).
- 2. Observe and investigate that rocks are often found in layers.
- 3. Describe that smaller rocks come from the breakdown of larger rocks through the actions of plants and weather.
- 4. Observe and describe the composition of soil (e.g., small pieces of rock and decomposed pieces of plants and animals, and products of plants and animals).
- 5. Investigate the properties of soil (e.g., color, texture, capacity to retain water, ability to support plant growth).
- 6. Investigate that soils are often found in layers and can be different from place to place.

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By the end of the 3-5 program, students will...

**Life Sciences**

Students demonstrate an understanding of how living systems function and how they interact with the physical environment. This includes an understanding of the cycling of matter and flow of energy in living systems. An understanding of the characteristics, structure and function of cells, organisms and living systems will be developed. Students will also develop a deeper understanding of the principles of heredity, biological evolution, and the diversity and interdependence of life. Students demonstrate an understanding of different historical perspectives, scientific approaches and emerging scientific issues associated with the life sciences.

- A. Differentiate between the life cycles of different plants and animals.
- B. Analyze plant and animal structures and functions needed for survival and describe the flow of energy through a system that all organisms use to survive.
- C. Compare changes in an organism's ecosystem/habitat that affect its survival.

1. Compare the life cycles of different animals including birth to adulthood, reproduction and death (e.g., egg-tadpole-frog, egg-caterpillar-chrysalis-butterfly).
2. Relate animal structures to their specific survival functions (e.g., obtaining food, escaping or hiding from enemies).
3. Classify animals according to their characteristics (e.g., body coverings and body structure).
4. Use examples to explain that extinct organisms may resemble organisms that are alive today.
5. Observe and explore how fossils provide evidence about animals that lived long ago and the nature of the environment at that time.
6. Describe how changes in an organism's habitat are sometimes beneficial and sometimes harmful.

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**Physical Sciences**

Students demonstrate an understanding of the composition of physical systems and the concepts and principles that describe and predict physical interactions and events in the natural world. This includes demonstrating an understanding of the structure and properties of matter, the properties of materials and objects, chemical reactions and the conservation of matter. In addition, it includes understanding the nature, transfer and conservation of energy; motion and the forces affecting motion; and the nature of waves and interactions of matter and energy. Students demonstrate an understanding of the historical perspectives, scientific approaches and emerging scientific issues associated with the physical sciences.

By the end of the 3-5 program, students will...

- A. Compare the characteristics of simple physical and chemical changes.
- B. Identify and describe the physical properties of matter in its various states.
- C. Describe the forces that directly affect objects and their motion.
- D. Summarize the way changes in temperature can be produced and thermal energy transferred.
- E. Trace how electrical energy flows through a simple electrical circuit and describe how the electrical energy can produce thermal energy, light, sound and magnetic forces.
- F. Describe the properties of light and sound energy.

- 1. Describe an objects position by locating it relative to another object or the background.
- 2. Describe an objects motion by tracing and measuring its position over time.
- 3. Identify contact/noncontact forces that affect motion of an object (e.g., gravity, magnetism and collision).
- 4. Predict the changes when an object experiences a force (e.g., a push or pull, weight and friction).

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**Science and Technology**

Students recognize that science and technology are interconnected and that using technology involves assessment of the benefits, risks and costs. Students should build scientific and technological knowledge, as well as the skill required to design and construct devices. In addition, they should develop the processes to solve problems and understand that problems may be solved in several ways.

By the end of the 3-5 program, students will...

- A. Describe how technology affects human life.
- B. Describe and illustrate the design process.

1. Describe how technology can extend human abilities (e.g., to move things and to extend senses).
2. Describe ways that using technology can have helpful and/or harmful results.
3. Investigate ways that the results of technology may affect the individual, family and community.
4. Use a simple design process to solve a problem (e.g., identify a problem, identify possible solutions and design a solution).
5. Describe possible solutions to a design problem (e.g., how to hold down paper in the wind).

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**Scientific Inquiry**

Students develop scientific habits of mind as they use the processes of scientific inquiry to ask valid questions and to gather and analyze information. They understand how to develop hypotheses and make predictions. They are able to reflect on scientific practices as they develop plans of action to create and evaluate a variety of conclusions. Students are also able to demonstrate the ability to communicate their findings to others.

By the end of the 3-5 program, students will...

- A. Use appropriate instruments safely to observe, measure and collect data when conducting a scientific investigation.
- B. Organize and evaluate observations, measurements and other data to formulate inferences and conclusions.
- C. Develop, design and safely conduct scientific investigations and communicate the results.

- 1. Select the appropriate tools and use relevant safety procedures to measure and record length and weight in metric and English units.
- 2. Discuss observations and measurements made by other people.
- 3. Read and interpret simple tables and graphs produced by self/others.
- 4. Identify and apply science safety procedures.
- 5. Record and organize observations (e.g., journals, charts and tables).
- 6. Communicate scientific findings to others through a variety of methods (e.g., pictures, written, oral and recorded observations).

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**Scientific Ways of Knowing**

Students realize that the current body of scientific knowledge must be based on evidence, be predictive, logical, subject to modification and limited to the natural world. This includes demonstrating an understanding that scientific knowledge grows and advances as new evidence is discovered to support or modify existing theories, as well as to encourage the development of new theories. Students are able to reflect on ethical scientific practices and demonstrate an understanding of how the current body of scientific knowledge reflects the historical and cultural contributions of women and men who provide us with a more reliable and comprehensive understanding of the natural world.

By the end of the 3-5 program, students will...

- A. Distinguish between fact and opinion and explain how ideas and conclusions change as new knowledge is gained.
- B. Describe different types of investigations and use results and data from investigations to provide the evidence to support explanations and conclusions.
- C. Explain the importance of keeping records of observations and investigations that are accurate and understandable.
- D. Explain that men and women of diverse countries and cultures participate in careers in all fields of science.

- 1. Describe different kinds of investigations that scientists use depending on the questions they are trying to answer.
- 2. Keep records of investigations and observations and do not change the records that are different from someone else's work.
- 3. Explore through stories how men and women have contributed to the development of science.
- 4. Identify various careers in science.
- 5. Discuss how both men and women find science rewarding as a career and in their everyday lives.