

Scientific Theory and Scientific Laws

Scientists often repeat scientific investigations to verify that the results for a hypothesis or a group of hypotheses are correct. This can lead to a scientific theory.

Scientific Theory The everyday meaning of the word *theory* is an untested idea or an opinion. However, a **scientific theory** is *an explanation of observations or events based on knowledge gained from many observations and investigations*. About 300 years ago, scientists began looking at samples through the first microscopes. They noticed tinier units, or cells, as shown in **Figure 3**. As more scientists observed cells in other organisms, their observations became known as the cell theory. This theory explains that all living things are made of cells. A scientific theory is assumed to be the best explanation of observations unless it is disproved. The cell theory will continue to explain the makeup of all organisms until an organism is discovered that is not made of cells.

Scientific Laws Scientific laws are different from societal laws, which are agreements on a set of behavior. A **scientific law** *describes a pattern or an event in nature that is always true*. A scientific theory might explain how and why an event occurs. But a scientific law states only that an event in nature will occur under specific conditions. For example, the law of conservation of mass states that the mass of materials will be the same before and after a chemical reaction. This scientific law does not explain why this occurs—only that it will occur.

Table 1 compares a scientific theory and a scientific law.