Activity 30

Sterile Leaf Litter vs. Natural Leaf Litter

Rationale: To determine whether the microbial life attached to leaves is an important part of the digestive processes for the worms a study must be undertaken. The leaves must be free of microbial life (sterile) that may help in digestion and compared to leaves that are not sterile.

Objectives

1) Design an experimental design for new variables.
2) Design the setup.
3) Analyze the data collected.

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
2.10.8. A,B
2.11.8. A,B

Materials

2-liter bottles per group
Leaf litter
Sterilized leaf litter.
Oven

Introduction

The introduction of microbial life to the gut of worms is an important aspect of life in the wild. However, these critters may be absent from vermiculture worms, unless the commercial worms carried them to the habitat. It would possible to prevent this from happening by only using cocoons. The cocoons' hatchlings placed in shredded

newsprint should be free of the normal microbial culture. Then if cocoons are placed in sterile leaf litter, students may be able to obtain more rigorous results. However, the teacher must decide if the time spent is worth the results.

Strategies

This should be as much of an inquiry based experiment as can be accomplished. The experimental design should be very similar to many previous activities. Refrain from over coaching in this activity. Students may need to review what chemical and biological active substances remain in fallen (dead) leaves. Fallen leaves attract many forms of molds, fungi, and protozoa that may or may not be beneficial to the growth and health of the vermiculture. These last few Activities are supposed to challenge the students' abilities to design rigorous and well conceived experiments. Use as little coaching as possible without sacrificing good scholarship.

Procedure

1) Set up 2, 2-liter or larger habitats per group.
2) Place shredded newsprint in one mini habitat.
3) Add water equal to 3 times the mass of the dry newsprint.
4) Dry the leaves thoroughly, crush or grind up.
5) Add water equal to 3 times the mass of the leaves.
6) Add 10 juvenile worms to each mini Habitat.
7) Place in a dark safe environment.
8) Feed immediately and monitor.
9) Record observations in the journal.
10) Remove worms on a regular basis, weigh, and measure their length.
11) Record measurements in the journal and in Data Table 1 or 2.
12) Note the first appearance of cocoons; count and record the numbers.
13) Note the first appearance of hatchlings; count and record the numbers.
14) Complete Data Table 1 or 2.
15) Draw conclusions from the results.

Expectations

The students should be able to:

1) complete a well conceived and designed experiment.
2) a well conceived Data Table.
3) analyze the collected data.

Data Table 1 *(Typical Student Data Table)* **Sterile Leaf Litter**

Date	Cocoons		Hatchlings		Increase in Cocoons		Increase in Hatchlings	
	#	Mass	#	Mass	#	Mass	#	Mass
Totals					**XXXX**		**XXXX**	
Average Per Worm					**XXXX**		**XXXX**	

Data Table 2 *(Typical Student Data Table)* **Natural Leaf litter**

Date	Cocoons		Hatchlings		Increase in Cocoons		Increase in Hatchlings	
	#	Mass	#	Mass	#	Mass	#	Mass
Totals					**XXXX**		**XXXX**	
Average Per worm					**XXXX**		**XXXX**	