

Investigating Habitat: Where Do Pill Bugs Live? An Inquiry Activity

Grade Level:

4th-6th grade

Total Time Required:

~1-2 class sessions (30-45 minutes each)

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[content adapted from Science Curriculum Improvement Study. (1970).
Environments: Teachers' Guide, New York: Rand McNally and Co.

Lesson Objectives:

Students will be able to:

1. Define habitat.
2. Identify abiotic environmental factors that might affect the habitat of pill bugs.
3. Determine pill bugs' habitat by testing their response to selected environmental factors.

Indiana Standards:**Process Standards:**

- Make predictions and develop testable questions based on research and prior knowledge.
- Plan and carry out investigation—often over a period of several class lessons—as a class, in small groups or independently.
- Collect quantitative data with appropriate tools or technologies and use appropriate units to label numerical data.
- Incorporate variables that can be changed, measured or controlled.
- Test predictions with multiple trials.
- Keep accurate records in a notebook during investigations.
- Analyze data, using appropriate mathematical manipulation as required, and use it to identify patterns. Make inferences based on these patterns.
- Evaluate possible causes for differing results (i.e., valid data).
- Compare the results of an experiment with the prediction.
- Communicate findings through oral and written reports and by using graphs.

Content Specific Standards:

- **Science 4.3.3 (Life Science)**
Design investigations to explore how organisms meet some of their needs by responding to stimuli from their environments.
- **Science 6.3.3 (Life Science)**
Describe how certain biotic and abiotic factors - such as predators, quantity of light and water, range of temperatures and soil composition-can limit the number of organisms an ecosystem can support.

Concepts and Vocabulary

Science Concepts / Vocabulary:

<i>Term</i>	<i>Defined by a scientist or engineer</i>	<i>Defined by a 6th grade student</i>
<i>Habitat</i>	An ecological or environmental area that is inhabited by a particular species of organism (plant, animal, or others). It is the natural environment in which a population of organisms lives.	*Where an animal lives or *The place where a single organism lives (instead of the entire population)
<i>Biotic factor</i>	Any living component that affects another organism, including animals that consume the organism in question, and the living food that the organism consumes.	*Something that is living in an environment
<i>Abiotic factor</i>	Any contribution to the environment that is nonliving (never living, not to be confused with dead). Examples would be temperature, amount of sunlight, pH of the soil and water, moisture, etc.	*Something that is dead in the environment *a nonliving factor in an environment

Equipment, Materials, and Tools

Materials for teams of 4 students each.

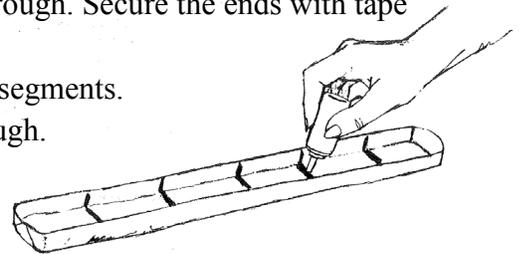
<i>Tools/Equipment</i>	<i>Materials</i>	
6-10 pill bugs (isopods) per team	Incandescent light	Heavy duty aluminum foil
Sand	Black construction paper	Ice
Water	Thermometers	Tape
Plastic containers / cups	Scissors	Markers

Inquiry Activity

What Environment Do Pill Bugs Prefer?

The goal of the activity is to determine pill bugs' habitat by conducting a series of fair test investigations of their preferences regarding selected abiotic environmental factors (e.g., light, moisture, temperature). Divide the class into teams of about 4 students each. The activity can be conducted in various ways. If time permits, each team can conduct investigations of several environmental factors. Alternatively, teams can select one factor to investigate, or the teacher can assign factors to individual teams. Data from multiple teams can be tabulated on the board or using a computer.

1. Each team should create an experimental runway using aluminum foil.
 - a. Begin with a 6" x 18" sheet of aluminum foil. Double it over lengthwise to create a 3" x 18" sheet.
 - b. Fold up the sides and ends about $\frac{3}{4}$ " to make a trough. Secure the ends with tape if needed.
 - c. Use a marker to divide the trough into six equal segments.
 - d. Add a thin layer of sand in the bottom of the trough.



2. Have each team design a fair test investigation of one environmental factor. Examples of factors that can be tested include: light (e.g., construction paper or foil can be used to shade a portion of the trough), moisture (e.g., water can be used to moisten the sand in a portion of the trough), and temperature (e.g., a light bulb and/or ice placed below the trough can create a temperature gradient). Students should vary only one factor at a time.
3. Ask students to record the conditions in each segment of the trough and write a prediction for how they think pill bugs will react to the tested environmental condition.
5. Have students conduct an experiment by placing 6-10 pill bugs in the center of the trough. After 5 minutes, they should count the number of pill bugs in each segment of the trough. Students should record the results in their notebook.
6. Repeat the experiment. Have students transfer their averaged data to the board or to a classroom computer. Ask students to create a bar chart (histogram) showing the distribution of the pill bugs by environmental condition. (Excel can be used to create the bar graph.) Questions that can be asked to guide the students' inquiry include:
 - a. What do the summary results from all of the teams suggest about the habitat of pill bugs? What is the evidence that supports this? Where would you expect to find pill bugs living in nature?
 - b. How did your results compare with your prediction?
 - c. What might explain differences in the results?