# Pill Bug Lab Coversheet

**Your name** _____

Partner(s) _____

Period _____

**Purpose:** Learn how to use your knowledge of the scientific method to design an experiment with pill pug. Analyze the relationship between independent and dependent variables, and formulate conclusions.

**Outcome:** Students will work together in groups to make observations, develop inferences, create hypothesis, perform an experiment, generate graphs using the computer, and explain their results.

**A. Ten Observations** _____ **(5 points)**

**B. Hypothesis** _____ **(4 points)**

**C. Variables and Controls** _____ **(3 points)**

**D. Materials and Procedure** _____ **(3 points)**

**Teacher Signature – *S. Brammer*** _____ **(2 points)**

**E. Data – Observations and Notes** _____ **(4 points)**

**F. Results and Calculations** _____ **(3 points)**

**Graphs – *rough draft and computer generated*** _____ **(6 points)**

**G. Conclusion:** _____ **(4 points)**

**Total Points Earned** _____ **(34 points)**

# *"Pill Bug" Lab*

Observations, Interpretations, and Experimental Design

You will learn how to apply the scientific method during this lab. The first step is to make observations. Then you will use the question about pill bugs and their **behavior** and to develop a hypothesis. The fun part is making a prediction about your hypothesis. After that, you will design an experiment that will test your hypothesis. Then you will have the opportunity to analyze your data and see if your hypothesis is correct! All animals will display preferences to their surroundings for example pill bugs can respond to various light intensities or moisture.

## A. Observations:

You may not harm the animals in any way! Working with your partner, select one or two pill bugs from the Pill Bug Hotel. Place your volunteer (give it a name if you wish) on a wet paper towel and gently set it on your table. Draw a detailed picture of your pill bug in the box below. Use a hand lens or dissection microscope for help. **Label:** Antennae, Head, Legs, and Tail End
Finally, record ten good observations of your bug. **Make no interpretations.**

1. Average bug mass (g) = _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

**The Question:** ***Does light exposure affect pill bug response?***

## B. Hypothesis:

You and your partner decide on a hypothesis for the question. A hypothesis is a statement that explains an observation. Use the question above for help.

$H_1$: _____

_____

_____

$H_0$: (Null Hypothesis)_____

_____

_____

## C. Variables & Controls:

The independent variable is the factor that is the cause. The dependent variable is the affect and is influenced by the cause. A control (constant variable) is a factor that needs to be the same for all bugs tested. Fill in the following:

Independent variable (cause): _____

_____

Dependent variable (affect): _____

_____

Control 1: _____

_____

Control 2: _____

_____

## D. Materials & Procedure:

Make a list of all the materials that you will need to conduct the experiment.

10 bugs, damp paper towel, observation chamber, _____

_____

_____

_____

_____

Write a **detailed description** of how you are going to test whether there is an affect of bug response to light. The level of detail must be sufficient for someone who is unfamiliar with this lab to be able to redo your experiment from your procedure.

Do not proceed with your experiment until the teacher signs off on your lab write up.
**NO CREDIT** will be given on this assignment if you do not get my signature. I will check your work and either tell you what needs to be changed or I will sign off on it for a green light.

**Teacher Signature** _____

## E. DATA:

Fill in the following table with the data collected during the experiment. Don't forget to write in the number of bugs every 30-second interval for TWO separate trials, so watch the clock!

### Observations and Notes **(while the experiment is in progress)**

Record the following: **1)** observations on what you saw, **2)** ideas on how to improve the experiment, and **3)** any additional comments during the experiment.

**Table 1: Pill Bug Response**

| Time | Number of Bugs in Dark | | Number of Bugs in Light | | |
|---|---|---|---|---|---|
| | Trial 1 | Trial 2 | Trial 1 | Trial 2 | |
| 0:00 | | | | | |
| 0:30 | | | | | |
| 1:00 | | | | | |
| 1:30 | | | | | |
| 2:00 | | | | | |
| 2:30 | | | | | |
| 3:00 | | | | | |
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| 6:30 | | | | | |
| 7:00 | | | | | |
| 7:30 | | | | | |
| 8:00 | | | | | |
| 8:30 | | | | | |
| 9:00 | | | | | |
| 9:30 | | | | | |
| 10:00 | | | | | |

## F. RESULTS AND CALCULATIONS: **(show all calculations below)**

**Table 2: Average Pill Bug Response**

***Formulas:***

$$Average\ (dark) = \frac{Trial\ 1 + Trial\ 2}{2} \quad Average\ (light) = \frac{Trial\ 1 + Trial\ 2}{2}$$

| Time | Average # of bugs | |
|---|---|---|
| | Dark | Light |
| 0:00 | | |
| 0:30 | | |
| 1:00 | | |
| 1:30 | | |
| 2:00 | | |
| 2:30 | | |
| 3:00 | | |
| 3:30 | | |
| 4:00 | | |
| 4:30 | | |
| 5:00 | | |
| 5:30 | | |
| 6:00 | | |
| 6:30 | | |
| 7:00 | | |
| 7:30 | | |
| 8:00 | | |
| 8:30 | | |
| 9:00 | | |
| 9:30 | | |
| 10:00 | | |

### Graph **(use graph paper)**

Make an XY graph (line graph) using the data from your average number of pill bugs. Include a title (descriptive of the variables measured and the subject organism), label the axes, indicate units (average number of bugs & minutes), and number the axes ticks. Include a legend that indicates dark condition and light condition. Connect the data points for each line.

## G. CONCLUSION:

What is your conclusion about the **pill bug's response**? **Respond in paragraph form**. Include the following in your conclusion:

Paragraph 1

1. Restate your original hypothesis ($H_1$).

Paragraph 2

2. Write about whether your Hypothesis was correct or not correct and why – refer to numerical data obtained. Use actual numbers obtained in your experiment.

Paragraph 3

3. Discuss your final results. Give a biological example, or inference.

Paragraph 4

4. What other experiments could be done with pill bugs? Describe the procedure.