Decomposing Microorganisms

Summary

The decomposition of grass clippings and leaves into compost demonstrates one of the useful functions of microorganisms.

Time Frame

1 class periods of 45 minutes each

Group Size

Large Groups

Materials

- Fresh grass clippings and green leaves
- A large (quart or gallon) glass jar with lid
- Water

Background for Teachers

This experiment will require about one month to complete. Plan accordingly. You may want to set up this activity at the outset of this unit and track its progress throughout the unit.

Nature has its own recyclers--microorganisms. When something dies, microorganisms use the dead matter as food so they can grow. This process is called decay. Leaves that fall to the ground begin to decay because of the actions of microorganisms in the soil. Rain provides the water that is needed to complete the chemical reactions. Fallen leaves turn dark and crumble because microorganisms are breaking down the larger chemicals in the leaves into simple materials that are released into the air and soil and can be used by other organisms.

In this experiment, the following changes will be observed:

- Juices from the green material form on the bottom of the jar.
- Microorganisms grow in this juice causing the liquid to become cloudy.
- The mixture settles, packs down, and begins to give off a foul odor.
- The mixture turns dark brown making green grass and leaves unidentifiable. This substance is called compost and makes the soil rich and fertile.

Intended Learning Outcomes

- Observe events and report observations.
- Know and explain science information.
- Make predictions and observations.
- Collect, record, and analyze data.
- Recognize relevance of science.

Instructional Procedures

- This experiment should be prepared and used as a teacher-led demonstration. Students will observe, record, and analyze the data as a class.
- Pack the jar 1/2 full of grass clippings and leaves. Sprinkle a small amount of water on top of the packed grass and leaves so that the mixture is moist (but a puddle of water is not formed at the bottom of the container).
- Place the lid on the jar but do not make the container air tight. (Gasses will be formed creating a force strong enough to break the jar.)

Place the jar in a dark, warm place and make observations every other day.
Use this lesson as an opportunity to develop science skills of making predictions, collecting and recording data accurately, analyzing data, and drawing inferences.
Some observations may include:

- Amount of water formed.
- Color of the fluid and firmer material.
- Presence of steam on the inside of the jar.
- Temperature of the container.
- Texture of the decomposing material.

After the experiment has been completed, have students answer the following questions in their science journal:

- Why were the materials kept in the dark? What would happen if the container was exposed to the sun?
- Why were the materials kept warm? What would happen if this material was kept in the cold?
- What process is occurring in the container?
- What gasses are given off in this process?
- What is an example of this process occurring in nature?
- Is this a useful or harmful process? Why?

Extensions

Allow students to make their own decomposition chamber. Once students select their initial materials, have them predict which materials will decompose the most quickly and the nature of the final product. Put end products into a school garden plot.

Assessment Plan

Evaluate the answers to the questions in #7 that students recorded in their science journals.

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