The Scientific Method

Scientific methods are used by scientists to answer questions and solve problems. The development of the cell theory, one of the most useful theories in biological science, illustrates how the methods of science work. In 1665, Robert Hooke first observed cells in cork.

1- Observing: The first step toward scientific discovery often takes place when a scientist observes something no one has noticed before. After Hooke's discovery, other scientists observed cells in a variety of organisms.

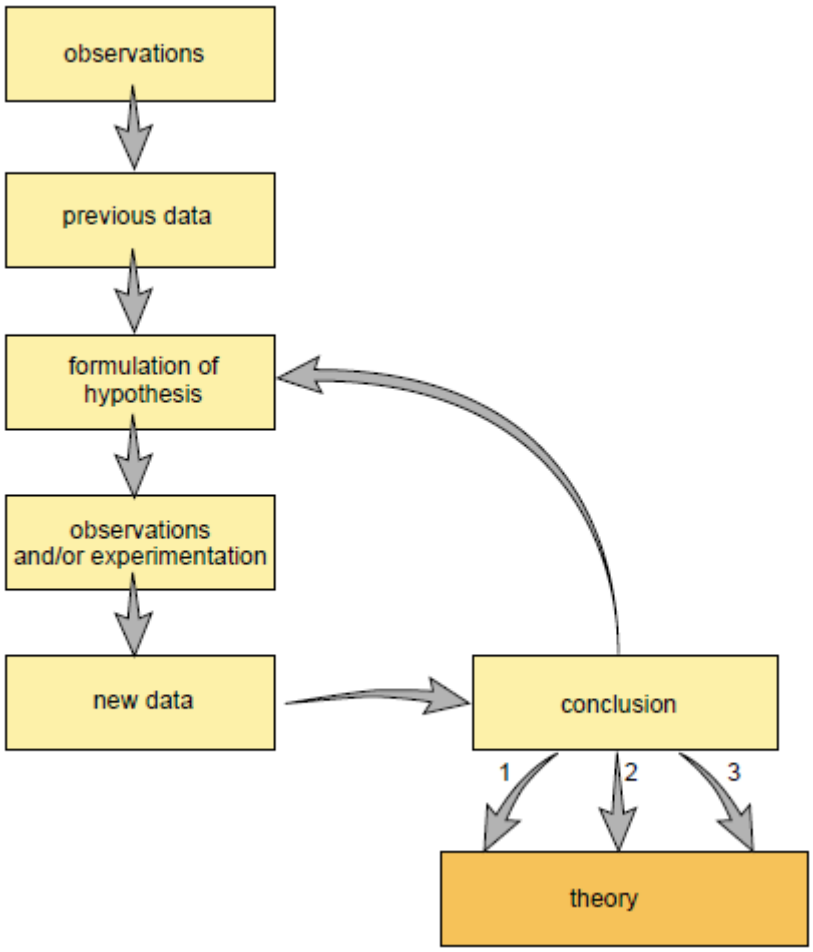
2- Making a hypothesis: A hypothesis is a testable explanation or answer to a question. In 1824, René Dutrochet hypothesized that cells are the basic unit of life.

3- Collecting data: Data can support or disprove a hypothesis. Over the years, scientists who used microscopes to examine organisms found that cells are always present.

4- Publishing results: Results of an investigation are useful only if they are made available to other scientists for a peer review. Many scientists published their observations of cells in the scientific literature. Scientists will analyze the procedure, examine the evidence, identify faulty reasoning, point out statements that go beyond the evidence, and suggest alternative explanations for the same observations.

5- Forming a theory: A theory is a hypothesis that is supported by a large body of scientific evidence. By 1839, many scientific observations supported the hypothesis that cells are fundamental to life. The hypothesis became a theory.

6- Developing new hypotheses: A new theory may prompt scientists to ask new questions or form additional hypotheses. In 1833, Robert Brown hypothesized that the nucleus is an important control center of the cell.


observations
previous data
formulation of hypothesis
observations and/or experimentation
new data
conclusion
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2
3
theory