

# Mill Food Recycler Educators Guide

A resource guide by educators, for educators using the  
Mill Food Recycler as a teaching tool in classrooms



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## FOREWORD

### Dear Educator,

Food waste is a significant challenge in schools and communities, but with the right tools and strategies, we can turn waste into a valuable resource. We are excited to introduce the Mill Food Recycler Educators Guide, a collection of lesson plans designed to help you and your students lead food recycling efforts by measuring, analyzing, and implementing solutions to minimize waste in the classroom.

At Arizona State University's [Sustainability Teachers Academy](#), we believe that education is the foundation of meaningful change. In collaboration with [Incite](#), [World Wildlife Fund \(WWF\)](#), and [Mill](#), we launched the Food Waste Futures Fellowship Program to support a cohort of 10 K–12 educators from five Title I schools across the Phoenix metropolitan area in integrating food systems sustainability into their classrooms. The fellowship brought food waste solutions to life for students with hands-on experiences, site visits, and integrated lesson plans. By naming their Mill Food Recyclers and using them daily, students made keeping food out of the landfill a regular part of their routine.

Building on WWF's Food Waste Warriors toolkit, this guide expands resources for schools, offering a comprehensive curriculum that highlights the Mill Food Recycler as an innovative tool to raise awareness about wasted food and to manage food scraps. By using Mill, students can measure and identify commonly discarded foods and apply evidence-backed waste reduction strategies to make a difference in their schools and communities.

Research shows that sustainability education—especially when focused on food—can drive behavior changes beyond the classroom, influencing household habits (Boulet et al., 2022; Duval & Zint, 2007). This guide is more than just a teaching resource—it's a catalyst for change.

We hope this guide inspires meaningful discussions, encourages students to engage with real-world waste-reduction solutions, and empowers them to view food as a resource to make a lasting environmental impact. Thank you for your dedication to sustainability education—we look forward to seeing the difference you and your students will make.



# Food Waste Futures Fellowship cohort



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EDUCATOR  
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# Food Waste Futures Fellowship cohort



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# Comparing and Contrasting Using Food Waste

## GRADE

Preschool - Kindergarten

## SUBJECT

Multi-disciplinary

## LESSON LENGTH

2-3 hours

## AUTHOR

Morgan Kane

## LESSON DESCRIPTION

Students will compare and contrast the decomposition process of food waste with food turned into food grounds using a Mill.

## STANDARDS

Early Learning and Kindergarten Standards focus on social-emotional growth, learning approaches, language, literacy, and social studies. Children develop self-awareness, focus, problem-solving, communication, collaboration, and a sense of community through discussions, writing, and shared experiences.

## RESOURCES

- [Where does your trash go? \(Video\)](#)
- [What happens to our 2.2 billion tons of trash? \(Video\)](#)
- [Follow That Garbage! A Journey to the Landfill - Bridget Heos](#)
- [Garbage Galore - Ellen Lawrence](#)
- [I Stink! - Kate and Jim McMullan](#)
- [Compost Stew - Mary McKenna Siddals](#)
- [Earth Book - Todd Parr](#)

## MATERIALS

- 2 mason jars
- Plastic gallon bag
- Mill Food Recycler
- Cell phone camera
- Food waste (split into two identical portions)
- Printed photos



## INTRODUCTION

- 1 Ask students if they know what a landfill is. If they do not know what a landfill is, watch the videos in the resource section to orient your students.
- 2 If students are already familiar with the concept of landfills, ask questions about where they are and their size. Challenge students to ponder what would happen if we ran out of room in landfills.



## ACTIVITY

- 1 After a meal on Monday with the students, sort the food waste into two identical piles and place one pile into a large mason jar and another into the Mill Food Recycler. Don't add any other food to the Mill for the lesson duration.
- 2 Take a photo of the food waste in the jar and in the Mill each day. On Friday, compare and contrast the Food Grounds and the unground food waste.
- 3 Help the students explore the unground food waste in the jar. Make sure you put the lid on the jar and do not allow them to touch the food waste. Note that the food may be moldy, so keep the jar closed when allowing students to interact with it. Give them prompts such as:
  - Sight: Describe color, size, texture
  - Touch: Dump the jar into a plastic gallon bag and seal it. Pass it around for students to explore with their hands. Students may describe it as squishy, cold, or gross.
- 4 Place the Food Grounds into a mason jar. Let the students see the grounds and give them the following prompts:
  - Sight: Describe color, texture, size. How much space does it take up in the jar? How does it look the same or different as the unground food?
  - Smell: Open the jar and pass around. Describe the smell.
  - Touch: Pour Food Grounds on the table for students to explore with their hands. Is it dry or wet?
- 5 Place the photos (either printed or digitally) next to each other to observe the progression over the week. Optionally, display the printed photos above the Mill as an information bulletin that students can refer back to or use as a teaching resource when telling others about the Mill and how it takes food that would otherwise be rotten and moldy and turns it into Food Grounds.

## EXTENSION

- 1 Brainstorm ways to implement food waste reduction strategies in the classroom, cafeteria, and at home.
- 2 Start a composting bin with the students. Use the books listed in the resources to help students understand how compost helps gardens grow and create more food, and check out the [Mill guide](#) on how to use Food Grounds outside.

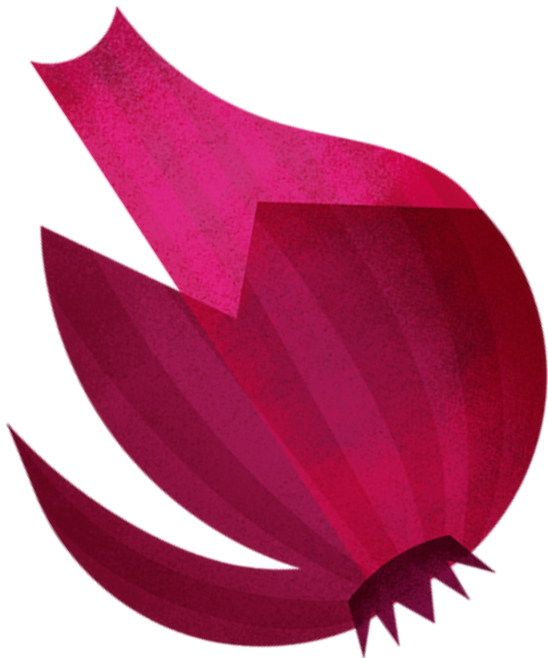
## ASSESSMENT

Have students journal about the following writing prompt: Explain how using the Mill Food Recycler impacts landfill use. Look for students to understand that using the Mill reduces the impact on landfills and turns food waste into grounds that can be used in gardens, compost, or as a chicken feed ingredient.



## TEACHER TIP

You may find that students get excited about feeding your Mill and try to throw out food they might otherwise eat. Have conversations about being mindful of only taking the food our own bodies will need and that it is okay if we don't eat everything on our plate if we are full but we don't want to throw things away, just because it is fun. After a while, the novelty will wear off and using the Mill will become part of their clean-up routine just as the trash can is.



# Turning More Into Less Food Waste

## GRADE

Preschool - Kindergarten

## SUBJECT

Multi-disciplinary

## LESSON LENGTH

5 days

## AUTHOR

Marin Velarde

## LESSON DESCRIPTION

This lesson focuses on understanding waste and developing responsible waste disposal habits. By defining waste in their own words and learning the concepts of "more" and "less" in relation to waste, students will explore the differences between Mill Food Recyclers and traditional composting methods. Finally, students will begin developing responsible habits when disposing of waste, aiming to minimize waste generation and encourage sustainability.

