

Nature of Science – Understanding Science

Vocabulary

<ul style="list-style-type: none"> • Science • Observation • Inference • Hypothesis • Prediction 	<ul style="list-style-type: none"> • Scientific Theory • Scientific Law • Technology • Critical Thinking
---	--

What is Science?

- **Science** is the investigation and exploration of natural events and of the new information that results from those investigations.
- We use science in our everyday lives!

3 Branches of Science

Earth Science	Life Science	Physical science
Study of Earth, including rocks, soils, oceans, the atmosphere, surface features	Study of living things	Study of matter and energy, including physics and chemistry

Scientific Inquiry

- Process that uses a set of skills to answer questions or to test ideas about the natural world.
- Scientists follow the Scientific Method

One way to begin a scientific inquiry to observe and ask questions.

- **Observation** is the act of using one or more of your *senses* to gather information and taking notes of what occurs.
- An **inference** is a logical explanation of an observation that is drawn from *prior knowledge or experience*.
- A **prediction** is a statement of what will happen next in a sequence of events.
- A **hypothesis** is a possible explanation for an observation that can be tested by scientific investigations. (If.....then.....because).
- When we test a hypothesis, we often **test whether our predictions are true.**

- After testing our hypothesis, we can **analyze** our results using various methods.
- Once we find the relationship among data and make several inferences, we can draw conclusions.
- A **conclusion** is a summary of the information gained from testing a hypothesis.

Rules of Science

- Scientific investigation can have various outcomes, including new technology, new materials, and possible explanations as to *how* or *why* something happens.
- **Technology** is the practical use of scientific knowledge, especially for industrial or commercial use.
- Another outcome of science is the development of scientific theories and laws
- A **scientific theory** is an explanation of observations or events that is based on knowledge gained from many observations and investigations.

- A **scientific law** is a rule that describes a pattern in nature.

New Information

- Scientific information constantly changes as new information is discovered.
- If new information *supports* a current scientific theory, then it is **not** changed. The information might be published to show further support of the theory, and might lead to advancements in technology or spark new questions that lead to new investigations
- If new information *opposes*, or does not support a current scientific theory, the theory **might be modified or rejected altogether**. Often, new information will lead scientists to look at the original observations in a new way. This can lead to new investigations with a new hypothesis. These can lead to new theories.

Evaluating Scientific Information

- To determine if information is scientific or pseudoscientific (false), you should always be skeptical and identify facts, opinions, and misleading information.
- **Critical thinking** refers to comparing what you already know with the information you are given in order to decide whether you agree with it.
- Questions that deal with opinions, beliefs, values, and feelings cannot be answered through scientific investigation.
- Not all questions can be answered through scientific investigations!

Key Concept Check

1. What is scientific inquiry?
2. How do scientific laws and theories differ?
3. How do fact and opinion differ?