LESSON:

3/10

SIXTH GRADE GARDEN ROTATION

STANDARDS ALIGNED:

YES

# Compost Lab

**PLACE OF LEARNING:**

## Garden Classroom

**DURATION:**

## 90 minutes

**GRADE LEVEL:**

## Grade 6

CONTRIBUTOR

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**TAGS:**

Decomposition
Compost
Soil

## Summary:

In this sixth grade science class, students will begin to understand the process of decomposition and learn about the organisms responsible for breaking down matter. Students will also begin to make the connection with finished compost as food for plants in the garden.

## Student Learning Goals & Objectives:

After this lesson, students will be able to:

- Explain the different layers in a compost pile (browns, greens, food scraps, manure, water, and air)
- Identify the organisms responsible for decomposition, the FBI (fungus, bacteria, invertebrates)
- Explain the process of decomposition
- Explain the importance of compost

## Assessments:

During this lesson, students will:

- Discuss and label the necessary components of the compost pile using the Compost Cake visual aid (browns, greens, food scraps, manure, water, and air)
- Discuss the organisms responsible for decomposition (fungus, bacteria, and invertebrates)
- Identify and discuss compost at several different stages on Compost Row from food scraps to fertile soil
- Discuss that making compost piles speeds up decomposition, reduces waste, and replenishes soil

## Materials & Prep:

MATERIALS

- Compost pile or row

- Three small piles of greens, browns, and food scraps
- Compost Cake Visual Aid with ingredient cards, elements, and file folder
- Fungus, bacteria, invertebrates (FBI) images
- Thermometer
- Bucket of sifted finished compost
- Rotting apple
- Prompt for Closing Circle activity
- Decomposition definition

BEFORE YOU BEGIN

- Build a compost pile or row
- Gather materials for your greens layer, browns layer, and food scraps into small piles near your compost
- Insert a thermometer into the hot pile
- Create job board, listing the Compost Lab activity and two garden jobs for working groups
- Create the Compost Cake visual aid
- Create the Compost Cake ingredient cards with Velcro backing
- Create the FBI images and their “Top Secret” folder

# Procedure Steps:

FULL GROUP, 7-12 MINUTES

1

**AT THE OPENING CIRCLE:**

Welcome students and introduce the Compost Lab by asking students to help us with this "Mystery of Decomposition.”

1. "*Help us with this mystery. What is going on with this apple? It’s not looking so good…*"
2. Have students participate in a Think-Pair-Share and discuss what they think is going on with the apple. Ask for two or three people to share out their thoughts. If

possible, have the students build on the ideas of others in the conversation.

3. Explain that students will take a break from their working groups to visit the Compost Lab. Explain that the garden can be thought of as an outdoor laboratory – a place to experiment and figure things out together.
4. Go over the garden jobs and divide students into working groups. Focus attention on the Job Board and exhibit team teaching. From their seat in the circle, each garden teacher gives a brief description of the garden job they will be leading that day.
5. In your small group, ask students to share one question they have about decomposition before participating in the lab.

SMALL GROUPS, 40-60 MINUTES

2

## AT THE COMPOST STATION

Students rotate through the Compost Lab activity and their working groups.

1. Start with an exploration activity. Ask students, "*How many things can you find in the compost pile or in the area that you think are connected to the mystery of the apple (or to decomposition in general)?*"
2. Come back together as a group and have the students do a Think-Pair-Share discussing how what they found is connected to the decomposition of the apple. Once they have finished sharing with each other, ask several students to share out with the group what connections they or their partner have made during their discussion.

3

## COMPOST CAKE AND FBI

Show students the Compost Cake visual aid.

1. Explain that building a compost pile is similar to building a layer cake. This layer cake/compost pile is feeding the FBI.
2. Show students the Compost Cake ingredient cards, and invite them to identify each one as they are arranged on the visual aid: C is for carbon (sticks, straw, dry

material, “the browns”), N is for nitrogen (living plant matter like leaves and grasses, “the greens”), M is for manure (horse, duck, chicken manure, which are rich in microorganisms), N is for nitrogen (this time from food scraps).