## STANDARDS

Early Learning and Kindergarten Standards focus on social-emotional growth, learning approaches, language, literacy, and social studies. Children develop self-awareness, focus, problem-solving, communication, collaboration, and a sense of community through discussions, writing, and shared experiences.

## RESOURCES

- [Circle Map Instructions](#)
- [WWF Food Waste Warriors Toolkit](#)
- [Filling the Earth With Trash - Jeanne Sturm](#)
- [Compost Stew - Mary McKenna Siddals](#)
- [I Stink! - Kate and Jim McMullan](#) (optional)
- [Earth Book - Todd Parr](#) (optional)
- [Composting: Nature's Recyclers - Robin Koontz](#) (optional)
- [How Did That Get in My Lunchbox?: The Story of Food - Chris Butterworth](#) (optional)

## MATERIALS

- Butcher paper or large sticky note pad
- Food is Not Trash Cards (Food Waste Warriors Toolkit)
- Luggage scale



## INTRODUCTION

- 1 Provide students with the prompt “What is waste?” Allow students to respond at their own level, using phonetic spelling or pictures.
- 2 Use students responses to start a discussion about waste. Explain to students that waste is when you throw something away that doesn’t need to be thrown away.
- 3 Wonder with students about what happens to our waste after it gets thrown into the trash.

## ACTIVITY

- 1 Using the [circle map instructions](#) in the resources, work with the students to create a circle map with the prompt “Foods we eat at lunch.” Students can add items on their own, or you can capture what students suggest and add it in.
- 2 Use the “Food is Not Trash” cards from [Food Waste Warriors Toolkit](#) linked in the resources. Discuss with students what they would do with each of the items. Emphasize that food that is unopened should not be thrown away.
- 3 Refer back to the “Foods we eat at lunch” Circle Map. Have students note food from the map that they consistently throw in the trash. Have students explain why they throw them away.
- 4 Read [Filling the Earth With Trash](#) by Jeanne Sturm.
- 5 Revisit the “Food is Not Trash” cards. Discuss with students what they could do with each of the items instead of throwing them in the trash. Start brainstorming different ways to dispose of our waste.
- 6 Introduce the Mill, and explain that it dries and grinds up food to help us keep food as food and out of the trash.
- 7 Place some Food Grounds on a tray for students to touch and smell. On another tray, place food waste saved from students’ lunch or snacks. Have students observe what they see, noting similarities and differences.
- 8 Collect all food waste from students’ lunch or snack. Using luggage scale, weigh food waste material prior to putting it in the empty Mill, write down the weight of the food waste.
- 9 The next day, empty grounds from the Mill and use a luggage scale to weigh the grounds. Ask the students: do the grounds weigh more or less than the material that was originally put in? Why? It may help to use unifix cubes or number lines to help demonstrate the concept of more or less.
- 10 Observe the Food Grounds. Prompt students to observe how they are the same or different from what was put in the Mill yesterday.
- 11 Read [Compost Stew: An A to Z Recipe for the Earth](#) by Mary McKenna Siddals.

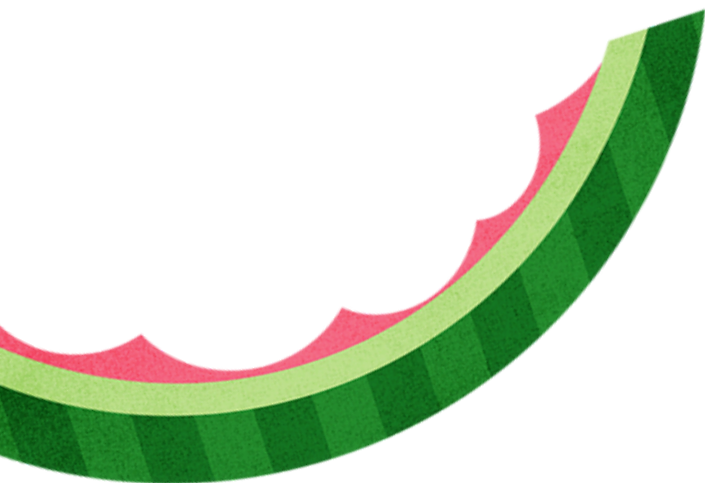
## ASSESSMENT

Have students respond to the following prompt:  
“Why does the material from the Mill weigh less than the material that was put in the Mill?”



## EXTENSION

- 1 Use the Food Waste Warriors Toolkit to conduct a food waste audit with your students to determine how much food is wasted during an average school lunch.
- 2 Develop a better understanding of more and less by building bottle composters using measuring cups of various sizes to measure the amount of materials that are added.



# Turning Lunch Into Learning

## GRADE

1st

## SUBJECT

Food Education

## LESSON LENGTH

1-2 hours

## AUTHOR

Loretta Lyken

## LESSON DESCRIPTION

Through this lesson, students will understand how the Mill Food Recycler works and how it reduces food waste. This is particularly important as young students consider ways to incorporate recycling and sustainability in daily life. This lesson does not contain standards because it is a model for how to incorporate the Mill Food Recycler into your daily classroom routines.



## RESOURCES

- [WWF's Food Waste Warriors Toolkit](#)
- [PBS, Science Trek Where does your trash go?](#)
- [Compost Stew - Mary McKenna Siddals](#)

## MATERIALS

- Examples of food and food waste
- "Food Waste Monitor" lanyards
- Two "Food Saved" buckets
- Two "Food Scraps" buckets
- Snack shelf or designated area for storing saved food
- Scale
- Poster board
- Markers



## INTRODUCTION

- 1** Ask students the following questions:
  - "Have you ever thrown away food after lunch or dinner?"
  - "What happens to food scraps after we throw them away?"
- 2** Explain that food waste is when we throw away food that could still be eaten or used for something else. Sometimes it's leftovers, food scraps, or even food we didn't open. When we waste food, it doesn't just disappear—it has to go somewhere, like a big trash pile called a landfill.
- 3** Hold up different food items (e.g., a whole apple, an apple core, an unopened yogurt, a sandwich with one bite missing). Ask:
  - "Which foods can we still eat?"
  - "Which foods could we use in another way, like composting?"
- 4** Explain that when food sits in the landfill, it doesn't just go away. It makes a gas called methane that can hurt the earth. When we save or compost food, we help the earth stay healthy.
- 5** Draw a poster with three bins:
  - Save to Eat Later (e.g., unopened food)
  - Compost (e.g., fruit and vegetable scraps)
  - Trash (e.g., wrappers, plastic)Explain that when we think carefully about where our food goes, we can keep trash piles smaller and help the earth. When we save food or compost it, we help the earth stay happy and healthy.

## ACTIVITY

- 1** Show a picture or videos of the Mill Food Recycler and explain how it transforms food scraps into nutrient-rich materials.
- 2** Explain to students that the Mill is like a magic helper for the Earth! It performs very special functions:
  - **It dries and grinds the food:** The Mill chops up the food scraps into tiny pieces and makes them super dry, which is full of good stuff plants need to grow!
  - **We use Food Grounds to help plants:** We can mix Food Grounds into soil to help plants grow. It's like giving plants a yummy snack.
- 4** Show students the Mill Food Recycler and use collected food scraps from your personal household or school lunch to model how to use the machine. Complete an overnight cycle with the Mill Food Recycler to demonstrate how it makes Food Grounds.
- 5** Create 5 new class jobs: Food Waste Warrior, Mill Monitor, Snack Organizer, Compost Champion, and Classroom Educator (the descriptions for these jobs are on the next page).

