

### Unit 1 Topic #3 Scientific Method - Making Hypotheses

#### **Background Information:**

Pillbugs—also known as sowbugs, woodlice, or roly pollies—can be found right in your backyard. They are mostly found in the northern central United States, though there are some species that live as far south as Florida. They have rounded backs and seven pairs of legs. Some species can roll up into a ball when they sense danger in the environment. Pill bugs play an important role in the environment by helping to decompose dead organisms and recycle nutrients into the soil.



Because pillbugs do not have a waxy outer coating (i.e. a cuticle) that covers their bodies, they are extremely vulnerable to “drying out.” Pillbugs in environments with lower than 50% humidity will die of dehydration within one day. (Note: 50% humidity means that the air is “filled” with only 50% of the water vapor that it CAN hold.) Once the humidity levels reach over 87%, pillbugs can absorb water through their body walls to rehydrate.

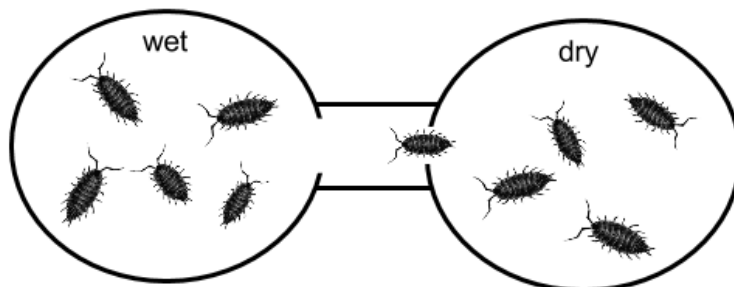
When outdoors, pillbugs typically choose to forage for food in cool, humid locations (ex: underneath a log). When inside a house, pillbugs can be found on water pipes or in cellars.

Pillbugs can breed throughout the year. The female carries the eggs in a brood pouch on the underside of her body. Often, there are as many as 200 eggs per brood. The eggs hatch in 3 to 7 weeks, and the young remain in the pouch another 6 to 7 weeks. Once the young leave the pouch, they never return. Some species produce only one brood per year, but others may produce two or more.

Pillbugs, like insects and their relatives, must shed their hard outer skin or exoskeleton to grow. They do this a dozen or more times during their lives. Pillbugs generally hide when they shed their skin because they are especially vulnerable to enemies at this time. The average life span of most pillbugs is about 2 years, but some have lived as long as 5 years.

#### **The Experiment:**

You decide to test the research question, “Do pillbugs prefer dry or humid environments?” You create a “choice chamber,” which consists of two circular dishes (i.e. petri dishes) connected by a passageway. In one petri dish, you place a wet paper towel. In the other petri dish, you place a dry paper towel. You place 20 pillbugs in the passageway between the two petri dishes. Every minute for ten minutes, you count the number of pillbugs that have moved to the wet dish vs. the dry dish.



**Assignment Description:** Provide a hypothesis for the experiment described above. Your hypothesis should be in the format, “If pillbugs are given a choice between a wet environment and a dry environment, then they will move towards the \_\_\_\_\_ environment.” You must provide an explanation for your hypothesis by referring to three pieces of information from the background section at the top of the page. Please describe a very clear, direct connection between the background information and your hypothesis. In other words, explain why you chose the hypothesis you did. You DO NOT need to describe the experiment in your response. Your response should be about 4-6 sentences in length. The rubric that I will use to evaluate your response is given below.

**Rubric:**

| <b>Category</b>  | <b>You Got It!</b><br>(3 points)  | <b>You're Almost There!</b><br>(2 points)  | <b>You Need to Make Some Changes!</b><br>(1 point)           | <b>Missing</b><br>(0 points)            | <b>Your Score</b> |
|--|---|--|--|---|-------------------|
| Hypothesis   | The hypothesis is correct and clearly stated.   | The hypothesis is not correct OR is not clearly stated.  | The hypothesis is not correct AND is not clearly stated.     | No hypothesis                           | /3                |
| Background Information                                   | Three pieces of information relevant to the hypothesis are clearly identified.                        | Only two pieces of information are identified, or the three pieces of evidence are not related to the hypothesis.                                | 1 piece of information are identified.                       | No pieces of information are identified | /3                |
| Connection Between Hypothesis and Background Information | There is a thorough and accurate explanation of how the pieces of information support the hypothesis. | There is an explanation but it lacks the necessary detail to fully describe the connection between the pieces of information and the hypothesis. | The explanation is not correct or is very lacking in detail. | There is no explanation                 | /3                |

**Total Points:** \_\_\_\_ / \_\_\_\_