TAKE CARE OF TEXAS: EDUCATOR MATERIALS

LESSON PLAN

Create Your Own Compost

Objectives:

Students will learn what composting is, the ingredients for a successful compost pile, and the environmental and societal benefits it provides.

Prerequisites:

- Download the **Take Care of Texas: Guide to Yard Care** for distribution to students or order a free classroom set. *Guides will take 7-10 days for delivery.*
- Before starting the lesson, set up the compost container in an approved area on campus. Avoid placing the container on concrete or paved surfaces, near wooden fences or buildings, or in highly trafficked areas. Be aware that if placed in direct sunlight, the compost pile will require water more often, but may compost faster.

Note: It may take several days to gather enough materials to initiate the composting process.

Duration:

45 minutes

Materials:

- Gloves (one pair per student)
- Yard stick or shovel
- Source of water
- Bags or reusable containers to collect “green” and “brown” materials
- Large container, bin, or chicken wire to create your own compost container (at least 3 feet wide and 3 feet tall). See image examples.
- Brown material (dried leaves, wood chips, dried glass clippings, paper, pine needles, or other plant material)
- Green material (fresh and moist grass clippings, flowers, fruit and fruit peels, tea bags, vegetables and peelings, coffee grinds, other plant-based food scraps)

Note: Do not compost animal bones, animal meat, animal fats such as fats or cooking oils, cat litter, coal, charcoal, colored paper, dairy products, diseased plants, pet droppings, insecticides, pesticides, poisons, weeds, or toxic chemicals.

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Introduction:

Composting is the natural process of turning organic matter (such as leaves, fruits, or branches) into nutrient-rich soil. This process requires “decomposers” which are organisms (microorganisms and/or macroorganisms) that break down organic matter. In just a few steps, you can create your own compost at home. Composting has many benefits, including:

- **You use less landfill space** by reusing your organic materials instead of sending them to a landfill.
- **Plants receive nutrients slowly** unlike chemical fertilizers, which could damage your plants if applied incorrectly.
- **Organic matter in soil increases** because compost improves vitamin and nutrient content in food grown in compost-rich soils.
- **Soil retains more moisture** as a layer of compost on top of your soil reduces the amount of moisture that evaporates.
- **Saves money** since you are using your waste to make compost, it’s practically free! And when you use it, you don’t have to buy as much or water as much (that is, you could save money on your water utility bill).

The four main components in the composting process are decomposers, water, oxygen, and organic matter. Just like us, decomposers need water and organic matter to survive. When they “eat” organic matter, decomposers release heat and certain molecules that plants can use as nutrients. They also release carbon dioxide; however, they might release other molecules that smell like rotten eggs if there isn’t enough oxygen in the compost pile for them to “breathe.”

There are two main types of organic matter for composting: “brown materials” and “green materials” (see the materials section for examples of each). Along with an adequate supply of oxygen, sufficient water, and a good balance of brown materials and green materials, you can create an ideal environment for decomposers and create ready-to-use compost in one to three months. Composting can take longer depending on the composting technique used, seasonal temperatures, moisture levels, and the ratio of brown to green materials. Regardless, the compost is ready-to-use when it is dark brown or black, crumbly, and has an Earth-like aroma.

Tips for composting in 1-3 months:

- The best composting temperature is reached when the pile is at least 3 feet tall.
- Break the materials into smaller pieces to help speed up the composting process.
- Maintain dampness—moisture of the pile should be similar to that of a wrung-out sponge.
- Mix the materials frequently to maintain oxygen throughout the pile.
- Maintain equal amounts (by weight) of green and brown materials.
- Make cuts in stems and leaves to provide entry for microorganisms.

