



# RRR You Ready?



**NYC Recycles**

NYC Department of Sanitation Bureau of Waste Prevention, Reuse and Recycling  
[nyc.gov/wasteless/schools](http://nyc.gov/wasteless/schools)

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Info for Schools



# The NYC K-12 School RRResource Guide

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## Glossary

## The NYC K-12 School RRResource Guide

# Why an RRResource Guide for NYC Schools

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Everyone creates waste. But there are many ways to reduce this amount of waste. Each one of us can make responsible and creative decisions that have a more positive impact on the environment. We can choose to buy products with less packaging, reuse products, and recycle them instead of throwing them away. We can **Reduce, Reuse, and Recycle**.

Reduce, Reuse, and Recycle (RRR) are the key elements of waste reduction and disposal. By using these tools, we can improve environmental sustainability.

While there may be other resources available to teach students about solid waste and how it impacts our lives, none are geared so specially to schools in New York City. This RRResource Guide is created **BY** New York City **FOR** New York City and we are making it widely available to all who can put it to good use.

Our original RRResource Guide, released in 2001, contained Activities geared to grades K-5. This updated version includes adaptations for Beginner, Intermediate, and Advanced levels and is designed to meet NYC's current K-12 Learning Standards.

Whether you are a teacher, a parent, a community leader, or a student mentor, you will find hands-on, project-based Activities in this Guide that connect real life decisions to NYC's curriculum requirements.

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## RRResource Guide Contents

The **NYC K-12 School RRResource Guide: RRR You Ready?** is a flexible kit designed to help you implement your own program.

In **Chapters One through Five**, you'll find background information to help you better understand each topic, followed by step-by-step Activities that support the chapter's topic. The chapters cover the following themes:

**Chapter One:** What Is Waste?

**Chapter Two:** What Happens to Waste?

**Chapter Three:** What Is Reduce, Reuse, and Recycle (RRR)?

**Chapter Four:** Be a TrashMaster!

**Chapter Five:** All About Composting

**Chapter Six: Supplemental Learning Opportunities** provides information on programs to help you take recycling, waste prevention, and composting to the next level. Also included are ideas for special school events, as well as various Home Sheets that help students involve their families in exploring why and how to Reduce, Reuse, and Recycle.

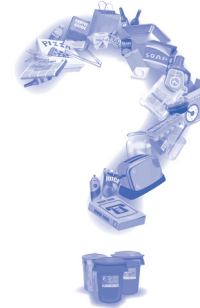
**Glossary** provides definitions of key vocabulary words identified in Chapters One through Five.

## Topic Summary

The **RRResource Guide** contains the following Activities and Supplemental Learning Opportunities:

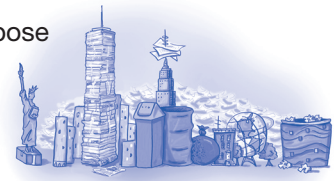
### Chapter One: What Is Waste?

- Activity 1: Understanding What We Throw Away
- Activity 2: Discovering How Much Waste We Produce Each Day
- Activity 3: Understanding the Types of Materials We Throw Away
- Activity 4: Exploring Waste from Individual Lunches
- Activity 5: Safe and Smart Ways to Handle Harmful Household Waste
- Activity 6: Life Cycles of Products



### Chapter Two: What Happens to Waste?

- Activity 1: Knowing Where Garbage Goes After It's Thrown Away
- Activity 2: Making a Modern Sanitary Landfill
- Activity 3: Where Does School Trash Go?
- Activity 4: Exploring How Long It Takes for Basic Materials to Decompose
- Activity 5: Banana Breakdown
- Activity 6: Litter in a River Experiment
- Activity 7: Studying Litter in the School Community



### Chapter Three: What Is Reduce, Reuse, and Recycle (RRR)?

- Activity 1: Recycling in the Classroom
- Activity 2: Recycling Is Only Part of the Solution
- Activity 3: Aluminum Cans: Full Circle
- Activity 4: Understanding When to Reduce, Reuse, or Recycle
- Activity 5: Reading About the Environmental Effects of Our Everyday Decisions
- Activity 6: Taking a Closer Look at Packaging
- Activity 7: Design Your Own Package
- Activity 8: The Story of the Mystery Package
- Activity 9: Teach NYC How to RRR
- Activity 10: RRR Posters
- Activity 11: RRR Jeopardy
- Activity 12: Developing an RRR Presence



### Chapter Four: Be a TrashMaster!

- Activity 1: Translating Learning into Personal Commitment
- Activity 2: Getting Your School to Be a Super Recycler
- Activity 3: Reduce Paper Use

- Activity 4: Overcoming RRR Obstacles
- Activity 5: Options for Reuse
- Activity 6: Make Your Own Paper
- Activity 7: Litter Awareness Campaign
- Activity 8: TrashMaster Acrostic
- Activity 9: Trash or Treasure
- Activity 10: An RRR Map of Your Neighborhood



## Chapter Five: All About Composting

- Activity 1: What's in My Waste?
- Activity 2: Beginning to Understand that Nature Recycles
- Activity 3: Finding Evidence of Composting In Nature
- Activity 4: Learning How to Compost Outdoors
- Activity 5: Decomposer Hunt
- Activity 6: Worm Facts
- Activity 7: Worm Bin Check
- Activity 8: Planting with Compost
- Activity 9: Compost Balancing Act
- Activity 10: Tracking Decomposition in an Outdoor Pile



## Chapter Six: Supplemental Learning Opportunities

- Golden Apple Awards for Schools in NYC
- Materials for the Arts
- NYC Compost Project
- Creating a TrashMasters Museum
- Creating a TrashMasters Street Fair
- Home Sheet #1: Talking Trash at Home
- Home Sheet #2: Supermarket Shopping Scavenger Hunt
- Home Sheet #3: Keep On Unwrapping
- Home Sheet #4: From Trash to Cash
- Home Sheet #5: Toys Through the Generations
- Home Sheet #6: Trash and RRR at Home
- Home Sheet #7: Brainstorm and Bag It!
- Home Sheet #8: Fast Food Throwaways
- Home Sheet #9: Family RRR Contest
- Home Sheet #10: How I Can Be a TrashMaster at Home





# Handout Summary

The **RRResource Guide** contains the following Handouts and Worksheets:

<b>Chapter 1</b>	Understanding What We Throw Away Handout . . . . .	5
	Weight Recording Handout . . . . .	9
	Types of Materials Handout . . . . .	15
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	School Recycling Program Setup Handout . . . . .	9
	School Recycling Activities Handout . . . . .	11
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<b>Chapter 5</b>	What's in My Waste? Worksheet . . . . .	7
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What to Compost Handout . . . . .	77	

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# How to Incorporate Activities

**RRR You Ready?** is a modular program designed to suit your class and your other curricula:

## A Theme-Based, Month-Long Program

You can use all of the Activities in sequence during a one-month period. By implementing a theme-based program toward the beginning of the school year, your students' enthusiasm can inspire real change, such as recycling in the classroom and the school throughout the year.

## A Year-Long Exploration

You can also present the Chapters and Activities throughout the full school year, providing the opportunity for in-depth exploration of each topic.

## An Ongoing Effort with Real RRRewards

**RRR You Ready?** helps students understand their role in reducing, reusing, and recycling. Implementing the program and seeing their work in action in their own school can be one of the best ways for them to learn.

Having a successful recycling program in your school can help make it a cleaner and safer environment. You can prepare your students to do their part by helping them fully understand the importance of reducing, reusing, and recycling.

This RRRResource Guide is designed to help you do just that. In addition to completing the various Activities presented, make sure to take advantage of the programs offered by the NYC Compost Project and Materials for the Arts. And don't forget to enter our Golden Apple Awards so that we can reward you for your RRR efforts!

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# Learning Standards

The **NYC K-12 School RRRResource Guide** encompasses NYC's Learning Standards. At the end of Chapters One through Five, you will find a list of Learning Standards for each Activity described.

Every Activity includes the Learning Standards that are met in the areas of:

- English Language Arts & Literacy
- Applied Learning
- NYC Science Scope & Sequence

Some Activities also meet additional Learning Standards, including:

- Mathematics
- Social Studies

Depending on the specifics of your own class discussions and student projects, additional Learning Standards may be fulfilled as you lead each Activity.

# Learning Standards Table

		NYS Common Core Learning Standards for English Language Arts & Literacy				NYS Learning Standards for Mathematics	NYS Learning Standards for Social Studies	Applied Learning Performance Standards	New York City Science Scope & Sequence
		College and Career Readiness Anchor Standards for Reading	College and Career Readiness Anchor Standards for Writing	College and Career Readiness Anchor Standards for Speaking and Listening	College and Career Readiness Anchor Standards for Language				
<b>Chapter 1</b>	Activity 1	x	x	x	x			x	x
	Activity 2		x	x	x	x		x	x
	Activity 3	x	x	x	x			x	x
	Activity 4	x	x	x	x	x		x	x
	Activity 5	x	x	x	x			x	x
<b>Chapter 2</b>	Activity 1	x	x	x	x			x	x
	Activity 2		x	x	x			x	x
	Activity 3	x	x	x	x			x	x
	Activity 4	x	x	x	x			x	x
	Activity 5		x	x	x			x	x
	Activity 6	x	x	x	x			x	x
	Activity 7		x	x	x			x	x
<b>Chapter 3</b>	Activity 1	x		x	x			x	x
	Activity 2		x	x	x			x	x
	Activity 3		x	x	x			x	x
	Activity 4		x	x	x			x	x
	Activity 5	x	x	x	x			x	x
	Activity 6		x	x	x			x	x
	Activity 7		x	x	x			x	x
	Activity 8		x	x	x			x	x
	Activity 9		x	x	x			x	x
	Activity 10			x	x			x	x
	Activity 11		x	x	x			x	x
	Activity 12		x	x	x			x	x

# Learning Standards Table

		NYS Common Core Learning Standards for English Language Arts & Literacy				NYS Learning Standards for Mathematics	NYS Learning Standards for Social Studies	Applied Learning Performance Standards	New York City Science Scope & Sequence
		College and Career Readiness Anchor Standards for Reading	College and Career Readiness Anchor Standards for Writing	College and Career Readiness Anchor Standards for Speaking and Listening	College and Career Readiness Anchor Standards for Language				
<b>Chapter 4</b>	Activity 1		x	x	x		x	x	x
	Activity 2	x	x	x	x			x	x
	Activity 3			x	x	x		x	x
	Activity 4	x	x	x	x			x	x
	Activity 5		x	x	x	x		x	x
	Activity 6		x	x	x			x	x
	Activity 7		x	x	x			x	x
	Activity 8		x	x	x			x	x
	Activity 9		x	x	x			x	x
	Activity 10		x	x	x			x	x
<b>Chapter 5</b>	Activity 1		x	x	x	x		x	x
	Activity 2	x	x	x	x			x	x
	Activity 3		x	x	x			x	x
	Activity 4	x	x	x				x	x
	Activity 5	x	x	x				x	x
	Activity 6	x	x	x				x	x
	Activity 7	x	x	x				x	x
	Activity 8	x	x	x	x			x	x
	Activity 9	x	x	x	x			x	x
	Activity 10		x	x	x	x		x	x

## Give Us Your Feedback

Help us improve this RRRResource Guide! We want to know how you are teaching our youngest citizens to reduce NYC's waste.

When you try the Activities in this Guide, let us know what works and what doesn't. What books, videos, and websites do you find useful? Tell us how YOU adapted these Activities for different levels, or suggest new Activities. Please be as specific and detailed as possible.

Use our online contact form at [nyc.gov/wasteless/contact](https://nyc.gov/wasteless/contact).

To share your own RRR and composting Activities, make sure to include the following info:

1. **Chapter** where Activity should go.
2. **Title** for Activity.
3. **Time** needed for the Activity.
4. **Subjects** covered by the Activity.
5. **Vocabulary** words used as part of the Activity. Note, if you are including new vocabulary words that are not already included in our Glossary, please provide definitions of these new words.
6. **Goals and objectives** of the Activity.
7. Any relevant **Teacher's notes**.
8. **Materials** needed.
9. Describe the warm up for the activity including **class discussion** and **suggested discussion** topics.
10. Specific **exploration steps** that explain how to conduct the activity.
11. Describe any **expanded exploration** topics.
12. List specific adaptations for **beginner, intermediate, and advanced levels**, which roughly correspond to elementary, intermediate, and high school.
13. If there are any associated **handouts**, please include a title and text for these.
14. As part of your submission, please provide **information about who you are and how you conceived of the activity** and why you think it should be included in this Guide.

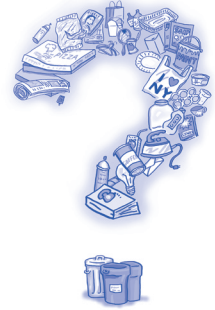
*NOTE: While we are eager to add new Activities to the RRR Guide in future updates, please note that we will only consider Activities that have been submitted by original authors and closely match the existing tone and style of the Guide. By submitting Activities, authors must agree that the New York City Department of Sanitation (DSNY) may use the content of the Activity for whatever purposes it sees fit and may or may not credit the source of the Activity. Please also note DSNY is under no obligation to use or return submitted content. Individuals who submit offensive or harassing files not related to City business may be liable for violations of law.*

Don't forget to enter your applied learning projects in our **Golden Apple Awards** to win huge cash prizes: [nyc.gov/wasteless/goldenapple](https://nyc.gov/wasteless/goldenapple).

**We look forward to seeing your ideas. Thank you!**

# Chapter 1

## What Is Waste?



### Chapter Focus:

The Activities in this chapter are designed to help students talk about waste by looking at how much we throw away, and what's in our waste.

## What Is Waste?

Waste is any material that we no longer find useful and want to throw away. Different cultures and even different people have varying ideas about what is waste. One person might find a hundred uses for something that another person would throw away after using only once.

You can think of waste as the by-product that results from all of our daily activities, from making breakfast to playing soccer. What we do with these by-products — whether we find new uses for them through recycling, or “get rid of them” by burying or burning them — has a big impact on the environment.

## What Makes Up Our Waste?

Much of what we consider waste — such as various kinds of containers and packaging — contains substances that have been made from the earth's raw materials. These substances are called **natural resources** and are divided into two categories: **renewable** resources and **nonrenewable** resources.

**Renewable Resources:** Raw materials that can be replenished are considered renewable resources. An example of a renewable resource is the wood from trees that is used to make paper. After a tree is cut down, a new tree can be planted in its place.

**Nonrenewable Resources:** Resources that are limited in supply are referred to as nonrenewable resources. The steel used to make metal cans is considered a nonrenewable resource because once iron is mined it cannot readily be replenished.

Another large component of our waste — such as food waste — is composed of plant or animal products, which are **biodegradable**.

**Biodegradable Materials:** Items that can decompose and be absorbed by the environment when exposed to the right air, water, and temperature conditions are classified as biodegradable.

Decomposition occurs through the work of microorganisms that break down biodegradable waste into simpler components that can be absorbed by the environment.

To learn what is in NYC's residential waste, visit the “What's in NYC's Waste” pages in “Resources” on [nyc.gov/wasteless](https://www.nyc.gov/wasteless).



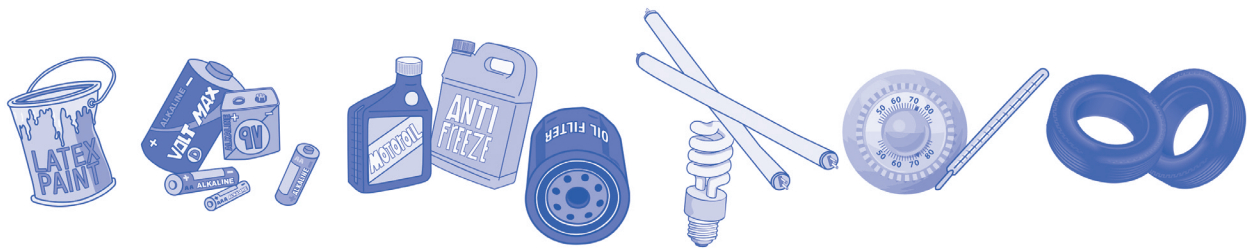
## Can Waste Be Harmful?

Some commonly used household products can be dangerous if they are used or thrown away improperly. Sanitation workers can suffer eye, respiratory, and burn injuries from harmful products that are not disposed of properly. In addition, toxic chemicals from these products can contaminate the environment and pollute the water, soil, and air.

Certain harmful products (such as fluorescent bulbs, paints, pesticides, and cleaning products) can be legally discarded in residential trash because residents usually generate such small quantities of these products.

NYC residents may bring certain products to NYC Department of Sanitation’s Household Special Waste Drop-Off Sites. Visit [nyc.gov/wasteless/specialwaste](https://nyc.gov/wasteless/specialwaste) for locations in every borough and what they accept.

The NYC Department of Sanitation holds annual SAFE Disposal events throughout the City where NYC residents can drop off all types of hazardous materials. Visit [nyc.gov/safedisposal](https://nyc.gov/safedisposal) for information about upcoming events.



## What Is Waste?

# Understanding What We Throw Away

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**Time:**

20 – 40 minutes, depending on whether you watch the video

**Subjects:**

English Language Arts, Science

**Vocabulary:**

biodiversity, climate change, ecosystem, extinction, natural resources, nonrenewable resources, pollution, recovered materials, recycling, reducing, renewable resources, reusing, trash, virgin materials, waste

**Goals and Objectives:**

Students learn about what their waste is made of and how their decisions about waste impact the environment. They will complete ***Understanding What We Throw Away Handout*** and a short writing or drawing-based activity.

**Teacher's Note:**

*This Activity can be completed without viewing the **TrashMasters! Waste Side Story video**, depending on your time and equipment availability.*

**Materials:**

- Copies of ***Understanding What We Throw Away Handout***
  - ***TrashMasters! Waste Side Story video*** (optional, available on [nyc.gov/wasteless](https://nyc.gov/wasteless))
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of what we throw away.

**Suggested Discussion:** Ask the class what they consider to be waste. Where does our waste go?

**Exploration:**

1. Watch ***TrashMasters!*** or a similar video with the class. Discuss the facts that your class found to be interesting.
2. Distribute copies of ***Understanding What We Throw Away Handout***.
3. Read the beginning of the handout together and give the class time to answer the questions.
4. Encourage the class to share their responses with each other.



### Expanded Exploration:

Review the connection between students' decisions about waste and their impact on the environment. Ask them to brainstorm items that could be reused instead of discarded and ask them what kinds of things they recycle.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Include a **read aloud** component by reading the handout with your class.

Follow the Activity instructions.

After the students have completed the handout, ask them to turn it over and illustrate one of the following:

1. How an item they use — such as a toy, backpack, or scooter — is made of many different parts.
2. An item they use that can be reused and recycled.

### Intermediate:

Follow the Activity instructions, and also encourage the students to offer their own questions about reducing, reusing, and recycling. Include a short writing assignment.

Possible questions include:

- How can we reduce our waste by cutting back on items that we use only once?
- What kinds of things could we reuse?
- What are some examples of when you've reused materials?
- What would happen if you didn't recycle?

Ask them to share their essays with the class.

### Advanced:

Follow the Activity instructions, and have the class work in groups of four. Ask each group to select two or more of the vocabulary terms and design a research-based presentation for the class that incorporates those terms.

## What Is Waste?

# Understanding What We Throw Away Handout

Name \_\_\_\_\_ Date \_\_\_\_\_

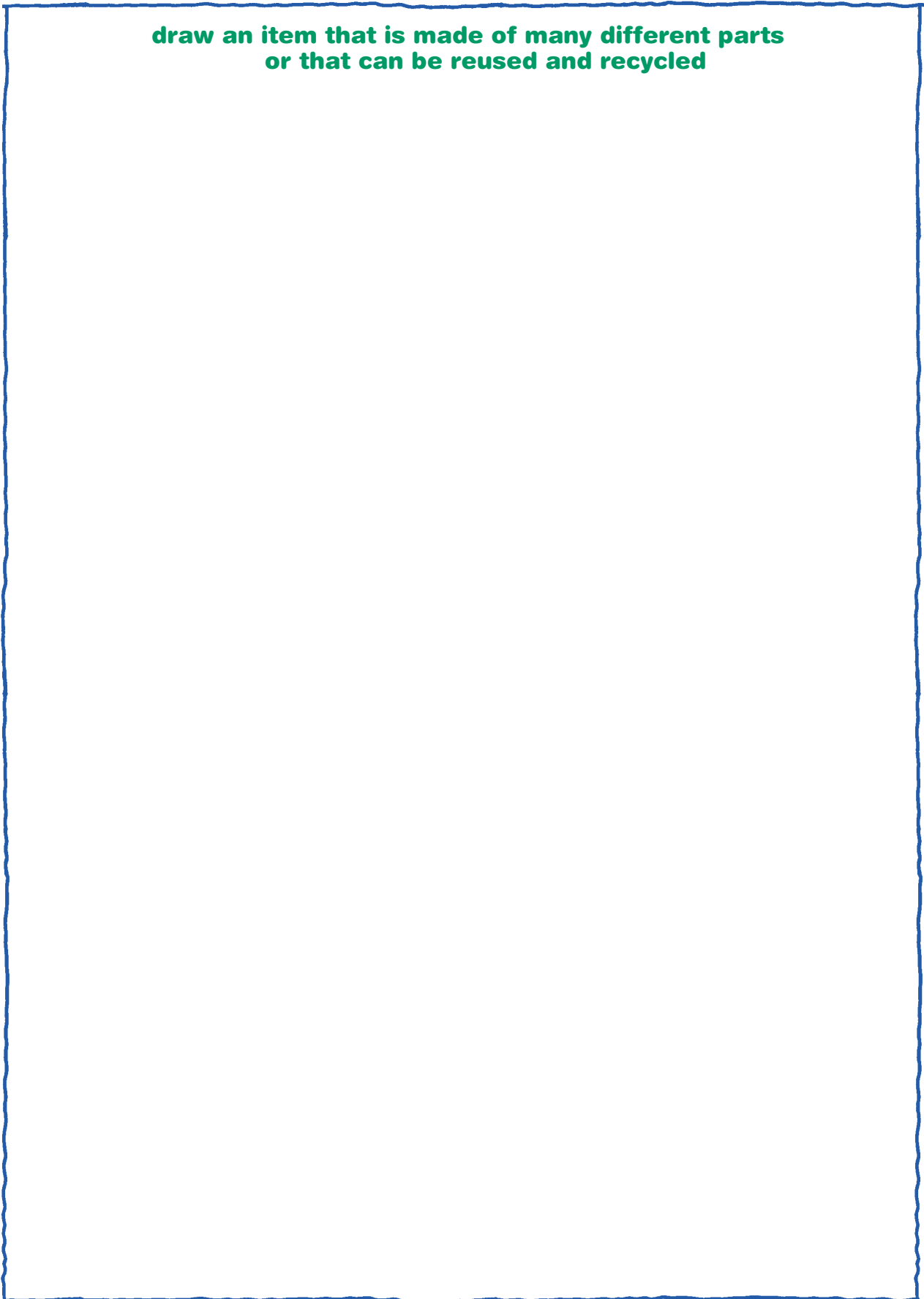
Everything comes from somewhere. This piece of paper and the pencil you are writing with were made in part from trees and may also include recycled materials. The clothes you are wearing may come from cotton, wool, or a combination of synthetic materials. All of these items were made and distributed by people and machines.

Air, water, trees, coal, oil, and natural gas are examples of **natural resources**. Natural resources that are being mined or extracted for the first time are called **virgin materials**. Materials that can be used again or **recycled** to produce new products are called **recovered materials**. Natural resources that can be easily replenished, like many types of trees, are called **renewable resources**; while natural resources that are in a limited supply, like fossil fuels, are called **nonrenewable** resources.

If we overuse something that can't be replenished or we choose to not reuse it, this will upset the balance of the **ecosystem**, or the connection between a community of organisms and their environment. When we mine something too much and when we use plants faster than they can replenish themselves, this causes **pollution** and often **extinction**. Burning too many fossil fuels, which are used in gas tanks and to make plastics, build up excessive amounts of greenhouse gasses that are a cause of **climate change**. To preserve **biodiversity**, or the variety of living things, we must pay close attention to the decisions we make each day that directly affect the environment: what we choose to purchase, what is in our waste, and how we decide to dispose of it.

1. What do you consider to be waste? List the last five things you threw away.
2. Pick two items to describe: What is each made out of? Where do its components come from?
3. Think about some items that you use only once and then discard. What other options are available for these items?
4. What items do you use that could be recycled in New York City?

**draw an item that is made of many different parts  
or that can be reused and recycled**



## What Is Waste?

# Discovering How Much Waste We Produce Each Day

**Time:**

25 minutes

**Subjects:**

English Language Arts,  
Science, Math

**Goals and Objectives:**

Students will learn about the amount of waste each person produces each day. They will complete **Weight Recording Handout** and measure the waste a person produces each day.

**Teacher's Note:**

*This Activity is helpful for reviewing and applying math skills. You may also want to incorporate other measurements.*

**Materials:**

- A **scale**
- Typical **trash items** (such as alkaline batteries, food scraps, soiled napkins, and paper towels)
- Typical **recyclables** (such as mixed paper, junk mail, empty cans and bottles)
- 1 **box** (large enough to hold 4 pounds of this collection)
- Copies of **Weight Recording Handout**

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of how much waste we produce each day.

**Suggested Discussion:** Ask the class how much waste they think they produce each day. How much do they think it weighs?

**Exploration:**

1. Distribute **Weight Recording Handout** and have them complete it individually or in pairs.
2. Show the class the collection of items you gathered and ask them how much they think all of it weighs, in total.



3. Weigh each item. Record the weights.
4. Ask the class if they know how much waste each American produces each day. After they have had a chance to guess and think about this, inform them that the average American produces more than four pounds of waste each day. If your class has Internet access, invite students to find out the most current figures on our daily waste production. Ask them if they think this figure seems like more or less than what they expected?

### Expanded Exploration:

Engage students in a discussion about how much waste they accumulate each day, each week, and each month. Have them brainstorm how they could reduce, reuse, or recycle items they normally would throw away as trash. Ask them to come up with other ideas about how they may be able to cut down on their waste.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Have the class illustrate and describe what four pounds of waste looks like. Ask them to figure out how much waste per day their entire class or family produces. They should share their illustrations with the class.

### Intermediate:

Follow the Activity instructions and ask the students to figure out how much waste their entire class or family produces each day and how much is produced in a week, month, and year.

Ask them to write a short response about observations they have made about their own waste and to describe at least five ways that they may be able to reduce waste. They should share their work with the class.

### Advanced:

Follow the Activity instructions and ask the class to calculate how much waste they produce each day. Is it more or less than four pounds? Do they think they could reduce their waste to less than four pounds each day? Ask them to calculate how much waste they produce each week, month, and year.

Let them choose from three writing assignment questions and encourage them to make a brochure or poster of their findings to share with the class:

1. Do you think the amount of waste a person produces can be reduced?
2. What are five items that you throw away as trash that you could reduce, reuse, or recycle?
3. Describe how taking responsibility for your own waste impacts the city, country, and world.

# What Is Waste?

## Weight Recording Handout

Name \_\_\_\_\_ Date \_\_\_\_\_

1. What is the weight of the empty box itself?
2. What is the total weight of the box with everything inside?
3. Calculate the total weight of all of the items inside the box (#2 total weight minus #1 weight of the empty box).
4. How much would you guess is the weight of the waste that a person makes each day?
5. Work with your class to figure out the actual amount of waste a person makes each day and write down the result here.
6. What is the difference between the weight of waste you thought a person produced each day and the actual weight?
7. How much waste does your whole class produce each day?
8. How much waste does your class produce each week?





## What Is Waste?

# Understanding the Types of Materials We Throw Away

### Time:

30 minutes

### Subjects:

English Language Arts, Science

### Vocabulary:

biodegradable, decomposition, non-biodegradable, nonrenewable resources, renewable resources

### Goals and Objectives:

Students will start thinking about the origins of materials and how to reuse and recycle them. They will complete **Types of Materials Handout** and create a collage art project.

### Teacher's Note:

*You can do this Activity in two parts, as indicated by Part 1 and Part 2. This Activity is a good follow-up to Activity 1, which introduces the concepts of renewable and nonrenewable resources.*

## Materials:

### For Part 1:

1 item of each kind:

- **Renewable resource** (paper)
- **Nonrenewable resource** (metal can)
- **Biodegradable** (fruit peel)
- **Non-biodegradable** (plastic bottle)

### For Part 2:

- Copies of **Types of Materials Handout**
- **Magazines** or catalogs
- **Scissors**
- **Tape** or glue

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

### Warm Up:

**Class Discussion:** Determine students' prior knowledge and understanding of the types of materials we throw away.

**Suggested Discussion:** What kinds of materials make up our waste?



## Exploration:

### Part 1

1. Using the definitions in the **Glossary**, help the students understand the meanings of: renewable resources, nonrenewable resources, biodegradable, non-biodegradable.
2. Discuss how waste can come from renewable or nonrenewable sources and explain how some are biodegradable. Ask the students for examples of products they use or know of that are biodegradable. Be sure to point out that some material can be categorized more than one way. For example, paper is biodegradable, and also comes from a renewable source.
3. Show examples of each type of waste from the Materials list.
4. Talk with students about the environmental impact of using different resources and creating different types of waste. Explain that non-biodegradable materials cannot be broken down naturally, and nonrenewable resources will some day run out.
5. Explore which types of plastics can be recycled in New York City ([nyc.gov/recycle](https://www.nyc.gov/recycle)). Let the students know that it's okay if they accidentally put an item in a recycling bin when it can't be recycled.

### Part 2

1. Now that your class has discussed how to identify four general categories of waste, they can complete side 1 of **Types of Materials Handout**.
2. Review the answers with the class.
3. Have the class turn over the handout and create a collage that illustrates what they have learned. Each box on the page displays a general category heading. Have them paste images from magazines into the renewable, nonrenewable, biodegradable, and non-biodegradable categories. Remind them that some items may fall under more than one category.

## Expanded Exploration:

Display the collages in the classroom or hallway. Encourage the class to continue the discussion about how their choices impact the environment. Ask them if they recycle any of the waste from their lunch and if they know how much lunch waste they create each day.

---

# Adaptations for Different Grades

*Choose level most appropriate for your class.*

## **Beginner:**

Follow the Activity instructions.

Review vocabulary terms and refer to the **Glossary**.

Divide the class into four or five groups and have each group describe to the class the meaning of one of the vocabulary terms.

## **Intermediate:**

Follow the Activity instructions and connect the lesson to your school's recycling program.

Have the class complete a short written assignment that incorporates the types of materials addressed in this Activity. Do the students know where to recycle their waste? What, if anything, could be improved about the school's recycling system? Have the class set up or improve upon a recycling system in the classroom.

## **Advanced:**

Follow the Activity instructions.

Ask students to write short essays or create presentations on one of the following topics:

1. Do you know if any of the products you use come from renewable resources? Does this knowledge influence whether you purchase the product?
2. Describe the laws around recycling that are enforced in New York City. Do you think people would recycle as much as they do without these laws? What other laws or community programs would you implement in order to get more people to reduce, reuse, and recycle?



## What Is Waste?

# Types of Materials Handout

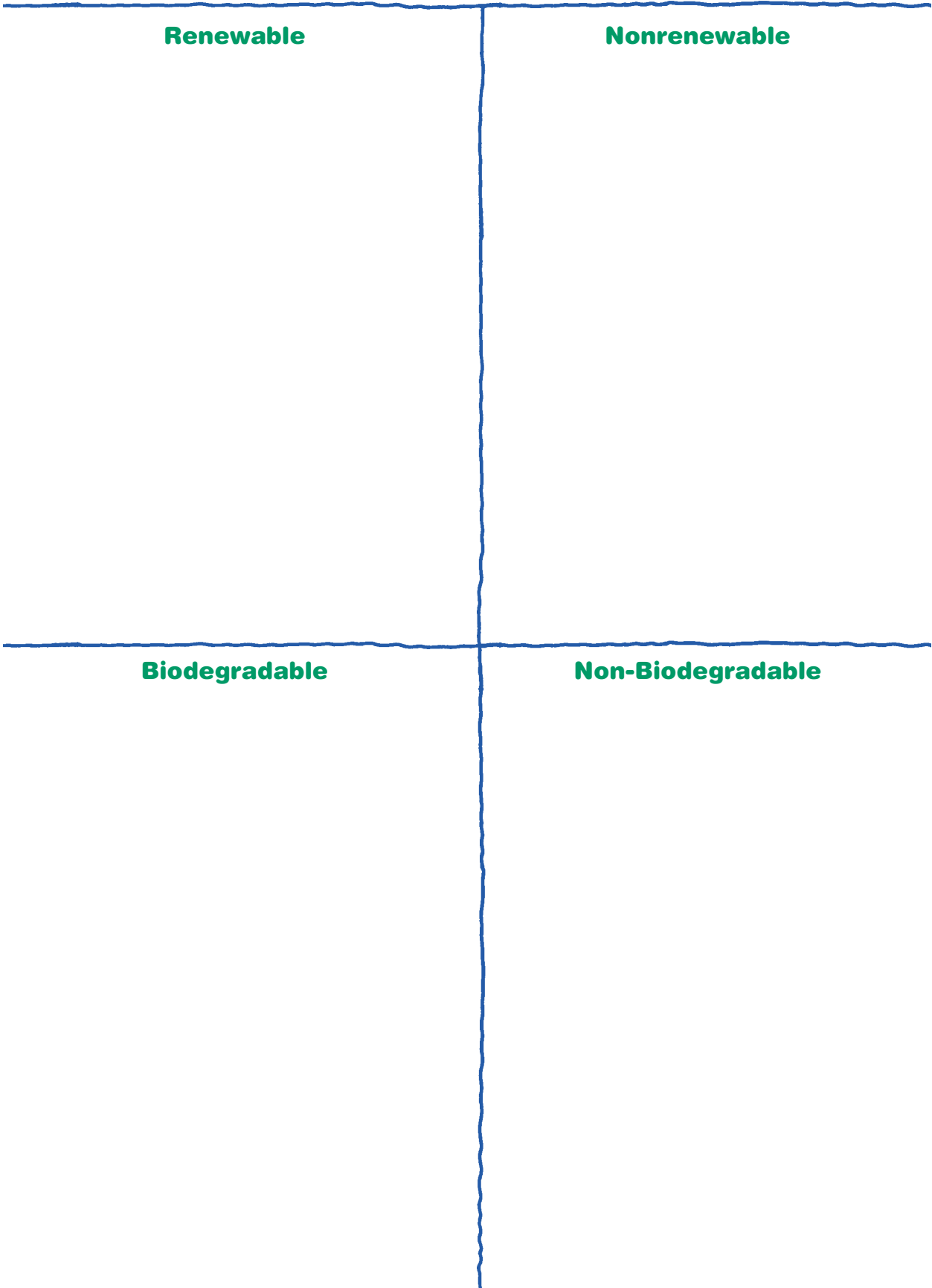
Name \_\_\_\_\_ Date \_\_\_\_\_

Fill in the blank with the following word choices:

**biodegradable, decomposition, non-biodegradable materials, non-renewable resources, renewable resources**

Some words may be used more than once.

1. Raw materials that can be replenished are considered \_\_\_\_\_.
2. Resources that are limited in supply are referred to as \_\_\_\_\_.
3. Items that can decompose and be absorbed by the environment when exposed to the right air, water, and temperature conditions are classified as \_\_\_\_\_.
4. \_\_\_\_\_ occurs through the work of microorganisms that break down biodegradable waste into simpler components that can be absorbed by the environment.
5. \_\_\_\_\_ are materials that cannot decompose or be broken down by the environment, such as foams, plastics, and glasses.
6. An example of \_\_\_\_\_ is the wood from trees that is used to make paper. After being cut down, new trees can be planted.
7. The iron used to make metal cans would fall under the category of \_\_\_\_\_ because once it is mined it cannot readily be replenished.



## What Is Waste?

# Exploring Waste from Individual Lunches

---

**Time:**

20 – 30 minutes

**Subjects:**

English Language Arts,  
Science, Math

**Vocabulary:**

biodegradable, compost,  
non-biodegradable,  
nonrenewable resources, recycle,  
reduce, renewable resources,  
reuse

**Goals and Objectives:**

Students will examine their own lunch waste, find its weight, and explore ways to reduce, reuse, and recycle it.

**Teacher's Note:**

*This Activity can easily be modified to suit your school's lunch program and coordinate with what your class is studying in math and science. Students can complete this Activity with or without their leftover lunch waste. If you choose to do this Activity without all of the students keeping their lunch waste, you may want to gather a sample of discarded lunch waste to help them visualize the lesson.*

**Materials:**

- Copies of **Lunchroom Waste Worksheet**
  - **Student lunches** or one sample of student lunch waste: packaging, food waste, and lunch tray
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of how much waste comes from individual lunches.

**Suggested Discussion:** Ask the class how much waste they think is left over each day from their lunches. Where does the waste go after it is discarded?

**Exploration:**

1. Distribute copies of **Lunchroom Waste Worksheet**. Show the class the lunch waste sample or ask them to examine their own lunch waste.
2. Refer to the lunch waste sample or the students' lunch waste to complete the handout.
3. Encourage the students to share their findings with the class.
4. Ask the class which, if any, of the items they could have done without? Which items can they reuse? Which items can be recycled?

### Expanded Exploration:

Ask the students to think of ways they can reduce, reuse, and recycle. What are some ways they can teach others about reducing, reusing, and recycling?

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions. Complete the handout in small groups or collectively as a class.

Invite students to draw everything that was in their lunch today, including all food, peels, packaging, and containers.

Next, ask them to draw before and after pictures of their uneaten lunch and what was left over from lunch. Finally, ask them to draw or write their ideas about how they can reduce the amount of waste left over from their lunches. Encourage them to share their work with the class.

### Intermediate:

Follow the Activity instructions, and group the students into small teams. Ask them to create a lunch menu of balanced meals that have as little packaging as possible. Describe how each item of the lunch waste can be recycled, composted, or discarded as trash. Have the teams present their menu projects to the class.

### Advanced:

Follow the Activity instructions.

Give the students a choice of three projects:

1. Create an art project with your left over lunch waste and write an artistic statement that connects the piece to reducing waste.
2. Write a research paper about how other schools worldwide approach reducing lunch waste.
3. Create a project proposal for your school that includes a sample menu of meals that are nutritionally balanced and also reduce waste. Include details about how you would improve upon waste management strategies. The students should present their projects to the class.

## What Is Waste?

# Lunchroom Waste Worksheet

Name \_\_\_\_\_ Date \_\_\_\_\_

1. List every item that was in your lunch today, including food, peels, containers, wrappers, and other packaging.
2. How much would you guess that your lunch weighs before you eat it?
3. Which of the items that you listed in question #1 are left over after you ate your lunch?
4. How much does this waste weigh?
5. Which items could you reduce? Reuse? Recycle?
6. How much lunch waste do you make each week?
7. How much lunch waste do you make each month?
8. How much lunch waste do you make each school year?
9. How much lunch waste does your class make per day?
10. How much lunch waste does your class make per week?
11. How much lunch waste does your class make per month?
12. How much lunch waste does your class make per school year?





## What Is Waste?

# Safe and Smart Ways to Handle Harmful Household Waste

**Time:**

30 minutes

**Subjects:**

English Language Arts, Science

**Goals and Objectives:**

Students will learn how to identify and dispose of harmful household waste. They will read and complete **Safe and Smart Handout** and a follow-up writing project to connect what they have learned to their family's everyday decisions.

**Vocabulary:**

combustible, contaminate, corrosive, flammable, harmful, poisonous, toxic, vapors

**Materials:**

- Copies of **Safe and Smart Handout**

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

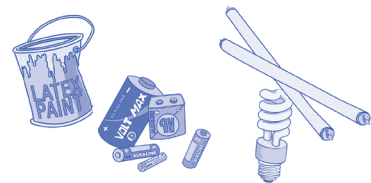
**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of household harmful waste and how to dispose of it.

**Suggested Discussion:** Ask the class to think of items in their homes that could be considered harmful waste. Why are these items dangerous? How do you dispose of them?

**Exploration:**

1. Distribute copies of **Safe and Smart Handout**.
2. Read and discuss the first side of the handout as a group.
3. Have the class complete the second side of the handout.
4. Assign a follow-up writing project from the Adaptations section.

**Expanded Exploration:**

Encourage class discussion about hazardous waste and disposal risks. Ask the class why they think it is important to think about harmful waste disposal.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Read and review the first side of **Safe and Smart Handout** with your class.

Review the vocabulary terms by referring to the **Glossary**. If the reading component is too advanced for your class, summarize the information and instruct students to always have a parent or adult handle products and waste that could be harmful. Instead of completing the second side of the handout, ask the class to develop a warning label for a harmful product. Ask each student to draw a symbol of caution and to write a warning label that includes at least one of the vocabulary words.

### Intermediate:

Follow the Activity instructions.

Have the class work in small groups on a follow-up project. Each group should develop a project and presentation on how to reduce harmful waste. This could be a PSA (public service announcement) or a manual or even a kit. Here are some sample projects:

- Why should you purchase a nontoxic product instead of a toxic one?
- What are some nontoxic cleaning ideas?
- What are some ways you can help others learn how to reduce their consumption of harmful products and safely discard the harmful products they have?

