



Science Unit: *Discovering Life in Local Habitats*

Lesson 4: *Forest Life: Wood bug study*

School Year: 2009/2010

Developed for: Weir Elementary School, Vancouver School District

Developed by: Ingrid Sulston (scientist); Diane Merchant and Julie Kawaguchi (teachers)

Grade level: Presented to grades 1 and 2; appropriate for grades K –7 with age appropriate modifications

Duration of lesson: 1 hour and 15 minutes

Objectives

1. Learn how to handle and care for live animals.
2. Gain experience in adding results to a bar graph and reading off the group's results.
3. Gain experience in predicting results.

Background Information

Following a field trip to a forest, students study a forest animal, the wood bug (also called woodlouse/sow bug/carpenter). Wood bugs are easy to take care of in the classroom, and are easily collected in the fall or spring under logs and rocks in gardens and forests. I believe I collected wood bugs from these three families: Oniscidae, Porcellionidae and Armadillidiidae (pill bugs, which roll into a ball). Refs 1-3.

Vocabulary

wood bug: a familiar animal with 14 legs and a hard exoskeleton; a crustacean that lives on land

crustacean: a large group of animals, segmented with an exoskeleton, mostly aquatic (e.g. shrimp, crab)

exoskeleton: an outer protective shell, found on animals that do not have bones

antennae: feelers at the front of the body, used for feeling and smelling surroundings

habitat: a place for a living thing to live

Materials

- science notebook and pencil for each student
- clear sided container (e.g. salad container) with small holes punched in the lid (for habitat).
- sand, enough to cover each habitat to a depth of about 1cm
- water to dampen sand and tissue, ideally left to sit for a few days to allow chlorine to dissipate
- rotten wood chunks, one per table group (e.g. cedar) to fit in habitat
- small rocks, one per table group, to fit in habitat
- wood bugs, enough for one per student plus 5 per table group
- box magnifiers, one per student
- small squares of white tissue to add to the bottom of the box magnifier
- large petri dishes, or similar flat clear containers with lids, one per student



SCIENTIST IN RESIDENCE PROGRAM

- fresh salad leaves, enough to cover half of each large petri dish
- partway composted leaves, enough to cover half of each large petri dish
- soft-haired paintbrushes for each adult, to move wood bugs if necessary

In the Classroom

Introductory Discussion:

a) Introduce wood bugs:

- Link to the previous lesson (if appropriate): “Yesterday we saw many plants and animals in the forest. Did any of you see this animal? (Show photo of wood bug, then a real wood bug).
- Comment that we see wood bugs in gardens in the city too. Ask if students have seen them in gardens or parks near their house, maybe under logs or rocks.

b) Introduce what we will do today:

- What are the needs of an animal to stay alive? (food, water, shelter). Wood bugs have these needs too.
- You are going to find out the needs of wood bugs today, then you can take care of some wood bugs yourself. Each table group will have a tub of wood bugs to take care of.

Other items to discuss or review.

- With live animals, we have to be very gentle in order not to hurt them. Do not pick up the wood bugs with your fingers. Only use a paintbrush if you need to move them around after this lesson.

Brief description of science activities to follow discussion:

- Where do wood bugs like to live? Testing what wood bugs like to hide under in their habitat.
- Looking more closely at wood bugs? Looking at wood bug body parts with a magnifier.
- What do wood bugs like to eat? Testing what food wood bugs would like in their habitat.
- Set up a wood bug habitat.

The processes of science that the students will focus on: careful observation, recording results, making predictions/hypotheses, graphing results, concluding.

Safety guidelines: none

Science Experiments

(1) Experiment Title: Where do wood bugs like to live?

Purpose of Experiment: To determine what hiding places to add to the wood bug habitats. (Wood bugs are often found under rotting wood and under rocks (refs 1-3), so these two hiding places are offered to wood bugs in the classroom habitats.)

Experimental Treatments: Wood bugs are offered a chunk of rotting wood and a rock to hide under.

Prediction or Hypothesis: Before the experiment, students are asked to predict whether the wood bugs will like hiding under the wood or the rock or neither.



