

STANDARD IV:

Students will understand how fossils are formed, where they may be found in Utah, and how they can be used to make inferences.

Science Benchmark:

Fossils are evidence of living organisms from the past and are usually preserved in sedimentary rocks. A fossil may be an impression left in sediments, the preserved remains of an organism, or a trace mark showing that an organism once existed. Fossils are usually made from the hard parts of an organism because soft parts decay quickly. Fossils provide clues to Earth's history. They provide evidence that can be used to make inferences about past environments. Fossils can be compared to one another, to living organisms, and to organisms that lived long ago.

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Objective 1:

Describe Utah fossils and explain how they were formed

- a. Identify features of fossils that can be used to compare them to living organisms that are familiar (e.g., shape, size, and structure of skeleton, patterns of leaves).
- b. Describe three ways fossils are formed in sedimentary rock (i.e., preserved organisms, mineral replacement of organisms, impressions of tracks).
- c. Research locations where fossils are found in Utah and construct a simple fossil map.

Objective 2:

Explain how fossils can be used to make inferences about past life, climate, geology, and environments.

- a. Explain why fossils are usually found in sedimentary rock.
- b. Based on the fossils found in various locations, infer how Utah environments have changed over time (e.g., trilobite fossils indicate that Millard County was once covered by a large shallow ocean; dinosaur fossils and coal indicate that Emery and Uintah County were once tropical and swampy).
- c. Research information on two scientific explanations for the extinction of dinosaurs and prehistoric organisms.
- d. Formulate questions that can be answered using information gathered on the extinction of dinosaurs.

Science language students should use:

Infer, environments, climate, dinosaur, preserved, extinct, extinction, impression, fossil, prehistoric, mineral, organism, replacement, trilobite, sedimentary, tropical

Intended Learning Outcomes for Fourth 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 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 fourth grade students will be able to:

1. Use Science Process and Thinking Skills

- a. Observe simple objects and patterns and report their observations.
- a. Sort and sequence data according to a given criterion.
- b. Make simple predictions and inferences based upon observation.
- c. Compare things and events.
- d. Use instruments to measure length, temperature, volume, and weight using appropriate units.
- e. Conduct a simple investigation when given directions.
- f. Develop and use simple classification systems.
- g. Use observations to construct a reasonable explanation.

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.

3. Understand Science Concepts and Principles

- a. Know science information specified for their grade level.
- b. Distinguish between examples and non-examples of science concepts taught.
- c. Explain science concepts and principles using their own words and explanations.

4. Communicate Effectively Using Science Language and Reasoning

- a. Record data accurately when given the appropriate form and format (e.g., table, graph, chart).
- b. Report observations with pictures, sentences, and models.
- c. Use scientific language appropriate to grade level in oral and written communication.
- d. Use available reference sources to obtain information

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

