

## Lab Skills 2 **Applying Scientific Methods**

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### Problem

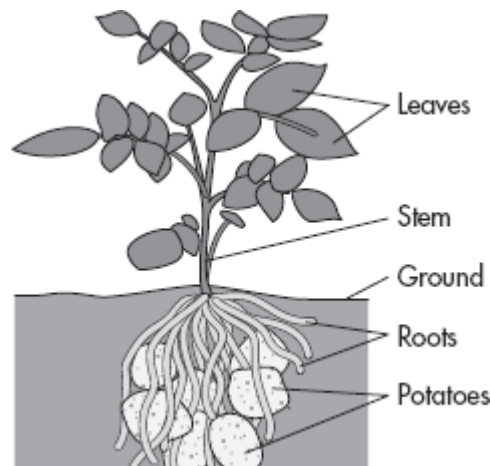
How will light affect the sprouting of eyes on a potato?

### Introduction

Scientific methodology is a general style of inquiry that is used to gather data and test ideas. Biologists use this type of inquiry to learn about living things. Doing experiments is a central part of scientific inquiry. For a controlled experiment, you need both an experimental setup and a control setup. The setups must be exactly the same except for the independent variable. With this approach, you will know that your results are due to that variable.

In this lab, you will use a potato to do a controlled experiment. Potato plants store starch in structures, known as potatoes, that people dig up and eat. Figure 1 shows where the potatoes are located in relation to the rest of the growing plant. Along the surface of a potato are buds, or “eyes,” which look like small dimples in the potato skin. The eyes in a potato can sprout and grow into new potato plants. In your experiment, you will determine whether more eyes sprout in the dark or in the light.

**Figure 1** Potato plant



## Skills Focus

Form a Hypothesis, Control Variables, Organize Data

## Materials

- medium-sized potato
- scrub brush
- knife
- dissection tray
- 2 paper towels
- 2 plastic bags with twist ties
- permanent marker

## Safety

When using the knife to cut the potato, keep your fingers out of the path of the blade. Wash your hands thoroughly with soap and warm water after handling the potatoes.

## Pre-Lab Questions

1. **Control Variables** How does cutting one potato in half help control the variables in this experiment?

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2. **Infer** Why is it necessary to place the potato halves on moist paper towels?

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3. **Design an Experiment** Why will you compare the percentage of eyes that sprout rather than the total number of eyes that sprout on each potato half?

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## Procedure

1. With the members of your group, discuss how the presence or absence of light will affect the sprouting of a potato. Record the hypothesis you will test to answer this question.

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

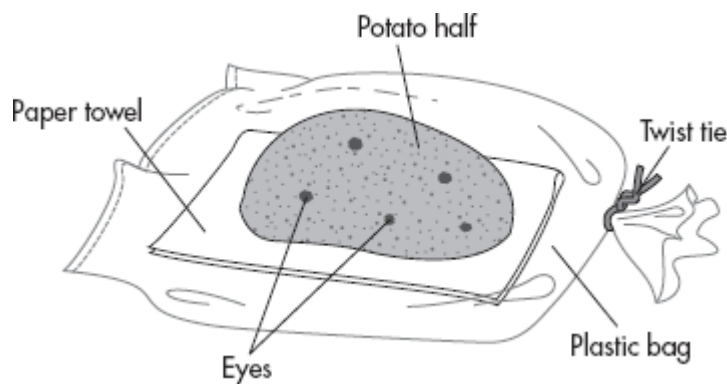
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2. Put on your safety goggles and lab apron. Scrub the potato with a firm brush to remove any wax coating that may be on the potato.

3. Using a dissection tray, carefully cut the potato lengthwise into equal halves. Assign one half to be put in the dark and one half to be kept in the light. Count the number of eyes on each potato half and record this information in the data table below.
4. Fold each paper towel until you have rectangles about equal in size to your potato halves. Moisten the towels with water. Place a folded paper towel in each plastic bag.
5. Place a potato half in each plastic bag with the cut surface on the paper towel as shown in Figure 2. Tie each bag with a twist tie. Use a permanent marker to label one bag Light and the other Dark.

**Figure 2** Potato half in plastic bag



6. Your teacher will designate a cool, dark place where you will keep one potato half and a cool, well-lit place where you will keep the other. Place the bags in the appropriate locations. Make sure that the potato halves are resting on top of the paper towels after you place the bags.
7. After one week, open the bags and count the number of sprouts on each potato. Record these numbers in the data table.
8. To calculate the percentage of eyes that sprouted, divide the number of sprouts by the number of eyes and multiply the result by 100. Record your answers in the data table.
9. When the experiment is over, follow your teacher's instructions for cleanup and disposal of materials.

Data Table			
Location of Potato	Number of Eyes	Number of Sprouts	Percentage of Eyes Sprouted
Dark			
Light			

## Analyze and Conclude

**1. Design an Experiment** What was the independent variable in this experiment? What was the dependent variable?

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**2. Design an Experiment** Which was the experimental setup in this investigation? Which was the control? Explain.

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**3. Evaluate** Did the results of your experiment support your hypothesis? Explain.

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**4. Infer** What effect does light have on the sprouting of potatoes?

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**5. Control Variables** Why was it important to keep both the control setup and the experimental setup at the same temperature throughout the experiment?

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## Extend Your Inquiry

Design an experiment to investigate whether temperature or amount of water affects the percentage of sprouts. Before you begin, have your teacher approve your plan.