Procedure:

1. Ask your students what they think happens when leaves, fruits, or branches fall on the ground.
2. Explain to students that those things naturally decompose because of decomposers. The decomposed materials can then be used to help trees, shrubs, and other plants to grow. See decomposer definition.
3. Use the Introduction and an Extension video or graphic to show them how the composting process works. Provide the TCEQ Extension printout for each student to help them understand the “ingredients” for composting and the difference between brown and green materials. Give examples of each.
4. Discuss procedures with your students for safely using gloves and tools, and checking the pile for animals before working.
5. As a class, collect enough brown material outside to completely fill the container. Store the browns on the side of the container.
6. Assign students to do the following each day until the compost pile is 3-feet tall:
    a. Throw any green material (from their lunches) into the container.
    b. Cover greens with browns and maintain an equal ratio of materials.
    c. Compost will break down faster once the pile has equal amounts of green and brown materials and the pile is at least 3 feet tall in the container.
7. As soon as the compost pile is 1 foot tall, add water to the pile and mix the materials with a stick or shovel to ensure uniform dampness and aeration.
8. Now that your students have seen how much water to add and how to mix the pile, assign this task to your students. This task will need to be done routinely for the next 1 to 3 months until the compost is ready for use. **Remind your students to check the pile before watering it to determine how much water (if any) to add.**
9. Adjust your watering schedule to maintain appropriate dampness, similar to that of a wrung-out sponge, throughout the pile.
10. Mix the materials every few times scraps are added or when the pile looks matted.
11. Use the compost in a school garden before the fall or spring growing season, for a class activity to pot small plants, or separate equally into gallon-sized bags and give to students to take home for potting plants or landscape.

Some things to note:

- If your compost pile ever has fruit flies or has an odor, add brown material and mix.
- The pile will decrease in volume by 35-50% in a week or so. If desired, you can continue to add more browns and greens to it; however, you will need to sift/remove un-composted greens from the pile before using it.
- If you get a lot of rain in your area, you may need to cover your composting bin. Too much water can slow down the process and make it slimy.

Glossary:

- **Compost** – a mixture of various decayed organic matter that is used for soil enriching and conditioning
- **Composting** – the natural process of decomposition and recycling of organic material into a humus-rich soil
- **Decomposers** – animals, bacteria, and fungi that break down organic matter
- **Nutrient** – any molecule that an organism may need to grow, reproduce, and maintain health
- **Biodegradable** – waste material that is capable of being broken down by decomposers
- **Microorganism** – a microscopic organism such as bacteria and fungi
- **Macroorganism** – an organism large enough to see with the human eye such as earthworms and insects

Applicable TEKS:

- **4th Grade** – §112.15.b. 1A,B; 2A,B,F; 4A; 5A,B; 7A,B,C; 8A,C; 9A,C; 10A.
- **5th Grade** – §112.16.b. 1A,B; 2A,B; 4A; 5A,B; 9A,B,C.
- **6th Grade** – §112.18.b. 1A,B; 2A,B,E; 4A; 7A.
- **7th Grade** – §112.19.b. 1A,B; 2A,B,E; 4A; 10A,B,C.
- **8th Grade** – §112.20.b. 1A,B; 2A,B,E; 4A; 11A,B.

References:

- Take Care of Texas – **What Should I Put in My Compost Pile?** *takecareoftexas.org/sites/default/files/infographics/What-Should-I-Put-in-My-Compost-Pile.jpg*
- Take Care of Texas – **Guide to Yard Care**. *takecareoftexas.org/sites/default/files/publications/GI-465-x.pdf*
- Texas Commission on Environmental Quality – **Compost Recipe**. *www.tceq.texas.gov/assets/public/assistance/education/Compost-Recipe-Graphic.png*
- Texas Commission on Environmental Quality – **How to Start Composting in Your Own Backyard**. *www.youtube.com/watch?v=oI3zTspfbb8&feature=youtu.be*
- Texas AgriLife Extension Service – **Composting for Kids PowerPoint**. *aggie-horticulture.tamu.edu/kindergarden/kidscompost/CompostingForKids.pdf*
- Environmental Protection Agency – **Composting at Home**. *www.epa.gov/recycle/composting-home*
- Texas A&M AgriLife Extension – **Don't Bag It, Compost It**. *aggie-horticulture.tamu.edu/earthkind/landscape/dont-bag-it/*

Note: Some of these references are from external sources and may not reflect the views of the TCEQ. Before using a reference, please verify that it is appropriate for your students.