## ACTIVITY (CONT.)

- 6** Each day, help students complete the following workflow:
- **Lunchroom Collection:** Food Waste Warriors collect food scraps and saved food during lunch. They encourage classmates to participate by sorting items into proper buckets.
  - **Classroom Processing:** Warriors and Mill Monitors bring the buckets back to the classroom. Food scraps go into the Mill Food Recycler, and saved food is placed on the snack shelf.
  - **Reflection and Reporting:** Compost Champions weigh and document the processed materials weekly. The team presents progress during class meetings.
- 7** Support students as they learn these roles and make them a part of the classroom routine. With practice, your students can become responsible leaders and advocates for your Mill.

## EXTENSION

Help students brainstorm ways to use unwanted food, like making applesauce from leftover apples, or banana bread from unwanted bananas. If possible, make these recipes with the students to demonstrate that food is a valuable resource.



## CLASS JOBS

### Food Waste Warriors (2 students):

- Wear laminated lanyards
- Carry two labeled buckets to the lunchroom:
  - "Food Saved" Bucket: Collects unopened, uneaten food that can be safely saved and shared.
  - "Food Scraps" Bucket: Collects leftover food scraps that cannot be eaten.
- Monitor to ensure proper sorting and minimize contamination.
- Transport the buckets back to the classroom for processing.

### Mill Monitors (2 students):

- Take the "Food Scraps" Bucket and empty its contents into the Mill Food Recycler.
- Monitor the machine's operation and explain its purpose to peers or visitors, becoming classroom experts on how the Mill reduces food waste.

### Snack Organizers (1-2 students):

- Sort the "Food Saved" Bucket.
- Place unopened food items on a designated snack shelf for later use.
- Keep the shelf tidy and ensure food safety (e.g., checking for spoilage).

### Compost Champions (1 student):

- Weigh the Food Grounds weekly to track how much waste has been recycled.
- Record the data on a Food Waste Tracker Chart and share findings with the class during morning meetings/science lessons.

### Classroom Educators (2 students):

- Teach their classmates about the importance of reducing food waste.
- Prepare small presentations, fun facts, or posters to encourage participation and remind everyone about proper sorting.

# Food Waste Warrior Signs and Lanyards



Print this sign out to hang in your classroom to remind students to conserve food.



Print out these badges, then laminate, hole punch, and feed yarn through the hole to make monitor signs.

# Food Waste Warrior Signs and Lanyards



Laminate and use velcro to attach these stickers to bins to create your food saved and food scraps bins.

# Poetry and the Mill

## GRADE

K-5 (special education)

## SUBJECT

Reading comprehension  
and decoding skills

## LESSON LENGTH

2-3 hours

## AUTHOR

Madeline Agpoon

## RESOURCES

- [Mill FAQs](#)
- [Scooping protocol](#)
- [Haiku writing protocol](#)
- [Haiku writing tool](#)
- [Haiku Starter](#)
- [McKinsey & Company Food Waste \(optional\)](#)
- [Kids Eat in Color Food Waste Guide \(optional\)](#)

## MATERIALS

- Highlighters
- Pencils
- Printed copies of Mill FAQ pages

## LESSON DESCRIPTION

This lesson is an introduction to the Mill Food Recycler. It will help students understand how a Mill works, what food waste is, why we use the Mill, and how we can further reduce food waste at schools. While this lesson was originally designed for use in a Learning Resource Center (LRC), it supports reading comprehension and decoding skills in grades K-5.

## STANDARDS

(2RF.3) Know and apply grade-level phonics and word analysis skills in decoding one-syllable or two-syllable words.

(2RI.1) Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.

(2RI.2) Identify and explain the main topic of a multi-paragraph text as well as the focus of specific paragraphs within the text.



## INTRODUCTION

- 1 Project the articles "[How is the Mill different from home composting devices?](#)" and "[How does a Mill food recycler cycle work?](#)" from the Mill FAQs and provide students with hard copies of the documents.
- 2 Determine sight words that you would like to work on with your students. As your students review the documents, highlight chosen sight words. Have students read highlighted words together.
- 3 Read the informational sheet to students while students "scoop out" phrases that teacher reads. [Scooping](#) is a fluency strategy where readers learn to group words together into phrases, rather than reading each word individually.
- 4 Show the students the inside and outside of the Mill. Ask the students if they have any questions about the Mill or food waste.

## ACTIVITY

- 1 Show students Food Grounds from the Mill. Allow students to touch and smell the grounds and ask students to describe them.
- 2 Explain the structure of Haikus to students, and give them examples of Haikus. Use the [Haiku protocol](#) in the resources for support.
- 3 Project the [Haiku writing tool](#) from the resources and work as a class to write a Haiku about the Food Grounds.
- 4 Have students create a list of adjectives that describe Food Grounds, the Mill, and how they feel about food waste.
- 5 Have students use the [Haiku starter](#) from the resources to write their own personal Haikus about the Mill.

## HAIKU EXAMPLE

Shredder is the best.  
Shredder's job is to eat food.  
Shredder eats cupcakes.

## EXTENSION

Have students transfer their Haikus to a separate page and illustrate them to reflect their experiences with the Mill Food Recycler.

## ASSESSMENT

Review students articles to check their understanding of sight words from the introduction. Review their Haikus to ensure that they followed the correct poetic format.



# Bananas for Food Waste Reduction!

## GRADE

2nd

## SUBJECT

Science

## LESSON LENGTH

1 hour

## AUTHOR

Jordan Petrine

## LESSON DESCRIPTION

Students use the Mill Food Recycler to explore how energy in the form of heat can cause changes in materials. They will use the scientific method to explore how banana peels are impacted by different environments, and will ultimately understand how the Mill turns liquid water into steam to transform food waste into Food Grounds.

## STANDARDS

(2-PS1-1) Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.  
(2-PS1-4) Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.

## RESOURCES

- [Chemical Changes Crash Course Video](#) (optional)

## MATERIALS

- 1 sheet of paper
- Glass beaker or other heat safe container
- Lighter
- 8 Banana peels
- Bananas for Food Waste Reduction Worksheet
- Student clipboards (optional)



## INTRODUCTION

- 1 Take a sheet of paper crumple it into a ball. Then tear it into small pieces and put the pieces into the glass beaker. Explain to students that these are both physical changes, meaning that while the matter has changed form, the properties and mass of that matter have stayed the same.
- 2 Use the lighter to light the paper on fire. Ask students if the mass and properties of the paper have stayed the same. Since they have not, this is a chemical change.
- 3 Reinforce this concept by asking students if the following are physical or chemical changes: melting ice (physical), burning wood (chemical), chopping up fruit (physical), cooking an egg (chemical).

## ACTIVITY

- 1 Check for understanding of words like chemical changes, physical changes, matter, and properties. Optionally, show them the [Crash Course video](#).
- 2 Explain to students that you're going to explore how different conditions impact the way banana peels change. Tell them that you're going to put 3 different banana peels in 3 locations in the school, and 5 in the Mill Food Recycler. Be sure to either eat the bananas or use them in a recipe to avoid food waste!
- 3 Have students complete the K (Know) and W (Want to know) parts of the KWL chart on their worksheet. Encourage them to think about what they know happens when banana peels are left out to decompose. If needed, help your students get started by working as a class or providing sentence starters.
- 4 Brainstorm with the students 3 places to put the banana peels throughout the school. Have students vote on a whiteboard or flipchart and place all the banana peels in their locations. Show students you are placing 5 banana peels in the Mill.
- 5 Have students write predictions on their worksheet: what will happen to the peels in the Mill bin? In other locations?
- 6 Let the Mill Food Recycler process the bananas overnight. Plan on either bringing the bananas from around the school to your classroom before the start of the lesson, or taking your class to the peels.
- 7 Present the banana peels to the students and have them use their senses of sight and smell to make observations about the peels. Students may notice that the peels are different colors, have grown mold, smell different, etc. Do not let students touch the peels.
- 8 Have students draw a before vs. after of what the banana peels look like. Encourage students to be as detailed as possible!
- 9 Put the banana peels that were in various school locations in the Mill. Have students predict what will happen to the peels.

