

FOOD AND THE ENVIRONMENT: COMPOSTING



SUMMARY

As we have learned in previous lessons; everything that grows decomposes eventually as part of the natural food cycle. Actively recycling food and other organic waste into compost provides a range of environmental benefits, including improving soil health, reducing greenhouse gas emissions, recycling nutrients, and mitigating the impact of droughts. We build on our previous lesson, Food Waste, by introducing composting, the science behind it, the reasons for doing it, and the environmental benefits, as well as encouraging students to identify what kind of composting they could partake in and how each of us can play a role in diverting the amount of food waste that reaches our landfills.

Duration: 90 mins, 2 Sessions | Grade Level: 4th-7th



Module 1: Food and the Environment

Composting

LESSON CONTENTS

- At A Glance 2
- Lesson Breakdown 3
- Detailed Lesson Script
 - PART I 4
 - PART II 8

LESSON RESOURCES

greenbeetz.org

our website hosts lesson slides, google forms, lesson videos, and teacher training videos, glossary, standards alignment and more

Worksheets

- Compost: Impacts More Than You Think
- How to Create Black Gold

COMPOSTING: AT A GLANCE



ESSENTIAL QUESTION

Why and how do we compost?



STUDENT LEARNING GOALS AND OBJECTIVES

After this lesson students will be able to:

- Define compost and what ingredients are necessary to make it.
- Understand the environmental benefits of composting.
- Advocate for composting in their homes, neighborhoods, and schools.
- Identify what can and cannot be composted.
- Feel empowered to compost even if they live in apartment buildings with no yard space.



VOCABULARY

- **Composting** - Composting is the natural process of recycling organic matter, such as leaves and food scraps, into a valuable fertilizer that can enrich soil and plants.
 - **Organic matter** - matter that has come from a recently living organism.
 - **Fertilizer** - enrichment/food to help plants grow more quickly.
- **Anaerobic composting** - decomposition of materials without oxygen present, this results in high levels of methane gas release and is what happens to food waste that gets to our landfills.
- **Aerobic composition** - decomposition of materials with oxygen present, results in a useful nutrient-rich compost.
- **Methane** - a greenhouse gas produced when food breaks down without oxygen (anaerobically); it traps heat in the atmosphere contributing to climate change.



KEY POINTS

- **More than half of what we throw into the trash is compostable!** (but in the trash it cannot compost!). Anything that grows decomposes eventually; composting speeds up the process by providing an ideal environment for bacteria, fungi, and other decomposers to do their work. The resulting decomposed matter (compost) is rich in nutrients and can be used for gardening, horticulture, and agriculture.
- Food waste is harmful when sent to landfills because it decomposes anaerobically, meaning without access to oxygen which creates greenhouse gasses, methane and carbon dioxide, that contribute to climate change. Landfills are the third-largest source of human-generated methane emissions in the United States.
- Composting can be done in urban areas. Even if you don't have a yard you can find compost drop-off locations in your neighborhood and bring your food scraps there.
- Know what to compost and encourage others to do the same! Advocate for composting and compost bins in your home, school, and community.

LESSON BREAKDOWN

TIME	ACTIVITY	MATERIALS/RESOURCES
PART 1		
3-5 min	Introduction: Turn & Talk	Lesson Slides
5-8 min	Vocabulary Preview	Lesson Slides
8-12 min	Lesson Video & Discussion	Vimeo or YouTube • Video Worksheets (<i>optional</i>)
5 min	Compost Ingredients	Lesson Slides
10 min	Brown material (carbon) vs. Green material (nitrogen)	How to create Black Gold handout
5 min	Food Detective Assessment	Exit Card Question
PART 2		
5-8 min	Review: Why should we care about composting?	Lesson Slides
6-8 min	Video: the Beginners Guide to Compost	Beginners Guide to Compost from “Now This Earth”
5 min	Review: What’s compostable again?	Lesson Slides
10 min	Activity: Make your own compost	• Clear jar/container, Green waste, Brown waste, & Water
7-10 min	Snackz & Factz	• Bananas (with peel) • Seed or nut butter that can be served in your classroom • Tortillas • Butter Knife(s)
5 min	Test Your Noodle	Lesson Slides
5 min	Food Detective Assessment	Exit Card

DETAILED LESSON SCRIPT: PART I

Introduction: Turn & Talk

3–5 minutes

LESSON SLIDES



Get your students thinking about this topic with open-ended questions about what we do with food we don't eat.

