RethinkWaste
Lesson Booklet

Table of Contents
1. What is Waste? - page 1
2. Let’s Sort Successfully! - page 6
3. Waste Detectives - page 11
4. Another "R": Repair! - page 20
5. Every Litter Bit Counts! - page 29
6. Litter Bingo - page 42
7. Eat Your Compost! - page 49
8. Alex Wastes Her Lunch - page 62
9. Post-Tour & Presentation Reflection - page 73
10. Environmental Justice Book Lessons - page 79
What is Waste?

Table of Contents

K - 5th Grade
1. Teacher Lesson Plan, page 2
   a. Overview
   b. Purpose & Learning Objectives
   c. Materials
   d. Driving Question
2. Student Worksheet, pages 3-5
   a. Introduction
   b. Key Terms
   c. Instructions
   d. Video
   e. Reflection, K-2
   f. Reflection, 3-5
Overview

On average, Americans throw away 4.5 pounds of waste daily. Over 50% of this waste is sent to be buried forever at the landfill. Not only is this a poor use of our natural resources, but landfills also release methane, a powerful greenhouse gas, that contributes to climate change.

By taking actions like practicing the 4R’s (Reduce, Reuse, Recycle, and Rot), we can make a positive difference by decreasing and diverting the waste we generate.

Purpose & Learning Objectives

This activity allows students to reflect on the What is Waste video. Students will be able to share how they feel, better understand waste processes, and communicate what they wish to learn more about. By learning more about waste issues, students can discuss with others and encourage others to participate.

Materials

Students will need internet access to watch the video before completing this reflection sheet. Adult facilitation is helpful for this activity.

Driving Question

What happens to our items after we are done using them? How does the way that we discard them affect the environment?
Introduction

On average, Americans throw away 4.5 pounds of waste daily. Over 50% of this waste is sent to be buried forever at the landfill. Not only is this a poor use of our natural resources, but landfills also release methane, a powerful greenhouse gas, that contributes to climate change.

By taking actions like practicing the 4R’s (Reduce, Reuse, Recycle, and Rot), we can make a positive difference by decreasing and diverting the waste we generate.

Key Terms

**WASTE:** Anything no longer needed or wanted

**RECYCLING:** To make new products products from used material. This is what happens to items in our blue recycling bin

**GARbage:** Items that are no longer useful, can’t be recycled, composted, or fixed which are sent to a landfill
What is Waste?
Student Worksheet, Grades K - 2

Instructions & Reflection Questions

Watch the "What is Waste?" video and then answer the questions below.
Note: If you do not have access to a printer, please complete the lesson using the Google Form.

1. Did you think of another item that belongs in the garbage? Write it below:

2. Are you excited to learn more about waste this week? What are you most excited to learn more about?

3. How did it make you feel when you saw the different kinds of waste (garbage, compost, and recycling)?

4. Why is it bad when garbage items go into nature?

5. What is one thing that your family can do to make less garbage?

6. Imagine a plastic water bottle. Can you think of a new way to use it?
Watch the "What is Waste?" video and then answer the questions below.
Note: If you do not have access to a printer, please complete the lesson using the Google Form.

1. Did you think of another item that belongs in the garbage? Write it below:

2. Are you excited to learn more about waste this week? What are you most excited to learn more about?

3. How did you feel seeing the different kinds of waste (garbage, compost, and recycling)?

4. Review the 4R's: Reduce, Reuse, Recycle, and Rot. Can you think of a 5th R?

5. How do you and your family practice the 4R's? Try to think of 1 example for Reduce, 1 example for Reuse, 1 example for Recycle, and 1 example for Rot.

Next, complete the Build A Model Landfill* activity!
*Build A Model Landfill adapted from our partners at the County's Office of Sustainability
Let’s SortSuccessfully!

Table of Contents
2nd - 5th grade
1. Teacher Lesson Plan, pages 7-8
   a. Overview
   b. Purpose & Learning Objectives
   c. Materials
   d. Driving Question
   e. Key Terms
   f. Standards & Topic Connections
   g. Adaptations & Extensions
2. Student Worksheet, pages 9-10
   a. Background
   b. Instructions
   c. Reflection
Let’s Sort Successfully! Grades 2-5
Teacher Lesson Plan

Overview

Did you know that 39,485,479.05 tons of waste were sent to California landfills in 2018 alone (Cal Recycle, 2018)? Of this, 181,189 tons were from the RethinkWaste service area (RethinkWaste, 2019). While this comprises less than 1% of our state’s total landfilled waste, we can still work to reduce it.

When material is sent to the landfill, it is compacted and becomes a source of methane, which is a greenhouse gas that contributes to climate change. By reducing the amount of waste we are sending to landfill, we are reducing the amount of methane sent into our atmosphere.

Purpose & Learning Objectives

This activity allows students to reflect on their own behaviors and think about how they affect the environment. Students are encouraged to share what they have learned with their caretakers or other decision-makers in their community.

Materials

Students will need internet access for this activity. They will also need a pencil and paper. Adult facilitation is strongly recommended but not required.

Driving Question

How does sorting our waste into the compost, recycling, and garbage bins help the environment?
Let’s Sort Successfully!
Teacher Lesson Plan

Key Terms

**ORGANIC MATTER**: Matter that has come from a recently living organism. Organic matter can decay, or break down.

**FOOD SOILED PAPER**: Paper products that have come in contact with food. Ex. A used napkin.

**CONTAMINATION**: To make something unusable by adding things that don’t belong.

Standards & Topics Connections

**One Planet Living Topic**
Zero Waste, Products & Materials (Consumption)

**Standards**: NGSS, HSS, Common Core

**Crosswalk of Standards**

**Problem Exploration**
NGSS: 3-5-ETS1-1, 3-5-ETS1-2, 5-PS1-3, 5-ESS3-1

HSS: Geography of the Local Region, Development of the Local Community: Change Over Time

Common Core: 3-5.W.1, 3-5.W.8, 3-5.SL.6, 3-5.L.1, 3-5.L.2, 3-5.L.3, 3-5.L.6

**Environmental Principles and Concepts (EP&Cs)**
Principals 1, 2, 3, 4, and 5

Adaptations & Extensions
This lesson can be extended to learn about sorting at the Material Recovery Facility (MRF). Follow this lesson plan* where students use critical thinking and engineering skills to build their own MRF!

*Lesson adapted from Wake County Environmental Services
Introduction

If you live in the RethinkWaste service area, which includes cities from Burlingame to East Palo Alto, the garbage we make at school, home, and businesses is sent to the Ox Mountain Landfill in Half Moon Bay - right next to Lemos Farms!

Ox Mountain is expected to fill up around 2039; when this happens, we need to start a new landfill. However, if we can reduce the amount of waste that we send there every day, we can make sure that the existing landfill is open longer.

One way we can help is by sorting our waste into the recycling and compost bins instead of putting everything into the garbage (so less material goes to the landfill).

For today's activity, we are going to learn about how to sort our waste and how we can teach others to do the same!

Instructions

1. Start today's lesson by watching Episode 2 of The Green Zone.

2. Next, try your hand at sorting with this game on the RethinkWaste website.

3. Share what you've learned with everyone that you live with! If you have recycling, compost, and garbage options available to you at home, pick one of these options:
   - Post these signs wherever you see waste bins in your home.
   - Create your own new signs and post them wherever you see waste bins in your home. Use words or phrases that will work best for you and your family!
   - Teach the other people that you live with about how and why we sort our waste.

If you do not have sorting options available to you at home or at school, write a letter to whoever is in charge of arranging these services. For example, this could be your apartment complex's property manager, your principal, or your adult guardian.

• Explain why you are requesting compost or recycling services, and why it is important that we do our best to sort our waste!
• If you don't have a compost pail in your kitchen, ask your parent or an adult in your household to help request a free compost pail by contacting Recology here.
Reflection Questions

Note: To access the reflection questions online, click here.

Below are the printable version of the reflection questions:

1. Who or what do you think is affected by landfills being in or near their homes? Do you think they like the landfill? Hint: Think about smells, litter, and natural habitats!

2. What is the benefit of putting food in the compost bin instead of the garbage bin? What about putting recyclable items in the recycling bin instead of the garbage bin?

3. What is one change that you can make in your own life to send fewer things to the landfill?

4. What is one thing that you’ve learned during this lesson that you wish everyone knew?
Waste Detectives

Table of Contents

2nd - 5th grade
1. Teacher Lesson Plan, page 12
   a. Overview
   b. Purpose & Learning Objectives
   c. Materials
   d. Driving Question
2. Student Worksheet, pages 13-19
   a. Introduction
   b. Key Terms
   c. Instructions
   d. Waste Audit Sheets
   e. Data Review
   f. Reflection
   g. Practicing the 4Rs at Home
Overview

In America, more than half of all of our waste gets sent to landfills (EPA, 2020). Yet, a significant portion of the waste sent to landfills should be composted or recycled instead. We can improve our use of natural resources by ensuring that recyclable items are remade, and compostable items can properly decay.

In this lesson, students will conduct a waste audit to tally what materials they commonly throw away. After some reflection, students will conduct an additional waste audit to see what impact their new behavioral changes have on their waste output. This lesson intends to increase awareness and change waste habits through a waste composition study, data review, and analysis.

