

Intended Learning Outcomes for Biology

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 science instruction in high school, students will be able to:

1. Use Science Process and Thinking Skills

2. Manifest Scientific Attitudes and Interests

Raise questions about objects, events and processes that can be answered through scientific investigation.

Maintain an open and questioning mind toward ideas and alternative points of view.

Evaluate scientifically related claims against available evidence.

Reject pseudoscience as a source of scientific knowledge.

3. Demonstrate Understanding of Science Concepts, Principles and Systems

4. Communicate Effectively Using Science Language and Reasoning

5. Demonstrate Awareness of Social and Historical Aspects of Science

- a. Understand the cumulative nature of scientific knowledge.

6. Demonstrate Understanding of 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.
- d. Understand that science conclusions are tentative and therefore never final. Understandings based upon these conclusions are subject to revision in light of new evidence.
- e. Understand that scientific conclusions are based on the assumption that natural laws operate today as they did in the past and that they will continue to do so in the future.
- f. Understand the use of the term "theory" in science, and that the scientific community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence.
- g. Understand that various disciplines of science are interrelated and share common rules of evidence to explain phenomena in the natural world.
- h. Understand that scientific inquiry is characterized by a common set of values that include logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results and honest and ethical reporting of findings. These values function as criteria in distinguishing between science and non-science.
- i. Understand that science and technology may raise ethical issues for which science, by itself, does not provide solutions.