### Advanced:

Follow the Activity instructions.

Give the class two writing assignment options:

1. Select a harmful product and write an essay describing the disposal risks. Include alternatives to that product and their benefits.
2. Write a research article about the consequences of harmful materials when they contaminate the environment.

Ask students to share what they have learned with the rest of the class.

## What Is Waste?

# Safe and Smart Handout

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## What Are Harmful Products?

Commonly used household and automotive products can be harmful to you, your family, city workers, and the environment if improperly stored, used, or discarded. Accidental swallowing or improper use of products can cause severe illness and even death.

Some household products can be dangerous after they are thrown away. If these items are improperly discarded, Sanitation workers can suffer eye, respiratory, and burn injuries. In addition, toxic chemicals from these products can contaminate the environment and pollute the water, soil, and air.

Harmful waste can be found in liquid or solid form, or anything in between. Many items like antifreeze are considered harmful because they are poisonous if ingested by humans or animals; this toxic product tastes sweet to pets and other animals, so spills are especially dangerous. Electronics like cell phones and computers are made with heavy metals while other items like fluorescent light tubes and thermometers contain mercury. These metals can damage ecosystems by seeping from landfills into our water supply.

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## Safe Handling and Disposal Tips

**Read the label.** Products that are highly toxic have a warning label. Look for words like “DANGER” and “POISON.” Other messages that describe the danger, like “causes burn on contact,” and “highly flammable,” or “highly combustible,” or “corrosive,” or “harmful vapors” offer additional clues that the product is hazardous.

**Try to use products that are not harmful to the environment.** There are many alternatives to toxic products. These products are made with safer ingredients and are often organic. Industry certifications help consumers identify more environmentally preferable products. Be creative. Instead of chemical cleaning products, try using baking soda and white vinegar.

**Don't buy more than you need.** It's important to be aware of how much you actually need to use so that you don't produce more waste than is absolutely necessary, especially when it comes to hazardous waste.

**Follow product instructions.** More is not better — you won't get twice the results by using twice as much. Use products only as directed and only when necessary.

**Never mix products or chemicals.** This is especially true for ammonia and bleach, which can cause respiratory problems when combined.

**Store potentially harmful products out of the reach of children and pets.** Use child-proof cabinet locks or containers.

**How to discard harmful products.** Certain harmful products (such as fluorescent bulbs, paints, pesticides, and cleaning products) can be legally discarded in residential trash because residents usually generate such small quantities of these products.

NYC residents may bring certain products to NYC Department of Sanitation's Household Special Waste Drop-Off Sites. Visit [nyc.gov/wasteless/specialwaste](https://nyc.gov/wasteless/specialwaste) for locations in every borough and to learn what to bring.

The NYC Department of Sanitation holds annual SAFE Disposal events throughout the City where NYC residents can drop off all types of hazardous materials. Visit [nyc.gov/safedisposal](https://nyc.gov/safedisposal) for information about upcoming events.

# What Is Waste?

## Safe and Smart Handout

Name \_\_\_\_\_ Date \_\_\_\_\_

### Vocabulary

Please answer the questions by incorporating some of the vocabulary words listed in the box.

**combustible, contaminate, corrosive, flammable, harmful, poisonous, toxic**

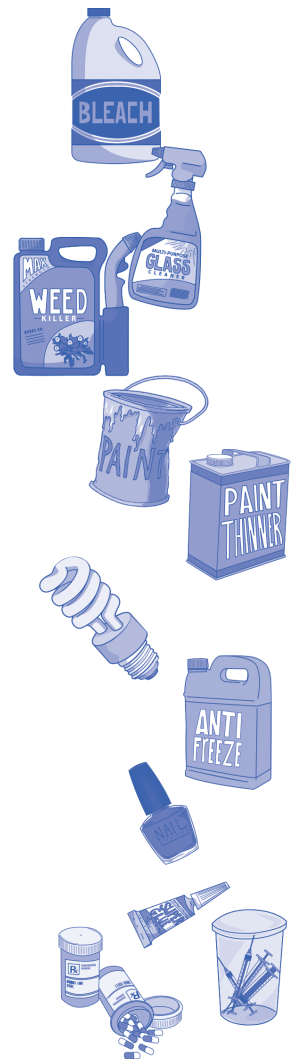
1. What are some examples of harmful products? Why are they considered harmful?

2. How could someone know if a product is toxic?

3. List some ways you could reduce your consumption of these products.

4. How would you dispose of harmful products?

5. Why should we avoid throwing away harmful waste in the regular garbage?



## What Is Waste?

# Life Cycles of Products

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**Time:**

30 minutes

**Subjects:**

English Language Arts, Science,

**Goals and Objectives:**

Students will explore the life cycles of products and create a narrative about an item, such as a t-shirt, a pencil, or a cell phone, that illustrates the steps of how the product was made, transported, used, and how it will be disposed.

**Vocabulary:**

manufacture, natural resources,  
recycle, reduce, reuse

---

**Materials:**

- **Internet access** for research (optional)
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of the concept of a life cycle.

**Suggested Discussion:** Ask the class if they have ever thought about where products come from and how they are made. Can they describe the life cycle of a product?

**Exploration:**

1. Review the basic steps of a product's lifecycle.
  - **Raw material acquisition:** the raw materials or natural resources that make up a product are harvested or extracted. For example, trees are harvested and cut down in order to make paper or wood products; crude oil is extracted to make plastics.
  - **Material manufacture:** raw materials are processed. For example, crude oil is made into the polymers that make plastics.
  - **Product manufacture:** materials are made into specific products.
  - **Transport:** products are transported to stores where they are sold to customers.
  - **Use:** the products are purchased and used by consumers.
  - **Disposal, reuse, or recycle:** the product is used again, recycled into another product, or disposed.

2. Ask the students to select a product and investigate the various steps associated with its life cycle. It would be helpful to let the class use computers to research the life cycle of the products they choose. If you do not have Internet access, you may want to have the students work in small groups and assist them with identifying the materials and steps for each product.
3. Have the students illustrate and write the life cycle steps of their products.

### Expanded Exploration:

Students should present their projects to the class. Ask them to think about the energy required for each step from materials acquisition to transporting the products. How does this impact the environment? How do our decisions as consumers impact the environment?

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Review vocabulary terms by referring to the **Glossary**. You may want the class to work together in small groups to identify and illustrate the life cycle steps.

### Intermediate:

Follow the Activity instructions.

You can expand this project into a research assignment that compares the steps of multiple products and connects how their life cycles impact the environment.

### Advanced:

Follow the Activity instructions.

This project can be expanded into a research project that examines a specific product and how the product's life cycle affects the environment. It should also connect how the everyday decisions of consumers impact the environment.

# What Is Waste?

## Learning Standards

### Activity 1: Understanding What We Throw Away

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Reading

Subsections 1, 2 Key Ideas and Details  
Subsection 3 Craft and Structure

##### College and Career Readiness Anchor Standards for Writing

Subsections 1, 2, 3 Text Types and Purposes  
Subsections 4, 5, 6 Production and Distribution of Writing  
Subsections 7, 8, 9 Research to Build and Present Knowledge  
Subsection 10 Range of Writing  
Subsection 11 Responding to Literature

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsection 1 Comprehension and Collaboration  
Subsections 4, 6 Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

Subsections 1, 2 Conventions of Standard English  
Subsection 3 Knowledge of Language  
Subsection 4 Vocabulary Acquisition and Use

#### The Applied Learning Performance Standards

A2 Communication Tools and Techniques

#### New York City Science Scope & Sequence

##### 7.1 a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.



# What Is Waste?

## Learning Standards

### Activity 2: Discovering How Much Waste We Produce Each Day

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Writing

Subsections 1, 2     Text Types and Purposes  
 Subsection 4         Production and Distribution of Writing

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsection 2         Comprehension and Collaboration  
 Subsections 4, 6     Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

Subsections 1, 2     Conventions of Standard English

#### New York State Common Core Learning Standards for Mathematics

Subsections 1, 2     Counting and Cardinality  
 Subsection 1         Operations & Algebraic Thinking  
 Subsection 1         Measurement & Data

#### The Applied Learning Performance Standards

A2     Communication Tools and Techniques  
 A5     Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1 a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1 b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

##### S1.1a,b,c

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.

# What Is Waste?

## Learning Standards

### Activity 3: Understanding The Types of Materials We Throw Away

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Reading

Subsection 1 Key Ideas and Details

##### College and Career Readiness Anchor Standards for Writing

Subsections 1, 2 Text Types and Purposes

Subsection 4 Production and Distribution of Writing

Subsection 7 Research to Build and Present Knowledge

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsection 1 Comprehension and Collaboration

Subsection 4 Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

Subsections 1, 2 Conventions of Standard English

Subsection 3 Knowledge of Language

Subsection 4 Vocabulary Acquisition and Use

#### The Applied Learning Performance Standards

A2 Communication Tools and Techniques

#### New York City Science Scope & Sequence

##### 7.1 a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1 b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

# What Is Waste?

## Learning Standards

### Activity 4: Exploring Waste from Individual Lunches

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Reading**

Subsection 1 Key Ideas and Details

##### **College and Career Readiness Anchor Standards for Writing**

Subsections 1, 2, 3 Text Types and Purposes

Subsections 7, 8 Research to Build and Present Knowledge

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

Subsection 2 Comprehension and Collaboration

Subsections 4, 5, 6 Presentation of Knowledge and Ideas

##### **College and Career Readiness Anchor Standards for Language**

Subsections 1, 2 Conventions of Standard English

#### **New York State Common Core Learning Standards for Mathematics**

Subsections 1, 2 Counting and Cardinality

Subsection 1 Operations & Algebraic Thinking

Subsection 1 Measurement & Data

#### **The Applied Learning Performance Standards**

A1 Problem Solving

A2 Communication Tools and Techniques

A5 Tools and Techniques for Working With Others

#### **New York City Science Scope & Sequence**

##### **7.1 a, 7.1b**

Human influences on the environment: positive influences.

##### **7.1c, 7.2a, 7.2b, 7.2c**

Human influences on the environment: negative influences.

##### **7.3a, 7.3b**

Human influences on the environment: decision making (risk/benefit).

##### **ICT 5.2, IPS 1.1-1.4, IPS 2.1**

Packaging and solid waste.

##### **LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1**

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### **LE 5.1d,e, LE 6.1 a,b**

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### **LE 6.1c, ICT 5.1, 5.2**

Renewable and nonrenewable sources of materials.

##### **LE 7.1a,b**

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.1b,c**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### **LE 7.2b,c, LE 7.2d**

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.2b,c, LE 7.2d**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### **LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1**

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

##### **PS 3.1b,c**

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

# What Is Waste?

## Learning Standards

### Activity 5: Safe and Smart Ways to Handle Hazardous Waste

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Reading

Subsections 1, 2	Key Ideas and Details
Subsection 4	Craft and Structure
Subsection 10	Range of Reading and Level of Text Complexity

##### College and Career Readiness Anchor Standards for Writing

Subsections 1, 2, 3	Text Types and Purposes
Subsection 4	Production and Distribution of Writing
Subsection 7	Research to Build and Present Knowledge

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsection 1	Comprehension and Collaboration
Subsection 4, 6	Presentation of Knowledge and Ideas

##### College and Career Anchor Standards for Language

Subsections 1, 2	Conventions of Standard English
Subsection 3	Knowledge of Language
Subsections 4, 5, 6	Vocabulary Acquisition and Use

##### The Applied Learning Performance Standards

A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1 a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

# What Is Waste?

## Learning Standards

### Activity 6: Life Cycles of Products

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Writing**

Subsections 2, 3     TextTypes, and Purposes  
 Subsection 4,        Production and Distribution  
                                  of Writing

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

Subsection 1        Comprehension and Collaboration  
 Subsections 4, 6    Presentation of Knowledge  
                                  and Ideas

##### **College and Career Readiness Anchor Standards for Language**

Subsections 1, 2    Conventions of Standard English  
 Subsection 4        Vocabulary Acquisition and Use

#### **The Applied Learning Performance Standards**

A2    Communication Tools and Techniques

#### **New York City Science Scope & Sequence**

##### **7.1 a, 7.1b**

Human influences on the environment:  
 positive influences.

##### **7.1c, 7.2a, 7.2b, 7.2c**

Human influences on the environment:  
 negative influences.

##### **7.3a, 7.3b**

Human influences on the environment:  
 decision making (risk/benefit).

##### **ICT 5.2, IPS 1.1-1.4, IPS 2.1**

Packaging and solid waste.

##### **LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1**

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### **LE 5.1d,e, LE 6.1 a,b**

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### **LE 6.1c, ICT 5.1, 5.2**

Renewable and nonrenewable sources of materials.

##### **LE 7.1a,b**

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.1b,c**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### **LE 7.2b,c, LE 7.2d**

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.2b,c, LE 7.2d**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### **LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1**

Water issues: depletion; pollution.

##### **LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1**

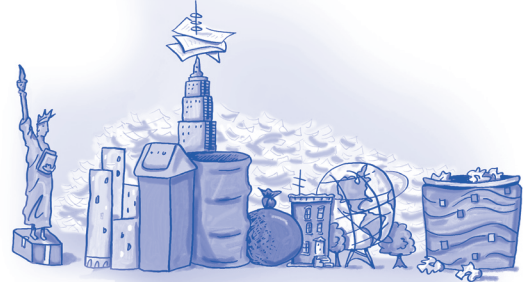
Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

## Chapter 2

# What Happens to Waste?

### Chapter Focus:

The Activities in this chapter will help students understand what happens to waste items, both garbage and recyclables, after they are thrown away. This includes exploring the history of waste disposal, how sanitary landfills work, what happens to school waste, how decomposition works, and the impacts of litter.



## So Many People, So Much Waste

More than eight million people live in New York City and over 50 million more visit each year. While New Yorkers actually create less waste per person than other Americans, the sheer number of people living, working, and visiting the city each year adds up to a lot of trash. With so many people making so much waste, it is important to look at what we are throwing away, where it goes, and how we can reduce the impact our waste has on the environment.

When we throw garbage “away,” it doesn’t just disappear. There is no “away.” There’s always an impact on the environment. Knowing what that impact is can help us make smart choices about what we buy and use, and the best ways to dispose of our waste at home, at school, at work, and in our community.



## What Happens to New York City’s Waste?

Most of New York City’s waste is transported by barge and truck to landfills or burnt in incinerators outside of the city. Moving New York’s waste requires the use of massive amounts of fuel — a nonrenewable resource. Using landfills and incinerators costs money, causes pollution, and takes up a lot of space.

Recycling reduces the amount of waste that New York sends to landfills and incinerators. It also conserves natural resources by reducing the need for raw materials when making new products.

Recycling, however, isn’t a perfect solution. It’s expensive, and uses energy and natural resources in the process. When studying waste disposal options, it is important to keep in mind that each method has environmental tradeoffs.

**Want to know the right way to dispose of a particular item?** Visit [nyc.gov/wasteless](https://www.nyc.gov/wasteless) and click on “Get Rid of Stuff” in the left column.





## What Happens to Waste?

# Knowing Where Garbage Goes After It's Thrown Away

---

**Time:**

20 minutes

**Subjects:**

English Language Arts, Science

**Goals and Objectives:**

Students will discuss where non-recyclable garbage goes and learn about the history of New York City's waste disposal system. They will read and complete **Knowing Where Garbage Goes Handout** and a writing assignment.

**Vocabulary:**

decomposition, groundwater, incinerators, landfill, landfill gas, leachate, organic

---

**Materials:**

- Copies of **Knowing Where Garbage Goes Handout**
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Teacher Prep:**

If this is your first Activity from this chapter, please read the **Chapter 2 Introduction**. Refer to the **Glossary** for definitions of vocabulary words.

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of where garbage goes after it's thrown away.

**Suggested Discussion:** What happens to waste when you throw it away? What are all of the possible avenues for discarded waste? Where does waste go when it isn't reused or recycled?

**Exploration:**

1. Distribute **Knowing Where Garbage Goes Handout**.
2. Have the class read it individually or as a group.
3. Ask them to complete the second side of the handout and assign a follow-up writing project (see the Adaptations section on the next page).



### Expanded Exploration:

Engage students in a discussion about New York City's waste disposal history and methods used today. Why is it important to reduce, reuse, and recycle? What are the benefits and risks of using landfills? If students were going to build their own model landfill, what features would they include?

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Include a **read aloud** component in the warm-up with the **Chapter 2 Introduction**. Review the vocabulary terms and refer to the **Glossary** for definitions.

Follow the Activity instructions.

Ask the students to illustrate and describe how a landfill is made and what it can become over time. Remind them that parks, like Freshkills Park on Staten Island and Battery Park in Manhattan, were once landfills and are now blossoming with trees and flowers.

Alternatively, give them the option of developing an idea for a board game in which something is thrown away and the player chooses where and how the item is disposed of. Encourage the students to share their projects with the class.

### Intermediate:

Follow the Activity instructions, and incorporate a **writing and presentation** component. Have the students invent a city and plan how they would dispose of waste.

- What's the name of your city?
- How many people live in your city?
- What products or natural resources is your city most known for?
- What kinds of recycling laws would you enforce?
- How would you dispose of your city's waste?
- If you choose to transport your city's waste somewhere else, describe the benefits and risks of doing so and how much it will cost financially and environmentally. Remember, transportation uses up fossil fuels, which are nonrenewable natural resources.

Students should present their plans to the class using display boards, a poster, or PowerPoint presentation.

### Advanced:

Follow the Activity instructions and incorporate a **research and presentation** component. Give the students a choice of two writing prompts:

1. Research the environmental benefits and risks of using incinerators and landfills to dispose of waste.
2. What happens when leachate contaminates groundwater?

Students should present their findings to the class using PowerPoint or a display board.

# What Happens to Waste?

## Knowing Where Garbage Goes

### Handout

Name \_\_\_\_\_ Date \_\_\_\_\_

## When You Throw Something Away, Where Does It Go?

Waste that isn't reduced, reused, or recycled is either **incinerated** (burnt to ash) or buried in a **landfill** (a landsite designated for waste burial).

## A Brief History of New York City's Waste

The overwhelming amount of garbage in New York City has been a problem since the late 1700s. In 1798, New York City created its first "Street Commission," workers who walked around the city and disposed of garbage, dirt, and animal waste. They dumped it into swamps, wetlands, and ravines. This waste landfill ended up expanding the waterfront. In fact, more than a quarter of Manhattan south of City Hall was once landfill.



As the city became more populous it became more difficult to keep up with the disposal of all the waste. Deadly diseases, such as, cholera, tuberculosis, and typhus, were widespread. Much of the garbage was dumped at sea, polluting the water and air, and killing wildlife. The city made some efforts to suspend ocean dumping and instituted rules about separating garbage. But it wasn't until 1938 that the Supreme Court ordered New York to stop polluting the sea with its garbage. More landfills were made throughout the five boroughs, but these landfills were not maintained as they should have been and residents complained about the smell and rat infestation.

So, the city decided to develop sanitary landfill procedures, which involve covering and compacting waste with dirt. A modern landfill is like a swimming pool. It's lined at the bottom and sides with plastic and sometimes clay to protect the groundwater from **leachate**, the liquid formed when rainwater mixes with decomposing waste. Most landfills are built with pipes that drain off the leachate where it can be collected and treated. Bulldozers spread the dirt around to help prevent **landfill gas** buildup, which occurs when **organic** (once living) matter decomposes in a landfill. Chemicals are added to cover up the smell, and new soil is added and mixed in with the waste every day.

New York City passed measures in the 1980s requiring residents to sort their waste and recycle certain items, to reduce the amount of waste. The last landfill in New York City, Fresh Kills on Staten Island, was closed in 2001 and is now a beautiful park. Today, New York City's waste is transported to landfills and incinerators outside the city. New York City continues to expand its waste reduction and recycling practices.



# What Happens to Waste?

## Knowing Where Garbage Goes

### Handout

Please respond to the following statements and questions.

1. List all of the possible ways to dispose of waste.
2. What is leachate? Why don't we want it to contaminate the groundwater?
3. What kinds of things can be recycled?
4. Why do we recycle?
5. What kinds of things can be reused?
6. What kinds of things go to landfills or incinerators?
7. What are some of the benefits and drawbacks of transporting waste to landfills and incinerators outside the city?



# What Happens to Waste?

## Making a Modern Sanitary Landfill

**Time:**

30 minutes

**Subjects:**

English Language Arts, Science

**Vocabulary:**

compacted solid waste,  
earth cover, groundwater,  
landfill, leachate

**Goals and Objectives:**

Students will work together to create models of sanitary landfills and monitor the changes over time. They will record their observations and complete a writing assignment.

**Teacher's Note:**

*The amount of materials you need will depend on how many groups you decide to have.*

**Materials:**

- Copies of *A Landfill Up Close Handout*
- Copies of *Making a Modern Sanitary Landfill Handout*
- **Transparent plastic containers** (could be a large plastic bottle)
- **Scissors**
- **Soil** (6" worth per group)
- **Plastic wrap**
- **Gravel** or fish tank rocks
- **Non-recyclable trash** (such as food scraps, used napkins, plastic bags, old rags)
- **Water**
- **Plastic tape**

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Teacher Prep:**

If you are going to use plastic bottles, it may be easier to cut them in half before you distribute them to the student groups.

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of the structure and process of sanitary landfills.

**Suggested Discussion:** Distribute copies of *A Landfill Up Close Handout* and go over the various parts of a landfill. What are landfills made of? How is waste added to them?

## Exploration:

1. Divide the class into small groups and distribute copies of ***Making a Modern Sanitary Landfill Handout*** so each group has a set of instructions.
2. Distribute the transparent plastic containers, one to each group. Be sure that the plastic container can be sealed and made airtight. If you're using a plastic bottle, cut the bottle in half and keep the top half, which will be secured later with tape.
3. First, place a 1" – 2" layer of soil to represent the ground under all landfills.
4. Spread the plastic wrap over the soil. This represents the plastic layer of liner, which prevents leachate from leaking into the groundwater.
5. Add a layer of gravel. This represents the gravel that landfills use to allow leachate to drain out.
6. Spread some of the waste items on top of the layer of gravel. Keep in mind that bulldozers spread the waste evenly in a real landfill. Place some of the waste items close to the container's sides so the group can observe the decomposition process.
7. Add a layer of soil.
8. Alternate layers of waste and soil, three times each.
9. Occasionally sprinkle water on the landfill to represent rainwater.
10. Secure the top portion of the container firmly with tape so that it is airtight.
11. Let air and water in for a few moments every two to three days.
12. Encourage the students to record their observations (can use the backside of ***Making a Modern Sanitary Landfill Handout*** for this purpose).

## Expanded Exploration:

Engage students in a discussion about real landfills and how long it takes for materials to decompose. Ask them where they think their school's waste goes and how long it takes for it to decompose.



# Adaptations for Different Grades

Choose level most appropriate for your class.

## Beginner:

Follow the Activity instructions.

Encourage each group to illustrate the changes in their landfills (can use the backside of **Making a Modern Sanitary Landfill Handout** for this purpose) and share their landfill's progress with the class.

## Intermediate:

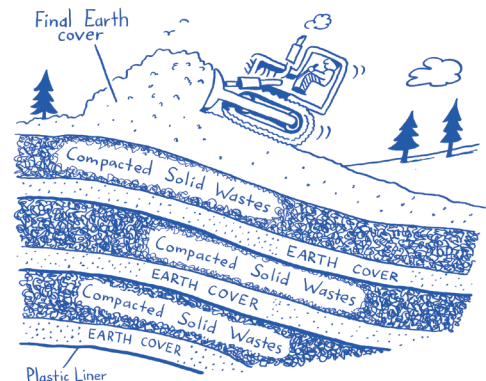
Follow the Activity instructions and have each student record the changes (can use the backside of **Making a Modern Sanitary Landfill Handout** for this purpose) and write a summary report of this project. Each group should present their findings to the class using a display board or PowerPoint and should address how their models are similar and different to real landfills.

## Advanced:

Follow the Activity instructions.

Ask each group to address the following questions in a written paper and class presentation:

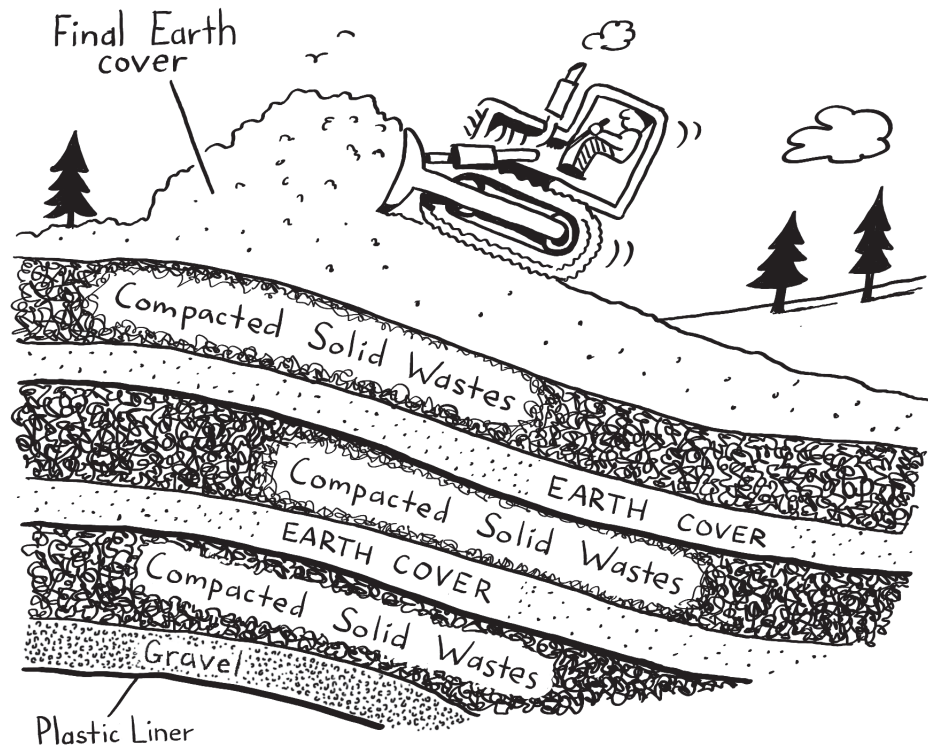
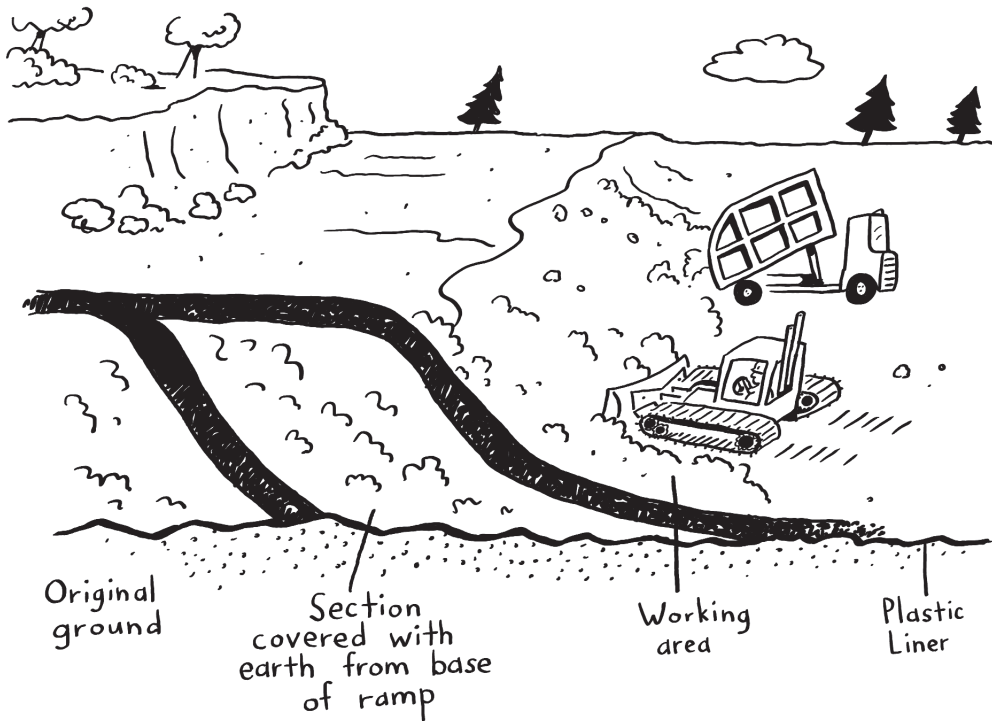
1. How is your model similar to a real landfill? How is it different?
2. How long did it take for some of the waste in your landfill to decompose beyond recognition?
3. Did layers closer to the top decompose faster or slower than layers closer to the bottom?
4. What variables contribute to the rate of decomposition?





# What Happens to Waste?

## A Landfill Up Close Handout







# What Happens to Waste?

## Making a Modern Sanitary Landfill Handout

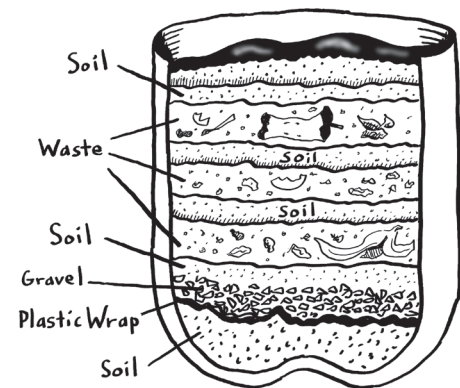
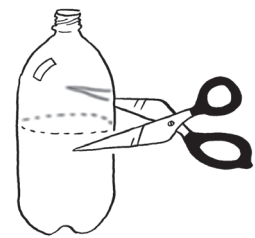
### Materials:

- **Transparent plastic container** (large plastic bottle with cap, or see-through plastic box with lid)
- **Scissors**
- **Soil** (4" – 6" worth per group)
- **Plastic wrap**
- **Gravel** or fish tank rocks (1 cup per group)
- **Non-recyclable trash** (such as food scraps, used napkins, plastic bags, old rags)
- **Water**
- **Plastic tape**
- **Observation journals**

### Instructions:

1. Use a see-through container so you can watch the progress of what's inside your mini-landfill.
2. If you're using a bottle or jug, cut the bottle in half, keeping the top portion and cap. If it's a plastic box, make sure it can be closed airtight.
3. Put in a 1" – 2" layer of soil, which is like the ground under all landfills.
4. Spread the plastic wrap over the soil. This represents the liner found in a sanitary landfill which keeps the leachate from leaking out from the landfill into the groundwater.
5. Add a layer of gravel. This represents the gravel used in landfills to allow leachate to drain away.
6. Evenly spread some of the waste items collected onto the gravel. Bulldozers spread the waste this way in a real landfill. Make sure some of the waste items are close to the transparent container's sides so you can watch the decomposition process.
7. Add a layer of soil.
8. Alternate waste and soil layers three times each.
9. Occasionally sprinkle water on the landfill to represent rainwater.
10. Replace the top portion of the bottle, securing it tightly with tape. If you're using a plastic container, put the top back on. Make sure the container's top is airtight to keep it from smelling.
11. Every 2 – 3 days, unscrew the cap (or open the lid if you're using a container) for a few moments to let air in, and water lightly. Be careful not to spill any of your landfill's contents!!

Plastic soda bottle



# Tracking What Happens to the Waste in Your Mini-Landfill

Now that you have made a mini-landfill, track what is happening to the waste that is buried inside.

Date	Draw or Write Your Observations

## What Happens to Waste?

# Where Does School Trash Go?

### Time:

30 – 45 minutes

### Goals and Objectives:

Students will investigate and write about your school's system for waste disposal.

### Subjects:

English Language Arts, Science

### Teacher's Note:

*This Activity is most effective if students are given an opportunity to interview the school's custodial and sustainability staff. You may want to include the students' findings on your class website. This Activity can be done in conjunction with these other Activities: **Chapter 3, Activity 1: Recycling in the Classroom** and **Chapter 4, Activity 2: Getting Your School to Be a Super Recycler.***

### Vocabulary:

custodian, recycle, reduce, reuse, Sustainability Coordinator

### Materials:

- Class **website** (optional)
- **Internet access** and staff for research

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

### Warm Up:

**Class Discussion:** Determine students' prior knowledge and understanding of where school trash goes.

**Suggested Discussion:** Where do you think school trash goes? What kind of waste disposal system does your school practice?

### Exploration:

1. Ask the students to investigate the following questions by researching information on the Internet and interviewing school staff:
  - How much trash does each class make each day?
  - How much does the whole school produce in a week?
  - Who is responsible for waste disposal and what specifically do these staff members do?
  - What is the role of the custodian?
  - What is the role of the Sustainability Coordinator?
  - What is the role of each student?
  - How often is the garbage picked up?

- How often are the recyclables picked up? Who picks them up?
  - What time of day do these trucks pick up the recyclables?
  - Do different trucks pick up different types of recyclables? If so, describe what they look like, how often they pick up recyclables, and how recyclables should be bagged.
2. After they have gathered information from their research and quotes from their interviews, have the students compose articles that summarize their findings. They should also include at least one illustration, hand-drawn or printed, with their articles.
  3. If you have already set up a class website, students can publish their articles online. If you do not have one and choose not to set one up, you can have students either compile a newsletter of the articles or have each student present their articles to the class.

### Expanded Exploration:

Engage students in a discussion about what happens to their waste after it is collected at the curb. Where does it go? Does it all go to one place? Or do trash and recyclables go to different places?

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## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Include a **read aloud** component by having students read each other's articles.

### Intermediate:

Follow the Activity instructions.

Encourage the students to come up with their own related questions to investigate; have them work in teams to present a series of interlinked articles to the class.

Students can work in small groups to present a video or live news presentations of their findings to the class.

### Advanced:

Follow the Activity instructions.

Have the students work in teams, using their articles to develop either a documentary video or a live informational presentation for an audience of new students. Each group presents their project to the class.

## What Happens to Waste?

# Exploring How Long It Takes for Basic Materials to Decompose

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**Time:**

30 minutes

**Subjects:**

English Language Arts, Science

**Vocabulary:**

biodegradable, decompose, decomposition

**Goals and Objectives:**

Students will learn about how long it takes for certain materials to decompose and see what impact the materials they use have on the environment.

**Teacher's Note:**

*If possible, bring in some of the items listed on the **Decomposition Flashcards**.*

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**Materials:**

- Copies of **Decomposition Worksheet**
  - **Decomposition Timeline**
  - Copies of **Decomposition Flashcards**
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of how long it takes for basic materials to decompose.

**Suggested Discussion:** What is decomposition? What happens to our garbage when we throw it away?

**Exploration:**

1. Distribute copies of the **Decomposition Worksheet**.
2. Shuffle the **Decomposition Flashcards** and deal one to every student or group of students. If available, give each student or group the actual item that matches their flashcard.
3. Every student should write down a guess for every item on their **Decomposition Worksheet**. If working in groups, have them discuss their reasoning and decide on an answer together.
4. Have students (or a representative from each group) stand and line up in sequence according to how long they think it takes their item to decompose. Each student should present a case for their item.

5. Referring to the **Decomposition Timeline**, reveal the correct answers one by one, and that student immediately moves to the proper sequence in the line. By the end of this Activity, students are standing in the proper Decomposition order.
6. Have students discuss and answer the questions listed on the back of their **Decomposition Worksheet**.

### Expanded Exploration:

To easily add a creative project-based component to the Activity, give every student a tile, colored note-card, or another reused item. On the tile have the students write the name of the item, draw a small sketch of it, and write how long the item takes to decompose. Then use glue or 2-sided tape to adhere the tiles to a board or an existing frame.

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## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Ask each pair of students to create a poster that illustrates the amount of time it takes for certain materials to decompose. Encourage them to share their posters with the class and display them throughout the school.

### Intermediate:

Follow the Activity instructions.

Have the students work in small groups. Give them the choice between making a group PSA (public service announcements poster) or a sculpture that reuses some classroom waste items. Ask them to share their projects with the class.

### Advanced:

Follow the Activity instructions.

Have students make a digital **Decomposition Timeline** using computers. Students can research various decomposition rates for specific items and insert photos and information about them into a presentation.







# What Happens to Waste?

## Decomposition Worksheet

Name \_\_\_\_\_ Date \_\_\_\_\_

Why will some of the items last a long time in the environment?

Why won't the plastic items ever really decompose?

Is it okay to litter any of the items? Why?

What happens when items are put in a landfill and not exposed to air? How does this affect decomposition?

What items could be reused or recycled?

# What Happens to Waste?

## Decomposition Flashcards

<b>Loose-leaf paper</b> 	<b>Banana peel</b> 	<b>Cotton t-shirt</b> 	<b>Wool sock</b> 
<b>Milk carton</b> 	<b>Paper Plate</b> 	<b>Plastic garbage bag</b> 	<b>Painted wood</b> 
<b>Nylon fabric</b> 	<b>Rubber boot sole</b> 	<b>Steel can</b> 	<b>Plastic cup</b> 
<b>Aluminum can</b> 	<b>Plastic six-pack holder</b> 	<b>Glass bottle</b> 	<b>Plastic bottle</b> 

## What Happens to Waste?

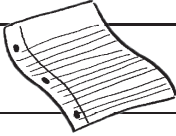

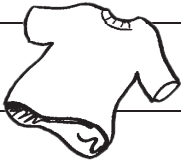




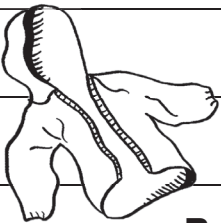
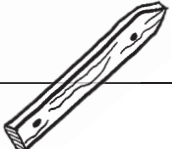
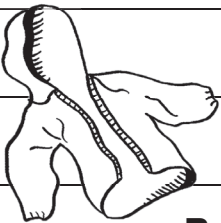







# Decomposition Flashcards

<p>Guess how long it takes this item to decompose.</p>	<p>Guess how long it takes this item to decompose.</p>	<p>Guess how long it takes this item to decompose.</p>	<p>Guess how long it takes this item to decompose.</p>
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# What Happens to Waste?

## Decomposition Timeline

This item... ..takes this long to decompose when exposed to air.

	<b>Loose-leaf paper</b>	<b>2 - 4 weeks</b>	
	<b>Banana peel</b>	<b>2 - 5 weeks</b>	
	<b>Cotton t-shirt</b>	<b>1 - 5 months</b>	
	<b>Wool sock</b>	<b>1 year</b>	
	<b>Milk carton</b>	<b>5 years</b>	
	<b>Paper plate</b>	<b>5 years</b>	
	<b>Plastic garbage bag</b>	<b>10 - 20 years</b>	
	<b>Painted wood</b>	<b>13 years</b>	
	<b>Nylon fabric</b>	<b>30 - 40 years</b>	
	<b>Rubber boot sole</b>	<b>50 - 80 years</b>	
	<b>Steel can</b>	<b>100 years</b>	
	<b>Plastic cup</b>	<b>250 years</b>	
	<b>Aluminum can</b>	<b>200 - 500 years</b>	
	<b>Plastic six-pack holder</b>	<b>450 years</b>	
	<b>Glass bottle</b>	<b>unknown</b>	
	<b>Plastic bottle</b>	<b>unknown</b>	



## What Happens to Waste?

# Banana Breakdown

### Time:

20 minutes

### Subjects:

English Language Arts, Science

### Vocabulary:

decay, decompose,  
decomposition, organic

### Goals and Objectives:

Students will study the process of decomposition and apply the knowledge to decisions they make about their own waste. They will gain hands-on experience implementing the Scientific Method as they observe a banana peel decaying in six different conditions (water, soil, with and without sunlight, with and without oxygen), and complete a writing assignment.

### Materials:

- Six **banana peels**
- Six **jars** or resealable plastic bags
- **Water**
- Copies of ***Banana Breakdown Handout***

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

### Warm Up:

**Class Discussion:** Determine students' prior knowledge and understanding of how organic materials decompose.

**Suggested Discussion:** What happens to garbage after you throw it away? What variables impact the rate of decomposition or decay?



### Exploration:

1. Distribute copies of ***Banana Breakdown Handout***.
2. **Questions/Predictions:** Do banana peels decompose faster in light or darkness? Do they decompose faster in a dry or wet environment? Do they decompose faster when exposed to oxygen or without oxygen?
3. Ask the students to write their predictions or hypotheses on ***Banana Breakdown Handout***.
4. Divide the class into six groups and assign each group one variable to test: sunlight/darkness, water/soil, oxygen/no oxygen.

**5. Procedure:** Each group will place their banana peel in a jar or resealable bag and create the condition that is being tested.

**Light/Darkness:** Place one container near a window and place the other in a drawer or closet or a similar place without light.

**Wet/Dry:** Add water to one container and leave the other container dry.

**Oxygen/No Oxygen:** Seal one container and leave the other unsealed.

**6.** Every few days, have the students record the changes they observe. They should note the date, draw and describe their observations.

