

Recyclers to the Rescue

5th Grade

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References:

- Columbus Public Schools Science 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 1: Use a simple key to classify objects, organisms and/or phenomena.

Objectives:

Through this lesson, students will be reminded of the needs of living things (an SLC for both third and fourth grade) and be able to construct a simple food chain. As an expansion upon their prior knowledge, the students will be introduced to the terms producer, consumer, herbivore, carnivore and omnivore.

Materials:

- 4 transparent containers with lids
- composting materials (3 parts plant material and dry leaves, one part lawn clippings, one part meatless food scraps)
- soil
- fast growing seeds such as radish, marigold or squash
- 16-20 earthworms

Before Class:

Fill each of the four containers with 3-4” of soil. Lightly spray the soil with water as you fill the containers. Also, poke holes in the container lids.

Initial Demonstration:

Ask the students to name things a mouse might eat; write these up on the board. Have them also name things that might eat a mouse and things that might eat what eats a mouse. As you put all their ideas on the board ask the students how you should organize the information so that someone outside of the classroom could look at the board and understand what eats what. When the lists are complete, have the students work individually to draw a food chain that includes a mouse and at least two other organisms.

Target Model:

- Mice feed on grass and smaller animals.
- They are, in turn, fed upon by larger animals.

Procedure:

Discuss the food chains the students drew. Use their ideas to draw a simple food chain on the board. For example:

Grass → Insects → Cricket → Field Mouse → Hawk

Now, introduce vocabulary to describe/analyze this food chain. You may choose to write the definitions on the board and/or label the food chain you composed. Food chains always begin with a **producer**. Producers use photosynthesis to make their food and do not, generally, rely on other living things to live and grow.

The remaining organisms in the food chain are called **consumers**. Consumers must eat other living things to survive. The first consumer in the chain is labeled the primary consumer, then secondary, tertiary, and top consumer. The top consumer is considered not to have any natural predators. Consumers can be further classified as **herbivores**, **carnivores** and **omnivores**. Herbivores eat only plants, carnivores only animals, and omnivores eat both.

Have the students study the food web then ask them the following questions: If the first organism in a food chain is always a producer, then what are the only possible classifications for the primary consumer? (herbivore or omnivore) Similarly, since the primary consumer is generally an animal, what are the only possible classifications for the secondary through top consumers? (omnivore or carnivore) Finally, if the top consumer has no natural predators, how does it die? (age, disease, hunting, destruction of its natural environment)

Target Observations:

- Plants are producers- they make their own food (with sunlight).
- Animals are consumers.

Target Revised Model:

- Food chains always begin with a producer, which makes food through photosynthesis, and end with a top consumer, which has no natural predators.
- Consumers can be classified as herbivores, carnivores, or omnivores.

Procedure:

Ask the students what will happen if there aren't enough producers to feed the first consumers. Hopefully, the students will notice that, not only will some of the first consumers

starve, but consumers further up the chain might also starve because their food supply has been diminished. It is very important, then, that we have enough producers to keep the whole chain moving along.

Tell the students that they are going to do an experiment to discover the most effective/efficient way to grow a producer (plant). Ask the students what the plants need to grow (sunlight, water, shelter/soil, nutrients, certain temperature range). Pull out the four containers you prepared earlier. Show the students that, as they are, each container has the same amount of soil. Remind the students that experiments rely on having certain controlled variables; the amount of soil is one of them. Controlled variables are necessary if we are to be sure later on which change to the experiment created a possibly differing outcome. Set one container aside as the control—nothing will be changed.

Ask the students what we might add to the containers to help the plants grow. Hopefully, someone suggests plant food and you can pull out the composting material and put it on top of two of the open containers. What else can be found in soil that may (or may not) help the plants to grow? Worms! Ask for volunteers who wouldn't mind touching some worms. One volunteer should add eight to twelve worms to the open container without compost, while the other adds eight to twelve worms to one of the containers with compost. Add 25 seeds to each of the four containers

Before you close the lids ask the students if the worms have all the things they need to live. What do they need? (food: compost/nutrients in the soil; water: in the soil (but they should add more over time); shelter: soil; warmth: the classroom is just about right; light: indirect sunlight is good, too much might dry them out) Close all the containers and set them in a cool, partly shady area of the classroom. The students should make observations of the containers throughout the next two weeks. At the end of the two weeks we'll open the four containers and see what has happened.

Target Observations:

- There are four containers- one with compost, no worms, one with compost and worms, one without compost but with worms, and one without either compost or worms.
- The plants have all their basic needs satisfied, some perhaps more so than others.

Target Revised Model:

- We are conducting an experiment with two variables to see which is the most efficient way to grow plants.

Summary:

The students have reviewed the benchmarks for the previous level (needs of living organisms) and have been introduced to vocabulary that will help them describe/analyze more complex food webs in the upcoming lessons. They have also set up an experiment that will show them how food webs can be affected (helped or hindered) by organisms outside of the web.