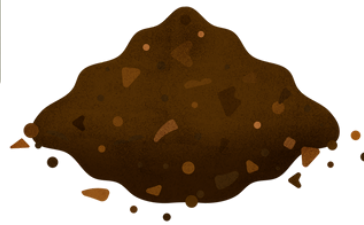
## ASSESSMENT

- 1 Complete K (Know) section of the KWL chart with what students have learned from the experiment.
- 2 Have students complete a written, 3-5 sentence exit ticket reflection on the science experiment. Students must describe properties of the matter and how they changed throughout the experiment.



## EXTENSION

- 1 Use the bananas from this experiment to make banana bread with the students. While making the bread, choose specific steps to ask if the matter is undergoing a physical or chemical change (i.e., mixing wet and dry ingredients, baking the bread, etc.).
- 2 Have students gather data by measuring the 5 banana peels before and after they are processed by the Mill. Help students understand that the peels lose mass because water is evaporating due to heat.



# Bananas for Food Waste Reduction Worksheet

NAME

CLASS

DATE

## KWL CHART

Look at the banana peels provided and think about what you know about what happens to banana peels after the banana is eaten. Use the KWL chart to brainstorm things you know and want to know about the peels.

KNOW	WANT TO KNOW	LEARNED

## PREDICT

Complete the following prompt:

I predict that when a banana peel is left in (location) \_\_\_\_\_,

it will (describe) \_\_\_\_\_

\_\_\_\_\_

because (explain) \_\_\_\_\_

\_\_\_\_\_



# Bananas for Food Waste Reduction Worksheet

NAME

CLASS

DATE

## DRAWING RESULTS

Draw a banana peel before and after it was left around the school for a day.  
Then, draw a picture of a banana peel after it went through the Mill Food Recycler.

Banana Peel Before	Banana Peel After	Banana Peel After Mill

## EXPLAIN

Explain your results using your understanding of chemical and physical changes using the prompt:

The banana peels underwent a (physical\chemical) \_\_\_\_\_ change because of the following evidence: \_\_\_\_\_.

# Investigating Heat and Matter

## GRADE

2nd

## SUBJECT

Science

## LESSON LENGTH

1 hour

## AUTHOR

Andrea Negrete

## LESSON DESCRIPTION

In this lesson, students explore how heating and cooling can cause changes in the state of matter. They will learn how to plan a scientific investigation and gather evidence to explain how heat affects the physical state of materials.

## STANDARDS

(2-PS1-1) Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.  
(2-PS1-4) Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.

## RESOURCES

- [What is Science Video](#)
- [Mill Composting Guide](#) (optional)
- [Life Lab \(Optional\)](#)

## MATERIALS

- Food waste from school lunches or snacks
- Investigating Heat and Matter Worksheet



## INTRODUCTION

- 1** Explain to students that matter can have a variety of different properties, like hard and soft, liquid, solid, etc.
- 2** Preselect a few items with a variety of different properties before class, such as a book, glass of water, or an apple. Have students describe the properties of the matter.
- 3** Explain to students that heat can cause physical or chemical changes matter. Ask students to describe examples of how heat can change states of matter.
- 4** Explain to students that you're going to do an investigation on states of matter. Show them the [What is Science?](#) video to introduce the scientific method.

## ACTIVITY

- 1** Before the lesson, collect food waste from student lunches or snacks. Put food scraps into two piles that are similar in size and scrap composition.
- 2** Have students draw a picture and use descriptive words on the worksheet to describe the properties of matter that the food has on the first day. Add one pile to the Mill Food Recycler, explaining to students that the Mill will heat the food overnight. Add the other pile to a sealable container and leave it, sealed, in the classroom overnight.
- 3** The next day, show students the Mill Food Grounds and the pile of food waste that was left out overnight. For student safety, do not open the sealed container. Have them draw pictures of each.
- 4** Continue the investigation for three days, examining the Food Grounds and food waste over the course of those days. Have students draw the food waste and Food Grounds after the last day (Day 5).

## ASSESSMENT

Have students describe the properties of the food waste that was not put into the Mill compared to the Food Grounds. Prompt students to explain using evidence the effect that heat had on matter.



## EXTENSION

Brainstorm other ideas for investigations with students using the Mill. Ideas include using different types of food waste or adding them to the school garden or compost pile. You can find more information on composting with Food Grounds in the [guide](#) section of the Mill website.

# Investigating Heat and Matter Worksheet

NAME

CLASS

DATE

## DAY 1, PICTURING FOOD WASTE

Draw the food waste and use words to describe it. Use your knowledge of the properties of matter.

Food Waste Description (Picture)	Food Waste Description (Words)

## DAY 2, RESULTS

Describe the food waste using pictures and words. Use your knowledge of the properties of matter.

Type of Food Waste	Food Waste Description (Picture)	Food Waste Description (Words)
Food waste left in the classroom		
Food waste put into the Mill		

# Investigating Heat and Matter Worksheet

NAME

CLASS

DATE

## DAY 5 RESULTS

Describe the food waste using pictures and words. Use your knowledge of the properties of matter.

Type of Food Waste	Food Waste Description (Picture)	Food Waste Description (Words)
Food waste left in the classroom		
Food waste put into the Mill		

## EXPLAINING THE RESULTS

What effect did heat have on matter? Use evidence to explain your results.

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# Food for Thought: Adding up the Waste

## GRADE

4th

## SUBJECT

Math

## LESSON LENGTH

2-3 hours

## AUTHOR

Tylar Rodriguez

## LESSON DESCRIPTION

This lesson introduces students to the concept of food waste through a hands-on exploration of how food decomposes, as well as how the Mill Food Recycler can reduce waste. Students will explore both math and science standards by comparing the quality of food thrown away to food that decays and will apply their math skills in real-life scenarios.

## STANDARDS

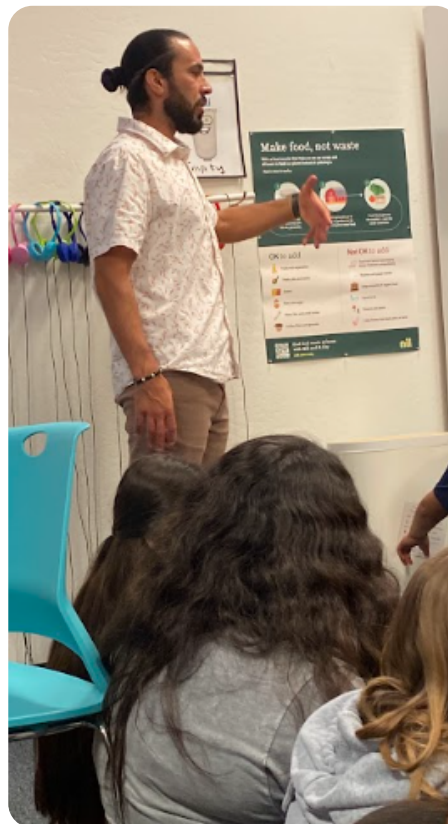
- (4.OA.1) Interpret a multiplication equation as a comparison
- (4.OA.2) Multiply or divide to solve word problems involving multiplicative comparison
- (4.OA.3) Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted.