3. Explain that decomposers, like all living organisms, have three main needs for survival: food, water, air. When building our compost piles, we are creating an environment suitable for the FBI by providing food, water, and air.
4. Open the “Top Secret” file folder and have students identify the FBI while looking at images of each.
5. Have students review what elements are found in the staged piles of food scraps, browns, and greens (carbon and nitrogen). Explain that we layer the browns, greens, and food scraps to make our compost piles.

4

## READING THE THERMOMETER

Have students gather around the hottest (newest) compost pile.

1. Direct their attention to the thermometer in the compost pile. Take guesses from students on how hot the compost pile gets and why it heats up. Have students read the thermometer and explain that decomposition is happening fastest when the compost is at the ideal temperature of 130-160 degrees Fahrenheit.
2. Take guesses for what causes the heat. Draw an analogy between a middle school dance – with a hundred students moving around in one room – and the bacteria in the compost pile. Individually, we hardly notice our own body heat, but when we are all together – eating, digesting, and moving around – our heat is noticeable and the room heats up. Explain that the billions of active bacteria give off heat while they decompose the pile.

5

## LIVING SOIL

If you have a compost row:

1. Show students the progression of the compost piles from start to finish with a walk down the row. Ask students to make an observation about the difference

between the first and the last pile (e.g. looks like soil, no longer hot, can no longer recognize the parent material, smaller in volume).

2. After showing all the stages of decomposition, gather students around a bucket of sifted finished compost.
3. Invite students to hold finished compost in their own hands. Explain that the components of this pile have been decomposed and changed into living soil. Take a handful of soil and explain that there are billions of bacteria in each handful.
4. Prompt students to think about why we might build compost piles in the garden when decomposition is occurring all around us all the time. Explain to students that composting speeds up decomposition, reduces waste, and replenishes soil.
5. Ask students to now come up with a working definition of decomposition together. Have a student read aloud the dictionary definition of decomposition and notice how the two are similar.

FULL GROUP, 10-15 MINUTES

6

**AT THE CLOSING CIRCLE:**

Ask students to think about one question they have about compost.

1. Facilitate a Think-Pair-Share discussing a question they have about compost. Share out.

## Compost Row Video

## Download Lesson Materials

COMPOST CAKE VISUAL AID

FUNGUS, BACTERIA, INVERTEBRATES (FBI) IMAGES

PROMPT FOR CLOSING CIRCLE ACTIVITY

DECOMPOSITION DEFINITION

## Vocabulary:

Fungus
Bacteria

Invertebrate
Decomposition

Living soil

## Teaching Notes:

At the Edible Schoolyard Berkeley, our compost pile is called "Compost Row." Compost Row is a free-standing pile method consisting of layered browns and greens. Science students at King add air to the compost by turning the piles across compost row until they have fully decomposed into living soil.
Students learn that the process of decomposition helps reduce waste and replenishes soil by amending the soil with finished compost. The concept of soil fertility is discussed. Students are given the opportunity to learn that topsoil is alive and is a habitat for many organisms. Healthy soil translates to healthy plants and healthy plants translate to healthy humans and animals. The concept of Matter Cycles is used to drive home this point.
The nuts-and-bolts skill of how to build a compost pile is valuable for students to know in our collective effort to maintain the garden space.
Throughout the year, students can reference the compost lab when they are

working on composting to bring meaning to the work.

Hang the Respect in the Garden poster in the Ramada to remind students of behavioral agreements. (See Respect in the Garden lesson)

# Academic Standards

### California Academic Content Standards

SCIENCE

6.5.B

Students know matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.

6.5.E

Students know the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.

# Edible Schoolyard Standards

### In the Garden Clasroom, Grade 6

TECHNIQUES

2.3

Identify layers and components of a compost pile; observe fungus, bacteria, and invertebrates in decomposition; tend compost with guidance.

# Contributors:

All lessons at the Edible Schoolyard Berkeley are a collaboration between the teachers and staff of the Edible Schoolyard and Martin Luther King, Jr. Middle School.

This lesson follows the BEETLES Project's Learning Cycle (Invitation > Exploration > Concept Invention > Application > Reflection) and uses their Discussion Routines (e.g. Think-Pair-Share and Whip-Around). For more information, review the BEETLES Learning Cycle (PDF) and Discussion Routines (PDF) documents or visit beetlesproject.org.

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