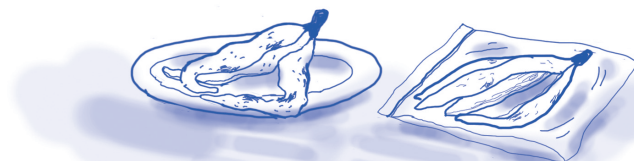
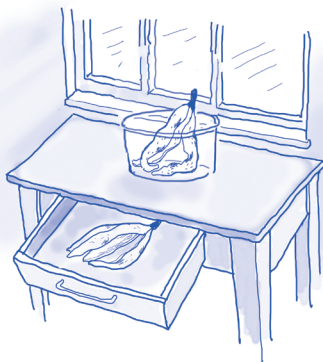
**7.** After all of the banana peels have decomposed, have each group present their observations to the class.

**8. Conclusions:** Have the class compare all of the results. Each student should write an overall conclusion and complete a follow-up writing assignment (see Adaptations for different levels).

### Expanded Exploration:

Engage students in a discussion about their conclusions and how this can lead to strategies for organic waste disposal.

- What are some ways people can dispose of vegetarian food scraps?
- Would food scraps decompose faster in a compost heap or in a landfill?
- Encourage them to imagine how long it takes for other materials to decompose in a landfill, where light and oxygen are limited.
- Applying what they have learned about environmental conditions and their impact on decomposition, what do they predict will be the decomposition rate for waste littered in a river?



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## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Review the meanings of the vocabulary terms and refer to the **Glossary** for definitions. Explain the elements of a scientific experiment in context of testing the impacts of various conditions on the decomposition rate of a banana peel. When the experiment has been completed, have the students create how-to books that illustrate and describe the steps of the experiment. They should present their books to the class.

### Intermediate:

Follow the Activity instructions and include a **writing** component in which they implement the Scientific Method. Students should present their hypotheses, ideas for analysis, and final conclusions to the class.

### Possible Hypotheses:

- Light will/will not make a banana peel decay faster.
- Water will/will not make a banana peel decay faster.
- Oxygen will/will not make a banana peel decay faster.

### Possible Analysis and Conclusions:

- How did the banana peel change during the week?
- What conditions made the banana peel decay faster?
- What conditions made the banana peel decay more slowly?

### Advanced:

Follow the Activity instructions.

Students should write a formal report of their observations and the overall class findings, implementing the Scientific Method. Each group should present their results and conclusions to the class using photography, PowerPoint, and/or a display board.





# What Happens to Waste?

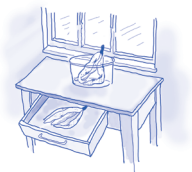
## Banana Breakdown Handout

Name \_\_\_\_\_ Date \_\_\_\_\_

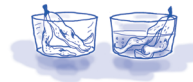
Please answer the following questions.

### Part 1: Questions and Predictions

1. Do you think banana peels will decompose faster in light or darkness?



2. Do you think banana peels will decompose faster in a dry or wet environment?



3. Do you think banana peels will decompose faster when exposed to oxygen or without oxygen?



### Part 2: Procedure

1. Which variable will your team test: sunlight/darkness, water/soil, oxygen/no oxygen?
2. Describe how your team plans to test the variable that you were assigned.
3. Check the box that applies to your team's experiment:
  - Light/Darkness:** Place one container near a window; place the other in a drawer or closet, or a similar place without light.
  - Wet/Dry:** Add water to one container; leave the other container dry.
  - Oxygen/No Oxygen:** Seal one container; leave the other unsealed.

### Part 3: Observations

Please note the date and write a brief description of your observations.

Date	Description

### Part 4: Conclusions

1. How long did it take for your team’s banana peel to decompose?
2. Which variables sped up the decomposition process?
3. Which variables slowed down the decomposition?

## What Happens to Waste?

# Litter in a River Experiment

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**Time:**

20 minutes

**Subjects:**

English Language Arts, Science

**Goals and Objectives:**

Students will create a model of a river and observe what happens to the water when trash is added. They will complete a writing assignment that examines how this experiment represents what happens to rivers and the sea when they become littered with trash.

**Vocabulary:**

contamination, decomposition, ecosystem, litter, pollution

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**Materials:**

- A large **jar** or glass bowl
  - **Sand, stones,** or other naturally present objects
  - **Small pieces of litter:** fruit rinds, nails, newspaper, plastic wrap, fabric
  - **Water**
  - Copies of *Litter in a River Handout*
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of the effects of litter on rivers and the sea.

**Suggested Discussion:** What happens to bodies of water when they become littered with trash? How does this contamination impact us?

**Exploration:**

1. Fill a large clear jar or glass bowl with water. Explain to the class that this represents a river or the sea.
2. You may want to add stones, sand, or other items that might naturally be present.
3. Invite the class to add small pieces of trash to the water.
4. Distribute copies of *Litter in a River Handout*.
5. Have the class write down the date and describe the littered water.

6. Leave the container alone and uncovered for a couple of weeks.
7. Ask the class to record the changes they observe over time on the ***Litter in a River Handout***.

### Expanded Exploration:

Engage the students in a discussion about the impacts of litter on the environment. Ask them to describe what happened to the water in their experiment and to imagine what would happen to the plants and animals that live in the water. Would they want to drink or swim in the water? How can students help reduce litter? How can they help their school or neighborhood community cut down on litter?

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## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Review the vocabulary words and refer to the **Glossary** for definitions. Encourage the students to illustrate and describe on a poster the changes they observed in the experiment.

### Intermediate:

Follow the Activity instructions and assign a research project that applies their observations to actual cases of water pollution. Students should write articles about their findings and present their articles to the class.

### Advanced:

Follow the Activity instructions and incorporate a research project about the long-term impact of water pollution on ecosystems. The articles should also include solutions, ways of managing water pollution, and strategies for decontaminating the water. They can present their articles to the class.



# What Happens to Waste?

## Litter in a River Handout

Name \_\_\_\_\_ Date \_\_\_\_\_

1. Write a description of and illustrate the container filled with clean water.
2. Describe and illustrate the trash that was added to the container.
3. What does the water look like one week later? Please include the date and a description of the litter and the water in your answer.
4. What does the water look like two weeks after the trash was added? Please include the date and description of the litter and water in your answer.
5. What happens to bodies of water when they become littered with trash?
6. How does this contamination impact plant life, animals, and people?



# What Happens to Waste?

## Studying Litter in the School Community

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**Time:**

45 minutes

**Subjects:**

English Language Arts, Science

**Vocabulary:**

litter, recycle, reduce, reuse

**Goals and Objectives:**

Students will explore the school grounds and record on **Litter in the School Community Handout** how much litter they find. They will properly dispose of the waste. They will analyze their findings and write essays that propose strategies to reduce the amount of litter.

**Teacher's Note:**

*This Activity can be done in conjunction with **Chapter 4, Activity 7: Litter Awareness Campaign**.*

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**Materials:**

- Clear bags for collecting litter
  - Copies of **Litter in the School Community Handout**
  - Gloves
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of litter and how much litter they think accumulates around the school each day and each week.

**Suggested Discussion:** Do you think there's a lot of litter around the school? Where do you think most of it occurs? Why do people litter?

**Exploration:**

1. Distribute copies of **Litter in the School Community Handout** and clear bags to collect litter.
2. Have the students work in pairs or small groups.
3. **Caution against picking up dangerous items, including needles or shards of glass.** But let them know that they should document everything.
4. They will search for litter inside the school building and outside on the school grounds for 20 – 30 minutes, and record their findings on **Litter in the School Community Handout**. The students will collect and properly dispose of any litter that they find, placing garbage in one bag, and recyclables in two separate bags for paper and for metal, glass, plastic, foil, and cartons. Any dangerous items should be left where they are, and reported to the custodian or Principal.



5. When they return to class, discuss any patterns that the students noticed. Were there specific areas of the property that seemed to have more litter than others? Here are some other questions to discuss:
- How many items of litter did they find in total?
  - How many metal items did they find?
  - How many glass items did they find?
  - How many plastic items did they find?
  - How many paper items did they find?
  - How many cloth items did they find?
  - How many food waste items did they find?
  - What else did they find?
  - Did they find more litter indoors or outdoors?
  - Why do they think people litter?
  - What are some ideas they have about reducing litter?

### Expanded Exploration:

Engage the students in a discussion about how they can encourage people to stop littering. Why do they think people litter? What are some ideas the school community could implement in order to reduce the amount of litter? Let them know that the Department of Sanitation offers a program to encourage volunteer clean-ups, providing bags, gloves, and tools. More information can be found on the New York City Department of Sanitation website ([nyc.gov/sanitation](https://nyc.gov/sanitation)) or by calling 311.

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## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Instead of having the students work in pairs, you may want to lead the entire class in the school grounds exploration. Encourage the students to create cartoon posters that incorporate their findings and a plan to reduce litter in the school community. They can share their work with the class.

### Intermediate:

Follow the Activity instructions.

Have the students make posters that illustrate ways to properly discard waste in garbage or recycling bins and why reducing litter is important. Encourage the students to present their posters to the class and display them around the school.

### Advanced:

Follow the Activity instructions and incorporate an **applied research** component. Ask the students to use their findings to estimate how much litter is created each day, week, and month. How many of the items could be reused or recycled? Students should share their research essays with the class and the larger school community.

# What Happens to Waste?

## Litter in the School Community Handout

Name \_\_\_\_\_ Date \_\_\_\_\_

List the items you found on the school grounds.

Items	Indoors	Outdoors

Where did you find the most litter?

Why do you think there was so much litter?

Please tally the number of items you found according to material type

Metal	Glass	Plastic	Paper	Cloth	Food Scraps	Other

What are some ideas you have about how your school community can reduce the amount of litter?



# What Happens to Waste?

## Learning Standards

### Activity 1: Knowing Where Garbage Goes After It's Thrown Away

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Reading

- Subsections 1, 2 Key Ideas and Details
- Subsection 4 Craft and Structure

##### College and Career Readiness Anchor Standards for Writing

- Subsections 1, 2, 3 Text Types and Purposes
- Subsections 4, 6 Production and Distribution of Writing
- Subsection 7 Research to Build and Present Knowledge

##### College and Career Readiness Anchor Standards for Speaking and Listening

- Subsections 1, 2 Comprehension and Collaboration
- Subsections 4, 6 Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

- Subsections 1, 2 Conventions of Standard English
- Subsection 3 Knowledge of Language
- Subsection 6 Vocabulary Acquisition and Use

#### The Applied Learning Performance Standards

- A2 Communication Tools and Techniques
- A5 Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

#### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

#### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

#### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

#### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

#### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

#### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

#### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

#### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

#### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

#### S1.1a,b,c

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.

# What Happens to Waste?

## Learning Standards

### Activity 2: Making a Modern Sanitary Landfill

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Writing

Subsection 2	Text Types and Purposes
Subsection 4	Production and Distribution of Writing
Subsection 7	Research to Build and Present Knowledge

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsections 4, 6	Presentation of Knowledge and Ideas
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##### College and Career Readiness Anchor Standards for Language

Subsections 1, 2	Conventions of Standard English
Subsection 3	Knowledge of Language

#### The Applied Learning Performance Standards

A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

##### S1.1a,b,c

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.

##### Standard 1-1.1a, 1.1b, 1.1c, 3.1, 3.2, 3.3

The role of scientific inquiry in studying biology.

##### Standards 1-1.2a, 1.2b, 1.3a, 1.3b, 2.1, 2.2, 2.3a, 2.3b, 2.3c, 2.4, 3.4a, 3.4b, 3.4c, 3.5a, 3.5b

The methods of science.

# What Happens to Waste?

## Learning Standards

### Activity 3: Where Does School Trash Go?

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Reading**

Subsection 1 Key Ideas and Details

##### **College and Career Readiness Anchor Standards for Writing**

Subsections 1, 2, 3 Text Types and Purposes

Subsections 4, 5, 6 Production and Distribution of Writing

Subsections 7, 8, 9 Research to Build and Present Knowledge

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

Subsections 1, 2 Comprehension and Collaboration

Subsections 4, 6 Presentation of Knowledge and Ideas

##### **College and Career Readiness Anchor Standards for Language**

Subsections 1, 2 Conventions of Standard English

Subsection 3 Knowledge of Language

#### **The Applied Learning Performance Standards**

A2 Communication Tools and Techniques

A3 Information Tools and Techniques

A5 Tools and Techniques for Working With Others

#### **New York City Science Scope & Sequence**

##### **7.1a, 7.1b**

Human influences on the environment: positive influences.

##### **7.1c, 7.2a, 7.2b, 7.2c**

Human influences on the environment: negative influences.

##### **7.3a, 7.3b**

Human influences on the environment: decision making (risk/benefit).

##### **ICT 5.2, IPS 1.1-1.4, IPS 2.1**

Packaging and solid waste.

##### **LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1**

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### **LE 5.1d,e, LE 6.1 a,b**

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### **LE 6.1c, ICT 5.1, 5.2**

Renewable and nonrenewable sources of materials.

##### **LE 7.2b,c, LE 7.2d**

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.2b,c, LE 7.2d**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### **LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1**

Water issues: depletion; pollution.

##### **LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1**

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

# What Happens to Waste?

## Learning Standards

### Activity 4: Exploring How Long It Takes for Basic Materials to Decompose

**New York State Common Core Learning Standards for English Language Arts & Literacy**

**College and Career Readiness Anchor Standards for Reading**

Subsection 1 Key Ideas and Details

**College and Career Readiness Anchor Standards for Writing**

Subsection 2 Text Types and Purposes

Subsection 4 Production and Distribution of Writing

**College and Career Readiness Anchor Standards for Speaking and Listening**

Subsection 1 Comprehension and Collaboration

Subsections 4, 6 Presentation of Knowledge and Ideas

**College and Career Readiness Anchor Standards for Language**

Subsections 1, 2 Conventions of Standard English

**The Applied Learning Performance Standards**

A2 Communication Tools and Techniques

A5 Tools and Techniques for Working With Others

**New York City Science Scope & Sequence**

**7.1a, 7.1b**

Human influences on the environment: positive influences.

**7.1c, 7.2a, 7.2b, 7.2c**

Human influences on the environment: negative influences.

**7.3a, 7.3b**

Human influences on the environment: decision making (risk/benefit).

**ICT 5.2, IPS 1.1-1.4, IPS 2.1**

Packaging and solid waste.

**LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1**

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

**LE 6.1c, ICT 5.1, 5.2**

Renewable and nonrenewable sources of materials.

**LE 7.1a,b**

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

**LE 7.1b,c**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

**LE 7.2b,c, LE 7.2d**

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

**LE 7.2b,c, LE 7.2d**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

**LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1**

Water issues: depletion; pollution.

**LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1**

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

**PS 3.1b,c**

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

**S1.1a,b,c**

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.

# What Happens to Waste?

## Learning Standards

### Activity 5: Banana Breakdown

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Writing**

Subsection 2	Text Types and Purposes
Subsection 4	Production and Distribution of Writing

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

Subsections 1, 2	Comprehension and Collaboration
Subsections 4, 6	Presentation of Knowledge and Ideas

##### **College and Career Readiness Anchor Standards for Language**

Subsections 1, 2	Conventions of Standard English
Subsection 3	Knowledge of Language
Subsection 6	Vocabulary Acquisition and Use

#### **The Applied Learning Performance Standards**

A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### **New York City Science Scope & Sequence**

##### **7.1 a, 7.1b**

Human influences on the environment: positive influences.

##### **7.1c, 7.2a, 7.2b, 7.2c**

Human influences on the environment: negative influences.

##### **7.3a, 7.3b**

Human influences on the environment: decision making (risk/benefit).

##### **LE 5.1d,e, LE 6.1 a,b**

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### **LE 7.1a,b**

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.1b,c**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### **LE 7.2b,c, LE 7.2d**

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.2b,c, LE 7.2d**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### **LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1**

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

##### **PS 3.1b,c**

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

##### **S1.1a,b,c**

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.

##### **Standard 1–1.2a, 1.2b, 1.3a, 1.3b, 2.1, 2.2, 2.3a, 2.3b, 2.3c, 2.4, 3.4a, 3.4b, 3.4c, 3.5a, 3.5b**

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# What Happens to Waste?

## Learning Standards

### Activity 6: Litter in a River Experiment

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Reading

Subsections 1, 2 Key Ideas and Details

##### College and Career Readiness Anchor Standards for Writing

Subsections 2, 3 Text Types and Purposes

Subsection 4 Production and Distribution of Writing

Subsections 7, 9 Research to Build Present Knowledge

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsection 2 Comprehension and Collaboration

Subsections 4, 6 Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

Subsections 1, 2 Conventions of Standard English

Subsection 3 Knowledge of Language

Subsection 6 Vocabulary Acquisition and Use

#### The Applied Learning Performance Standards

A2 Communication Tools and Techniques

A5 Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

##### S1.1a,b,c

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.

# What Happens to Waste?

## Learning Standards

### Activity 7: Studying Litter in the School Community

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Writing

Subsections 2, 3	Text Types and Purposes
Subsection 4	Production and Distribution of Writing
Subsections 7, 9	Research to Build Present Knowledge

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsection 2	Comprehension and Collaboration
Subsections 4, 6	Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

Subsections 1, 2	Conventions of Standard English
Subsection 3	Knowledge of Language
Subsection 6	Vocabulary Acquisition and Use

#### The Applied Learning Performance Standards

A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1 a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

##### S1.1a,b,c

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.



## Chapter 3

# What Is Reduce, Reuse, and Recycle (RRR)?



### Chapter Focus:

The Activities in this chapter help students conduct in-depth explorations about what it actually means to reduce, reuse, and recycle with specific examples of how to do this at school and at home.

## Reduce First, Then Reuse, Then Recycle

Although it is impossible to eliminate waste completely, we can easily make big reductions in the amount of waste we produce. Here are three simple steps that each of us can take to make a difference:

1. **Reduce:** stop waste before it happens.
2. **Reuse:** use things more than once.
3. **Recycle:** separate materials so that they can be made into other products.

### Reduce

Stopping waste before it happens may sound simple, but it's something that most people don't often think about or practice. Reducing waste means saying "no" to unneeded shopping bags, napkins, excessive packaging, and other items that are offered to us when we shop. It also means buying only the things we really need so that we throw out less.

**Say "no bag, thanks" whenever you can.** If you're buying only a few small items, just put them in your purse, tote, or briefcase. Or bring your own reusable bag.

**Use your own drink container** for your coffee, tea, water, soup, and other drinks instead of using disposable cups or bowls. Replacing disposable cups with your own reusable mug or thermos might seem like an insignificant act, but consider the amount of waste that could be eliminated if thousands or millions of fellow New Yorkers did the same. A good reusable mug can also help you from spilling your drink. Many coffee shops also provide a discount to those who bring their own mug.

**Unsubscribe from unwanted mail and catalogs.** NYC has partnered with Catalog Choice to offer New Yorkers a free, easy way to opt out of unwanted mailings. This service allows you to search by company to opt out of your unwanted mail. In addition, it helps match you with many other opt out services available. See [nyc.gov/wasteless/junkmail](https://nyc.gov/wasteless/junkmail) for more info.



## Reuse

We can reuse many everyday items that we frequently toss out. For example, we can reuse plastic bags as garbage bags, and can return hangers to the dry cleaners so they can be used again. Instead of using paper towels, we can wash out sponges or cloths so that they can be used many times.

Another form of reuse is donation to charity. We can give away items that we no longer want in order to make them available to others. When we reuse, we cut down on pollution while saving resources, energy, and money.

Visit [nyc.gov/stuffexchange](https://nyc.gov/stuffexchange) or download the iPhone app to learn where in NYC to donate, buy, or sell antiques, artifacts, collectibles, and gently used goods (including high-end and designer items).

Request a re-fashionNYC clothing donation bin for your building. re-fashionNYC is a partnership between NYC and Housing Works to make clothing donation easy with in-building drop-off for buildings with 10 or more units. See [nyc.gov/refashion](https://nyc.gov/refashion) for more info.



## Recycle

Recycling is breaking down products into raw materials and using those materials to make something new. It's also important to think about the recycling loop when we shop. Using products made from recycled materials maximizes resources and the benefits of recycling itself.

Principals, custodians, food service staff, teachers, and students all have responsibilities to make sure that materials designated for recycling are kept separate from garbage and properly placed out for Department of Sanitation collection.

To set up a successful school recycling program, start by talking with your Principal about your current program, NYC's requirements, and goals for improvement.

- The Department of Sanitation does not provide recycling or garbage containers. Your custodian or Principal can purchase recycling bins through their standard DOE procurement process.
- Any type of container can be used for recycling indoors — you can even use labeled cardboard boxes or empty buckets from the cafeteria kitchen that would otherwise be discarded.
- Label recycling containers with free Department of Sanitation decals (or use paint or permanent marker). Post signs explaining what to recycle near every container.

Visit [nyc.gov/recycle](https://nyc.gov/recycle) to learn more about what and how to recycle in New York City.

## RRR Can Make a Difference!

We can cut down on the amount of waste that we discard by taking steps to reduce how much garbage each of us generates, reusing products whenever possible, and recycling as much of the rest as we can.



## What Is Reduce, Reuse, and Recycle (RRR)?

# Recycling in the Classroom

---

**Time:**

20 minutes

**Subjects:**

English Language Arts,  
Science, Art

**Vocabulary:**

cullet, recycle, reduce, reuse,  
slurry, smelt

**Goals and Objectives:**

Students will engage in an Activity that helps them understand the recycling process and what types of items are recyclable. They will read and complete **Recycling Handout** and use this knowledge to either create or enhance a recycling area.

**Teacher's Note:**

*This Activity can be done in conjunction with these other Activities: **Chapter 2, Activity 3: Where Does School Trash Go?** and **Chapter 4, Activity 2: Getting Your School to Be a Super Recycler.***

---

**Materials:**

- Copies of **Recycling Handout**
  - **Recyclable items:** plastic bottles, metal cans, glass jars, aluminum foil, newspapers, magazines, junk mail
  - **Recycling bin** for paper & cardboard
  - **Recycling bin** for metal, glass, plastic & cartons
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Teacher Prep:**

If this is your first Activity from this chapter, please read the **Chapter 3 Introduction**. Refer to the **Glossary** for definitions of vocabulary words.

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of the school's recycling system.

**Suggested Discussion:** Ask the class where they discard recyclable items. What do the bins look like?

### Exploration:

1. Distribute copies of **Recycling Handout** and display the recyclable items from the list.
2. Read **Recycling Handout** with the class.
3. Show each recyclable item to the class and ask them to identify the appropriate recycling bin to dispose of the item.
4. Have them complete **Recycling Handout**, drawing or writing examples of recyclable items that should be placed in each bin.
5. Discuss your classroom's recycling system with the class, or create one together. If you do not want to have more than a paper recycling bin in your classroom, remind the class of where they can find the nearest blue recycling bin.

### Expanded Exploration:

Engage students in a discussion about the importance of recycling. Ask them if they understand that recycling is only part of the solution. What are some other ways they can reduce the amount of waste they produce?

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Include a **read aloud** component in the warm-up with the **Chapter 3 Introduction**. Follow the Activity instructions.

Have the class cut out and attach their illustrations on or near the recycling bins to help remind students which types of items should be placed in each bin. They can work together to decide on placement and presentation.

### Intermediate:

Follow the Activity instructions.

Have the class work together in small groups to either set up or enhance a set of recycling bins in the school. They can create posters and collages to serve as a visual aid to help students remember which recyclable items go in each bin.

### Advanced:

Follow the Activity instructions and have the students work together on a follow-up project. Give them the option of using photography and drawings to create visual aids with recycling instructions to be placed above bins, or make a short video or audio recordings about recycling to be shared with the school community.

# What Is Reduce, Reuse, Recycle (RRR)?

## Recycling Handout

Name \_\_\_\_\_ Date \_\_\_\_\_

In New York City we sort our trash and place recyclable items in two different streams. Visit [nyc.gov/recycle](http://nyc.gov/recycle) for detailed recycling info.

Paper & Cardboard	Metal, Glass, Plastic & Cartons
newspapers, magazines, catalogs	metal cans
white & colored paper	aluminum foil wrap & trays
mail & envelopes	metal caps & lids
paper bags	household metal
wrapping paper	glass bottles and jars
soft-cover books	plastic bottles, jugs & jars
cardboard egg cartons & trays	rigid plastic caps & lids
smooth cardboard	rigid plastic containers, housewares & packaging
corrugated cardboard boxes	food & beverage cartons & drink boxes

## What Happens to Recyclables After They Are Collected?

### Paper

Paper is collected and sorted by type, baled, and then sent to a paper mill. There, it's mixed with warm water to form what's called **slurry**. Staples, glue, and coating are removed and the mixture is bleached and de-inked. Finally, the slurry is spread on large screens, rolled, and formed into finished sheets of recycled paper.



### Aluminum

Aluminum is shredded, decontaminated, and then melted down or **smelted**. Then it's poured into blocks and shipped to manufacturers who melt it again and make it into new products.

Making cans from recycled aluminum uses 90 – 97% less energy than making them from the raw material, bauxite, which is mined overseas and shipped to the US for processing.

Aluminum cans and foil are the most valuable materials we can collect for recycling. They are sold, melted down, and back on the shelves as new cans and products within six weeks.





### Steel

Steel is 100% recyclable and can be reprocessed almost indefinitely. New York City sells steel cans and other metal items to scrap metal dealers and steel mills, which smelt the scrap metal to make a variety of steel products, such as new cans, bicycles, bridges, and cars.

Steel cans are generally made with 25% recycled content. They are used in packaging many products, like food, paints, shoe polish, and motor oil.

### Glass

Most glass is broken while it's transported from the curb to a Material Recovery Facility and all of it is then crushed and made into tiny glass particles called cullet. This can be used as a substitute for stone in cement and asphalt.



### Plastic

Plastic is sorted by hand, sold by type, cleaned, and made into pellets. Manufacturers use these pellets to make new products such as plastic lumber, fiberfill stuffing for jackets, and carpeting.

Clear plastic is the most useful for recycling. It can be used to make clear products, but can also be used to make colored plastics. Colored plastics cannot be de-colored or re-colored, so they have a limited use.



### Cartons

Food and beverage cartons are separated into distinct bales which are then sent to special processors who can separate the layers of paper fiber and inner foil to reclaim these commodities.



Please write or draw recyclable items in the appropriate categories below:

Paper & Cardboard	Metal, Glass, Plastic & Cartons

## What Is Reduce, Reuse, and Recycle (RRR)?

# Recycling Is Only Part of the Solution

**Time:**

30 minutes

**Vocabulary:**

reduce, reusable, reuse

**Subjects:**

English Language Arts, Science

**Goals and Objectives:**

Students will discuss different waste reduction strategies and complete a writing assignment that addresses specific ways they can reuse and reduce waste.

**Materials:**

- Examples of **overpackaged items**, including a prepackaged lunch
- A **reusable lunch container**

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of recycling and how it is only part of the solution.

**Suggested Discussion:** What are some ways that we can take responsibility for our environmental impact? In addition to recycling waste, what else can we do?

**Exploration:**

1. Review the definitions of reduce, reuse, and reusable.
  - **Reduce:** to use less of; to decrease in extent, amount, number, or other quantity
  - **Reuse:** to extend the life of an item by using it more than once, repairing or modifying it, or by creating new uses for it.
  - **Reusable:** Able to be used again, either as it is or by repairing or altering it.
2. Discuss these terms and encourage the class to brainstorm strategies in which they can reduce and reuse items each day.

3. Show examples of overpackaged items and explain what makes them overpackaged.
4. Next, share the reusable lunch container with the class. Explain why reusing a lunch container reduces waste and is better for the environment. Remind the class that most Americans produce at least four pounds of waste each day and this could be one option for reducing that amount.

### Expanded Exploration:

Engage the students in a discussion about other strategies for reducing and reusing waste. How can we reuse what we would otherwise throw away? How can we reduce the amount of items we consume?

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Have the students write a brief description of how they can reduce the amount of waste they produce and reusable alternatives they can try, like lunch containers. Have the students present their descriptions to the class.

### Intermediate:

Follow the Activity instructions.

Ask the students to write about ways they already reduce the amount of items they use and ways that they would like to continue reducing waste. They should include examples of reusing items, like lunch containers. Encourage the students to share their ideas with the class.

### Advanced:

Follow the Activity instructions.

Have each student write an article about how to reduce waste. It should include strategies they currently practice and strategies they would like to start implementing to reduce waste and reuse items even more. Have the students present their articles to the class.



## What Is Reduce, Reuse, and Recycle (RRR)?

# Aluminum Cans: Full Circle

---

**Time:**

20 minutes

**Subjects:**

English Language Arts,  
Science, Math

**Vocabulary:**

aluminum, coiled sheets, melted,  
refund, shredded, transported

**Goals and Objectives:**

Students will discover what happens to aluminum cans and how they are recycled and then resold. They will create a narrative illustration of the full circle process of recycled aluminum.

**Materials:**

- Aluminum cans (optional visual aid)
  - Poster paper
  - Markers, pencils, and/or crayons
  - Copies of *The Steps of Recycling Handout*
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of the steps involved in recycling aluminum cans

**Suggested Discussion:** Where does aluminum come from? Where does it go after it is placed in a recycling bin? Have you ever noticed people collecting cans from garbage and recycling bins? Why do you think they were doing that?

**Exploration:**

1. Distribute *The Steps of Recycling Handout* and discuss the 13 steps associated with recycling an aluminum can.
2. Discuss the value of cans. Present a few hypothetical math questions that explore how many cans someone would have to sell in order to make various amounts of money.
3. Have the students complete *The Steps of Recycling Handout* in small groups.

4. If time allows, assign each group 1 – 3 of the 13 steps and have them work together to create a narrative illustration.
5. After they are finished, have the groups present their work to the class and ask them to display the collection of posters in the order of the 13 steps.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Include a **read aloud** component in the warm-up by reading ***The Steps of Recycling Handout*** to the class. Have the students work in small groups to complete narrative illustrations of each step. They should work together to put the illustrations in the order of the 13 steps.

Ask the class if they can figure out how many cans a person would have to collect to earn a refund of one dollar.

### Intermediate:

Follow the Activity instructions and complete ***The Steps of Recycling Handout***. Have the class work in small groups to create narrative illustrations about the 13 steps. Each group should address all 13 steps and present their work to the class.

Ask the class to work together to figure out how many cans they would have to sell in order to make \$100.

### Advanced:

Follow the Activity instructions and complete ***The Steps of Recycling Handout***. Give the students the option of narrating the journey of one aluminum can, or the story of someone involved in the recycling process (for example, someone who collects cans and sells them or someone who works at the can plant). Invite them to share their narratives with the class. Search [nyc.gov/wasteless](https://www.nyc.gov/wasteless) for “scavenging” to get more info and see a video on the impact of scavenging on NYC’s recycling program.



# What Is Reduce, Reuse, Recycle (RRR)?

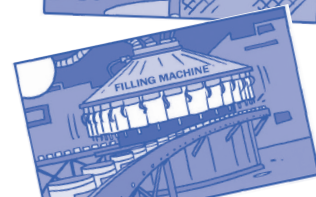
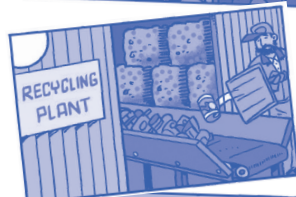
## The Steps of Recycling Handout

Name \_\_\_\_\_

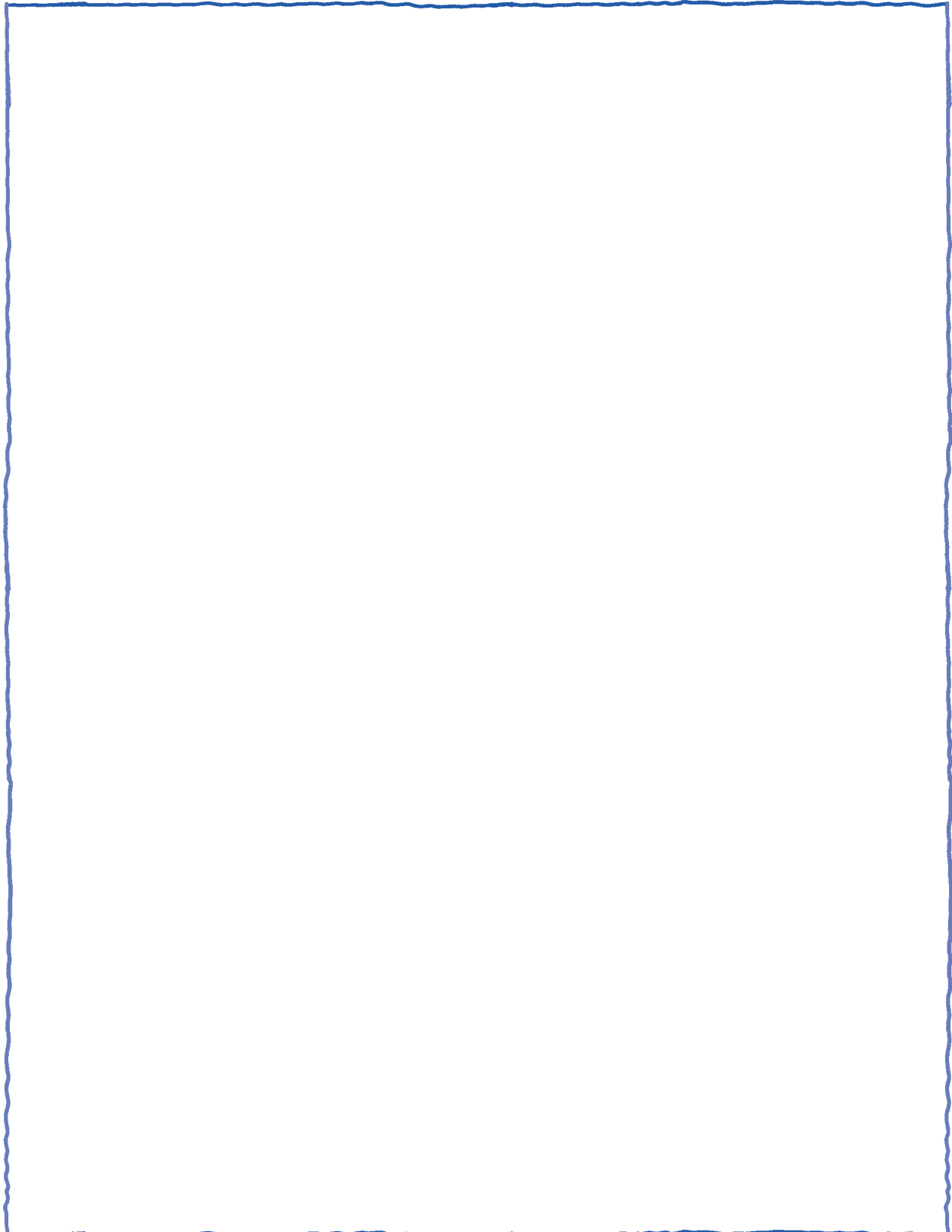
Date \_\_\_\_\_

Please read the 13 steps of recycling aluminum.

1. Buy a can of seltzer.
2. Drink it.
3. If possible, return the empty can to the store for a five-cent refund.
4. The can is transported to a can-crushing factory.
5. Collected cans are shredded.
6. The shredded cans are melted.
7. The melted cans are formed into long, coiled sheets of aluminum.
8. Aluminum coils are transported to a can manufacturing plant.
9. Aluminum coils are turned into cans and lids.
10. Aluminum cans and lids are transported to drink companies.
11. Cans are filled with drinks and lids are attached.
12. Filled cans are delivered to the store.
13. Buy a can of seltzer at the store.



Now that you have learned about the 13 steps associated with recycling an aluminum can, write a short story or illustrate a comic book describing all of the steps.



## What Is Reduce, Reuse, and Recycle (RRR)?

# Understanding When to Reduce, Reuse, or Recycle

---

**Time:**

30 minutes

**Subjects:**

English Language Arts, Science, Art

**Goals and Objectives:**

Students will study ways to reduce, reuse, and recycle. They will also complete hands-on art and writing projects that incorporate real-life application of RRR.

**Vocabulary:**

disposable, recycle, reduce, reusable, reuse

---

**Materials:**

- **Disposable items:** paper plate, paper napkin
  - **Reusable items:** ceramic plate, cloth napkin, sponge
  - **Recyclable items:** plastic jug, aluminum can
  - **Magazines** to cut up for collage
  - **Paper** to make 3 posters
  - **Markers** or colored pencils
  - **Glue** or tape
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of when to reduce, reuse, and recycle.

**Suggested Discussion:** Ask the class how they know when to recycle something. What ways have they been able to reduce the amount of waste they produce? Are there waste items that they reuse?

**Exploration:**

1. Display the items and review the vocabulary terms. Refer to the **Glossary** for definitions.
2. Ask the class to identify the disposable items. Remind them that one of the ways to cut down on waste production is by reducing the amount of disposable items they use.



3. Explain that reusing items is another way to reduce waste.
4. Ask the class to identify the reusable items.
5. Compare the disposable and reusable items. For example, suggest using a cloth napkin instead of a paper one.
6. Ask the class to identify the recyclable items.
7. Divide the class into three groups.
8. Distribute the art supplies and assign each group a different category: disposable, reusable, or recyclable.
9. Each group will make a poster representing the types of items in their category. They can cut pictures from magazines and draw images.
10. Each group will present their poster to the class. The posters can be displayed along with the actual items from each category.

### Expanded Exploration:

Engage students in a discussion about how they can reduce the amount of disposable items they use and ways to reuse and recycle more. Ask them if they have read any articles or books about the human impact on the environment.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Have the students complete a follow-up project. Ask them to think of several items they use and at least three ways they can reduce, reuse, and recycle them. They can create a brochure that illustrates these examples and share it with the class.

### Intermediate:

Follow the Activity instructions.

Students should write follow-up responses to the Activity. The response papers should describe what they consume and throw away on a typical day and how they could reduce, reuse, and recycle more. Encourage the students to share their responses with the class.

### Advanced:

Follow the Activity instructions.

Students should think of at least five ways in which they could reduce, reuse, and recycle more. They can write public service announcements or short documentary videos inspired by their real life examples. They should present their documentary projects (script or video) with the class.

## What Is Reduce, Reuse, and Recycle (RRR)?

# Reading About the Environmental Effects of Our Everyday Decisions

---

**Time:**

30 minutes

**Subjects:**

English Language Arts, Science

**Vocabulary:**

ecosystem, environment, recycle, reduce, reuse, sustainability

**Goals and Objectives:**

Students will conduct research on the Internet to select books on the environmental effects of our everyday decisions. Students will read a book, present their progress to the class, and complete a summary report that connects the information to their own consumption and waste production decisions.

**Teacher's Note:**

*Depending on your preference and on the reading levels of your class, you may want to select one book and read it together as a class. Please see the Adaptations section for more information.*

---

**Materials:**

- Internet access
  - Copies of ***Environmental Effects Handout***
  - Access to **library books**
- 

## Activity

*Following this activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of how their everyday decisions affect the environment.

**Suggested Discussion:** Ask the class what kinds of decisions they make each day that impact the environment. Have they read any books on this subject?

**Exploration:**

1. Explain to the class that they will read about the environmental effects of their everyday decisions.
2. Help them research and select a book to read on this subject, using the Internet.
3. Visit the library together to check out the books they selected, or assign a date by which they must have acquired the book on their own.
4. Distribute copies of ***Environmental Effects Handout***.

5. Schedule and assign presentation days for students to share their reading progress with the class. If your whole class is reading the same book, you can have the students take turns sharing their impressions of what has happened so far in the book.
6. Assign a deadline for students to finish reading the book and hand in their summary reports. Their summary reports should apply the ideas in the book to their own consumption and waste decisions.

### Expanded Exploration:

Engage students in a discussion about what they learned from the books. Ask the class to share how they plan to make better decisions about consumption and waste disposal.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Include a **read aloud** component by selecting a book for the entire class to read together. You can read it to them and also encourage the students to read in pairs. Each student should respond to the book with a summary that includes drawing and new vocabulary words. Encourage them to share their projects with the class.

There are a number of books published on this topic. Here are a few suggestions, but you should conduct your own search to be sure to find one that is current and on the appropriate reading level:

- ***The Lorax*** by Dr. Seuss
- ***Just A Dream*** by Chris Van Allsburg
- ***The Berenstain Bears Don't Pollute (Anymore)*** by Stan & Jan Berenstain
- ***The Polar Bears' Home: A Story About Global Warming*** by Lara Bergen
- ***I Can Save The Earth!*** by Alison Inches
- ***The Adventures of A Plastic Bottle*** by Alison Inches
- ***What Happens To Our Trash*** by D.J. Ward
- ***Where Does The Garbage Go?*** by Paul Showers
- ***What's So Bad About Gasoline?: Fossil Fuels And What They Do*** by Anne Rockwell
- ***The Wump World*** by Bill Peet
- ***The Wartville Wizard*** by Don Madden
- ***The Everything Kids' Environment Book: Learn how you can help the environment-by getting involved at school, at home, or at play*** by Sheri Amsel
- ***E Is for Environment: Stories to Help Children Care for Their World – at Home, at School, and at Play*** by Ian James Corlett
- ***West Side Kids: The Big Idea – Book #1*** by Ellen Schechter

## Intermediate:

Follow the Activity instructions.