## RESOURCES

- [The Enormous Scale of Global Food Waste](#)
- [Rotting Fruit Timelapses](#)
- Food for Thought Worksheet

## MATERIALS

- Hanging scale
- 2 five gallon buckets
- Latex gloves (optional)
- 4-8 lbs of food scraps collected from previous day's meals



## INTRODUCTION

- 1** Present the [Enormous Scale of Global Food Waste](#) graph. For each photo, allow students 2 minutes to record a "Notice." A Notice should be something that surprised the student, or something that they learned. For example:
  - I was surprised by how much food the United States wastes!
  - I learned Australia wastes the most food.
- 2** Allow students 2 minutes to record "Wonders." A Wonder should begin with the phrase, "I wonder..." For example:
  - I wonder why we waste so much food in the US.
  - I wonder what other countries are doing to waste less food.
- 3** After students write down their Notices and Wonders for the graph, allow students 2 minutes to talk with a shoulder or face partner about their observations. Then, select 3-4 students to share their thoughts with the class. Focus conversation around what their observations might tell them about how we view food in the United States.
- 4** As the conversation winds down, let students know that our job is to consider how we as a classroom can reduce our own waste.
- 5** Point out the Mill Food Recycler, and explain to students that the Mill will help us reduce the amount of waste that is produced at school.

## ACTIVITY

- 1** Pass out the Food for Thought worksheet. Spend 5 minutes allowing students to use their senses to describe what food might look like after it is thrown away. They may use words or pictures to help. If students struggle, consider showing the [time lapse of food rotting](#).
- 2** Show students food collected from lunch on the previous day (you can get students to help collect food). Students should identify, name, and draw the foods in the "Before" boxes on the worksheet.
- 3** Place the food in a 5 gallon bucket and weigh it using the hanging scale. Convert the weight from pounds to grams (1lb=450g). Round the answer to the nearest whole gram and have students record it on the worksheet.
- 4** Ask students to predict if the food will weigh more, less, or the same after it goes through the Mill. Have them record predictions in the worksheet.
- 5** Have students work in pairs to complete the food waste scenarios in the worksheet.
- 6** Allow the Mill to create Food Grounds overnight.
- 7** On the next day, review students predictions on the relative weight of the Food Grounds. Then remove the Food Grounds from the Mill and place them into a 5 gallon bucket. Weigh the grounds, convert it to grams, and have students record the measurement in their worksheet.

## ACTIVITY (CONT.)

- 8 Ask students to subtract the before and after weight to determine the change in mass.
- 9 Put a small amount of grounds out at each table group for students to inspect. Have students make observations with all of their senses (except taste), and have them record their notes and a drawing in the worksheet.

- 10 Before students record their answers, discuss their observations.
  - What differences in the food waste did they notice?
  - Is this the result they expected?
  - How could the Mill reduce the amount of food that is wasted?
  - Is it enough to only use the Mill? What more should we do to reduce our food waste impact?



## ASSESSMENT

As an informal assessment, review your students' reflections from the activity. Be sure they understand that the Mill Food Recycler reduces food waste and the impact that waste has on our food system by keeping it as food.

As a formal assessment, review their answers on the Food for Thought worksheet and ensure that they understand the mathematic principles in the worksheet (key to the right).

## EXTENSION

- 1 Review the [Enormous Scale of Global Food Waste](#) graph.
- 2 Have students choose three countries and determine how much food is wasted per year in grams.
- 3 Help students use a formula to determine how much the food would weigh if all of the waste was processed using the Mill Food Recycler.
- 4 Use the extension worksheet in the document to help guide your students through this activity.

## WORKSHEET ANSWER KEY

1. 1,800 apples harvested, 450 apples wasted
2. 300 slices of pizza, 40 slices wasted
3. 9 bunches of bananas wasted
4. 40 sandwich halves wasted
5. 4,350 grams of fruit salad were eaten
6. 3,080 grams of bread were sold
7. 2,280 grams of soup were eaten
8. 650 grams in total were wasted

# Food For Thought Worksheet

NAME

CLASS

DATE

## DIRECTIONS

In this activity, we will take a closer look at how the Mill Food Recycler could be used to reduce food waste in our community and school.

## BACKGROUND INFORMATION

What happens to food after it goes into the trash? How does it change? Think of some examples of food you might eat in school. Then, use words and drawing to show what you think happens to that food as it sits in the trash bags and in a landfill.

After food is thrown away, what happens to it? (Words)	After food is thrown away, what happens to it? (Pictures)

## EXPLORING FOOD WASTE

Take a look at the food waste provided. Write the names of the foods you can identify in the box below. Draw a picture of what the food looks like before it goes in.

What food can you identify? (Words)	What do the foods look like? (Pictures)

Make a prediction of what will happen to the weight of the food after it goes into the Mill Food Recycler.

**I think the food scraps will weigh (more\less\same) \_\_\_\_\_ after going into the Mill Food Recycler because \_\_\_\_\_.**

# Food For Thought Worksheet

NAME

CLASS

DATE

## RECORD THE DATA

Weigh the food waste provided in grams. Allow the Mill Food Recycler to create Food Grounds and weigh the food waste after it is turned into Food Grounds.

Weight of food (g) before	Weight of food (g) after	Change in mass (before-after)

## BACKGROUND INFORMATION

Record your observations of the Food Grounds after being in the Mill Food Recycler.

How did the food change after being in the Mill? (Words)	How did the food change after being in the Mill? (Pictures)

## REFLECTION

- 1 How did the Mill Food Recycler change the food waste that was put in?
- 2 How does the Mill Food Recycler reduce our waste? Is this strategy enough? What more should we do to reduce our food waste?

# Food Waste Scenarios Worksheet

NAME

CLASS

DATE

## DIRECTIONS

Working with your partner, solve each food waste scenario.

## FOOD WASTE SCENARIOS

- 1** At an apple orchard, each tree produces 120 apples. If 15 trees are planted, how many apples are harvested in total? After the harvest, 30 apples from each tree are too damaged to be sold and are thrown away. How many apples are wasted in total?
- 2** In a school, there are 150 students. Each student is given 2 slices of pizza for lunch. If every student gets lunch, how many slices will be served? If only 130 students eat lunch, how much pizza will be wasted?
- 3** A fruit stand sells bananas in bunches of 8. The stand sells 32 bunches of bananas. At the end of the day, 72 bananas are unsold and need to be thrown away. How many bunches of bananas are wasted?
- 4** A group of friends makes 60 sandwiches for a picnic. Each sandwich is cut into 2 halves. If 20 sandwiches are left uneaten, how many halves of sandwiches are wasted?

# Food Waste Scenarios Worksheet

NAME

CLASS

DATE

## FOOD WASTE SCENARIOS (CONT.)

- 5** A fruit salad was made with 2,450 grams of apples, 1,200 grams of bananas, and 1,500 grams of strawberries. After serving, 800 grams of the salad were not eaten and had to be thrown away. How much fruit salad was eaten in total?
- 6** A bakery baked 4,320 grams of bread in the morning. By the end of the day, 1,240 grams of bread were left unsold and had to be thrown away. How many grams of bread were sold?
- 7** A large pot of vegetable soup weighed 3,800 grams before it was served. After the meal, 1,520 grams of soup were left uneaten and were thrown away. How much soup was eaten?
- 8** A party served cheese and crackers, with the total weight of the cheese being 1,780 grams and the crackers weighing 920 grams. At the end of the event, 400 grams of cheese and 250 grams of crackers were thrown away. How much cheese and crackers were wasted together?

