

Study Guide The Nature of Science

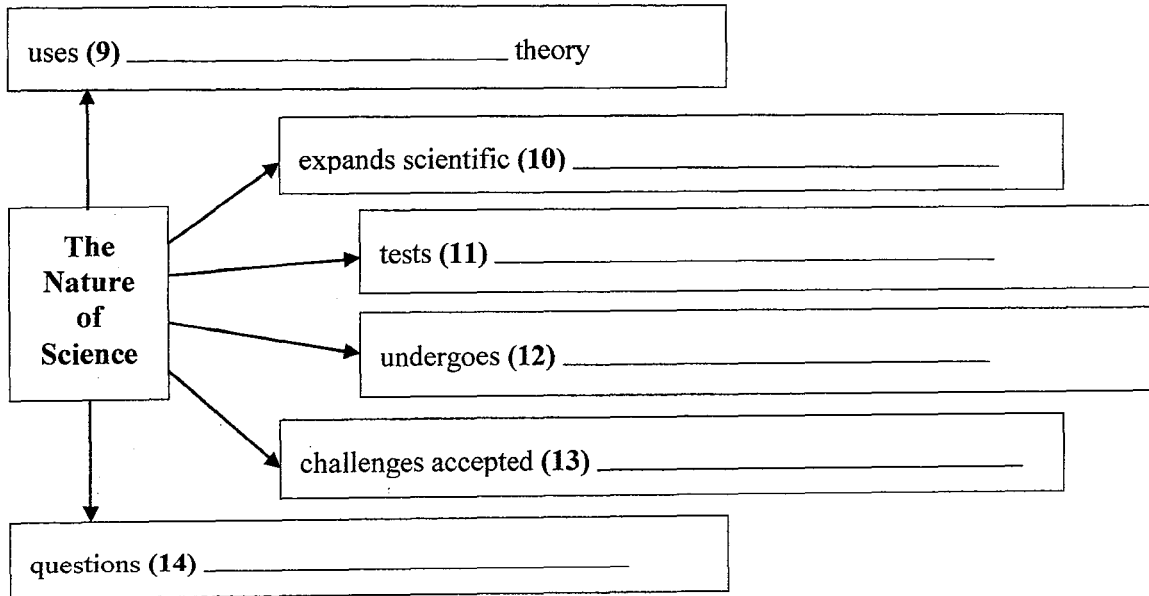
In your textbook, read about the nature of science.

Complete the table by checking the correct column(s) for each description.

| Description | Science | Pseudoscience |
|--|---------|---------------|
| 1. Studying genes and inheritance | | |
| 2. Forecasting personality by reading bumps on the head | | |
| 3. Observing interactions of organisms in the environment | | |
| 4. Peers reviewing investigations and experiments | | |
| 5. Telling the future by reading lines on the palms | | |
| 6. Forming untestable hypotheses based on nonscientific literature | | |
| 7. Forming testable hypotheses based on observations and questions | | |
| 8. Communicating experimental findings and offering data for peer review | | |

Complete the graphic organizer below. These terms may be used more than once:

claims knowledge peer review results scientific theories



Study Guide Methods of Science

In your textbook, read about the methods of science.

Match the definition in Column A with the term in Column B.

Column A

- _____ 1. a procedure that tests a hypothesis by collecting information under controlled conditions
- _____ 2. in an experiment, the group that is the standard against which results are compared
- _____ 3. in an experiment, the group that is exposed to the factor being tested
- _____ 4. the factor that remains fixed in an experiment
- _____ 5. the condition being changed by the scientist
- _____ 6. the factor that results from or depends on changes to the independent variable
- _____ 7. information gained from observation
- _____ 8. a testable explanation of a situation

Column B

- A. constant
- B. experimental group
- C. independent variable
- D. experiment
- E. control group
- F. dependent variable
- G. hypothesis
- H. data

In your textbook, read about data gathering.

