

Using the Scientific Method

The amount and quality of food available for an organism determines how well the organism survives and reproduces. In this activity you will determine how food availability affects insect populations.

A Meal from a Worm

- Activity:** Rear mealworms with different amounts of food.
Life Skill: Learning the scientific method
Entomology Skill: Understanding impact of limiting resources
Success Indicator: Determines the effect of food on mealworm larvae production
Supplies Needed: Mealworms, containers for mealworms, corn meal, potato slices

In this chapter you will discover the satisfaction of finding answers to your questions by using the scientific method. The scientific method will help you increase your ability to pose questions, predict answers and test possible solutions to a problem (hypothesis). The methods you learn will help you in everyday life, especially in situations where you need to do critical thinking. As you learn more about the scientific method, you'll gain a better understanding of insect behavior, too.

Steps of the scientific method

1. State the problem
2. Think of possible ways to solve the problem (Your hypothesis)
3. Design a method to test your hypothesis
4. Do the experiment
5. State what happened
6. Ask questions of what you saw
7. Come to a conclusion

BEEgin

Go to a pet or bait store and buy a container of mealworm larvae (about 50 per container). Buy the "older" larvae for this activity. Mealworms are the immature stages of the yellow mealworm, *Tenebrio molitor* L. or the dark mealworm, *T. obscurus* Fabricius.

The first step is to make two suitable containers to rear the mealworms. A two-liter soda bottle works well but other containers such as plastic sandwich containers or plastic food storage boxes serve as excellent rearing boxes. If you use plastic soda bottles, cut off the tops of both bottles. Place 20 mealworm larvae into the bottom portions of each container. Next add two cups of corn meal into one container and add one cup of corn meal to the other container. Add a potato or apple slice into each container for moisture.

Label the container with two cups of corn meal as "A" and the container with one cup of corn meal as "B."

This activity is designed to determine how well each test group does with a fixed amount of food so do not add any additional corn meal to either of the two containers. Be sure to replace the potato or apple slice each week. When you change the potato or apple slice, dump out the entire contents into another container and count the number of mealworm larvae, pupae and adults. Depending on the maturity of the larvae, it may take a few weeks for pupae to develop. Do this each week and record your observations in the charts.

Container A (2 Cups)
Date Started: _____

Week	No. Larvae	No. Pupae	No. Adults
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

Food should affect population!



Container B (1 Cup)
Date Started: _____

Week	No. Larvae	No. Pupae	No. Adults
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			



Share what happened

- What did you observe in both containers at the end of 2, 4 and 6 weeks?
- What did you discover about how mealworm larvae feed?

Process what's important

- Why is it important to record the observations as soon as possible?
 - How did you use the scientific method in this activity?
- Q.** What effect did the amount of food have on the population?

A. _____

Generalize to your life

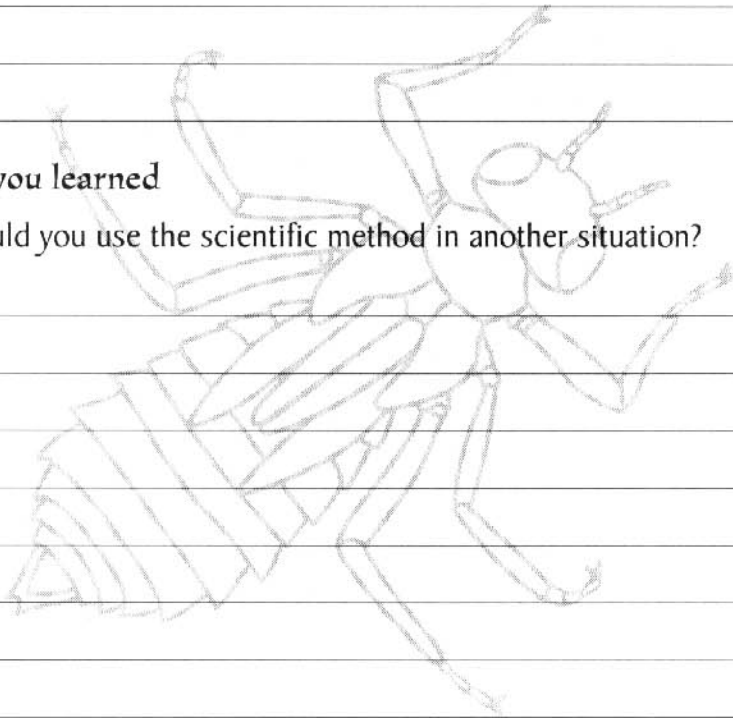
- What happened in this activity that you did not plan would occur?
- Q.** How would you redesign the experiment to test the effect of potatoes (moisture source) on mealworm survivability?

A. _____

Apply what you learned

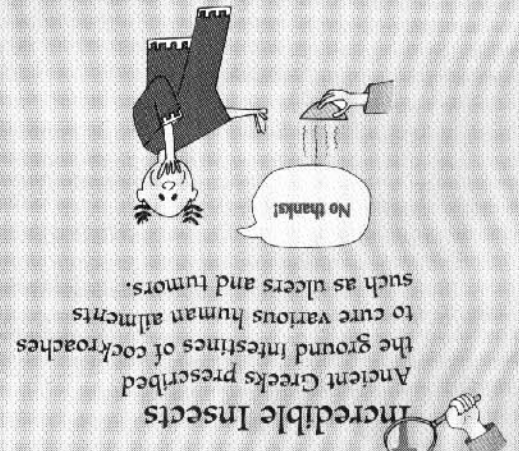
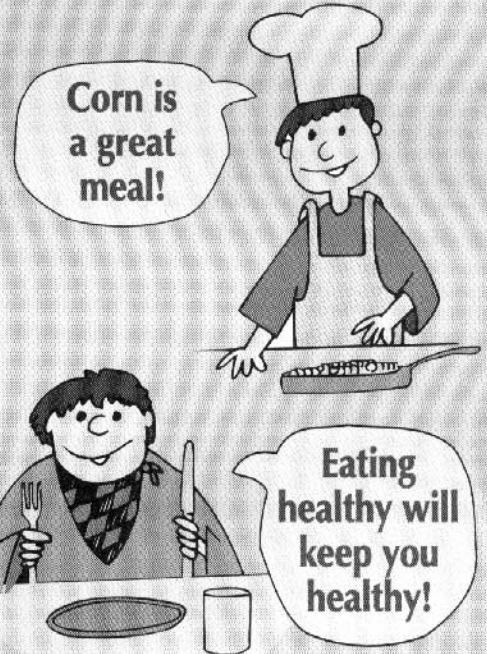
- Q.** How could you use the scientific method in another situation?

A. _____



Beetle Larvae

A female beetle can lay about 250 to 1,000 eggs in her lifetime. The eggs hatch in from 4 to 18 days depending on the temperature. At each successive molt, larvae change color from white to yellow. Full grown larvae measure about 1 to 1.5 inches long. Under favorable conditions, larvae will complete their development in about 2.5 to 3 months.



Migrating On

1. What resources do you use each day, and how do you wisely use these resources?

