

Physical Sciences

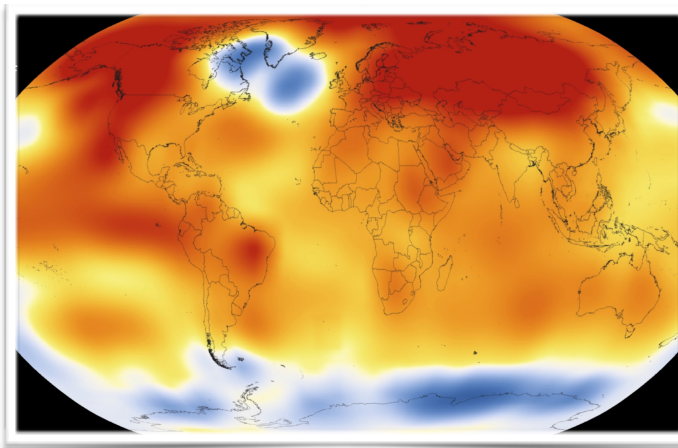
Salt Lake Community College | General Education

Physical Sciences (PS) at SLCC:

- Astronomy
- Atmospheric Science
- Chemistry
- Geography
- Geology
- Physics

What Do Physical Scientists Study?

- Rock Formation
- Plate Tectonics
- Earthquakes and Volcanoes
- Water and Carbon Cycles
- Weather and Climate
- Motion, Forces, and Gravity
- Heat, Energy, Radiation, and Magnetism
- Planets, Comets, Galaxies and the Cosmos
- Chemical Properties
- Chemical and Nuclear Reactions



NASA—Global Temperature Anomalies

Inquiry in the Physical Sciences

Science is a way of knowing about the natural or social world. The natural sciences encompasses the physical and life sciences. Physical scientists concern themselves with the physical characteristics, laws, and processes of our world, the solar system, and the broader universe. Science attempts to explain “why things are the way they are” without any misconceptions projected onto phenomena from our own beliefs about reality.

Scientists use the **scientific method**, which rests on several key foundational elements. One is **objective observation**. An observation is objective if it occurs without bias and does not differ from one observer to the next. Subjective observations—those that are conditioned by beliefs and opinions or simply by characteristics of the observer—have no place in science.

Natural scientists strive whenever possible to use observations that result in quantitative data rather than qualitative data, because **quantitative data** is typically

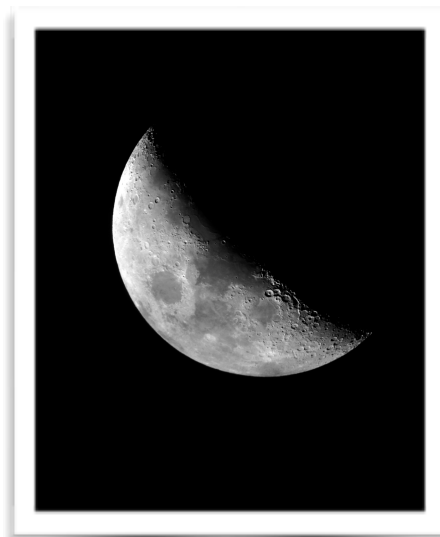
What Do You Think?

1. Under what conditions would a laboratory study or experiment be a better approach to a question than careful observation in the field? What 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. The natural sciences and the 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.
4. On a Yellowstone camping trip, you go on hikes and paddle rivers, lay out under the stars at night, and marvel at geysers and hot springs. How can an understanding of the natural sciences enrich your experience at Yellowstone?

more objective and precise. Quantitative data results from careful measurements or observations and takes the form of numbers. Qualitative observations are typically textual in nature such as descriptions of phenomena.

Scientists create tentative explanations called **hypotheses**. All hypotheses need to be **testable**, meaning that they can be tested to see if they represent accurate or inaccurate explanations of natural phenomena. The ability to test hypotheses with experiments or careful observation separates science from belief systems grounded in faith.

Science is a social process in which individuals within or across scientific disciplines collaborate to better understand the natural world by testing hypotheses through careful, objective observation. They subject 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. **Karl Popper**, the famed philosopher of science, suggested that the great achievement of science is that it is based on the progressive **falsification** of incorrect hypotheses, and the substituting of new hypotheses with greater explanatory power. Through this process we progressively gain a more complete picture of how the natural world works.



David Hubert — Moon