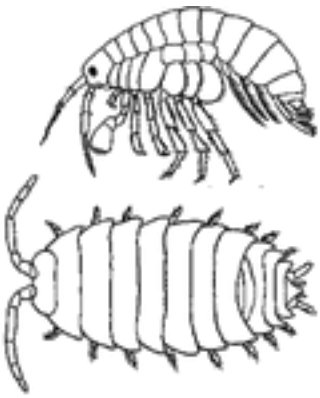
Isopod Behavior or The Rolly-Polly Lab



Name: _____

Objectives:

- Observe various aspects of a terrestrial isopod
- Examine responses of isopods to various environmental factors
- Learn to write good observations and make detailed biological sketches
- Design and conduct an investigation of animal behavior

Background Information

Terrestrial isopods are land dwelling crustaceans, commonly known as sowbugs or pillbugs (or rolly-pollys). They are related to lobsters, crabs, and shrimp and terrestrial isopods breathe with gills. While they look similar, sow bugs are different from pill bugs. Pill bugs will curl into a ball when threatened whereas sow bugs will attempt to flee. Since your isopods are caught from the wild, make sure you are using the same type for your experiments. Ethology is the study of animal behavior. Many behaviors involve movement of the animal within its environment. In this exercise, you will investigate some innate (instincts) behaviors of isopods. Orientation is a process by which animals position themselves with respect to spatial features of their environments. Taxis involves the turning of an animal's body relative to a stimulus - either toward or away. Kinesis is a random turning or movement of an animal in relation to a stimulus.

1) What type of organism will you study in this lab?

2) List two organisms it's related to.

3) Define crustacean. (*It is not in this pre-lab, you will have to look it up and write a definition in you own words.)*

4) Define ethology.

5) Define taxis

6) Define kinesis.

A. General Observations

Step	Procedures	Comments, Observations, Errors and Data
1	• Observe the pill bugs and write down what you see. Notice where they go, how they interact and anything else you may see. ***Do NOT prod or push them around. We want to observe their "natural" behavior.*** To help you learn how to make and write good usable observations answer each of the following questions. Questions will not always be asked you need to begin to think about what to consider when doing scientific investigations. ***WHAT details will I need to remember to explain this to another scientist when I'm at home doing my report? (you won't be able to remember so WRITE IT DOWN)***	
2	• **What does it look like?** *You will need to make a sketch using the details you write here so think about:* • How many eyes, legs, horns, body segments etc they have • Are they all of the same species (can you see differences between bugs?) • Can you if a bug is a male or female? • Determine the relative proportions (length, width, height as well as lengths of body parts) **USE A RULER TO MEASURE but be gentle!**	(5pts; must have 3 measurements with units)
3	• How do the bugs seem to sense their environment?	
4	• How do they exhibit dominance behaviors?	
5	• What are some stimuli they seem to respond to?	

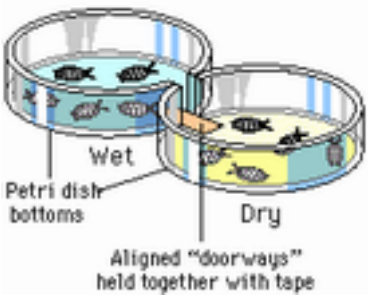
6	• How do they respire?	

B. Scientific Sketching

1	• When you make a sketch of a pillbug, don't just draw an oval with a few squiggly legs - you are expected to do a scientific illustration similar to the sketch of an earthworm below.  Here are some tips for making an accurate sketch (include in your lab report) • Determine the relative proportions (length, width, height as well as lengths of body parts) • Count the number of body segments • Count the number of legs • Locate and label the body parts • Note the size of the pillbug
2	Draw your sketch here: (5pts; must be labeled & have measurements)

C. Behavior Chamber

Step	Procedures	Comments, Observations, Errors and Data

1	• Now you will study how the bugs response to different environmental stimuli. • Each chamber will consist of two sides, each side having a different environment, plus a tube that connects the chambers so that the isopods can move from one place to the other. 
2	• Set up your behavior chamber so that you have one side moist and one side dry (using round filter paper). • Cut the filter paper so it fits the chamber. • Transfer 5 isopods to each side of the chamber (total of 10). *Use tip of brush to transfer isopods gently.* • Count and record the number of animals on each side of the chamber every 30 seconds for **ten minutes**, using a table like the one below.

Time	# in Wet	# in Dry	Other Notes
0:00			
0:30			
1:00			
1:30			
2:00			
2:30			
3:00			
3:30			
4:00			
4:30			
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8:30			
9:00			
9:30			
10:00			

7) Based on your observations, do isopods prefer a moist or dry environment?

8) Would the movement you observed be **taxis** or **kinesis? _____ Explain** (using at least 2 complete sentences) **why**?

9) Suggest a reason (using at least 2 complete sentences) why this behavior might be advantageous to an isopod.

10) In this part of the experiment, the independent variable was _____.

11) In this part of the experiment, the dependent variable was _____.

D. Student Designed Experiment

<table>
<tr><th>Step</th><th>Procedures</th><th>Comments, Observations, Errors and Data</th></tr>
<tr><td>1</td><td>• Now you will design you own behavioral experiment. Pick TWO to study in the chamber.
<table>
<tr><th>Factor</th><th>Materials (suggested)</th></tr>
<tr><td>Temperature</td><td>cold pack, warm pack</td></tr>
<tr><td>Light</td><td>lamps, flashlights, dark construction paper, aluminum foil</td></tr>
<tr><td>pH</td><td>low pH (HCl), high pH (NaOH)</td></tr>
<tr><td>Substrate (surface)</td><td>soil, sand, sandpaper, bark, paper, cedar chips, gravel</td></tr>
<tr><td>Odor</td><td>ammonia</td></tr>
<tr><td>Food</td><td>apple, potato, fish food, lunchmeat</td></tr>
</table></td><td></td></tr>
<tr><td>3</td><td>• Form a hypothesis, often written as an IF-THEN statement.

Poor: I think pillbugs will move toward the wet side of a choice chamber.

Better: If pillbugs prefer a moist environment, then when they are randomly placed on both sides of a wet/dry choice chamber and allowed to move about freely for 10 minutes, most will be found on the wet side.</td><td></td></tr>
<tr><td>4</td><td>Write your hypothesis here:</td><td></td></tr>
<tr><td>5</td><td>• Set up your behavior chamber so that each side has one of the factors you decided to investigate.
• Transfer 5 isopods to each side of the chamber (total of 10).

Use tip of brush to transfer isopods gently.

• Count and record the number of animals on each side of the chamber every 30 seconds for ten minutes, using a table like the one below.</td><td></td></tr>
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12) Explain (using at least 3 sentences) your conclusion? Did your result match your hypothesis? Explain Why or why not?

13) In this part of the experiment, did the isopods exhibit kinesis, taxis or an obvious preference to one environment over the other?

14) Suggest a reason (using at least 2 complete sentences) why this behavior might be advantageous to an isopod.

15) In this part of the experiment, the independent variable was _____.

16) In this part of the experiment, the dependent variable was _____.

17) In this part of the experiment was there a **true** "control" group? _____ Explain (using at least 2 complete sentences) why or why not?

18) Explain (using at least 2 complete sentences) one way this experiment can be improved? (none = 0pts)