** PILLBUG PREFERENCES** *Armadillidium vulgare*   
 (Common names: Pillbug, roly poly, doodlebug)

**Geographic Range:** Pillbugs are found in temperate climates throughout the world including United States, Australia, Europe, India, Japan, and Africa. There are 4 species that live in South Dakota.

**Habitat:** You have probably seen them in your basement or garden, where they live under stones, leaves, or bark. They hide in damp places during the day and are active at night.

**Classification:** Pillbugs are Arthropods, NOT insects. They are CRUSTACEANS that live on land and are more closely related to other familiar crustaceans including lobsters, crabs, and shrimp.

**Physical Description:** All arthropods have a tough outer cuticle, segmented body, and jointed legs.  Pillbugs have 7 pairs of legs, antennae, and breathe with sets of overlapping gills found on the underside of their bodies. Pillbugs in North America vary from gray to brown in color.

**Blue Blood:** Many crustaceans have hemocyanin in their blood. Unlike our hemoglobin, which contains iron, hemocyanin contains copper ions. When oxygenated, pillbug blood appears blue.

**Respiration:** Like their marine cousins, terrestrial pillbugs use gill-like structures to exchange gases. They require moist environments to breathe, but cannot survive being submerged in water.

**Molting**: Organisms with hard exoskeletons must molt to grow bigger. Pillbugs molt in sections. First, the back half splits and slides off. A few days later, the front section is shed. If you find a pillbug that's gray or brown on one end, and pink on the other, it's in the middle of molting. During molting they are more vulnerable to predation and DESSICATION (drying out).

**Reproduction**: Females carry the fertilized eggs in a fluid filled pouch (MARSUPIUM) on their abdomen. Upon hatching, tiny juveniles stay in the pouch for several days before leaving to explore the world. Females can have 2-3 broods per year averaging 100 offspring.

**Life span:** Average 1.5 years; can live up to 3 years.

**Food Habits:** Pillbugs are omnivores; feeding on fungi, live/dead plants, and other arthropods. Pillbugs also eat feces, including their own. Each time a pillbug poops, it loses a little copper, an essential element it needs to live. To recycle this precious resource, a pillbug will consume its own poop (COPROPHAGY).

**Defense:** Body armor, glands that release unpleasant secretions, and camouflage. They are famous for curling up into a tight ball for defense called *CONGLOBATION*. Known predators are: Centipedes, spiders, ants, birds, amphibians, basically anything that eats invertebrates.

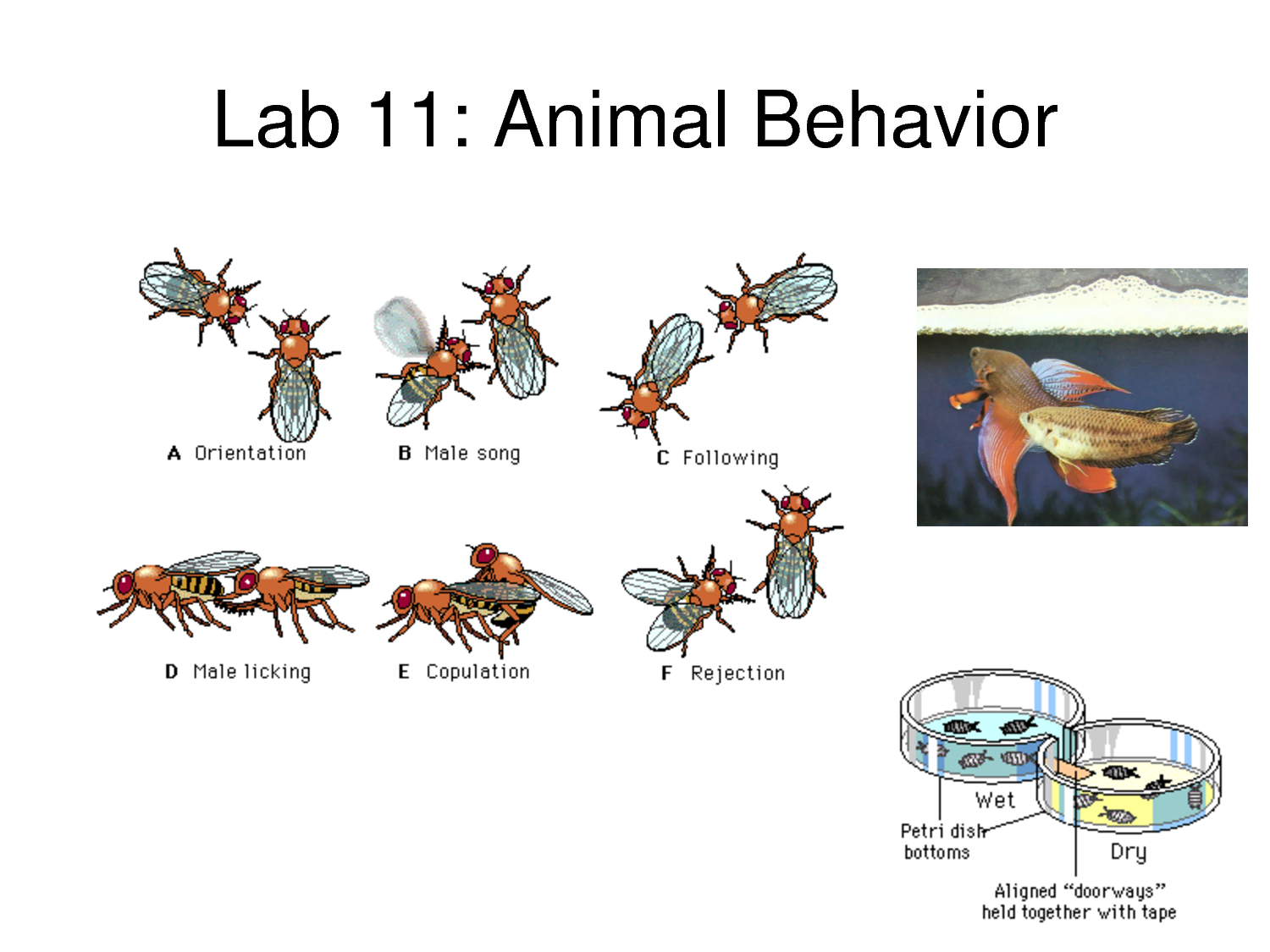
**Ecosystem Roles**: Pillbugs are detritivores and play an important role in recycling nutrients in ecosystems. They part of the community of species including earthworms, snails, and millipedes that break down dead plants and animals.

