SCIENTIFIC METHOD

WHAT IS IT?

The scientific method is a method of research in which a problem is identified, data is gathered, a hypothesis is made from this data, and the hypothesis is tested. In other words, the scientific method is a way for scientists to study and learn different things. Using the scientific method, scientists can come up with answers to questions.

HISTORY

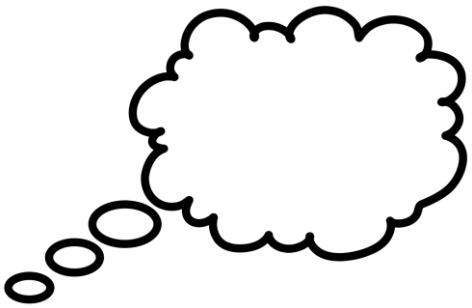
The scientific method was not created by one person, but developed by different scientists and philosophers over time. Some people still debate the best way to implement the scientific method. Isaac Newton, Francis Bacon, and Rene Descartes all contributed to the development of the method to learn about science and nature. They wrote papers discussing how to use experiments and change variables to determine if a guess, or hypothesis, was right.

STEP #1: OBSERVE

The first step of the scientific method is to make an observation. Identify a problem or ask a question about something that is going on.

STEP #2: QUESTION

The second step of the scientific method is to come up with a question based on observations. Without a question, there can be no answer.

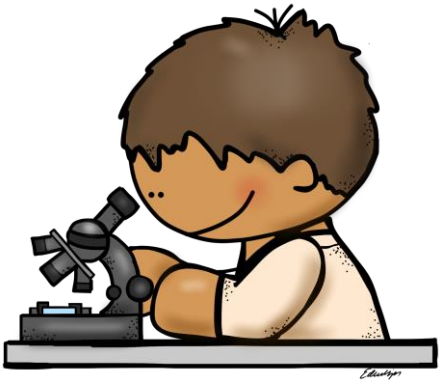


STEP #3: HYPOTHESIS

In step three, make an educated guess, or hypothesis. This is a potential answer to a question that can be tested. To make a hypothesis, research should be done to make sure your hypothesis is practical.

STEP #4: DESIGN

In step four, design an experiment that will test the question you are asking. The experiment should be set up carefully. A good experiment always has at least one variable, or factor being tested. Experiments should also have a control, meaning everything is set up the same, but the variable is missing.



STEP #5: EXPERIMENT

In step 5, carry out the experiment. Results should be recorded and observations made. Make sure experiments are based on fact instead of emotion or opinion. Sometimes multiple experiments are carried out before conclusion can be made.

STEP #6: RESULTS

In this step, the results are gathered and analyzed. Data is often organized in a charts, graphs, diagrams, or summaries to share the results.

STEP #7: CONCLUSION

In step 7, it is determined whether a hypothesis was proven or disproven. A conclusion is drawn and presented. A theory, a logical explanation for events, may be developed after a conclusion is formed. If a theory is tested several times, it can be become a law, a theory accepted as true. Laws can still be changed though by other experiments.

IMPORTANCE

The scientific method is vital to modern science to provide a formal method to determine questions and their answers. Without it, much of the science and knowledge may have not been discovered.

THINK ABOUT IT...

What are some topics you want to further investigate?

Name_____

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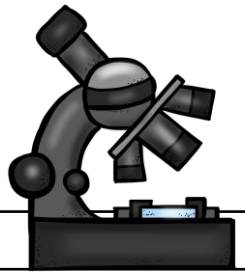

Matching: Match each term with its description.

1. ____ theory	A. Factor being tested
2. ____ data	B. An accepted theory that was tested many times
3. ____ Newton	C. Everything set up the same, but missing the variable
4. ____ law	D. Logical explanation for events
5. ____ hypothesis	E. Last step of the scientific method
6. ____ variable	F. Famous scientist who contributed to the scientific method
7. ____ control	G. Information that is often organized in graphs and charts
8. ____ observe	H. Testing of a hypothesis
9. ____ conclusion	I. An educated guess
10. ____ experiment	J. First step of the scientific method

Multiple Choice: Choose the best answer.

11. What is the main purpose of the scientific method?
A. To prove other scientists' conclusions incorrect.
B. To determine answers to scientific questions.
C. To provide scientists with necessary materials.
D. To teach students about scientific laws.

12. How does a theory mainly become a law?
A. It is published.
B. It is approved by the scientific community.
C. It is tested several times.
D. It is proven incorrect by experiments.

13. What is the main purpose of this passage?
A. To persuade the reader to do their own experiment.
B. To explain how to come up with an idea for a scientific experiment.
C. To entertain the reader with an interesting story about an experiment.
D. To inform the reader of what the scientific experiment is and its steps.

14. "The scientific method is vital to modern science to provide a formal method to determine questions and their answers." What is the best meaning of vital, as used in the quote?
A. Important
B. Scientific
C. Research
D. Proven