COMPOST AND BIODEGRADABILITY

Garden

ADAPTED GRADES K–5 | SCHOOL PARTNER LESSON PLAN

TIME AND LENGTH
45 min

LOCATION
Garden

ESSENTIAL QUESTIONS
- Is soil living?
- What lives in the soil & how do they work together to help our garden?

MATERIALS
- "What does it mean to recycle?" items
  - Food scraps, recyclable/donatable items (soup cans, paper, etc./pair of shoes, t-shirt, etc.) and non-recyclable items (chip bag, plastic wrap, etc.)
- Healthy Compost Layers organizer Handout
- FBI sheet
- Colored pencils
- Worm bins
- Compost
- Lint
- Food scraps
- Leaves, paper scraps, etc.
- Clear tennis ball containers (1 per class)
- C/N Ratio Poster
- ebook
- Magnifying glasses
- Bug catchers
- Pruners
- Gloves/tweezers
- Trays
- Shovels/Forks
- "Compost Critters" ID page Handout—laminated/sheet protected
- *Compost Stew: An A to Z Recipe for the Earth* by Mary McKenna Siddals
- 5 gal bucket (if you don't have a compost bin at your school)
- 5 gal bucket of greens
- 5 gal bucket of browns

NOTE:
Adapted from **Grade 1 Garden Lesson #5: Soil Web**, pg 428.

CUNNINGHAM ELEMENTARY SCHOOL
AUSTIN Independent School District

PEAS
PARTNERS FOR EDUCATION, AGRICULTURE & SUSTAINABILITY

CREATED BY
Cunningham Elementary School and Partners for Education in 2021

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VOCABULARY

- Nitrogen/el nitrógeno
- Carbon/el carbón
- Compost/el abono orgánico
- Decomposition/la descomposición
- Soil/el suelo
- Fungi/los hongos
- Bacteria/la bacteria
- Invertebrate/el invertebrado

TEACHER BACKGROUND

The process of decomposition of a healthy compost pile can be hard for students to see in a single observation, but with a close look, evidence can be found; particularly when students are invited to actively participate in building out the proper layers of the compost as well as investigating for signs of specific decomposers.

LESSON DESCRIPTION

In this lesson, students will explore the idea that not everything in the garden is growing, some things are breaking down to let others grow. They will learn how to build a healthy compost pile through hands-on activities.

LEARNING OBJECTIVES

- Students will know that healthy soil allows for healthy plants.
- Students will know that recycling organic matter in compost is a good way to return nutrients to the garden.
- Students will know how to construct a healthy compost pile.
- Students will know the role of FBI as decomposers of organic matter.

Content Learning Objectives

Garden Planning and Maintenance

GPM.1.2 Demonstrate knowledge of what plants need.

Soil

S.2.3 Balance carbon (browns) and nitrogen (greens) in compost.

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ACADEMIC STANDARD CONNECTIONS

Texas Essential Knowledge and Skills (TEKS) for Science, Elementary, Revised 2022

K.7 Earth and space. The student knows that the natural world includes earth materials. The student is expected to:
(C) give examples of ways rocks, soil, and water are useful.

1.7 Earth and space. The student knows that the natural world includes rocks, soil, and water that can be observed in cycles, patterns, and systems. The student is expected to:
(A) observe, compare, describe, and sort components of soil by size, texture, and color;
(C) identify how rocks, soil, and water are used to make products

2.1 Scientific investigation and reasoning. The student conducts classroom and outdoor investigations following home and school safety procedures. The student is expected to:
(B) identify and demonstrate how to use, conserve, and dispose of natural resources and materials such as conserving water and reuse or recycling of paper, plastic, and metal

2.9 Organisms and environments. The student knows that living organisms have basic needs that must be met for them to survive within their environment. The student is expected to:
(A) identify the basic needs of plants and animals

3.7 Earth and space. The student knows that Earth consists of natural resources and its surface is constantly changing. The student is expected to:
(A) explore and record how soils are formed by weathering of rock and the decomposition of plant and animal remains

