Observations vs. Inferences

One way scientists learn about our world is through **observation**, or the gathering of information through the five senses. Any phenomenon being studied must first be observed using sight, smell, hearing, taste, or touch.

There are two kinds of observations: *qualitative* and *quantitative*. Qualitative observations use adjectives to *describe* what you observe. The water is *cold* is an example of a qualitative observation. Quantitative observations use numbers to *measure* what you observe; for example, the water is *42°F*. In science experiments, quantitative observations can be accurately and objectively compared.

If it's difficult to quantify something, scientists find ways to turn qualitative observations into quantitative observations. Suppose you want to quantify this qualitative observation: Lemons taste sour. You could ask people to rate the "sourness" on a scale of 1 to 5. Now you can more easily compare a qualitative observation such as a lemon's sourness using numbers. This gives a quantitative result.


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In science, **inferences** are made alongside observations. While an observation is information you gather from your senses, an inference is an explanation for an observation you make. You make inferences based on your past experiences and prior knowledge.

An observation of this picture is: *The grass is wet.* An inference is: *The grass is wet because it rained.* You might also infer that the grass is wet from morning dew. When new observations are made, inferences often change. If you looked again at the photo and saw a sprinkler, then you might infer that the grass is wet from the sprinkler.

Observations and inferences allow us to describe and explain the world around us.

Do You Know?

Some things can't be observed using just our senses, such as sound waves, cells, and radiation.
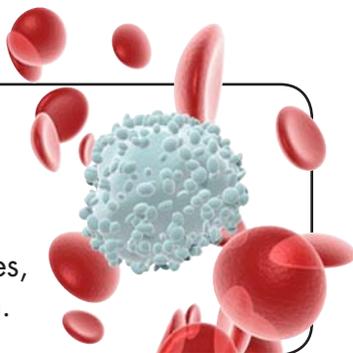
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✓ Brain Check

❏ How do we make observations?
❏ Give an example of a qualitative observation.
❏ What are inferences based on?