# Extension Worksheet

NAME

CLASS

DATE

## DIRECTIONS

Complete the table using the information from the infographic from [Statista](#). Select 3 countries and write down the weight of food wasted per person (number in the circle next to the country). Then, complete the table following each step.

## FOOD WASTE SAVINGS

A	B	C	D	E	F
Country Name	Food waste per person (kg)	Mass of Mill Food Grounds (kg) Divide B by 8, ignore the remainder	Amount of food waste (g) Multiply B x 1000	Amount of food waste after Mill (g) Multiply C x 1000	Amount of food waste saved by Mill (g) Subtract D - E
United States	59	$59/8 = 7$	$59 \times 1000 = 59,000$	$7 \times 1000 = 7,000$	$59,000 - 7,000 = 52,000$

# Worms and Food Waste

## GRADE

5th

## SUBJECT

Earth Science

## LESSON LENGTH

3-4 weeks

## AUTHOR

Shaleta Chatman

## LESSON DESCRIPTION

Student will learn about the role of worms in composting and soil health as they explore how worms can break down food waste and reduce its impact on the environment. The Mill Food Recycler can reduce food waste by extending food waste usage for worm farming. Students will seek to answer the essential question: Why is it important to put food waste to good use?

## STANDARDS

(5.L3U1.11) Obtain, evaluate, and communicate evidence about how natural and human-caused changes to habitats or climate can impact populations.

(5.L3U1.12) Construct an argument based on evidence that inherited characteristics can be affected by behavior and/or environmental conditions.

## RESOURCES

- [Soil Food Web](#)
- [Worm Anatomy](#)
- [Vermicomposting Ted-Ed Video](#)
- [PBS Compost Video](#)
- [Instructions: Make a Worm Composting Bin](#)
- [Compost Guide](#)
- [Compost Basics](#)

## MATERIALS

- Clear plastic containers
- Red wiggler worms
- Food scraps (vegetable peels, fruit waste, coffee grounds)
- Soil and shredded newspaper or cardboard
- Markers
- Chart paper
- Worm and Soil Observation Worksheets
- Laptops



## INTRODUCTION

- 1 Begin with a discussion about food waste: What is it? Why is it a problem?
- 2 Have students do research to collect information about the negative impact food waste (water and land usage, methane release, etc).
- 3 Using the driving question “What effect does food waste have on our lives?” have students create a circle map to brainstorm ideas regarding the effects of food waste.
- 4 If students have more experience with food waste, have them use their notes to create a flow map or multi flow map to show the impact human actions have on the environment



## ACTIVITY

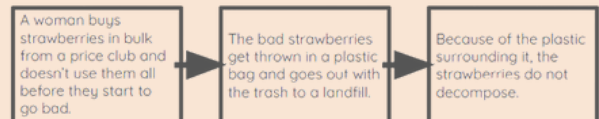
- 1 Show a picture of the soil-food web. Discuss how each element of the web is important for the health of soil and food. Let students know they will be focusing on one decomposer (worm) and how it contributes to the soil-food web.
- 2 Have students connect their learning of ecosystems to the soil food web by creating questions around changes to the soil food web. For example: What would be the effect on worms if there were no producers?

## CIRCLE MAP EXAMPLE

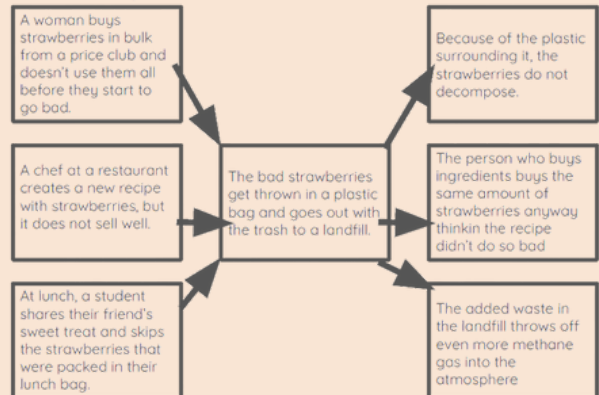


## FLOW AND MULTI FLOW MAP EXAMPLES

### Flow Map



### Multi Flow Map



## ACTIVITY (CONT.)

- 3** Show pictures or models of worms and discuss their anatomy and functions.
- 4** Divide students into small groups to research the following topics:
  - The life cycle of worms
  - Foods that are safe for worms to eat
  - How to harvest nutrient-dense soil produced by worms
- 5** Have groups present their research findings to the class.
- 6** Show a short video about composting and the benefits of worms in the process (see resources).
- 7** Show students the Mill Food Recycler. Highlight:
  - How the Mill works, and the impact it can have on food waste.
  - The different ways Food Grounds from the Mill can be used
  - How you can use the Mill to create food for the worms.
- 8** Guide students in setting up their worm farms using clear plastic containers by layering cardboard, soil, shredded newspaper, and food scraps, and then add the worms. If you have not created worm farms before, review the support guides in the resources section.
- 9** Explain to students how to care for their worm farms (feeding, moisture levels, etc.). Use Food Grounds from the Mill to feed worms.
- 10** Have students record their observations about their worm farms on their worksheets over the next few weeks.
- 11** Discuss ways the nutrient dense soil your worm farm produces can be put to use (school or home gardens, classroom window garden, donate to local nurseries or gardening plots). Make a plan with your students to put your soil to good use.
- 12** Discuss the importance of reducing food waste and how worm farming can contribute to sustainability. Invite students to share what they learned and how they can apply this knowledge at home.

## ASSESSMENT

Assess how students can answer the essential question: "Why is it important to put food waste to good use?" Pay attention to vocabulary used, text evidence from research, and experiential evidence from hands-on portion. Evaluate based on the following vocabulary words:

- Consume, decompose, decomposer, food waste, landfill, methane gas, nutrient-rich, produce, recycle, reduce, soil, vermiculture

## EXTENSION

- 1** Plan a field trip to a local farm or composting facility.
- 2** Keep worms and observation records for the rest of the school year. Using the Mill and Mill app, track how many pounds of food waste were saved from landfills.

# Worm and Soil Observations Worksheet

NAME

CLASS

DATE

## DIRECTIONS

**Every day:** Check to see if more food is needed. If you see food, you do not need to put in more. If food is needed, weigh and record how much food you add before you put it in the container.

