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Teacher's Corner Lesson Plans

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Is This Habitat For Me? – Part 1 (of 3)*†

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Grade level: 4

Provincial curriculum links: Ontario

Subject: Science and Technology

Keywords: earthworm, population, habitat, environmental conditions

Description

Students answer the question “Where in the schoolyard will you find the greatest number of earthworms?” by counting numbers of worms in small measured amounts of soil from different areas of their schoolyard. This is lesson 1 out of a total of 3 lessons.

Curriculum Framework

Topic: Life Systems

Strand: Habitat and Communities

Specific Lesson Goals:

- Identify through observation, various factors that affect plants and animals in a specific habitat
- Recognize that animals and plants live in specific habitats because they are dependent on those habitats and have adapted to them
- Formulate questions about and identify the needs of animals and plants in a particular habitat and explore possible answers to these questions and ways of meeting these needs
- Plan investigations for some of these answers and solutions, identifying variables that need to be held constant to ensure a fair test and identifying criteria for assessing solutions.

* This exercise is adapted from *Teaching in the Outdoor Classroom*, Evergreen/TDSB Summer Institute, 2007, 82 pages.

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- Compile data gathered through investigation in order to record and present results, using tally charts, tables, and labeled graphs produced by hand or with a computer
- Communicate the procedures and results of investigations for specific purposes and to specific audiences, using media works, oral presentations, written notes and descriptions, drawings and charts.
- Describe ways in which humans can affect the natural world

Preparation

Preparation Time:

- 10 minutes

Length of lesson:

- 85 minutes
 - 10 min Introduction/Review of Habitats
 - 10 min Understanding Earthworms and Concept Map
 - 10 min Completing Research Proposal
 - 5 min Field Work Prep. (marking cans, gathering equipment)
 - 5 min Field Work Demonstration
 - 30 min Site Worm Data Collection
 - 5 min Class Data Compilation
 - 10 min Discussion of Results, Interferences, Conclusions

Resources required:

- Per Research Team
 - Research Proposal
 - Large (Number 10) Coffee can with top and bottom removed
 - Permanent Marker
 - Metric Ruler
 - Soil Tray
 - Worm collection tray
 - Trowel (1-2)
 - Data Collection Sheet Pencil (1 per data sheet)
 - Clipboard
- Teacher Resources:
 - Chart paper and markers or black/white board with chalk/markers
 - Class Data Collection Sheet
 - Area markers/pylons or map to indicate study areas
 - Resources re: earthworms
 - Pictures of or real objects of aquarium with living creature, nest, drinking glass and water, mouldy fruit, potted plant, schoolyard.

Procedure

1. Discuss with the students what they already know about Habitats. Show students the following objects: (pictures or real objects)
 - a. aquarium with a living fish/newt/turtle etc.
 - b. potted plant
 - c. drink of water
 - d. mouldy piece of fruit
 - e. empty nest
 - f. schoolyard showing evidence of wildlife
2. Ask "Which of these are habitats and which are not?" Have students "think- pair -share" responses and then survey the class using thumbs up (yes), down (no) or sideways (unsure). Ask students to explain their thinking (*great opportunity to uncover misconceptions*). Review or teach students the meaning of a habitat.

*Habitats are often referred to as the **home** of a living organism. It is also the place where a living creature can **meet its needs of food, water, air, shelter, space, and family**. It must also be able to adapt to the environmental conditions/ climate and to the interactions with other living creatures of that space.*

*Therefore, the aquarium, potted plant, mouldy fruit and schoolyards are habitats as they **include the living creature(s) meeting their needs**, whereas the drink of water **hopefully** has no living creatures in it. The nest is the shelter, but not the habitat.*

