

SCIENCE STANDARDS

Grade – Second

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 K-2 program, students will...

- A. Observe constant and changing patterns of objects in the day and night sky.
- B. Explain that living things cause changes on Earth.
- C. Observe, describe and measure changes in the weather, both long term and short term.
- D. Describe what resources are and recognize some are limited but can be extended through recycling or decreased use.

- 1. Recognize that there are more stars in the sky than anyone can easily count.
- 2. Observe and describe how the sun, moon and stars all appear to move slowly across the sky.
- 3. Observe and describe how the moon appears a little different every day but looks nearly the same again about every four weeks.
- 4. Observe and describe that some weather changes occur throughout the day and some changes occur in a repeating seasonal pattern.
- 5. Describe weather by measurable quantities such as temperature and precipitation.

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By the end of the K-2 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. Discover that there are living things, non-living things and pretend things, and describe the basic needs of living things (organisms).
- B. Explain how organisms function and interact with their physical environment.
- C. Describe similarities and differences that exist among individuals of the same kind of plants and animals.

1. Explain that animals, including people, need air, water, food, living space and shelter; plants need air, water, nutrients (e.g., minerals), living space and light to survive.
2. Identify that there are many distinct environments that support different kinds of organisms.
3. Explain why organisms can survive only in environments that meet their needs (e.g., organisms that once lived on Earth have disappeared for different reasons such as natural forces or human-caused effects).
4. Compare similarities and differences among individuals of the same kind of plants and animals, including people.
5. Explain that food is a basic need of plants and animals (e.g., plants need sunlight to make food and to grow, animals eat plants and/or other animals for food, food chain) and is important because it is a source of energy (e.g., energy used to play, ride bicycles, read, etc.).
6. Investigate the different structures of plants and animals that help them live in different environments (e.g., lungs, gills, leaves and roots).

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different kinds of Ohio plants and animals and some of the ways animals depend on plants and each other.
8. Compare the activities of Ohio's common animals (e.g., squirrels, chipmunks, deer, butterflies, bees, ants, bats and frogs) during the different seasons by describing changes in their behaviors and body covering.
9. Compare Ohio plants during the different seasons by describing changes in their appearance.

By the end of the K-2 program, students will...

7. Compare the habitats of many

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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 K-2 program, students will...

- A. Discover that many objects are made of parts that have different characteristics. Describe these characteristics and recognize ways an object may change.
- B. Recognize that light, sound and objects move in different ways.
- C. Recognize sources of energy and their uses.

1. Explore how things make sound (e.g., rubber bands, tuning fork and strings).
2. Explore and describe sounds (e.g., high, low, soft and loud) produced by vibrating objects.
3. Explore with flashlights and shadows that light travels in a straight line until it strikes an object.

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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 K-2 program, students will...

- A. Explain why people, when building or making something, need to determine what it will be made of, how it will affect other people and the environment.
- B. Explain that to construct something requires planning, communication, problem solving and tools.

- 1. Explain that developing and using technology involves benefits and risks.
- 2. Investigate why people make new products or invent new ways to meet their individual wants and needs.
- 3. Predict how building or trying something new might affect other people and the environment.
- 4. Communicate orally, pictorially, or in written form the design process used to make something.

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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 K-2 program, students will...

- A. Ask a testable question.
- B. Design and conduct a simple investigation to explore a question.
- C. Gather and communicate information from careful observations and simple investigation through a variety of methods.

1. Ask "how can I/we" questions.
2. Ask "how do you know" questions (not "why" questions) in appropriate situations and attempt to give reasonable answers when others ask questions.
3. Explore and pursue student-generated "how" questions.
4. Use appropriate safety procedures when completing scientific investigations.
5. Use evidence to develop explanations of scientific investigations. (What do you think? How do you know?)
6. Recognize that explanations are generated in response to observations, events and phenomena.
7. Use appropriate tools and simple equipment/instruments to safely gather scientific data (e.g., magnifiers, non-breakable thermometers, timers, rulers, balances and calculators and other appropriate tools).
8. Measure properties of objects using tools such as rulers, balances and thermometers.
9. Use whole numbers to order, count, identify, measure and describe things and experiences.

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By the end of the K-2 program,
students will...

10. Share explanations with others to
provide opportunities to ask questions,
examine evidence and suggest
alternative explanations.do you know?)

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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 K-2 program, students will...

- A. Recognize that there are different ways to carry out scientific investigations. Realize that investigations can be repeated under the same conditions with similar results and may have different explanations.
- B. Recognize the importance of respect for all living things.
- C. Recognize that diverse groups of people contribute to our understanding of the natural world.

- 1. Describe that scientific investigations generally work the same way under the same conditions.
- 2. Explain why scientists review and ask questions about the results of other scientists' work.
- 3. Describe ways in which using the solution to a problem might affect other people and the environment.
- 4. Demonstrate that in science it is helpful to work with a team and share findings with others.