SCIENTIST IN RESIDENCE PROGRAM

Methods and Instructions:

Set-up prior to experiment: one hour before students come into class, set up a habitat for each table group. Each habitat is a clear container with a layer of damp sand on the bottom, a chunk of rotten wood, a rock and five wood bugs.

Students work in their table group, with each student given a task.

1. Sitting at the carpet, students are shown a habitat and asked to predict whether wood bugs might prefer to hide under the wood or the rock, or stay out in the open sand. For this age group it is best if predictions are done anonymously: ask students to close their eyes, and vote by raising their hand.
2. At their desks, each group counts how many of their five wood bugs are under the wood, how many are under the rock and how many are out on the open sand. They record their results (see worksheet), and bring them back to the class.
3. Each table group adds their data to a class bar chart (see bar chart example). (For the classes I worked with 90% of the wood bugs were under the rotting wood. The remainder were out in the open sand).
4. Students adapt their habitat in response to the results. (The rock was removed from our habitats).
5. Discussion on why the wood bugs like the rotting wood. (It is a shelter, it is damp so keeps them moist, it is dark under the wood, they might also eat the wood).
6. Conclude that we have given the wood bugs a shelter that they like in their habitat.

(2) Activity Title: Looking more closely at wood bugs.

Purpose of Activity: To closely observe wood bugs and their body parts.

Methods and Instructions:

Set-up prior to experiment: a box magnifier, the bottom lined with damp tissue and containing a live wood bug, for each student.

Students work individually.

1. Discuss the colour, body parts of wood bugs, and how they might help them survive, led by what the students notice. (Wood bugs have 14 legs - they are crustaceans. Wood bugs have antennae for feeling around and smelling. They have an exoskeleton to protect them, which is made from segments. Some wood bug species are able to roll into a ball. See refs 1-3).
2. An interesting point to make: wood bugs are closely related to ocean-living crustaceans such as shrimp. Like these ocean animals, they have gills - using them to extract oxygen from water. Because of this, they always need to be in a moist environment, and will die fast if they dry out.

(3) Experiment Title: What do wood bugs like to eat?

Purpose of Experiment: To determine what food to add to the wood bug habitat.

Experimental Treatments: Wood bugs are offered fresh salad leaves and partway composted leaves.

Prediction or Hypothesis: Before the experiment, students are asked to predict which food the wood bugs will be more attracted to.

Methods and Instructions:

Set-up prior to experiment: a large petri dish, half covered in fresh salad leaves, the other half covered in partway composted leaves.

Students work individually.

1. Students tip their wood bug from their box magnifier into the petri dish with two food choices, and put on the lid. Adults can help by gently pushing the wood bug with a paintbrush if necessary.



SCIENTIST IN RESIDENCE PROGRAM

2. Discussion at the carpet while the wood bugs to adjust to their new environment for a few minutes: students predict whether wood bugs would be more attracted to the fresh salad leaves or the partway rotten leaves. (Again, for this age group it is best if predictions are done anonymously by asking students to close their eyes, and then vote by raising their hand.) A second vote of what the students might like to eat for their dinner given the same choices lightens up the heaviness of predicting at this age, and gives some thought to how different animals might have different food preferences.
3. At their desks, students write a sentence in their notebooks, recording whether their wood bug prefers the fresh leaves or the rotten leaves.
4. Each student adds their data to a class bar chart - see Bar chart example. (For the classes I worked with 80% of the wood bugs were on the rotten leaves and the remainder were on the fresh leaves).
5. Conclude as a class what food to put in the habitat for the wood bugs. (For our classes, we added mostly compost and a couple of fresh leaves).

(4) Activity Title: Set up a wood bug habitat.

Purpose of Activity: To make a suitable habitat for wood bugs, based on their needs determined by the previous experiments.

Methods and Instructions:

Set-up prior to experiment: none

Students work in their table group, with each student given a task.

1. Students add their wood bugs from the previous experiment to the habitat at their table group.
2. Ask students to check that they have damp sand to keep them moist, so that they can get oxygen. Ask students to check that they have a place to shelter, and food to eat. Lastly put the lid on.

Closure Discussion

1. We experimented with wood bugs to find out their needs. We found out what kind of shelter they like, and we found out what kind of food they prefer. Then we made them habitats to satisfy these needs.
2. Questions and discussion with other concerns and ideas regarding taking care of the wood bugs over the next few weeks.