Purpose & Learning Objectives

This activity allows students to reflect on their own behaviors and think about how they affect the environment. Students are encouraged to share what they have learned with their caretakers or other decision-makers in their community.

Materials

Students will need internet access for this activity. They will also need a pencil and paper. Adult facilitation is required for younger students.

Driving Question

What kinds of waste do we make? How can studying our waste help us to reduce it?
Introduction

In America, more than half of all of our waste gets sent to landfills (EPA, 2020). Yet, a significant portion of the waste sent to landfills should be composted or recycled instead. We can help by making sure that our waste gets sorted into the right place. By sorting your waste correctly you are preventing valuable resources from being wasted.

In this lesson, you will conduct a waste audit to tally what materials you commonly throw away. After the first audit, you will reflect on changes you and your family could make to prevent waste from ending up in the landfill. When you’ve tested out the new ways your family is trying to reduce waste, conduct another waste audit to see what impact your new changes had on your waste.

Key Terms

**COMPOST:** A nutrient-rich fertilizer made from our food and yard scraps. Anything we put in our green compost bin becomes fertilizer

**LANDFILL:** An area of land meant to handle the disposal of solid waste. The landfill is the final destination for anything we put in our garbage bin

**REDUCE:** To make less waste by using fewer items and resources

**REUSE:** To extend the life of an item by using it over and over again or thinking of new ways to use it

**RECYCLE:** To make new products from used materials. This is what happens to items put in our blue bin
Step 1: For this activity, we will be taking a detailed look at the waste we create for 2 days! This is called a waste audit. From when you wake up to when you go to bed, make a list of the types of items you are using throughout the day (ex: hard plastic container). Keep a tally of these items in the provided table.

To see an example waste audit and a refresher on how to sort your waste correctly into each bin, watch this video.

Step 2: Answer the Data Review and Discussion questions.

Step 3: Next, do your best to reduce your waste over the next week. Try to use less paper, reuse containers, and save your leftovers for later! See the provided “Tips and Tricks” sheet for more ways to reduce.

Step 4: Conduct another waste audit. Think about what changed and what stayed the same.

Optional: If you do not have a compost pail in your kitchen, ask your parent or an adult in your household to help request a free compost pail by contacting Recology here.

If you live in an apartment, ask your parent or an adult to talk to the property manager of your apartment complex about getting compost services for everyone in your building!

Remember: When we put items in the black bin, they go straight to the landfill and are buried in the ground forever. This means that if we put compostable or recyclable items into the landfill bin, they can never turn into nutrient-rich fertilizer or new items.

We all share the planet Earth with each other. Let’s do our part and think before we throw!
# Waste Audit #1

<table>
<thead>
<tr>
<th>Material type</th>
<th>Tally</th>
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<tbody>
<tr>
<td>Hard Plastic</td>
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<tr>
<td>Water bottles, applesauce and yogurt containers, peanut butter jars, etc.</td>
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<tr>
<td>Soft Plastic</td>
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<tr>
<td>Chip and candy wrappers, zip-top bags, plastic lids to snack containers, etc.</td>
<td></td>
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<tr>
<td>Metals</td>
<td></td>
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<tr>
<td>Cans for tuna, soup, beans, soda cans, aluminum foil, etc.</td>
<td></td>
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<tr>
<td>Paper/Cardboard</td>
<td></td>
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<tr>
<td>Boxes for cereal or snack bars, junk mail, magazines, newspaper, etc.</td>
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<tr>
<td>Glass</td>
<td></td>
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<tr>
<td>Soda bottles, jars for pasta, jam, pickles, etc.</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Plastic straws, plastic utensils, juice boxes, tissues, diapers, pet waste, etc.</td>
<td></td>
</tr>
<tr>
<td>Food Scraps</td>
<td></td>
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<tr>
<td>Egg shells, fruit peels, chicken bones, any uneaten food items</td>
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**Notes and Observations:**
# Waste Audit #2

<table>
<thead>
<tr>
<th>Material type</th>
<th>Tally</th>
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<tr>
<td><strong>Hard Plastic</strong>&lt;br&gt;Water bottles, applesauce and yogurt containers, peanut butter jars, etc.</td>
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</tr>
<tr>
<td><strong>Soft Plastic</strong>&lt;br&gt;Chip and candy wrappers, zip-top bags, plastic lids to snack containers, etc.</td>
<td></td>
</tr>
<tr>
<td><strong>Metals</strong>&lt;br&gt;Cans for tuna, soup, beans, soda cans, aluminum foil, etc.</td>
<td></td>
</tr>
<tr>
<td><strong>Paper/Cardboard</strong>&lt;br&gt;Boxes for cereal or snack bars, junk mail, magazines, newspaper, etc.</td>
<td></td>
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<tr>
<td><strong>Glass</strong>&lt;br&gt;Soda bottles, jars for pasta, jam, pickles, etc.</td>
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</tr>
<tr>
<td><strong>Other</strong>&lt;br&gt;Plastic straws, plastic utensils, juice boxes, tissues, diapers, pet waste, etc.</td>
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<tr>
<td><strong>Food Scraps</strong>&lt;br&gt;Egg shells, fruit peels, chicken bones, any uneaten food items</td>
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Notes and Observations:

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**Date:**

16

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**Waste Detectives, Grades 2-5**
Data Review

1. What material type did you generate the most of?

2. What fraction of your waste was soft plastic?

3. What fraction of your waste was hard plastic, metals, paper/cardboard, glass, AND food scraps? When sorted into the correct bins, these items will not end up in a landfill.

4. Choose 10 items and graph them by material type below. What do you notice?
Take out your crayons, colored pencils, and markers and get ready to express yourself! First, think about what feelings you had while doing this lesson. Go ahead and write down all of the different feelings (mad, sad, happy, angry, worried, etc.) on the lines. Pick a color for each of the feelings that you wrote down. Fill in the box next to the line with each of the different colors. Color in the heart to show how this lesson made you feel. After you're done drawing, show your drawing to someone and tell them about it.

**Reflection Questions**

1. How is the waste you create at home different from the waste you create at school? Why is it different (or the same)?

2. Think about your answer to Question 1 of the Data Review. How could you reduce the amount of waste you create in this category? What about the other categories?

3. Color Your Feelings!
   Take out your crayons, colored pencils, and markers and get ready to express yourself! First, think about what feelings you had while doing this lesson. Go ahead and write down all of the different feelings (mad, sad, happy, angry, worried, etc.) on the lines. Pick a color for each of the feelings that you wrote down. Fill in the box next to the line with each of the different colors. Color in the heart to show how this lesson made you feel. After you’re done drawing, show your drawing to someone and tell them about it.

<table>
<thead>
<tr>
<th>Color &amp; Feelings:</th>
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Waste Detectives, Grades 2-5
Practicing the 4R’s at Home

Reducing your waste can seem hard, especially when it feels like everything is wrapped in packaging! Here are a few tips for practicing the 4R’s (Reduce, Reuse, Recycle, Rot) at home.

**Bulk Buy:** Small snack bags are perfect to pack in our lunches, but they create a lot of waste that gets sent to the landfill. Instead, buy a bigger container of your favorite snack and pack them in reusable containers. This is also a great way to reduce the number of trips you take to the grocery store.

**Reuse Reuse Reuse:** Store leftovers in containers instead of plastic bags. If you prefer plastic bags or it’s what you have on hand, give them a quick rinse so you can use them more than once.

Instead of putting plastic food containers from restaurants and markets in the recycling or trash, clean them out and use them to store food or other small household items.

**Dismiss Disposables:** When ordering food to-go or delivery, ask the staff not to include disposable utensils if you will be eating at home.

Instead of using paper towels, try using more cloth napkins or small hand towels that can be washed when necessary.

Beeswax wrap is an easy, sustainable alternative to one-use plastic wrap. You can even make your own!

**Successful Storage Systems:** Try to eat food that will spoil first - move them to the front of the fridge or create a special, designated area for them and tell the people you are living with!

**Bad Banana Becomes Bread:** Be creative with produce that is past its prime. Soft fruits can go into smoothies and wilted vegetables can be added to soup or stew.

**Clean Clutter but Curb Waste:** If you plan to start spring cleaning early, save items that you don’t want but are in good condition for donation.
Another “R”: Repair!

Table of Contents

3rd - 5th grade

1. Teacher Lesson Plan, pages 21-22
   a. Overview
   b. Purpose & Learning Objectives
   c. Driving Question
   d. Materials
   e. Key Terms
   f. Standards & Topic Connections
   g. Adaptations & Extensions

2. Student Worksheet, pages 23-28
   a. Introduction
   b. Fix-It Tips
   c. Materials
   d. Instructions
   e. Repair Journal
   f. Reflection
Another “R”: Repair!
Teacher Lesson Plan

Overview

Waste is generated at an increasing rate every year. On average, one person living in America (that includes us!) makes about 42 pounds of electronic waste per year. Sadly, most of that will likely end up in landfills.

From electronics to small appliances, furniture to clothing, we want to remind students that “broken” doesn’t have to mean “trash”. We can all help conserve our natural resources by trying to fix our broken items instead of throwing them away. We know the 4R’s: Reduce, Reuse, Recycle, and Rot (Compost). Now, we want to introduce one more important “R”: Repair!

