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The Mealworm Puzzle

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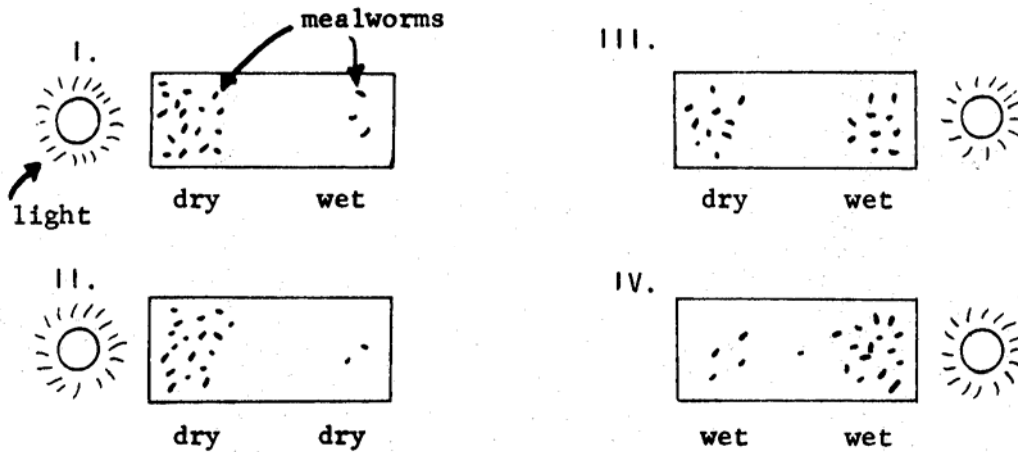
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The Mealworm Puzzle

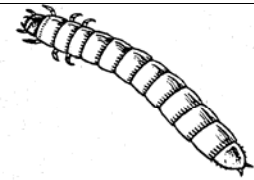
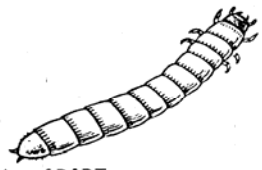
Some experimenters wanted to test the response of mealworms to light and moisture. To do this they set up four boxes as shown in the diagram below. They used lamps for light sources and constantly watered pieces of paper in the boxes for moisture. In the center of each box they placed 20 mealworms. One day later they returned to count the number of mealworms that had crawled to the different ends of the boxes.



What can you conclude from these diagrams? The diagrams show that mealworms respond to (response means move toward or away from):

- A) light but not moisture
- B) moisture but not light
- C) both light and moisture
- D) neither light nor moisture

Please explain your choice. _____



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How did you think your way through the problem? Did you think at once of the way to do it, or did you first think of a way that had to be modified or abandoned? _____

When you are done, examine a collection of student responses, next page.

The following are typical student responses and their explanations to the Mealworm Puzzle. Read these responses and compare them with your own. Look for similarities and differences between type B and type A responses.

Student B1 (College Junior)

D. "No definite pattern was followed by the mealworms."

Student B2 (Norma Kuhn - Age 20)

D. "Because even though the light was moved in different places the mealworms didn't do the same things."

Student B3 (College Freshman)

A. "They usually went to the end of the box with the light."

Student B4 (High School Sophomore)

A. "Because there are 17 worms by the light and there are only 3 by the moisture."

Student B6 (Harold O'Keefe - Age 20)

A. "Because in all situations, the majority go where there's light. Wetness doesn't seem to make a difference."

Student A1 (Barbara Downing - Age 21)

C. "Boxes I and II show they prefer dry and light to wet and dark, Box IV eliminates dryness as a factor, so they do respond to light only. Box III shows that wetness cancels the effect of the light, so it seems they prefer dry. (It would be clearer if one of the boxes was wet-dry with no light)."

Student A2 (David Kenting - Age 19)

C. "When the light was on the dry side they all crowded to the dry side. When it was on the wet side, an equal amount went to each side."

Student A3 (High School Freshman)

C. "In experiment 3 the mealworms split 1/2 wet, 1/2 dry. So it's safe to assume that light was not the only factor involved."

Student A4 (Delores Johnson - Age 19)

B. "I, II, and IV show that mealworms seem to like the light, but in III they seem to be equally spaced. This leads one to believe that mealworms like the dryness and the reason in pictures III and IV they are by the light is because of the heat that the light produces which gives a dryness effect."

Student A5 - (John Blake - Age 16)

C. "The mealworms in all cases respond to light. However, in box 3 the division is about 1:1. This shows that they worms are attracted to the light but do not like the situations where the dry area was next to the light. When there is no choice between wet and dry such as in case IV the worms turn to the light. Note: We might also test a box like this wet dry with no light to further verify the effect of moisture."

Now answer the questions on the following page.