References

1. Kneidel, Sally. 1993. Creepy Crawlies and the Scientific Method. Fulcrum Publishing. p. 17-25.
2. <<http://www.scientistinresidence.ca>> Previous Scientist in Residence Program lesson plan: SRP_Urban Biology_Lesson 1_Habitat Choice in Woodbugs_2008.doc
3. <<http://en.wikipedia.org/wiki/Woodbug>> General information on wood bugs, including photos. Hosted by Wikipedia. Accessed May 19, 2010.

Extension of Lesson Plan

1. Students continue to take care of their wood bugs over the following weeks. After the habitats are dismantled, the wood bugs should be returned to their original habitat.
2. Other experiments to determine other preferences are possible (see refs), though as wood bugs are complex living things that need a while to settle in changed environments, it is tricky to find experiments that are both quick and that lead to reasonable conclusions (e.g. in my experience testing the light/dark and dry/moist preferences of wood bugs takes longer than many references suggest).

Where do woodbugs like to live?

Count the number of woodbugs in your tub.

	Number of woodbugs
On the sand	
Under the wood	
Under the rock	

Record the number of woodbugs for the whole class.

	Number of woodbugs
On the sand	
Under the wood	
Under the rock	

Where do woodbugs like to live?

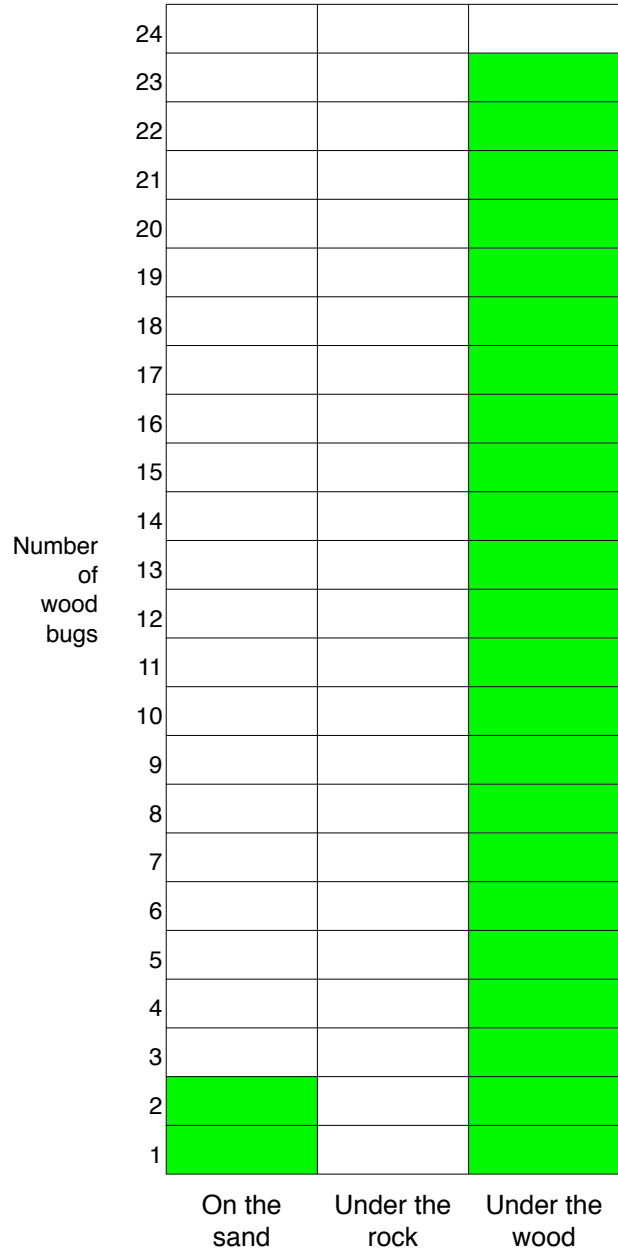
Count the number of woodbugs in your tub.

	Number of woodbugs
On the sand	
Under the wood	
Under the rock	

Record the number of woodbugs for the whole class.

	Number of woodbugs
On the sand	
Under the wood	
Under the rock	

Where do wood bugs like to live?



What do wood bugs like to eat?

