How do mealworms behave in response to various stimuli?

Mealworms are useful for studying animal behavior because they are relatively easy to manage, and they respond to many types of stimuli. A stimulus is anything in the environment to which an organism reacts. Mealworms are also excellent for studying innate behaviors of animals. Innate behaviors are those that are inherited rather than learned. Innate behaviors are important to an animal´s survival.

Animals have two types of innate behaviors: reflexes and instinctive behaviors. The simplest innate behaviors are reflexes. Reflexes are automatic, immediate responses to stimuli. For example, blinking when an object flies toward your face is a reflex. All animals have reflexes. During a reflex, a message passes from a sense organ along the nerve to the spinal cord and back to the muscles. The message does not go to the brain.

Instinctive behaviors are patterns of innate behavior that have evolved within an animal species over many generations. Instinctive behavior begins when the animal recognizes a stimulus and continues until all parts of the behavior have been performed. For example, salmon´s swimming upstream to spawn is a behavior that has allowed this species to survive and produce offspring. Salmon instinctively display this behavior. They do not need to learn it.

In the Virtual Lab, you will predict, observe, and describe the responses of mealworms to various stimuli. You will also classify behaviors as reflexes or instinctive behaviors.

Objectives:
- Predict, observe, and describe the responses of mealworms to various stimuli.
- Distinguish between reflexes and instinctive behaviors.
- Explain the importance of reflexes and instinctive behaviors.

Procedure:
1. Go to the following website:
   http://www.glencoe.com/sites/common_assets/science/virtual_labs/LS17/LS17.html

2. Click the Play button on the video controller to watch an introductory video about mealworms. Click the Pause button to pause, the Rewind button to go back a few frames, the Fast Forward button to go forward a few frames, and the Stop button to rewind to the beginning of the video.

3. Click a file tab to select a stimulus to examine.

4. Read the Stimulus Question on the file card. Predict how the mealworm will respond to the stimulus.

Note: Your predictions will not be evaluated. Making predictions is part of the scientific process. Proving or disproving hypotheses is a way in which important scientific discoveries are made.

5. Drag one of the three responses to the Predicted Behavior area. Enter your prediction in the Table.

6. Click the Play button on the video controller.

7. Watch the video to see how the mealworm responds to the selected stimulus.

8. Drag the response that corresponds to the mealworm´s actual behavior to the Actual Behavior area. Record the actual response in the Table.
    Note: When you click a new file tab, data from the previous file card will be erased.

9. Repeat the Virtual Lab until you have observed mealworms´ responses to four different stimuli.

10. Complete the Journal questions.

11. Click the Reset button to obtain a different set of stimuli.

Table:

Stimulus Applied	Predicted Behavior	Actual Behavior	Type of Behavior

Questions:

1. What is the difference between a reflex behavior and instinctive behavior? Describe reflex behaviors and instinctive behaviors that humans possess.

2. Which mealworm behaviors were reflexes? Why?

3. Which mealworm behaviors were instinctive? Why?

4. How did the mealworm respond to food as a stimulus? What type of behavior is displayed in the mealworm's response to food? Why is this behavior important?

5. How did the mealworm respond to cold water as a stimulus? Was the response behavioral or metabolic?