Introduction Question:

- *What do you do with the food you don't eat? Do you remember what you did this afternoon with the scraps you didn't finish from lunch? Or from dinner last night?*

Vocab Review

5–8 minutes

Today we are going to talk about Compost! Let's get started with introducing some vocab.

VOCABULARY



Composting

Composting is the natural process where organic matter such as food scraps and leaves decompose so that we can recycle the nutrients; the final product is a valuable natural fertilizer referred to as compost (or Black Gold), which has many benefits for our planet.

Organic matter

Matter that has come from a recently living organism.

Fertilizer

Enrichment/food to help plants grow more quickly.

Anaerobic composting

Decomposition of materials without oxygen present, this results in high levels of methane gas released - this is what happens to food waste that makes it to our landfills.

Aerobic composting

Decomposition of materials with oxygen present, this results in a useful nutrient-rich compost.

Methane

A greenhouse gas produced when food breaks down without oxygen (anaerobically); and it traps heat in the atmosphere contributing to climate change.

Lesson Video: Composting

8-12 minutes

Have a partner, group and/or open discussion to address these ideas after the video. Display and/or refer to the Key Points and the following infographic to aid your discussion.

Questions to assist class discussion:

- *What is compost? And why should we compost?*



DIFFERENTIATION

You should decide which structure will help your students access the information:

1. Have students watch the video and ask questions
2. Watch the video more than once, pausing at key moments, etc.



The above graphic comes from the Institute for Local Self-Reliance (www.ilsr.org), a national nonprofit organization working to strengthen local economies, and redirect waste into local recycling, composting, and reuse industries. It is reprinted here with permission.

Visit them online to see more: <https://ilsr.org/compost-impacts-posters/>

KEY POINTS



Composting

More than half of what we throw into the trash is compostable! (but in the trash it cannot compost!)

Anything that grows decomposes eventually; composting speeds up the process by providing an ideal environment for bacteria, fungi, and other decomposers to do their work. The resulting decomposed matter (compost) is rich in nutrients and can be used for gardening, horticulture, and agriculture.

Compost fights against Climate Change

Food waste is harmful when sent to landfills because it decomposes anaerobically, meaning without access to oxygen, which creates greenhouse gasses, methane and carbon dioxide, that contribute to climate change. Landfills are the third-largest source of human-generated methane emissions in the United States.

Composting in Urban Areas

Composting can be done in urban areas. Even if you don't have a yard you can find compost drop-off locations in your neighborhood and drop off your food scraps.

Compost Advocacy

Know what to compost and encourage others to do the same! Advocate for composting and compost bins in your home, school, and community.

Compost Ingredients

5 minutes

Most everything will decompose eventually - but composting speeds up this natural decomposition process and gives you amazing fertilizer for your plants, garden, neighborhood, school, etc..

What 5 ingredients do you need to make compost?

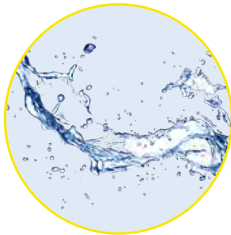


Green Waste

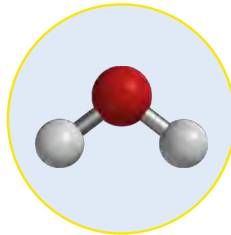


Brown Waste

The ratio of brown waste to green waste is critical to making compost, usually you need about 3:1 (brown:green)



Water



Air



Decomposers

Brown material (carbon) vs. Green material (nitrogen)

10 minutes

Now let's identify what would be a Brown Ingredient (something that is dry and usually high in carbon) vs. a Green Ingredient (something that is green and wet and usually high in nitrogen) with the handout: How to create Black Gold.