*Animal Diversity Web University of Michigan Department of Zoology  
http://www3.northern.edu/natsource/INVERT1/Pillbu1.htm  
http://insects.about.com/od/isopods/a/10-facts-pillbugs.htm*

PILLBUG PREFERENCES LAB:  
  
GROUP MEMBERS \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
  
You will be conducting an experiment to figure out if isopods prefer a moist or dry environment or have no preference. To do this, you will observe the movement of the 10 pillbugs in the choice chamber.

MAKE A HYPOTHESIS:  
 Your hypothesis should state WHAT YOU THINK THE PILLBUGS WILL DO and WHY.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



SET UP THE EXPERIMENT:

1. Prepare a choice chamber as illustrated at the right. Moisten a piece of filter paper and place it on one side of the chamber. Place a dry filter paper on the other side the chamber.   
  
2. Use a soft brush to transfer 10 pillbugs from the culture container into the choice chamber. Wait 5 minutes to allow the pillbugs to become familiar with their new surroundings. Observe their movement without disturbing the animals in any way. DO NOT PROD OR POKE OR SHAKE THE DISH, MAKE LOUD SOUNDS, OR SUBJECT THEM TO BRIGHT LIGHTS. You want to observe their behavior, NOT influence or interfere with it.

3. Gently move 5 pillbugs to each side of the chamber.

4. Start your timer and count how many pillbugs are on each side of the choice chamber every 30 seconds for 10 minutes. Record your data in the chart provided. Decide how you will record bugs found in between the two sides.  
  
5. Do not poke or prod the pillbugs. You want them to respond to their environmental “choices” not your interference.

DATA COLLECTION:

WET = SIDE \_\_\_\_ DRY = SIDE \_\_\_\_\_

TOTAL PILLBUGS ON WET SIDE = \_\_\_\_\_\_\_\_\_

TOTAL PILLBUGS ON DRY SIDE = \_\_\_\_\_\_\_\_\_\_  
  
Calculate the average number of Pillbugs on each side for your group’s data.

Average # of Pillbugs on WET side \_\_\_\_\_\_\_\_\_\_\_\_

Average # of Pillbugs on DRY side \_\_\_\_\_\_\_\_\_\_\_\_

ENTER YOUR DATA FOR THE TOTAL PILLBUGS ON EACH SIDE INTO THE CLASS SPREADSHEET.

CLASS DATA:  
  
TOTAL PILLBUGS ON WET SIDE = \_\_\_\_\_\_\_\_\_

TOTAL PILLBUGS ON DRY SIDE = \_\_\_\_\_\_\_\_\_\_  
  
Average # of Pillbugs on WET side \_\_\_\_\_\_\_\_\_\_\_\_

Average # of Pillbugs on DRY side \_\_\_\_\_\_\_\_\_\_\_\_

STUDENT-DESIGNED EXPERIMENT:   
 Design your own experiment to test another set of choices and collect data.

DRAW A PICTURE OF HOW YOU WILL SET UP THE CHOICE CHAMBER:  
Think about how you will keep all the variables the same except the one you want to test.

