Name _____ Class _____ Date _____

EXPLORING MEALWORM BEHAVIOR

BACKGROUND INFORMATION

Behavior is the way an organism responds to stimuli. Some behaviors must be performed automatically in order to survive. Other behaviors are flexible and capable of being changed by experience. The behavior of an animal is just as important to its survival and reproduction as its physical characteristics. And like physical characteristics, behavior can evolve and be inherited if it enhances the animal's ability to survive. In this laboratory investigation, you will examine the behavior of mealworms.

PROBLEM

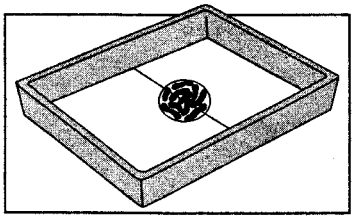
How do mealworms respond to their environment?

MATERIALS *(per person)*

aluminum foil	lamp (or sunlight)
150-mL beaker	10 mealworms
dry cereal	petri dish
small paintbrush	ruler
compass	scissors
cellophane tape	sheet of unlined paper
dissecting tray	

PROCEDURE

1. Use the scissors to cut a sheet of paper to fit into the bottom of the dissecting tray.
2. Find the exact center of the paper. Use a compass to draw a circle with a 2.5-cm radius at the center of the sheet of paper. Use the ruler to find the centers of the two longest edges of the paper. Mark these two points. Connect the points with a straight line.
3. Place the sheet of paper in the bottom of the dissecting tray. Tape the sheet of paper to the tray along the edges of the paper.
4. Place 10 mealworms into a 150-mL beaker.
5. Put a petri dish under one edge of the dissecting tray to raise it about 1 cm. Place the mealworms into the circle in the center of the tray.



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6. Observe the mealworms' behavior for 10 minutes. Note whether they crawl uphill or downhill. Observe what they do when they reach the edge of the tray. Record your observations. Remove the mealworms from the tray.
7. Place a piece of aluminum foil over half of the tray. Line up one edge of the foil with the line you drew down the center of the paper. Shine the lamp directly over the tray. Place the mealworms back in the circle. Observe the mealworms' behavior for 10 minutes. Record your observations.
8. Remove the aluminum foil. Place a small handful of dry cereal in one corner of the tray. Brush the mealworms back into the circle. Observe the mealworms' behavior for 10 minutes. Record your observations.

OBSERVATIONS

1. How many mealworms remained within the circle in the tilted dissecting tray? How many climbed uphill? How many climbed downhill?

2. In response to light, how many mealworms remained within the circle? How many crawled under the aluminum foil? How many crawled into the light?

3. When cereal was placed in the dissecting tray, how many mealworms remained within the circle? How many crawled into the cereal? How many did not?

4. What did the mealworms do when they reached the edge of the tray?

ANALYSIS AND CONCLUSIONS

1. Do mealworms prefer to climb uphill or downhill? How might this behavior be adaptive?

2. Do mealworms prefer to be in light or in shade? How might this be adaptive behavior?

3. Do mealworms prefer to be in or out of the cereal? How might this behavior be adaptive?

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4. How is the mealworms' behavior at the edge of the tray adaptive?

CRITICAL THINKING AND APPLICATION

1. Were most of the mealworm behaviors you observed learned or instinctive? Explain your reasoning.

2. In an experiment, ten mealworms were placed in the center of a tray that had dry cereal in one corner. After ten minutes, nine of the mealworms were buried in the cereal. The cereal was then removed and the mealworms returned to the center of the tray. After a few minutes, five of the mealworms went back to the corner of the tray where the food had been. Explain this behavior.

3. In an experiment, a mealworm was placed in a tray on one side of a partition. A mound of bran flakes was located on the other side of the partition. At one end of the partition was an opening through which the mealworm could pass. The first time the mealworm was placed in the tray, it took 10 minutes for the mealworm to reach the food. On subsequent trials, the amount of time it took for the mealworm to crawl across the partition into the mound of food decreased to 7 minutes, 5 minutes, and 4 minutes. Explain.

4. Explain why behavior is as important to an organism's survival as reproduction or physical characteristics.

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