You can also divide the class into groups and have each group read and report on a different book.

Students can pick any book related to the topic of environmental effects of everyday choices. Here are a few suggestions, but students should conduct their own search to be sure to find one that is current and on the appropriate reading level:

- **Harvest For Hope** by Jane Goodall
- **Silent Spring** by Rachel Carson
- **Global Warming (Life and Environmental Science)** by Ron Fridell
- **Climate Change (DK Eyewitness Books)** by John Woodward and DK Publishing
- **The Down-to-Earth Guide To Global Warming** by Laurie David & Cambria Gordon
- **Chomp** by Carl Hiaasen
- **Hoot** by Carl Hiaasen
- **Flush** by Carl Hiaasen
- **Scat** by Carl Hiaasen

## Advanced:

Follow the Activity instructions.

Give students the option of writing research papers instead of book reports. The papers should incorporate other related information and apply the information to their everyday decisions. If the student selects a book that is slightly above his or her reading level, encourage the student to write a report on a chapter or two instead of the entire book. Students should present what they learned to the class.

Students can pick any book related to the topic of environmental effects of everyday choices. Here are a few suggestions, but students should conduct their own search to be sure to find one that is current and on the appropriate reading level:

- **Silent Spring** by Rachel Carson
- **Harvest For Hope** by Jane Goodall
- **Hot, Flat, and Crowded: Why We Need a Green Revolution - and How It Can Renew America** by Thomas Friedman
- **What's the Worst That Could Happen?: A Rational Response to the Climate Change Debate** by Greg Craven
- **Climate Change: Picturing the Science** by Gavin Schmidt & Joshua Wolfe
- **Collapse** by Jared Diamond
- **The Future** by Al Gore
- **Eaarth** by Bill McKibben
- **The Omnivore's Dilemma** by Michael Pollan



# What Is Reduce, Reuse, Recycle (RRR)?

## Environmental Effects Handout

Name \_\_\_\_\_ Date \_\_\_\_\_

Please answer the following questions.

### Part 1: Before you read the book

1. What is the title of the book you selected?
2. What is the name and background of the book's author?
3. Why did you select this book?
4. What do you hope to discover?

### Part 2: After you read the book

5. What were some surprising facts that you learned from this book?
6. How would you summarize this book?
7. How does the information revealed in this book relate to decisions you make each day?
8. Would you recommend this book to others? Why or why not?
9. What environmental issues or facts would you like to read more about?
10. What books do you plan to read next?



# What Is Reduce, Reuse, and Recycle (RRR)?

## Taking a Closer Look at Packaging

---

**Time:**

20 minutes

**Subjects:**

English Language Arts, Science

**Goals and Objectives:**

Students will examine examples of overpackaging and appropriate packaging and learn about their impact on the environment. They will complete writing projects that connect their observations to strategies for reducing the consumption of overpackaged products.

**Vocabulary:**

biodegradable, overpackaging, packaging, pollution, waste

---

**Materials:**

- Examples of **overpackaged lunches** or meals (produce wrapped in plastic)
  - Examples of **appropriately packaged** items (reusable container, loose produce)
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of packaging and its impact on the environment.

**Suggested Discussion:** What is packaging? Why do we use it? How do we know if something is overpackaged? Why does this matter?

**Exploration:**

1. Introduce each item to the class.
2. Ask the class to determine whether the item is an example of overpackaging or appropriate packaging.
3. Encourage the students to think of other examples of both overpackaged and appropriately packaged items.



4. Ask them if they know what happens to packaging when they throw it away. How does this impact the environment?
5. Assign a follow-up project from the Adaptations section.

### Expanded Exploration:

Engage the students in a discussion about why they think many products are overpackaged. Ask them to imagine inventing a product with appropriate packaging.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Elementary:

Follow the Activity instructions.

Ask the class to draw and describe examples of appropriately packaged and overpackaged products and to share their work with the class.

### Intermediate:

Follow the Activity instructions.

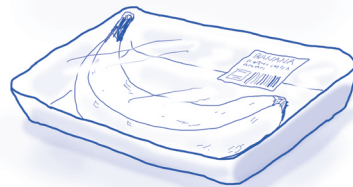
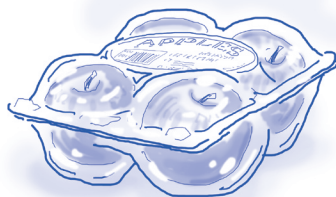
Have the class work in groups to brainstorm at least five items they use regularly that are examples of overpackaged products.

Next, ask each student to write down every piece of packaging that comes with each of the items that they listed. Ask them to evaluate all of the pieces of packaging and decide what can be eliminated or replaced with materials that use fewer resources.

### Advanced:

Follow the Activity instructions.

Encourage the class to think about products they consume and whether they will start to consider packaging before purchasing a product. Ask them to choose an example of an overpackaged product and to draft a letter to the manufacturer or distributor asking for environmentally friendlier packaging. They should present their letters to the class.



## What Is Reduce, Reuse, and Recycle (RRR)?

# Design Your Own Package

---

**Time:**

20 minutes

**Subjects:**

English Language Arts, Science, Problem Solving, Art

**Vocabulary:**

biodegradable, overpackaging, packaging, recyclable, reusable, sustainability, waste

**Goals and Objectives:**

Students will apply what they have learned about the problem of overpackaging to design their own packaging that uses the fewest resources possible and is also reusable and/or recyclable.

**Materials:**

- Pens, markers, colored pencils
  - Paper or poster board
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of packaging and its impact on the environment.

**Suggested Discussion:** Why is it a good idea to pay attention to the packaging of products before we buy them? How does packaging impact the environment? Ask the class to give examples of when they have reused or recycled packaging.

**Exploration:**

1. Review examples of overpackaging and appropriate packaging.
2. Ask the class to design packaging for a real product or one that they invent. The packaging should use the fewest resources possible and also be reusable and/or recyclable.
3. Have the students illustrate and write detailed descriptions of the packaging: what it's made from and how it can be reused and/or recycled.
4. Students should share their projects with the class.

**Expanded Exploration:**

Encourage class discussion about the importance of packaging and how this waste impacts the environment. Ask them to think about other overpackaged products. Ask the class if they think they could identify a product if they were only given clues about the product's packaging.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

**Beginner:**

Follow the Activity instructions.

Students can invent their own products and packaging, trying to make sure the packaging uses as few resources as possible and can be reused and/or recycled. Have the students draw their ideas and share them with the class.

**Intermediate:**

Follow the Activity instructions.

Students should write descriptions of their invented packaging that explain how it can be reused and/or recycled. They may also include drawings and descriptions of how the packaging can be reused. Encourage them to think of ways to reuse and recycle packaging, and ways to buy alternative products that use less packaging. They should present their projects to the class.

**Advanced:**

Follow the Activity instructions.

Encourage the students to write letters to manufacturers, or to government or industry representatives, suggesting ways to reduce packaging and use fewer resources to manufacture packaging material. Have them share their projects and letters with the class.

## What Is Reduce, Reuse, and Recycle (RRR)?

# The Story of the Mystery Package

---

**Time:**

20 minutes

**Subjects:**

English Language Arts, Science, Problem Solving

**Vocabulary:**

biodegradable, natural resources, nonrenewable, overpackaging, packaging, renewable, sustainability, waste

**Goals and Objectives:**

Students will complete *The Story of the Mystery Package Handout* and explore the resources used to make products and packaging. They will apply problem solving skills to come up with more sustainable alternatives to packaging.

**Materials:**

- Copies of *The Story of the Mystery Package Handout*
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of packaging and what resources are used for packaging and how packaging may be reused and recycled.

**Suggested Discussion:** What are some examples of overpackaging? What are some examples of appropriate packaging? What are the materials made from? Can the packaging be reused and/or recycled?

**Exploration:**

1. Distribute *The Story of the Mystery Package Handout*.
2. Invite each student to think of a container or package that protects a food item.
3. Offer examples, like an oatmeal box, aluminum can, soda bottle, or even a banana peel.

4. Each student will keep the food item they selected a secret, and answer questions 1 – 8 to offer clues about the item they have selected.
5. Then, they will exchange papers with a partner. They will read each others' clues and try to identify the mystery food item.

### Expanded Exploration:

Encourage class discussion about packaging and the decisions they make each day about what they consume and how much waste they produce. Ask them to think of more sustainable alternatives for overpackaged products and to think of ways to reuse and recycle packaging. Ask them if they can think of an effective way to get more people to reduce, reuse, and recycle.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Encourage the students to illustrate their answers to the last question and to share their illustrations with the class.

### Intermediate:

Follow the Activity instructions.

Encourage the students to play the game a second time on the back of the handout, and to think of more ways to reduce the amount of waste they produce. Each pair of students should present their mysteries to the class.

### Advanced:

Follow the Activity instructions.

Ask the class to make a list of items they used during the past week and to write down how many of those items included overpackaging. Have them approximate how much of their waste is from packaging and to come up with a few ways to reduce this waste.

Ask them to list sustainable alternatives to products with packaging, and ways to reuse and recycle packaging. Encourage the students to share their lists and reduction plans with the class.

# What Is Reduce, Reuse, Recycle (RRR)?

## The Story of the Mystery Package Handout

Name \_\_\_\_\_ Date \_\_\_\_\_

Think of a container or package that protects a food item (but don't share what it is) and then answer questions 1 – 8. Save question 9 for your partner. Use the bottom of this page to illustrate your answer. If there's time, use the back of this page to play again.

1. What am I used for?
2. What am I made from?
3. What natural resources do I come from?
4. Am I thrown away after I'm used?
5. If I can be recycled, what else can I become?
6. Am I biodegradable?
7. Can I be used again? If so, how?
8. As a container, can I be improved? If so, draw or write about a better design.
9. What am I?



# What Is Reduce, Reuse, Recycle (RRR)?

## The Story of the Mystery Package Handout

Name \_\_\_\_\_ Date \_\_\_\_\_

Think of a container or package that protects a food item (but don't share what it is) and then answer questions 1 – 8. Save question 9 for your partner. Use the bottom of this page to illustrate your answer.

1. What am I used for?
2. What am I made from?
3. What natural resources do I come from?
4. Am I thrown away after I'm used?
5. If I can be recycled, what else can I become?
6. Am I biodegradable?
7. Can I be used again? If so, how?
8. As a container, can I be improved? If so, draw or write about a better design.
9. What am I?



# What Is Reduce, Reuse, and Recycle (RRR)?

## Teach NYC How to RRR

---

### Time:

30 minutes for Part 1 and  
30 minutes for Part 2

### Goals and Objectives:

Students will create public service announcement (PSA) scripts or short videos that encourage New Yorkers to reduce, reuse, and recycle.

### Subjects:

English Language Arts, Science,  
Problem Solving

### Teacher's Note:

*Students can read the scripts of their public service announcements in front of an audience, or ask the Principal to broadcast them as the school's daily announcements.*

### Vocabulary:

recycle, reduce, reuse

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### Materials:

- **Internet access** to research public service announcements
  - **Video camera** (optional)
  - **Internet access** to publish video (optional)
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

### Warm Up:

**Class Discussion:** Determine students' prior knowledge and understanding of how to reduce, reuse, and recycle.

**Suggested Discussion:** What have they learned about reducing, reusing, and recycling? What are some effective ways to encourage others to reduce, reuse, and recycle?

### Exploration:

#### Part 1:

1. Ask the class to find a public service announcement that they like. Or, if your class does not have Internet access, you may want to discuss examples of well-known public service announcements.
2. Ask them to pay attention to the writing styles, humor, narrative devices, music, animation, and messaging in different public service announcements. They should identify the target audiences for each public service announcement.



3. Have the class work in small groups to brainstorm ideas on reducing, reusing, and recycling.
4. Either individually or as a group, the students will write scripts for the public service announcements to encourage New Yorkers to reduce, reuse, and recycle.

### Part 2:

5. If you and your students have access to video cameras, have the class create short videos based upon the prepared scripts.
6. Show the completed videos to a live audience, or have students do a live reading of the scripts in front of an audience. Or ask the Principal's permission to have students read their PSAs (public service announcements) over the school loudspeakers as Daily Announcements.

### Expanded Exploration:

Encourage class discussion about other ways to promote RRR. Ask them if they can think of examples when other forms of art, such as music, were used to promote an idea or product.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions in Part 1 only.

Encourage the students to include original illustrations as part of their script. Students should present their illustrated scripts to the class.

### Intermediate:

Follow the Activity instructions for Part 1 and Part 2.

Encourage the students to incorporate research in their public service announcements.

Students should present their completed scripts to the class, either reading from the script or as a filmed production. Have students write summaries of the announcements or videos and address how they think they might influence others to reduce, reuse, and recycle.

### Advanced:

Follow the Activity instructions for Part 1 and Part 2.

Each student should work individually to write the script and then work in small groups to decide on which announcement to present. They should present their finished works to the class, either as a live reading or a video production, depending on equipment availability. The videos could also be uploaded to YouTube and/or published on your school's website.

# What Is Reduce, Reuse, and Recycle (RRR)?

## RRR Posters

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**Time:**

20 minutes

**Subjects:**

English Language Arts,  
Science, Art

**Vocabulary:**

recycle, reduce, reuse

**Goals and Objectives:**

Students will review what they have learned about reducing, reusing, and recycling and they will create posters that promote an RRR concept.

**Teacher's Note:**

*Students can perform their announcements live instead of filming them.*

**Materials:**

- Recycled and/or reused paper
  - Old magazines and newspapers
  - Markers or colored pencils
  - Glue and/or tape
  - Discarded materials (optional)
- 

## Activity

*Following this activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of the importance of reducing, reusing, and recycling.

**Suggested Discussion:** What is the most interesting RRR fact you have learned so far? What information do you think is most critical for others to know? How might you be able to share this information with others?

**Exploration:**

1. Explain to the class that they will be making posters to get the school community excited about reducing, reusing, and recycling.
2. Each student will create a poster that addresses at least one RRR concept.
3. Be sure to point out how the class is reusing recycled paper and scraps from magazines, newspapers, and other discarded materials, which will eventually be recycled with the entire poster.

### Expanded Exploration:

Encourage class discussion about what they have learned so far. Are there other RRR facts they would like to learn? Can they think of RRR facts that many other people may not know?

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Students should share their posters with the class before they are displayed around the school.

### Intermediate:

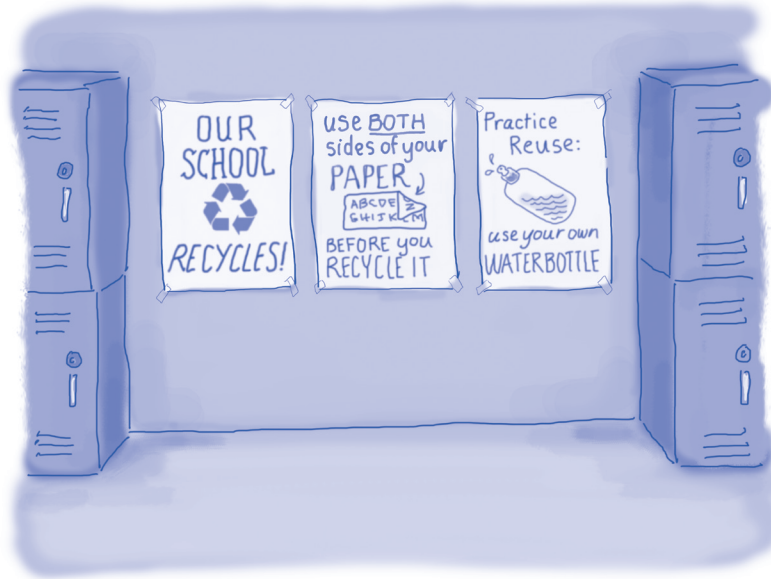
Follow the Activity instructions.

Students can work in groups to coordinate the themes of their projects so that more RRR concepts are covered. Students can submit their posters to a state or national contest promoting sustainability.

### Advanced:

Follow the Activity instructions.

If your class has access to computers, they can incorporate images from the Internet and even publish their posters on your school's website. Students can submit their posters to a state or national contest promoting sustainability.



# What Is Reduce, Reuse, and Recycle (RRR)?

## RRR Jeopardy

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**Time:**

45 minutes

**Subjects:**

English Language Arts, Science

**Vocabulary:**

recycle, reduce, reuse, and everything else in the **Glossary**

**Goals and Objectives:**

Students will work in teams to create their own questions and answers to quiz their classmates on facts about reducing, reusing, and recycling.

**Teacher's Note:**

*This Activity can be broken down into two shorter lessons.  
Part 1: The groups are assigned and each group comes up with the questions and answers for the game.  
Part 2: The class plays the game.*

**Materials:**

- Copies of **RRR Jeopardy Handout**
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of why we reduce, reuse, and recycle.

**Suggested Discussion:** Why is it important to reduce, reuse, and recycle? Can you think of some interesting RRR questions that might stump your classmates?

**Exploration:**

1. Divide the class into four or five groups.
2. Distribute copies of **RRR Jeopardy Handout**.
3. Review the basic rules of Jeopardy, which are described on **RRR Jeopardy Handout**.
4. Allow the teams the option of creating their own categories or selecting one from **RRR Jeopardy Handout**.
5. Explain to the class that they will be creating and playing their own version of *Jeopardy*.
6. Each team should come up with at least 10 questions and answers on the back of **RRR Jeopardy Handout** and give the completed set to you.

7. Inform the class that they will respond to all of the other answers and questions, except for the answers and questions that their team composed.
8. Assign a number of points that each question is worth and list each team/category on the board to help the class keep track of their scores.
9. Read each answer and call on the team that raises their hand first.

### Expanded Exploration:

Encourage class discussion about facts or questions that they found surprising during the game. Ask them what they would like to learn more about. Ask the class for their ideas on how they might be able to turn what they have learned into a commitment to make better RRR decisions.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Each team can come up with five answer and question sets instead of ten. You may want to give time to the teams to write and draw a response to share with the class, instead of calling on whoever gets the answer first.

### Intermediate:

Follow the Activity instructions.

Encourage students to incorporate outside research into their answer and question sets, and have the class work together to come up with a revised answer and question set to be used with future classes.

### Advanced:

Follow the Activity instructions.

Have the class use the Internet and other outside resources to compose their answers and questions. They could compose 15 – 20 sets per category. Have them compile all of the sets together to make a trivia book.

# What Is Reduce, Reuse, Recycle (RRR)?

## RRR Jeopardy Handout

Name \_\_\_\_\_ Date \_\_\_\_\_

### What is Jeopardy!?

**Jeopardy!** is the name of a television quiz show created by Merv Griffin in 1964. It presents a range of trivia answer clues to contestants who must respond by giving the correct question.

### RRR Jeopardy Instructions

With your team, create your own RRR category or select an RRR category from those listed below. Then, on the back of this paper, compose 10 trivia answers and questions that relate to your category. Hand in one completed **RRR Jeopardy Handout** to your teacher. Your team will not respond to the category answers and questions you created, but you will compete with the other classmates when answers from the other categories are presented.

### Examples

**Category:** Define It!

**RRR Jeopardy Host:** This substance is formed when paper collected for recycling is mixed with warm water before it is further processed to make recycled paper.

**Contestant:** **What is slurry?**

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**Category:** Key Recyclers

**RRR Jeopardy Host:** This New York agency collects your garbage and recyclables.

**Contestant:** **What is the Department of Sanitation?**

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**Category:** Use It – Or Lose It!

**RRR Jeopardy Host:** After they are melted down, these can be used to make a bicycle or a bridge.

**Contestant:** **What are steel cans?**

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**Category:** Green Numbers

**RRR Jeopardy Host:** This is the number of waste bins that should be used in every apartment or house in New York City.

**Contestant:** **What are three?**

---

**Category:** RRR Hypothetical Situations

**RRR Jeopardy Host:** Instead of disposing of food scraps in the garbage cans, you could do this.

**Contestant:** **What is compost?**

# What Is Reduce, Reuse, Recycle (RRR)?

## RRR Jeopardy Handout

Create your own RRR category or select an RRR category from the list on the other side. Compose 10 trivia answers and questions that relate to your category.

**Category Name:** \_\_\_\_\_

**1.** Question: \_\_\_\_\_

Answer: \_\_\_\_\_

**2.** Question: \_\_\_\_\_

Answer: \_\_\_\_\_

**3.** Question: \_\_\_\_\_

Answer: \_\_\_\_\_

**4.** Question: \_\_\_\_\_

Answer: \_\_\_\_\_

**5.** Question: \_\_\_\_\_

Answer: \_\_\_\_\_

**6.** Question: \_\_\_\_\_

Answer: \_\_\_\_\_

**7.** Question: \_\_\_\_\_

Answer: \_\_\_\_\_

**8.** Question: \_\_\_\_\_

Answer: \_\_\_\_\_

**9.** Question: \_\_\_\_\_

Answer: \_\_\_\_\_

**10.** Question: \_\_\_\_\_

Answer: \_\_\_\_\_

## What Is Reduce, Reuse, and Recycle (RRR)?

# Developing An RRR Presence

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**Time:**

20 – 30 minutes

**Subjects:**

English Language Arts, Science

**Vocabulary:**

compost, recycle, reduce, reuse, sustainability

**Goals and Objectives:**

Students will gain hands-on experience with researching and writing about reducing, reusing, and recycling, and will publish their work on a website.

**Teacher’s Note:**

*This project requires Internet access . Students should first complete a series of writing assignments and then post their revised versions on a free blog site or school-hosted website.*

**Materials:**

- Internet access
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students’ prior knowledge and understanding of reducing, reusing, and recycling and how to “**develop an RRR presence.**”

**Suggested Discussion:** What have you learned so far about reducing, reusing, and recycling? What surprised you the most? What information do you think is most important to share with others?

**Exploration:**

1. Depending on your preferences, students may work on this project in small teams or as a class. There are a number of free blog websites that students may use, such as **Blogspot.com** and **Wordpress.com**. Ask the students to brainstorm a name for their blog or website.
2. Secure the blog on their behalf or, for older students, walk them through setting up the blog or website.
3. Explain that each student will write about their experiences with reducing, reusing, and recycling through a series of essays that will be revised before being posted to the class or team website.



4. Give the students a choice of writing prompts:
  - What are “The Three R’s of the Environment” and why are they important?
  - What is waste?
  - Describe how you have been able to reduce the amount of items you consume.
  - Describe how you have been able to reuse items instead of discarding them.
  - What kinds of things can be recycled?
  - Is composting a form of recycling? How does it work?
  - What does it mean to be environmentally responsible and why is it important?
  - What does sustainability mean to you? What do you predict will be the future of New York City’s waste management practices?
  - Research how other cities address the importance of reducing, reusing, and recycling. How are these waste management practices similar and different to New York City’s?
  - Illustrate and narrate a story in which someone learned about his or her waste management practices and changed them for the better.
5. Help the students revise their essays.
6. Publish the essays on the class website or assist each team in posting the essays on their blogs.

### Expanded Exploration:

Encourage the class to think of their own topics and experiments relating to reducing, reusing, and recycling to write about and have them continue writing articles or blog posts.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Encourage the students to support their responses to the writing prompts with illustrations. Post the content on one class website. To build reading and presentation skills, the class can also share their responses with the class.

### Intermediate:

Follow the Activity instructions.

Have the students work in pairs or small teams to help each other revise their responses before they are posted. Encourage the class to incorporate research into their posts and to respond to each other’s blog posts. Ask the teams to come up with their own topics relating to waste reduction, and to explore and publish these articles.

### Advanced:

Follow the Activity instructions and include a **research** component in each response. Give students the option of creating their own websites and other social media accounts relating to this topic. Have them present their articles to the class each time one is posted. Encourage them to incorporate video and photography, and to comment on each other’s blog posts. Students should share their published articles with family and friends.

# What Is Reduce, Reuse, and Recycle (RRR)?

## Learning Standards

### Activity 1: Recycling in the Classroom

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Reading

Subsections 1, 2	Key Ideas and Details
Subsection 4	Craft and Structure
Subsection 10	Range of Reading

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsection 2	Comprehension and Collaboration
Subsection 4	Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

Subsection 1	Conventions of Standard English
Subsections 4, 6	Vocabulary Acquisition and Use

#### The Applied Learning Performance Standards

A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1 a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

# What Is Reduce, Reuse, and Recycle (RRR)?

## Learning Standards

### Activity 2: Recycling Is Only Part of the Solution

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Writing**

- Subsections 2, 3     Text Types and Purposes
- Subsection 4        Production and Distribution of Writing

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

- Subsections 1, 2    Comprehension and Collaboration
- Subsection 4        Presentation of Knowledge and Ideas

##### **College and Career Readiness Anchor Standards for Language**

- Subsections 1, 2    Conventions of Standard English
- Subsection 3        Knowledge of Language
- Subsection 6        Vocabulary Acquisition and Use

#### **The Applied Learning Performance Standards**

- A2    Communication Tools and Techniques
- A5    Tools and Techniques for Working With Others

#### **New York City Science Scope & Sequence**

##### **7.1a, 7.1b**

Human influences on the environment: positive influences.

##### **7.1c, 7.2a, 7.2b, 7.2c**

Human influences on the environment: negative influences.

##### **7.3a, 7.3b**

Human influences on the environment: decision making (risk/benefit).

##### **ICT 5.2, IPS 1.1-1.4, IPS 2.1**

Packaging and solid waste.

##### **LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1**

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### **LE 5.1d,e, LE 6.1a,b**

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### **LE 6.1c, ICT 5.1, 5.2**

Renewable and nonrenewable sources of materials.

##### **LE 7.2b,c LE 7.2d**

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.2b,c LE 7.2d**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

# What Is Reduce, Reuse, and Recycle (RRR)?

## Learning Standards

### Activity 3: Aluminum Cans: Full Circle

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Writing**

Subsections 2, 3 Text Types and Purposes

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

Subsection 2 Comprehension and Collaboration

Subsections 4, 5, 6 Presentation of Knowledge and Ideas

##### **College and Career Readiness Anchor Standards for Language**

Subsection 1 Conventions of Standard English

Subsection 6 Vocabulary Acquisition and Use

#### **New York State Common Core Learning Standards for Mathematics**

Subsections 1, 2 Counting and Cardinality

Subsection 1 Operations & Algebraic Thinking

#### **The Applied Learning Performance Standards**

A2 Communication Tools and Techniques

A5 Tools and Techniques for Working With Others

#### **New York City Science Scope & Sequence**

##### **7.1a, 7.1b**

Human influences on the environment: positive influences.

##### **7.1c, 7.2a, 7.2b, 7.2c**

Human influences on the environment: negative influences.

##### **7.3a, 7.3b**

Human influences on the environment: decision making (risk/benefit).

##### **ICT 5.2, IPS 1.1-1.4, IPS 2.1**

Packaging and solid waste.

##### **LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1**

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### **LE 5.1d,e, LE 6.1 a,b**

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### **LE 6.1c, ICT 5.1, 5.2**

Renewable and nonrenewable sources of materials.

##### **LE 7.2b,c, LE 7.2d**

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.2b,c, LE 7.2d**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

# What Is Reduce, Reuse, and Recycle (RRR)?

## Learning Standards

### Activity 4: Understanding When to Reduce, Reuse, or Recycle

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Writing

Subsections 2, 3 Text Types and Purposes  
 Subsection 4 Production and Distribution of Writing

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsections 1, 2 Comprehension and Collaboration  
 Subsection 3 Knowledge of Language

##### College and Career Readiness Anchor Standards for Language

Subsections 1, 2 Conventions of Standard English  
 Subsection 3 Knowledge of Language  
 Subsections 4, 5, 6 Vocabulary Acquisition and Use

#### The Applied Learning Performance Standards

A2 Communication Tools and Techniques  
 A5 Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1 a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

# What Is Reduce, Reuse, and Recycle (RRR)?

## Learning Standards

### Activity 5: Reading About the Environmental Effects of Our Everyday Decisions

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Reading

- Subsections 1, 2, 3 Key Ideas and Details
- Subsections 4, 5, 6 Craft and Structure
- Subsection 8 Integration of Knowledge and Ideas
- Subsection 9 Range of Reading and Level of Text Complexity

##### College and Career Readiness Anchor Standards for Writing

- Subsections 1, 2 Text Types and Purposes
- Subsections 4, 5 Production and Distribution of Writing
- Subsections 7, 9 Research to Build and Present Knowledge

##### College and Career Readiness Anchor Standards for Speaking and Listening

- Subsection 1 Comprehension and Collaboration
- Subsections 4, 6 Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

- Subsections 1, 2 Conventions of Standard English
- Subsection 3 Knowledge of Language
- Subsections 4, 5, 6 Vocabulary Acquisition and Use

#### The Applied Learning Performance Standards

- A2 Communication Tools and Techniques
- A5 Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

##### S1.1a,b,c

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.

# What Is Reduce, Reuse, and Recycle (RRR)?

## Learning Standards

### Activity 6: Taking a Closer Look at Packaging

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Writing**

Subsections 2, 3     Text Types and Purposes  
 Subsection 4        Production and Distribution of Writing

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

Subsections 1, 2     Comprehension and Collaboration  
 Subsections 4, 6     Presentation of Knowledge and Ideas

##### **College and Career Readiness Anchor Standards for Language**

Subsections 1, 2     Conventions of Standard English  
 Subsection 3         Knowledge of Language

#### **The Applied Learning Performance Standards**

A2     Communication Tools and Techniques  
 A5     Tools and Techniques for Working With Others

#### **New York City Science Scope & Sequence**

##### **7.1a, 7.1b**

Human influences on the environment: positive influences.

##### **7.1c, 7.2a, 7.2b, 7.2c**

Human influences on the environment: negative influences.

##### **7.3a, 7.3b**

Human influences on the environment: decision making (risk/benefit).

##### **ICT 5.2, IPS 1.1-1.4, IPS 2.1**

Packaging and solid waste.

##### **LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1**

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### **LE 5.1d,e, LE 6.1 a,b**

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### **LE 7.1a,b**

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.1b,c**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### **LE 7.2b,c, LE 7.2d**

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.2b,c, LE 7.2d**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### **PS 3.1b,c**

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

# What Is Reduce, Reuse, and Recycle (RRR)?

## Learning Standards

### Activity 7: Design Your Own Package

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Writing

Subsections 2, 3	Text Types and Purposes
Subsection 4	Production and Distribution of Writing

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsections 1, 2	Comprehension and Collaboration
Subsections 4, 6	Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

Subsections 1, 2	Conventions of Standard English
Subsection 3	Knowledge of Language

#### The Applied Learning Performance Standards

A1	Problem Solving
A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.



# What Is Reduce, Reuse, and Recycle (RRR)?

## Learning Standards

### Activity 8: The Story Of The Mystery Package

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Writing

- Subsection 3 Text Types and Purposes
- Subsection 4 Production and Distribution of Writing

##### College and Career Readiness Anchor Standards for Speaking and Listening

- Subsections 4, 6 Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

- Subsections 1, 2 Conventions of Standard English
- Subsection 3 Knowledge of Language

#### The Applied Learning Performance Standards

- A1 Problem Solving
- A2 Communication Tools and Techniques
- A5 Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

# What Is Reduce, Reuse, and Recycle (RRR)?

## Learning Standards

### Activity 9: Teach NYC How to RRR

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Writing

Subsections 1, 3	Text Types and Purposes
Subsections 4, 6	Production and Distribution of Writing
Subsection 10	Range of Writing
Subsection 11	Responding to Literature

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsections 1, 2, 3	Comprehension and Collaboration
Subsections 4, 5, 6	Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

Subsections 1, 2	Conventions of Standard English
Subsection 3	Knowledge of Language
Subsections 5, 6	Vocabulary Acquisition and Use

#### The Applied Learning Performance Standards

A1	Problem Solving
A2	Communication Tools and Techniques
A3	Information Tools and Techniques
A4	Learning and Self-management Tools and Techniques
A5	Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

##### S1.1a,b,c

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.

# What Is Reduce, Reuse, and Recycle (RRR)?

## Learning Standards

### Activity 10: RRR Posters

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

Subsection 2 Comprehension and Collaboration  
Subsections 4, 5, 6 Presentation of Knowledge and Ideas

##### **College and Career Readiness Anchor Standards for Language**

Subsection 1 Conventions of Standard English  
Subsection 5 Vocabulary Acquisition and Use

#### **The Applied Learning Performance Standards**

A2 Communication Tools and Techniques  
A5 Tools and Techniques for Working With Others

#### **New York City Science Scope & Sequence**

##### **7.1a, 7.1b**

Human influences on the environment: positive influences.

##### **7.1c, 7.2a, 7.2b, 7.2c**

Human influences on the environment: negative influences.

##### **7.3a, 7.3b**

Human influences on the environment: decision making (risk/benefit).

##### **ICT 5.2, IPS 1.1-1.4, IPS 2.1**

Packaging and solid waste.

##### **LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1**

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### **LE 5.1d,e, LE 6.1 a,b**

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### **LE 6.1c, ICT 5.1, 5.2**

Renewable and nonrenewable sources of materials.

##### **LE 7.1a,b**

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.1b,c**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### **LE 7.2b,c, LE 7.2d**

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.2b,c, LE 7.2d**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### **LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1**

Water issues: depletion; pollution.

##### **LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1**

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

# What Is Reduce, Reuse, and Recycle (RRR)?

## Learning Standards

### Activity 11: RRR Jeopardy

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Writing

Subsection 2	Text Types and Purposes
Subsection 4,	Production and Distribution of Writing
Subsections 7, 9	Research to Build and Present Knowledge

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsections 1, 2	Comprehension and Collaboration
Subsection 6	Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

Subsections 1, 2	Conventions of Standard English
Subsection 3	Knowledge of Language
Subsection 6	Vocabulary Acquisition and Use

#### The Applied Learning Performance Standards

A1	Problem Solving
A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

# What Is Reduce, Reuse, and Recycle (RRR)?

## Learning Standards

### Activity 12: Developing an RRR Presence

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Writing

- Subsections 1, 2, 3 Text Types and Purposes
- Subsections 4, 5, 6 Production and Distribution of Writing
- Subsections 7, 8, 9 Research to Build and Present Knowledge
- Subsection 10 Range of Writing
- Subsection 11 Responding to Literature

##### College and Career Readiness Anchor Standards for Speaking and Listening

- Subsections 1, 2, 3 Comprehension and Collaboration
- Subsections 4, 5, 6 Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

- Subsections 1, 2 Conventions of Standard English
- Subsection 3 Knowledge of Language
- Subsections 4, 5, 6 Vocabulary Acquisition and Use

#### The Applied Learning Performance Standards

- A1 Problem Solving
- A2 Communication Tools and Techniques
- A3 Information Tools and Techniques
- A4 Learning and Self-management Tools and Techniques
- A5 Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

## Chapter 4

# Be a TrashMaster!



### Chapter Focus:

The Activities in this chapter will help students apply what they have learned about reducing, reusing, and recycling (RRR) to their everyday lives and choices in the future.

## Become a TrashMaster...Reduce, Reuse, Recycle!

While it's true that reducing and managing waste in New York City are large and complex tasks, they aren't impossible. Each of us can make a difference by remembering the three R's: reduce, reuse, and recycle.

## Make Informed Decisions

The best way to encourage the three R's is to provide students and the public with the information they'll need to make their own informed decisions and choices.

RRR choices are different for each individual and organization. There are no hard and fast rules to follow. But there are guidelines and useful suggestions for students — and all New Yorkers — to adapt to their own lives.

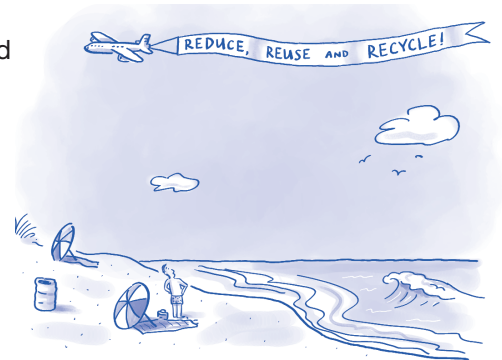
## Use the Many Resources Available on NYC's WasteLess Website: [nyc.gov/wasteless](http://nyc.gov/wasteless)

Encourage students to come up with their own ideas and solutions. When we think about things differently, this inspires us to act differently and make smart choices that impact the environment.

## Spread the Message

Becoming a TrashMaster isn't only about what you do as an individual to recycle used cans and unwanted paper, it is about teaching others how to help care for the environment. TrashMasters pay attention to what we throw away, and spread the word about reduction, reuse, and recycling.

As a TrashMaster, you can introduce new ways to reduce waste, and lead others to take action by sharing your ideas. Tell your family, friends, and neighbors how much they can do to help, and how important their efforts are. If we all work together, we can have a huge impact on the amount of waste created in our classrooms, our neighborhoods, our city, and on our planet.





## Be a TrashMaster!

# Translating Learning into Personal Commitment

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**Time:**

20 minutes

**Subjects:**

English Language Arts, Science, Art, Civics

**Vocabulary:**

commitment, contract, recycle, reduce, resolution, reuse

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**Goals and Objectives:**

Students will make a personal commitment to help protect New York City's environment by reducing, reusing, and recycling as much as possible.

**Materials:**

- Copies of **TrashMaster Contract**
  - **Markers**, colored pencils
  - **Paper**
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Teacher Prep:**

If this is your first Activity from this chapter, please read the **Chapter 4 Introduction**. Refer to the **Glossary** for definitions of vocabulary words.

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of ways that they already practice reducing, reusing, and recycling.

**Suggested Discussion:** In what ways do you reduce, reuse, and recycle? How could you practice RRR even more?

**Exploration:**

1. Discuss the concepts of commitment, resolution, and making a contract with one's self.
2. Help the students think of ways they can reduce, reuse, and recycle.
3. Distribute copies of **TrashMaster Contract**.
4. Ask each student to complete **TrashMaster Contract** and to create an illustrated document that describes how they will reduce, reuse, and recycle more.



### Expanded Exploration:

Encourage class discussion about how the decisions they make each day directly impact the environment. Ask them how they might be able to reduce the amount of paper they use in the classroom each day.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

The students can color in the **TrashMaster Contracts**. Encourage them to create a how-to guide that illustrates how they plan to reduce, reuse, and recycle more. Students should present their **TrashMaster Contracts** and how-to guides to the class.

### Intermediate:

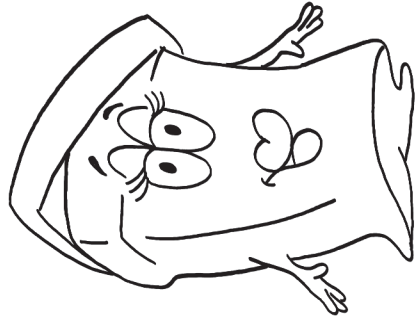
Follow the Activity instructions.

Ask the students if they think they can convince others to make a personal commitment to reduce, reuse, and recycle more. Challenge the class to lead others to make contracts with themselves and offer a reward to the student who presents the highest number of completed contracts.

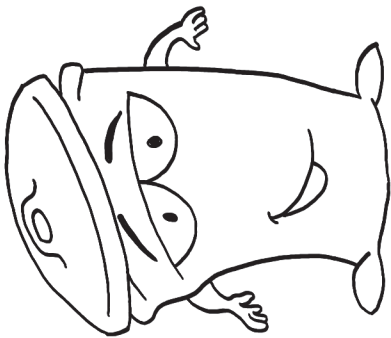
### Advanced:

Follow the Activity instructions.

Ask the students to write about how the changes they have decided to make directly impact the environment. They could also write about strategies to get others to decide to reduce, reuse, and recycle more. Encourage students to share their written responses with the class.



# TrashMaster Contract



I, \_\_\_\_\_ will do the following

to reduce, reuse, and recycle:

---

---

---

---

---

---

---

---

Signature

Date





## Be a TrashMaster!

# Getting Your School to Be a Super Recycler

### Time:

20 – 45 minutes

### Subjects:

English Language Arts, Science

### Vocabulary:

recycle, reduce, reuse,  
Sustainability Coordinator

### Goals and Objectives:

Students will work together to set up a successful recycling program in their school.

### Teacher's Note:

*The process of setting up a recycling program works best when you and your class work with the Sustainability Coordinator and the custodian. It would benefit the class to invite them to meet with your class to discuss this Activity. You may want to refer to [nyc.gov/wasteless/schools](http://nyc.gov/wasteless/schools) for additional information about setting up a successful recycling program and recycling activities. This Activity can be done in conjunction with these other Activities: **Chapter 2, Activity 3: Where Does School Trash Go?** and **Chapter 3, Activity 1: Recycling in the Classroom.***

### Materials:

- Copies of **School Recycling Program Setup Handout**
- Copies of **School Recycling Activities Handout**
- **Recycling bin(s)** for mixed paper & cardboard
- **Recycling bin(s)** for metal, glass, plastic & cartons
- **Trash bin**
- **Clear plastic bags**
- **Materials to label** the bins (order free labels at [nyc.gov/wasteless/schools](http://nyc.gov/wasteless/schools))

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

### Warm Up:

**Class Discussion:** Determine students' knowledge of the current recycling system at school.

**Suggested Discussion:** What kinds of items do you put in the trash can? What kinds of items do you put in each of the recycling bins? Where are they located?

