

**SKILLS INTRODUCTION**

## Developing a Hypothesis

Suppose you and your neighbor are growing tomatoes. One day you notice that your neighbor's plants are much bigger than yours. What's causing the difference? How can you get your plants to grow as big as your neighbor's?

The question you asked about the tomato plants could lead you to develop a hypothesis. A **hypothesis** (plural: *hypotheses*) is a possible explanation for a set of observations or answer to a scientific question. Hypotheses are based on a person's observations and previous knowledge or experience.

In science, hypotheses must be testable. That means that researchers should be able to carry out an investigation and obtain evidence that shows whether the hypothesis is true or false.

Read the following examples. Notice which of the hypotheses is testable.

**Example 1:** Fertilizer makes plants grow bigger. (testable)

**Example 2:** With luck, plants will grow bigger. (not testable, because you can't control "getting lucky")

Scientists use a hypothesis to write a prediction. Often the prediction is worded as an *If . . . then . . .* statement. For example, the hypothesis in Example 1 can lead to the following prediction: If I give my plants fertilizer, then they will grow big. The prediction is a rough outline of an experiment that can be performed to test the hypothesis.



### Tips for Developing Hypotheses

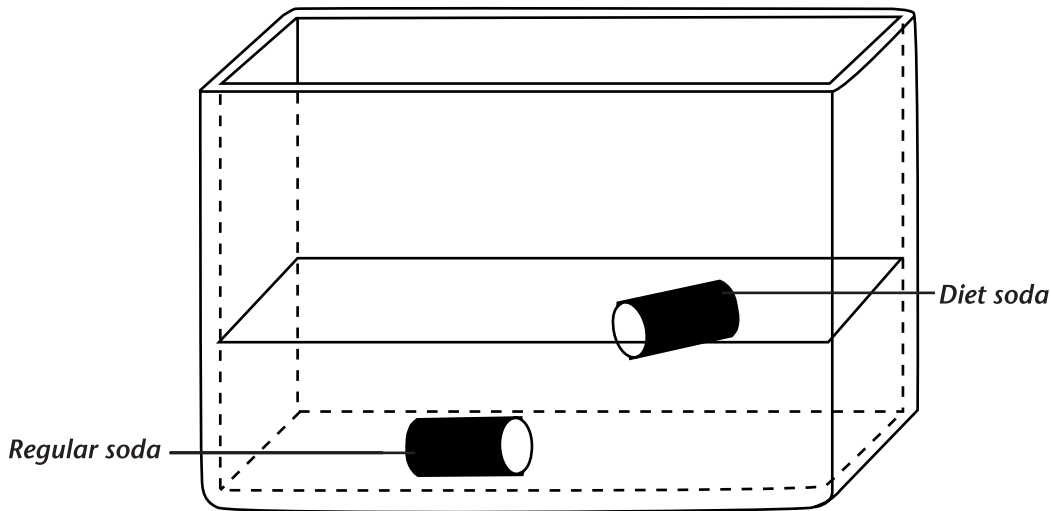
- ◆ Ideas for hypotheses often result from problems that have been identified or questions that have been raised. To help develop ideas for a hypothesis, write down several questions about the topic. Try to narrow the questions to one that can be investigated scientifically. Then write the hypothesis.
- ◆ Make sure the hypothesis is an explanation that is based on observation, previous knowledge, or experience.
- ◆ Make sure the hypothesis can be tested through an investigation.
- ◆ Use the hypothesis to write a prediction in the form of an *If . . . then . . .* statement.

**Checkpoint** Write a hypothesis based on this question: "Will empty trucks use the same amount of gas as heavily loaded trucks?" Then use your hypothesis to write a prediction in the form of an *If . . . then . . .* statement.

## SKILLS PRACTICE

### Developing a Hypothesis

The day after a picnic, you look into the cooler. All of yesterday's ice has turned to water. Only two beverages are left. A can of diet soda is floating at the surface. A can of regular soda is resting at the bottom.



You pick up the two cans. You see that both drinks are made by the same company. Then you read the labels.



## Developing a Hypothesis (*continued*)

Answer the following questions. Use the back of this sheet if you need more space.

1. You think that something about the regular drink must have made it sink, while something about the diet drink made it float. Write down at least two possible ideas that might explain the events.

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2. Suppose that the type of drink did *not* affect which can floated or sank. Maybe the cans themselves were different in some way. Maybe something besides soda got into one of the cans by mistake. Write down at least two possible ideas that might explain the events.

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3. Write down any other possible ideas you can think of. Could the cooler have had any affect? Could something in the water be responsible? Could there be an object in the water that you can't see?

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4. Review your answers to Question 1. Use one of your ideas to write a hypothesis explaining why one can floated and the other sank. (*Hint: Make sure you use a complete sentence.*)

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5. Review your answers to Questions 2 and 3. Choose one of your ideas describing something besides the type of drink that caused the floating or sinking. Write a hypothesis based on that idea.

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6. Are both of your hypotheses testable? Write a brief description of how you could test each one. Mention any equipment you would need. (*Hint: You can open the cans and pour out the drinks as part of your tests.*)

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7. Think About It Review your work. Use it to help you write a short summary of how to develop a hypothesis about an event.