4.7 Earth and space. The students know that Earth consists of useful resources and its surface is constantly changing. The student is expected to:
(A) examine properties of soils, including color and texture, capacity to retain water, and ability to support the growth of plants
(C) identify and classify Earth's renewable resources, including air, plants, water, and animals, and nonrenewable resources, including coal, oil, and natural gas, and the importance of conservation

4.9 Organisms and environments. The student knows and understands that living organisms within an ecosystem interact with one another and with their environment. The student is expected to:
(A) investigate that most producers need sunlight, water, and carbon dioxide to make their own food, while consumers are dependent on other organisms for food

5.9 Organisms and environments. The student knows that there are relationships, systems, and cycles within environments. The student is expected to:
(A) observe the way organisms live and survive in their ecosystem by interacting with the living and nonliving components
(B) describe the flow of energy within a food web, including the roles of the Sun, producers, consumers, and decomposers

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Lesson Sequence

Engage

Cultivate Curiosity (5 mins):

- What does it mean to recycle?
  - Ask students to turn to their shoulder partner to discuss what it means to recycle. Provide ample time for discussion as you move about the space to listen & support conversation as needed.
  - After, ask students to share out what their partner said.

Explore

Root Around (6 mins):

- In groups/as a whole class separate various items (suggestions listed in Materials section) into groups.
  - Ask the students to think about what it means to recycle when grouping the items. Allow students to create their own groupings
  - Ask students to share out about why they categorized as they did
  - Discuss the importance of recycling in their homes, as well as in the garden—recycling organic matter returns nutrients to the soil
  - Healthy soil! Healthy plants!

Explain

Grow Understanding (7 mins):

For younger grades

- Read *Compost Stew: An A to Z Recipe for the Earth* by Mary McKenna Siddals

For older grades

- When we compost, we are feeding small critters that create healthy soil.
- When we have healthy soil, we have healthy plants!
  - To create a healthy compost pile you only need four things:
    - Carbon organic material (Brown materials)
    - Nitrogen organic material (Green materials)
    - Water
    - Oxygen

- Use the anchor chart to show the proper way to stack "browns" & "greens".
  - Demonstrate the appropriate ratio using a clear container—layering as you explain
  - Brown materials are carbon or carbohydrate-rich & they are the food sources for all the organisms that work with microbes to break down the organic material
    - Fall leaves, pine needles, twigs, chipped tree branches, bark, straw, hay, sawdust, corn stalks, paper, dryer lint, cotton fabric, corrugated cardboard
  - Green materials are rich in nitrogen or protein that tend to heat the compost up
    - Grass clippings, coffee grounds, tea bags, veggie & fruit scraps, plant trimmings, annual weeds (w/o seed heads & no Bermuda grass because the seed is held within the rhizome), eggshells. When tilled into the **soil**, ground **eggshells** provide your plants with calcium. Calcium is also essential for building healthy "bones"—the cell walls of a plant.

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- Briefly Explain that a proper compost pile is a great home to decomposers, or Garden FBI (Fungus, Bacteria, Invertebrates)! (critters were the focus of last year's compost lesson, so this just needs to be touched on)
  - Bacteria do most of the work, even though they are invisible to the naked eye.
  - Other animals large enough to see, such as beetles, worms, centipedes, millipedes, and sow bugs, are also important decomposers.
  - Without decomposers all life would stop because new plants would not have the necessary nutrients needed to grow. Decomposers turn our garbage into plant food!

Elaborate **Observe the Fruits (20 mins):**

- Building compost—you can have each class do all three jobs, or have grade levels/classes do one job each
  - Chop (6 inches in size or less)
  - Add greens/browns
  - Mix/Turn
  - Water (as wet as a wrung out sponge)
- As you build, keep an eye out for critters in the compost!
- If you don't have a compost bin at your school, you can create—"Compost in a Bucket"—This is the same process, however you want to cover the top with about a gallon of soil, compost or potting mix so it doesn't turn rancid.