3. Explain that one living creature that lives in our schoolyard is an earthworm. Discuss what the students already know and wonder about earthworms and its habitat needs. Have students create an individual concept web about earthworms and their habitat.
4. Based on earthworms needs and preferred habitat, brainstorm with students about how the populations of earthworms might vary in the different areas in the schoolyard. **Where would you find the greatest numbers of earthworms?** If time permits, take a quick walk through the schoolyard to generate specific ideas (e.g. "I think there will be more earthworms here than there.") Ask students to record their thoughts and predictions in a journal.
5. Divide students into research teams. Model the process for filling out a Research Proposal. Have each team complete a Research Proposal and submit it to you and /or peers for review and planning purposes.
6. Outside, demonstrate to students the sample plot field method.
 - a. Record the type of ground cover on data sheet: "Is This a Habitat for Me?"
 - b. Make 4-6 marks on a coffee can with a permanent marker 5 cm from the bottom of their can.

- c. Twist the coffee can into the ground 5 cm. (to the marks they made). Wiggle and twist the can back and forth and around to create defined cuts into the soil. (If soil is too compacted to insert coffee can, water area first and then try again)
 - d. Remove the coffee can.
 - e. Dig out the soil with a garden trowel within the boundaries made by the coffee can to a depth of 5 cm. Place loose soil in a collection tray.
 - f. Search for and place all earthworms found in the soil sample in a second tray. Earthworms may be picked up with a spoon or with fingers. It is unlikely your soil sample will contain organisms that could be harmful but rubber gloves provide another level of safety. Count and record the total number of earthworms from each sample on the data sheet.
 - g. Replace worms and soil into study plot.
 - h. Repeat 2 more times in close proximity to the first sample for a total of three soil samples. Compile an average number of worms for better accuracy in each area.
 - i. Review demonstration with the students, (e.g., What did you see me do? What did I do first, second, etc.) Review the data collection form.
7. Assign an area of the schoolyard to each research team. Ask students to take three soil/worm samples within their first area. Invite students to choose one of the other study areas with different attributes (ie shady, less grass cover, etc.) and repeat the experiment.
 8. Gather as a class and compile data on the class "Habitat for Me" data sheet.

Discussion and Questions

- Invite discussion with the students around the following:
 - What did your research team notice? What questions came up during the experiment?
 - Based on the compiled data, where in the schoolyard will you find the greatest number of earthworms? What could be the reason for this?
 - Possible explanations may include:
 - Temperature: above or below ground
 - Type of soil, soil compaction, amount of organic matter
 - Impact of other living plants or animals including humans
 - Amount of water
 - pH levels,
 - Ground cover
 - Other?

- Discuss as a group which ones might be appropriate for further study. How would the class go about collecting data for the different environmental conditions?

Environmental Condition	Possible Methods and Materials for Collecting Data
Temperature	Soil temperature-soil thermometer
	Air temperature, thermometer
Soil	Soil type: compare textures to grades of sand paper Waterbottle shake test to determine size of particles
	Organic Matter: Colour comparison using paint colour strips
	Soil compaction: percolation test, water, timer and coffee can
Water Levels	Soil water meter, paper towel squeeze
Acidity	pH paper or meter
Impact of animals and plants including humans	Anecdotal observations over time, maps, video
Ground cover	Anecdotal observations, photographs, comparisons of percentage covered
Other?	

Student Assessment and Evaluation

See Part 3

Enrichment and Extension Activities

- Ask students to change the focus from worm populations to other soil dwellers, macro and/or microscopic. Design and conduct simple scientific investigations regarding their habitats and populations in the schoolyard.
- Design the ideal school yard, balancing the needs of students and student activities but also of earthworms and their habitats.

Educator Notes

- Although combining Parts 1 & 2 into one field work session will maximize time outside, it is recommended to complete the field work over a number of days.
- Part 3 gives the background necessary for the literacy activity "Postcards from the Perfect Plot"

References/Resources

The Schoolyard Ecosystem, Mid-Hudson Urban Ecosystem Studies Project
Soil Dweller Experiment, Mike Schneider, Students in a Project Learning Approach to Schoolyard Habitat Development, <http://web.stclair.k12.il.us>