

## The Solar System Standard III

### Science Benchmark:

The solar system consists of planets, moons, and other smaller objects including asteroids and comets that orbit the sun. Planets in the solar system differ in terms of their distance from the sun, number of moons, size, composition, and ability to sustain life. Every object exerts gravitational force on every other object depending on the mass of the objects and the distance between them. The sun's gravitational pull holds Earth and other planets in orbit. Earth's gravitational force holds the moon in orbit.

### STANDARD III

Students will understand the relationship and attributes of objects in the solar system.

### STANDARD III: Students will understand the relationship and attributes of objects in the solar system.

*Objective 1:* Describe and compare the components of the solar system.

- a. Identify the planets in the solar system by name and relative location from the sun.
- b. Using references, compare the physical properties of the planets (e.g., size, solid or gaseous).
- c. Use models and graphs that accurately depict scale to compare the size and distance between objects in the solar system.
- d. Describe the characteristics of comets, asteroids, and meteors.
- e. Research and report on the use of manmade satellites orbiting Earth and various planets.

*Objective 2:* Describe the use of technology to observe objects in the solar system and relate this to science's understanding of the solar system.

- a. Describe the use of instruments to observe and explore the moon and planets
- b. Describe the role of computers in understanding the solar system (e.g., collecting and interpreting data from observations, predicting motion of objects, operating space probes).
- c. Relate science's understanding of the solar system to the technology used to investigate it.
- d. Find and report on ways technology has been and is being used to investigate the solar system.



*Objective 3:* Describe the forces that keep objects in orbit in the solar system.

- a. Describe the forces holding Earth in orbit around the sun, and the moon in orbit around Earth.
- b. Relate a celestial object's mass to its gravitational force on other objects.
- c. Identify the role gravity plays in the structure of the solar system.

**Science language students should use:**

Asteroids, celestial object, comets, planets, satellites, star, distance, force, gravity, gravitational force, mass, scale, solar system, telescope, 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.

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



---

**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 the cumulative nature of science knowledge.

**6. Understand the Nature of Science**

- a. Science is a way of knowing that is used by many people, not just scientists.
- 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.**