Evaluate **Reflect (7 mins):**

Fill in Healthy Compost Layers sheet

POSSIBLE EXTENSIONS

Read aloud: *Diary of a Worm* by Doreen Cronin

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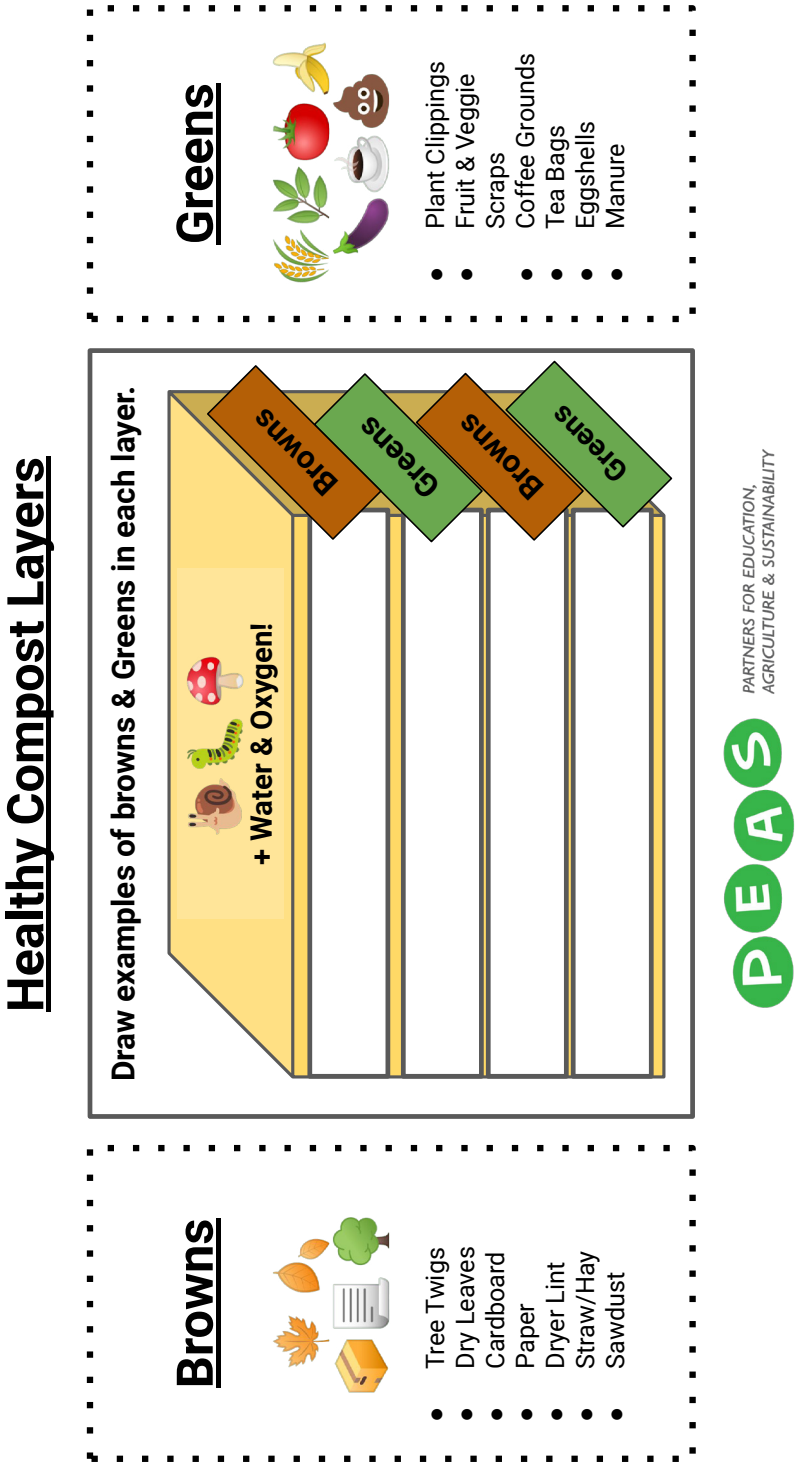

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COMPOST CRITTERS WORKSHEET

Circle Me If You Can Find Me


collenbola


springtail


mite


slug


worm cocoon


sow bug


fruit fly

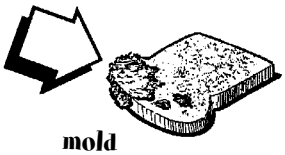

white worms


beetle


redworm


spider


snail


mold


ant


millipede


centipede


bacteria


pill bug

Name: _____ Date: _____

Source: Compost Critters Worksheet

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