

Lesson 10: Where Is My Food?

Key Concepts:

- Monarchs may use multiple senses to find their milkweed food plant.
- There are many ways to set up an experiment to answer a question.
- It is important to think of all possible outcomes of an experiment as you set it up.

Skills:

- Experimental methods
- Scientific reasoning

Materials:

- 4 or more hungry 4th or 5th instar caterpillars (don't feed them for 20-30 minutes before the experiment)
- 3 paper towel or toilet paper rolls
- Plastic wrap
- Milkweed
- Chart paper or "Can Monarch Caterpillars Find Their Food" Data Sheet (teacher page)

Objective

Students will conduct a simple experiment to determine if monarch caterpillars can find food in a simple maze. There are many possible ways to conduct this experiment, and students should be given the opportunity to provide input into the design and interpretation of their research.

Background

In this experiment, your students will investigate the monarch's searching behavior and ability to find food. Here, we only use its hostplant, milkweed, but require that the caterpillar find its food in a Y-shaped maze. We do know that females usually only oviposit on milkweed so that the larvae do not initially have to search for their hostplant. However, as they grow they often move to another plant, so they do need to be able to find milkweed. For further background on *Butterfly Sensory Systems*, see the Monarch Biology section.

It is best to use hungry caterpillars for this experiment. If you see one eating just before the experiment, it will probably be motivated to find more milkweed. One that is very still on the top or side of its container is probably molting and is unlikely to search for food.

Procedure

Guide your students through the following steps of the scientific method. They may come up with alternative hypotheses, methods, and results; those we've listed here are only examples.

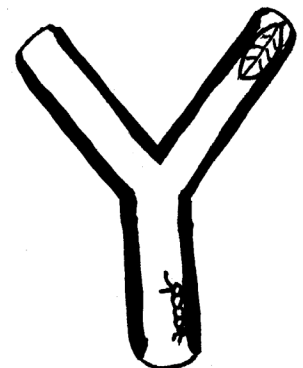
Question: Can monarch caterpillars find their food in a simple maze?

Sample Hypotheses:

- Monarch caterpillars can find milkweed in a simple maze.
- Monarch caterpillars cannot find milkweed in a simple maze.

Methods:

1. To make the Y-shaped maze, cut a lengthwise strip out of the top of each roll so that students can see caterpillars inside the maze. Trim one end of each roll so that you can tape them together to make a "Y" (see figure) and then cover with plastic wrap to keep caterpillars from crawling out of the maze.
2. Place milkweed at the end of one of the branches. Hold the maze upright, with

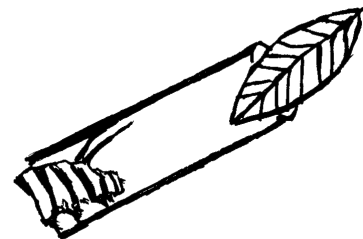


the bottom of the “Y” touching a table.

- Place one caterpillar at the bottom of the maze and see if it can find its way to the milkweed. If it hasn't found the milkweed after 3 or 4 minutes, stop the trial and record “NO” in the column labels “Did it find the milkweed?” You can use caterpillars up to five times, but give them a break between trials.
- If a caterpillar does find the milkweed, record how long it took to find it.
- Repeat the trial with several other caterpillars and record the results for each caterpillar on chart paper. Discuss how the caterpillars are or are not finding their milkweed.

Sample Results:

Caterpillar	Did it find milkweed?	How long did it take to find the milkweed?
Charlie	Yes	2 min, 22 sec.
Milky	No	
Stripes	Yes	3 min, 15 sec
EatsAlot	No	
Charlie	Yes	1 min, 55 sec
Milky	No	
Stripes	Yes	3 min, 39 sec
EatsAlot	Yes	1 min, 30 sec
Charlie	Yes	2 min, 10 sec
Milky	No	
Stripes	Yes	3 min, 5 sec
EatsAlot	Yes	2 min, 40 sec



Conclusions : The results above suggest that MOST of the time caterpillars can find milkweed in a simple maze and that perhaps poor Milky needs help.

Name _____

“Can monarch caterpillars find their food?” Data Sheet

Name of caterpillar	Trial number	Did it find milkweed?	How long did it take to find milkweed?