110 - Pillbug Behavior and Habitat Preference

Supports PA STEELS Standards

- 3.1.1.A Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.
- 3.1.1.B. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive
- 3.1.1.C Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
- 3.1.4.B Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways
- 3.1.6-8.H Gather and synthesize information about how sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
- 3.1.6-8.L Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
- 3.1.9-12.M Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
- 3.1.9-12.O Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.

Summary and Timing

Students observe the Advancing Science pillbug colony to learn how an organism's structure supports its function. Students design and carry out investigations to draw conclusions about pillbug habitat preference. The kit includes a pillbug terrarium with 100+ isopods (pillbugs and sowbugs) of varying ages, choice chambers for the habitat investigation, and other supplies needed to support student investigations. AP Bio lab 11 (Animal Behavior) can be accomplished with this lab. Suggested timing - 2-3 class periods.

Materials *Teacher Provided (view materials)

- *Next Time You See a Pillbug* by Emily Morgan
- Pillbug Terrarium
- Spray Bottle
- Choice chambers
- Hand lens
- Paint brushes
- Filter paper
- Black paper

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- Cups
- Trays
- Timers
- *Pillbug food (fruit and veggies peels, avoid citrus and soft fruits that may attract fruit flies)

Safety

- Wash hands after working with live specimens.
- Treat living organisms with care and respect.

Suggested Background Resources

- Isopod background and care information from Carolina Biological

Local Context

Explore your schoolyard for pillbugs in the wild, and use your pillbug knowledge to decide where to look in the schoolyard for pillbugs.

Credits and Document Version

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Procedure

1. **Grade 1 Teachers,** provide each group of students with a few pillbugs in a tray to observe - what do you notice? What do you wonder? Students may use their hands or the paintbrushes to gently touch the pillbugs. Prompt your students to observe the following:
   a. Sketch and label a picture of the pillbug in their science notebook.
   b. Observe the pillbugs and answer some of the following questions in discussion groups or in their science notebook:

- How many legs does the pillbug have? *14*
- How does the pillbug use its antennae? *To sense its environment.*
- What color is the pillbug? How does this help the pillbug in its environment? *Pillbugs are gray, except during molting, the molted section is white. The pillbugs color helps it camouflage with its environment. If you find a blue pillbug in the Advancing Science kit, please remove it, blue pillbugs are sick with a virus!*
- What do you notice about the pillbug's exosketelon (outer covering)? *The body segments look like armored plates. Pillbugs shed their exoskeleton as they grow. Sowbugs look similar, but their body has a more flattened shape.*
- What do you notice about the pillbug's belly? *The white structures on the belly are gills for breathing.*
- How does the pillbug respond to gentle touching with the paintbrush? *The pillbug will likely roll up into a ball, this defense mechanism protects the soft underside of the pillbug and keeps the gills from drying out. Sowbugs do not roll up into a ball, they have taillike appendages that prevent them from rolloing up.*
- Compare a young pillbug to an adult pillbug. What is the same? What is different? *Female pillbugs carry their eggs in a pouch on the underside of their body for 3-4 weeks, young hatchlings will stay in the pouch for another week or two before they wander off on their own. The first two molts allow the pillbugs to finish development, gaining the 7th body segment and 7th pair of legs and look just like the adults.*

   c. After observing the pillbugs, read *Next Time You See a Pillbug* by Emily Morgan. Revisit the pillbugs after reading the book. Encourage students to add more detail to their pillbug diagram.
   d. Explore your schoolyard for pillbugs in the wild, and use your pillbug knowledge to decide where to look in the schoolyard for pillbugs.

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2. **Grade 4 Teachers**, use the Advancing Science pillbug kit materials to complete the *Pill Bug Checkpoint Lab* from NSTA. For "checkpoint B", plastic choice chambers (double-chambered dishes) are provided instead of a box. Complete checkpoints A, B, and C, and then read *Next Time You See a Pillbug* by Emily Morgan.

   a. In addition to the Checkpoint Lab from NSTA, you may wish to have students observe and journal. Observe the animal as it explores its environment - what do you notice? What do you wonder? Instruct the students to sketch the animal and answer some of the following questions that are appropriate for your grade level and target content. How many legs does it have? Body segments? Antennae? What structures do you notice on the ventral (belly) side? Are all pillbugs the same size and color? How do they respond to stimuli (touching, or gently blowing on the animal)?

3. **Middle and High School Teachers**, use the Advancing Science pillbug kit materials to complete *Carolina Biological's Pillbug Behavior Choices* lab or have students design their own investigation.

   a. In addition to the Carolina Biological lab activity, you may wish to have students observe and journal. Observe the animal as it explores its environment - what do you notice? What do you wonder? Instruct the students to sketch the animal and answer some of the following questions that are appropriate for your grade level and target content. How many legs does it have? Body segments? Antennae? What structures do you notice on the ventral (belly) side? Are all pillbugs the same size and color? How do they respond to stimuli (touching, or gently blowing on the animal)?

   b. This investigation is a great opportunity for student-led inquiry, instead of providing the protocol, introduce the choice chamber and encourage students to design their own investigation to test the isopod's habitat preference. Each dish consists of two "rooms" with a connecting "hallway" allowing the isopods to move freely between "rooms". Students can test the pillbug habitat preference under opposite conditions, such as wet or dry, dark or light.

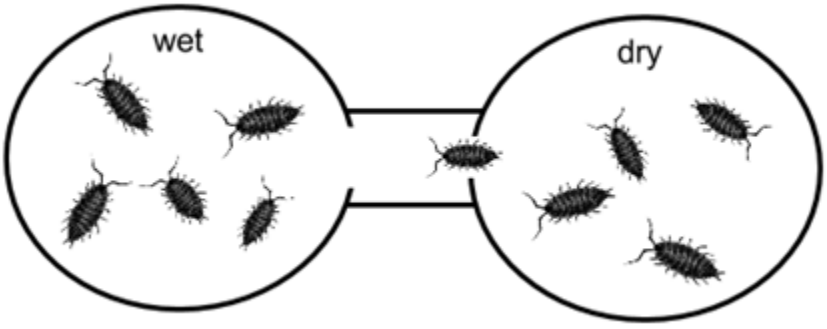

Figure 1. Choice chamber for pillbug investigations.