



Experiment: What Conditions Encourage Leaf Litter Decomposition?

Goal:

Students will understand various conditional factors that affect decomposition rates.

Objective:

Students will understand the components of traditional experimental design and observational science.

NGSS (suggested):

MS-LS2-3: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Suggested Grade Level: 5-8

Background:

Everything that lives on planet Earth will, at some point, reach the end of their life cycle and die. The decomposition of dead organisms is an important process in any natural system. It is at this stage where nutrients and matter are recycled from a living creature back into the system. The conditions surrounding an underwater decomposition process and a terrestrial decomposition process are, obviously, quite different. However, each process has the same end result: recycled matter. Underwater decomposition is difficult to model in a traditional classroom setting, let alone a virtual classroom! This activity allows students to compare decomposition in three similar environments with altered conditions: water content and the presence of arthropods. The control treatment assumes that decomposition will be occurring with in-situ microbes. Students will make observations over the course of a week comparing the two treatments to a control group. Note: Make sure your habitats have some kind of lid, we're playing with bugs!



Materials:

3 large jars (or other container) with lids
12 Roly Polies (isopods)
Soil from outside
Fallen leaves, small sticks/twigs
Spray bottle
Masking tape and marker (for labeling jars)

Procedure:

- 1) Fill each jar about $\frac{1}{4}$ of the way with soil.
- 2) Evenly distribute leaf litter and sticks between the three jars.
- 3) With the spray bottle, mist some water onto the soil and leaf litter in one of the jars
- 4) Now it is time to add the roly polies! Evenly distribute your isopods between the damped soil/leaf jar and one of the dry soil/leaf jars. The 12 listed in the materials section is a suggestion, as it allows for at least 6 in each treatment. Make sure the number of roly polies in each jar is equal.
- 5) Label each jar:
 - a) "Control": the jar containing soil, leaf litter, and sticks
 - b) "Isopods": the jar containing soil, leaf litter, sticks, and roly polies
 - c) "Isopods and Water": the jar containing soil, leaf litter, sticks, roly polies, and misted water
- 6) Set all three jars next to one another in a partly shaded area (example: on a counter next to a window).
- 7) Create a hypothesis: how will the introduced environmental factors impact the leaf litter?
- 8) Observe:
 - a) Take a photo once a day for 1 week. Which decomposes the most?
 - b) Write down daily observations on the attached worksheet.

Evaluation: Have students explain which sample decomposed the most during the experiment duration. Why do they think this happened? Can they relate their observations to greater ecosystem conditions? I.e. What would happen if there were no decomposers in the Great Lakes? Was their original hypothesis correct?