WHAT FACTORS WILL YOU CONTROL TO MAKE SURE YOU ARE TESTING ONLY ONE THING?  
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

MAKE A NEW HYPOTHESIS:  
 Your hypothesis should state WHAT YOU THINK THE PILLBUGS WILL DO and WHY.  
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

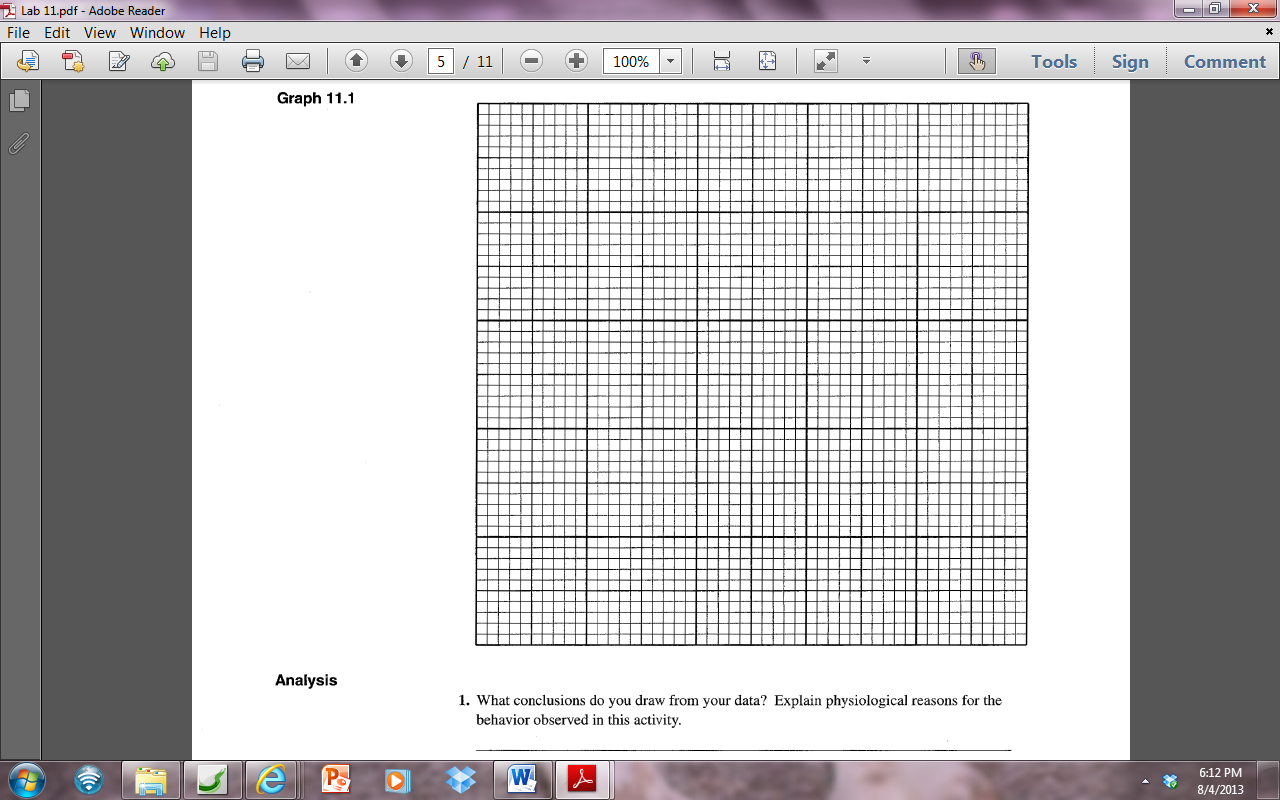
COLLECT DATA:  
  
A side = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ B side = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



YOUR GROUP’S EXPERIMENT:   
  
TOTAL NUMBER OF PILLBUGS ON SIDE A= \_\_\_\_\_\_\_\_\_\_\_ AVG # PILLBUGS SIDE A \_\_\_\_\_\_\_\_\_\_\_\_

TOTAL NUMBER OF PILLBUGS ON SIDE B = \_\_\_\_\_\_\_\_\_\_ AVG # of PILLBUGS SIDE B \_\_\_\_\_\_\_\_\_\_\_\_

MAKE A STACKED BAR GRAPH of YOUR GROUP’S DATA for WET vs DRY choices, the CLASS DATA for WET vs DRY choices, and your DATA FOR THE EXPERIMENT YOU DESIGNED. MAKE A COLORED KEY to represent the choices.

 PILL BUG PREFERENCES

100   
 90   
 80   
 70   
 60  
 50   
 40  
 30   
 20   
 10   
 0

% OF PILLBUGS

NO Our group’s CLASS DATA YOUR   
 PREFERENCE data (wet vs dry) (wet vs dry) EXPERIMENT

**CONCLUSIONS- Write 2-3 complete sentences to explain what happened.**  
What kinds of things could impact where the pillbugs are choosing to be in this experiment besides the choices you are testing?   
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Is there a difference between YOUR GROUP’S DATA and the CLASS DATA for WET vs DRY choices ?   
EXPLAIN any differences.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Did the pillbugs show a preference for wet or dry? WHAT IS YOUR EVIDENCE?  
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Does a hypothesis have to be proven to be CORRECT? EXPLAIN your answer.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Was your hypothesis for Day 1 (wet vs dry) correct? PROPOSE A REASON FOR THE RESULTS YOU SAW.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Did the pillbugs show a preference for the choices provided on DAY 2? WHAT IS YOUR EVIDENCE?  
  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Was your hypothesis for Day 2 correct? PROPOSE A REASON FOR THE RESULTS YOU SAW.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Look at the information sheet about pillbugs. Tell something you learned about pillbugs that you didn’t know.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_