Purpose & Learning Objectives

This activity gives students the opportunity to practice observation skills by noting broken items in their home. They will be prompted to reflect on and discuss the theme of “Repair” using cause-and-effect reasoning. Students will also engage in creative problem-solving by brainstorming possible solutions and sketching.

Driving Question

How does repairing our broken goods benefit the environment?

Materials

Students need a notepad and pencil to record their broken items if they are unable to print the following worksheets. Internet access will be helpful for the lesson extension where students can directly input their data. Assistance from an adult is strongly recommended, but not required.

Key Terms

**REPAIR**
To fix or mend something that is broken.

**MATERIAL**
What things are made of; the elements, substance, or parts of which something is made or can be made with.
Another “R”: Repair!
Teacher Lesson Plan

Standards & Topics Connections

One Planet Living Topic
Zero Waste, Products & Materials (Consumption)

Standards: NGSS, HSS, Common Core
Crosswalk of Standards
Problem Exploration
NGSS: 3-5-ETS1-1, 3-5-ETS1-2, 4-ESS3-1
HSS: Economics of the Local Region: Choices, Costs, and Human Capital
Common Core: 3.NF.1, 3.MD.3, 3.MD.4, 4.NBT.4, 4.NBT.5, 4.NF.3,

Environmental Principles and Concepts (EP&Cs)
Principals 1, 2, 3, and 5

Adaptations & Extensions

This activity can be expanded to analyze data as a class and include multiple students. Each student can input their findings into a spreadsheet, logging information such as number of broken items, item type(s), and brand(s). This data can then be graphed for further analysis and/or mathematical calculations. Use “Lesson Repair Template” as an example.

Alternatively, teachers may facilitate a discussion among students and encourage them to share their findings and compare what they found. This could become an extended exercise by keeping a posted log in the classroom (or online) of broken items at home and/or school.
Another “R”: Repair!  
Student Worksheet

Introduction

You have probably heard about the 4 R’s already: Reduce, Reuse, Recycle, Rot. These are great ways to think about waste, but there is another special “R” that is important, too. Can you guess what it is? You’re right! It’s Repair!

What does repair mean? Have you ever had a toy that stopped working? Or noticed a rip or hole in a pair of pants? Many people think that once something is broken it’s time to throw away, but there is probably a way to fix it or repair it first!

Repair is important because when you repair an item, you make it last longer. When we throw an item in the garbage, it usually goes straight to the landfill and stays there forever. When you repair something that was broken, you can extend its useful life - which means you are keeping it out of the landfill. Repairing an item also means you won’t have to buy a new one, which saves valuable resources, energy, and money. You might even learn handy new repair tricks!

A Few Tips from the Fix-it Fairies!

Clothing can easily be fixed by sewing up small holes or putting patches over large rips. Even a broken backpack strap can be repaired with a needle and thread!

Has the rubber or plastic covering on a cord worn away or broken so that the metal wires are exposed? Use some electrical tape to carefully cover up the wire - no need to buy a new one.

A zipper that opens behind the zipper slider is an easy fix. Use locking pliers to squeeze the top and bottom plates of the zipper slider closer together - just a little at a time. Repeat slowly until the zipper starts closing behind the zipper pull.
Another "R": Repair!
Student Worksheet

Materials

All you will need is a pencil and creativity. You can either print the table from this worksheet, or write your answers on a separate sheet of paper and type it in later. Try using scratch paper if you have some available.

Instructions

**STEP 1**
Walk through all the rooms in your home. In each room, look for items that are broken in any way. This could be items like appliances, electronics, clothing, etc. Ask an adult to help you if you can't reach something or if you aren't sure what something is.

**STEP 2**
When you find an item that could be repaired, document the details. Carefully fill out the table on the next page of this worksheet, or write down the answers to these questions if you’re using a separate sheet of paper:

- What is today’s date?
- What is the item that is broken? Write the name or draw the item
- Where was it found? Example: kitchen cabinet
- What material is this item made of? Example: glass and plastic
- What is it (intended to be) used for?
- How often would we use it if it were working? Every day? Once a year?

**STEP 3**
Repeat Steps 1 and 2 until you think you’ve found all of the broken items in your home. You can also check your back or front yard, with adult permission.
### Repair Journal

<table>
<thead>
<tr>
<th>Date</th>
<th>What item is broken? Write or draw</th>
<th>Where was it found?</th>
<th>What material is this item made of? How often do we use it? Write a sentence.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: 9/1/20</td>
<td>Example: Clothes iron</td>
<td>Example: Laundry room shelf</td>
<td>Example: The iron is made of plastic and metal. We use it 3 times a week</td>
</tr>
</tbody>
</table>
# Repair Journal

<table>
<thead>
<tr>
<th>Date</th>
<th>What item is broken? Write or draw</th>
<th>Where was it found?</th>
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</tr>
</tbody>
</table>
1. Find the sum of all of the broken items. Then, multiply the sum by the number of classmates you have. How many total broken items might belong to you and all of your classmates combined?

2. Graph the number of items by material type. What material breaks the easiest? What material does not seem to break as easily? If an item is made of more than 1 material, pick the material that makes up the majority of the item.

3. Choose one item and guess how it might need to be fixed. Write your idea below: Then, with the help of an adult, look up a video on how to fix the item. Was your idea similar? What were the similarities? What were the differences?
4. How do you think this item could have been made differently to prevent it from breaking in the first place?

5. What do you think about when considering whether or not to fix a broken item vs. replace it? Cost? Convenience? Time?

With the permission of an adult, report your broken items here: http://bit.ly/brokenitemreport. If you can, hold on to these items for the next Fixit Clinic in your neighborhood.

If your teacher is collecting data from your class, input your findings into the shared spreadsheet.
Every Litter Bit Counts!

Table of Contents

1st - 5th Grade

1. For Teachers (Grades 1-5), pages 30-32
   a. Teacher Lesson Plan
   b. Teacher Instructions

2. For Students (Grades 1-5), pages 33-35
   a. Student Instructions
   b. Litter Journal

3. For Students (Grades 1-5), pages 36-39
   a. Litter Flow Activity
   b. Reflection

4. For Students (Grades 3-5), pages 40-41
   a. Advocacy Letter Instructions
   b. Example
Every Litter Bit Counts
Teacher Lesson Plan

Overview
This unit provides students with an opportunity to think critically about waste generation and solutions. After observing and collecting litter in their neighborhoods, students will analyze their data and write an advocacy letter to a company, organization, or governing body of their choice.

History
The first synthetic plastic, called Bakelite, was invented in 1907 by Leo Baekeland. During World War II, synthetic plastics like Bakelite rose in popularity - there was a great need to preserve certain natural resources, so synthetic materials became their substitute. This caused plastic production in the United States to increase by 300% (Science History Institute, 2020).

Soon, plastic became the material of choice for everyday items, such as foodware and grocery bags. In the last 70 years, more than 8.3 billion metric tons of plastic has been produced globally (ABC News, 2019). In 2016, it was estimated that about 8 million metric tons of plastic enter the ocean each year (National Oceanic and Atmospheric Administration).

We can protect our oceans by doing our best to reduce how much plastic we use. When you have a choice, try to choose glass, metal, or paper instead!

Materials
This activity has two format options, depending upon student access to a smartphone. It is recommended that classes collectively complete one format, in order to make data comparisons easier.

Because students will be outside collecting litter, they should wear a mask and gloves (or some other form of hand protection such as a small plastic bag). It’s also recommended that the collection portion of the activity is completed with an adult or older family member.
Every Litter Bit Counts
Teacher Lesson Plan

Purpose & Learning Objectives

This unit provides students with an opportunity to think critically about waste generation and solutions. After observing and collecting litter in their neighborhoods, students will analyze their data and write an advocacy letter to a company, organization, or governing body of their choice.

Standards & Topics Connections

<table>
<thead>
<tr>
<th>One Planet Living Topic</th>
<th>Zero Waste, Products &amp; Materials (Consumption)</th>
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</thead>
<tbody>
<tr>
<td>Standards: NGSS, HSS, Common Core</td>
<td>Problem Exploration</td>
</tr>
<tr>
<td>NGSS: 3-5-ETS1-1, 3-5-ETS1-2, 5-PS1-3, 5-ESS3-1</td>
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<tr>
<td>HSS: Development of the Local Community: Change Over Time, Physical and Human Geographic Features That Define California</td>
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</tr>
<tr>
<td>Common Core: 3.MD.3, 3-5.RL.1, 3-SR1.2, 3-5.R1.8, 3-5.W1-5, 3-5.W7, 3-5.W8, 3-5.L1-3</td>
<td></td>
</tr>
</tbody>
</table>

Environmental Principles and Concepts (EP&Cs)
This lesson covers EP&C Principles 1, 2, 3, 4, and 5.

Adaptations & Extensions

Format 1 (with Litterati app): Students will need a smart phone with the Litterati app downloaded. The app can be found in the App Store or in Google Play. They will be required to create an account to access the app features. Students will also need a mask, gloves, and small bag to collect and dispose of litter.

Format 2 (without Litterati app): Students will use a pencil and paper to record the location, item type, and brand of the litter they find. They will also need a mask, gloves, and small bag to collect and dispose of litter.
Every Litter Bit Counts
Instructions for Teachers

Unit Overview

The suggested timeline for this unit is 2 weeks.