### Exploration:

1. Review why recycling is important and how our everyday decisions impact the environment.
2. Distribute copies of ***School Recycling Program Setup Handout*** and help the students answer the questions.
3. Discuss the roles of the school's Sustainability Coordinator and custodian and how they work to keep the school safe and environmentally responsible. Refer to the ***Glossary*** for assistance.
4. Review the kinds of items that should be recycled and in which bin they should go.
5. If the Sustainability Coordinator and custodian are available, introduce them to the class. Discuss why recycling is important and review where recycling bins are currently located. Ask the Sustainability Coordinator and custodian where the best place would be to set up another recycling area. If these representatives are not available, discuss these issues with your class.
6. Distribute copies of ***School Recycling Activities Handout*** and discuss ways that the students can improve the school's recycling program.

### Expanded Exploration:

Encourage the class to think of ways to inform the entire school community about the importance of recycling. What does the school need to do to become a Super Recycler? What steps does the school need to take to enter DSNY's Golden Apple Awards (see page 3 in Chapter 6 for more info).

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Instead of writing a proposal for action, as ***School Recycling Activities Handout*** instructs, invite students to make illustrations of a successful recycling area. The students should share their illustrations with the class.

### Intermediate:

Follow the Activity instructions.

Have the students share their proposals with the class and encourage them to work together to implement their plans for action, including entering the Golden Apple Awards.

### Advanced:

Follow the Activity instructions.

Have the students survey the school building to review where recycling bins are located and to make a list of where additional bins are needed. Before meeting with the school custodian and Sustainability Coordinator, students can prepare interview questions regarding improvements that can be made to the school's recycling program. Students can then use this information to create action plans, including entering the Golden Apple Awards.

# Be a TrashMaster!

## School Recycling Program Setup Handout

Name \_\_\_\_\_ Date \_\_\_\_\_

Please answer the following questions..

1. What is the name of your school's designated Sustainability Coordinator?
2. What is the name of the custodian?
3. Describe the role of the Sustainability Coordinator.
4. Describe the role of the custodian.
5. List examples of items that should be placed in the mixed paper recycling bin.
6. List examples of items that should be placed in the recycling bin for metal, glass, plastic & cartons.
7. Draw and describe what an ideal recycling area should have.



8. List the areas in your school that should have recycling bins.
9. Does your school have recycling bins in the areas listed in #8 above?  
What areas still need recycling bins?
10. What steps can you take to improve recycling in your school?



# Be a TrashMaster!

## School Recycling Activities Handout

Name \_\_\_\_\_ Date \_\_\_\_\_

Did you know that your school could be awarded prize money for setting up exemplary recycling programs? Refer to the [nyc.gov/wasteless/goldenapple](http://nyc.gov/wasteless/goldenapple) website for more information on the **Golden Apple Awards** and **TrashMasters! Super Recyclers**.

Take action! Select an Activity from those listed below or invent your own. Write a proposal that summarizes your plan for action and describe why you think recycling is important.

### Make Lids for Recycling Containers

Create and decorate lids from cardboard or plastic, with wide slits for green recycling bins and large holes for blue recycling bins. This encourages proper recycling and reduces contamination.

### Start a Green Team or Recycling Club

Select only two representatives from each classroom in every grade, or from just the highest grade, to serve on the Green Team. Promote this as a honored position. Invite students to write an essay about why they think recycling is important. Design special t-shirts, buttons, or hats for your recycling team.



### Recycling Monitors and Mentors

Monitors make sure every room recycles properly — including the classrooms, offices, and cafeterias. At lunch, position monitors near bins to show students how milk gets dumped and where to put recyclables. Have older students explain your school recycling program to younger grades.

### School Recycling Assembly

Present an assembly program dedicated to recycling. Teams of students can collaborate to write and perform skits and songs, including clear instructions about what and how to recycle in your school. Or bring in outside performers who engage students in environmental education.

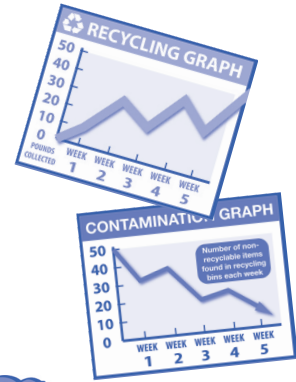
### Incorporate Literacy and Art

Read books about recycling, the environment, sustainability, and waste prevention. Write essays, poems, or persuasive letters. Draw or paint posters or a mural to encourage recycling at school and at home. Display your students' work in the school's public areas. Or compile the essays and artwork into a book or calendar, or publish them on a website.



## Math & Science Applications

Conduct waste audits of each classroom and office. Weigh and measure paper recycling. Afterschool programs can count and chart the number of bags of paper vs. the bags of trash getting placed out for DSNY collection. Calculate totals and percentages, and graph recycling rates. Research the life cycle and environmental benefits of trees. Examine the properties and decomposition rates of recyclable materials.



## Inter-Class Competitions

Be aware that weighing or measuring the amount of recyclables produced by each class will encourage wasteful practices of using more paper than necessary. It is best to reduce paper use and measure contamination rates, rather than compare how much paper is in the recycling bin. Post weekly results for each room for all to see. Reward model recyclers; retrain the rest.



## Bring the Message Home

NYC residents recycle the same materials as schools. Order promotional materials on recycling and waste prevention, and distribute to parents via backpack mail. Suggest families maintain their children’s good recycling habits at home.

## Help Other Schools Recycle

Expand your recycling successes by mentoring another school that shares your campus or neighborhood.



## Involve NYC’s Environmental Network

Contact environmental organizations in NYC to find out about their educational opportunities. Go on a local field trip. Take advantage of the many other local, state, and national environmental education resources.

## Enter the Golden Apple Awards

**TrashMasters! Super Recyclers** rewards schools in NYC with cash prizes for implementing exemplary recycling programs in compliance with NYC regulations, with educational components. Show us your school’s recycling program! See [nyc.gov/wasteless/goldenapple](http://nyc.gov/wasteless/goldenapple) for more info.

## Tell the World

Build community awareness by promoting your school’s sustainability activities through the school newsletter, website, and the local media. Make sure the Parents Association and other organizations that use your school building after school and weekends know what and how to recycle.

## Be a TrashMaster!

# Reduce Paper Use

---

**Time:**

20 minutes

**Subjects:**

English Language Arts, Science, Math, Problem Solving

**Vocabulary:**

recycle, reduce, reuse, operational definition

**Goals and Objectives:**

Students will examine the amount of paper found in the classroom's green recycling bin. They will count and sort the paper and use mathematical reasoning and problem solving skills to identify ways to reduce the amount of paper they use and increase the amount they reuse.

**Teacher's Note:**

*Please don't empty the green recycling bin for a week or two, so the students can examine and use its contents.*

---

**Materials:**

- Paper from the recycling bin
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of how much paper they use on a daily basis and how they could reduce that amount.

**Suggested Discussion:** How much paper do you think you use on a daily basis? How much of it is reused and/or recycled? What are some ways you could reuse paper?

**Exploration:**

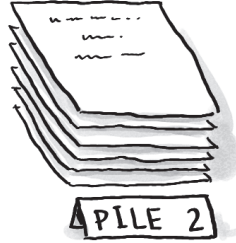
1. Present the classroom's green recycling bin to the class and remind them of its purpose.
2. Divide the class into small groups.
3. Distribute piles of paper from the green bin to each group.
4. Ask them to count the pieces of paper.
5. Explain how paper can be reused before it is recycled. Show an example of a piece of paper that has at least one blank side. Explain how the blank side could be used to complete an assignment or used as scrap paper. Invite them to imagine other ways they could use the paper.

6. Ask the students to sort the papers into three piles and to count the papers in each pile:

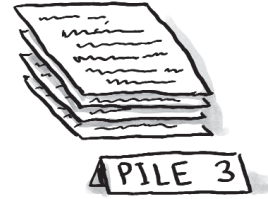
one side is  
completely blank;



half of one  
side is blank;



less than half of one  
side is blank.



7. Invite each group to share their observations with the class. Each group should include answers to these questions in their presentations:
- How many of the papers were reusable?
  - What was the group's operational definition of reusable?
  - How could they reduce the amount of paper they use and increase the amount they reuse?

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Ask the students to add up the total number of sheets of paper that each group counted, to calculate the total number of sheets found in the recycling bin.

Next, have them calculate how many sheets of paper were reusable. Is this amount less than, more than, or equal to half of the total amount? If this amount is from one week's accumulation, how much would be accumulated in one month? Each group should share their calculations and relevant observations with the class.

### Intermediate:

Ask the students to calculate the total amount of papers in the bin and the proportion of reusable papers to total papers. Ask them to calculate what percentage of papers found in the recycling bin were reusable. Invite each group to present their findings with the class.

### Advanced:

Invite the class to calculate the percentage of papers that could be reused each week, each month, and each year. Ask them to calculate the approximate amount and percentage of papers that could be reused in all of the classrooms of the school. Ask them how much paper could be reused each year. If every school in New York City did this, how many papers in total could be reused?

## Be a Trashmaster!

# Overcoming RRR Obstacles

---

**Time:**

20 minutes

**Subjects:**

English Language Arts, Science,  
Problem Solving

**Vocabulary:**

recycle, reduce, reuse,  
sustainability

**Goals and Objectives:**

Students will explore obstacles surrounding reducing, reusing, and recycling, and come up with action plans to overcome these challenges. They will work together to create a book, which will be made available to the school community.

**Teacher's Note:**

*This Activity is most effective when students revisit their **TrashMaster Contracts**.*

---

**Materials:**

- Copies of **TrashMaster Contracts** (from Activity 1 in this chapter)
- **Markers** and/or colored pencils, or computers and printers (if available)
- **Paper**

---

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of how to reduce, reuse, and recycle.

**Suggested Discussion:** Ask the class if they have been able to fulfill their commitment to reduce, reuse, and recycle as described on their **TrashMaster Contracts**. What were some of the challenges they encountered?

**Exploration:**

1. Ask the class to share stories about how they have been able to reduce, reuse, and recycle.
2. Remind them of the **TrashMaster Contracts** they signed.
3. Ask the students to think about challenges they have faced when trying to reduce, reuse, and recycle.
4. Invite the class to help each other come up with action plans to overcome these obstacles.
5. Divide the class into small groups.

6. Explain that each group will come up with at least four obstacles and action plans, which they will write about and illustrate.
7. The class will work together to compile all of their obstacles and solutions into a book.
8. The book could be published on the class website or displayed in the library or cafeteria, where the school community may view it.

### Expanded Exploration:

Encourage class discussion about obstacles and solutions that they found to be surprising and those that seemed to be the most common. Ask the class to think of creative ways to reuse materials.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Encourage the students to illustrate obstacles they have encountered when reducing, reusing, and recycling, and their action plans to overcome these obstacles. They should share their work with each other and work together to compile a book.

### Intermediate:

Follow the Activity instructions.

Each group of students can create their own book of RRR obstacles and solutions. The books should also address why reducing, reusing, and recycling are important and how these practices impact the environment. Encourage the class to incorporate outside research.

After each group completes a first draft, they can trade first drafts with another group to proofread and offer suggestions for revisions. Then, the groups will revise and rewrite their books and present them to the class. You may also want to publish the books on the class' website and make them available to the greater school community.

### Advanced:

Follow the Activity instructions.

Students can work in small groups or individually to create books about the obstacles and solutions surrounding reducing, reusing, and recycling and how this impacts the environment. Each book should have a title, a brief biography about the author or authors, and a dedication page. Students may also incorporate outside research to support their action plans.

The books should go through a series of revisions before they are presented to the class and made available to the school community. You may also want to have students publish the books on the class website.

# Be a Trashmaster!

## Options for Reuse

---

### Time:

30 minutes

### Subjects:

English Language Arts, Science, Math, Problem Solving, Art

### Vocabulary:

biodegradable, recycle, reduce, reuse, sustainability

### Goals and Objectives:

Students will explore the different ways cloth and paper napkins affect the environment. They will practice reuse by creating napkin rings for themselves and their families.

### Teacher's Note:

*One paper towel tube can make about six napkin holders and one toilet paper tube can make two or three napkin rings. You may want to ask the class to bring in the tubes for this project or collect them ahead of time.*

### Materials:

- **Cardboard tubes** found inside paper towels or toilet paper
- **Paints** or collage materials
- **Cloth napkin**
- **Scissors**
- **Napkin ring**
- **Markers** and/or paints

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

### Warm Up:

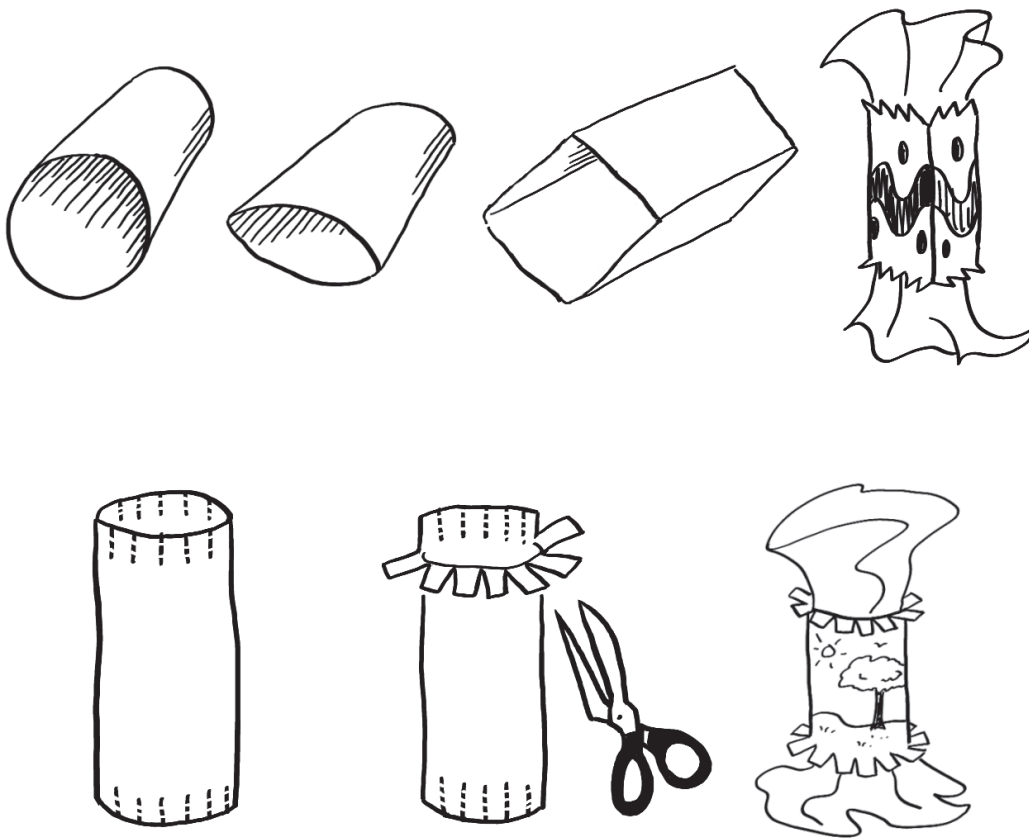
**Class Discussion:** Determine students' prior knowledge and understanding of the reuse concept.

**Suggested Discussion:** How many paper napkins would you guess you and your family use in a week? Do you think it is better for the environment to use cloth napkins instead of paper napkins?

### Exploration:

1. Demonstrate the difference between a cloth and a paper napkin.
2. Invite the class to estimate the number of napkins they use each day and help them translate this number into an approximate number of trees that make up the class' amount of napkins in a month and a year.
3. Ask them if they ever use cloth napkins and to describe the benefits of using cloth napkins instead of paper napkins. Have them come up with other ways to cut down on the number of paper napkins they use. For example, they could refuse excess napkins with purchased meals.

4. Let them know that cloth napkins do not have to be washed after each use, just as most people do not wash their bath towels after every use. Explain that one way to keep their napkins separate is by using personalized napkin rings.
5. Show the napkin ring to the class and demonstrate how to place the cloth napkin inside.
6. Explain that they will be making their own napkin rings for their families to use.
7. Praise them in advance for reusing cloth napkins and for reusing the cardboard tubes.
8. Help them cut the cardboard tubes into strips of 1-2 inches. Encourage them to decorate their napkin rings and to share them with their families.



### Expanded Exploration:

Encourage class discussion about the importance of reuse. Ask them to think of other ways they can reuse items. Ask them to think about other creative projects they could make from items that would otherwise be discarded.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### **Beginner:**

You may want to cut the cardboard tubes in advance. Follow the other Activity instructions and have the students share their finished projects with the class.

### **Intermediate:**

Follow the Activity instructions.

Encourage the class to brainstorm other ideas for creative reuse. Each student can write a set of instructions or a proposal for a creative reuse project. Students should share their instructions and proposals with the class.

### **Advanced:**

Follow the Activity instructions.

Assign a research project about the topic of reuse. Ask them to find examples of creative reuse in the news or in history and to write a short paper describing the work and citing reference materials. They should present their research projects to the class.





## Be a TrashMaster!

# Make Your Own Paper

### Time:

45 minutes

### Subjects:

Art, English Language Arts,  
Science

### Vocabulary:

fiber, pulp, recycle, reduce, reuse

### Goals and Objectives:

Students will learn how recycled paper is made by making their own.

### Teacher's Note:

*This project is messy. You may want to ask the class ahead of time to bring in an apron or smock. When gathering these materials, try to collect used paper that has minimal print ink because ink tends to darken recycled paper. Also, please note that colored paper makes colored pulp. Paper will take roughly two days to dry.*

### Materials:

- **Used paper** (loose leaf, paper towels, magazines, copy paper, scrap paper)
- **Dryer lint** (optional)
- A **blender** or an egg beater and a large bowl
- 1-2 gallons of **warm water**
- **Window screen** (clean and dent-free, slightly larger than the size of the paper you are making)
- A **flat tub** or dish pan that is larger than the screen and at least 6" deep
- **Heavy paper** or wooden block
- **Newspaper** or thick felt (for blotting)
- A **rolling pin** or tall, thick glassed bottle
- **Old t-shirts**, old button-down shirts worn backwards, smocks, or aprons (to protect clothes)

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

### Warm Up:

**Class Discussion:** Determine students' prior knowledge and understanding of how paper is made.

**Suggested Discussion:** How is paper made? How is recycled paper made? Why is it better for the environment to use recycled paper?

### Exploration:

1. Explain to the class that they will be making their own recycled paper.
2. Remind the class to protect their clothes by wearing an old shirt, smock, or apron.
3. Shred the paper into small pieces.
4. Put these pieces into the bowl.



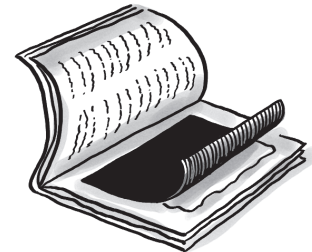
5. Add dryer lint.
6. Add warm water. Four parts of water to one part used paper is the best proportion.
7. Let the mixture soak for 5 – 10 minutes.
8. Beat the mixture until it's a thick pulp. If you are using a blender, fill the blender halfway with warm water and add a handful of shredded paper.
9. Pour the pulp into the flat tub. Repeat the steps above until the tub is half-full.



10. Dip the screen into the flat tub and cover it with the mixture. Evenly distribute and flatten the mixture over the screen. Let the extra water drain into the tub. With a thick piece of paper or wooden block, press the excess water out of the pulp.
11. Pile layers of newspaper and an extra layer of blotting paper or felt on top. Use the screen to place the pulp on the blotting paper and then remove the screen.
12. Fold the newspaper over the pulp like a closing book.



13. Flatten the covered pulp with a rolling pin or thick-glassed bottle.
14. Open your blotting paper to air out the paper you just created. Let it dry for a couple of days. Carefully peel the new sheet from the blotting paper.
15. Do not put extra pulp down the drain. It can be reused or recycled. To reuse it, wrap the extra pulp in paper and put it in the freezer. To recycle it, leave the pulp out to dry and then place it in the recycling bin.



### Expanded Exploration:

Encourage class discussion about recycled paper and other ingredients they may want to add next time. They could use papers of different colors and add extra ingredients, like colored threads, confetti, food coloring, starch, bleach, small leaves, flowers, and glitter.

Students can use their recycled paper: copy their own poem onto the paper, illustrate it, and frame it for display or as a keepsake. Or paste a favorite drawing, poem, or photo onto the paper to use the paper itself as a frame.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### **Beginner:**

Follow the Activity instructions.

Encourage students to write and illustrate the steps to this Activity and share their work with the class.

### **Intermediate:**

Follow the Activity instructions.

Assign a follow-up research paper about the amount of recycled paper that is used and how this has or has not made a significant impact in deforestation.

### **Advanced:**

Follow the Activity instructions.

Ask the students to present a research project to the class that incorporates information about the rate of recycled paper used today and other ways people are starting to change their product consumption and disposal methods and how this has impacted the environment. They should present their research projects with the class.



## Be a TrashMaster!

# Litter Awareness Campaign

---

**Time:**

20 minutes

**Goals and Objectives:**

Students will plan and implement a litter awareness campaign.

**Subjects:**

English Language Arts, Science, Problem Solving, Art

**Teacher's Note:**

*This Activity can be done in conjunction with **Chapter 2, Activity 7: Studying Litter in the School Community.***

**Vocabulary:**

campaign, community relations, litter, public relations, recycle, reduce, reuse

---

**Materials:**

- Paper or cloth for posters or banners
  - Markers and/or paints
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Class Discussion:** Determine students' prior knowledge and understanding of the litter problem in their community.

**Suggested Discussion:** Ask the class if they have noticed a lot of litter around the school and neighborhood. Why do they think there's so much litter? What happens to litter, where does it go? How can we help to reduce litter in our community?

**Exploration:**

1. Present the idea of working together to launch a litter awareness campaign.
2. Invite student ideas and impressions of how to go about launching a campaign.
3. Ask the class to think about where they have seen the most litter.
4. Have them brainstorm ideas about how to work with the neighborhood to reduce the amount of litter. Explain that they are putting together a community relations plan.
5. Suggest the idea of creating posters or banners to help advertise the campaign. Ask the class to think of other ways to take action.

6. Encourage the students to create a plan to clean up the litter. Explain that this sets an example in the community and also helps to clean up the neighborhood. The NYC Department of Sanitation offers a program to encourage volunteer clean-ups. More information can be found on the DSNY website ([nyc.gov/sanitation](http://nyc.gov/sanitation)) or by calling 311.
7. Ask the class to think of ways to tell others in the community how they were able to help reduce the amount of litter. Explain that they are working together to come up with and implement a public relations strategy.
8. Take before and after pictures, and submit samples of your promotional campaign as well as exemplary student classwork to DSNY Golden Apple Awards **TrashMasters! Team Up to Clean Up**. You may win cash prizes for your efforts!

### Expanded Exploration:

Encourage class discussion about the next steps to implement this campaign, and how they can make a permanent reduction in neighborhood litter. Ask them to think of other environmental campaigns they would like to develop. Encourage them to brainstorm creative ways of engaging the community.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Have the class work in small groups to develop their campaign strategies. Encourage them to illustrate posters that advertise the importance of reducing litter. Each group should present their ideas and posters to the class.

### Intermediate:

Follow the Activity instructions.

Divide the class into small groups and ask them to write a campaign strategy proposal and present it to the class. Encourage the groups to set deadlines for each step needed to implement their campaigns.

### Advanced:

Follow the Activity instructions.

The class can work in small groups to come up with a campaign strategy that incorporates outside research and social media. They can present their proposals to the class. Encourage the class to take the next steps required to implement their campaigns.

## Be a TrashMaster!

# TrashMaster Acrostic

---

**Time:**

30 minutes

**Goals and Objectives:**

Students will create acrostics with the term “TrashMaster” that explore the themes of reducing, reusing, and recycling.

**Subjects:**

English Language Arts, Science

**Vocabulary:**

acrostic, recycle, reduce, reuse

---

**Materials:**

- Copies of *TrashMaster Acrostic Handout*
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students’ prior knowledge and understanding of the importance of reducing, reusing, and recycling.

**Suggested Discussion:** What are some creative ways we can express the importance of reducing, reusing, and recycling? Ask the class if anyone can define *acrostic*.

**Exploration:**

1. Distribute copies of *TrashMaster Acrostic Handout*.
2. Describe the meaning of “acrostic.” An acrostic is a series of words or phrases in which particular letters, usually the first or the last, spell out a different word or phrase when read in order.
3. Explain that they will be creating their own acrostics using the term “TrashMaster” and incorporating the themes of reducing, reusing, and recycling.
4. Invite the students to share their acrostics with the class.

**Expanded Exploration:**

Encourage class discussion about creative methods to promote reducing, reusing, and recycling. Ask the class to think of new ways to demonstrate the importance of reducing, reusing, and recycling.



---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### **Beginner:**

Follow the Activity instructions.

Encourage the class to illustrate their acrostics and present them to the class. You may want to compile all of the acrostics in a book.

### **Intermediate:**

Follow the Activity instructions.

Invite the class to come up with other environmental words or concepts to use in an acrostic. They can create short booklets of their environmental acrostics and present them to the class.

### **Advanced:**

Follow the Activity instructions.

The students can create short booklets that include this and other environmentally-themed acrostics and share them with the class. They can also work together to coordinate a reading event that showcases some of their acrostics.

## Be a TrashMaster!

# TrashMaster Acrostic Handout

Name \_\_\_\_\_ Date \_\_\_\_\_

An **acrostic** is a series of lines in which particular letters, such as the first or the last, spell out a different word or phrase when read in order.

Create your own acrostic using the word “TrashMaster” and using the themes of reducing, reusing, and recycling. You can use the back of this handout for scratch paper.

T \_\_\_\_\_

R \_\_\_\_\_

A \_\_\_\_\_

S \_\_\_\_\_

H \_\_\_\_\_

M \_\_\_\_\_

A \_\_\_\_\_

S \_\_\_\_\_

T \_\_\_\_\_

E \_\_\_\_\_

R \_\_\_\_\_



# Be a TrashMaster!

## Trash or Treasure

---

**Time:**

20 minutes

**Subjects:**

English Language Arts, Science,  
Problem Solving

**Vocabulary:**

recycle, reduce, reuse

**Goals and Objectives:**

Students will explore how one person's trash can be another person's treasure. They will work together to coordinate a stuff exchange event to trade items that they no longer want instead of throwing them away.

**Teacher's Note:**

*This is a two-part project:*

*In Part 1, students plan a stuff exchange event.*

*In Part 2, they participate in the stuff exchange event.*

---

**Materials:**

- Students should bring in one item that they no longer want to keep
  - Poster paper and markers to promote the event in advance
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior understanding of how the concept of waste is subjective: what one person considers waste another person may consider a treasure.

**Suggested Discussion:** What are some examples of when waste has been reused? Ask the class if there are items in their homes that they no longer want, which they could give to someone else instead of throwing away.

**Exploration:****Part 1: Planning the Event**

1. Ask the class to give examples of how one person's waste can be another person's treasure.
2. Offer the idea of trading items with each other as an alternative to throwing them away.
3. Tell them that they will be working together to plan a stuff exchange event at which each student will trade an item they no longer want for another.
4. Have the class work in small groups to plan the date, time, location, and other event details.
5. Facilitate a discussion about the best structure for the event. Compare and refine the students' ideas, or present those listed in Part 2.

6. Now that they have planned the event, help them brainstorm possible items to exchange. Those unable to bring an item from home can create something they could trade, such as a drawing, poem, or coupon for services.

### Part 2: The Event

1. Make sure everyone remembered to bring in at least one item to exchange.
2. Invite everyone to display their items on a table or on their own desks.
3. Announce that the class will be randomly assigned to groups. Each will take turns looking through the items on display and each student will get to choose and take an item. The class will have another opportunity to trade with each other after they have each selected an item.
4. Give everyone a chance to look at the items.
5. Divide the class into groups at random.
6. Call one group at a time to select an item.
7. After everyone has selected an item, they may trade with each other again.

### Expanded Exploration:

Encourage class discussion about how this exchange event has reduced the amount of waste and has also been an example of how to reuse items. Consider setting up a permanent exchange box in the classroom. Ask students to brainstorm other ways to practice reducing and reusing. Look for examples like flea markets, stoop sales, and online exchanges like eBay, Craigslist.org, and local e-groups.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

For Part 1, ask the students to illustrate the items they will be trading and to present their illustrations to the class. For Part 2, ask the students to illustrate and write about the item they selected, and how this event was an example of reducing and reusing.

### Intermediate:

Follow the Activity instructions.

Students can also complete follow-up writing assignments that summarize the event and explore how this event is an example of reducing and reusing.

### Advanced:

Follow the Activity instructions.

Invite students to complete research assignments for which they find examples of exchange events in the community and worldwide. For instance, many American towns now participate in ongoing book exchanges.

## Be a TrashMaster!

# An RRR Map of Your Neighborhood

---

**Time:**

45 – 60 minutes

**Goals and Objectives:**

Students will make an RRR map of the stores in your school's neighborhood that offer ways to recycle or reuse.

**Subjects:**

English Language Arts, Science, Problem Solving

**Vocabulary:**

recycle, reduce, reuse

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**Materials:**

- Internet access
  - Paper and markers
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## Activity

*Following this activity are adaptations for Beginner, Intermediate, and Advanced.*

**Warm Up:**

**Class Discussion:** Determine students' prior understanding of reducing, reusing, and recycling in their neighborhood.

**Suggested Discussion:** Ask the class if they know of any stores in their neighborhoods that offer a refund for recyclable items. Which stores accept plastic bags or rechargeable batteries for recycling? Which ones sell reusable shopping bags, or give a discount for bringing your own bag? How about service stations that accept motor oil or tires? Do they know of any stores in their neighborhoods that sell used or reusable items? Have they seen stores like these in other areas?

**Exploration:**

1. Find out if the students know of any existing stores in your school's neighborhood that offer ways to recycle or reuse, such as a store that redeems deposit bottles and cans, or takes back its plastic or paper bags. Stores that buy and sell used items, such as secondhand books or clothes, should be included.
2. Let the class know that they will be taking a walk around the neighborhood and creating maps of the area that show all of the stores that practice RRR.
3. Brainstorm with the class about specific parts of the neighborhood to explore and document. Decide together on an area.

4. Divide the class into teams and ask at least one person in each team to sketch a map of the area about to be explored.
5. Lead the class on a walk around the neighborhood to find stores that practice RRR.
6. Remind the students to document the exact address, website, and other details. Encourage the students to make illustrations of or take photographs of the stores.
7. Each group of students should work together to come up with a neighborhood map of stores that incorporate environmental sustainability into their business practices.

### Expanded Exploration:

Encourage class discussion about ways businesses and consumers can influence environmental sustainability. Revise the maps and create a final draft as a group that can be scanned or photographed and printed for distribution, or posted on a school or neighborhood website. Follow-up by letting the stores know that your school is supporting their work and ask the stores to display the students' map.

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## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Have the students take photos or make illustrations of the stores that incorporate RRR. You can include these on a large bulletin board-sized map or display them in the classroom.

### Intermediate:

Follow the Activity instructions.

Students can also complete follow-up writing assignments that incorporate the ratio of RRR stores to non-RRR stores, and address how businesses and consumers can influence the environment.

### Advanced:

Follow the Activity instructions.

Incorporate a **math** component by asking teams to make their maps to scale. Invite students to investigate other parts of the neighborhood and to do research on the number of stores that incorporate RRR in New York City and all over the country.

# Be a TrashMaster!

## Learning Standards

### Activity 1: Translating Learning into Personal Commitment

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Writing

Subsections 1, 2	Text Types and Purposes
Subsection 4	Production and Distribution of Writing

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsection 1	Comprehension and Collaboration
Subsections 4, 6	Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

Subsection 1	Conventions of Standard English
Subsection 3	Knowledge of Language
Subsection 6	Vocabulary Acquisition and Use

#### New York State Common Core Learning Standards for Social Studies

Civics, Citizenship, and Government

#### The Applied Learning Performance Standards

A1	Problem Solving
A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.



# Be a TrashMaster!

## Learning Standards

### Activity 2: Getting Your School to Be a Super Recycler

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Reading

Subsection 1 Key Ideas and Details

##### College and Career Readiness Anchor Standards for Writing

Subsections 1, 2 Text Types and Purposes

Subsection 4 Production and Distribution of Writing

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsection 1 Comprehension and Collaboration

Subsection 4 Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

Subsections 1, 2 Conventions of Standard English

Subsection 3 Knowledge of Language

#### The Applied Learning Performance Standards

A2 Communication Tools and Techniques

A5 Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

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## Learning Standards

### Activity 3: Reduce Paper Use

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsection 1	Comprehension and Collaboration
Subsections 4, 6	Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

Subsection 3	Knowledge of Language
Subsection 6	Vocabulary Acquisition and Use

#### New York State Common Core Learning Standards for Mathematics

Subsections 1, 2	Counting and Cardinality
Subsection 1	Operations & Algebraic Thinking

#### The Applied Learning Performance Standards

A1	Problem Solving
A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1 b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

##### S1.1a,b,c

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.

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## Learning Standards

### Activity 4: Overcoming RRR Obstacles

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Reading

- Subsections 1, 2, 3 Key Ideas and Details
- Subsections 5, 6 Craft and Structure
- Subsection 11 Responding to Literature

##### College and Career Readiness Anchor Standards for Writing

- Subsections 1, 2, 3 Text Types and Purposes
- Subsections 4, 5, 6 Production and Distribution of Writing
- Subsection 10 Range of Writing
- Subsection 11 Responding to Literature

##### College and Career Readiness Anchor Standards for Speaking and Listening

- Subsections 1, 2, 3 Comprehension and Collaboration
- Subsections 4, 5, 6 Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

- Subsections 1, 2 Conventions of Standard English
- Subsection 3 Knowledge of Language
- Subsection 6 Vocabulary Acquisition and Use

#### The Applied Learning Performance Standards

- A1 Problem Solving
- A2 Communication Tools and Techniques
- A3 Information Tools and Techniques
- A4 Learning and Self-management Tools and Techniques
- A5 Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment:

decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

# Be a TrashMaster!

## Learning Standards

### Activity 5: Options for Reuse

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Writing**

Subsection 2	Text Types and Purposes
Subsection 4	Production and Distribution of Writing

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

Subsection 2	Comprehension and Collaboration
Subsections 4, 6	Presentation of Knowledge and Ideas

##### **College and Career Readiness Anchor Standards for Language**

Subsections 1, 2	Conventions of Standard English
Subsection 6	Vocabulary Acquisition and Use

#### **New York State Common Core Learning Standards for Mathematics**

Subsections 1, 2	Counting and Cardinality
Subsection 1	Operations & Algebraic Thinking

#### **The Applied Learning Performance Standards**

A1	Problem Solving
A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### **New York City Science Scope & Sequence**

##### **7.1a, 7.1b**

Human influences on the environment: positive influences.

##### **7.1c, 7.2a, 7.2b, 7.2c**

Human influences on the environment: negative influences.

##### **7.3a, 7.3b**

Human influences on the environment: decision making (risk/benefit).

##### **ICT 5.2, IPS 1.1-1.4, IPS 2.1**

Packaging and solid waste.

##### **LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1**

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### **LE 7.1a,b**

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.1b,c**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

# Be a TrashMaster!

## Learning Standards

### Activity 6: Make Your Own Paper

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Writing**

Subsection 2	Text Types and Purposes
Subsection 4	Production and Distribution of Writing

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

Subsection 2	Comprehension and Collaboration
Subsections 4, 6	Presentation of Knowledge and Ideas

##### **College and Career Readiness Anchor Standards for Language**

Subsections 1, 2	Conventions of Standard English
Subsection 6	Vocabulary Acquisition and Use

#### **The Applied Learning Performance Standards**

A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### **New York City Science Scope & Sequence**

##### **7.1a, 7.1b**

Human influences on the environment: positive influences.

##### **7.1c, 7.2a, 7.2b, 7.2c**

Human influences on the environment: negative influences.

##### **7.3a, 7.3b**

Human influences on the environment: decision making (risk/benefit).

##### **ICT 5.2, IPS 1.1-1.4, IPS 2.1**

Packaging and solid waste.

##### **LE 7.1a,b**

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.1b,c**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

# Be a TrashMaster!

## Learning Standards

### Activity 7: Litter Awareness Campaign

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Writing**

Subsection 2	Text Types and Purposes
Subsection 4	Production and Distribution of Writing

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

Subsections 1, 2	Comprehension and Collaboration
Subsections 4, 5, 6	Presentation of Knowledge and Ideas

##### **College and Career Readiness Anchor Standards for Language**

Subsections 1, 2	Conventions of Standard English
Subsection 6	Vocabulary Acquisition and Use

#### **The Applied Learning Performance Standards**

A1	Problem Solving
A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### **New York City Science Scope & Sequence**

##### **7.1a, 7.1b**

Human influences on the environment: positive influences.

##### **7.1c, 7.2a, 7.2b, 7.2c**

Human influences on the environment: negative influences.

##### **7.3a, 7.3b**

Human influences on the environment: decision making (risk/benefit).

##### **LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1**

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### **LE 7.1a,b**

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.1b,c**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### **LE 7.2b,c, LE 7.2d**

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.2b,c, LE 7.2d**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

# Be a TrashMaster!

## Learning Standards

### Activity 8: TrashMaster Acrostic

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Writing

Subsection 3	Text Types and Purposes
Subsection 4	Production and Distribution of Writing

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsection 1	Comprehension and Collaboration
Subsections 4, 6	Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

Subsection 2	Conventions of Standard English
Subsection 3	Knowledge of Language
Subsection 5	Vocabulary Acquisition and Use

#### The Applied Learning Performance Standards

A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1 b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

# Be a TrashMaster!

## Learning Standards

### Activity 9: Trash or Treasure

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Writing**

Subsection 3	Text Types and Purposes
Subsection 4	Production and Distribution of Writing

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

Subsections 1, 2	Comprehension and Collaboration
Subsections 4, 6	Presentation of Knowledge and Ideas

##### **College and Career Readiness Anchor Standards for Language**

Subsections 1, 2	Conventions of Standard English
Subsection 6	Vocabulary Acquisition and Use

#### **The Applied Learning Performance Standards**

A1	Problem Solving
A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### **New York City Science Scope & Sequence**

##### **7.1a, 7.1b**

Human influences on the environment: positive influences.

##### **7.1c, 7.2a, 7.2b, 7.2c**

Human influences on the environment: negative influences.

##### **7.3a, 7.3b**

Human influences on the environment: decision making (risk/benefit).

##### **ICT 5.2, IPS 1.1-1.4, IPS 2.1**

Packaging and solid waste.

##### **LE 7.1a,b**

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.1 b,c**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).



# Be a TrashMaster!

## Learning Standards

### Activity 10: An RRR Map of Your Neighborhood

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Writing

Subsection 2	Text Types and Purposes
Subsections 4, 5	Production and Distribution of Writing

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsections 1	Comprehension and Collaboration
Subsections 4, 5, 6	Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

Subsections 1, 2	Conventions of Standard English
Subsection 6	Vocabulary Acquisition and Use

#### The Applied Learning Performance Standards

A1	Problem Solving
A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1 a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1 b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

## Chapter 5

# All About Composting

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### Chapter Focus:

This chapter offers an introduction to the basics of composting. The Activities give students hands-on experience with decomposer organisms and natural decomposition, even if there is no access to an outdoor compost bin or indoor worm bin. The information presented in this chapter focuses on waste reduction through recycling *organics* (things that were once alive or came from something that was alive) into compost, which is a dark, crumbly, porous, soil-like material used in gardening.

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## Let's Break It Down

If you follow the three R's — reducing waste before it happens, reusing what you can, and recycling everything you can — you will notice that you have a lot less garbage. If you look closer at what's left in your trash, you will see that some of it consists of food scraps and soiled paper such as napkins and towels. To reduce your waste even further, you can recycle these materials by turning them into compost.



## What Is Composting?

You can think of composting as speeding up the way that nature recycles organics. In nature, when a leaf falls to the forest floor, it is slowly broken down over a long period of time and consumed by a host of creatures ranging from worms and insects to microorganisms, such as bacteria and fungi. The elements in the organic materials are recycled back into the natural system to be used by other organisms. When we compost our organic materials, we speed up the natural process by controlling the ingredients and conditions that the decomposer organisms need to thrive. This is done by monitoring the mix of materials, moisture, air, and heat. The finished compost is a nutrient-rich soil amendment that has special properties essential for growing healthy plants and building healthy soil. Because it slowly releases nutrients, holds water, and promotes beneficial soil life, compost is a great alternative to synthetic fertilizers.



## Why Is Composting Important?

You might be wondering why food scraps and other organic material like paper, leaves, and yard waste don't just naturally turn into compost at the landfill. It's because when they are layered and compacted with other trash, they lack the oxygen needed to properly decompose. Rather than break down and return their nutrients to the soil, the organics interact with the other materials in the landfill to create toxic liquids and gases that can leach into the surrounding environment. By composting, we help the environment by cutting down on the amount of organic waste disposed of in landfills, reducing the amount of fuel needed to transport the waste, and keeping the nutrient cycle going without the use of synthetic fertilizers.

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## How Does It Work?

