

# The Water Express



Grade 2

## Lesson at a Glance

Students conduct an experiment with plant cuttings to discover the importance of water in plant growth.

## Key Concept

Water flows between living and nonliving things and transports nutrients between soil and plants.

## Objectives

Students will be able to:

- 1) Predict what will happen to plant cuttings in soil and in water.
- 2) Observe the cuttings for one week and record observations.
- 3) Analyze the results and draw conclusions.
- 4) Write and illustrate a summary of the experiment.

## Time

one class period, plus ten minutes per day for one week

## Subject Areas

science, language arts, art

## Materials

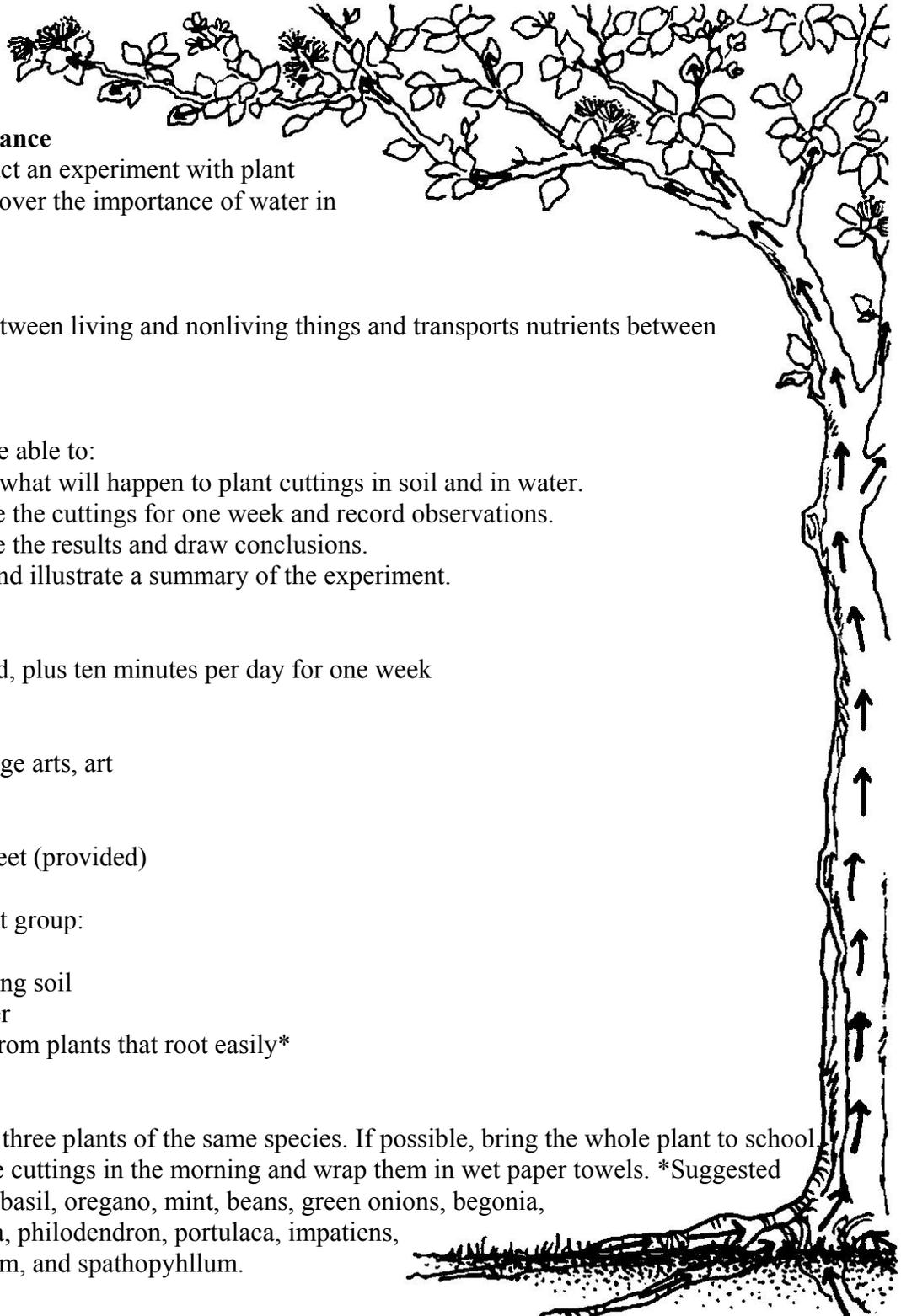
student data sheet (provided)

for each student group:

- 2 clear jars
- cup of potting soil
- cup of water
- 2 cuttings from plants that root easily\*

## Preparation

Collect at least three plants of the same species. If possible, bring the whole plant to school. Otherwise, take cuttings in the morning and wrap them in wet paper towels. \*Suggested plants include: basil, oregano, mint, beans, green onions, begonia, pothos, wedelia, philodendron, portulaca, impatiens, coleus, geranium, and spathophyllum.



## Teacher Background

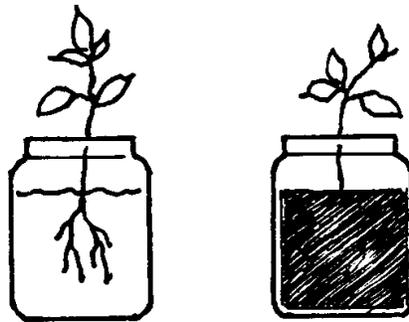
Water is continually cycled between living and nonliving things. People and other animals drink water and lose it through perspiration or elimination of wastes. In either case, it will eventually be **evaporated** into the air, **condense** and fall as rain and begin the cycle again.

