Lesson Plan: Compost Chefs

Adapted from the Environmental Protection Agency’s “The Quest for Less, Chapter 2.3: Composting” – www.epa.gov

Goal: To learn how composting can prevent food scraps and yard trimmings from being thrown away and how different components, such as air, moisture and nitrogen, affect composting.

Assessment: Students will create four compost bins with different “recipes” of air, moisture and nitrogen. Students will observe the four compost bins and record the differences these conditions cause in the composting process.

Age Group: Grades 5-8

Time: 1 hour for set-up of compost bins, 15-45 minutes on an occasional basis for up to 4 weeks.

Materials:

- Four thin, plastic buckets (5 gallons each) or other plastic container (e.g., milk jug)
- One hand drill or punch type can opener
- Grass clippings (shredded, if possible)
- Vegetable and fruit peels
- Weeds (shredded, if possible)
- Hay (shredded, if possible)
- Sawdust
- Coffee grinds
- Thermometer
- Bloodmeal
- One marker or pen
- Tape
- Four pieces of construction paper (3 by 5 inches each)
- Garden trowel
- A notebook to record recipes and observations (one per student)

Vocabulary

Composting – the controlled decomposition of organic materials.
Nitrogen – an element essential to the composting process, known as the “green” component in a compost pile which includes grass and food scraps.
Oxygen – important for the survival of the invertebrates and microorganisms that breakdown organic material in a compost pile.
**Decompose** – to become broken down into parts, to rot.

**Bedding** – dirt, newspaper or leaves used as a bottom layer in a compost container.

**Organic** – material that is or was once alive.

**Activity**

Step 1:
- Explain to the class what compost is and how it is made.
- Discuss why composting is important in managing and reducing trash that is sent to landfills.
- Explain how composting works, and how nitrogen, oxygen, and water all play a part in the creation of compost.
- Have students create 4 charts (1 for each bucket) in their notebooks. They should have Weeks 1-4 on one side and Temperature, Appearance and Smell on the other. Also, make sure they leave room on the page for them to write down the ingredients for that bucket.

Step 2:
Pick an appropriate project space. This activity can either be conducted in an indoor area of the classroom that has been covered with a protective drop cloth or in a designated area outside of the school. If you choose to leave the compost buckets outside, make sure the chosen area will not be disturbed by recess or after-school activity. Use the hand drill and carefully poke several holes in the sides (near the bottom) of three of the buckets or milk jugs.

Step 3:
Have the students sit in a circle within view of you and the compost buckets. Divide the class into four groups and assign a group of students to each bucket. Using the construction paper and marker, label the buckets “one” through “four.”

Step 4:
Work with each group of students to set up the buckets. As each mixture is created, discuss its ingredients and ask students to record the “recipe” in their notebooks. Following are directions for setting up each bucket:

**Bucket #1 – Compost lacking nitrogen**
- Place mostly “brown” carbon-containing materials in the bucket, such as dead leaves, straw, and coffee grounds. On top, add a few vegetable and fruit peels.
- Moisten, but do not soak, the mixture with water.

**Bucket #2 – Compost lacking moisture**
- Place a mixture of “green” grass clippings (make sure they are dry), bloodmeal, and vegetable and fruit peels in the bucket.
- Place a few layers of “brown” dead leaves, straw, and coffee grounds into the mixture.
- Do not add any water.

**Bucket #3 – Compost lacking air circulation**
- Use the bucket without holes.
- Place several layers of mostly high-nitrogen grass-clippings, bloodmeal, vegetable peels, and fruit peels in the bucket.
- Moisture the mixture with water.

**Bucket #4 – “Perfect” Compost**
Layer (in an alternating pattern) leaves, coffee grounds, straw, and vegetable and fruit peels, and a small amount of grass clippings in the bucket.

Moisten the mixture with water.

Step 5:
Explain that, as compost chefs, the students must monitor their creations. Give each group written instructions on how to care for its compost bucket over the next few weeks. For example:

Bucket #1
- Use a garden trowel to stir your compost mixture regularly: once every 3 days for the first 2 weeks, then once per week.
- Add a dash of moisture to your compost mixture with a sprinkle of water every other week.

Bucket #2
- Use the garden trowel to stir your compost mixture regularly: once every 3 days for the first 2 weeks, then once per week.
- Keep your compost mixture dry.

Bucket #3
- Add a sprinkle of water to your compost mixture every week.
- Make sure you don’t stir your mixture.

Bucket #4
- Add a sprinkle of water to your compost mixture every week.
- Use the garden trowel to stir your mixture regularly: once every 3 days for the first 2 weeks, then once per week.

Step 6:
At each interval of stirring or watering, have all of the groups visit each compost bucket and record their findings, including temperature, appearance, and smell.

Step 7:
After 4 weeks, have the students use the trowels to dig into each compost pile and examine it closely. Ask them to compare and contrast the compost in each bucket. Ask students which mixture decomposed the most.

Step 8:
- Use the finished compost from Bucket #4 as soil for classroom plants or a garden. Have students explore how compost aids new vegetative growth.
- Ask students to list the most important ingredients for a good compost pile (nitrogen, water, and air circulation). Have them explain what role each ingredient plays in decomposition. Ask each group to name the missing ingredient in its mixture (Group #4 won’t have a missing ingredient).
- Have students explain how composting reduces the amount of waste that we send to the landfills.
- Ask students to think of places in nature where composting might occur naturally.

Extensions
- Explore composting as a natural cycle. Study the nitrogen cycle and have students make
diagrams of its components. (The nitrogen cycle is the continuous cyclic progression of
chemical reactions in which atmospheric nitrogen is compounded, dissolved in rain, deposited
in soil, assimilated, and metabolized.) Use composting as a lead-in to discuss other natural
cycles.
- Start a school wide compost bin using the appropriate wastes from school lunches. Have
students decide which wastes can be added to the pile and have different classes watch over
and stir the pile each week. Have each participating class start a small flower garden plot,
using the compost as a soil amendment.

Minnesota Teaching Standards

5th Grade
Science: 5.1.1.1.4, 5.1.1.2.1, 5.1.1.2.2

6th Grade
Science: 6.1.3.4.1, 6.2.1.2.1

7th Grade
Science: 7.1.1.2.2, 7.1.1.2.3, 7.1.3.4.2

8th Grade
Science: 8.1.1.2.1, 8.1.3.4.2