**Every week:** Count how many worms are in the worm container. Remember to handle worms carefully.

## WORM AND SOIL OBSERVATIONS

### Week 1 Worm Count:

Day	Amount of Food Added (write 0 if none added)	Soil Observations (color, feel, moisture)	Comparison to worm-free soil

### Week 2 Worm Count:

Day	Amount of Food Added (write 0 if none added)	Soil Observations (color, feel, moisture)	Comparison to worm-free soil

# Worm and Soil Observations Worksheet

NAME

CLASS

DATE

## WORM AND SOIL OBSERVATIONS (CONT.)

### Week 3 Worm Count:

Day	Amount of Food Added (write 0 if none added)	Soil Observations (color, feel, moisture)	Comparison to worm-free soil

### Week 4 Worm Count:

Day	Amount of Food Added (write 0 if none added)	Soil Observations (color, feel, moisture)	Comparison to worm-free soil

# Exploring Carbon Cycling

## GRADE

9th

## SUBJECT

Integrated Science

## LESSON LENGTH

2-3 hours, over 3 days

## AUTHOR

Brianne Loya

## RESOURCES

- [Carbon Cycle diagram](#)
- Student experiment procedures
- [Carbon Cycle Game](#) (optional)
- [Carbon Quest Interactive](#) (optional)

## MATERIALS (PER GROUP)

- Exploring Carbon Cycling Worksheet
- Two small pots with drainage holes
- Soil sample
- Mill Food Grounds
- CO<sub>2</sub> sensor
- Plastic wrap or lid to cover containers for CO<sub>2</sub> measurements (this could be a balloon to capture CO<sub>2</sub> if no sensor is available).
- Measuring spoons

## LESSON DESCRIPTION

Students will construct and refine models to describe how Mill Food Grounds contribute to the cycling of carbon and nutrients among the biosphere, atmosphere, geosphere, and hydrosphere, focusing on the role of decomposition and organic matter. By collecting and analyzing experimental data, students evaluate how Mill grounds impact nutrient availability, carbon storage, and ecosystem health and apply the findings to explain patterns in the cycling of matter and energy. Students will apply their understanding of carbon and nutrient cycles to propose and justify sustainable practices that integrate Mill grounds, reducing human impact on natural systems and promoting ecosystem stability.

## STANDARDS

(HS-ESS2-6) Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

(HS-LS2-4) Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.



## INTRODUCTION

- 1 Show students a diagram of the carbon cycle. Highlight and explain the following:
  - Photosynthesis, respiration, decaying organisms\decomposition, factory emissions\combustion
  - The role of decomposers in returning carbon and nutrients to the soil.
- 2 Introduce Mill Food Grounds as an example of organic matter that can influence these cycles.
- 3 Show students the Food Grounds and explain that the Mill uses heat to dehydrate food waste and turn it into a resource that can be used to impact soils.

## ACTIVITY

- 1 Have students make predictions of how they think Food Grounds might effect carbon cycling in the soil. For example:
  - The grounds will increase the amount of carbon in the soil, so decomposition levels will increase.
- 2 Have students make predictions before they begin the experiment.
- 3 Direct students to follow procedures to create a “control” and “treated” sample of soil using Food Grounds. Measure CO<sub>2</sub> levels to evaluate decomposition. Note that you can create a simple if imprecise CO<sub>2</sub> sensor by stretching balloons over the top of soil containers to collect gases.
- 4 Allow the soil containers to remain undisturbed for 24-48 hours to allow decomposition to begin.
- 5 After the students have collected CO<sub>2</sub> data, have groups prepare short whiteboard reports to summarize their findings in a few sentences and be ready to share their data.
- 6 Have all groups present their data and explore any trends in the CO<sub>2</sub> levels.
- 7 If desired, complete the same experiment using soil testing kits to explore the amount of nitrogen and phosphorous in the soil.

## ASSESSMENT

Discuss as a whole class:

- How do the grounds affect CO<sub>2</sub> production?
- How do these results demonstrate the role of organic matter in carbon cycling?
- How can Mill grounds be used to enhance sustainability?
- What are the broader environmental benefits of incorporating organic waste into soil?

## EXTENSION

After understanding the role of organic matter in these cycles, students can apply their knowledge to real-world scenarios by designing experiments that integrate Mill grounds into sustainable resource management practices. By linking the abstract concept of carbon cycling with practical applications in soil and water systems, students deepen their understanding of how innovations can mitigate human environmental impact.

# Exploring Carbon Cycling Worksheet

NAME

CLASS

DATE

## OBJECTIVE

Investigate how Mill grounds influence the carbon cycle by measuring CO<sub>2</sub> production.

## STUDENT PREDICTIONS

## MATERIALS (PER GROUP)

- 2 small pots with drainage holes
- Soil sample
- Mill Food Grounds
- CO<sub>2</sub> sensor
- Plastic wrap or lid to cover containers for CO<sub>2</sub> measurements (this could be a balloon to capture CO<sub>2</sub> if no sensor is available).
- Measuring spoons

## PROCEDURE

- 1** Label one pot as "Control" and the other as "Treated."
- 2** Fill both pots with the same amount of soil.
- 3** Add 2 tablespoons of Mill grounds to the "Treated" container and mix thoroughly with the soil. Leave the "Control" container unchanged.
- 4** Slowly pour water into each container, ensuring the soil is moist but not waterlogged. Wait approximately 5 minutes for the water to settle.
- 5** Cover each container to trap air inside. If using balloons to capture CO<sub>2</sub>, cover the top of the container completely with the balloon.
- 6** Leave the containers undisturbed for 24-48 hours to allow decomposition to begin.
- 7** Use a CO<sub>2</sub> sensor to measure and record gas levels inside each container. If using balloons, record the sizes. Note any differences between the "Control" and "Treated" samples.

## DATA

Sample	Amount of CO <sub>2</sub>	Observations
Control		
Treated		

# Transformation and Change

## GRADE

9

## SUBJECT

Visual Arts

## LESSON LENGTH

8-12 hours

## AUTHOR

Matthew King

## RESOURCES

- Example Rubrics (below)
- [Food Waste is the World's Dumbest Problem](#)
- [Mill Intro Video](#)
- [Mill Impact Information](#)
- [UN Food and Climate Change: Healthy diets for a healthier planet](#)
- [The Global Food Waste Scandal](#)
- [Corita Kent | 2016 AIGA Medalist](#)
- [Corita Kent Artwork](#)

## MATERIALS

- Pencils
- Paper
- Sponges
- Paint brushes
- Paint
- Local dirt
- Fine mesh screen
- Stencil material (recycled manila envelopes work well)

## LESSON DESCRIPTION

In this project, students will delve into the theme of Transformation and Change by creating a collaborative outdoor art installation featuring stenciled designs made with mud. This medium highlights the fleeting nature of art, emphasizing both ephemerality and non-destructive creation. Using the Mill Food Recycler, students will observe how food waste can be rapidly transformed into a valuable resource. Drawing inspiration from pop artist Corita Kent, they will embrace risk-taking, ambiguity, and the juxtaposition of themes such as food, waste, transformation, community connections, and their personal responses to the process.

## STANDARDS

(VA:Cr1.1.HSI) Use multiple approaches to begin creative endeavors.

(VA:Pr5.1.HSI) Evaluate, select, and apply methods or processes appropriate to display artwork in a specific place.

(VA:Re8.1.HSI) Interpret an artwork or collection of works, supported by relevant and sufficient evidence found in the work and its various contexts.

(VA:Cn10.1.HSI) Document the process of developing ideas from early stages to fully elaborated ideas.

(VA:Cn11.1.HSI) Describe how knowledge of culture, traditions, and history may influence personal responses to art.



## INTRODUCTION

- 1 Encourage students to put food waste into the Mill Food Recycler after school breakfast and lunch on a regular basis so that they can observe the transformation of their food waste.
- 2 Have students reflect on the Mill process and their observations, considering personal insights, big ideas, and connections to themes like change and sustainability. Encourage them to brainstorm and record a central concept for their artwork, understanding that it's okay to create a project that relies mostly or entirely on words.
- 3 After giving them time to explore, orient students to the Mill Food Recycler and the problem of food waste using the resources provided.
- 4 Set up a photo station with a backdrop where students can photograph food waste. They are encouraged to arrange, count, and describe the waste, noting textures, colors, and other details. Students will write down subjective observations using descriptive words like "soggy," "bright," or "slimy" to reflect on their perceptions.

