

SCIENCE STANDARDS

Grade – Kindergarten

Standard

Benchmark

Indicators

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**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. Observe that the sun can be seen only in the daytime, but the moon can be seen sometimes at night and sometimes during the day.
- 2. Explore that animals and plants cause changes to their surroundings.
- 3. Explore that sometimes change is too fast to see and sometimes change is too slow to see.
- 4. Observe and describe day-to-day weather changes (e.g., today is hot, yesterday we had rain).
- 5. Observe and describe seasonal changes in weather.

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**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.

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

- 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. Explore differences between living and non-living things (e.g., plant-rock).
2. Discover that stories (e.g., cartoons, movies, comics) sometimes give plants and animals characteristics they really do not have (e.g., talking flowers).
3. Describe how plants and animals usually resemble their parents.
4. Investigate variations that exist among individuals of the same kind of plant or animal.
5. Investigate observable features of plants and animals that help them live in different kinds of places.
6. Investigate the habitats of many different kinds of local plants and animals and some of the ways in which animals depend on plants and each other in our community.

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---

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

**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.

- 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. Demonstrate that objects are made of parts (e.g., toys, chairs).
2. Examine and describe objects according to the materials that make up the object (e.g., wood, metal, plastic and cloth).
3. Describe and sort objects by one or more properties (e.g., size, color and shape).
4. Explore that things can be made to move in many different ways such as straight, zigzag, up and down, round and round, back and forth, or fast and slow.
5. Investigate ways to change how something is moving (e.g., push, pull).

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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. Explore that objects can be sorted as "natural" or "man-made".
2. Explore that some materials can be used over and over again (e.g., plastic or glass containers, cardboard boxes and tubes).
3. Explore that each kind of tool has an intended use, which can be helpful or harmful (e.g., scissors can be used to cut paper but they can also hurt you).

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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 "what if" questions.
2. Explore and pursue student-generated "what if" questions.
3. Use appropriate safety procedures when completing scientific investigations.
4. Use the five senses to make observations about the natural world.
5. Draw pictures that correctly portray features of the item being described.
6. Recognize that numbers can be used to count a collection of things.
7. Use appropriate tools and simple equipment/instruments to safely gather scientific data (e.g., magnifiers and other appropriate tools).
8. Measure the lengths of objects using non-standard methods of measurement (e.g., teddy bear counters and pennies).
9. Make pictographs and use them to describe observations and draw conclusions.
10. Make new observations when people give different descriptions for the same thing.

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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. Recognize that scientific investigations involve asking open ended questions. (How? What if?)
- 2. Recognize that people are more likely to accept your ideas if you can give good reasons for them.
- 3. Interact with living things and the environment in ways that promote respect.
- 4. Demonstrate ways science is practiced by people everyday (children and adults).