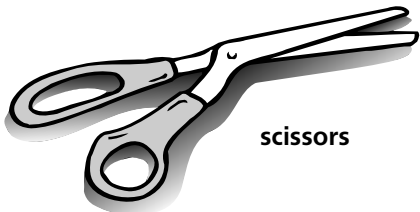
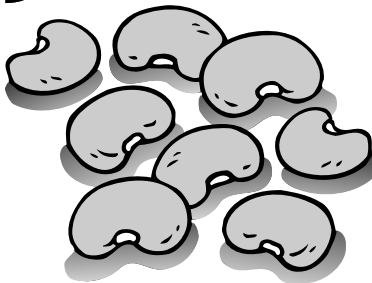


# Responses of Plants to Gravity

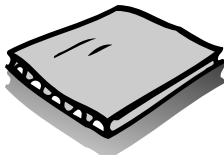
## WHAT YOU NEED



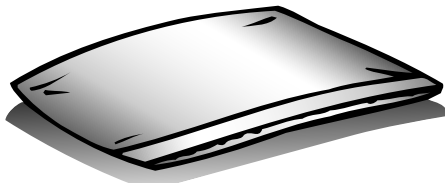
scissors



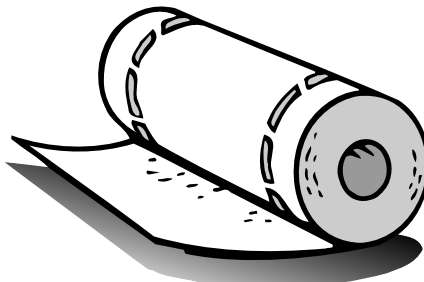
eight lima beans  
(soaked in water overnight)



piece of corrugated cardboard



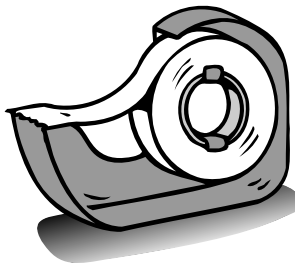
self-sealing plastic bag



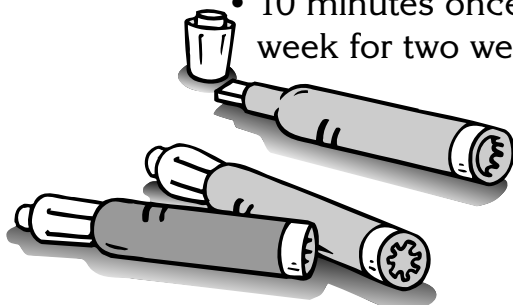
several paper towels



water



tape



markers

## Find Out

Do this activity to see how plants respond to gravity.

## Process Skills

Observing  
Communicating  
Predicting  
Inferring  
Interpreting Data  
Designing  
Investigations

## Time

- 30 minutes the first day
- 10 minutes once a week for two weeks

## WHAT TO DO



1. Cut a piece of cardboard so that it will barely slide inside the plastic bag. Use two layers of cardboard if necessary to get a tight fit. Remove the cardboard from the bag and wrap a layer of paper towels around it. Slide the towel-covered cardboard back into the bag. Pour in enough water to soak the cardboard and the towels. Pour off any excess water after the cardboard is thoroughly wet.

2. Slide eight lima beans inside the bag on top of the towel-covered cardboard. Place the lima beans in a circle.
3. Put your name and the date on the bag. Seal the bag. The plastic should hold the lima beans in place. If any of the beans slip, push on the outside of the bag and line them up or add more paper towels.
4. Hang the bag on a wall in your classroom. Do not lay the bag flat.
5. **Observe** the lima beans once a day until the seeds begin to sprout.
6. **Draw** how the roots look when the seeds sprout. Hang the bag in the same place after you make your observations.
7. **Predict** how the roots of each of the seeds will look after one week by drawing how the seeds will look.
8. Once the seeds have sprouted, wait one week. Then, **observe** and **draw** the roots of the seeds.



## Plant Responses to Gravity

How the Roots Look When Seeds Sprout

Prediction of How the Roots Will Look One Week After Sprouting

How the Roots Look One Week After Sprouting

## Conclusions

1. **Infer** what force, or environmental influence, caused the roots to grow downward.
  
2. How does this response help the plant to survive?

## New Questions

1. What is the name of the plant response that involves a change of position by growing toward or away from a stimulus?
  
2. What are some other environmental influences that can cause a plant to change its position?
  
3. How could you design an experiment to show how one of these environmental influences could change the growth or position of your bean sprouts? Explain what would be learned by collecting data on this influence.



Name \_\_\_\_\_



# ACTIVITY

## Investigating a Population

**Predict** what you think happened to the mouse population between 1989 and 1999.


## **Activity Journal**

### **Lesson 1 • The Nature of Ecosystems**

Name \_\_\_\_\_

## **Conclusions**

**1** Was your prediction supported by the data? Why or why not?

**2** Did the number of mice increase or decrease between 1989 and 1999?

**3** Between which two years was there the greatest change in the population?

**4** **Infer** what limiting factors affected the population size of the field mice.

## **Asking New Questions**

**1** List two factors that could cause the mouse population to decrease.

**2** List two factors that could cause the mouse population to increase.

Name \_\_\_\_\_



# ACTIVITY

## Investigating What a Predator Eats

**Predict** what an owl might eat.

**Record** the types and numbers of skulls you found in the pellet.

## **Activity Journal**

### **Lesson 2 • Interaction in Ecosystems**

Name \_\_\_\_\_

## **Conclusions**

- 1** Compare your prediction with your observations.
  
- 2** What kinds of materials did you identify in the owl pellet?
  
- 3** **Infer** what the interactions and relationships were between the owl and the animals it ate.

## **Asking New Questions**

- 1** How are the owl and other predators important to Earth's ecosystem?
  
- 2** **Infer** what the owl's niche might be in its community.



Name \_\_\_\_\_



# ACTIVITY

## Investigating Earthworm Behavior

How do the earthworms react when you hold the container under a bright light?

What does the earthworm do when you hold it in the palm of your hand?

How does the earthworm react to the vinegar?

## **Activity Journal**

### **Lesson 3 • Behaviors and Adaptations**

Name \_\_\_\_\_

## **Conclusions**

- 1** What were the different stimuli to which the worm responded?
- 2** What earthworm behavior did you observe?
- 3** If the earthworm had never before been exposed to the stimuli used in this activity, was the earthworm's behavior learned or innate? Why?

## **Asking New Questions**

- 1** How might the earthworm's responses to light, touch, and vinegar help it to survive?
- 2** How else might you test an earthworm's responses to its ecosystem?