

### Activity 3

## Worm Growth

**Rationale:** Much of the success of the Habitat will depend upon continued optimal environmental conditions for the worms. The most important measure would be the increase in worm mass. The change in mass of the worms can be used with other variables, such as a decrease in mass or volume of vermicompost.

### Objectives

- 1) Design a method for collecting all of the worms.
- 2) Develop an understanding about the connection between environmental variables and change in the mass of worms.
- 3) Develop an understanding about which environmental variables may be causing changes in worm mass.
- 4) Develop a sense of how to determine which variable(s) is causing the change in mass.
- 5) Develop an understanding of the accuracy and precision needed for the correct measurement of the variables.

### PDE Standards

#### Science and Technology

3.1.7. A,B,C

3.2.7. A,B,C,D,E,F

3.6.7. A,B

3.7.7. A,B,C,D

#### Environment and Ecology

4.1.7. A,B,C

4.2.7. A,C

4.6.7. A,B,C

#### Math

2.1.8. A,B,D,G

2.2.8. A,B,F

2.3.8. A,B,D

2.4.8. A,B,D,F

2.5.8. A,B,C,D

2.6.8. A,B,C,E,F

2.7.8. B,C,D

2.8.8. F,G,H,I,J

2.11.8. A,B

### Materials

Bin

Balance (centigram)

Light source

Protective gloves

1-L plastic food container

White poster board, nonabsorbent

## **Introduction**

The best way to determine the health of the Habitat is to analyze the growth data. One of the best procedures is to measure the total mass of the worms at selected intervals. This requires a careful removal of the worms from the vermicompost. The worms should be decomposing the garbage/food, metabolizing the food as stored energy, and converting it to body mass, eggs, and new worms. However, if environmental conditions in the Habitat are not ideal or only near ideal, a slight increase in mass may occur, but new worms will be in very short supply.

## **Strategies**

The standard deviation and variance can be omitted. However, the calculator can calculate both and students can experience using the results without a complete understanding of the mathematics involved. One of the overarching concepts of this and future activities is to determine the environmental conditions that influence the growth of worms. The easiest procedure is to weigh the worms every week -- after the Habitat is well established. Under certain conditions the worms will grow well and their numbers as well as their total mass will increase. These changes in mass can be compared to the recorded conditions in the Habitat. Of course, if the class has more than one habitat each Habitat can be used for selected variables. Use one or more Table 1s to record the mass and the environmental variable(s) conditions for each Habitat. Try not to crush or destroy any of the small 3 – 4 mm cocoons. Each cocoon contains 1 – 3 small eggs that can hatch into small worms.

## **Procedure**

- 1) Remove about  $\frac{1}{2}$  of a liter of vermicompost and place it in a pile on a white poster board. Repeat this with the remaining vermicompost.
- 2) Shine a 200 watt light bulb on the piles. Gently remove the outer layers of each pile and place any worms caught into the weighing box. Most of the worms will go the bottom center and you will eventually have them all corralled.
- 3) Tare the weighing box before adding any worms or record the mass of the box in the journal and in Table 1.
- 4) Record the mass of the clean worms in the journal and in Table 1.

## **Expectations**

The students should be able to:

- 1) notice a change in the mass of the worms and the number of new worms (small).
- 2) note the conditions of the vermicompost: dampness, smell, and temperature.
- 3) determine the rate of growth in grams/week and % change/week.
- 4) determine the rate of change by entering the data (mass in List 2 and the time interval in List 1) into the graphing calculator and perform a linear regression on List 1 versus List 2.



