

Lab # 7 – Movement, stimulus and response

QEP Essential Knowledge

Living Things: Forces and Motion

How animals move

Characteristics of living things

Movement

Respond to environment

Stimulus and response

SWBAT

Demonstrate how muscles enable an earthworm to move.

Make a prediction and carry out an investigation to test the prediction.

Identify responses to stimuli in earthworms and explain why they respond as they do.

Explain which kind of stimulus causes a faster response in humans – visual or auditory.

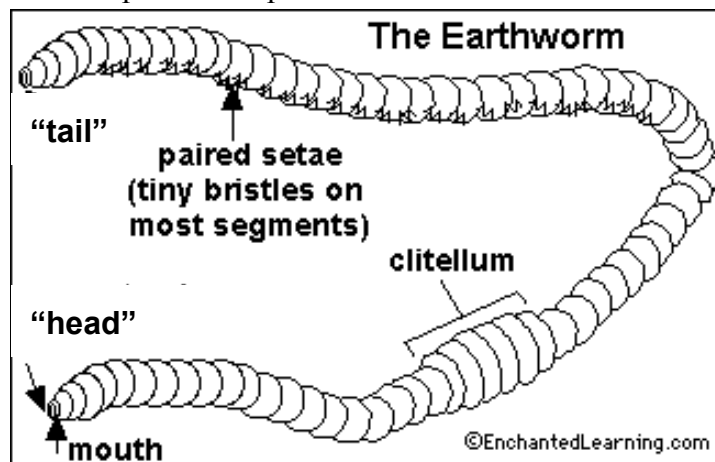
Stimulus and Response in Earthworms

Today we are exploring the question: What adaptations do organisms have that allow them to move in their habitats and what kind of stimuli cause them to move?

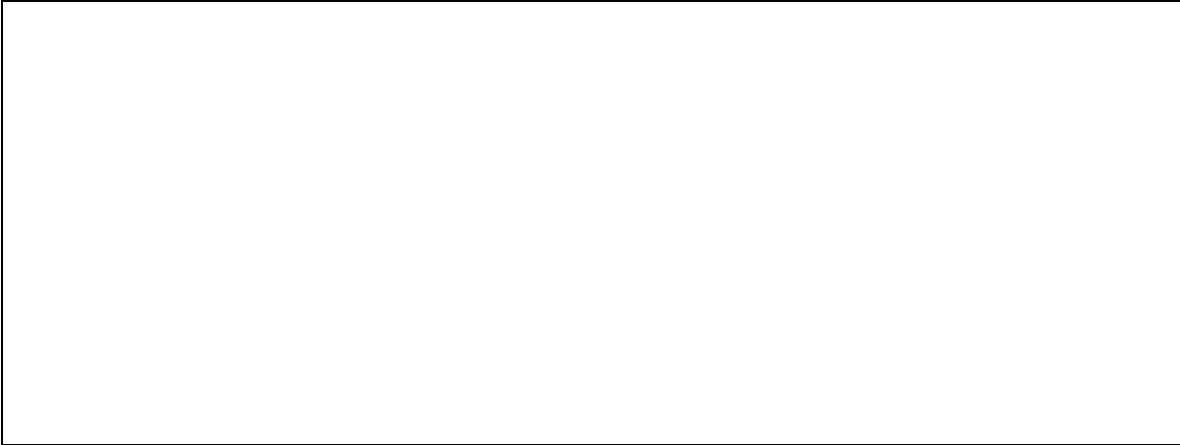
EXPLORE

In this lab, you will work with earthworms, which are living organisms. Treat them with respect. Do not harm them by squeezing, crushing, dropping, or over-handling, and do not let them dry out. The worm will die if it dries out.

