Recyclers Revisited
5th Grade

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References:

- Columbus Public Schools Curriculum Guide for SLC 14

Benchmarks:

SLC 14: Trace the transmission of energy in a small, simple ecosystem and/or identify the roles of organisms in the energy movement in an ecosystem.

Benchmarks: Students will identify the roles of organisms in a food chain/web.

SLC 13: Demonstrate an understanding of the cycling of resources on Earth, such as carbon, nitrogen and/or water.

Objectives:

The students will check in on their "Recyclers" experiment to see how the plants are growing. The results should indicate the importance of decomposers (the worms) in aiding the generation of the lowest level of the food web, the producers. The students will review the role of decomposers in driving the nitrogen cycle.

Materials:

- worm terrariums from "Recyclers" lesson

Initial Demonstration:

This lesson should be delivered about two weeks after the "Recyclers" lesson, when the worm terrariums were set up. Although the students should have been observing the terrariums over the course of the two intervening weeks, today the students will take a closer look and analyze the changes that they observe.

Remove the terrariums from their shady spot and bring them to the front of the classroom. Ask the students to come up front in groups to take a look.

Target Observations:

- In each of the four containers the seeds sprouted and began to grow.
- Some plants grew faster than others.
- The compost placed in two of the containers has decomposed a bit, one more so than the other.

Initial Model:

- The plants grew at different rates.
- The plants in the container with both worms and compost grew best.

Procedure:

Hopefully, the plants in the container with both compost and worms grow the best. The plants in the other containers will likely show roughly equivalent growth. Discuss the students' observations. Specifically, make sure they give ideas about the role of the compost and the worms in helping the plants to grow.

Remind the students that plants need several different things to grow. What are they? (sunlight, water, soil, nutrients, shelter) Where does the compost fit in? (It adds nutrients to the soil as it breaks down.) And how do worms help? (They are decomposers, which means they help to break down dead/decaying material, thereby more quickly replacing nutrients in the soil.) If compost adds nutrients and worms help speed up the transfer of nutrients to the soil, why don't the containers with only compost and only worms show significantly more growth? (The worms alone have no compost to break down; instead they hurt plants by using up water and nutrients from the soil for their own needs. The compost alone breaks down at a slow rate, so over only two weeks it is probable that very little compost was transformed into a useable form for the plants.)

So, both worms and compost are needed to help plants grow more quickly. In nature, "compost" includes not only plant material, but also dead animals. As well, there are many more decomposers than worms. Specialized bacteria also help break down dead/decaying material AND help convert the nitrogen in these materials into useable forms for the plants.

Note: The positive relationship between the worms and the plants is called a symbiosis. Another example of a positive symbiosis is a bee and a flower. Symbioses do not have to be positive—such as a dog and its fleas, or a tree and a termite.

Target Observations:

- The compost decomposed fastest in the presence of the worms.

Target Revised Model:

- Decomposers help plants to grow by breaking down dead/decaying material and turning it into nutrients crucial to the health of the plant.

Summary:

So, what was the point of all this again? Oh, right, producers! As the first step in the food chain, all "higher" organisms depend on the health and abundance of the producers. Decomposers help producers to grow. How can we remember where they fit in? And why

aren't they part of the food chain? Remind the students that most natural processes are cyclical, but food chains are linear. The decomposer acts as the missing link between top consumer and producer by breaking down top consumers (and other dead materials) and turning them into nutrients to help "feed" the producers. Decomposers are not included in food chains, however, because they neither prey on top consumers, nor are they consumed by producers (although they may be consumed by other organisms in the chain, such as when birds eat worms).

Decomposers fill in the missing link between top consumer and producer. They are not part of the food chain, but they keep it alive by helping break down dead/decaying material and converting it into nutrients for plants.