

Scientific Method

READ


The scientific method helps you find answers to your questions about the world. It starts with a question and your answer to the question based on your observations. This “answer” is called your hypothesis. The next step is to test your hypothesis by creating experiments that can be repeated by other people in other places. If your experiment is repeated many times with the same results and conclusions, this information becomes part of the scientific knowledge we have about the world.

Steps to the Scientific Method

1. Make observations or research something.

2. Ask a question or state a problem.

3. State a hypothesis.

4. Test the hypothesis with an experiment.

5. Draw conclusions based on the test.

- Read the following story. You will use this story to practice using the scientific method.
- *Eddie gives his mother a bunch of roses for Mother’s Day. She fills a vase with water, trims the ends of the flower stems, and arranges the roses in the vase. Then she remembers that she heard from a friend that putting an aspirin in the water helps the flowers stay fresh longer. She goes to the medicine cabinet to look for aspirin.*
- *Eddie’s sister Kela comes into the kitchen and sees the flowers. She said she heard putting a few drops of bleach in the water helps keep the flowers fresh. She thinks it is because the bleach kills the bacteria in the water.*
- *Eddie thinks it seems strange that aspirin or bleach would be better than plain water. He asks his mother if they can do an experiment to find out whether the aspirin or bleach will make the flowers last longer. She thinks it is a good idea and finds some smaller vases to hold the flowers.*
- Now, answer the following questions about the process they used to reach their conclusion.

PRACTICE


Make observations or research something

1. What are the observations that Eddie has made?

Ask a question or state a problem

2. What question does Eddie want to answer during the experiment?

State a hypothesis

3. What hypothesis would Eddie’s mother make based on the information she heard from a friend?
4. What hypothesis would Kela make?

5. What hypothesis would Eddie make?

Test the hypothesis with an experiment

Eddie, Kela, and their mother divide the flowers into three bunches of four flowers each. They mix the flowers so the bunches are as identical as possible. They put water in the vases. Into one vase, they add an aspirin, wait for it to dissolve, mix the water, and add the flowers. Into another vase, they add three drops of bleach, mix the water, and add the flowers. The flowers are put into plain water in the third vase.

6. What two things about the water should be the same for all three vases?

The three vases are placed near a window on the kitchen counter. They decide to change the water every evening, adding new aspirin and bleach to the water each day. Each day they will also compare the condition of the flowers.

7. List two factors that should be kept the same for all three vases during the experiment. Don't use factors you listed in the previous question.
8. What sort of data should they record each day to compare the flowers?

Draw conclusions based on the test

One week later, they look over their data and compare the flowers. The flowers with the aspirin in the water have lost a total of seven petals and have many brown spots. The flowers with the bleach in the water have lost a total of two petals and have hardly any brown spots. The flowers in the plain water have lost four petals and have a medium amount of brown spots.

9. Based on the data, what should Eddie, Kela, and their mother conclude about the experiment?
10. In this experiment, the water was changed each day. Do you think the results would have been different if the same water had been left in the vases all week?
11. State a different question you could answer about the freshness of flowers that uses some or all of the same materials.