

Science Benchmark:

The Sun is one of billions of stars in the Milky Way Galaxy; that is one of billions of galaxies in the universe. Scientists use a variety of tools to investigate the nature of stars, galaxies and the universe. Historically, cultures have observed objects in the sky and understood and used them in various ways.

STANDARD IV:

Students will understand the scale of size, distance between objects, movements, and apparent motion (due to Earth's rotation) of objects in the universe and how cultures have understood, related to and used these objects in the night sky.

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Objective 1: Compare the size and distance of objects within the systems in the universe.

- a. Use the speed of light as a measuring standard to describe the relative distances to objects in the universe (e.g., 4.4, light years to star alpha Centauri; 0.00002 light years to the sun).
- b. Compare the distances between objects in the solar system.
- c. Compare the size of the Solar System to the size of the Milky Way Galaxy.
- d. Compare the size of the Milky Way Galaxy to the size of the known universe.

Objective 2: Describe the appearance and apparent motion of groups of stars in the night sky relative to Earth how various cultures have understood and used them.

- a. Locate and identify stars that are grouped in patterns in the night sky.
- b. Identify ways people have historically grouped stars in the night sky.
- c. Recognize that stars in a constellation are not all the same distance from Earth.
- d. Relate the seasonal change in the appearance of the night sky to Earth's position.
- e. Describe ways that familiar groups of stars may be used for navigation and calendars.

Science language students should use:

Galaxy, constellation, Milky Way Galaxy, speed of light, universe, light years, distance, star, Sun

Intended Learning Outcomes For Sixth Grade Science

The Intended Learning Outcomes (ILOs) describe the skills and attitudes students should learn as a result of science instruction. They are an essential part of the Science Core Curriculum and provide teachers with a standard for evaluation of student learning in science. Instruction should include significant science experiences that lead to student understanding using the ILOs.

The main intent of science instruction in Utah is that students will value and use science as a process of obtaining knowledge based upon observable evidence.

By the end of sixth grade students will be able to:

1. Use Science Process and Thinking Skills

- a. Observe simple objects, patterns, and events, and report their observations.
- b. Sort and sequence data according to criteria given
- c. Given the appropriate instrument, measure length, temperature, Volume, and mass in metric units as specified.
- d. Compare things, processes, and events.
- e. Use classification systems.
- f. Plan and conduct simple experiments.
- g. Formulate simple research questions.
- h. Predict results of investigations based on prior data.
- i. Use data to construct a reasonable conclusion.

2. Manifest Science Attitudes and Interests

- a. Demonstrate a sense of curiosity about nature.
- b. Voluntarily read or look at books and other materials about science.
- c. Pose questions about objects, events, and processes.
- d. Maintain an open and questioning mind toward new ideas and alternative points of view.
- e. Seek and weigh evidence before drawing conclusions.
- f. Accept and use scientific evidence to help resolve ecological problems.

3. Understand Science Concepts and Principles

- a. Know and explain science information specified for the grade level.
- b. Distinguish between examples and non-examples of concepts that have been taught.
- c. Solve problems appropriate to grade level by applying science principles and procedures.

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4. Communicate Effectively Using Science Language and Reasoning

- a. Record data accurately when given the appropriate form (e.g., table, graph, chart).
- b. Describe or explain observations carefully and report with pictures, sentences, and models.
- c. Use scientific language in oral and written communication.
- d. Use reference sources to obtain information and cite the source.
- e. Use mathematical reasoning to communicate information.

5. Demonstrate Awareness of Social and Historical Aspects of Science

- a. Cite examples of how science affects life.
- b. Understand that science investigations use a variety of methods and do not always use the same set of procedures; understand that there is not just one “scientific method.”
- c. Science findings are based upon evidence.

- **Instruction should include significant science experiences that lead to student understanding using ILOs.**