**WEEK 1**
Students will begin collecting litter on Monday and use the Litterati app OR the "RethinkWaste Litter Journal Worksheet" to document litter throughout the week. On Friday, students will complete the reflections worksheet to submit on Monday of Week 2.

**WEEK 2**
During Week 2, students will analyze their litter data and collectively decide as a class on one organization or governing body to write an advocacy letter to. Each student will write their own letter, and submit on Friday of Week 2.

Suggestion: Frame this unit as a friendly challenge!
Invite other classes at your school to participate and compete for which class can collect the most litter. Then compare data!

**FORMAT 1**
(Students use Litterati app): To conduct this unit using the Litterati app, download the app and create a challenge for your individual class. You will have the ability to limit the geographic area and time constraints of the challenge, as well as the "target" litter goal. You can find an instructional video on how to begin a Litterati challenge here.

**FORMAT 2**
(Students use "RethinkWaste Litter Journal Worksheet"): To complete this unit without the Litterati app, students can fill out the "Litter Journal Worksheet" while collecting litter. Teachers may want to ask students to keep track of how many pieces of litter they've collected if conducting this in a challenge format.
When people litter, their trash ends up in the environment and can harm habitats and animals. This week, we will be searching for litter and cleaning up the environment around us.

1. Before you go out to pick-up litter, make sure that you ask an adult for permission.
2. You must wear a mask and gloves or use grabbers when collecting litter. Do not touch litter with your bare hands!
3. Go with a buddy. Ask your older sibling, parent, or someone else in your household to join you.
4. One person (Teammate #1) will write down all of the information needed for the litter journal, while the second person (Teammate #2) will collect the litter. Feel free to take turns picking up litter and filling out the journal.

**Teammate Roles**

**TEAMMATE #1** Your job will be to fill out the litter journal.

Be sure to have a pencil or pen and a hard surface to write on (like a clipboard or book). As your partner picks-up litter, talk about what you are writing down in the field journal, and answer all the questions on the worksheet. Remember to draw a small picture of the item. If you aren’t sure what category an item belongs in, look at the word bank on the next page for some help. If you run out of room on the worksheet, use the back of the page or another sheet of notebook paper.

**TEAMMATE #2** Your job will be to pick-up the litter.

Before you think about picking up any litter, make sure you have something to protect your hands. You can wear gloves or even put a plastic bag over your hand. The best and safest option is using a trash grabber if you have one! Collect the litter in any kind of container or bag. If using a plastic bag, you should place the bag in your garbage cart once you’re done with it. If you use a reusable container, be sure to get an adult’s permission first and wash the container well after you’re done picking up litter.
Every Litter Bit Counts!
Student Worksheet

Key Terms

**Hard plastic**: Plastic that does not change shape when you try to crumple it in your hand, like water and soda bottles, yogurt containers, peanut butter jars, etc.

**Soft plastic**: Plastic that easily crumples into a ball, like wrappers, zip-top bags, plastic lids to snack containers, plastic bags, etc.

**Metals**: Cans for tuna, soup, beans, soda cans, aluminum foil, etc.

**Paper/Cardboard**: Boxes, junk mail, newspaper, wipes, tissues, napkins, etc.

**Glass**: Soda bottles, jars for pasta, jam, pickles, etc.

**Food Scraps**: Any uneaten food items

**Landfill/Other**: Plastic straws, plastic utensils, cigarette butts, masks, gloves, juice boxes, diapers, pet waste, etc.

Sample Litter Journal

<table>
<thead>
<tr>
<th>Date: Tuesday, November 3</th>
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</thead>
<tbody>
<tr>
<td><strong>Item &amp; Quantity</strong></td>
</tr>
<tr>
<td>Item: Headphones</td>
</tr>
<tr>
<td>Quantity: 3</td>
</tr>
</tbody>
</table>

Let’s Go!

Print the litter journal on the next page as many times as you need to document all the litter you find this week! If you don’t have a printer, use a piece of notebook paper and copy the table.
**Litter Journal**

Date: ____________

<table>
<thead>
<tr>
<th>Item &amp; Quantity</th>
<th>Drawing</th>
<th>Where</th>
<th>Category</th>
<th>Brand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Hard plastic, soft plastic, metals, paper/cardboard, glass, food scraps, other)</td>
<td></td>
</tr>
</tbody>
</table>

*Every Litter Bit Counts! Grades 1-5*
Litter Flow Activity
Grades 1-5

Let's spend a moment thinking about how litter gets into our environment, and where it might end up. Take a look at the image below. For each of the circled objects or places, trace with your finger or say out loud the path that the litter might have taken to get there, and then how the litter might end up in the creek.

Optional: Print this page and draw arrows to show the path of the litter.

Next: Once litter makes it to the ocean, does it ever really break down? Take a look at the image on the next page to find out.
Are you surprised by the amount of litter that you found outside? Plastic, paper, glass, and more are commonly found on our streets, roads, and even places in nature like beaches! According to an organization called Keep California Beautiful, we are never more than 12 steps away from a piece of litter when we are outside. That’s a lot of litter! It’s important for all of us to understand the negative impact litter has on our world. Let’s reflect on our findings and brainstorm solutions.
Imagine an empty plastic water bottle out on the side of a road. Because it is empty, the bottle is light enough for the wind to carry it away and into a storm drain. The storm drain empties into the bay, and the bay leads to the ocean. What might happen to the plastic water bottle once it is in the ocean?

Every Litter Bit Counts!
Reflection Questions, Grades 1-5

Answer the questions below in complete sentences:

1. What were the three most common items that you found during your litter hunt? Why do you think people litter these items so much?

2. Use the chart in the Litter Flow Activity to figure out how long it will take for these 3 items to break down.

3. How do you think so much litter gets into our environment? Hint: Refer to the diagram in the Litter Flow Activity for clues!

4. You looked for litter around your neighborhood, but litter is everywhere! Where did you find the most litter? Why do you think it was a common place for litter?

5. Imagine an empty plastic water bottle out on the side of a road. Because it is empty, the bottle is light enough for the wind to carry it away and into a storm drain. The storm drain empties into the bay, and the bay leads to the ocean. What might happen to the plastic water bottle once it is in the ocean?
6. Kelly just finished having a picnic at the park with his dad and sister. They're all packed up and ready to head home. Kelly notices that his little sister has left her plastic fruit snack wrapper in the grass. What should Kelly (nicely!) say to his sister?

7. By now, we know that the best way to prevent litter from entering the environment is to not litter in the first place. The next time you're in a natural space (a yard, a park, a beach, etc.), what are two new things that you can do to make sure that your waste does not end up in the environment? Hint: “Don’t litter” is not the answer!

8. Now, let’s take a good look at our data. Use the graph below to compare the 5 items that you found the most of. Write the name of each item below the x axis. Don’t forget to give your graph a title!
Advocacy Letter
Use Your Voice for Good!
Grades 3-5

One way that we can use our voices to speak up for positive change is by writing letters to companies, organizations, and governing bodies like city councils that make important decisions. This is called an advocacy letter. Advocacy letters are meant to share feedback and ideas that we might have for the letter reader.

Getting Started

1. Think about an item that we found a lot of during the week.
2. Then, think about who would be the best person or group who could help change that.
3. What do we want to ask them to do to prevent that item from being littered so often?

Look at your litter data - what item did you find the most of and who would you like to write to? When writing the letter, you can follow this format:

1. Greeting
2. Introduce yourself
3. Explain why you are writing and the item you found a lot of
4. Why is littering, especially of this item, bad for the environment?
5. What can the reader do to help?
6. Thank you
7. Signature
Dear Arrowhead,

My name is Xavi and I am a 3rd grade student in East Palo Alto, CA. This week, my classmates and I went around our neighborhoods and picked-up litter. I picked up 15 plastic water bottles with Arrowhead’s label on them. My class picked up a total of 52 plastic bottles.

When plastic bottles are thrown into the environment instead of into the recycling bin, they can make their way to the ocean and hurt animals like fish and birds. The animals think the plastic is food and can swallow bottle caps and get very sick.

I think it would be really great if Arrowhead shared how people can protect the environment. One example could be encouraging people to use reusable water bottles. Another example could be buying the big containers of water instead of the little ones. You can also remind people that they need to put the bottles in the recycling bin when they are done with them so they can be made into something new.

These would help us make less plastic waste and not hurt animals and the environment. I hope to hear from you soon!

Sincerely,
Xavi
# Litter Bingo

## Table of Contents

1st - 5th grade

1. Teacher Lesson Plan, pages 43-44  
   a. Overview  
   b. Purpose & Learning Objectives  
   c. Materials  
   d. Standards & Topic Connection  
   e. Adaptations & Extensions  

2. Student Worksheet, pages 45-48  
   a. Introduction  
   b. Instructions  
   c. Sorting Resources  
   d. Key Terms  
   e. Reflection  
   f. Bingo Card  
   g. Reflection Activity
Overview

Waste is generated at an increasing rate every year. On average, one person living in America (that includes us!) makes about 4.5 pounds of waste each day. Sadly, much of our waste is ending up in our environment whether or not it could be recycled or composted.

In this lesson, students will explore the kinds of litter can be found around their neighborhoods, and learn what bin those items belong in. We can all help reduce negative environmental impacts by putting waste in its proper place.