LESSON SLIDES



ITEM	GREEN WASTE	BROWN WASTE	NEITHER
 Pinecones			
 Apple cores			
 Dry leaves			
 Expired milk			
 Compost bags			
 Grass clippings			
 Corn cob			
 Potato chips			
 Saw dust			

Food Detective Assessment

5 minutes

Have students answer the following on an Exit Card:

- *What is composting and what 5 ingredients do we need to make it?*

DETAILED LESSON SCRIPT: PART II

Review: Why should we care about composting?

5-8 minutes

LESSON SLIDES



Have students brainstorm and answer the question below based on their previous lesson or review the slides together as an introduction.

What are the environmental benefits to composting: (these are the 4 answers you are seeking)

1. Reduces food waste
2. Cuts methane/greenhouse gas emissions from landfills
3. Improves soil health and decreases erosion
4. Conserves water (because compost has very high water holding capacity)

Video

6-8 minutes

[Beginners Guide to Compost from “Now This Earth”](#) walks us through the process of composting in a city and the benefits of composting.



Review: What's Compostable Again?

5 minutes

WHAT CAN AND CANNOT BE COMPOSTED?

YES



Anything that comes from the ground can be composted. This includes: paper, cardboard, leaves/yard waste, sawdust, veggie and fruit scraps, non-plastic tea bags (staples removed), crushed egg shells, coffee grounds, tissues, paper towels, and napkins.

NO



Pet Waste, Inorganic Materials (Plastic), Colored or Glossy Paper, Diseased Plants, Dairy and Other Animal Products (unless your city composts and it's accepted)



Activity: Make Your Own Compost

10 minutes

We'll make our own compost in class:

Ingredients: A clear jar/container,
Green waste, Brown waste, & Water

INSTRUCTIONS

If you have large sized food wastes like banana peels or stems, etc... cut them up into small pieces (this speeds up the compost time)

Make three or more layers of waste (1. brown-green, 2. brown-green, 3. brown-green)

Keep moist with water as needed (lightly pour or spray on, not drenched)

Shake container gently or open and mix once a week (to mix the air) — or more often is desired. The more you mix the faster you compost

- As an added experiment you can observe different jars in the classroom over time. Assign some to be never stirred, some to be stirred every day, once a week, once every 2 weeks, etc. and observe

When the layers have blended into dirt, grow your favorite plant in the jar using your own homemade compost!



MATERIALS

- **A clear jar/container** - one for each student or groups of student or a big one for the class
- **Green waste** - collect from cafeteria leftovers or use your banana peels from the snackz and factz coming uop
- **Brown waste** - collect from home or school garden
- **Water**

Snackz & Factz: Banana Sushi

10 minutes

Instructions: Separate students into groups. Give each group a tortilla, butter knife, access to the nut/seed butter and a banana (you can add raisins and cinnamon or other nuts as options). Roll up, slice it up into “sushi” bites and enjoy!



MATERIALS

- Bananas (with peel)
- Seed or nut butter that can be served in your classroom
- Tortillas
- Butter Knife(s)



Display and discuss these FACTZ while you enjoy your banana sushi SNACKZ:

How long does it generally take a banana peel to break-down in each of these settings?

