

Earthworm Extraction

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School or Agency: St. Anne's Wetland Education Outreach Project

Grade Level(s): 5-12

Science Topic: Invasive species

Summary: Students will perform an earthworm extraction on wetland grounds after learning about devastating effects of invasive species. They will collect and identify earthworm specimens, record their data, then discuss the positive and/or negative effects the earthworms could be having on the wetlands.

Core Content: Biological Science, Unifying Concepts. More specifically: Unity and Diversity, Biological Change, Energy Transformation (nutrient cycling), and Interdependence.

Objectives: Students will learn about invasive species in the classroom, and witness it first-hand with a trip to the wetlands. They will collect specimens in the field, record data and observations, and discuss the benefits and detriments of invasive species in ecosystems. Students should be able to describe the interrelationships and interdependencies within an ecosystem and predict the effects of changing one or more of the components within an ecosystem.

Materials: 6oz. mustard powder, eight gallon jugs of water, six 1ft x 1ft frames, twelve medium-sized containers, notebooks for recording observations, small trowel

Procedures:

1. Educators must be familiar with the topic of invasive species before attempting this lesson plan. In the days prior to the activity, teachers should discuss invasive species with the class, providing examples of species invasions and some of the consequences of the invasions. Some relevant, informative websites that can assist in providing facts and examples are:

<http://www.invasivespeciesinfo.gov/whatis.shtml>

<http://www.invasive.org/>

<http://www.invasivespecies.gov/>

<http://www.dnr.state.mn.us/invasives/terrestrialanimals/earthworms/index.html>

<http://www.nrri.umn.edu/worms/identification/index.html>

2. The day before heading out to the wetlands for the extraction, prepare the hot mustard solutions. Add one ounce of mustard powder to each of six gallons of water, leaving the final two gallons of water undiluted.
3. At the wetlands, divide the class into six groups and select six suitable sampling areas. Clear any leaf litter from the ground and place the frames on top of the soil surface. Use the trowel to bank the soil up against the outside of the frame to prevent the water-mustard solution from escaping.
4. Shake the jugs vigorously to ensure proper mixing of solution and to remove lumps. Slowly pour about half of the mixture onto the soil within the frame. Worms should begin to appear within 1-2 min.
5. Each group of students should have two containers. The first container is meant to initially house the worms until a sufficient number of specimens has been collected and data has been recorded. The second container should have soil (uncontaminated by the mustard solution) in it, and any worms that will be taken back to the classroom can be rinsed off and housed there.
6. Once the worms begin to surface, the students should collect them and put them into their first container. After about ten minutes, the students should slowly pour the remainder of their solution onto their plot of soil.
7. After twenty minutes, the extraction should be complete. Students should try and identify different types of worms and select some specimens to take back to the classroom for further observation. Types of earthworms:

(epigeic, endogeic, anecic- see

<http://www.nrri.umn.edu/worms/identification/index.html>)

8. Any worms that are to be returned to the wetlands should be rinsed off prior to release.
9. Upon returning to the classroom, ask students to graph the number of each type of worm they found.

Assessment Techniques: Students should be able to define the term “invasive species” and identify some examples of invasive species. Students should reflect upon and discuss the effects they think earthworms might be having on the wetlands.

Resources: Method adapted from: Lawrence AP, Bowers MA (2002) A test of the hot mustard extraction method of sampling earthworms. *Soil Biology and Biochemistry* vol. 34(4): 549–552

Extensions: See worm observatory lesson plan.