Purpose & Learning Objectives

This activity gives students the opportunity to practice observation skills by noting the different types of litter around their neighborhoods. They will be prompted to reflect on and discuss the 4R’s: Reduce, Reuse, Recycle, and Rot (Compost). Students will also engage in simple mathematics by calculating what portions, in fractions, of the litter they found could be recycled, composted, or landfilled.

Materials

Students need a notepad and pencil to record the litter they find and answer the reflection questions if they are unable to print the following worksheet. Internet access will be helpful if the student needs assistance sorting items into the correct bins.
If students are interested in being entered into a drawing for a prize, they can pick up all of the litter they come across. Be sure students wear gloves while picking up litter and wash their hands afterward. The student must live within the RethinkWaste service area (Burlingame to East Palo Alto) to enter the drawing.

To enter, they should email a picture or screenshot of the litter they collected along with the competed bingo card to tours@rethinkwaste.org. Please include the student’s name, the name of their parent or guardian, city, phone number, and email address so we can contact winners!
Litter Bingo
Student Worksheet

Introduction

Our everyday actions can have a big impact on the planet. One of those actions that has a negative impact is littering. When people litter, it gets into our streets and environment. Litter can then make its way into our bays and oceans, where it endangers animals.

Instructions

Go around your neighborhood to see what kinds of litter are on the ground. When you find an item that fits the description on the square, write or draw the item on the line. See the middle square for an example.

You can use the same item to fill in multiple squares, as long as the item correctly fits all of the descriptions. To win bingo, you must fill in all 5 squares in a row, column, or diagonally.

If you are interested in being entered in a drawing for a fabulous prize, pick up all of the litter you come across. Be sure to wear gloves while picking up litter and wash your hands afterward. To enter, email a picture or screenshot of the litter you collected and the completed bingo card to tours@rethinkwaste.org. Please include your name, the name of your parent or guardian, city, phone number, and email address so we can contact winners!

Sorting Resources

If you are having trouble figuring out what bin items belong in, use these resources to figure out the answer. Click on the links below:

WhatBin.com - Recology San Mateo County
RethinkWaste.org/game - RethinkWaste Interactive Carts Game
**Key Terms**

**SINGLE-USE**  An item that was made to be used only one time before being disposed of.

**SOFT PLASTIC**  Plastic that easily crumples up into a ball when you squeeze it, such as plastic bags.

**HARD PLASTIC**  Plastic that stays the same shape when you squeeze it, such as plastic water bottles.

**RECYCLABLE ITEMS**  Items that can be made into new items through the recycling process.

**COMPOSTABLE ITEMS**  Items that can break down naturally into nutrient rich soil, which is called compost.

**TRASH ITEMS**  Items that go straight to the landfill - be careful, because some of these items are too dangerous to put in the regular trash (like batteries!)

**Reflection Questions**

1) Of the total litter that you found, what fraction of it belongs in the trash? What about recycling? What about composting?

2) List 2 reasons why it’s important to keep litter out of our environment:

3) How can you help decrease the amount of litter in your neighborhood?
<table>
<thead>
<tr>
<th>B</th>
<th>I</th>
<th>N</th>
<th>G</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item that belongs in the trash</td>
<td>Metal that belongs in the recycling</td>
<td>Single-use item</td>
<td>Hard Plastic</td>
<td>Packaging</td>
</tr>
<tr>
<td>Item made from mixed materials</td>
<td>Soft plastic</td>
<td>Something you can reuse</td>
<td>Broken item</td>
<td>Item that does not belong in any of the three bins</td>
</tr>
<tr>
<td>Item made from recycled material</td>
<td>Paper</td>
<td>Single-use item</td>
<td>Item that belongs in the trash</td>
<td>Hard plastic</td>
</tr>
<tr>
<td>Broken item</td>
<td>Item that does not belong in any of the three bins</td>
<td>Soft plastic</td>
<td>Paper</td>
<td>Item that belongs in the recycling</td>
</tr>
</tbody>
</table>
Take out your crayons, colored pencils, and markers and get ready to express yourself!

First, think about what feelings you had while doing this lesson. Go ahead and write down all of the different feelings (mad, sad, happy, angry, worried, etc.) on the lines.

Pick a color for each of the feelings that you wrote down. Fill in the box next to the line with each of the different colors.

Color in the heart to show how this lesson made you feel. After you’re done show your drawing to someone and tell them about it.
# Eat Your Compost!

## Table of Contents

3rd - 8th Grade

1. Teacher Lesson Plan, pages 50-51
   a. Overview
   b. History
   c. Purpose & Learning Objectives
   d. Driving Question
   e. Standards & Topic Connections
   f. Adaptations & Extensions

2. Student Worksheet, pages 52-61
   a. Introduction
   b. Instructions
   c. Food Journal
   d. Writing Activity
   e. Food History
   f. Reflection
   g. Recipes
Eat Your Compost! Grades 3-8

Teacher Lesson Plan

Overview

According to the U.S. Environmental Protection Agency, Americans waste 80 BILLION pounds of food each year. That’s about 219 pounds of food waste per person annually, or a half pound of food waste per person every day! Unfortunately, most of this food waste is sent to landfills. Food is the single largest category of material taking up landfill space.

Even if we compost our food instead of sending it to the landfill, it’s still kind of a waste... just think of all the time, labor, energy, and resources that go into growing or making our food! You can get the most out of your groceries by getting creative and using all of your food and food scraps. As long as the food is still safe to eat (mold = toss), use it!

For this activity, students will be Compost Chefs. Students will think about or try preparing a recipe that uses a food in their household that otherwise would have been composted. Students will then research three of the ingredients used in the recipe, and write about their experience cooking and eating their dish. Time to put on an apron and embark on a food adventure!

History

Albert Howard is known as the father of modern composting for his work in the early 1900s experimenting with organic gardening and farming. However, people have been using organic material to improve their crops since farming began over 12,000 years ago (Carry On Composting). Tablets found from the Akkadians in Mesopotamia from around 2300 B.C. are believed to be the oldest written reference to compost (National Geographic, 2016). In the U.S., there are records as early as 1621 of the pilgrims being taught composting methods by Tisquantum (known commonly as Squanto), the Patuxet man who acted as their interpreter (Columbian College of Arts & Sciences, 2013).

In 1999, the first large-scale curbside composting collection in a U.S. city was started in San Francisco. This program was called “The Fantastic Three” and is still in use today (BioCycle Magazine, 2000). RethinkWaste, which was founded in 1982, uses a 3 bin system as well!
Purpose & Learning Objectives

Through this lesson, students will explore the topic of food waste and take action within their household to prevent it. Students will research potential recipes based on their available ingredients. Students will practice basic kitchen skills such as measuring, mixing, and baking. They will learn the history of three ingredients used in their dish. Finally, students will express their cooking and dining experiences by participating in a creative writing exercise.

Driving Question

How does food waste impact the environment and what actions can we take to prevent it at home?

Standards & Topics Connections

One Planet Living Topic

Zero Waste, Products & Materials (Consumption)

Standards: NGSS, HSS, Common Core

NGSS: 3-5-ETS1-1, 3-5-ETS1-2, 5-LS2-1, 5-ESS3-1
HSS: Development of the Local Community: Change Over Time; Physical and Human Geographic Features That Define California; Economics of the Local Region: Choices, Costs, and Human Capital
Common Core: 3-5.RI.7, 3-5.RI.8, 3-5.W.2, 3-5.W.4, 3-5.W.8, 3-5.L.1-3, 3-5.L.5

Environmental Principals & Concepts (EP&Cs)

This lesson covers EP&C Principles 1, 2, 3, and 5.

Adaptations & Extensions

Have students share photos and recipes with the class and build a whole-class cookbook!
Did you know that in the United States, almost 40% of all food is wasted!? Think about all of the energy it takes to get food onto your plate: the ingredients must be planted, grown, harvested, sorted, cleaned, processed, packaged, and transported to a distribution center or directly to a store (via ship, airplane, or vehicle), picked up by your family, and finally, cooked! After all of that, doesn’t it seem silly to let food get thrown away?

Think about why your family might unintentionally be wasting food - did you buy a pack of strawberries that was too big so they got moldy before you could eat them? Did you have an old can of soup that got lost in the cabinet and no one remembered?

We might not realize it, but another way we waste food is by composting it when we don’t need to. Composting is a good option to get rid of inedible food items, but a lot of the “food scraps” we put in the compost are still good to eat and can be used for other recipes. By paying attention to and thinking creatively about our food scraps, we can prevent more food from going to waste. In today’s lesson, you'll record the food waste you generate over 3-4 days and write a recipe and food review, using as many food scraps as possible.

Albert Howard is known as the father of modern composting for his work in the early 1900s experimenting with organic gardening and farming. However, people have been using organic material to improve their crops since farming began over 12,000 years ago. Tablets found from the Akkadians in Mesopotamia from around 2300 B.C. are believed to be the oldest written reference to compost. In the U.S., there are records as early as 1621 of the pilgrims being taught composting methods by Tisquantum (known commonly as Squanto), the Patuxet man who acted as their interpreter.

In 1999, the first large-scale curbside composting collection in a U.S. city was started in San Francisco. This program was called “The Fantastic Three” and is still in use today. RethinkWaste, which was founded in 1982, uses a 3 bin system as well! On average, Americans waste about a half pound of food per person per day.
Add to this list every time you observe food waste for 3 days. With permission, you can save some food scraps and store in a bag in your freezer for future use. Make sure you collect the food scraps before putting them in the compost bin!