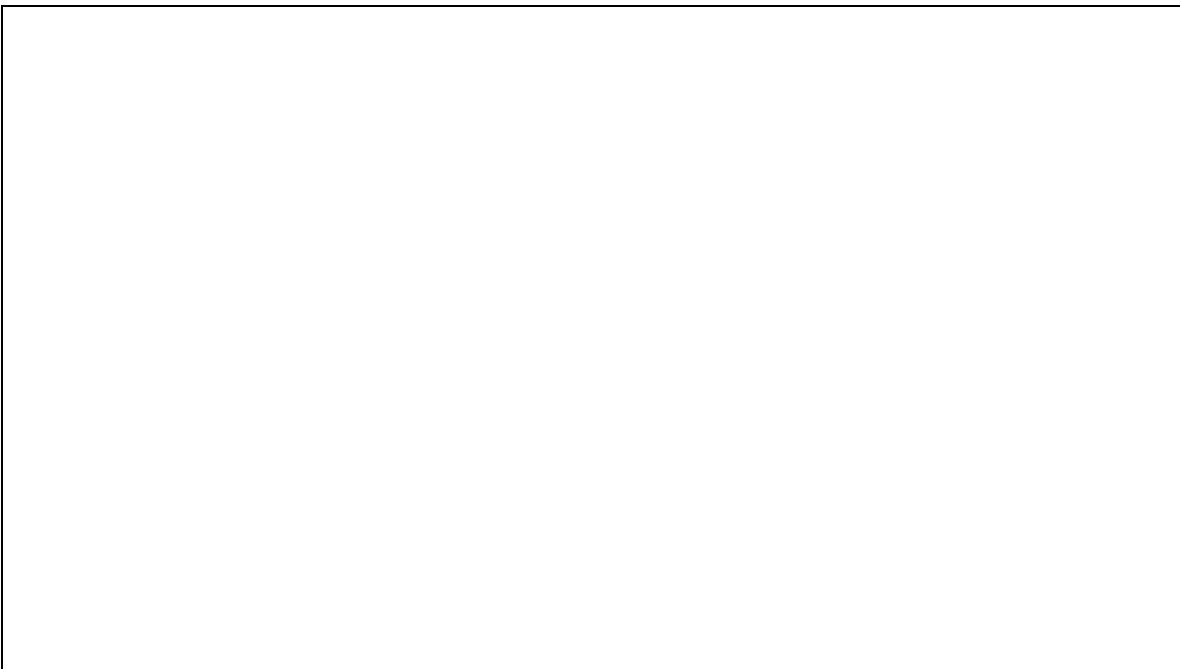
A. Carefully examine the earthworm using a magnifying glass. Use the diagram below to identify the main parts. Determine which end is the head (where the mouth is) and which end is the tail. The clitellum is the reproductive part of the worm



B. Make and label a sketch of a **close-up view of several segments** and setae (hairs on each segment). You may not be able to see the setae, but you should be able to feel them.



C. Carefully observe how the worm moves. Notice how the segments change shape as the worm moves and how the setae are used. Draw and/or describe what you see as the earthworm moves.



EXPLAIN

You will discuss how earthworms move and how their movement and structure suits their habitat.

EXTEND - Earthworm response to stimuli

A. Based on what you know about earthworms so far, as well as where they live, answer these questions.

What senses do you think earthworms might have?

What stimuli do you think earthworms might respond to? Will they show a negative or positive response to those stimuli?

B. Your TA will assign your group a stimulus to test, either light/dark; wet/dry; or exposure to a strong chemical (vinegar).

Prediction: Together with your group, think about how the earthworm lives and make a prediction of how you think earthworms will respond to this stimulus. For example: A worm will move toward vinegar (positive response).

C. Materials:

Light/dark: paper towels and a flashlight. Use the paper towel to make a space the worm can crawl under where it is dark. Have another area in the light. Do NOT let the worm dry out.

Wet/dry: paper towels and water. Use dry and wet paper towels to see where the worm stays or moves to. Do NOT let the worm dry out.

Chemical exposure: cotton ball and vinegar. Place 3 drops of vinegar on the cotton ball. **IMPORTANT:** be sure that you **do not** expose the worm *directly* to the vinegar. The cotton ball should be placed *near* the worm but never directly on the worm's body. Do NOT let the worm dry out.

D. Record data: Carry out the investigation and record your results in the table.

Trial	Results
1	
2	
3	
4	
5	

E. Compile or compare data with other groups that tested the same stimulus. Did the other groups get similar results?

F. Interpret the data: Fill in the following table to summarize what you learned from this investigation.

Stimulus	Claim – How do worms generally respond to this stimulus?
Light vs. dark	
Wet vs. dry	
Exposure to vinegar	

F. What senses do earthworms seem to have? Do they have the same senses as humans?

Explain **WHY** earthworms respond to these stimuli as they do. (HINT: Think about where they live.)

Stimulus and Response in Humans

Now you will test stimulus and response in humans and answer this question: Do humans respond faster to visual stimuli to tactile (touch) stimuli?

Your TA will demonstrate how to do this investigation. Practice a few times before you begin. Do not record trials that were not done properly.

A. Record how many cm the ruler dropped before the person grabbed it (column 2). Read ruler at the top of index finger, where they caught the ruler.

Trial	cm ruler dropped	Reaction time
1		
2		
3		
4		
5		

D. After recording how far the ruler dropped use the table provided in class to convert the distance the ruler fell (cm) to the time it took to fall that far (reaction time) and record that in the table as well. You will have to estimate if you have a measurement that is in between two.

E. Use the data to answer the question: Do humans respond faster to visual stimuli to tactile (touch) stimuli? Provide evidence as well.

F. Provide a hypothesis to explain why you got the results you did.