In the city, it is recommended that you make compost in a commercial or homemade compost bin. You can also compost indoors using red wiggler worms in a ventilated bin. Although anything that was once alive can be composted, in school or garden settings you should only compost things that come from plants, like fruit and vegetable scraps, coffee grounds and tea bags, grass clippings and yard wastes that have not been sprayed with pesticides or herbicides. Many paper products that don't go into the recycling bin can also be composted. Please refer to NYC Compost Project literature for a list of additional items that can be composted.



Over time, decomposer organisms will turn your organics into nutrient-rich compost. Compost acts as an excellent soil conditioner and can be mixed into street tree beds, added to flower and vegetable gardens, mixed with potting soil for indoor plants, or spread onto lawns.



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## Where to Get Help: NYC Compost Project

The NYC Compost Project ([nyc.gov/wasteless/compostproject](http://nyc.gov/wasteless/compostproject)) was created by the NYC Department of Sanitation in 1993 to provide compost education and outreach to NYC residents, nonprofit organizations, schools, and businesses.

Funded and managed through the Department of Sanitation's Bureau of Waste Prevention, Reuse and Recycling, the NYC Compost Project programs are carried out by Department-funded staff at host sites in each borough.

Each NYC Compost Project location offers a home composting demonstration site, a compost telephone helpline, and provides compost-related literature, workshops, and classes for residents, teachers, landscapers, and other interested parties.

NYC Compost staff and volunteers regularly disseminate composting and recycling information at thousands of community events, and offer low-cost compost bins for sale to NYC residents.



# All About Composting

## What's in My Waste?

### Time:

20 – 30 minutes

### Subjects:

English Language Arts,  
Science, Math

### Vocabulary:

biodegradable, compost,  
decompose, landfill, reduce,  
reuse, recycle,

### Goals and Objectives:

After examining items from a classroom trash can or from their own lunchroom waste, students will learn how certain waste items can remain in landfills for decades, if not centuries, before they are fully broken down. Through a mathematical exercise and scientific reasoning, they will connect this information to their own lives and identify ways to reduce, reuse, recycle, and compost.

### Teacher's Note:

Prepare a garbage bag filled with clean samples from each of the categories on the **What's in My Waste? Worksheet**. Be sure to wash all items before placing in the bag. You may want to keep the compostable items separate. See [nyc.gov/recycle](http://nyc.gov/recycle) for info on what to recycle in NYC.

### Materials:

- **Gloves** (for handling the bag of garbage)
- **Recyclable and reusable items** (glass bottle, plastic bottle, aluminum can, milk carton)
- **Non-recyclable items** (plastic garbage bag, plastic six-pack holder, Styrofoam® container, drink pouch)
- **Compostable items** (fruit rind, vegetable peeling, tea bag, paper plate, napkin)
- **Scale** (optional)
- Copies of the **What's in My Waste? Worksheet**

## Activity

Following this Activity are adaptations for *Beginner, Intermediate, and Advanced*.

### Teacher Prep:

If this is your first Activity from this chapter, read the **Chapter 5 Introduction**. Refer to the **Glossary** for definitions of vocabulary words.

### Warm Up:

**Class Discussion:** Determine students' prior knowledge and understanding of waste and waste management, particularly the concepts of reducing, reusing, recycling, and composting.

**Suggested Discussion:** What type of things can you think of that might get thrown out in the trash? Which of those items can be reused? Share some examples of when you have reused an item instead of discarding it. Which items can be recycled? How would you describe composting? What kinds of items could be composted? Do you know anyone who composts? Why is it important to reduce, reuse, recycle, and compost?

## Exploration:

1. Distribute the ***What's in My Waste? Worksheet***.
2. Show the class the garbage bag and explain that they will be sorting the contents into four categories, items that can be: reused, recycled, composted, and landfilled.
3. Ask the class to help sort the items and to list them under the appropriate category (or categories) on their handouts.
4. Explain that certain items take a very long time to break down. Glass is made from molten sand and does not decompose; it can last millions of years. Plastic items, like cups and toys, can last 250 years. Aluminum cans may last 200 – 500 years. Remind them of the importance of reusing and recycling.
5. Explain how it takes a few weeks to several months for most food scraps to decompose under the right conditions. Explain that biodegradable items, including food scraps, do not fully decompose in a landfill because the items are compacted and there is a lack of air, water, and sunlight, which play important roles in the decomposition process.
6. Have the students list the number of each type of item found in the garbage bag. Ask them to think about the amount of time it would take for the item to decompose when exposed to air and light and remind them that the air is pressed out when the items are compacted in a landfill.
7. Have students weigh each item and list the weight on their worksheets. Have the class calculate the total weight of each line.
8. Ask the students to answer the questions on the back of the ***What's in My Waste? Worksheet***. Remind the class that by composting food scraps and by reusing and recycling other items, they can reduce the amount of waste sent to a landfill.

## Expanded Exploration:

Engage the class in a discussion about New York City's waste and how the daily decisions each one of us make directly impact this problem. Why is it important to think about our waste? What ways can we be more environmentally responsible? What items can be composted? What are the benefits of composting?

---

# Adaptations for Different Grades

*Choose level most appropriate for your class.*

## Beginner:

Follow the Activity instructions.

Include a **read aloud** component from the *What's in My Waste? Worksheet* or with the definitions of vocabulary words from the **Glossary**.

Consider modifying this Activity by using samples from the cafeteria trash. This would focus the lesson on the waste surrounding just one meal of their day.

Ask the class to draw what they imagine a landfill looked like a hundred years ago and what they imagine a landfill looks like today. Then ask the class to illustrate a compost pile or bin. Encourage them to share their drawings with the class.

## Intermediate:

Follow the Activity instructions.

Encourage the students to use the *What's in My Waste? Worksheet* to list items they throw away each day or each week in the trash at home or at school. Have them identify which items came from plants and inform them that these can be recycled by turning them into compost. Alternately, conduct the Activity by looking at what is in a bag of trash from the school cafeteria. Discuss ways to reduce the amount of food scraps being sent to a landfill. If their family or school doesn't currently compost, what are some ways students could begin doing so? Let students know that they can also bring certain food scraps to neighborhood drop-off locations. (See [nyc.gov/wasteless](http://nyc.gov/wasteless) and search for "food waste drop off" for a current list.)

Ask the class to write an article about ways New Yorkers can reduce the amount of food scraps sent to a landfill. If time and resources allow, the students could revise their articles and compile their work into a book or post their articles online on the school website or as a class blog

## Advanced:

Follow the Activity instructions.

Incorporate a **research and writing** component. Ask the class to research the types of materials that can be composted (find out on [nyc.gov/wasteless/compost](http://nyc.gov/wasteless/compost)). What percentage of waste could be diverted from a landfill by composting? What composting methods are practiced today?

Have the students use the *What's in My Waste? Worksheet* to conduct a waste audit of the garbage and recycling bags in their home, classroom, or school cafeteria, either by observing what is in the bags or by physically sorting and weighing the materials. What are the students' plans for composting their organic waste?

Students could create brochures, PowerPoint presentations, or a class blog to share their findings and explain why composting is an important strategy for managing organic waste.



# All About Composting

## What's in My Waste? Worksheet

Name \_\_\_\_\_ Date \_\_\_\_\_

Examine the contents of the garbage bag. Each item can be reused, recycled, composted, or landfilled. Categorize and sort the items into groups. List the items in the table below.

Reuse	Recycle	Compost	Landfill

Consider the amount of time it would take for each type of item to break down when exposed to air and sunlight. Other variables, such as moisture and temperature, also affect the rate of decomposition. It takes longer for the items to decompose when compacted in a landfill, where there is a lack of oxygen and sunlight. Weigh each item and mark your sheet each time you find an item that is listed below.

Item	Quantity	Weight per Item	Total Weight	Approximate Break Down Time (when exposed to air and light)
glass bottle				no one knows exactly how long
plastic bottle				no one knows exactly how long
plastic six-pack holder				450 years
aluminum can				200 – 500 years
plastic cup				250 years
rustproof steel can				50 years
plastic garbage bag				10 – 20 years
paper plate				5 years
milk or juice carton				3 months
this piece of paper				2-4 weeks
most vegetarian food scraps				a few weeks to a year
<b>TOTALS</b>				



Please answer the following questions, using what you discovered from the first part of this Activity.

1. How many items could be composted?
2. What is the weight of food scraps that could be composted instead of dumped in a landfill?
3. How many items could be reused?
4. What is the total weight of items that could be reused?
5. How many items could be recycled?
6. What is the total weight of items that could be recycled?
7. What is the total approximate amount of time it would take for everything to decompose?
8. List the items you had in your lunch today, including the food and its packaging.
9. Which items from your lunch could be composted?
10. What items do you consume regularly that could be composted instead of thrown away?
11. Calculate the approximate weight of food scraps you have left over each week?
12. List three ways to compost your food scraps.
13. Even though biodegradable items eventually decompose, why do you think composting is important?

# All About Composting

## Beginning to Understand That Nature Recycles

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**Time:**

20 minutes

**Vocabulary:**

decompose, leaf litter, millipede, nature, nutrients, sow bug

**Subjects:**

English Language Arts, Science

**Goals and Objectives:**

Students will read a poem, discuss decomposition in nature, and write a poem about the decomposition process.

**Materials:**

- Copies of a grade-level appropriate poem: ***Nature Recycles*** by Joel Smith; ***Compost*** by L. Mark Finch; or ***This Compost*** by Walt Whitman
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Teacher Prep:**

If this is your first Activity from this chapter, read the **Chapter 5 Introduction**. Refer to the **Glossary** for definitions of vocabulary words. Review the ***Decomposers in a Compost Pile Tip Sheet*** (in **Chapter 5, Activity 5**).

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of recycling in nature.

**Suggested Discussion:** What, if anything, is recycled in nature?

**Exploration:**

1. Distribute an appropriate grade-level poem to the class.
2. Discuss examples of poetic devices such as alliteration, rhyming couplets, and onomatopoeia in the poem.

3. Ask the class:
  - What is being recycled in the poem?
  - Who are nature's recyclers and what do they do?
  - What are the nutrients and why are they important?
  - How does each part of the poem relate to the other parts?
  - What is leaf litter?
4. Encourage students to write their own poems about how nature recycles.
5. Invite the students to read their poem out loud to the class or to share their poems with a partner. Students can illustrate their poems with drawings, photos, or pictures cut out from magazines. Display the poems on a bulletin board or the school website.

### Expanded Exploration:

Ask the class if they have ever seen decomposition in nature. What are some examples of decomposition in nature that they have seen or would like to see?

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Include a **read aloud** component from **Nature Recycles** by Joel Smith. You may also cut a copy of the poem into strips and have individuals or pairs of students read each section to the class. Be sure to define words in **Nature Recycles** that students may not know, such as *nutrients* and *leaf litter*. Have the students incorporate illustrations into their poems and to share them with the class.

### Intermediate:

Follow the Activity instructions using the poem, **Compost** by L. Mark Finch (or other grade-level appropriate poem about decomposition).

Help the students get started on writing their own poem by suggesting that they include certain vocabulary terms, such as *decompose* and *nutrients*. Encourage students to research other facts and organisms to include in their poems.

### Advanced:

Follow the Activity instructions using the poem, **This Compost** by Walt Whitman. Have students list examples of the imagery of death and decay. Ask students to write a brief essay on whether this poem is positive or negative. The students could research and read other poems about decomposition. Give the class the option of writing a poem individually or working in small groups. Encourage the students to share their work with the class. Post students' work on a bulletin board or the school website.

# All About Composting

## Nature Recycles

BY JOEL STONE

Used by permission of the Wisconsin Department of Natural Resources.

1



Here is a tree with its many parts.  
It has leaves and branches, a trunk, roots and bark.

2



The leaves in the fall turn from bright green to brown.  
As the weather turns cooler, they fall to the ground.

3



First one leaf will fall and then many more,  
As leaves become leaf litter on the forest floor.

4



Who'll clean up this mess? What shall we do?  
Here come nature's recyclers, nature's clean-up crew.

5



Why do they clean up this leaf litter mess?  
'Cause dead leaves have nutrients that they like the best.

6



Nutrients are like food, found in things living and dead.  
Without them nothing could grow, and all life would end.

7



Let's meet nature's recyclers and see how they toil.  
As they break down leaf litter and add nutrients to soil.

8



This is a *slippery slug*, a snail with no shell.  
It cleans floors of gardens, lawns and forests as well.

9



This is a *mushroom*, a plant that's not green.  
It breaks down leaf litter and keeps the woods clean.

10



This is a *worm*. What does it do?  
It digs under the leaves and chews them up, too.

11



This is a *beetle* with a hard black shell.  
It chomps all the leaves on the ground where they fell.

12



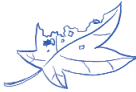
This is a *sowbug* that hides in the dark.  
It munches on dead plants in your garden and park.

13



This is a *millipede*; try counting its feet.  
It crunches up plants and keeps the ground neat.

14



So nature's recyclers, as they crunch, munch, and chew,  
Break leaves into pieces that become nutrients, too.

15



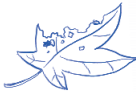
Nutrients in the soil make trees big and strong.  
They're sucked up the tree roots when spring comes along.

16



Nutrients are like food, and for trees they are good.  
They help make new leaves, strong branches, and wood.

17



And so, last year's brown leaves that were part of the tree,  
Were changed into food to make the new leaves you see.

# All About Composting

## Compost

BY L. MARK FINCH

Published by Prairie Poetry ([prairiepoetry.org](http://prairiepoetry.org)), which selects submissions from authors whose work reflects the spirit of the Great Plains.

When I've left my husk and you've had your weep,  
Toss me out on the compost heap.  
Mix me in with the leaves and such  
And sprinkle some water — it won't take much.  
Stir well with a fork, or whatever you've got,  
Do what it takes to help me rot.

And when I've become a rich, dark soil  
Plow me in, and I'll start my toil  
Of nourishing worms, and likewise roots  
And pushing up some tender shoots  
Of grass, and veggies, and bushes and trees  
Perches for birds, and banquets for bees.

I'll make plants fruit! I'll grow food for critters!  
I'll raise up some corn, and you can make fritters!  
It'll be lots of fun — I can just hardly wait!  
To nurture new life will really be great.  
And I'll laugh at you some, if I get on your shirt  
And you get annoyed and start calling me "dirt."

When dogs track me in Winter, my name will be Mud  
But when Spring comes around, I'll be in each bud.  
Hug a tree in the Summer, and pat on its bark,  
Rest yourself in its shade — say, “You're looking good, Mark!”  
If you miss me in Autumn, well heck — look around  
I'll be in the leaves, the river, the ground.

Sprinkle me some where the wildflowers grow, and  
I'll be in the trilliums, pushing up through the snow  
And I'll be in the worms when the young robins feed  
And provide a soft cradle for each dying plant's seed.  
When a fish eats a worm (if the robins are sharin')  
There's a good chance I'll fly in the wings of a heron.

Whatever you do, don't build me a tomb —  
I haven't been bad! Don't lock me in a room!  
I want to be free — instead of riding my bike, I'll  
Go out and pedal on Life's great cycle  
And I'll get around, all over this Earth,  
Following the path of life, death and rebirth.

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# All About Composting

## This Compost

BY WALT WHITMAN  
(1819-1892)

Something startles me where I thought I was safest,  
I withdraw from the still woods I loved,  
I will not go now on the pastures to walk,  
I will not strip the clothes from my body to meet my lover the sea,  
I will not touch my flesh to the earth as to other flesh to renew me.

O how can it be that the ground itself does not sicken?  
How can you be alive you growths of spring?  
How can you furnish health you blood of herbs, roots, orchards, grain?  
Are they not continually putting distemper'd corpses within you?  
Is not every continent work'd over and over with sour dead?

Where have you disposed of their carcasses?  
Those drunkards and gluttons of so many generations?  
Where have you drawn off all the foul liquid and meat?  
I do not see any of it upon you to-day, or perhaps I am deceiv'd,  
I will run a furrow with my plough, I will press my spade through  
the sod and turn it up underneath,  
I am sure I shall expose some of the foul meat.



Behold this compost! behold it well!  
Perhaps every mite has once form'd part of a sick person — yet behold!  
The grass of spring covers the prairies,  
The bean bursts noiselessly through the mould in the garden,  
The delicate spear of the onion pierces upward,  
The apple-buds cluster together on the apple-branches,  
The resurrection of the wheat appears with pale visage out of its graves,  
The tinge awakes over the willow-tree and the mulberry-tree,  
The he-birds carol mornings and evenings while the she-birds sit on  
their nests,  
The young of poultry break through the hatch'd eggs,  
The new-born of animals appear, the calf is dropt from the cow, the  
colt from the mare,  
Out of its little hill faithfully rise the potato's dark green leaves,  
Out of its hill rises the yellow maize-stalk, the lilacs bloom in  
the dooryards,  
The summer growth is innocent and disdainful above all those strata  
of sour dead.

What chemistry!  
That the winds are really not infectious,  
That this is no cheat, this transparent green-wash of the sea which  
is so amorous after me,  
That it is safe to allow it to lick my naked body all over with its tongues,  
That it will not endanger me with the fevers that have deposited  
themselves in it,

That all is clean forever and forever,  
That the cool drink from the well tastes so good,  
That blackberries are so flavorful and juicy,  
That the fruits of the apple-orchard and the orange-orchard, that  
melons, grapes, peaches, plums, will none of them poison me,  
That when I recline on the grass I do not catch any disease,  
Though probably every spear of grass rises out of what was once  
catching disease.

Now I am terrified at the Earth, it is that calm and patient,  
It grows such sweet things out of such corruptions,  
It turns harmless and stainless on its axis, with such endless  
successions of diseas'd corpses,  
It distills such exquisite winds out of such infused fetor,  
It renews with such unwitting looks its prodigal, annual, sumptuous crops,  
It gives such divine materials to men, and accepts such leavings  
from them at last.



# All About Composting

## Finding Evidence of Composting in Nature

---

**Time:**

20 – 30 minutes

**Subjects:**

English Language Arts, Science

**Vocabulary:**

compost, compost piles, decompose, nutrients, organic

**Goals and Objectives:**

Students make scientific observations about decomposition in nature.

**Teacher's Note:**

*This Activity takes students out of the classroom to locate and identify evidence of decomposition in nature. They will get their hands dirty and discover natural areas where organic material is breaking down. The ideal seasons for this Activity are fall and early spring, when leaves are still on the ground.*

---

**Materials:**

- **Outdoor area** with decomposing materials
  - **Gloves**
  - **Rake**, shovel, or long stick
  - **Bags** to hold the materials collected by the class
  - **Paper** or journal for students to record their findings
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Teacher Prep:**

If this is your first Activity from this chapter, read the **Chapter 5 Introduction**. Refer to the **Glossary** for definitions of vocabulary words.

- Find a local park or other suitable area for an outdoor walk that has decomposing leaves, twigs, brush, logs, or other plant materials on the ground.
- Make sure students are wearing appropriate clothing for an outdoor activity.

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of *decomposition*.

**Suggested Discussion:** What are organic materials? What happens to organics in nature over time? Compare and contrast composting with decomposition in nature.

## Exploration:

### Elicit Student Predictions:

- How can you tell when something is decomposing? Describe signs of decomposition, such as evidence of bugs, insects, and changes to the plant material.
- How does decomposition happen?
- What evidence of decomposition might you observe?
- What locations may show more decomposition than others?
- How can you tell when something is decomposing?
- Describe signs of decomposition, such as evidence of bugs, insects, and changes to the plant material.

### Procedure:

1. Lead students on a nature walk. Look for areas with leaves, twigs, logs, brush, etc. on the ground.
2. Encourage students to find indicators of decomposition on and under the plant material.
3. Record indicators of decomposition. Sketch and describe these findings, including bugs, insects, moisture, color, temperature, type of material, and other observations.

### Additional Discussion:

- a. What materials were breaking down?
- b. What were some distinguishing features of the decomposition?
- c. What are some observations you've made in your journal?

**Conclusions:** Students share their observations with the whole group.

## Expanded Exploration:

Ask students to list all of the different variables that could have affected decomposition (bugs, insects, moisture, time, temperature, etc.). Have the class brainstorm, plan, and perform experiments that test the impact of each variable on the samples you brought back to the classroom.

---

# Adaptations for Different Grades

*Choose level most appropriate for your class.*

## Beginner:

Follow the Activity instructions.

While you are outside, ask each student to collect five leaves in various states of decomposition. Once they return to the classroom, students can glue their leaves onto a piece of construction paper in sequence from least decomposed to most decomposed.

Spray the collections with hairspray or acrylic to prevent further decay. Or observe and discuss how the items in the displays continue to decompose over time.

## Intermediate:

Follow the Activity instructions.

Engage students formally in the scientific method as they begin to look at factors affecting decomposition in outdoor plant materials. Ask them to present and discuss their hypotheses, ideas for analysis, and final conclusions.

### Prompt hypothesis development with these sample questions:

- Does composting occur by itself?
- What are some variables that speed up the rate of decomposition?
- What conditions are most conducive to the decomposition process?
- How do moisture and oxygen affect the decomposition process?

Ask the students to write reports of their findings and work in small groups to present ideas for experiments. Have the class vote on which follow-up experiments to conduct. Once the experiments are complete, have a class discussion about the elements of a successful compost pile.

## Advanced:

Follow the Activity instructions and have the students work in small groups. Have each group select different types of organic material — such as sticks, flowers, leaves, wood chips, bark, or paper — and chart the rate of decomposition.

Have the students make predictions about how various environmental conditions (size of organic matter, exposure to air, moisture levels, and composition of organic matter) will impact decomposition, and which organic items will decompose most quickly.

Ask the teams to design and conduct follow-up experiments. They should record their observations in data journals. Students can make drawings or take photographs of the various stages of decomposition to accompany their written descriptions. Final results and conclusions can be presented in a written report and as a PowerPoint or display board presentation.



# All About Composting

## Learning How to Compost Outdoors

---

### Time:

30 – 60 minutes

### Subjects:

English Language Arts, Science

### Vocabulary:

bacteria, carbon, compost, compost piles, decompose, fungi, macroorganism, microorganism, nutrients, nitrogen, organic

### Goals and Objectives:

Students use a reading assignment, an optional video, and add organic waste to a compost bin to explore how organic materials can be converted into finished compost (a natural soil amendment).

### Teacher’s Note:

*This activity offers instruction on how to make compost using an outdoor bin. The NYC Compost Project in each borough offers free consultations to schools interested in setting up outdoor compost bins. See **Chapter 5, Activity 7** for instructions on how to create an indoor worm compost bin.*

### Materials:

- *New York City Outdoor Composting Guide*
- Compost bin
- Gloves
- Organic materials
- Pitchfork or shovel
- “Home Composting” section of *Without You It’s All Just Trash Video* (optional; available on [nyc.gov/wasteless](http://nyc.gov/wasteless))
- Copies of *What’s Rotting Away Compost Log* (in **Chapter 5, Activity 10**)

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

### Teacher Prep:

If this is your first Activity from this chapter, read the **Chapter 5 Introduction**. Refer to the **Glossary** for definitions of vocabulary words.

- Consult with the NYC Compost Project in your borough to determine the best style and location for your compost bin, or where there is an outdoor compost bin that you can visit.
- Identify and designate an accessible area for an outdoor compost bin, or plan a visit to a compost site. Search [nyc.gov/wasteless](http://nyc.gov/wasteless) to find compost demonstration sites in NYC.
- Gather organic materials for the compost bin, using the *New York City Outdoor Composting Guide* for guidance on appropriate “greens” and “browns.”



## Warm Up:

1. **Class Discussion:** Determine students' prior knowledge and understanding of how to compost outdoors.

**Suggested Discussion:** What types of materials could be added to a compost bin? How do the materials decompose? Do we need to add worms or other organisms to ensure that the material added to the bin properly decomposes?

2. Ask the class "What is a microorganism?" "What is a macroorganism?" Refer to the **Glossary** for definitions. Explain that microorganisms and macroorganisms, in addition to water and oxygen, help turn organic material into finished compost. These organisms are naturally present in the environment and will thrive in a compost pile.
3. Review the **New York City Outdoor Composting Guide** with the class. If time and equipment availability allow, you may also want to watch the "Home Composting" section of the **Without You, It's All Just Trash Video**.
4. Ask your students, "Why do people compost their organic waste?" Be sure to discuss how composting organic materials can help reduce the amount of waste that is dumped into landfills.
5. Explain to the class that they are going to add their organic waste to a compost bin. They will then conduct experiments to observe what happens to their waste and learn how the composting process works.

## Exploration:

**Questions:** How is finished compost made? What kinds of waste should be composted in a small scale composting operation? Scientifically, how does composting happen?

### Elicit Student Predictions:

- Which variables and environmental conditions influence the process of composting?
- How long will it take for specific items to break down?

### Procedure:

1. Explain to the class, "We are going to add our own organic waste to a compost bin to better understand how composting works. The first step is to collect organic materials. Since I knew we were going to be doing this Activity, I brought a few things we can compost: (describe with your actual list of compostable items). We'll use these to start our compost bin."
2. Bring the class to the compost bin. Go through the steps outlined in the **New York City Outdoor Composting Guide** with the class, allowing students to take turns putting material into the compost bin.
3. Explain, "Periodically, we'll stir the material in the compost bin to make sure the decomposers get enough air, and can do the hard work of consuming and breaking down the organic material. We will also need to make sure that the organic material stays as moist as a wrung-out sponge. So, we'll check back and add more dry or wet materials as needed to the bin."
4. Continue to explain to the class, "We'll add organic materials to the compost bin twice a week until it is full. Each time we add material, we'll check to see what is happening to the organics we've put in. When you see that that material has begun to decompose, please be sure to record your observations."

5. Have the students write about and draw what they witness in the bin or pile. You may want to use the chart ***What's Rotting Away Compost Log*** in **Chapter 5, Activity 10**.
6. Continue observing the materials in the compost bin. (At some point, you may need to stop adding organic material to the bin to ensure that there is room to stir the materials.) Eventually, the compost bin will yield dark, nutrient-rich soil.

**Guided Questions:** How can we tell when all the organic material has fully decomposed? How do we know when to harvest the finished compost from the bin? What materials decompose the fastest? What conditions seemed best for decomposition? Why?

**Conclusions:** Students record their observations and predictions and share their results with the whole group.

### Expanded Exploration:

Engage students in a discussion about composting and what they learned while managing their own bin. Why is composting important? How does composting locally help the environment? How can finished compost be used? Have students apply their conclusions by creating informational posters, video PSAs (public service announcements), or PowerPoint presentations.

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## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Include a ***read aloud*** component from the ***New York City Outdoor Composting Guide***. Be sure you define words they may not know. Explain the elements of a scientific experiment, informing the class that they will test the compost in different situations, making predictions, observations, and drawing conclusions. Then have students create how-to books that describe the steps of the experiment

### Intermediate:

Follow the Activity instructions.

Engage students formally in the scientific method, asking students to present and discuss their hypotheses, ideas for analysis, and final conclusions. Include a ***writing*** component in which they describe their reasoning. Have students work in teams to investigate composting specific types of organic material.

1. The compost starter group adds autumn leaves (or another organic ingredient) to the compost bin.
2. The watering group adds appropriate amount of water to the bin and mixes when necessary.
3. The food scraps group adds collected food scraps and other materials to the bin.
4. The mixing group aerates the compost bin as needed.
5. The recording group takes notes on these steps and records observations.

The final product will be fully decomposed finished compost. The class can add this compost to amend the soil for indoor plants, horticultural areas in the schoolyard, or in nearby street tree beds.

### **Advanced:**

Follow the Activity instructions, dividing students into small groups. Have each group select a different type of organic material — such as fruit, vegetables, leaves, wood chips, paper, etc. — to chart the rate of decomposition and its variables.

The student teams will record their observations in journals. Along with drawings of their observations, they could take photographs of the various stages of decomposition. The teams will present their final results to the class using a display board or PowerPoint presentation.

# All About Composting

## New York City

# Outdoor Composting Guide

## What you need to know to start outdoor composting in New York City.

The Department of Sanitation's **Bureau of Waste Prevention, Reuse and Recycling** encourages residents to compost yard trimmings and food scraps in their own backyards and community gardens.

This kind of composting is not only the least expensive way to manage organic waste, it also recycles nutrients close to where they can best be used.

Although New York City backyards and gardens are often smaller than their suburban counterparts, they provide plenty of room for a compost bin!

Here are the six steps to begin composting, right here in New York City — no matter how small your outdoor space.

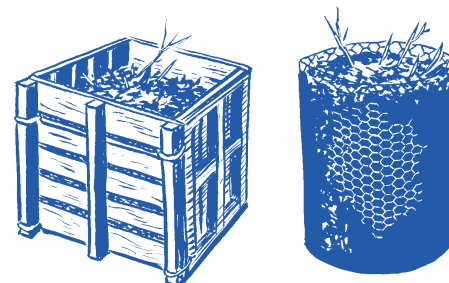


## Step 1...set up your bin

Compost bins are really just containers for your compost pile that serve to keep warmth and moisture in, and keep pets, rodents, and other pests out. They also help keep your pile sightly, tidy, and compact, which can be especially important in small yards. People set up compost bins on terraces, roof gardens, patios, next to outdoor garbage cans, in courtyards, side alleys, and community gardens.

**Choose a compost bin** based on the space you have available for composting, the materials you want to compost, your budget, and the amount of time you want to spend tending your pile. Visit [nyc.gov/wasteless/compost](https://nyc.gov/wasteless/compost) to find out about NYC Compost Project demonstration sites or to obtain more information about buying or building a compost bin.

**Holding units** are the simplest types of bins but shouldn't be used for food scraps because they lack adequate protection against rodents. Therefore, holding units should only be used for composting leaves and garden trimmings. You can construct your own using inexpensive or recycled wood, chicken wire, or cinder blocks. Simply add the appropriate organic materials to your holding bin and let the material decompose. This method requires little work, but can take from six months to a year to make finished compost. If you want to regularly add additional leaves and garden trimmings, you will need to either speed up the decomposition process or add more than one holding unit.

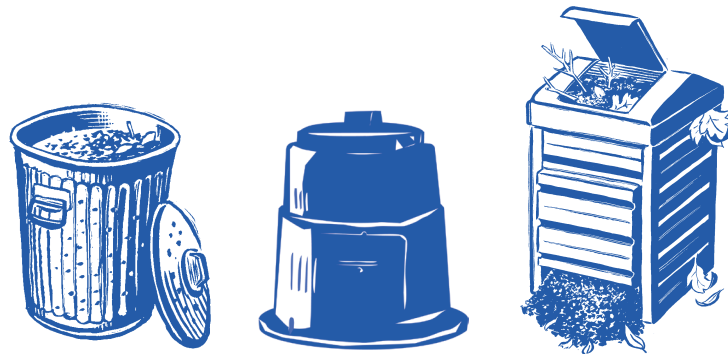


*Two kinds of homemade holding units: wooden slats, and chicken wire rolled into a cylinder.*

**Enclosed bins** are suited to handle both yard trimmings and kitchen scraps. They are most appropriate for small yards or any small space, such as a side alley, roof garden, or terrace. If you live in a multi-unit building and are placing your compost bin near outdoor garbage and recycling cans, make sure you visibly label your compost bin so that other residents do not accidentally place refuse or recyclables in it. Other options used in New York City include installing a combination lock for the compost bin.

You can construct an enclosed bin by drilling ventilation and drainage holes in the lid, sides, and bottom of a 20- or 30-gallon garbage can or barrel.

The **NYC Compost Project** sells commercially available compost bins. Visit [nyc.gov/wasteless/compost](https://nyc.gov/wasteless/compost) to find out more.



**Rodent-proofing** should not be necessary if your compost bin is enclosed. However, if rats are a problem in your area, you can take additional steps to make your bin more rodent resistant:

- Add screens to areas where rats and other burrowing animals can get through.
- If your bin is placed on the soil, lay a piece of screen between the soil and the bottom of the bin.
- Turn material regularly to prevent nesting.
- In especially tough cases, add a vertical screen (6 to 8 inches into the ground) around the perimeter of the bin.

#### Frequently asked questions...setting up your bin

**Q:** Should I set up my compost bin in a sunny or shady spot?

**A:** It does not make a difference to the composting process whether you set up your bin in the sun or in the shade.

**Q:** Should I set up my compost bin on pavement or soil?

**A:** You can set up your bin on either concrete or soil. However, soil is preferable if you don't want to stain the concrete surface.

## Step 2...add organic materials (food and yard waste)

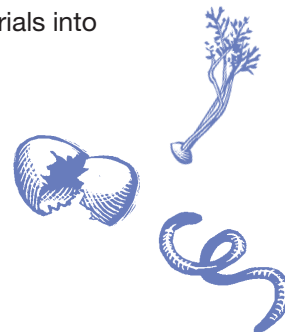
To know what to add to your compost bin, it is helpful to classify organic materials into “GREENS” and “BROWNS.”

**GREENS** are fresh, moist, nitrogen-rich plant materials that still have some life in them (fruit and vegetable scraps, coffee grounds, tea bags, fresh leaves, yard prunings, grass clippings, etc.).

**BROWNS** are dry, carbon-rich plant materials with no life in them (fall leaves, shredded paper, straw, wood chips, twigs, etc.).

**If you are primarily composting “BROWNS,”** shredding items such as leaves into smaller pieces and keeping the pile moist will speed up the decomposition process.

**When composting “GREENS,”** such as food waste or green garden trimmings, be sure to start with a layer of browns. Maintain equal amounts of greens and browns throughout the bin for successful composting. Always cover food scraps with a layer of browns to deter pests and flies. If you have space for bagged leaves, keep a supply near your compost bin throughout the year to cover food scraps. A convenient way to store kitchen scraps (before adding them to your compost pile) is to keep them in the refrigerator or freezer inside a resealable container or large zip-lock bag.



### FAQ...adding organic materials

**Q:** Do I need to add worms to my compost bin?

**A:** Worms aren't crucial to the composting process — many other organisms will take care of the decomposition in the absence of worms. In an outdoor compost bin, worms will usually find their own way into the bin.

**Q:** Do I need to add a *bioactivator*?

**A:** While some gardening companies promote various products to “jump start” your compost bin, these additives are not necessary for successful composting — the microorganisms responsible for decomposition are already present on the materials you add to the pile.

*If possible, keep some fall leaves on hand year-round to add to your compost bin.*



## What to compost...

Here are materials that are excellent for composting (aim to add equal amounts of “GREENS” and “BROWNS”). Two other ingredients — water (Step 3) and oxygen (Step 4) — are also needed to transform your compost into black gold.

### **GREENS**

*fresh, moist, nitrogen-rich materials*

#### FROM YOUR GARDEN

- green plants and garden trimmings
- fresh leaves and flowers
- grass clippings (or recycle by leaving on the lawn)

#### FROM YOUR KITCHEN/HOME

- fruit and vegetable scraps
- coffee grounds & tea bags
- manure and bedding from animals that **ONLY** eat plants
- brewery waste, hops, and pomace



### **BROWNS**

*dead, dry, carbon-rich materials*

#### FROM YOUR GARDEN

- fall leaves, small twigs, and woody prunings
- dry plant material
- straw and hay
- pine needles
- potting soil

#### FROM YOUR KITCHEN/HOME

- bread and grains
- egg shells
- nutshells
- corncobs
- food-soiled paper towels and napkins
- shredded newspaper
- sawdust and wood shavings (from untreated wood)
- stale beans, flour, and spices
- wood ashes
- cornstarch – and other plant-based packing materials

## ...and what to avoid

#### FROM YOUR GARDEN

- pesticide-treated plants or pesticide-treated grass clippings
- diseased or pest-infested plants
- poison ivy
- invasive weeds
- weeds with seeds
- large branches (call 311 to schedule a special removal)
- non-compostable materials such as sand or construction debris

#### FROM YOUR KITCHEN/HOME

- meat or fish scraps
- cheese or dairy products
- fats, grease, or oil
- cat or dog feces; kitty litter
- colored or glossy paper
- sawdust made from pressure-treated plywood or lumber
- coal or charcoal ashes
- non-compostable materials such as plastics, metals, or glass



### FAQ...composting year round

**Q:** Can I compost year round?

**A:** Yes! Even though decomposition will slow down over the winter, you can continue to add food and yard waste to your compost pile. Once the weather warms, decomposition will speed up.

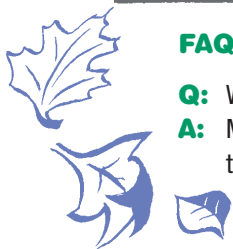
## Step 3...check moisture

The ideal moisture level for your compost bin is like a wrung-out sponge: moist, but not soggy.

If composting food waste, the “GREENS” will provide the needed moisture, and the “BROWNS” will soak up some of this moisture and distribute it evenly throughout the bin.

If you are mainly composting yard waste (and therefore you have an abundance of “BROWNS”), you may need to add water. When adding water, make sure to turn the pile as you spray to evenly coat and soak the material. Leaves should glisten with moisture. Shredded paper should be wet, but not “mushy.” During the hot summer months, you may need to add extra water.

It is essential to monitor moisture levels so that your compost pile remains moist and never dries out.

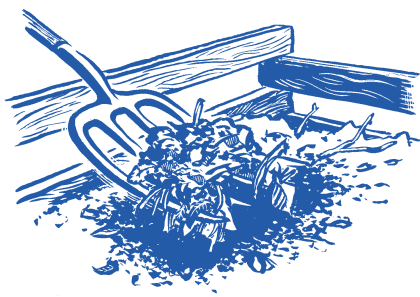


### FAQ...dealing with soggy compost

**Q:** What should I do if my compost bin becomes soggy?

**A:** Make sure you are adding enough dry, brown materials. Mix in “BROWNS” such as shredded paper or leaves to soak up the moisture.

## Step 4...turn the compost pile



In order for the microorganisms in your pile to do their work, they need just the right combination of greens, browns, moisture, and air. Steps 2 & 3 address the first three components, so let's look at how you can get air into your compost pile.

From time to time, you should turn or aerate your compost. Take a long-handled rake, pitchfork, compost crank, or even a long stick and push it down into different parts of the pile to mix and “fluff” up the compost. Try moving the inside of the pile outward and the outer areas to the inside.

### FAQ...turning compost

**Q:** How often should I turn my compost pile?

**A:** For the best results, turn your pile about once every two weeks. Turning the pile less frequently is not a problem. In composting, like cooking, you learn as you go along. Find a turning schedule that works best for you.

## Step 5...check the compost

As you continue to add and mix organic materials, check on the compost to make sure there is adequate moisture, and periodically turn the pile.





# Troubleshooting

## Symptom: Rotten-egg odor

**Problem:** Excess moisture and not enough air (anaerobic conditions).

**Solution:** Turn pile frequently; add dry material such as fall leaves, woodchips, or shredded newspaper. Make sure bin has drainage; leave lid off to allow more air to flow.

## Symptom: Ammonia odor

**Problem:** Too much green, nitrogen-rich material (such as food scraps, grass clippings).

**Solution:** Add brown, carbon-rich material (such as fall leaves, woodchips, or straw).

## Symptom: Slow decomposition

**Problem:** Lack of moisture, lack of air, or lack of nitrogen.

**Solution:** Add water as needed; turn pile; add aeration tubes; add nitrogen-rich material, such as food scraps.

## Symptom: Unwanted pests, flies

**Problem:** Wrong materials in the pile; food scraps are exposed; bin isn't rodent resistant.

**Solution:** Don't add animal or dairy products, grains, or fatty foods. Make sure food is well covered. Make bins more rodent resistant by adding hardware cloth to areas where animals could get through. Add a screening barrier vertically 6 to 8 inches into the ground. Keep the pile moist and turn pile more often to increase temperature and disturb nesting.



### FAQ...finished compost

**Q:** How long will it take to make finished compost?

**A:** That all depends on you! Some people want to make finished compost quickly and take extra steps to speed up the process, such as cutting up large pieces of material and more frequently turning and watering their piles. This more intensive method should produce finished compost in about three months. Other people take a more relaxed approach by simply adding materials and letting nature do the rest, which should produce finished compost in a year or more.

## Step 6...use your compost

Finished compost resembles dark, crumbly topsoil and should bear no resemblance to the original materials. Compost should have a pleasant, earthy smell to it.

**A quick test to see if your compost is finished:** Place some of the compost in a sealed plastic bag. Wait a few days. If you open the bag and it does not smell, your compost is done. If it smells rotten, put it back — it's not finished.

### FAQ...using your compost

**Q:** Can I use compost for potting soil?

**A:** Yes, but not by itself. Different plants thrive in different potting mixes, but a good rule to follow is to add one part compost to two parts of potting soil.

# All About Composting

## Decomposer Hunt

### Time:

30 – 60 minutes

### Subjects:

English Language Arts, Science

### Vocabulary:

bacteria, compost, decomposers, fungi, microorganism, nutrients, organic

### Goals and Objectives:

Students dig into a sample of compost and learn to identify organisms in a compost pile, such as sow bugs, millipedes, and worms. Students discuss the role of the different decomposers in the breakdown process.

