



Is Evolution a Theory or a Fact?

It is both. But that answer requires looking more deeply at the meanings of the words "theory" and "fact."

In everyday usage, "theory" often refers to a hunch or a speculation. When people say, "I have a theory about why that happened," they are often drawing a conclusion based on fragmentary or inconclusive evidence.

The formal scientific definition of theory is quite different from the everyday meaning of the word. It refers to a comprehensive explanation of some aspect of nature that is supported by a vast body of evidence. Many scientific theories are so well-established that no new evidence is likely to alter them substantially. For example, no new evidence will demonstrate that the Earth does not orbit around the sun (heliocentric theory), or that living things are not made of cells (cell theory), that matter is not composed of atoms (atomic theory), or that the surface of the Earth is not divided into solid plates that have moved over geological timescales (the theory of plate tectonics). Like these other foundational scientific theories, the theory of evolution is supported by so many observations and confirming experiments that scientists are confident that the basic components of the theory will not be overturned by new evidence. However, like all scientific theories, the theory of evolution is subject to continuing refinement as new areas of science emerge or as new technologies enable observations and experiments that were not possible previously.

One of the most useful properties of scientific theories is that they can be used to make predictions about natural events or phenomena that have not yet been observed. For example, the theory of gravitation predicted the behavior of objects on the moon and other planets long before the activities of spacecraft and astronauts confirmed them. The evolutionary biologists who discovered Tiktaalik predicted that they would find fossils intermediate between fish and limbed terrestrial animals in sediments that were about 375 million years old. Their discovery confirmed the prediction made on the basis of evolutionary theory. In turn, confirmation of a prediction increases confidence in that theory.

In science, a "fact" typically refers to an observation, measurement, or other form of evidence that can be expected to occur the same way under similar circumstances. However, scientists also use the term "fact" to refer to a scientific explanation that has been tested and confirmed so many times that there is no longer a compelling reason to keep testing it or looking for additional examples. In that respect, the past and continuing occurrence of evolution is a scientific fact. Because the evidence supporting it is so strong, scientists no longer question whether biological evolution has occurred and is continuing to occur. Instead, they investigate the mechanisms of evolution, how rapidly evolution can take place, and related questions.

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Definition	Characteristics
Example	Non-Example
Definition	Characteristics
Example	Non-Example

Is Evolution a Theory or a Fact? Answer the question completely using information from the article to support your answer. Answer on the back side of this paper.