

# Teaching Suggestions

## Science and Mathematics Lab

(Course 1, Lesson 9-7)

### *Ivy League Math*

#### OVERVIEW

In this activity, students will measure the length of a vine and count the number of leaves on each vine. They will record this information in a function table. They will then use this information to draw a graph of the number of leaves per unit length of vine. Finally, they will use the measurements to write a function that describes the graph.

#### RECOMMENDED TIME

1 class period

#### MATERIALS

- ivy or similar vine, cut to four different lengths
- large piece of heavy paper such as blotting paper
- pots and potting soil
- ruler
- paper cups

#### PREPARATION

Obtain one or two vining houseplants at a garden store, general discount store, or grocery store. You will need four vines for each pair of students. Prior to class, cut the vines into lengths of 4, 6, 8, and 12 inches. The vine pieces must include all of their leaves, and the leaves should be spaced about 2 inches apart. Do not use a vine if it does not conform to this standard or students will have difficulty making their measurements.

#### TEACHING THE LAB

1. Have students work in pairs.
2. Demonstrate how to measure the vines. One student can hold the vines straight. The other can measure.
3. After the lab, students can put the vine segments in paper cups of water and place the cups on a window sill or in another well-lit area. In time, the vines will sprout roots and can be transferred to a pot with soil. Give each student a pot to take home.

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### *Ivy League Math (continued)*

#### **Answers and Conclusions**

1. Graphs will vary, but they should be a straight line with slope of about  $\frac{1}{2}$ .
2. The function rule should be about  $y = \frac{1}{2}x$ .
3. The recalculated values will vary based on the particular vines of each group.
4. The function rules of all groups should be  $y = \frac{1}{2}x$  unless a group had an unusual set of vines.

#### **EXTENSION**

According to the function rule, a 6-foot vine would have 36 leaves.

$$6 \text{ ft} = 6 \times 12 \text{ or } 72 \text{ in.}; y = \frac{1}{2}(72) \text{ or } 36 \text{ leaves}$$

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## Ivy League Math

### INTRODUCTION

Ivies and most other types of vines are members of a group of plants called *angiosperms*, which means “flowering plants.” There are many species of ivy, but the one with which most of us are familiar is the English Ivy or *Hedera helix*. Ivies will climb any rigid structure, such as trees or walls, using aerial roots which develop from their stems.

### OBJECTIVES

In this lab, you will:

- measure the length of each vine.
- count the number of leaves on each vine.
- enter your data in a function table.
- draw a graph that represents the relationship between the length of the vine and the number of leaves.
- determine the number of leaves per unit length of vine.

### MATERIALS

- ivy or similar vine, cut to four different lengths
- large piece of heavy paper such as blotting paper
- pots and potting soil
- ruler
- paper cups

### PROCEDURE

1. Work with a partner. Place each vine on the piece of paper in order from shortest to longest.
2. Label each vine by writing a number from 1–4 above each vine.
3. Use your ruler to measure the length of each vine to the nearest inch. One person can hold the vine straight while the other person measures it. Record the measurements in the Data Table as variable  $x$ .
4. Count the number of leaves on the vine you have just measured. Record this information in the table as variable  $y$ .
5. Repeat Steps 3 and 4 for each vine.

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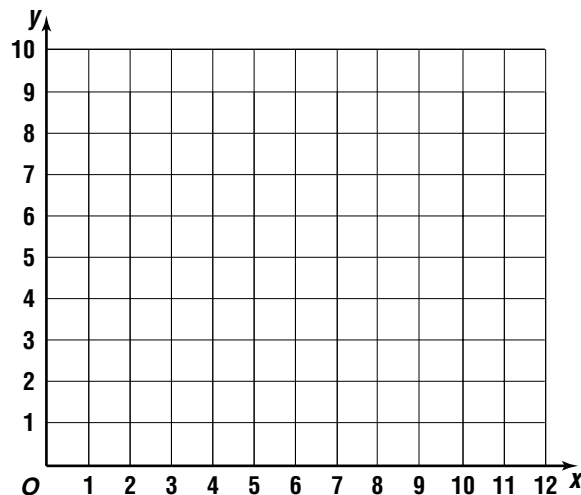
## Ivy League Math (continued)

### DATA AND OBSERVATIONS

| Vine | Vine Length ( $x$ ) | Number of Leaves ( $y$ ) | Ordered Pairs ( $x, y$ ) |
|------|---------------------|--------------------------|--------------------------|
| 1    |                     |                          |                          |
| 2    |                     |                          |                          |
| 3    |                     |                          |                          |
| 4    |                     |                          |                          |

### Questions and Conclusions

- Graph the ordered pairs from the table on the coordinate plane. The  $x$ -axis represents the length of the vines. The  $y$ -axis represents the number of leaves. Draw a line through the points you plotted. Is it a straight line?
- Use the information in the table and your graph to determine the function rule that describes the number of leaves (output) per unit length (input).
- Use your function rule to recalculate the number of leaves ( $y$ ) that should be on each vine, based on the vine lengths you measured ( $x$ ). Do these values match your original values? If not, are they less than or greater than the original values?
- How does your function rule compare with those of your classmates?



### EXTENSION

If your friend tells you that a vine is 6 feet long, how many leaves do you think the vine has? Explain your answer.