## ACTIVITY

- 1 Have students examine Corita Kent's art using the links provided in the resources. A good launching point are artworks which appropriate (borrow) words and images from food packaging, familiar brands, and signage. Through discussion and written reflection, have students:
  - Speculate about why Kent appropriated words and logos from advertising and popular culture.
  - Identify humanistic issues like hunger, community, and compassion.
  - Start to identify something about food, waste, human concerns, social issues, transformation, or change that resonates for them to contribute to this group art project.
- 2 Have students practice the stenciling method by making stencils of their initials and then applying paint using a sponge through their stencils.
- 3 Once students gain proficiency with the stencil technique and paint, move on to mud. Sift local dirt using a sieve or screen to remove larger particles and then mix with just enough water to make the mud workable. Encourage your students to experiment and discover what works for them.
- 4 Have students individually to sketch artwork on paper consisting of just a couple of words and maybe a simple shape. Any response from students that is about change, transformation, ephemerality, food, climate change, advertising, packaging, etc. will help contribute to the group's overall art installation.
- 5 Before making their final stencils, have students make their artwork at full size and then put them on the floor to see how they can be arranged together as a larger collaborative piece.

## ACTIVITY (CONT.)

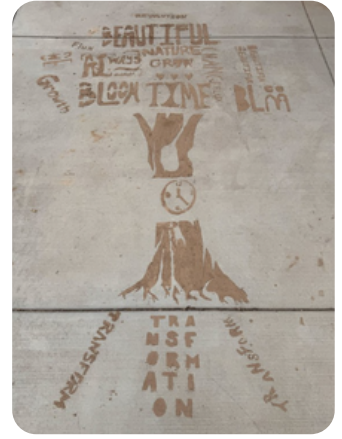
- 6 Have students work in groups to create a collective piece of art using their separate stencils. They can combine stencils or create a new stencil that combines their ideas together.
- 7 Have students install their artwork in a common space. This might be adjacent to the entrance to their school or maybe a common area everyone will see at lunch. Encourage students to think about how the stenciled mud artwork will change quickly and to document the change with photography, video, and voice recordings.

### EXTENSION

Students can be encouraged to extend the project by encouraging them to document the installation for a school social media account or by incorporating other media (digital, animation, 3D) as part of their response to the prompt.

### ASSESSMENT

Use the suggested rubrics to grade and provide feedback on student work, or create your own.



### STUDENT VOICE

**“Time changes. Food changes. So in a way as the food is getting older and changing we are getting older and changing too. Maybe we shouldn't be worried about change?”**

## EXAMPLE PROJECT RUBRICS

<b>Sketching and Idea Generation Rubric (VA:Cr1.1.HSI)</b>				
Criteria	Exceeds Expectations (4)	Meets Expectations (3)	Approaching Expectations (2)	Needs Improvement (1)
Exploration of Ideas	Consistently explores and develops thoughtful responses to the prompt, demonstrating deep reflection and original thinking.	Ideas are clear and connected to the prompt, with evidence of exploration and reflection.	Ideas show minimal exploration or connection to the prompt, with limited depth or originality.	Little to no exploration of ideas; responses are surface-level or incomplete.
Creativity and Risk-Taking	Demonstrates innovation by taking risks and exploring unconventional ideas that challenge assumptions.	Shows creativity by experimenting with new ideas and techniques relevant to the project.	Exhibits some creative effort but relies on familiar or safe ideas.	Minimal effort to think creatively or take risks; ideas are repetitive or underdeveloped.

<b>Installation and Group Collaboration Rubric (VA:Pr5.1.HSI)</b>				
Criteria	Exceeds Expectations (4)	Meets Expectations (3)	Approaching Expectations (2)	Needs Improvement (1)
Preparation and Refinement	Artwork is meticulously prepared and refined, demonstrating careful attention to detail and readiness for installation.	Artwork is adequately prepared and refined, with clear effort toward presentation.	Artwork shows minimal refinement, with some effort toward preparation for installation.	Artwork is incomplete or lacks refinement, showing little effort in preparation.
Collaboration and Teamwork	Consistently contributes to group decisions, listens actively, and works collaboratively to enhance the group installation.	Participates in group decisions and contributes to the success of the installation.	Participates occasionally, but contributions to group work are minimal or inconsistent.	Rarely participates or disrupts group efforts, contributing little to the installation.

## EXAMPLE PROJECT RUBRICS (CONT.)

<b>Installation and Group Collaboration Rubric (VA:Pr5.1.HSI)</b>				
<b>Criteria</b>	<b>Exceeds Expectations (4)</b>	<b>Meets Expectations (3)</b>	<b>Approaching Expectations (2)</b>	<b>Needs Improvement (1)</b>
<b>Connections to Contemporary Issues</b>	Draws thoughtful, original connections between the project themes (e.g., transformation, food waste) and contemporary societal or cultural issues.	Makes clear and relevant connections between project themes and contemporary issues.	Attempts to connect project themes to contemporary issues, but connections are weak or underdeveloped.	Connections to contemporary issues are absent or unrelated to the project themes.
<b>Application to Artistic Process</b>	Contextual understanding enriches and elevates the artistic process, leading to a deeply informed and intentional creative approach.	Contextual understanding informs the artistic process and contributes to thoughtful creative decisions.	Limited contextual understanding impacts the artistic process, with minimal influence on creativity.	Little to no contextual understanding is applied to the artistic process, resulting in a disconnected approach.

# Now What?



## WAYS TO ENGAGE

Use these lessons to [integrate Mill Food Recyclers into your classrooms](#) and ask your district to engage in food saving, waste reducing practices. Learn about one student's experience in taking action [here](#). Use [WWF's Food Waste Warrior Toolkit](#) for help with cafeteria audits and other food waste reduction strategies, including:

**Offer vs. Serve:** This allows cafeteria managers to reap the benefits of serving reimbursable school meals while allowing students to decline certain meal components that they know they will not eat.

**Share Tables:** Unused and sealed food from school lunch can be shared among students during the lunch period or donated to after school programs.

## EXTEND IT OUTDOORS

### Compost

- [Instructions: Make a Worm Composting Bin](#)
- [Vermicomposting Ted-Ed Video](#)
- [PBS Compost Video](#)
- [Compost Guide](#)
- [Compost Basics](#)
- [A Teacher's Guide to Compost Activities](#)

### Gardening

- [Lifelab Gardening Resources](#)
- [Kids Gardening](#)
- [Children and Nature](#)
- [EPA strategies for preventing food waste](#)

## IN THE CAFETERIA

Nutrition Service Director Janay Watts from Tempe Elementary School District in Tempe, Arizona has successfully implemented Food Waste Reduction strategies in her district. She focuses on four areas: food waste reduction, student participation, customer service, and monthly monitoring of expenditures.

Her initiatives focus on building positive, fun relationships with students and promoting student voice in the cafeteria. For example, her team conducts "taste tests" of future menu items with students to ensure that they actually want to eat the cafeteria meals, and facilitate students designing their own recipes that can end up on the lunch menu if they pass the taste test. Her team also organizes exciting lunch events like "Taste the Rainbow," which encourages students to try different colored fruits and vegetables from the salad bar.

Through collaborative efforts, the team has established monthly goals for each school site that target key data points, including food costs, food waste, and student participation. This valuable data is accessible to the team, keeping them informed and driving positive change. While none of her initiatives are punitive towards students or staff, she has effectively reduced both food expenditures and waste across the district. The belief and vision is that "students should have more than a transactional relationship with food."

As a teacher, we recommend getting to know your cafeteria staff! There may be opportunities to make meals fun for the students, which increases engagement, promotes healthier students, and reduces food waste.

# Mill Food Recycler Educators Guide



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