



Science Unit: *Decomposers and Recyclers*

Lesson: 3 *Wood Bugs*

School Year: 2012/2013

Developed for: Dr. George M. Weir School, Vancouver School District

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Grade level: Presented to grades K-3; appropriate for grades K – 5 with age appropriate modifications.

Duration of lesson: 1 hour

Notes: This lesson requires one wood bug per student. It is best to do this lesson during spring or fall, wood bugs are easily collected from a garden or green space. Look for wood bugs under rocks, woody material, or in damp places. Collect enough specimens the day before and keep them in a ventilated, closed tub with woody debris, in a cool, shady place until you are ready to use them. After the lesson, release all animals back to their natural habitat.

Objectives

1. Explore wood bugs and learn about their habitats, food, predators and life cycles.
2. Learn about why wood bugs are good recyclers in the forest ecosystem.
3. Investigate compost to look for recyclers/decomposers.

Background Information

Wood bugs or wood lice are found in many natural damp dark places, such as under rotting logs or rocks, or damp soil. Wood bugs (*Oniscus aselus*, *Porcellio scaber*) have numerous names such as sow bugs, slaters or wood lice. Wood bugs are not actually bugs or insects but are crustaceans, and thus related to crabs and lobsters. Most crustaceans are found in marine or aquatic environments but wood bugs are a good example of terrestrial crustaceans. They have 14 legs and a hard segmented shell-like exoskeleton, which helps to protect them from predators and desiccation. As they grow, their exoskeleton often becomes too small. Then they moult their shell, in two halves, first with the back half, then a few days later the front half is moulted. By moulting just half the exoskeleton at a time, the wood bug has some protection during this vulnerable period. Sometimes one can see a wood bug with a pink half (newly moulted) and a grey half (old exoskeleton). After the exoskeleton is moulted, the wood bug eats it, providing important nutrients. Some species, when threatened, roll into a ball so that the exoskeleton covers their soft underbellies. These are often called pill bugs or roly polies (*Armadillidium vulgare*). Wood bugs have three body parts: a head, thorax and abdomen. Some species have gill-like structures (like their aquatic cousins) under their legs, and will suffocate when in a dry environment. They do not produce liquid urine but excrete ammonia gas through their exoskeleton. They produce faeces, which they later eat, making them the ultimate recyclers! This is called coprophagy and is done to reabsorb essential minerals. Wood bugs possess uropods, which are tube like structures at their posterior end. Uropods are used to absorb water like drinking straws, and also are used to release strong smells as a defense mechanism to ward off predators, much like a stink bomb!

They are good recyclers, eating dead plant and animal material, (as well as their own waste), helping to turn it back into soil or compost. Occasionally they can eat live plants, particularly young seedlings. They reproduce by sexual reproduction, and the females carry about 20-30 eggs in a brood pouch, called a



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marsupium, located below their abdomen. Eggs hatch out after 3-4 weeks, and young juvenile wood lice hatch out with almost transparent shells. The average lifespan of a wood louse is about 3-4 years.

Vocabulary

<u>Decomposer:</u>	Organisms that obtain their food and energy from breaking down complex organic substances from organisms or their parts that are dead or decaying, into simple organic substances they can use. Fungi and bacteria are examples of decomposers.
<u>Detritivore/ Decomposer:</u>	An organism that obtains its nutrients by consuming detritus (fresh and decomposing plant or animal materials as well as organic fecal matter).
<u>Detritus:</u>	Fresh or decomposing plant and animal materials (non-living organic material).
<u>Woodlice:</u>	Small terrestrial crustaceans often found in damp dark places in forests and gardens.
<u>Crustaceans</u>	Group of mostly aquatic arthropods which include crabs, lobsters, shrimp, krill, barnacles, wood bugs, characterized by a segmented exoskeleton, jointed paired limbs.
<u>Arthropods:</u>	A large group of invertebrate animals including insects, crustaceans, spiders etc. These have a segmented body, an exoskeleton made of chitin and jointed legs, in pairs.
<u>Exoskeleton:</u>	Hard, bony structure found in insects and crustaceans that protect internal organs. Often shell-like.
<u>Uropod:</u>	Tube like structures on the back end of the woodlice, used to absorb water and to release strong smells for protection against potential predators.

Materials (In Class)

- Woodlice (wood bugs) (one for each student)
- Magnifying glasses
- Dissecting microscopes
- Petri dishes (one for each student)
- Bug jars
- Poster of wood bug lifecycle
- Poster of wood bug external anatomy
- Poster of wood bug internal anatomy

In the Classroom

I. Introductory Lesson (Classroom)

We are going to learn about wood bugs. Who has seen a wood bug before? Where do they live? What group of animals do they belong to? How do they move? How do they reproduce? How do they breathe? What do they eat? Why are they called wood bugs? How do they eat? Do you think they have teeth? Who are their predators? Are they recyclers? Why?

1. Students will familiarize themselves with wood bugs and find all the body parts.
2. Students will focus on observation skills, drawing, labeling and recording data.
3. Safety Guidelines:
 - Tell students to handle animals gently and with care. Wood bugs are very fragile.
 - Remind students that all animals will be returned to their natural habitat after the lesson.
 - Remind students to wash hands well after handling wood bugs.

Science Activity



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Each student will be given a Petri dish and wood bug. With the aid of a magnifying glass students will investigate all the parts of their wood bugs: segmented shell, antennae, 14 jointed legs, head, abdomen, thorax and uropods, Students will then be asked to lift up their Petri dishes to observe their wood bugs from the underside. Occasionally one can see the brood pouch filled with eggs on the underside of a female wood bug.

Students will be asked to draw their wood bug and to label the drawing with all the body parts. Ask students to bring up their wood bug to look at it under the microscope.

Warning: wood bugs do not like to be under strong or hot light. Please leave your wood bug under the microscope for a very short time only and then replace it in a damp dark place.

Closure Discussion

Discuss differences between wood bugs and other decomposers. What is similar? What is different about them? What have you learned about wood bugs? Why are they good recyclers?

References

Tokuda, Yukhisa. I'm a Pill Bug. 2006. Kane Miller Book Publishers. La Jolla, California

Pascoe, Elaine. Pill Bugs and Sow Bugs and Other Crustaceans. 2001. Blackbirch Press, Woodbridge Conn.

Hughes, Monica. Pill Bugs. Creepy Creatures Raintree Sprouts Series. 2004. Raintree. Chicago

Extension

Make a decomposer habitat in the classroom using an aquarium. Place rocks, soil, leaf litter and woody debris. Get students to collect decomposers (worms, wood bugs, snails, slugs, millipedes, etc.) to place in the terrarium. Cover the terrarium with cheese cloth taped in place. Spray with a spritzer water bottle 3-4 times per day to keep terrarium moist. Release all animals back to their natural habitat, after 3-4 weeks.