

# Life Sciences

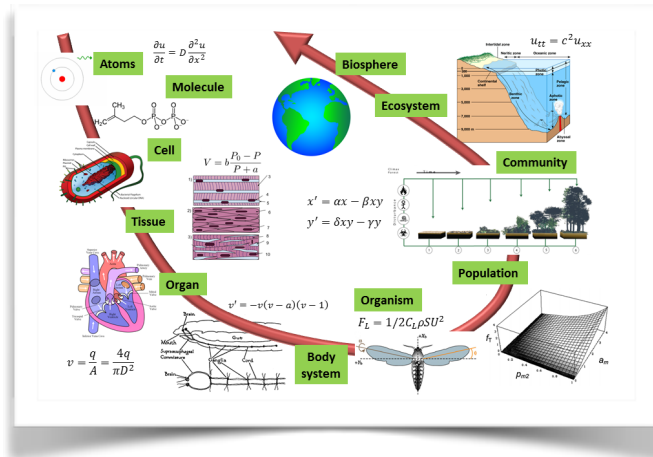
Salt Lake Community College | General Education

## Life Sciences (LS) at SLCC

- Animal Biology
- Conservation Biology
- Human Biology
- Marine Biology
- Plant Biology
- Environmental Science
- Physical Anthropology
- Nutrition

## What Do Life Scientists Study?

- Gene function and expression
- Genetic inheritance of traits
- Evolution of species
- Extinct organisms
- The origin of life
- Biodiversity
- Behavior and interactions of organisms



Laura Miller, Fair Use, QBio--Atoms to Biosphere

## Inquiry in the Life Sciences

Science is a way of knowing about the natural or social worlds. The natural sciences encompasses life and physical sciences. Life scientists study how living organisms function. The **scientific method** is a way to understand the natural world that relies on curiosity, **empirical evidence**, and logical reasoning. Empirical evidence is that which is based on observation or experience.

Life scientists study living—and once living—organisms and construct **hypotheses** to explain what they see. Scientists practice **empiricism** by conducting experiments or making observations and measurements to test their emerging understanding. All hypotheses need to be **testable**, meaning that they can be tested to see if they represent accurate or inaccurate explanations of natural phenomena. Testability separates science from belief systems, which make claims that are ultimately beyond empirical research because they are grounded in faith.

## What Do You Think?

1. Under what conditions would a laboratory study or experiment be a better approach to a question than careful observation in the field? What about the reverse? What are the relative merits of each?
2. Homeopathy, the Law of Attraction, Phrenology, and 2012 Millenarianism are examples of pseudoscience. What distinguishes science from pseudoscience? What are other examples of pseudoscience?
3. On a High Uintas camping trip, you observe plants and animals while hiking and kayaking, which sparks contemplation of our origins and relationship to the natural world. How can an understanding of the life sciences enrich your experience in the wilderness?
4. The natural and social sciences both embrace the scientific method. What do you suppose are the differences in methodology used and conclusions drawn between the natural and social sciences? Think about how their different subjects impact methods and conclusions.

In the natural sciences, large bodies of mutually reinforcing evidence and observations come together to constitute a **scientific theory**. The word “theory” in this context is different from how we use the word in everyday conversation. I may have a theory that I do better on tests when I refrain from eating breakfast before, but that’s just an unsubstantiated idea floating in my head. On the other hand, a scientific theory represents a consensus about how the world works that is well-supported by empirical evidence. Scientific theories—like climate change—should not be dismissed lightly without overwhelming counter evidence.

**Evolution** is the grand unifying theme (or theory) of the life sciences. It explains the unity of life, or how all organisms are biochemically similar due to their shared ancestry. It also explains the diversity of life and how different species have adapted to occupy different niches of the biosphere.

Like other scientists, life scientists submit their work to a process of **peer review**—the scrutiny of other scientists who strive to replicate or refute their findings—in scientific journals and at conferences. It is important that scholars try to **replicate** the findings of published research. Studies that can be replicated—that is, repeated with similar results—have more scientific credibility than do studies that cannot be replicated.



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