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Grade Level: 5th grade – 12th grade

Time Frame: Minimum time: 30 minute set-up, 24 hours for traps to collect

Biodiversity is part of the Biosphere unit in the Standards for Earth/Environmental Science. This lesson was designed for High School Freshmen, but can easily be modified for middle school students.

One of the major components of our biosphere, the living components of our earth, is biodiversity, or the variety of species in our world. Often students learn about the variety of life found in large biomes, but very little about the plants and animals in their own backyard. To help students learn more about the biodiversity around them I have designed several methods for students to investigate the native biodiversity, specifically invertebrates and mammals. The following are guides on how to build a trap for invertebrates, a way to actively collect invertebrates, and a way to track mammal diversity surrounding your school. Additionally I have added some online resources for teachers to use to help identify invertebrates and mammals.

Guide to Building a Pit-Fall Trap for Invertebrates

Materials required

2 plastic cups per trap

Shovel or spade

Anti-freeze

Steps

1. Using the spade, dig a small hole slightly larger than the cups.
2. Place both cups inside the hole, one cup inside of the other. The first cup will help to hold the hole in place while the second will act as a reusable trap that can be removed and refilled.
3. Backfill the hole up to the edge of the top cup, making it easy for animals to become trapped.
4. Place 2 cm of anti-freeze into the top cup to act as bait.
5. Check each trap daily to identify organisms captured.
6. ID organisms using an ID resource, see below for a list of recommended resources.
7. Additionally, can add a funnel at the mouth of the trap to keep insects in the trap or place a cover on top of the trap to keep out rain or snow.

Guide to Building a Sand Trap for Tracks

Materials

Plate or other flat surface

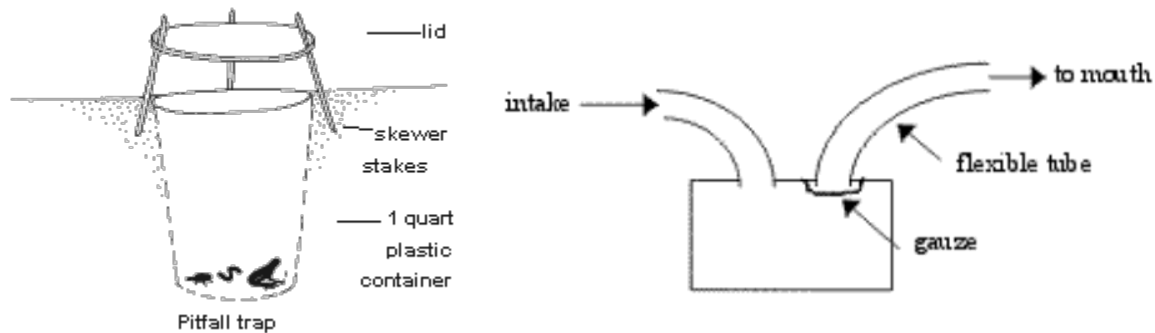
Sand

Water (can use unscented mineral oil)

Bait – tuna fish or sardines work well (optional)

Procedure

1. Mix sand with water until sand is moist, not sopping. (Dry and saturated sand will not hold tracks)
2. Place sand on plate (or other flat surface) and smooth out sand.
3. Optional: Place bait in middle of sand trap.
4. Place traps outside for 24 hours, record tracks and identify species using ID resources.
5. Replace trap and bait for more replicates.



Guide to Building a Pooter (Insect Catcher)

Materials

Small plastic container with lid

2 feet (60 cm) of plastic tubing

Fine mesh (Gauze and cotton balls work)

Glue (hot or super)

Procedure

1. Cut plastic tubing into 2 pieces, 1 ½ feet (45 cm) and 6 inches (15 cm) in length.

2. Punch two holes into the plastic container, this works best when the holes are not on the same side. Either place the holes on opposite sides or one hole on the top and one hole on the side.
3. Insert 1 piece of plastic tubing into each hole. The tubing only needs to go into the plastic container approximately $\frac{1}{4}$ inch ($\frac{1}{2}$ to $\frac{3}{4}$ cm).
4. Use the glue to secure the tubing.
5. Glue a small piece of the mesh over the hole supporting the short piece of tubing inside the container. The mesh will keep you from swallowing any insects you collect.
6. Once your pooter (insect catcher) has had time to dry take it outside and use the long piece of tubing as a wand while you inhale through the short piece of tubing, over trees and other creviced areas.

You should collect live insects in the plastic container that you can ID back in the classroom or in the field.



Coyote



Gray fox



Red fox



Bobcat



House cat



Lynx



Otter



Fisher



Mink



Weasel



Raccoon



Striped skunk



Porcupine



Beaver



Black bear



Opposum



Woodchuck



Muskrat



Snowshoe hare



Cottontail rabbit



Gray squirrel



White-footed mouse



Moose



Whitetail Dee



Elk and red deer



Crow



Turkey



Ruffed grouse



Pheasant



Key to tracks

Resources

These are some excellent resources you can use in your classroom for your own explorations into biodiversity. While online guides and Apple/Droid apps are useful, a field guide for organisms from your specific area (country, state, section of country) tend to be the most accurate. The following list is not comprehensive and is simply a good place to start looking for a way to identify species you and your students find during your classroom explorations.

Recommended Field Guides

National Audubon Society Field Guides – Useful for North American flora, fauna, and minerals

Peterson Field Guides – Useful for North American flora and fauna

eNature.com – Free online field guides for North American flora and fauna

Free online guides for Flora and Fauna

birds.cornell.edu/onlineguide/ - Free online guide for North American Birds

arborday.org/trees/whattree/?TrackingID=908 – Free online key for trees

amphibiaweb.org – Free online database for amphibians worldwide, includes IUCN status

bugfacts.net – Free non-comprehensive guide for arthropods

<http://www.epa.gov/region1/eco/uep/pdfs/BugBook.pdf> - Free US EPA insect guide

ID Apps for iPhone, iPad, and Droid

LeafSnap – An NSF funded app

IdentifyTreeLite – Has a free and pay version

TreelD – Additionally will work with fall foliage

TREES PRO HD NATURE MOBILE

eNature Park Wildlife – Free, useful for US National Parks

Virginia Tech Tree – Free plant key for Droid