Culturing Worms

Live Material Care Guide

Background

Worms are excellent organisms for the study of animal behavior, locomotion, regeneration, and decomposition. Both aquatic and terrestrial species are inexpensive and easy to maintain in the classroom. Worms have a simple digestive tract, a moderately complex nervous system, and many scientists have been surprised with their degree of intelligence. Many species of worms are hermaphrodites, that is, they possess both male and female sex organs. Worms are also sensitive to bright light and vibrations—great experimental variables to explore during worm studies.

Lumbricus terrestris, the common earthworm, is probably the most familiar worm to students. Earthworms are classified in the phylum Annelida (segmented worms). Earthworms aerate and enrich topsoil, making their presence vital for crop growth. Aquatic relatives of earthworms, *Lumbriculus variegatus* (or California blackworm) are frequently used for experiments involving drugs, regeneration, and locomotion. Their bodies are transparent and blood flow can be readily observed. *Eisenia foetida*, generally referred to as redworms, are marvelous decomposers. They eat their weight in "garbage" everyday and turn it into rich humus, an organic fertilizer. A common concern regarding classroom vermicomposting with redworms is the odor, but when properly maintained, composting bins are odor-free!

Housing/Feeding

Have a culturing setup ready for the worms before their arrival. Keep the cultures out of direct sunlight, in the coolest area (40–60 °F) of the room, or outside if possible. As long as the worms are kept above freezing, they will thrive and reproduce. Temperatures over 60 °F will slow reproduction, and temperatures over 80 °F may be fatal to worm cultures.

Earthworms will thrive in any sturdy, leakproof wooden, plastic, or glass container. Coolers also work well. A container 30 × 30 × 45 cm in size will house up to 100 earthworms. Fill to a level of at least 10 cm of a lightly moistened, loamy soil that doesn't have a lot of sand or clay in it. Mix it with some decomposing leaves or other organic material. Additional leaves should be placed on top of the culture soil. Earthworms eat decaying organic matter, which is primarily supplied by the decaying leaves. Add a few pinches of crumbled bread or cornmeal to the top of the soil approximately every three weeks. Soil should be changed every six months, if the worms are being cultured long-term.

Lumbriculus variegatus, will thrive in a large, shallow plastic pan filled with approximately three inches of non-chlorinated water. Do not use distilled or deionized water. Fresh aged water, such as clean pond water or spring water, is a good source of chlorine-free water. Tap water must be chlorine-free. Cut small 2–3 inch squares of brown paper towel or paper bag (choose a piece free of glue) and submerge a few into the culture water. Aerate the culture by gently forcing air into water using a clean pipet or an aquarium pump. Feed the worms sinking *pellet* fish food. Feed 1–2 pellets every three days. Keep cultures in a dark area. Strain off old water and add fresh aged water and new paper to the culture every week, or as the water becomes cloudy.

Redworms are primarily used for decomposition studies. They should be cultured in a large, sturdy, leakproof bin (plastic, with a fitted, ventilated lid works best). Add 2–3 inches of leaves to the bottom of the culture container. Next add "garbage" materials, such as fruit and vegetable remains, coffee grounds, and bread crusts. *Do not add animal products to the culture.* Top the food layer with soil before adding the worms. Whenever new compost is added to the culture, cover it with a layer of soil.

Tips

- Test soil for appropriate moisture content by squeezing a small amount together. If the soil stays clumped, but does not leave a water residue, the moisture level is appropriate for culturing worms. If the soil falls apart, water needs to be added. If the soil is very wet, allow it dry in sunlight for a few hours.
- Individual student cultures of 2–3 earthworms can be housed in any plastic container with a lid into which holes have been made.
- Earthworms are a good food source for many larger classroom animals such as amphibians, reptiles, crayfish, birds, and certain species of fish.

Publication No. 10593
061616

Disposal

Do not release worms into the local environment. They may harbor pathogens or damage the ecosystem. Dead worms may be disposed of according to Flinn Suggested Biological Waste Disposal Method Type IV. Please consult your current *Flinn Scientific Catalog/Reference Manual* for proper disposal procedures.

Connecting to the National Standards

This laboratory activity relates to the following National Science Education Standards (1996):

Unifying Concepts and Processes: Grades K–12
Systems, order, and organization
Form and function

Content Standards: Grades 5–8
Content Standard C: Life Science, structure and function in living systems, reproduction and heredity, regulation and behavior

Content Standards: Grades 9–12
Content Standard C: Life Science, matter, energy, and organization in living systems; behavior of organisms

Materials for *Culturing Worms* are available from Flinn Scientific, Inc.

Catalog No.	Description
LM1103	Earthworms, 30
LM1220	Lumbriculus variegatus, 30
LM1177	Redworms (Eisenia foetida), 50
FB0673	Potting Soil
AB1414	Worm Farm—Complete
FB0534	Worm Composting Kit
FB1558	McWorm: Invertebrate Fast Food
FB0267	Aquarium/Terrarium, Economy, 1/2 gallon
FB0268	Aquarium/Terrarium, Economy, 1 gallon

Consult your *Flinn Scientific Catalog/Reference Manual* for current prices.