### Teacher's Note:

*This Activity requires compost containing partially decomposed materials, obtained from an active indoor or outdoor compost bin. Create and use the **Decomposer Extractor** to observe smaller living organisms.*

### Materials:

- **Trays or plastic containers** for each student or group of students
- **Spoons** for each student
- Enough **compost** for the entire class
- Copies of ***Decomposers in a Compost Pile***
- ***Decomposer Flashcards***
- **Observation containers** (optional)
- **Magnifying glasses** (optional)
- ***Decomposer Extractor*** (optional)

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

### Teacher Prep:

If this is your first Activity from this chapter, read the **Chapter 5 Introduction**. Refer to the **Glossary** for definitions of vocabulary words.

### Warm Up:

1. **Class Discussion:** Determine students' prior knowledge and understanding of which organisms live in compost and how they contribute to the composting process.

**Suggested Discussion:** What organisms do you think we'll find while digging through the compost? What kinds of things do you think these organisms eat? How do they help with composting?

2. Lead students through ***Decomposers in a Compost Pile*** and review images on ***Decomposer Flashcards***.
3. Ask your students, "How important are these living creatures to the decomposition process? Why?"
4. Explain to the class that they will examine samples of compost to find and identify some of the organisms that live within it.

## Exploration:

### Elicit Student Predictions:

What organisms live in compost and how can we identify them? How do these organisms contribute to decomposition?

### Procedure:

1. Fill each tray or container with a few scoops of compost and distribute to the students.
2. Students use spoons to dig through their compost looking for living organisms.
3. When students find a living organism, have them carefully put it into an observation container (if available) so that everyone can get a closer look at it.
4. Encourage the class to examine the organisms using magnifying glasses (if available). Have the students write down which of the organisms they were able to identify from ***Decomposers in a Compost Pile***.
5. Have students make sketches of the organisms they find and label any identifiable traits.
6. After the class has found and identified various organisms, discuss how these organisms help with composting.

**Suggested Questions:** How does each organism contribute to decomposition differently? Which of these organisms are tertiary consumers, secondary consumers, and primary consumers? Which types of decomposers are too small to see?

**Conclusions:** Students present their observations to the whole class.

## Expanded Exploration:

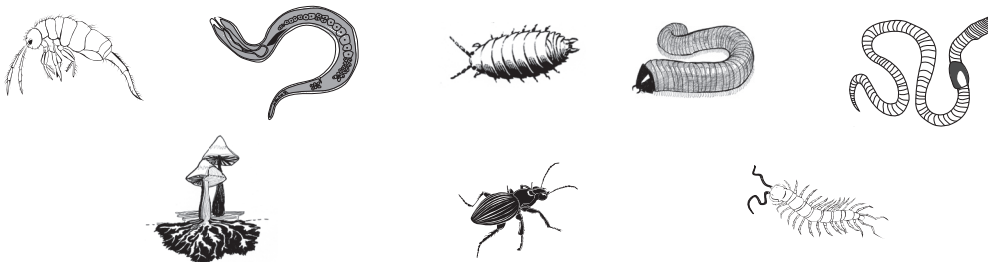
Discuss the importance of living organisms to the composting process. Ask the students if the organisms should be returned to the compost, and if organic materials can decompose as quickly without them.

Explore which waste disposal methods do or do not allow organic waste to decompose with the help of these organisms.

Have the students create a report or presentation educating their peers about the importance of decomposer organisms.

Create and use the ***Decomposer Extractor*** to observe smaller organisms that live in the compost.

After the project is complete, release the organisms back into the compost.



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## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Include a **read aloud** component in the warm-up. Be sure you define words they may not know in ***Decomposers in a Compost Pile*** fact sheet: compost, decomposers, microorganisms, etc. You can refer to the **Glossary** and the back of the ***Decomposer Flashcards*** for definitions.

Explain the importance of scientific observation in wildlife biology. Inform the class that by identifying various traits of the organisms and by drawing pictures of them they are doing what scientists do. At the end of the observation, have students create how-to books describing the steps of the experiment. Make a chart displaying and describing their drawings of the decomposer organisms.

### Intermediate:

Follow the Activity instructions.

Students can work together in small groups to make ***Decomposer Extractor*** devices. After students identify the organisms, have them record their observations and illustrations in their science journals. They should also describe various traits of each organism, such as size, shape, and how it moves.

### Advanced:

Follow the Activity instructions.

Students can work in small groups to make ***Decomposer Extractor*** devices. After the class has found the decomposer organisms and identified them, ask each group to pick one of the organisms to research in more detail. Each group should find their own source material, gather data, and present their findings in a research report and presentation.

Reports should include observational drawings or photographs from the Activity. These can be included as part of PowerPoint or display board presentations.



# All About Composting

## Decomposer Extractor

Create this extraction device which will enable the class to observe the smaller decomposers that live in compost.

### Materials:

- **Glass jar and funnel** (alternately a 2-liter plastic bottle, cut in half)
- A **bright light**
- **Wire mesh** or netting (such as a net bag for onions)
- **1-2 cups fresh compost** with partially decomposed materials

### Procedure:

1. Place the wire mesh inside the neck of the funnel (or bottle) to keep the compost from falling out.
2. Place the funnel inside the neck of the glass jar. If you're using a plastic bottle, turn the top half upside down and place it into the bottom half so that the neck forms a funnel.
3. Fill the funnel with compost.
4. Cover the wide top of the funnel with wire mesh, netting, or plastic wrap to keep the organisms contained.
5. Shine the light into the funnel. The organisms will try to escape from the light and make their way down the funnel and into the bottom container. Leave the light over the compost for several hours or until the decomposers are extracted.
6. After the class has separated the decomposers from the compost, have them identify the decomposers using ***Decomposer in a Compost Pile*** fact sheet and the ***Decomposer Flashcards***. Have students document their results in data journals and create reports to showcase what they have learned.

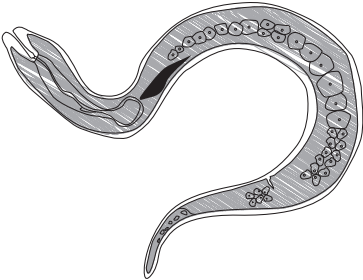




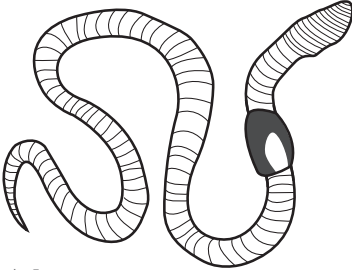
# All About Composting

## Decomposer Flashcards

**Nematodes**



**Earthworm**



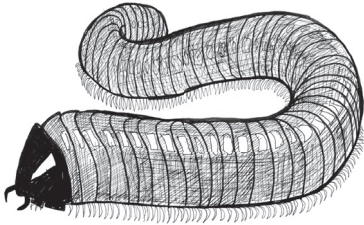
**Sow Bug**



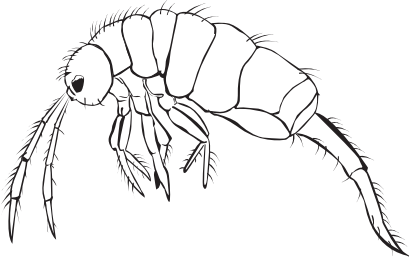
**Fungus**



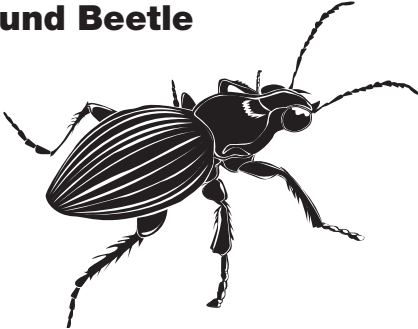
**Millipede**



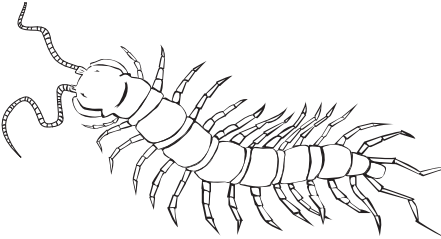
**Springtail**



**Ground Beetle**



**Centipede**





# All About Composting

## Decomposer Flashcards

### Earthworm

Earthworms do the lion's share of the decomposition work among the larger compost organisms. They are constantly tunneling and feeding on dead plants and decaying insects during the daylight hours. Their tunneling aerates the compost and enables water, nutrients, and oxygen to filter down.

### Nematodes

Nematodes, or roundworms, are the most abundant invertebrates in the soil. Typically less than one millimeter in length, they prey on bacteria, protozoa, fungal spores, and each other. Though there are pest forms of nematodes, most of those found in soil and compost are beneficial.

### Fungus

Molds and fungi are frequently found in a healthy compost bin. The most common are mushrooms, which sometimes pop up on a cool pile. Fungi feed on decaying organic matter with tiny, hair-like hyphae that secrete enzymes that break down and simplify the organic matter. They act as an additional food source to other organisms, such as earthworms.

### Sow Bug

Sow bugs and pill bugs are considered omnivores, meaning they feed on both living and dead organic matter. They shred and consume some of the toughest material, those high in cellulose and lignin (tree parts and leaves). Sow bugs that roll up like an armadillo are known as pill bugs or roly-polys.

### Springtail

Springtails, along with nematodes and mites, dominate in numbers among the soil invertebrates. It's estimated that more than 80% of the organic matter on earth passes through the gut of a springtail or a sow bug on its journey to becoming topsoil. They feed principally on fungi, but also on nematodes and small bits of organic detritus.

### Millipede

Millipedes are slower and more cylindrical than centipedes and have two pairs of appendages on each body segment. They feed mainly on decaying plant tissue but will eat insect carcasses and excrement.

### Centipede

Centipedes are fast moving predators found mostly in the top few inches of the compost heap. They have formidable claws behind their head which possess poison glands that paralyze small red worms, insect larvae, newly hatched earthworms, and arthropods - mainly insects and spiders.

### Ground Beetles

Ground beetles have many representatives lurking through litter and soil spaces. Most of them feed on other organisms, but some feed on seeds and other vegetable matter.

# All About Composting

## Decomposers in a Compost Pile

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Compost is produced through the hard work of a number of different decomposer organisms that break down organic material and convert it into finished compost. These decomposers are naturally present on the organic materials that you add to your compost pile and also exist in the areas surrounding your compost system.

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### Compost Ecosystem

Decomposers in a compost pile are part of a complex compost ecosystem in which food, water, air, and shelter are provided by the material within the compost pile. If any of those essential ingredients are missing, the organisms either slow down or stop working altogether. It is this web of interdependence that is the driving force behind the production of compost.

Some organisms feed on decomposing plant materials while others feed on other organisms. The two main categories of decomposers are chemical and physical decomposers.

**Chemical decomposers** work by using chemicals in their bodies to break down the organic matter into simple compounds for energy. This is similar to how the acids in our stomachs dissolve the food we eat. Chemical decomposers are mostly micro-organisms that cannot be seen without a microscope. Examples of chemical decomposers include bacteria, protozoa, and fungi.

Bacteria are the most abundant of the microorganisms found in a compost pile and perform the majority of the decomposition. An important by-product of their work is the generation of heat, which can warm up the pile and attract other heat-loving organisms to assist with the breakdown process.

**Physical decomposers** work by feeding on the organic materials in a pile. Similar to how we use our teeth to break up large pieces of food, physical decomposers chew, grind, and squeeze the materials into smaller pieces. After digestion, they excrete waste products which are then broken down even further by the chemical decomposers. Physical decomposers are mostly macroorganisms that can be seen without a microscope. Examples of physical decomposers are worms, mites, flies, and snails.

Earthworms do a large amount of the decomposition work among the macroorganisms. Several species of worms dig tunnels and feed on the decomposing materials in the compost pile. The spaces that the worms create as they move through the compost pile allow air, water, and nutrients to circulate, creating the necessary conditions for many of the other organisms to thrive.

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### Compost Food Web

All of the decomposer organisms in the compost ecosystem are linked by a “what eats what” food web, wherein organisms are classified according to what they eat. There are three levels of consumers in the compost food web: primary, secondary, and tertiary. This web structure keeps the different populations under control and maintains a healthy and balanced compost pile.

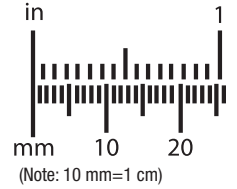
**Primary (first level) consumers** feed directly on dead plant materials (and other decomposers that have died) in the compost pile. This group consists of chemical decomposers such as bacteria and fungi, but also includes larger physical decomposers such as snails, slugs, beetle mites, worms, and flies.

**Secondary (second level) consumers** feed on primary consumers and their waste products. This group consists of physical decomposers which include springtails, mold mites, and nematodes.

**Tertiary (third level) consumers** feed on secondary (and sometimes tertiary!) consumers. This group consists of fast moving consumers which include centipedes, pseudoscorpions, predatory mites, and rove beetles.


# compost food web identification guide

The compost food web is a way of classifying organisms according to what they eat and by what eats them! Follow the guide below to identify organisms in your compost pile and learn who may be eating whom.

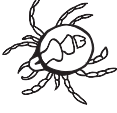


## tertiary consumers


Macroorganisms that feed on secondary consumers.




**Spider**  
(1-30 mm)




**Predatory Mite**  
(0.5-1 mm)



**Ground Beetle**  
(8-20 mm)




**Pseudoscorpion**  
(1-2 mm)




**Centipede**  
(30 mm)

## secondary consumers


Macroorganisms that mainly feed on primary consumers.




**Mold Mite** (1 mm)




**Springtail** (0.5-3 mm)



**Feather-Winged Beetle**  
(1-2 mm)




**Nematode (Roundworm)**  
(1 mm)




**Protozoa** (.01-.5 mm)

## primary consumers


Microorganisms that feed directly on dead plants or animals.




**Woodlouse (Roly-Poly, Sowbug)**  
(3-35 mm)




**Green June Beetle Grub**  
(13.5-25 mm)




**Black Soldier Fly & Black Soldier Fly Larva (Maggot)**  
(20-25 mm) (18 mm)




**Slug** (2-25 mm)




**Beetle Mite** (1 mm)




**Millipede**  
(25-35 mm)




**Earthworm**  
(50-150 mm)




**Bacteria**  
(microscopic)



**Actinobacteria**  
(microscopic)



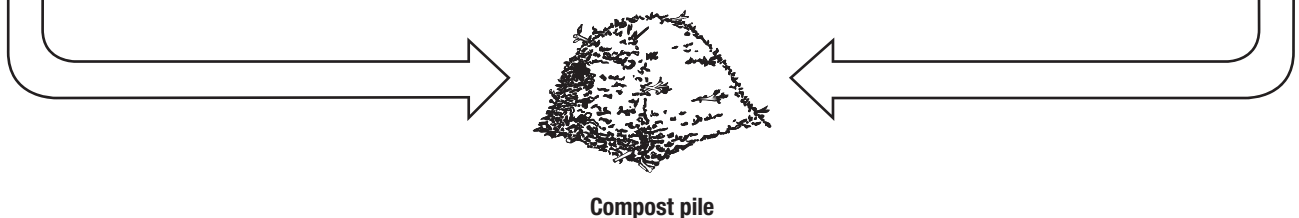
**Fungus**  
(some microscopic)



**Snail**  
(2-25 mm)

## organic matter

Leaves, grass clippings, other plant debris, and food scraps.



Compost pile

# All About Composting

## Worm Facts

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**Time:**

20 minutes

**Subjects:**

English Language Arts, Science

**Vocabulary:**

anterior, aortic arches, bristles, clitellum, *Eisenia fetida*, esophagus, intestine, posterior, segments, vermicompost, worm casting,

**Goals and Objectives:**

Students learn the anatomy of the red wiggler worm and explore its role in the indoor composting process. They read *Eisenia fetida: Red Wiggler Worm* and apply the knowledge to a writing project, which can be presented to the class.

**Teacher's Note:**

*If you have a worm bin, look at the worms with the class. This Activity can be easily shortened or expanded to suit your needs. See the suggested Activity adaptations for details.*

**Materials:**

- Copies of *Eisenia fetida: Red Wiggler Worm*
  - Worm Bin (optional)
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Teacher Prep:**

If this is your first Activity from this chapter, read the **Chapter 5 Introduction**. Refer to the **Glossary** for definitions of vocabulary words.

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of composting and the role of worms.

**Suggested Discussion: What is compost?** Why are worms important to composting? In what kind of environment does the red wiggler worm thrive?

**Exploration:**

1. Engage students in a game about worm facts by quizzing them on items listed on *Eisenia fetida: Red Wiggler Worm*. Have students check their answers by reviewing *Eisenia fetida: Red Wiggler Worm*.
2. Discuss why red wigglers work well in indoor composting systems.

## Expanded Exploration:

Engage the class in a discussion about the benefits of indoor composting using red wiggler worms.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Include a **read aloud** component with the definitions of vocabulary words from the **Glossary**. Then, have the students color in the picture of the red wiggler worm on ***Eisenia fetida*: Red Wiggler Worm**. Encourage them to also create original illustrations. Ask the students to write a poem or story about the red wiggler worm, which can be presented with their illustration.

### Intermediate:

Follow the Activity instructions, and include a **writing** component.

Give the students a choice between two assignments:

1. The student is a nature journalist and is writing a profile piece on the red wiggler worm. Students should use the following words: vermicompost, coelomic fluid, gizzard, and compost, and include at least two of their favorite facts from the handout. They can incorporate additional words from the **Vocabulary** section for bonus points.
2. The student is a performing artist and must create a poem, song, or short play that somehow involves the red wiggler worm.

### Advanced:

Follow the Activity instructions, and include a **writing and presentation** component.

Give the class a choice of two projects:

1. Make a plan for a short documentary film about red wiggler worms. Research the major differences between red wiggler worms (*Eisenia fetida*) and other earthworms (e.g. *Lumbricus terrestris*). Research can also focus on small (indoor systems) or large scale vermicomposting operations, how much material is composted, and uses for the finished compost. Students should turn in their scripts and present their documentaries to the class using storyboards to describe the scenes they would create.
2. Write and illustrate a children's book about a day in the life of a red wiggler worm. The story should demonstrate the worm's important role in indoor composting and be aimed towards teaching younger students.

# All About Composting

## *Eisenia fetida*: Red Wiggler Worm

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There are over seven thousand species of earthworms; however, one species in particular is well suited for indoor composting: *Eisenia fetida*. *Eisenia fetida* (also called red wiggler worm, tiger worm, manure worm, brandling worm, and a range of other names) are an important macroorganism decomposer in both indoor and outdoor composting systems.

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### Red Wiggler Worm Basics

Red wiggler worms live in the upper layer of soil where they feed on microorganisms and decaying organic matter. However, unlike other species of earthworms, *Eisenia fetida* don't tunnel deeply or make permanent burrows. They reproduce quickly, thrive in habitats with high organic matter, can tolerate a wide range of temperatures and moisture conditions, and can live close to one another. An indoor worm bin mimics all of these natural conditions, which makes *Eisenia fetida* ideal for indoor composting.

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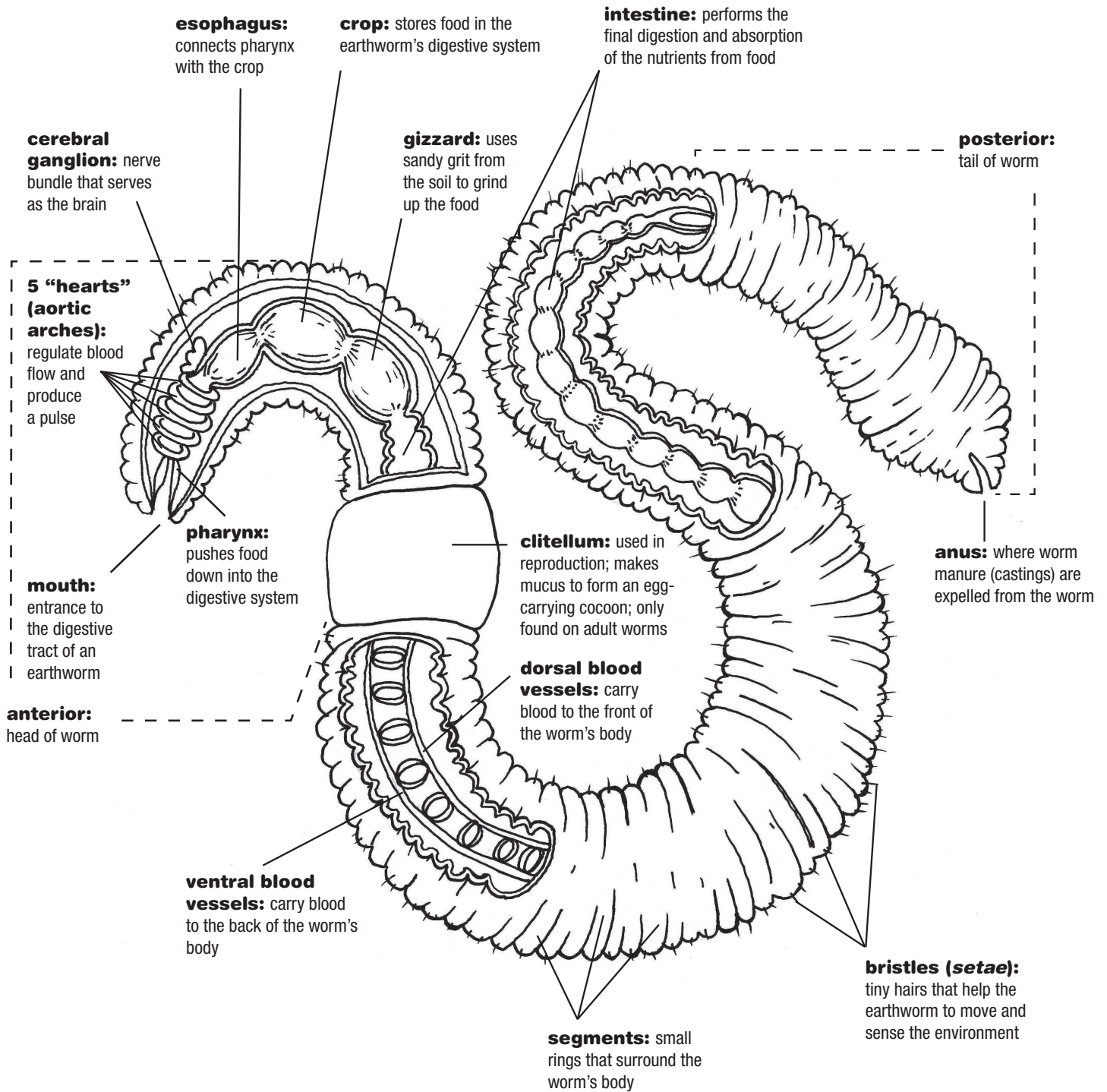
### Fun Worm Facts

- Worms do not have eyes; they have cells in the front part of their bodies that can detect light.
- Worms do not have teeth; they grind up food by using the grit in their gizzard.
- Worms living in an indoor worm bin (*Eisenia fetida*) can eat half their body weight in food scraps every day!
- Worms have both male and female reproductive organs but still need another worm to reproduce.
- *Eisenia fetida* have 5 “heart-like” organs called aortic arches.
- *Eisenia fetida* start reproducing when they are about 2 months old.
- One mature worm can produce about 100 worms in a year.
- Worms live up to one year.
- Worms “breathe” through their skin, so it is very important to keep them and their environment moist, but not sopping wet as they can drown if it's too wet.
- If you hold a worm long enough, you will likely see a yellow secretion on your hand, called coelomic fluid.
- Coelomic fluid is thought to be a defense mechanism against predators as the liquid can smell bad. This bad smell is thought to be the basis of their name *fetida* or *foetida* which is the Latin scientific term used for many foul-smelling species.
- Coelomic fluid is also a way for worms to remoisten their bodies when conditions are dry.



# color a wiggly worm!

Color in the *Eisenia fetida* (red wiggler worm) image below to help you to identify the various parts of the worm.



# All About Composting

## Worm Bin Check

### Time:

20 – 30 minutes

### Subjects:

English Language Arts, Science

### Vocabulary:

*Eisenia fetida*, harvesting, organic, red wiggler worms, vermicompost, worm casting



### Goals and Objectives:

Students complete a reading comprehension assignment and learn how to maintain an indoor compost system. Working in pairs, students apply this information in role playing scenarios. If time allows, students can present their plans for making an indoor compost system in the form of illustrated how-to manuals.

### Teacher's Note:

*You can shorten this Activity by reviewing certain sections of the fact sheet, **Indoor Composting with a Worm Bin** and having the class complete just one side of the handout, **Worm Bin Composting Questions**. If the questions are too difficult for your class, you may want to read the appropriate sections of **Indoor Composting with a Worm Bin** and skip to the side of the Activity handout that lists the role playing scenarios.*

### Materials:

- *Indoor Composting with a Worm Bin*
- Copies of **Worm Bin Composting Questions**
- **Worm Bin** (optional)

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

### Teacher Prep:

If this is your first Activity from this chapter, read the **Chapter 5 Introduction**. Refer to the **Glossary** for definitions of vocabulary words.

### Warm Up:

**Class Discussion:** Determine students' prior knowledge and understanding of indoor composting and the importance of balancing conditions such as the amount of food, temperature, moisture, air, and the number of worms.

**Suggested Discussion:** What kinds of food scraps can you put into an indoor composting bin? Where should you put the food scraps in an indoor composting bin? What kinds of worms should you use? Why are the worms needed? What are some signs of an unbalanced worm bin?



### Exploration:

1. Read and review *Indoor Composting with a Worm Bin*.
2. Complete one or both sides of *Worm Bin Composting Questions*.

### Expanded Exploration:

Ask the students to define the nature and quantity of waste they produced that day. Students should share which portions of that material could be composted in a worm bin. Engage the class in a discussion about why it is important to understand the different elements of the waste stream when thinking about composting and recycling.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Include a **read aloud** component from *Indoor Composting with a Worm Bin*. Ask the students to illustrate the steps of setting up a worm bin and to share their illustrated guides with the class.

### Intermediate:

Follow the Activity instructions and complete the handout.

Ask students to write a description of the bin they would make and where they would keep it. Be sure they include the exact location that they envision for the worm bin and the reasons why. Offer extra credit to students who share their instructions with their families and begin composting at home.

### Advanced:

Follow the Activity instructions and complete the handout. Ask the students to create a display board, PowerPoint presentation, or how-to manual about setting up an indoor composting bin. Students should conduct research on commercially available and do-it-yourself indoor composting options. The manual should include a few problem scenarios with solutions as well as information on how to procure needed supplies including red wiggler worms. Offer extra credit to students who follow up on the assignment by composting at home.

## Part 1

# Worm Bin Composting Questions

Name \_\_\_\_\_ Date \_\_\_\_\_

1. Describe how worms breathe.
2. Why is it important to keep the bedding consistently moist?
3. What kinds of worms should you order for an indoor composting system?  
What kinds of worms are not appropriate for an indoor composting system?
4. How many pounds of food scraps could two pounds of worms process in a week?
5. What is the recommended temperature for a worm bin?
6. List some items that you can compost in your worm bin.
7. How big should food scraps be when placed inside the worm bin?
8. Where should food scraps be placed inside the bin?
9. List some items that should not be composted in your worm bin.
10. How long will it take for the contents of the bin to resemble dark soil?
11. Describe how to harvest finished compost from a worm bin.
12. Why is it important to remove the worm castings from the bedding?
13. How can you use finished vermicompost?
14. List some ways to balance the conditions of the bin so that the worms continue to thrive.

## Part 2

# Worm Bin Composting Questions

*With a partner, take turns asking each other how to solve each problem scenario.*

**Scenario 1:** Your brother threw last week's leftovers that contained broccoli and onion into the bin and now it is starting to stink. How would you remedy this situation?

**Scenario 2:** You notice a few fruit flies in or near your worm bin. How do you eliminate this problem and prevent it from happening again?

**Scenario 3:** It's natural to have a small mite population in your bin, but lately you've been noticing many more mites than usual. Many seem to be congregating around the melon pieces you added to the bin last week. What might you do to reduce the number of mites?

**Scenario 4:** One corner of the bin seems particularly wet. How do you plan to fix this problem?

# All About Composting

## Indoor Composting with a Worm Bin

### A Guide To Indoor Composting In New York City

If you don't have access to an outdoor composting area, you can compost your food scraps indoors by using red wiggler worms in a worm bin composting system.

Red wiggler worms process food scraps and decaying plant material into an excellent plant fertilizer and soil amendment called vermicompost.

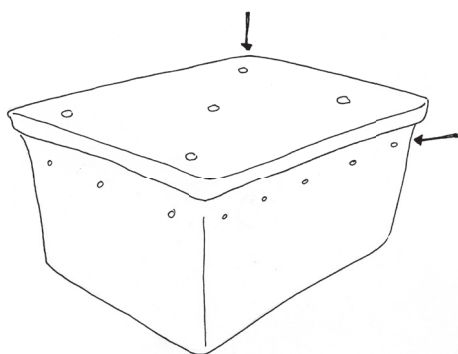
Indoor composting requires some time and attention to ensure that the worms have access to the food, water, air, and shelter they need to survive, thrive, and multiply. To start composting your food scraps indoors, you will need a bin, bedding, and some red wiggler worms. The amount of food scraps that you intend to compost will determine the quantity of worms and size of bin needed. We recommend most households start with one pound of worms. One pound of worms can process about three and a half pounds of food scraps a week.



### Choosing a Worm Bin

#### Materials:

- One-cubic foot, shallow plastic container (8 to 12 inches deep) with a lid
- Drill
- Fine mesh screen (optional)



#### Directions:

- Drill at least 10 quarter-inch holes in the container top.
- Use non-toxic glue to attach fine screen over holes to keep out pests.

You can buy a worm bin, or you can make your own by adapting a plastic box or plastic storage container.

---

## Making the Bedding Material

### Materials:

- Newspaper  
(Do not use glossy paper or full color paper as the toxic chemical dyes and heavy metal residues could end up in your finished vermicompost.)
- Water
- A worm bin



### Directions:

- Shred the newspaper, or rip it length-wise into long strips, about one-inch wide.
- Moisten the strips with water.
- Gently squeeze out excess water from the strips so that they are wet but not dripping.
- Fluff up bedding material.

Bedding absorbs moisture, provides a place for the worms to live, and covers the food scraps. Newspaper torn into one-inch wide strips or shredded mechanically is the most common source of bedding. When first setting up your bin, fill it 2/3 full of bedding.

Because worms breathe through their skin, bedding materials should be consistently moist in order to create a comfortable habitat for your worms. Therefore, moisten the shredded newspaper with water and mix around until all paper is evenly damp, like a wrung out sponge. Paper should not drip water when squeezed.

Worms will eat both the food and the bedding. Add more bedding to the bin as needed to keep the food scraps covered and to absorb excess moisture. Food scraps are high in moisture and should keep the bedding moist. However, if your bedding seems dry, add more water with a plant mister or watering can, or add more food scraps.



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## Adding Worms

### Materials:

- *Eisenia fetida* worms



### Directions:

- Pour worms out of their container on top of the bedding.
- Put on the lid – the worms will eventually make their way down into the bedding.

To find out where to buy worms, go to [nyc.gov/wasteless](https://www.nyc.gov/wasteless) (see Resources>Products & Services>Kitchen and Composting).

When you order red wiggler worms from a supplier, you should look for *Eisenia fetida*, a species that will effectively recycle your food scraps and will thrive in a worm bin. These are not to be confused with nightcrawlers and other garden worms, which are usually brown or gray in color and will not survive in a worm bin.

The quantity of worms you need depends on how many pounds of “worm food” your household generates each week. **In an established bin, one red wiggler worm processes half its own weight in food scraps every day!** So, if you stock your bin with two pounds of worms, they should be able to process a pound of food scraps a day, or seven pounds a week

## Worm Bin Placement

Make sure your worm bin is placed in a good location for both you and the worms. Aside from your own aesthetic preferences, red wigglers are most active when the temperature inside the bin is anywhere between 55°F and 80°F (13°C and 27°C). Common indoor placements that often meet those temperature needs include the kitchen, laundry room, or basement.

If you want to keep your worm bin outdoors, you'll need to make sure it has enough shade in the summer and plenty of insulation in the winter to maintain the desired temperature range. Water can have a negative impact on your worm bin as well, so make sure your worm bin is protected from heavy rains as the worms can drown.

---

## What to Compost in Your Worm Bin

### Materials:

- Fruit and vegetable scraps
- Coffee grounds and paper tea bags  
*(Remove the staples from tea bags)*



### Directions:

- Move some bedding to the side and add food scraps.
- Cover the food scraps with bedding material or vermicompost. Do not leave food scraps exposed on top of the bin.
- Each time you feed your worms, place the food scraps in a different area of the bin. Doing this will give you a sense of how long it takes for the food scraps to break down and how much you can add to the bin each time.

You can feed your worms small amounts every day, or their whole week's food supply at one time. All food scraps you put into the bin should be cut into 1 – 2 inch pieces.

---

## Harvesting Vermicompost: Letting the Worms Separate the Materials

### Materials:

- Newspaper
- Watering can or plant mister
- Food scraps or garden trimmings
- A bag or container to hold finished vermicompost

### Directions:

- Move all the contents over to one side of the worm bed.
- Add new moistened bedding to the empty side, and start placing food scraps on that side.
- Over about a one-month period, most of the worms should move over to the new bedding, allowing you to scoop out the relatively worm-free vermicompost.



Once the worms have processed the food scraps and bedding, they leave behind dark, crumbly castings. When the bedding starts to resemble dark soil, usually about three to six months, it's time to harvest your vermicompost.

Harvesting is when you remove the vermicompost from the bin and separate the castings from the bits of bedding, food scraps, or worms that are in it. If left in the bin for too long, the castings start to become toxic to the worms.

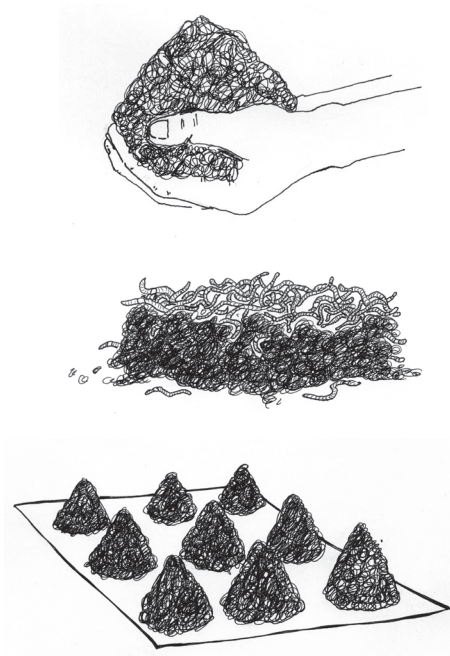
## Harvesting Vermicompost: Separating the Materials by Hand

### Materials:

- Newspaper or plastic tarp
- Watering can or plant mister
- Food scraps
- A bag or container to hold finished vermicompost

### Directions:

- Spread out a newspaper or tarp on the ground or on a table.
- Move bedding over to one side of the worm bin.
- Remove dark crumbly material from the worm bin.
- Make small piles of vermicompost on the newspaper.  
*(The worms will gather in the center of the piles to avoid bright light.)*
- Brush the castings off of the top and sides of each small pile. Put this finished material in a bag or container.
- While you are waiting for worms to gather into the center of the vermicompost piles, make new bedding.
- Add new bedding to the empty side of the worm bin.
- Add fresh food scraps to the empty side of the worm bin.
- Gently harvest the castings from the outside of each pile and put the castings in a bag or container.
- Carefully remove the worms that have clustered in the center of each pile. Put them back into the worm bin.
- Scoop up any remaining vermicompost and return to the bin.
- It's alright if there are a few worms still in the castings if you are going to use it in a garden. However, if you are using it in potted plants, it's best to remove all worms.



This method is a fast (but slightly involved) way to harvest vermicompost from your worm bin.



## Troubleshooting

Taking steps to avoid problems with your worm bin is often easier than getting rid of problems once they've started, so it's important to monitor your bin regularly for the problems below.

If the problem with your worm bin can't be controlled, the best solution may be to harvest the worms and start a new bin from scratch, using what you've learned from your experience to create a better bin.

Contact the NYC Compost Project in your borough with any worm bin questions or problems. See [nyc.gov/wasteless/compostproject](https://nyc.gov/wasteless/compostproject) for more info.

### odor problems and solutions

**Exposed food.** Cover food scraps with bedding.

**Too much moisture.** Add dry bedding so that it can soak up pooling water, particularly in wet areas. Reduce the amount of food placed in the bin.

**Not enough oxygen.** Add dry bedding; fluff up the bedding if it appears matted down.

**Too much food; not decomposing.** Break food into smaller pieces, especially hard, woody items like stems. You can also freeze and thaw food scraps to break down cell walls. Feed worms less so that they have time to go through food in the bin.

**Food in bin is naturally odorous.** Some foods are naturally odorous when decomposing (such as onions, broccoli, or cabbage, plants in the allium or brassica family). Therefore, remove foods that produce unpleasant odors if it bothers you. Don't add meat, bones, dairy, or oil products.

### fruit fly problems and solutions

If fruit flies are a problem, you can try using flypaper traps or make your own fruit fly trap. See trapping fruit flies section (on previous page). House flies should not be attracted to your worm bin if you cover the food scraps with bedding material.

**Exposed food.** Bury food under bedding material; cover the contents with a dry sheet of newspaper.

**Too much moisture.** Avoid overfeeding; add dry bedding.

**Fruit fly eggs in food scraps.** Cut fruit into small pieces; wash all fruits and peels, particularly bananas and citrus. Freeze fruit before feeding to worms or microwave fruit for 60 seconds. These actions help to kill fruit fly eggs. You can also simply avoid adding fruit.

### worm death problems and solutions

Dead worms decompose rather quickly; you can have a bin with no worms before you realize it.

**Bin is too wet; worms are drowning.** Add dry bedding; leave lid off for an hour or two to allow water to evaporate. Make sure bin is well ventilated.

**Bin is too dry; worms are drying out.** Lightly moisten and turn bedding; add moist foods. Make sure it's not too hot for the worms.

**Not enough air; bedding and food are matted together; worms are suffocating.** Fluff bin contents to aerate. Be sure bin is adequately ventilated with holes; add paper tubes or other bulky paper products such as torn up paper egg cartons to increase air flow.

**Not enough food.** Increase food, or reduce number of worms.

**Worms not eating.** Avoid adding too much food at one time. Avoid very spicy or salty foods, large amounts of citrus, or toxic ingredients like alcohol.

**Bin is too hot or too cold.** Worms prefer the same temperatures that people do, so it's best to keep the bin in a location where the surrounding temperature is between 55°F and 80°F (13°C and 27°C). Smaller bins are more impacted by surrounding temperatures so keep these in a location with temperature controls. The summer heat can cause problems for your worms. You can create "air-conditioning" for your worms by freezing a water bottle and placing it on top of the shredded newspaper inside your worm bin. Replace the lid and your worms will be cool all day. Take the bottle out and re-freeze it over night so you can add it to the bin again in the morning. This is only necessary if you notice worms trying to escape or if temperatures are over 85°F.

**An over-abundance of mites.** A small mite population is natural, but if you notice large collections of mites, you should try to remove them. Remove any food that has a congregation of mites. To reduce mites, bring bin outside and leave it open in the sun for 1 – 2 hours to dry it out a little. Repeat as necessary until mite population is reduced. To trap mites, place a slice of fresh bread in the bin, wait until mites congregate on it, and then remove the bread.

## Worm Bin Checklist

Use these checklists to make sure your worm bin is functioning properly!

### SIGNS OF A HEALTHY WORM BIN

- Bin smells earthy like the soil.
- Bedding is disappearing over time.
- Worm castings are accumulating.
- Worms have glistening skin.
- Sufficient air space between the bedding.
- Bin has small quantities of other critters, such as mites or little white worms.
- Fuzzy mold on some foods.
- Bin contents are damp but not soggy.
- Bin filled with fluffed up, shredded paper.
- Food is not visible when you open the bin.

### SIGNS OF AN UNBALANCED WORM BIN

- Liquid dripping from the drainage holes.
- Puddles of water in the bin.
- Bedding and castings are dry.
- Castings and bedding are sticking to the worms.
- Bin has a foul odor.
- Food and bedding are matted in large clumps.
- Fruit flies present.
- Mites present in large quantities.
- Maggots present.



## trapping fruit flies

Here are two kinds of fruit-fly traps you can make yourself:



**1. Funnel fly trap (left).** Pour some apple cider or beer into a glass jar and add a drop of detergent. Cut the corner off a plastic sandwich bag and place it into the jar; secure the plastic-bag “funnel” with a rubber band around the rim of the jar.

**2. Bottle fly trap (right).** Cut a small plastic water or soda bottle in half. Fill the bottom half with some apple cider or beer and a drop of detergent. Turn the top half upside down and place it into the bottom half so that the neck forms a funnel. Secure the two halves with tape.





# All About Composting

## Planting with Compost

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### Time:

20 – 30 minutes

### Subjects:

English Language Arts, Science

### Vocabulary:

compost, decomposition, mulch, nutrients

### Goals and Objectives:

After completing a short reading Activity, students will apply what they have learned in an experiment comparing the growth of plants in regular soil and plants in a compost/soil mixture.

