

#9400

SCIENTIFIC METHOD

AIMS MULTIMEDIA

2000

Grade Levels: 6-9

19 minutes

1 Instructional Graphic Enclosed



DESCRIPTION

Presents general information about the scientific method and identifies its steps. Gives simple examples of how it is used in daily life and restates the steps several times.

ACADEMIC STANDARDS

Subject Area: Nature of Science

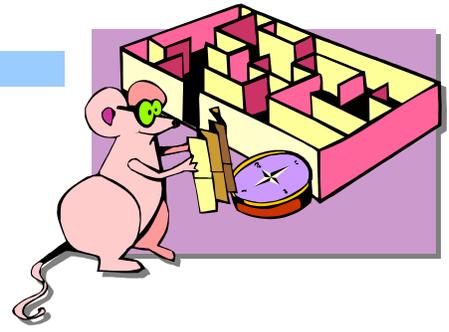
- Standard: Understands the nature of scientific inquiry
 - Benchmark: Knows that scientific inquiry includes evaluating results of scientific investigations, experiments, observations, theoretical and mathematical models, and explanations proposed by other scientists (e.g., reviewing experimental procedures, examining evidence, identifying faulty reasoning, identifying statements that go beyond the evidence, suggesting alternative explanations)
- Standard: Understands the scientific enterprise
 - Benchmark: Knows that throughout history, many scientific innovators have had difficulty breaking through accepted ideas of their time to reach conclusions that are now considered to be common knowledge
- Standard: Understands the nature of scientific knowledge
 - Benchmark: Knows that scientific explanations must meet certain criteria to be considered valid (e.g., they must be consistent with experimental and observational evidence about nature, make accurate predictions about systems being studied, be logical, respect the rules of evidence, be open to criticism, report methods and procedures, make a commitment to making knowledge public)

INSTRUCTIONAL GOALS

1. To learn the basic steps in the scientific method.
2. To use the scientific method to solve problems and answer questions.
3. To understand the guidelines for conducting reliable experiments.
4. To explore various ways of gathering information.

VOCABULARY

1. conclusion
2. control
3. data
4. experiment
5. hypothesis
6. scientific method
7. single variable
8. theory



BEFORE SHOWING

1. How do scientists get information about a lot of things? If from books, who wrote those books and how did *they* get the information?
2. What kind of questions do students have about the world?

AFTER SHOWING

Applications and Activities

1. Ask students to choose a scientist from the list below and to write a one-page summary of their chosen person's contributions to science. What discovery or discoveries did the person make using the scientific method?
 - a. Nicolaus Copernicus
 - b. Johann Kepler
 - c. Sir Isaac Newton
 - d. Carolus Linnaeus
 - e. Gregor Mendel
 - f. Louis Pasteur
 - g. Marie Curie
 - h. George Washington Carver
 - i. Jane Goodall
2. Ask students to summarize each step of the scientific method in their own words.
3. Ask students to use the scientific method to answer the question, "Why is paper the best material to use for writing?"
4. Ask students to consider each hypothesis below. What tool or tools could they use to prove each hypothesis?
 - a. It's warmer on the west side of my house than on the east side.
 - b. Plants in the sun grow faster than plants in the shade.
 - c. Taking a shower is quicker than taking a bath.
 - d. My bedroom is longer than it is wide.
 - e. I weigh more in the morning than I do at night.
 - f. I use more milk on my cereal than my brother does.
5. Ask each student to locate an article related to science. How is the scientific method involved in the pursuit of knowledge or in the solving of a problem? Have students present a summary of their articles to the class, along with their own thoughts on the importance of the information.

6. Arrange for a scientist to speak to the class about his or her particular field of study. Ask them to talk about what they do on a daily basis. Discuss how the scientific method is used to help the scientist do his or her job. After the presentation, allow students to ask questions about the speaker's job, education, and training.
7. Ask each student to bring three small items to class that are made of various materials, including wood, paper, plastic, steel, iron, tin, etc. Provide the class with a magnet. Allow them to test their items by touching each one with the magnet. Ask them to record their observations. Next, compare their observations with other students'. Remind them that this is what real scientists do. After analyzing the data, ask each student to formulate a hypothesis about magnets. Discuss these hypotheses. How can they be thoroughly tested?
8. Ask students to investigate and learn more about the scientists who discovered the true nature of the earth. What was the major discovery of Nicholas Copernicus? Johann Kepler? What tools did these men use to test their hypotheses?
9. Discuss social attitudes about science and scientists. For instance, how are scientists often portrayed in movies? Are they clumsy men with wild ideas, nerdy social outcasts, or evil villains intent on destroying the world? How accurate are these portrayals?
10. Ask students if they have read any science fiction books. If so, encourage them to discuss the books with their classmates. Why are people interested in science fiction books, television shows and movies?
11. Practice using the scientific method by completing the activity provided. (See INSTRUCTIONAL GRAPHICS.)

RELATED RESOURCES



Captioned Media Program

- Conducting an Experiment (Revised Edition) #2367
- Learning How Scientists Work: Preparing a Successful Science Fair Project #3052
- Scientific Method #2521
- The Scientific Method #9399



World Wide Web

The following Web sites complement the contents of this guide; they were selected by professionals who have experience in teaching deaf and hard of hearing students. Every effort was made to select accurate, educationally relevant, and "kid safe" sites. However, teachers should preview them before use. The U.S. Department of Education, the National Association of the Deaf, and the Captioned Media Program do not endorse the sites and are not responsible for their content.

- **SCIENCE FAIR CENTRAL**

<http://school.discovery.com/sciencefaircentral/>

A comprehensive guide to creating your science fair project! Presents project ideas to help you get started, search the database for over 300 science fair questions, provides tip sheets for Astronomy, Biology, Chemistry, Earth Science, and Physical Science projects, check out science contest for students in grades 5 through 8, and more!



- **YOUR SCIENCE FAIR PROJECT RESOURCE GUIDE**

<http://www.ipl.org/div/kidspace/projectguide/>

Are you looking for some help with a science fair project? This Internet Public Library (IPL) site will guide you to a variety of helpful and specific Web site resources and will lead you through the necessary steps to successfully complete a science experiment. Text throughout has highlighted words to click on for explanation of specific vocabulary.

- **THE SCIENTIFIC METHOD**

http://biology.clc.uc.edu/courses/bio104/sci_meth.htm

Extensive explanation of steps that make up the scientific method. Provides several observation, hypothesis, and "conclusion" examples.

- **THE SCIENTIFIC METHOD**

http://www.biology4kids.com/files/studies_scimethod.html

The scientific method is the way scientists learn and study the world around them. It can be anything from a leaf, to a dog, to the entire universe. Provides a brief explanation of each step before moving on to the next stop on tour.

INSTRUCTIONAL GRAPHICS

- USING THE SCIENTIFIC METHOD

Using the Scientific Method



Directions: Think of a problem or an unanswered question you have had during the last few weeks. Use the scientific method to work through the problem or to find an answer to the question. The steps below will help.

- 1) Define the problem or question.**

- 2) Gather information using one or more of the five senses.** Some ways to gather information include interviewing people, observing things, or reading books and articles. Summarize your findings below.

- 3) Form a hypothesis.** Using the information you have gathered, make an educated guess about how to solve the problem or answer the question.

- 4) Perform one or more experiments to test your hypothesis.** Describe your experiment or experiments below.

- 5) Make observations and record the data below.**

- 6) State a conclusion.** Did your findings prove or disprove the hypothesis?