After 3 days, examine the list of food scraps. Can you think of any meals or desserts that include the ingredients that you threw away?

Create (or look up) a tasty recipe using as many food scraps as possible! You will use this for a creative writing exercise next.

**Key Terms**

- **Compost**: A nutrient-rich fertilizer made from our food and yard scraps. Anything we put in our green compost bin becomes fertilizer.
- **Food scraps**: Any uneaten or inedible food. Our food scraps can go into the compost bin or be turned into a delicious meal!
- **Recipe**: A set of instructions for preparing a particular dish. It includes the list of ingredients and can also include measurements of ingredients.

**Instructions & Materials**

**Recommended**: If you decide to cook your food scraps recipe, you may need help using sharp kitchen tools and hot appliances. Hire an adult to be your assistant chef!

Observe any food (ex: extra bones, old bananas) that is thrown away and document it.

**Option 1**: If using a food scale, put waste from each meal in a bowl and weigh.

**Option 2**: If not using food scale, count the number of food items that are wasted (ex: 3 chicken bones, 2 old bananas).

- Add to this list every time you observe food waste for 3 days. With permission, you can save some food scraps and store in a bag in your freezer for future use. Make sure you collect the food scraps before putting them in the compost bin!
- After 3 days, examine the list of food scraps. Can you think of any meals or desserts that include the ingredients that you threw away?
- Create (or look up) a tasty recipe using as many food scraps as possible! You will use this for a creative writing exercise next.

**You will need...**

- Pen or pencil
- Notebook
- Basic cooking tools
- Food scale (optional)
- Bowl (optional)
## Food Scrap Journal

<table>
<thead>
<tr>
<th>Food Scrap</th>
<th>Tally or Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>
For this activity, we will be practicing using descriptive language as a food writer. Please read the article below for inspiration.

**Ulavacharu Tiffins**

At this vegetarian offshoot of Ulavacharu, a southern Indian restaurant in Sunnyvale, multicourse tiffins are the focus. Ulavacharu's style of cooking is distinctly home-style and hearty, from the silky and rich pongal rice ($6.99) to the thick and buttery mysore pak ($5), loaded with cardamom flavor and perfect with a cup of tea. When dining in, you eat lentils and rice, steamed rice cakes or roti from metal trays, with the other, varied elements of the meal — chutneys, spicy lentil stews and deeply flavored sauces — presented in small metal bowls. Here, every dish is presented as a consortium of flavors: set meals whose components are meant to complement each other.

The dosas are really some of the best in the Bay Area. The menu features 22 variations, with myriad fillings and batter mix-ins. The lacy onion rava dosas ($8.99) are made with a thin, unfermented batter of semolina, rice and wheat flours splashed over sliced red onions on a hot griddle. The dosa is then folded three times, much like Chinese jianbing, and served with a spicy and sour tomato and lentil sambar and coconut, tomato, peanut and ginger chutneys. I hear that these accoutrements are refilled generously when you’re dining in.

Sadly, takeout is less extravagant, with everything in plastic containers and foil and no refills. I ate my dosa on the trunk of my car, exposed to the same ambient seasoning that heightens every taco truck dinner. A bit janky, but it only got me more excited to come back later and finally have the tiffins the way they’re meant to be eaten.

— S.H.

This article was written by two food journalists from the San Francisco Chronicle: Soleil Ho and Carolyn Jung. Food journalists visit restaurants in their communities and write about their experiences. They often include details about what it felt like to dine at the restaurant, including comments about the decor, music, and staff, but they will always write in-depth descriptions of the dishes that they try.
For this assignment, use your imagination to write about your experience creating and eating your dish. For example, you could ask yourself what the strongest flavors were. Is it something that you would want to eat on a warm day, or a cold day? How did eating the dish make you feel? What smells, colors, and textures stood out in your dish?

Your article should include at least 1 paragraph about your cooking experience and at least 1 paragraph about your dining experience. Do your best to add adjectives and adverbs when writing your review of your compost meal. Bon appetit and happy writing!
Food History

Pick three ingredients that are important in your dish. Once you have decided the three ingredients you want to focus on, fill out the form below for each ingredient.

Ingredient #1: ____________________This ingredient comes from the country of ____________________, and was discovered _________ years ago by the ____________________ people. It is now grown in the countries of ____________________, ____________________, and ____________________. This ingredient is often used in these dishes: ____________________, ____________________, and ____________________.

*What country was your ingredient grown in? ____________________
How many miles is that from your city? __________
Can this ingredient be grown in California? (circle one) Yes No

Ingredient #2: ____________________This ingredient comes from the country of ____________________, and was discovered _________ years ago by the ____________________ people. It is now grown in the countries of ____________________, ____________________, and ____________________. This ingredient is often used in these dishes: ____________________, ____________________, and ____________________.

*What country did your ingredient come from? ____________________
How many miles is that from your city? __________
Can this ingredient be grown in California? (circle one) Yes No

Ingredient #3: ____________________This ingredient comes from the country of ____________________, and was discovered _________ years ago by the ____________________ people. It is now grown in the countries of: ____________________, ____________________, and ____________________. This ingredient is often used in these dishes: ____________________, ____________________, and ____________________.

*What country did your ingredient come from? ____________________
How many miles is that from your city? __________
Can this ingredient be grown in California? (circle one) Yes No

*Hint: If your ingredient is packaged, look on the package to see where it’s from.
Reflection Questions

In this lesson, we learned about how to creatively use our food waste to make new food.

Why is it important that we reduce food waste as much as possible? Besides the food itself, what else is wasted when we throw away uneaten food?

What is one benefit of trying to buy items that are grown or made closer to where we live?

What was the most surprising fact you learned about your ingredients?

In addition to being a Compost Chef and thinking about how to use food scraps before composting them, what is one more way your family can reduce food waste?
Sample Recipes

Food Scraps:
- 5 pieces of wilted kale
- 2 onion tops and bottoms
- 10 carrot peels
- 1 parmesan rind without wax, cheesecloth, or paper
- 6 chicken bones
- 1 sweet potato that is half squishy
- 2 orange peels

Possible Recipes:
Here are three examples of recipes Compost Chefs could make using some of the food scraps listed above. Remember your recipe doesn't have to include all of your food scraps, but should include at least 2 different food scraps.

**Compost Casserole**
Inspired by: https://www.thekitchn.com/pasta-casserole-how-to-make-110912

Food Scraps:
- 5 pieces of wilted kale
- 10 carrot peels
- 1 parmesan rind
- 1 sweet potato that is half squishy. Cut off the squishy part.

Additional Ingredients:
- 1 lb of pasta
- Fresh cut parsley
- 1 cup of shredded cheese

Steps:
1. Preheat the oven to 350°F
2. Cook the pasta according to the instructions (boil the pasta for 10 minutes)
3. Grease a 9x13-inch dish with butter
4. Cut up the vegetables and herbs: the kale, carrot peels, half of the sweet potato, and the parsley
5. Grate the parmesan rind
6. Add the cheese, vegetables, and herbs to the pasta
7. Put the mixture into the greased 9x13-inch dish
8. Bake the casserole in a 350°F oven
Eat Your Compost!
Student Worksheet

Food Scrap Stock:
Inspired by: https://www.allrecipes.com/recipe/12982/basic-vegetable-stock/

Food Scraps:
• 5 pieces of wilted kale
• 2 onion tops and bottoms
• 10 carrot peels
• 1 parmesan rind
• 6 chicken bones
• 1 sweet potato that is half squishy. Cut off the squishy part.
• 2 orange peels

Additional Ingredients:
• 1 tablespoon of olive oil
• ¼ cup of fresh thyme
• 8 clove of garlic
• 1 teaspoon of salt
• 2 quarts of water

Steps:
1. Chop vegetables (kale, onion, carrots, sweet potato, garlic) into 1-inch chunks
2. Heat olive in a big pot then add kale, onion, carrots, sweet potato, garlic, thyme
3. Add parmesan rind, chicken bones, orange peels, salt and water to the pot, and bring it to a boil.
4. After reaching a boil, lower the heat to simmer (make sure the pot is not covered) for 30 minutes.
5. Strain the mixtures, so you separate the chunks of vegetables, fruit, cheese, and bones from the liquid.
6. Discard the leftover vegetables, fruit, cheese, and bones in the compost
7. Use the liquid stock to make more dishes like soups!
Candied Orange Peels
Inspired By: https://altonbrown.com/candied-orange-peel-recipe/

Food Scraps:
- Orange peels of 4 oranges
- 2 Cup of sugar
- 4 Cups of water

Steps:
1. Scrape the pith (or white stuff) of the orange peels off as much as possible. The more you remove, the less bitter the candies will be!
2. Add the peels and 2 cups of water to a deep saucepan and bring to a boil.
3. Reduce the heat down to let the peels simmer for 15 minutes.
4. Drain the pan and add the sugar and the remaining cup of water to the peels.
5. Bring to a boil over medium heat, continuing to stir the peels until the sugar dissolves.
6. Once the syrup boils, drop the heat down and let the peels simmer for about an hour. During this time, the sugar is being absorbed by the peels, so it’s important to take your time on this step!
7. Remove the peels from the heat and place on a cooling rack overnight. Save the remaining syrup in the pan and use it as a sweetener in tea or juice!
Alex Wastes Her Lunch

Table of Contents

3rd - 5th Grade

1. Teacher Pre-Tour Lesson Plan, pages 63-66
   a. Overview
   b. History
   c. Purpose & Learning Objectives
   d. Driving Question
   e. Standards & Topic Connections

2. Student Pre-Tour Lesson Plan, pages 67-69

3. 3rd Grade Pre-Tour Worksheet, page 70

4. 4th Grade Pre-Tour Worksheet, page 71

5. 5th Grade Pre-Tour Worksheet, page 72
Overview

In 2017, Americans discarded 267.8 MILLION TONS of waste (EPA, 2020). That’s about 4.51 pounds per person, every single day of the year! Of that waste, more than 50% was sent to the landfill, where it will sit for years and years.

