



LESSON SUMMARY

To give students an opportunity to understand the natural cycle of decay in the forest.

Activity Information

Estimated Duration: Two 30 minute periods

Materials: Ziploc plastic bags, trowels, magnifying glasses or microscopes, paper towels.

Setting: Indoors/Outdoors

Key Vocabulary: forest litter, decay, cycle, recycle, bacteria, fungus, humus, decompose.

Teacher Background

In a forest there is a constant cycle of life and death. Nutrients are returned to the soil through the decomposition of dead plant matter. This is accomplished by a group of organisms known as decomposers. They include: bacteria, fungi, earthworms, and insects. In some places the decomposition of forest litter is so rapid that dead materials shed in one year have been entirely reduced to their component parts by the next year. In other places the process is slower and a considerable depth of litter can accumulate. Such is the case in a pine forest where the litter, called duff, can reach many centimeters and persist for years before decomposition begins.

However, in a forest all dead material is eventually recycled. We think of a forest as a producer of oxygen through the process of photosynthesis. As well, a primary component of plant matter, carbon, is released during decomposition as carbon dioxide. Carbon can be stored in dead plant matter as peat or coal. This process takes thousands, even millions of years.

ACTIVITY

- Step 1** Discuss with the student's things that people throw away. What eventually becomes of these things? (Answer – some are recycled; some are sent to a landfill). Discuss how nature also throws things away. What types of things are thrown away? (Answer – Leaves, twigs, plants that die). What happens to the things nature throws away?
- Step 2** Visit a woodlot or forest and observe the things that are lying on the ground. These will include leaves, twigs, and bits of bark and trunks of dead trees. This material is called forest litter.
- Step 3** Have the students carefully work their way down through the forest litter with a trowel until they reach the soil. What changes take place in the litter as you go in deeper? (Answer – It decays and loses its distinctive appearance.) Have them feel the litter at the top and at the bottom of the pile. Describe the moisture content. Look for any creatures that are living in the litter. Try to find a tree trunk or stump in an advanced state of decay. Look for fungus. Have them smell the litter.
- Step 4** Take samples of the litter from several spots. Make certain that each sample includes materials from the top and near the soil.
- Step 5** In the classroom have the students empty out each bag onto a separate paper towel. Make a list of the materials that can be identified in each sample, (e.g. pine needles, leaves and twigs). Use a magnifying glass to observe the portion of the litter that has begun to decay.
- Step 6** Discuss with the students the concept of a cycle in the forest. Begin by using the annual fall of deciduous leaves as an example. What happens to these leaves on the forest floor? Introduce or recall the term humus. What causes the decay (decomposing) of forest litter into humus? Why is humus important to the forest? Develop the concept of the release of nutrients back into the soil through the decay of forest litter.

Step 7 Prepare a flow chart or diagram of the life cycle of a plant in the forest. For example, a tree grows and produces leaves. The leaves fall to the ground in the autumn. Creatures that eat the dead leaves cause them to decompose. This releases the nutrients back into the soil where they are used by other plants to grow.

Extension

Place several litres of forest litter in a plastic pail. Add enough water to keep it moist. Over several days check the temperature at the center of the pile. If the temperature rises the litter is decaying rapidly through the process of composting. Compare this to the composting of materials in a home composter. In a forest the composting takes place more slowly.

Look at partially decayed forest litter under a microscope. Are there any organisms present?

Research fungi. What are the mushrooms and toadstools? How do fungi help cause the breakdown of forest litter?