Complete the table by checking the correct column(s) for each description.

| Description | Quantitative Data | Qualitative Data |
|---|-------------------|------------------|
| 9. Numerical data | | |
| 10. Observations of hunting behavior | | |
| 11. The temperature changed from 30°C to 25°C | | |
| 12. The distance the car travels in each lap is 500 meters | | |
| 13. The solution turns blue when heated | | |
| 14. The plant grew toward the light | | |
| 15. Each of the 12 test subjects flew 2000 miles to their summer hunting grounds. | | |
| 16. Calculations, graphs, and charts | | |

Can you Spot the Scientific Method?

Each sentence below describes a step of the scientific method. Match each sentence with the correct step.

- | | | |
|-------|---|---|
| _____ | 1. Stephen predicted that seeds would start to grow faster if an electric current traveled through the soil in which they were planted | A. Recognize or Research a Problem |
| _____ | 2. Susan said, "If I fertilize my geranium plants, they will blossom | B. Form a hypothesis |
| _____ | 3. Jonathan's data showed that household cockroaches moved away from raw cucumber slices. | C. Test the hypothesis with an experiment |
| _____ | 4. Rene grew bacteria from the mouth on special plates in the laboratory. She placed drops of different mouthwashes on bacteria on each plate. | D. Draw conclusions |
| _____ | 5. Kathy use a survey to determine how many of her classmates were left-handed and how many were right handed. | |
| _____ | 6. Jose saw bats catching insects after dark, he asked "how do bats find the insects in the dark?" | |
| _____ | 7. Justin wondered if dyes could be taken out of plant leaves, flowers, and stems. | |
| _____ | 8. Alice soaked six different kinds of seeds in water for 24 hours. Then she planted the seeds in soil at a depth of 1 cm. She used the same amount of water, light, and heat for each kind of see. | |
| _____ | 9. Bob read about growing plants in water. He wanted to know how plants could grow without soil. | |
| _____ | 10. Kevin said, "If I grow five seedlings in red light, I think the plants will grow faster than the five plants grown in white light." | |
| _____ | 11. Angela's experiment proved that earthworms move away from light. | |
| _____ | 12. Scott said, "If acid rain affects plants in a particular lake, it might affect small animals, such as crayfish, that live in the same water. | |
| _____ | 13. Michael fed different diets to three groups of guinea pigs. His experiment showed that guinea pigs need vitamin C and protein in their diets. | |

Name: _____ Date: _____ Period: _____

The Simpsons and the Scientific Method

Read each scenario and identify the steps of the scientific method.

The Homer Scenario

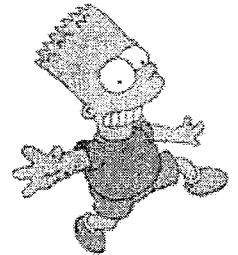
Homer notices that his shower is covered in a strange green slime. His friend Barney tells him that coconut juice will get rid of the green slime. Homer decides to check this out by spraying half of the shower with coconut juice. He sprays the other half of the shower with water. After 3 days of "treatment" there is no change in the appearance of the green slime on either side of the shower.



1. What was the initial observation?
2. Identify the Control Group
3. Identify the Independent Variable
4. Identify the Dependent Variable
5. What should Homer's conclusion be?

The Bart Scenario

Bart believes that mice exposed to microwaves will become extra strong (maybe he's been reading too much Radioactive Man). He decides to perform this experiment by placing 10 mice in a microwave for 10 seconds. He compared these 10 mice to another 10 mice that had not been exposed. His test consisted of a heavy block of wood that blocked the mouse food. He found that 8 out of 10 of the microwaved mice were able to push the block away. 7 out of 10 of the non-microwaved mice were able to do the same.



6. Identify the Control Group
7. Identify the Independent Variable
8. Identify the Dependent Variable
9. What should Bart's conclusion be?
10. How could Bart's experiment be improved?