Litter (aerobic, out in the open but not in a compost pile)	Landfill (anerobic)	Composted
7 months – 2 years (depending on climate).	Anywhere from 2 – 50 years , they can become fossilized without air*	2 - 4 weeks

*Archaeologists have actually done digs in landfills tunneling down several hundred feet to find recognizable banana peels and avocado pits. They're able to timestamp these foods based on the newspaper dates that are at the same depth of the landfill. These recognizable organic waste pieces have been documented to be over 50 years old! - [zero waste wisdom](#)

Test Your Noodle

5 minutes

1. **True** or False: About half of what we throw into the trash is compostable.
2. What do you think would happen if we didn't have decomposers?
 - a. Nothing would change
 - b. The Earth would be less smelly
 - c. The Earth would be covered in dead plants and animals**
3. When we actively turn a pile of compost we are adding air, or aerating, the pile also known as:
 - a. Anaerobic composting
 - b. Aerobic composting**
 - c. Recycling
 - c. Reusing
4. Select the ingredients needed to make a compost pile:
 - a. Brown matter or waste (carbon)**
 - b. Rats
 - c. Air**
 - d. Decomposers**
5. What are the environmental benefits to composting?
 - a. Reduces food waste
 - b. Cuts methane/greenhouse gas emissions from landfills
 - c. Improves soil health and decreases erosion
 - d. Conserves water (because compost has very high water holding capacity)
 - e. All of the Above**

Food Detective Assessment

5 minutes

Have students answer the following on an Exit Card

- *What are the environmental benefits of composting?*

EXTENSION IDEAS

Locate the nearest drop-off location to you and write your answer down or go a step further and draw a circle on a map.

- [Search NYC dropoff locations online](#)

Get to know some compost advocates:

- Read about [Composting Hero - Domingo Morales](#)

“Composting is the only form of recycling you can do from start to finish and watch your work be put to good use,” - Mr. Morales

How to Begin Composting at School

Encourage students to bring composting to your school if there is not already a system in place. If there IS a composting system, encourage your students to advocate for others to properly use the compost bins available to them. Here are tips for them to go about this:

- Try to find a teacher or adult to help you out and advocate for you.
- Research composting techniques to decide which one is the best fit for your school. Do you want indoor or outdoor bins?
- Develop a collection process. Set up an efficient process for collecting food waste and for delivering it to your bins. Maybe this is a compost bin at lunch? Educate staff and students about each step of the process before beginning the program. Recruit additional people and students who want to help spread the news.
- Incorporate the program into the curriculum. See if teachers can integrate the new composting efforts into their existing curriculum (maybe through this Green Beetz module) and tell their students about it.
- Build support for composting. Educate students, parents, teachers, staff and administrators about the benefits of composting and what you’ve learned in this lesson.
- Start a classroom [vermicomposting](#), or worm composting - a great indoor option if your outdoor space is limited (it can be done outdoors as well).

How to Create Black Gold

Identifying BROWNS, GREENS, and everything else.

*TIP - food items that you would eat usually go into the GREEN category and non-edible plant items usually go into the BROWN category, this is not a steadfast rule but you can mostly rely on it.

ITEM	GREEN WASTE	BROWN WASTE	NEITHER
 Pinecones			
 Apple cores			
 Dry leaves			
 Expired milk			
 Compost bags			
 Grass clippings			
 Corn cob			
 Potato chips			
 Saw dust			
 Dog poop			
 Tea bags (non-plastic)			
 Hay			
 Dirty napkins			
 Soggy lettuce			
 Paper straws			
 Plastic straws			

How to Create Black Gold (ANSWER KEY)

Identifying BROWNS, GREENS, and everything else.

*TIP - food items that you would eat usually go into the GREEN category and non-edible plant items usually go into the BROWN category, this is not a steadfast rule but you can mostly rely on it.

ITEM	GREEN WASTE	BROWN WASTE	NEITHER
 Pinecones		X	
 Apple cores	X		
 Dry leaves		X	
 Expired milk	X		
 Compost bags			X
 Grass clippings	X		
 Corn cob		X	
 Potato chips	X		
 Saw dust		X	
 Dog poop			X
 Tea bags (non-plastic)	X		
 Hay		X	
 Dirty napkins		X	
 Soggy lettuce	X		
 Paper straws		X	
 Plastic straws			X