Plants usually absorb water and nutrients through their roots. They give off water through their stomata (pores) on the underside of their leaves. Their moisture transpires through the plant to the leaf surface and then evaporates into the atmosphere. This is transpiration.

Some plants do not need soil to survive and can be grown hydroponically (in water) without soil. These plants must have nutrients added to the water to maintain productivity and health. (Of course, some plants, such as algae, live naturally without soil. Others, including some cacti, use so little water that they can absorb what they need from the air.)

## Teaching Suggestions

1. Display a mound of soil and ask students if it is needed by living things. Discuss the needs of all living things (food, water, shelter, space).
2. Divide the class into small groups. Distribute two clear jars to each group. Have students fill one jar halfway with dry soil, and the other halfway with water.
3. Distribute plant cuttings. Ask groups to put one cutting in the water and the other in the soil. Do not add water to the soil. Place both jars near a window for light.



4. Distribute the data sheet. Ask students to predict what will happen to the cuttings, and record their predictions on the sheet. Have students draw a picture of each cutting in the space provided.
5. Check the jars each day. If the water level in the jar is low, add more. Do not add anything to the soil. Have students draw the plants each day and record their observations.

6. Discuss the experiments:
  - What did the plants need most—water or soil? (water)
  - Why did plants in the soil die? (They needed water.)
  - Are any roots visible yet? Why are roots important? (They absorb water and nutrients, which are like vitamins. Nutrients are normally held in the soil and are derived from dead plant and animal matter.)
  - Could the cuttings live forever in the water? (Probably not, unless nutrients were added.)
7. Have students use the data they collected to prepare written, illustrated summaries of their experiments.

### **Extended Activities**

- Have students bring in pots and soil to plant their cuttings. Be sure they add pebbles to the bottom of the pots for drainage. Water the plants as needed. Measure the plants on a weekly basis and record plant growth.
- Students could place plastic bags over leaves growing on a school hedge or border planting. Be sure the plants are well watered, and that the bags are attached securely so that no air can escape. After 20–30 minutes, have students remove the bags. They will be damp with water transpired by the plant.
- Have students use the data collected to make a book about plants' needs for survival.

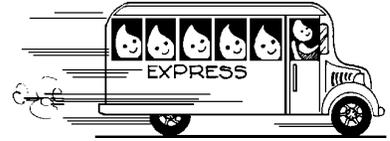
**SCIENTIFIC EXPERIMENT**

DATE: \_\_\_\_\_

QUESTION: What do plants need more—soil or water?

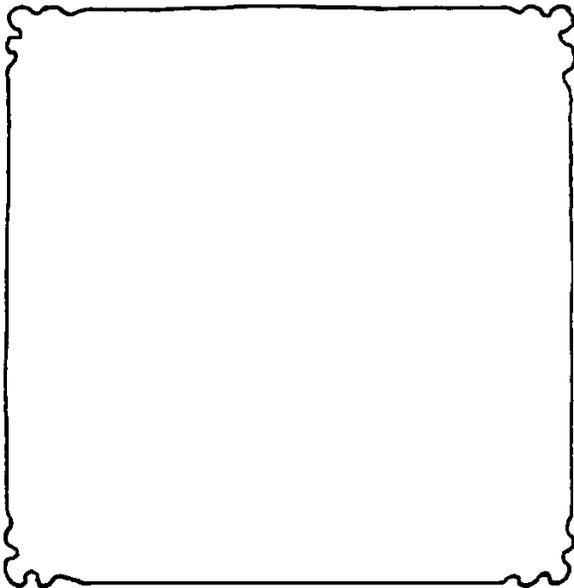
I predict: \_\_\_\_\_

I found: \_\_\_\_\_



**PLANT IN SOIL**

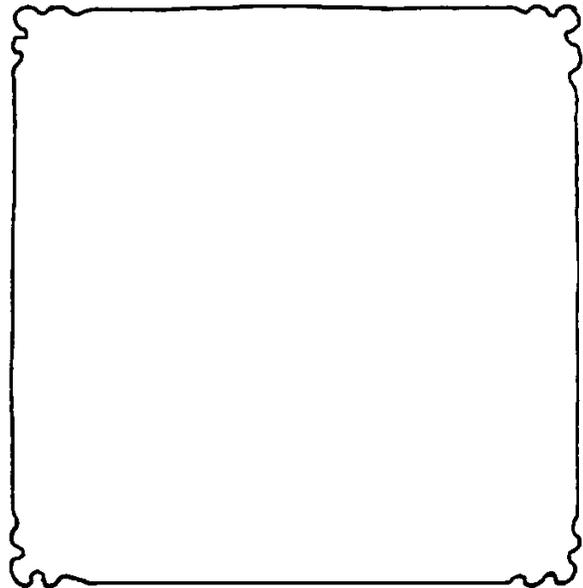
Draw a picture of the plant in the space below.



Describe the plant here:

**PLANT IN WATER**

Draw a picture of the plant in the space below.



Describe the plant here: