

Garden Lesson: Creating Compost

Season: Fall | Grades: 7th and 8th

Ohio Science Concept

- Grade 7 (ESS): Cycles and Patterns of Earth and the Moon- the Sun and thermal energy transfer
 - Grade 7 (PS): Conservation of Mass and Energy- Properties of matter
- Grade 8 (ESS): Physical Earth- Physical features of Earth and how they formed
 - Grade 8 (LS): Species and Reproduction- Fossil record and the diversity of species

Next Generation Science Standards

- MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

Science Inquiry and Application

- Identify questions that can be answered through scientific investigations
- Use appropriate mathematics, tools and techniques to gather data and information
- Analyze and interpret data
- Think critically and logically to connect evidence and explanations

Objectives

Students will...

- Identify and examine the decomposition process and make connections nutrient cycling in a food web
- Engage in effective composting practices which balance carbon and nitrogen
- Investigate diversity in soil characteristics from samples taken around the school

Materials

- Transition signal (bell, chime, etc.)
- *Observe Station*: samples of compost at different states of decomposition, arthropod identification sheets, tarps, hand lenses, popsicle sticks, student worksheets, pencils, clipboards
- *Explore Station*: samples of sand, silt and clay, trowels, glass jars with lids, student worksheets, pencils, clipboards, tape, marker, water source, soil shake data collection sheets
- *Garden Station*: garden fork, water source, buckets for collecting plant material, gloves

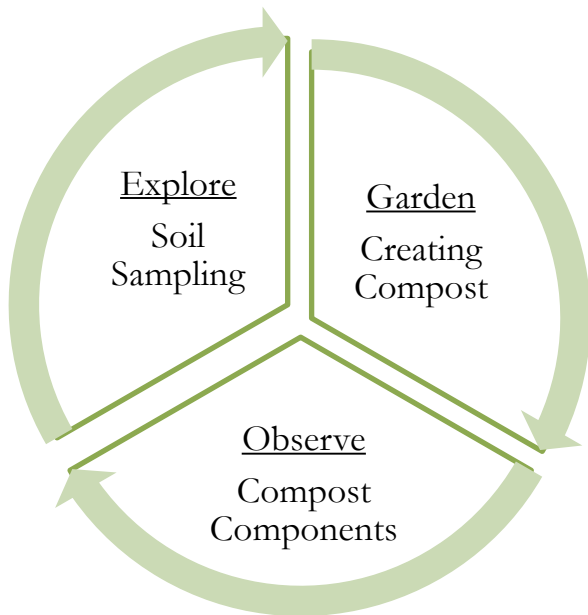
Overview

The focus of this lesson is to develop an understanding of decomposition. Through hands on examination and authentic practices, students learn the scientific principles and environmental benefits of composting. At the Observe Station students use tools to identify components of the decomposition process occurring in compost and relate these components to the cycling of energy and elements. At the Explore Station students investigate soil samples from around the school grounds and develop explanations for what various plant species need to thrive. At the Garden Station students engage in composting plants and best practices for tending a compost system. The lesson will close with a group discussion about how students can apply what they've learned to help the environment.

5 minutes Introduction

- Welcome & review expectations
- How is soil formed? What happens in the compost?
- Break into three groups for station time

20 minutes Station Rotation (5 minutes per station + 1 minute for transition)



Observe: Compost Components

- Materials: samples of compost at different states of decomposition, arthropod identification sheets, tarps, hand lenses, popsicle sticks, student worksheets, pencils, clipboards
- Prep: Divide the students into three teams & distribute materials
- Ask the students to explain what compost needs so decomposition can occur effectively, what we should put in the compost bin and the why the samples look different
- Using the tools available students should list the components they observe in their samples

Explore: Soil Sampling

- Materials: samples of sand, silt and clay, trowels, glass jars with lids, student worksheets, pencils, clipboards, tape, marker
- Explain that soils can be identified based on their sand, silt and clay composition. Show examples of sand, silt and clay.
- Prep: Divide the students into teams of three and distribute the materials
- Instruct each group to collect a soil sample and complete the student worksheet (adding water, shaking, labeling their sample, describing the location where it was collected and hypothesizing about the amounts of sand, silt and clay present)
- Vigorously shake the jars and let sit- after 24 hours students will be able to identify the different layers in their soil sample

Garden: Creating Compost

- Materials: garden fork, buckets for collecting plant material, gloves
- Ask students to list items that can be composted and how to maintain a balance of carbon and nitrogen
- Divide the group into two teams and have one team collect nitrogen material and the other collect carbon material to add to the compost
- Aerate the compost pile by turning with the garden fork and add water if needed

5 minutes Conclusion: What Can You Do?

- Ask students to explain why composting is important
- How could the students encourage more people to compost?

Arthropod Identification Sheet

Source: "Do the Rot Thing" from CVSWMD Organics

COMPOST CRITTERS WORKSHEET

Circle Me If You Can Find Me



collembola



springtail



mite



sow bug



slug



worm cocoon



beetle



fruit fly



white worms



redworm



spider



snail



mold



ant



centipede



bacteria



millipede



pill bug

Name: _____ Date: _____

Observe Station Student Worksheet: Compost Components

Directions: Use hand lenses and observational skills to compare and contrast compost components at different stages. Try to identify as many items as you can and sort into the categories of living or nonliving.

Stage of Compost _____

<u>Living</u>	<u>Nonliving</u>

Explore Station Student Worksheet: Soil Sampling

Name _____

Draw the area where you collected your soil:

Name and/or describe the plants growing around the collection site:

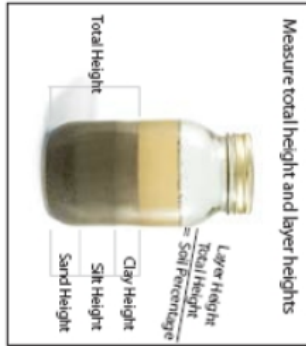
List 5 observations about your soil sample:

1. _____
2. _____
3. _____
4. _____
5. _____

Do you think your soil is mostly sand, clay or an even combination of the three?

Soil Shake Data Collection

Measure (in centimeters) the height of each layer.



- Sand height = _____ cm
- Silt Height= _____ cm
- Clay height= _____ cm
- Total Height= _____ cm

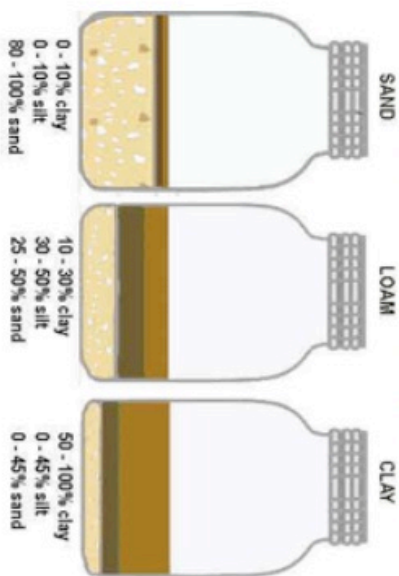
Divide the individual heights of the layers by the total height to find the percentages of your soil components

- sand height = _____ x 100 = _____ %
total height
- silt height = _____ x 100 = _____ %
total height
- sand height = _____ x 100 = _____ %
total height

- **Best garden soils have a
- Combination of clay, silt and sand. Different sizes of particles allow for oxygen.
 - Sand allows both drainage and root movement
 - Clay can hold water.
 - Silt can store nutrients.
 - Optimum pH for flowers and vegetables being between 6 and 6.5.

Classify your soil by comparing your percentages to those below:

JAR TESTING FOR SOIL TYPE



Our soil type is _____

Would your soil be good to use in our garden?

Name _____

Draw the outcome of your soil shake experiment. Label the layers of sand, silt and clay.

Make 3 observations about the results of the soil shake test:

1. _____

2. _____

3. _____