Science Unit: *Forest Ecosystem*
Lesson 3: *What Do Snails Eat?*

School year:	2006/2007
Developed for:	Southlands Elementary School, Vancouver School District
Developed by:	Linda Hanson (scientist), Joanna Wood and Elizabeth Robertson (teachers)
Grade level:	Presented to grades 1 - 2; appropriate for grades 1-4 with age appropriate modifications.
Duration of lesson:	1 hour and 15 minutes
Notes:	Snails can be collected beforehand from either the forest or a backyard garden. Be sure to return the snails to the outdoors after the experiment. Students should be introduced to the concept of "Thinking like a scientist" prior to the lesson.

Objectives

1. To learn about snails, a forest consumer.
2. To introduce students to experimental design.
3. To conduct a food choice experiment.

Background Information

Snails are found in a variety of microhabitats within the temperate rainforest. They may be found on plants, under decaying logs, hidden amongst litter on the forest floor or anywhere else where cool, moist conditions prevail. A snail's diet can be diverse; however snails are generally herbivorous, eating both living and decaying vegetation. Since they eat both living and dead vegetation we can think of them as both consumers and detritovores. Snails use a specialized structure known as a radula to obtain their food. The radula is a rough tongue-like projection covered with rows of tiny chitinous teeth. Snails use their radula to scrape up and trap food particles. Ask the children to envision it as similar to a cat's tongue or sandpaper.

Vocabulary

consumer:	An organism that eats other living organisms.
decomposer:	An organism that eats detritus (dead organic matter).
herbivore:	An organism that eats plants.
radula:	A rough tongue-like organ covered with rows of tiny teeth used to obtain food.

Materials

- jar of snails (3 snails per group)
- timer
- spoons (2 per group)
- 1 pack of small post-it notes
- 6" diameter glass Petri dishes (1 per group)
- aluminum pie plate (1 per group)
- tweezers (1 pair per group)
- worksheets
- three food choices (wood, fresh leaves, dried/decaying leaves)
- small bottles of dechlorinated water
- tissues
- fine sandpaper

- poster depicting the experimental set-up
- poster showing the parts of a snail
- tray to hold equipment (1 per group)

In the Classroom

Introductory Discussion

1. Pull out a clear jar of snails.
    - Today we are going to learn about snails and snail diets.
    - Where did we see snails on our forest walk? What do we think they might eat? (write on board)
    - Are they consumers or decomposers? (review vocabulary) How can we test this?
    - How do you think snails eat? Do they have teeth? Explain how snails use their radula to obtain food.
    - Time permitting, have the students observe the snails for a few minutes paying special attention to their mouths. The students can use leaves and sandpaper to simulate how the radula works.
2. Short description of other items to discuss or review.
    - Review “Thinking like a Scientist”
    - Identify the three food choices.
    - Use the poster to explain the experimental design.
    - Use questions to discuss the importance of experimental design.
    - Why do we put the snails in the centre of the dish? (need equal distances to each choice)
    - What would happen if we always put the snails facing the same direction? (may go to the food they see first).
    - What do we see when snails move? (leave a trail) Could this influence the choice of the next snail? (may follow the trail).
    - Why do we cover the dish? (don’t want to scare the snail).
    - **Discuss respect for living creatures**. Handle the snails with care and do your best not to frighten them. Do not poke them.
    - Have the students record a prediction (hypothesis) on their worksheet.
3. Briefly describe safety guidelines.
    - Wash your hands before and after handling the snails.

Science Activity/Experiment

Experiment Title: What do snails like to eat?

Purpose of Experiment: The purpose of this experiment is to determine what type of food snails prefer.

Experimental Treatments: Food type

Treatment 1	wood
Treatment 2	fresh leaves
Treatment 3	decaying leaves

Methods:

Set-up prior to experiment: Have a tray set up for each group of students. Each tray should contain: 1 jar of snails, one stacking dish (pre-marked with the locations for food choices and snail placement), one small bottle of water, some tissues, two spoons, one pair of tweezers, one aluminum pie plate, three post-it notes and three portions each of wood, fresh leaves, and decaying leaves.

1. Split students into groups of three. Each student will have a different job for each replicate of the experiment. One student (A) will handle the snail, one (B) will record the result and one (C) will replace the food/water before each new trial. Time keeping will be handled by the teacher/scientist.
2. Have student C pour a thin layer of water into the bottom of the dish (0.5 cm) and then use the tweezers to place the three food choices into their respective areas of the dish.
3. When instructed to by the teacher student A will use the spoons to carefully pick up the snail and place it into the middle of the dish. (The teacher will begin timing for 3 minutes)
4. The snail should be placed so that it faces a different food choice for each of the three replicates. Student B should record which direction the snail is facing.
5. Student A should cover the dish with the aluminum pie plate.
6. When the timer rings student A should remove the pie plate and all students should observe the snail's location.
7. Student B should record the snail's location on the group's data sheet.
8. Student C will discard the water and food in the dish and wipe the dish with a tissue to remove any snail trails. Once the dish is clean student C will place new food and water in the dish.
9. Each group will do 3 replicates using a new snail for each replicate. (The number of replicates can be increased for older grades).
10. Once all replicates have been completed have the students clean up their work areas and return the equipment to the trays. If they have not done so already, students A and C should copy the results from student B onto their worksheets.
11. The results for all replicates will be graphed as a class. Have the students place post-it notes onto the blackboard to create vertical bar graphs. Each post-it note will represent one observation.

Closure Discussion

1. What do our results suggest about snail's diet preferences?
2. Is this what you expected?
3. What was the hardest part of the experiment? What could we do different next time?

References

1. Haggard, Paul and Judy Haggard. 2006. Insects of the Pacific Northwest. Timber Press Inc.
2. Forsyth, Robert. 2004. Land Snails of British Columbia. Royal B.C. Museum.

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Scientist: _____

Date: _____

What do snails like to eat?

Purpose: To find out what type of food snails like.

Prediction: I think snails will move towards the

/ / / / / / / / /

My Results:

Snail Number	Snail is Facing:	Where the Snail Stops		
		wood	fresh leaves	dead leaves
1	wood			
2	fresh leaves			
3	dead leaves			
TOTAL				

Class results:

wood:_____ fresh leaves:_____ dead leaves:_____

Conclusion:

Snails like to eat:

/ /

Colour the parts of the snail.