

**EXPERIMENTING SKILLS**

## *Designing an Experiment*

The following report was written by a middle-school science student:

My question was, "Why do some helium balloons last longer than others?" I did research and discovered that balloons aren't filled with pure helium. My hypothesis was that balloons with a higher percentage of helium last longer.

In my experiment, I filled 12 balloons with helium. Four of them were completely filled to 30 cm across. Four were filled to 20 cm across. Four were filled to about 10 cm across. The balloons lasted about the same amount of time, so my hypothesis was not true.

On the report evaluation, the teacher wrote, "Good idea, but you didn't test your hypothesis." What do you think the teacher meant?

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How could the experiment be changed to test the hypothesis?

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### **Be Sure to Answer the Question**

An experiment should test a specific hypothesis. Always ask yourself, "Does my experiment match my hypothesis?"

For example, Makiko wanted to test the following hypothesis: "Gerbils can think better right after they eat." She built a maze to test her eight gerbils' thinking ability. At first, she planned to test four gerbils right after they had eaten one brand of gerbil food and the other four after they had eaten another brand of gerbil food. Would this experiment test Makiko's hypothesis? Write the hypothesis you think this experiment would test.

Makiko decided she would feed her gerbils at 8 P.M. every evening. Then she would test four gerbils in the maze at 8:30 P.M. and the other four on the following morning. This experiment would test her original hypothesis.



**Designing an Experiment, continued**

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**Asking the Question**

What hypothesis is each of the following experiments designed to test? For each experiment, provide an appropriate hypothesis.

- 1. Makiko fed half her gerbils all at once. The other half were fed their daily ration in three equal parts—in the morning, at midday, and at night. After a month, all of the gerbils were tested in the maze.

**Hypothesis:** \_\_\_\_\_  
\_\_\_\_\_

- 2. Makiko kept half her gerbils in a cage on a table surrounded by plants. She kept the other half in a cage on a table without plants. After a week, she tested the gerbils in the maze.

**Hypothesis:** \_\_\_\_\_  
\_\_\_\_\_

**A Bit More Practice**

For the following puzzling event, propose both a hypothesis and an experiment that tests your hypothesis.

- 3. You return to the car from an all-day shopping spree at the mall. Your favorite CD, which you left on the dashboard, is now stuck.

**Hypothesis:** \_\_\_\_\_  
\_\_\_\_\_

**Experiment:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**TROUBLESHOOTING**

Write down the different variables that your hypothesis mentions. Your experiment to test your hypothesis should use the same variables. Present your hypothesis to your class, and explain your experiment.

**TRY THIS!**

Why is it important for Makiko to use more than one gerbil in each of the experimental trials? For instance, in one experiment she fed four gerbils once a day and four gerbils three times a day. Why didn't she just use two gerbils, one for each feeding schedule?

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