We can all work to decrease that number! Small changes in our everyday lives can have a big impact on our planet. In this lesson, we’ll follow Alex’s journey to understand why we sort our waste using math, science, and our thinking skills. Alex questions if sorting her waste into compost, recycling, and garbage even makes a difference at all. Let’s see what you think!

History

Albert Howard is known as the father of modern composting for his work in the early 1900s experimenting with organic gardening and farming. However, people have been using organic material to improve their crops since farming began over 12,000 years ago (Carry On Composting). Tablets found from the Akkadians in Mesopotamia from around 2300 B.C. are believed to be the oldest written reference to compost (National Geographic, 2016). In the U.S., there are records as early as 1621 of the pilgrims being taught composting methods by Tisquantum (known commonly as Squanto), the Patuxet man who acted as their interpreter (Columbian College of Arts & Sciences, 2013).

In 1999, the first large-scale curbside composting collection in a U.S. city was started in San Francisco. This program was called “The Fantastic Three” and is still in use today (BioCycle Magazine, 2000). RethinkWaste, which was founded in 1982, uses a 3 bin system as well!
Purpose & Learning Objectives

This lesson seeks to make a mental connection between students and the waste that they produce. Students utilize the scientific method to prove or disprove a given hypothesis. Students will analyze data, generate graphs, and think critically to interpret their findings.

In conjunction with a field trip to the Shoreway Environmental Center, this activity serves as a pre-lesson to help facilitate discussions about waste. While at the facility, students will better understand the magnitude of our waste. This lesson will aid in comprehending our role in waste generation and resource conservation as consumers.

Driving Question

How do Alex’s actions impact the lifespan of the landfill? How can individuals protect the environment at mealtime?

Standards & Topics Connections

One Planet Living Topic
Zero Waste, Products & Materials (Consumption)

Standards: NGSS, HSS, Common Core
NGSS: 3-5-ETS1-1, 3-5-ETS1-2
HSS: Development of the Local Community: Change Over Time, Physical and Human Geographic Features That Define California, Economics of the Local Region: Choices, Costs, and Human Capital
Common Core: 3.MD.B.3, 4.MD.A.1,

Environmental Principals & Concepts (EP&Cs)
This lesson covers EP&C Principles 1, 2, 3, and 5.

Adaptations & Extensions

Collect data from the whole class and see how much mealtime waste we can keep out of the landfill!
Alex Wastes Her Lunch
Pre-Tour Teacher Lesson Plan

**Lunchtime for Alex**

Alex is your typical elementary school student. This morning, she wakes up late. Alex's dad stops her just as she’s headed out the door, making sure Alex has her lunchbox in hand.

Alex makes it to school and is focusing hard on her classwork throughout the day. Before she knows it, the bell rings and it’s time to head to lunch! She grabs her lunchbox and plops down at a bench with her friends. Alex opens her lunch box and... YUCK! A tuna fish sandwich? She throws away the sandwich and its plastic wrap.

Instead, Alex opens up her granola bar and munches away. Then she eats her yogurt with a plastic spoon. Alex’s next snack is a banana, but halfway through eating the banana, Alex decides she doesn’t want it any more and throws it away, too. She ends her lunch with a box of apple juice to wash it all down. The recess bell chimes, and Alex is excited to go play. Although she has compost, recycling, and trash bins at school, Alex is too busy rushing off to recess and decides to throw everything into the trash bin every day.

By the end of lunch, Alex has thrown away her tuna sandwich, plastic wrap, a granola bar wrapper, a yogurt cup, plastic spoon, half of a banana, and a juice box.

Let’s take a look at Alex’s lunch waste from this week.

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuna sandwich</td>
<td>Paper lunch tray</td>
<td>Apple core</td>
<td>Paper lunch tray</td>
<td>STUDENTS WILL FILL IN THEIR OWN DATA HERE</td>
</tr>
<tr>
<td>Plastic wrap</td>
<td>Burrito wrapper</td>
<td>Plastic wrap for the sandwich</td>
<td>Hotdog inside the corndog</td>
<td></td>
</tr>
<tr>
<td>Granola bar wrapper</td>
<td>A few bites of burrito</td>
<td>String cheese wrapper</td>
<td>Corndog stick</td>
<td></td>
</tr>
<tr>
<td>Yogurt cup</td>
<td>Milk carton</td>
<td>Half of the string cheese</td>
<td>Mustard packets</td>
<td></td>
</tr>
<tr>
<td>Plastic spoon</td>
<td>Plastic fruit cup</td>
<td>Plastic water bottle</td>
<td>Milk carton</td>
<td></td>
</tr>
<tr>
<td>Half a banana</td>
<td>Plastic spoon</td>
<td></td>
<td>Baby carrots</td>
<td></td>
</tr>
<tr>
<td>Empty juice box</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Each of the items in Alex's lunch weigh a certain amount of ounces:

- Soft plastic & wrappers: 1/5 oz
- Fruit: 2/5 oz
- Food: 1 2/5 oz (or 7/5 oz)
- Hard plastic: 3/5 oz
- Food soiled paper: 2/5 oz
- Metals: 3/5 oz
- Milk carton: 2/5 oz

What happens to Alex's waste once she throws it away? To answer this question, let's use the plastic water bottle Alex threw away on Tuesday as an example.

The trash on the school campus is taken out to the dumpsters by their custodian, Mr. Leo. Garbage from the dumpsters is collected every Thursday by the Recology garbage trucks and dropped off at the Shoreway Environmental Center, in an area called the Transfer Station. The water bottle will land in a big pile of garbage, adding to the 1.7 million pounds of trash collected here every day.

Then, another truck brings the garbage to the landfill. A landfill is a large area of earth that has been carved out in order to fill with garbage. Where Alex lives, there are 35 semi trucks full of trash adding to the landfill every day, and it's filling up quickly. Alex's plastic bottle lands in the giant pile, and is covered up with dirt. Because it's made of hard plastic, it will be at least 450 years before the water bottle breaks down, all while adding chemicals to the soil and water around the landfill.

One day, Alex's class takes a field trip to the Shoreway Environmental Center and she sees all the garbage that is sent to the landfill every day. She remembers all of the waste she threw in the garbage and wants to do something to help. Alex predicts that sorting her trash at lunch will reduce the amount of waste going to the landfill. She promises herself that when she gets back to school, she will stop throwing everything in the garbage and start sorting in the 3 bins: compost, recycling, and garbage.
Alex Wastes Her Lunch
Student Worksheet, Grades 3-5

Lunchtime for Alex

Alex is your typical elementary school student. This morning, she wakes up late. Alex’s dad stops her just as she’s headed out the door, making sure Alex has her lunchbox in hand.

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Instead, Alex opens up her granola bar and munches away. Then she eats her yogurt with a plastic spoon. Alex’s next snack is a banana, but halfway through eating the banana, Alex decides she doesn’t want it any more and throws it away, too. She ends her lunch with a box of apple juice to wash it all down. The recess bell chimes, and Alex is excited to go play. Although she has compost, recycling, and trash bins at school, Alex is too busy rushing off to recess and decides to throw everything into the trash bin every day.

By the end of lunch, Alex has thrown away her tuna sandwich, plastic wrap, a granola bar wrapper, a yogurt cup, plastic spoon, half of a banana, and a juice box.

Let’s take a look at Alex’s lunch waste from this week. Fill out Friday with your own lunch waste.

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
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<td>• Paper lunch tray</td>
</tr>
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<td>• Burrito wrapper</td>
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<td>• Hotdog inside the corndog</td>
</tr>
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<td>• A few bites of burrito</td>
<td>• String cheese wrapper</td>
<td>• Corndog stick</td>
<td>• Corndog stick</td>
</tr>
<tr>
<td>• Yogurt cup</td>
<td>• Milk carton</td>
<td>• Half of the string cheese</td>
<td>• Mustard packets</td>
<td>• Mustard packets</td>
</tr>
<tr>
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<td>• Plastic fruit cup</td>
<td>• Plastic water bottle</td>
<td>• Baby carrots</td>
<td>• Baby carrots</td>
</tr>
<tr>
<td>• Half a banana</td>
<td>• Plastic spoon</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Empty juice box</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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- Food: 1 2/5 oz (or 7/5 oz)
- Hard plastic: 3/5 oz
- Food soiled paper: 2/5 oz
- Metals: 3/5 oz
- Milk carton: 2/5 oz

What happens to Alex’s waste once she throws it away? To answer this question, let’s use the plastic water bottle Alex threw away on Tuesday as an example.

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One day, Alex’s class takes a field trip to the Shoreway Environmental Center and she sees all the garbage that is sent to the landfill every day. She remembers all of the waste she threw in the garbage and wants to do something to help. Alex predicts that sorting her trash at lunch will reduce the amount of waste going to the landfill. She promises herself that when she gets back to school, she will stop throwing everything in the garbage and start sorting in the 3 bins: compost, recycling, and garbage.
Albert Howard is known as the father of modern composting for his work in the early 1900s experimenting with organic gardening and farming. However, people have been using organic material to improve their crops since farming began over 12,000 years ago (Carry On Composting). Tablets found from the Akkadians in Mesopotamia from around 2300 B.C. are believed to be the oldest written reference to compost (National Geographic, 2016). In the U.S., there are records as early as 1621 of the pilgrims being taught composting methods by Tisquantum (known commonly as Squanto), the Patuxet man who acted as their interpreter (Columbian College of Arts & Sciences, 2013).

In 1999, the first large-scale curbside composting collection in a U.S. city was started in San Francisco. This program was called “The Fantastic Three” and is still in use today (BioCycle Magazine, 2000). RethinkWaste, which was founded in 1982, uses a 3 bin system as well!
In looking at the entire graph, on which day was the most waste generated? Order the days from lowest to highest.

Identify the hypothesis Alex determines in the story.

What else, besides sorting, could Alex do to reduce her waste at lunch?

How does the waste Alex throws away affect the size of the landfill?
Data Analysis

Complete the following bar graph using the table from Alex's lunch.

<table>
<thead>
<tr>
<th>Day of the Week</th>
<th>Number of Items Thrown in the Garbage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td></td>
</tr>
</tbody>
</table>

On which day of the week was the most waste generated? What fraction of the total waste of the week was generated on this day?

Identify Alex’s hypothesis. Do you think this hypothesis will be proven true? Why or why not?

Besides sorting, what else could Alex do to reduce her waste at lunch?
Data Analysis

Use the table from Alex’s story to complete the following bar graph. Identify the X and Y axis, and plot each day of the week.

<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Waste</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Waste</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Waste</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Waste</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Waste</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

On which day of the week was the most waste generated?

What fraction of the total waste of the week was generated on this day?

Identify the hypothesis of Alex’s story. Do you think this hypothesis will be proven true? Why or why not?

What could Alex do to pack a zero waste lunch?
Post-Tour & Post-Presentation Wrap-Up

Table of Contents

K - 5th grade
1. Teacher Lesson Plan, page 74
   a. Overview
   b. Purpose & Learning Objectives
2. Student Worksheet, pages 75-78
   a. Part I: Reflection
   b. Part II: Nature Walk
Post-Tour & Presentation Wrap-Up
Teacher Lesson Plan

Grades K - 5
Time: 45 - 90 minutes

Overview

In 2018 alone, the RethinkWaste service area sent 181,189 tons of waste to the landfill (RethinkWaste, 2019). Over the course of the tour and/or presentation, students have come to understand why it is important to decrease that amount. By working together and making small but significant changes, we can reduce it!

Students will have an opportunity to reflect on what they've learned, what they will do differently, and why it matters.

This lesson concludes in an introspective walk, where students will use their senses to appreciate nature.

Purpose & Learning Objectives

This activity allows students to reflect on what they have learned about waste and how they can change their habits. Students will internalize the lessons and enjoy nature by taking a mindful walk.

Driving Question

How does our waste impact the environment? What can we do to decrease our impact?
Part I: Reflection

Together, we have investigated what waste is, where it goes, and how we can reduce what goes into the landfill. We know how to sort properly, what happens to the waste we put into the 3 bins, and why it is so important (and fun!) to try repairing and reusing things before throwing them away.

Reflect on the tour or presentation you participated in, and answer the following discussion questions:

1. What is something you learned that surprised you?

2. Describe how you felt about waste before the tour or presentation and compare it to how you feel now. Are you more confident about what goes into the different bins?

3. Why do you think it is important that we learn about waste?
It is important to connect to our environment, so we can better understand why we need to protect it. Let’s stretch our muscles and enjoy the great outdoors! With your guardian’s permission, go for a walk around your neighborhood (or another natural setting) with a family member or friend.

Pay close attention to your five senses while out and about: sight, smell, hearing, touch, and taste. Sometimes we forget to appreciate the small, everyday things because we are so used to having them around - like the sound of birds chirping or the nice cool feeling of the breeze on your skin!

1. What is one interesting thing that you saw during your walk? How did you feel when you saw it?

4. Where does waste come from, and why do we have so much of it?

5. Our challenge to you: Think about the waste you generate at home. What is one change you or your family is going to make next week to reduce the amount of waste being thrown out?

Part II: Nature Walk
2. What is one quiet thing you heard during your walk? Where was the sound coming from?

3. Gently touch a safe item during your walk, like grass, a flower petal, or tree bark. Circle the descriptors: Was the item hard / soft / furry / prickly / rough / smooth? Did it make you feel happy / sad / excited / nervous / scared? Write your other feelings below!

4. Describe a smell that you encountered during your walk. What was your reaction to the smell?

5. Our final sense: taste! What was the first thing you ate when you got home from your walk? What did you enjoy about eating this item?
Use the blank space below to draw one thing that made you happy during your walk. Thank you for working hard to keep Earth beautiful!
Environmental Justice Book Lessons

Table of Contents
1. Rainbow Weaver, page 80
2. Si Se Puede, page 81
3. Where’s Rodney?, page 82
Student Discussion Questions

After seeing the cover and hearing the title, what do you think the book is about?

1. How does the story of Ixchel make you feel? Describe.
2. Why does Ixchel want to help her mother weave?
3. How does Ixchel find a way to weave without thread? What life skills does she use?
4. Do you like to help your family with their work? How do you help at home?
5. Why are there plastic bags littered around the milpa (field)?
6. Do you see plastic bags or other litter around your neighborhood? Describe at least one thing everyone can do to help prevent plastic bags from ending up where they do not belong.
7. How does collecting the plastic bags have more than one positive effect on Ixchel and her community?
8. Which of the 4R’s does Ixchel use? Reduce, reuse, recycle, or rot?
9. If you were Ixchel, what material would you try to weave if you could not have thread?
10. Think of a time when you were struggling to make something, and you found a solution or alternative like Ixchel. Describe what you did (or could have done).

Virtual Book Read Out-Loud:

English: [Link]
Spanish: [Link]

Pre-Reading Question
After seeing the cover and hearing the title, what do you think the book is about?

Post-Reading Question

1. How does the story of Ixchel make you feel? Describe.
2. Why does Ixchel want to help her mother weave?
3. How does Ixchel find a way to weave without thread? What life skills does she use?
4. Do you like to help your family with their work? How do you help at home?
5. Why are there plastic bags littered around the milpa (field)?
6. Do you see plastic bags or other litter around your neighborhood? Describe at least one thing everyone can do to help prevent plastic bags from ending up where they do not belong.
7. How does collecting the plastic bags have more than one positive effect on Ixchel and her community?
8. Which of the 4R’s does Ixchel use? Reduce, reuse, recycle, or rot?
9. If you were Ixchel, what material would you try to weave if you could not have thread?
10. Think of a time when you were struggling to make something, and you found a solution or alternative like Ixchel. Describe what you did (or could have done).
¡Sí, Se Puede! Yes, We Can!
By Diana Cohn

Student Discussion Questions

**Virtual Book Read Out-Loud:**
www.youtube.com/watch?v=P3PSaUzacNU

**Pre-Reading Question**

After seeing the cover and hearing the title, what do you think the book is about?

**Post-Reading Question**

1. How does the story of Carlitos and his mamá make you feel? Describe.

2. Why does Carlitos' mamá have to work at night? Why does she have so many jobs?

3. Picture someone you know that has more than one job. Why do you think some people have to work multiple jobs while others have one job or no job?

4. Do you think that is fair? Explain.

5. Had you heard about strikes before reading this book?

6. What is a strike? Why are they important? Describe.

7. Why is it important for Carlitos' mamá and the janitors to strike?

8. Why do you think the author tells us where Carlitos' classmates' families are from?

9. Do you think about the people who clean your school or home?

10. Do you remember to say "thank you" whenever you see them? What is another way you can show you appreciate their hard work?

11. Think of a time when you experienced or saw something unfair and you wanted to make a change. What is a strategy you used (or could have used) to take action?
Virtual Book Read Out-Loud:

www.youtube.com/watch?v=3BS1PRM-Tx8d

Pre-Reading Question

After seeing the cover and hearing the title, what do you think the book is about?

Post-Reading Question

1. How does the story about Rodney make your feel? Describe.
2. What are some things you like about the outdoors?
3. What do you think we can learn from being outdoors?
4. Why does Rodney not pay attention when Ms. Garcia is asking him questions?
5. Why does Rodney’s mom not want him to play at the park with the yellow grass?
6. Do you like spending time outside by where you live? Why or why not?
7. Why do you think Ms. Garcia takes the class on a field trip to the big park?
8. Why do you think the school bus had to go so far from Rodney’s school to get to the big park?
9. Why do you think Rodney had not visited the big park before?
10. What are the differences between the park with the yellow grass and the big park?
11. Why did Rodney say the big park was “majestic” at the end?