### Teacher's Note:

*Over a period of weeks, this Activity demonstrates the benefits of using compost for planting. Students may get their hands dirty while feeling the differences in texture between compost and soil. Choose seeds that germinate quickly, such as for marigolds, beans, and basil. For faster results, potato eyes, plant starts, or spider plantlets may also be used.*

---

### Materials:

- **Two planting containers** for each student team (reuse containers to make the planters, such as well-rinsed milk cartons or the bottom few inches of plastic bottles)
  - **Six similar seeds or two plants** per team
  - **Potting soil** (enough for each team)
  - **Compost** (enough for each team)
  - **Water**
  - Copies of ***How to Use Compost***
  - ***Planting with Compost Progress Log***
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

### Teacher Prep:

If this is your first Activity from this chapter, read the **Chapter 5 Introduction**. Refer to the **Glossary** for definitions of vocabulary words.

### Warm Up:

**Class Discussion:** Determine students' prior knowledge and understanding of what plants need to thrive, and the use of finished compost as a soil amendment.

**Suggested Discussion:** How do plants obtain nutrients? What does soil do for plants? What is compost? How do you know when compost is finished or ready to use? What can compost be used for and why do people use it?

Read the ***How to Use Compost*** tip sheet and distribute the ***Planting with Compost Progress Log***.

## Exploration:

### Elicit Student Predictions:

How might growing plants in a compost/soil mix affect their rate of growth? What difference might there be between plants grown in a compost/soil mix compared to plants that are grown only in soil?

### Procedure:

1. Group students together into teams. Distribute two planting containers and six of the same type of seeds or two plants to each team.
2. Instruct the teams to label each of their planting containers with their team name, what is being planted, the date, and the words “soil” or “soil and compost.”
3. Fill one planting container with potting soil and one container with a mixture of one part compost and four parts soil. Place three seeds or one plant in each container, following the seed packet or plant care instructions.
4. Ask the students to observe and describe the difference between the compost mixture and the potting soil. Encourage them to form hypotheses about which plant will grow faster and which will be healthier.
5. Add water to the containers and set them in an appropriate area, per seed packet or plant care instructions.
6. Have the students begin the ***Planting with Compost Progress Log*** and let them know that they will be monitoring the progress of their plants for the next few weeks.

### Expanded Exploration:

Ask students why the compost is mixed with soil and encourage discussion about the benefits of composting. Some points to consider about planting with compost include:

- The coarse texture that students observed in compost helps it to act like a sponge and hold moisture.
- Mixing the compost with soil creates air spaces and gives roots room to grow.
- Compost contains beneficial microorganisms and nutrients that help plants grow.

---

## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### **Beginner:**

Follow the Activity instructions and have students write down their hypotheses before they begin completing the ***Planting with Compost Progress Log***.

After they have observed significant changes in plant growth, have them write an illustrated scientific summary of their findings. It should include: Question, Hypothesis, Procedure, and Conclusion sections. Encourage the students to share their reports with the class.

### **Intermediate:**

Follow the Activity instructions, and include a ***writing*** component.

Students should write reports that implement the scientific method. Have each team present their findings to the class using display boards or PowerPoint presentations. Encourage them to take pictures of their plants and incorporate the photos into their presentations.

### **Advanced:**

Follow the Activity instructions.

Students can write reports that implement the scientific method. Students can develop a proposal presentation that includes their findings and offers a project plan about how to incorporate composting in their school or neighborhood.



# All About Composting

## How to Use Compost Handout

### Finished Compost

Finished compost resembles dark, crumbly topsoil and should bear no resemblance to the original materials. Compost should have a pleasant, earthy smell to it. Using “unfinished” or immature material that contains food scraps can attract pests and can cause harm to young plants, so make sure your compost has fully decomposed before adding it to your garden beds.

### How to Tell if Your Compost Is Finished




The simplest way to tell if your compost is mature and ready to use is by doing the “bag test.” Put a handful of moist compost into a zip-lock bag and press out the air before sealing. Leave it for three days, then open the bag. If you detect an ammonia or sour odor, the microorganisms are still at work and you need to let your compost finish curing. Test another sample of compost again in a week.

### Using Finished Compost

There are various ways to utilize your finished compost. You can sprinkle compost on top or mix it into your flower and vegetable beds, gently rake compost into tree beds, blend it with potting soil to revitalize indoor plants, or spread it on top of the soil on your lawn as a soil amendment.

### Compost in the Home Garden

Adding compost to your garden helps improve the structure and overall health of your soil. It is rich in organic content and as such, will retain moisture and will increase your overall earthworm and microbial population, which will serve as biological controls against unwanted pests. In addition, compost will provide a slow release of macronutrients, which means that your plantings will get a steady supply of nutrients as needed rather than a one shot injection of conventional chemical fertilizers.

usage	what to do	
<b>amending soil</b>	Work one to two inches of compost into the top three to five inches of soil.	
<b>growing vegetables</b>	<p>Give your vegetable garden plenty of compost in the fall. Spread several inches of compost on top of the existing bed, then till it in come springtime.</p> <p>Put a handful of compost in each hole when you're planting.</p> <p>Once plants begin to grow quickly, you can add a half-inch layer of compost around the base of the plants. Provide “heavy feeder” plants such as tomatoes, corn, and squash with half an inch of compost monthly—this will result in great produce!</p>	
<b>growing flowers</b>	In the spring, loosen the top few inches of annual and perennial beds and mix in a one-inch layer of compost. Or in the fall, apply a one-inch layer of compost as a mulch to protect plant roots from freezing and conserve moisture.	
<b>replenishing soil in potted plants &amp; window boxes</b>	Even the best potting soil gets depleted of its nutrients as plants grow. To replenish nutrients, add an inch of compost to potted plants and window boxes twice a year. Or, make your own potting soil using two parts screened compost to one part sand or perlite.	



# Using Finished Compost

## Using Compost for Gardening Projects

### usage

### what to do

#### rejuvenating lawn or turf



When establishing new turf, incorporate up to three inches of compost into the existing soil base. If possible, till to a depth of five to eight inches before seeding. Otherwise, seed directly over the compost.

On existing turf, you can treat bald spots by incorporating an inch of compost into the soil and then reseed. This will fight compaction and help suppress soil-borne diseases.

You can also topdress existing turf with as much as one-half inch finely screened compost. This is easiest with a spreader, but you can use a shovel for small areas where you want to add compost. Rake the compost evenly throughout the grass area to enable the compost to readily sift down to the soil. The compost will settle down into the soil, improving its structure and providing nutrients. Over time, this will mean less compaction, fewer bald spots, and a reduced need for synthetic fertilizers.

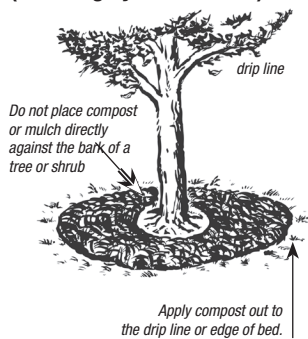
#### tree planting

When planting a new tree, it's best to work one-half inch to one inch compost into the top two inches of soil from the trunk of the tree out to the dripline—the outermost parameter of the tree's canopy. (See image below)

Compost used in this way serves as a substitute for the layer of organic matter that naturally exists on the forest floor: it provides organic nutrients, reduces moisture loss, and keeps the soil cool.

Don't add compost to a freshly dug hole when planting a new tree, as applying compost in this way will discourage tree roots from going beyond the hole.

#### tree and shrub maintenance (including nyc street trees)



Apply compost as mulch to trees and shrubs to prevent weeds and make plants more drought resistant. Spread up to two inches of compost under the tree or shrub out to the drip line (the outermost leaves on a tree) or edge of the bed. This will help reduce moisture loss and stabilize soil temperature.

You can also incorporate compost into the soil once or twice a year to provide organic nutrients. Before adding compost to compacted soils, gently cultivate the soil with a hand tool; this will prevent damage to shallow feeder roots while making nutrients more readily accessible to the trees or shrubs.

Do not place compost or mulch directly against the bark of the tree or shrub or on exposed woody roots as this could cause rot and invite pests and disease.

#### maintaining perennial & annual beds

Spread one to two inches of compost on top in perennial and annual beds in the early spring or fall to prevent weeds from establishing and to make plants more drought-resistant.

# All About Composting

## Planting with Compost

### Progress Log

Name \_\_\_\_\_ Date \_\_\_\_\_

Record your observations in the Progress Log. List the date of observation and a brief description and illustration of each plant. Track the date of gestation, and measure the height of the plants.

Date	Potting Soil Description/Drawing	Compost Mixture Description/Drawing

Date	Potting Soil Description/Drawing	Compost Mixture Description/Drawing

# All About Composting

## Compost Balancing Act

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**Time:**

20 – 30 minutes

**Subjects:**

English Language Arts, Science

**Vocabulary:**

aeration, anaerobic, carbon, compost, decompose, nitrogen, ventilation, volume

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**Goals and Objectives:**

Students will learn how to maintain a healthy and balanced compost bin or pile. After reading sections of the **New York City Outdoor Composting Guide**, they will complete **Composting Scenarios Handout**, which offers a reading comprehension and role playing activities.

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**Materials:**

- **New York City Outdoor Composting Guide** (in Chapter 5, Activity 4)
  - Copies of **Composting Scenarios Handout**
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Teacher Prep:**

If this is your first Activity from this chapter, read the **Chapter 5 Introduction**. Refer to the **Glossary** for definitions of vocabulary words.

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of composting and what goes into a compost pile.

**Suggested Discussion:** What kinds of materials can you compost in an outdoor bin in a dense, urban setting? What kinds of things should you not compost in that bin? How do you know if you have a healthy compost pile or not?

**Exploration:**

1. Read sections of the **New York City Outdoor Composting Guide**. Engage the students in a discussion about composting and why it is important.
2. Have the students work in groups to complete both sides of **Composting Scenarios Handout**.

### Expanded Exploration:

Encourage the class to think about decomposition as a natural occurrence and composting as one way people can manage this process. Discuss how composting food scraps can make a significant impact on the amount of waste dumped in landfills.

**Suggested Questions:** What are the benefits of making compost? Have you ever seen a real outdoor compost heap or bin?

Contact your local NYC Compost Project ([nyc.gov/wasteless/compostproject](https://nyc.gov/wasteless/compostproject)) to get more information on a touring a compost site near you, making an indoor worm bin, or starting an outdoor compost operation.

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## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Depending on the reading levels of your students, you may want to skip the first half of side one of **Composting Scenarios Handout**.

After you review some problem scenarios as a class, ask the students to make posters of a healthy compost bin and an unhealthy compost bin. Encourage them to share their illustrations with the class.

### Intermediate:

Follow the Activity instructions.

Go over the answers as a class and discuss other troubleshooting techniques or questions that may arise. Have each pair come up with four more problem scenarios and solutions. They can create short videos or illustrated cartoon books of the scenarios and present them to the class.

### Advanced:

Follow the Activity instructions.

Encourage the students to use these materials and conduct their own research to develop a brochure or video project that simplifies what can and should not be composted and troubleshooting strategies.

# All About Composting

## Composting Scenarios Handout

Name \_\_\_\_\_ Date \_\_\_\_\_

### Using Composting Vocabulary

You can refer to the *New York City Outdoor Composting Guide* (in **Chapter 5, Activity 4**) for help. Please fill in the blank spaces with vocabulary words listed in the box below.

**carbon, nitrogen, volume, decompose, compost, anaerobic, aeration, ventilation**

1. \_\_\_\_\_ is a mixture of decayed organic materials.
2. The amount of space a three-dimensional object occupies is called \_\_\_\_\_.
3. To rot or decay are other terms for \_\_\_\_\_.
4. \_\_\_\_\_ and \_\_\_\_\_ are other words that mean air circulation.
5. The chemical element \_\_\_\_\_ is found in high amounts in many composting “browns” or dead and dry items for compost, like autumn leaves, straw, and hay.
6. \_\_\_\_\_ is a chemical element found in high amounts in composting “greens,” including cut flowers and freshly cut grass.
7. When something is without air it is \_\_\_\_\_.

### What Goes In a Compost Pile

You were just elected compost coordinator for your school’s outdoor compost bin. It’s up to you to determine which items should be added or not. Write “**yes**” or “**no**” beside each item.

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Pepperoni pizza _____</li> <li>2. Egg shells _____</li> <li>3. Newspaper _____</li> <li>4. Autumn leaves _____</li> <li>5. Tea bags _____</li> <li>6. Coffee grounds _____</li> <li>7. Broccoli over rice _____</li> <li>8. Pine needles _____</li> <li>9. Dog manure _____</li> <li>10. Cat manure _____</li> <li>11. Nutshells _____</li> <li>12. Popcorn _____</li> </ol> | <ol style="list-style-type: none"> <li>13. Hot dogs _____</li> <li>14. Apple cores _____</li> <li>15. Dead flowers _____</li> <li>16. Moldy bagels _____</li> <li>17. Poison ivy _____</li> <li>18. Pesticide-treated grass _____</li> <li>19. Macaroni &amp; cheese _____</li> <li>20. Plastic yogurt container _____</li> <li>21. Food-soiled napkins _____</li> <li>22. Fruit salad _____</li> <li>23. Coal or charcoal ash _____</li> <li>24. Sawdust _____</li> </ol> |
|--|--|

## Solving Composting Problems

With your group, take turns role playing the scenarios below. Discuss and write down your diagnosis and solution for each one.

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1. It's been an especially cold winter and my pile is not hot. I have been taking the temperature every day since I built the compost pile two weeks ago, but it has not gotten above 68°F (20°C). Isn't it supposed to be between 90°F and 140°F (32°-60°C)?

Diagnosis \_\_\_\_\_

Solution \_\_\_\_\_

2. Two nights ago, I saw some animals around my compost pile when I brought out my food scraps from dinner. I think they were eating some of the food I put in the pile last week. What should I do?

Diagnosis \_\_\_\_\_

Solution \_\_\_\_\_

3. My pile stinks like rotten eggs! Why does it smell so bad? What should I do?

Diagnosis \_\_\_\_\_

Solution \_\_\_\_\_

4. The material in my compost pile looks the same as when I first put it in there and hasn't turned into compost at all. It's been over a week, shouldn't something have happened?

Diagnosis \_\_\_\_\_

Solution \_\_\_\_\_

5. My pile stinks like ammonia. How can I make it stop?

Diagnosis \_\_\_\_\_

Solution \_\_\_\_\_

## All About Composting

# Tracking Decomposition in an Outdoor Pile

---

**Time:**

20 – 30 minutes

**Subjects:**

English Language Arts, Science

**Vocabulary:**

carbon, compost, decomposition, nitrogen, organic, oxygen

**Goals and Objectives:**

Students will learn more about composting and how temperature and moisture levels and the types of items added to the compost bin impact its progress. They will monitor compost over a period of time at their school's compost bin, or with a series of field trips to one of the NYC Compost Project demonstration sites (see **NYC Compost Project** info sheet in Chapter 6).

**Teacher's Note:**

*This Activity requires access to an outdoor compost bin or pile over a period of weeks. If your school does not have its own outdoor compost bin, you may want to schedule a series of field trips to NYC Compost Project Community Compost sites near you. Contact your local NYC Compost Project for more information.*

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**Materials:**

- Copies of the **What's Rotting Away Compost Log**
  - **What To Compost** fact sheet
  - **Scale**
  - **Thermometers**
  - An **outdoor compost bin**
- 

## Activity

*Following this Activity are adaptations for Beginner, Intermediate, and Advanced.*

**Teacher Prep:**

If this is your first Activity from this chapter, read the **Chapter 5 Introduction**. Refer to the **Glossary** for definitions of vocabulary words.

**Warm Up:**

**Class Discussion:** Determine students' prior knowledge and understanding of composting and decomposition.

**Suggested Discussion:** What are the key ingredients for composting? Answers include: organic materials, food scraps, leaves, garden trimmings, carbon, nitrogen, oxygen, water, and temperature. What are some indicators of an unhealthy or unbalanced compost bin? Answers include: odor, low temperature, and slow decomposition rate.

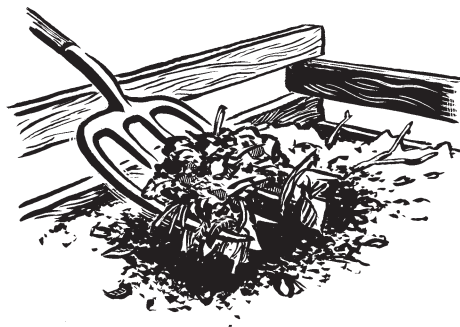


## Exploration:

1. Take your class to an outdoor bin or pile to observe the temperature, moisture, odor, and appearance of the organic materials in it.
2. Have the students take turns measuring the temperature in various parts of the pile and ask them to record this on the ***What's Rotting Away Compost Log***.
3. Remind the class that to speed decomposition, materials should be moist, not too dry and not too wet. Ask them to rate the moisture of the materials on a scale of 1 to 10, reflecting dry to wet.
4. Ask them to describe the smell of the decomposing materials. Is there an odor and if so, what does it smell like? What does this mean?
5. Refer to the ***What to Compost*** fact sheet for help about which materials to add to the pile in order to balance the conditions. Review items that fall under the "Greens" or "Browns" category. Green items include freshly cut grass and flowers, as well as fruit and vegetable scraps. Brown items include autumn leaves, pine needles, newspaper, and bread.
6. After you discuss and decide which items should be added, be sure to weigh each item before adding it to the compost pile.
7. Students should record all of these observations on the ***What's Rotting Away Compost Log***.
8. Return to the compost bin as often as possible with the class so they can help keep the compost balanced and use their observations and hands-on experience to connect how their everyday decisions about their waste can actually make a difference.

## Expanded Exploration:

Encourage the class to continue composting. How can they dispose of their food scraps each day? If your school does not have an outdoor compost bin or an indoor worm bin, are there places within the school or nearby to drop off food scraps?



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## Adaptations for Different Grades

*Choose level most appropriate for your class.*

### Beginner:

Follow the Activity instructions.

Include a **read aloud** component from **What to Compost** or with the definitions of vocabulary words from the **Glossary**. When they return to the classroom, have the class create posters that illustrate the different “Green” and “Brown” organic materials that can be composted. The posters can be presented to the class and displayed.

### Intermediate:

Follow the Activity instructions.

Group the students into teams and give each team the option of creating a board game or a display board that explores how to balance an outdoor compost pile. It should include the difference between “Green” and “Brown” organic materials, and address the impact of temperature, moisture, and odor on a compost heap. The project should present scenarios where the player or viewer must think about how to balance the conditions of the compost bin. Encourage them to share their projects with the class.

### Advanced:

Follow the Activity Instructions.

Give students a choice between three projects:

1. Write a research paper about the history of composting in NYC with predictions for the future of composting in New York City;
2. Create a board game or other kind of game that incorporates balancing the compost conditions, following the Intermediate Activity instructions above;
3. Create an art piece out of scrap materials incorporating the themes “Greens” and “Browns” and composting.



# All About Composting

## What's Rotting Away

### Compost Log



Use this record sheet on a daily, weekly, or bi-weekly basis to track the temperature, moisture levels, odor, and the amount of material added to your compost pile. By monitoring your pile consistently over a few months, you will be able to observe the various states of decomposition.

<b>Date</b>								
<b>Air Temperature</b>								
<b>Core Bin Temperature</b> (inner core of pile)								
<b>Moisture Level</b> (on a scale of 1-10: 1 is very dry, 10 is too wet)								
<b>Odor</b> (soil, ammonia, or rot)								
<b>Greens Added</b> (lbs.)								
<b>Browns Added</b> (lbs.)								
<b>Compost Comments</b>								

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<b>Odor</b> (soil, ammonia, or rot)								
<b>Greens Added</b> (lbs.)								
<b>Browns Added</b> (lbs.)								
<b>Compost Comments</b>								

# All About Composting

## What to Compost Handout

Mix roughly equal parts (by volume) of high-nitrogen **GREENS** and high-carbon **BROWNS**.

Without enough greens, a pile will decompose slowly; without enough browns, the pile may develop an unpleasant odor. In general, it's better to err on the side of too many browns. Chop up bulkier materials. To avoid odors or pests, bury food scraps under browns.

Two other ingredients — water and oxygen — are needed to ensure that your compost pile transforms itself into a mound of black gold.

## Add Equal Parts GREENS and BROWNS

### GREENS

fresh, moist, nitrogen-rich materials

#### FROM YOUR GARDEN

- green plants and garden trimmings
- fresh leaves and flowers
- grass clippings (or recycle by leaving on the lawn)



#### FROM YOUR KITCHEN/HOME

- fruit and vegetable scraps
- coffee grounds & tea bags
- manure and bedding from animals that ONLY eat plants



### BROWNS

dead, dry, carbon-rich materials

#### FROM YOUR GARDEN

- fall leaves, small twigs, and woody prunings
- dry plant material
- straw and hay
- pine needles
- potting soil



#### FROM YOUR KITCHEN/HOME

- bread and grains
- egg shells
- nutshells
- corncobs
- food-soiled paper towels and napkins
- shredded newspaper
- sawdust and wood shavings (from untreated wood)
- stale beans, flour, and spices
- wood ashes



## Materials to Avoid


#### FROM YOUR GARDEN

- pesticide-treated plants or pesticide-treated grass clippings
- diseased or pest-infested plants
- poison ivy
- invasive weeds
- weeds with seeds
- large branches (call 311 to schedule a special removal)
- non-compostable materials such as sand or construction debris

#### FROM YOUR KITCHEN/HOME

- meat or fish scraps
- cheese or dairy products
- fats, grease, or oil
- cat or dog feces; kitty litter
- colored or glossy paper
- sawdust made from pressure-treated plywood or lumber
- coal or charcoal ashes
- non-compostable materials such as plastics, metals, or glass

# Compost Troubleshooting Guide

SYMPTOM	PROBLEM	SOLUTION
<b>rotten-egg odor</b>	Excess moisture and not enough air (anaerobic conditions). 	Turn pile frequently; add dry BROWN material such as autumn leaves, woodchips, or newspaper. Make sure bin has drainage; leave lid off to allow more air to flow.
<b>ammonia odor</b>	Too much GREEN, high-nitrogen material (such as food scraps, grass clippings).	Add BROWN, high-carbon material (such as autumn leaves, woodchips, shredded newspaper, straw).
<b>slow decomposition</b>	Lack of moisture.	Add water while turning pile.
	Lack of air.	Turn pile; add aeration tubes.
	Lack of nitrogen; too much BROWN, high-carbon material.	Add material high in nitrogen (more GREENS), such as food scraps or grass clippings.
<b>low pile temperature</b> <i>(If you have a small pile, or if it is very cold out, don't be concerned if your compost is not generating heat; decomposition is still occurring, but at a slower pace.)</i>	Pile too small.	Increase pile size (space permitting).
	Insufficient moisture.	Add water while turning pile.
	Poor aeration.	Turn pile; add aeration tubes.
	Lack of nitrogen.	Add more GREENS (material high in nitrogen), such as food scraps or grass clippings.
	Cold weather.	Increase pile size, or insulate pile with straw or other material.
<b>high pile temperature</b> (over 140°F, 60°C)	Pile too large.	Reduce pile size.
	Insufficient ventilation.	Turn pile.
<b>unwanted pests</b>	Wrong materials in the pile.	Avoid meat, dairy, and fatty foods.
	Food scraps are exposed.	Make sure food is well covered.
	Bin isn't rodent-resistant.	Make bins more rodent resistant by adding hardware cloth to areas where animals could get through. Add a screening barrier vertically 6 to 8 inches into the ground; keep pile moist; turn pile more often to increase temperature and disturb nesting.

# All About Composting

## Learning Standards

### Activity 1: What's in My Waste?

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Writing

- Subsections 1, 2, 3 Text Types and Purposes
- Subsections 4, 6 Production and Distribution of Writing
- Subsections 7, 8 Research to Build and Present Knowledge
- Subsection 10 Range of Writing

##### College and Career Readiness Anchor Standards for Speaking and Listening

- Subsections 4, 5, 6 Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

- Subsections 1, 2 Conventions of Standard English
- Subsection 3 Knowledge of Language

#### New York State Common Core Learning Standards for Mathematics

- Subsections 1, 2 Counting and Cardinality
- Subsection 1 Operations & Algebraic Thinking
- Subsection 1 Measurement & Data

#### The Applied Learning Performance Standards

- A2 Communication Tools and Techniques
- A5 Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: a) depend on their natural and constructed environment b) have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

##### S1.1a,b,c

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.



# All About Composting

## Learning Standards

### Activity 2: Beginning to Understand That Nature Recycles

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Reading**

- Subsections 1, 2, 3 Key Ideas and Details
- Subsections 4, 5, 6 Craft and Structure
- Subsection 11 Responding to Literature

##### **College and Career Readiness Anchor Standards for Writing**

- Subsection 3 Text Types and Purposes
- Subsection 11 Responding to Literature

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

- Subsections 4, 6 Presentation of Knowledge and Ideas

##### **College and Career Readiness Anchor Standards for Language**

- Subsections 1, 2 Conventions of Standard English
- Subsection 3 Knowledge of Language
- Subsections 4, 5, 6 Vocabulary Acquisition and Use

#### **The Applied Learning Performance Standards**

- A5 Tools and Techniques for Working With Others

#### **New York City Science Scope & Sequence**

##### **LE 5.1d,e, LE 6.1a,b**

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### **S1.1a,b,c**

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.

# All About Composting

## Learning Standards

### Activity 3: Finding Evidence of Composting in Nature

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Writing**

- Subsections 1, 2    Text Types and Purposes
- Subsection 4        Production and Distribution of Writing
- Subsection 7        Research to Build and Present Knowledge
- Subsection 10      Range of Writing

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

- Subsections 4, 6    Presentation of Knowledge and Ideas

##### **College and Career Readiness Anchor Standards for Language**

- Subsections 1, 2    Conventions of Standard English

#### **The Applied Learning Performance Standards**

- A1    Problem Solving
- A2    Communication Tools and Techniques
- A3    Information Tools and Techniques
- A4    Learning and Self-management Tools and Techniques
- A5    Tools and Techniques for Working With Others

#### **New York City Science Scope & Sequence**

##### **LE 5.1d,e, LE 6.1a,b**

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### **PS 3.1b,c**

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

##### **S1.1a,b,c**

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.

##### **Standards 1–1.1a, 1.1b, 1.1c, 3.1, 3.2, 3.3**

The role of scientific inquiry in studying biology.

##### **Standards 1–1.2a, 1.2b, 1.3a, 1.3b, 2.1, 2.2, 2.3a, 2.3b, 2.3c, 2.4, 3.4a, 3.4b, 3.4c, 3.5a, 3.5b**

The methods of science.

# All About Composting

## Learning Standards

### Activity 4: Learning How to Compost Outdoors

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Reading**

Subsection 1	Key Ideas and Details
Subsections 4, 5	Craft and Structure
Subsection 10	Range of Reading and Level of Text Complexity

##### **College and Career Readiness Anchor Standards for Writing**

Subsection 2	Text Types and Purposes
Subsection 4	Production and Distribution of Writing
Subsection 7	Research to Build and Present Knowledge
Subsection 10	Range of Writing

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

Subsections 2, 4, 6	Presentation of Knowledge and Ideas
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#### **The Applied Learning Performance Standards**

- A1 Problem Solving
- A2 Communication Tools and Techniques
- A4 Learning and Self-management Tools and Techniques
- A5 Tools and Techniques for Working With Others

#### **New York City Science Scope & Sequence**

##### **LE 5.1d,e, LE 6.1a,b**

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### **PS 3.1b,c**

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

##### **S1.1a,b,c**

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.

##### **Standards 1–1.1a, 1.1b, 1.1c, 3.1, 3.2, 3.3**

The role of scientific inquiry in studying biology.

##### **Standards 1–1.2a, 1.2b, 1.3a, 1.3b, 2.1, 2.2, 2.3a, 2.3b, 2.3c, 2.4, 3.4a, 3.4b, 3.4c, 3.5a, 3.5b**

The methods of science.

# All About Composting

## Learning Standards

### Activity 5: Decomposer Hunt

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Reading**

Subsection 1	Key Ideas and Details
Subsections 4, 5	Craft and Structure
Subsection 10	Range of Reading and Level of Text Complexity

##### **College and Career Readiness Anchor Standards for Writing**

Subsection 2	Text Types and Purposes
Subsection 4	Production and Distribution of Writing
Subsection 7	Research to Build and Present Knowledge
Subsection 10	Range of Writing

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

Subsections 2, 4, 6	Presentation of Knowledge and Ideas
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#### **The Applied Learning Performance Standards**

- A1 Problem Solving
- A2 Communication Tools and Techniques
- A4 Learning and Self-management Tools and Techniques
- A5 Tools and Techniques for Working With Others

#### **New York City Science Scope & Sequence**

##### **LE 5.1d,e, LE 6.1a,b**

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### **PS 3.1b,c**

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

##### **S1.1a,b,c**

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.

##### **Standards 1–1.1a, 1.1b, 1.1c, 3.1, 3.2, 3.3**

The role of scientific inquiry in studying biology.

##### **Standards 1–1.2a, 1.2b, 1.3a, 1.3b, 2.1, 2.2, 2.3a, 2.3b, 2.3c, 2.4, 3.4a, 3.4b, 3.4c, 3.5a, 3.5b**

The methods of science.

# All About Composting

## Learning Standards

### Activity 6: Worm Facts

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Reading

- Subsections 1, 2 Key Ideas and Details
- Subsection 4 Craft and Structure
- Subsection 7 Integration of Knowledge and Ideas
- Subsection 10 Range of Reading and Level of Text Complexity
- Subsection 11 Responding to Literature

##### College and Career Readiness Anchor Standards for Writing

- Subsections 2, 3 Text Types and Purposes
- Subsection 4 Production and Distribution of Writing
- Subsections 8, 9 Research to Build and Present Knowledge
- Subsection 10 Range of Writing
- Subsection 11 Responding to Literature

##### College and Career Readiness Anchor Standards for Speaking and Listening

- Subsections 1, 2 Comprehension and Collaboration
- Subsections 4, 5, 6 Presentation of Knowledge and Ideas

#### The Applied Learning Performance Standards

- A2 Communication Tools and Techniques
- A3 Information Tools and Techniques
- A5 Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

# All About Composting

## Learning Standards

### Activity 7: Worm Bin Check

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Reading

Subsections 1, 2	Key Ideas and Details
Subsection 4	Craft and Structure
Subsection 10	Range of Reading and Level of Text Complexity
Subsection 11	Responding to Literature

##### College and Career Readiness Anchor Standards for Writing

Subsection 2	Text Types and Purposes
Subsections 7, 9	Research to Build and Present Knowledge
Subsection 10	Range of Writing
Subsection 11	Responding to Literature

##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsection 2	Comprehension and Collaboration
Subsections 4, 6	Presentation of Knowledge and Ideas

#### The Applied Learning Performance Standards

A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 5.1d,e, LE 6.1a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 7.2c,d, ICT 5.2, IPS 1.1-1.4, IPS 2.1

Water issues: depletion; pollution.

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

##### S1.1a,b,c

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.

##### Standards 1–1.1a, 1.1b, 1.1c, 3.1, 3.2, 3.3

The role of scientific inquiry in studying biology.

##### Standards 1–1.2a, 1.2b, 1.3a, 1.3b, 2.1, 2.2, 2.3a, 2.3b, 2.3c, 2.4, 3.4a, 3.4b, 3.4c, 3.5a, 3.5b

The methods of science.

# All About Composting

## Learning Standards

### Activity 8: Planting with Compost

#### **New York State Common Core Learning Standards for English Language Arts & Literacy**

##### **College and Career Readiness Anchor Standards for Reading**

Subsections 1, 2	Key Ideas and Details
Subsection 4	Craft and Structure
Subsection 10	Range of Reading and Level of Text Complexity
Subsection 11	Responding to Literature

##### **College and Career Readiness Anchor Standards for Writing**

Subsections 2, 3	Text Types and Purposes
Subsection 4	Production and Distribution of Writing
Subsection 7	Research to Build and Present Knowledge
Subsection 10	Range of Writing

##### **College and Career Readiness Anchor Standards for Speaking and Listening**

Subsections 4, 5, 6	Presentation of Knowledge and Ideas
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##### **College and Career Readiness Anchor Standards for Language**

Subsections 1, 2	Conventions of Standard English
Subsection 3	Knowledge of Language

#### **The Applied Learning Performance Standards**

A5	Tools and Techniques for Working With Others
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#### **New York City Science Scope & Sequence**

##### **7.1a, 7.1b**

Human influences on the environment: positive influences.

##### **7.1c, 7.2a, 7.2b, 7.2c**

Human influences on the environment: negative influences.

##### **7.3a, 7.3b**

Human influences on the environment: decision making (risk/benefit).

##### **LE 5.1d,e, LE 6.1a,b**

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### **LE 7.1b,c**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### **LE 7.2b,c, LE 7.2d**

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### **LE 7.2b,c, LE 7.2d**

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### **PS 3.1b,c**

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

##### **S1.1a,b,c**

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.

##### **Standard 1–1.1a, 1.1b, 1.1c, 3.1, 3.2, 3.3**

The role of scientific inquiry in studying biology.

##### **Standard 1–1.2a, 1.2b, 1.3a, 1.3b, 2.1, 2.2, 2.3a, 2.3b, 2.3c, 2.4, 3.4a, 3.4b, 3.4c, 3.5a, 3.5b**

The methods of science.

# All About Composting

## Learning Standards

### Activity 9: Compost Balancing Act

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Reading

Subsections 1, 2	Key Ideas and Details
Subsection 10	Range of Reading and Level of Text Complexity

##### College and Career Readiness Anchor Standards for Writing

Subsection 2	Text Types and Purposes
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##### College and Career Readiness Anchor Standards for Speaking and Listening

Subsection 2	Comprehension and Collaboration
Subsections 4, 6	Presentation of Knowledge and Ideas

##### College and Career Readiness Anchor Standards for Language

Subsections 1, 2	Conventions of Standard English
Subsection 3	Knowledge of Language

#### The Applied Learning Performance Standards

A1	Problem Solving
A2	Communication Tools and Techniques
A5	Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.



# All About Composting

## Learning Standards

### Activity 10: Tracking Decomposition in an Outdoor Pile

#### New York State Common Core Learning Standards for English Language Arts & Literacy

##### College and Career Readiness Anchor Standards for Writing

- Subsection 2 Text Types and Purposes
- Subsection 4 Production and Distribution of Writing
- Subsection 7 Research to Build and Present Knowledge

##### College and Career Readiness Anchor Standards for Speaking and Listening

- Subsections 1, 2 Comprehension and Collaboration
- Subsection 4 Presentation of Knowledge and Ideas

##### College and Career Anchor Standards for Language

- Subsections 1, 2 Conventions of Standard English
- Subsection 3 Knowledge of Language

#### New York State Common Core Learning Standards for Mathematics

- Subsections 1, 2 Counting and Cardinality
- Subsection 1 Operations & Algebraic Thinking
- Subsection 1 Measurement & Data

#### The Applied Learning Performance Standards

- A1 Problem Solving
- A2 Communication Tools and Techniques
- A4 Learning and Self-management Tools and Techniques
- A5 Tools and Techniques for Working With Others

#### New York City Science Scope & Sequence

##### 7.1a, 7.1b

Human influences on the environment: positive influences.

##### 7.1c, 7.2a, 7.2b, 7.2c

Human influences on the environment: negative influences.

##### 7.3a, 7.3b

Human influences on the environment: decision making (risk/benefit).

##### ICT 5.2, IPS 1.1-1.4, IPS 2.1

Packaging and solid waste.

##### LE 3.2b, LE 7.1e, LE 7.2c,d, ICT 1.2, 1.4, 2.1-2.3, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, IPS 1.1-1.4, IPS 2.1

Environmental concerns: acquisition and depletion of resources; waste disposal; land use and urban growth; overpopulation; global warming; ozone depletion; acid rain; air pollution; water pollution; impact on other organisms.

##### LE 5.1d,e, LE 6.1a,b

Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (food chains and food web).

##### LE 6.1c, ICT 5.1, 5.2

Renewable and nonrenewable sources of materials.

##### LE 7.1a,b

Describe the way that humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.1b,c

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2b,c, LE 7.2d

Describe the way humans: depend on their natural and constructed environment; have changed their environment over time.

##### LE 7.2b,c, LE 7.2d

Identify examples where human activity has had a beneficial or harmful effect on other organisms (e.g., deforestation).

##### LE 7.2c,d, ICT 6.1, IPS 1.1-1.4, IPS 2.1

Environmental toxins: pesticides and herbicides; fertilizers; organic waste.

##### PS 3.1b,c

Observe and describe physical properties of objects using all of the appropriate senses: size, shape, texture, weight, color, etc. Determine whether objects are alike or different.

##### S1.1a,b,c

Formulate questions of scientific inquiry with the aid of references appropriate for guiding the search for explanations of everyday observations.

##### Standard 1-1.1a, 1.1b, 1.1c, 3.1, 3.2, 3.3

The role of scientific inquiry in studying biology.

## Chapter 6

Supplemental  
Learning Opportunities

Waste reduction doesn't just happen in the classroom. New Yorkers need to reduce, reuse, and recycle whenever and wherever possible. It is up to each of us to share the RRR message with others and keep our city sustainable.

Programs such as the **Golden Apple Awards**, **Materials for the Arts**, and the **NYC Compost Project** offer invaluable resources for schools to take recycling, waste prevention, and composting to the next level.

Special events including the **TrashMasters Museum** and **TrashMasters Street Fair** are designed to bring the ideas in the RRRResource Guide to a wider audience. As you participate in them, think about all that you have learned from the Activities in previous chapters, and how you can share that knowledge with others.

The **Home Sheets** are meant to facilitate discussion and help families think about the impact that their actions have on the environment. RRR is about small modifications that we as individuals make in our daily lives in order to make big changes in the world around us.

<b>Programs</b>	<b>Golden Apple Awards</b> for Schools in NYC
	<b>Materials for the Arts</b>
	<b>NYC Compost Project</b>
<b>Events</b>	Creating a <b>TrashMasters Museum</b>
	Creating a <b>TrashMasters Street Fair</b>
<b>Home Sheets</b>	<b>Home Sheet 1:</b> Talking Trash at Home
	<b>Home Sheet 2:</b> Supermarket Shopping Scavenger Hunt
	<b>Home Sheet 3:</b> Keep On Unwrapping
	<b>Home Sheet 4:</b> From Trash to Cash
	<b>Home Sheet 5:</b> Toys Through the Generations
	<b>Home Sheet 6:</b> Trash and RRR at Home
	<b>Home Sheet 7:</b> Brainstorm and Bag It!
	<b>Home Sheet 8:</b> Fast Food Throw-Aways
	<b>Home Sheet 9:</b> Family RRR Contest
	<b>Home Sheet 10:</b> How I Can Be a TrashMaster at Home



# Supplemental Learning Opportunities Golden Apple Awards for Schools in NYC



DSNY Golden Apple Awards offer cash prizes in three **TrashMasters!** contests for schools in New York City (both public and private), grades K–12.

Schools can compete in any or all of the three contests by completing separate and distinct projects for each contest. Schools enter in separate Elementary, Intermediate, and High School Divisions.

A judging panel of environmental educators and government officials carefully reviews the entries submitted to select the winners for each borough within each grade division.



**TrashMasters!**  
**SUPER**Recyclers

Show off your **school's recycling program.**



**TrashMasters!**  
**REDUCE & REUSE**  
**CHALLENGE**

Describe how your school **reduces waste.**



**TrashMasters!**  
**TeamUp**to**CleanUp**

Brag about your school's **cleanup and gardening projects.**



**NYC Compost Project**  
**GOLDEN SHOVEL**  
**MASTER SCHOOL COMPOSTER**

TrashMasters! contest entries that show school composting projects are reviewed by the NYC Compost Project to select the Master School Composter in each borough.

Winning schools receive cash prizes and certificates, as well as gifts for their participating students and staff.

Please note: schools cannot win multiple years for the same project. For ongoing projects, schools must explain new initiatives in their contest submissions.

All contest entries must be submitted using our online form. See complete instructions: [nyc.gov/wasteless/goldenapple](http://nyc.gov/wasteless/goldenapple)





# Supplemental Learning Opportunities

# Materials for the Arts

## All NYC Public School Teachers Can Get Free Reused Supplies



For more info, see: [materialsforthearts.org](https://materialsforthearts.org)

### Practice Reuse in Your Classroom

Materials for the Arts repurposes unneeded items by providing them for free to teachers and artists. Practice reuse in your classroom by gathering items from Material for the Arts’s warehouse in Long Island City. Use the materials for the project-based learning opportunities presented in this **RRResource Guide** and for other lessons.

Each time you use the supplies, you are giving a hands-on learning experience to your students about how to reuse materials, demonstrating how one person’s waste can be another person’s treasure. The treasures found in Materials for the Arts’s warehouse include stationery and office supplies, furniture, buttons, rolls of fabric, paint, reams of paper, and many other exciting items.

### Materials for the Arts

Founded in 1978, Materials for the Arts, NYC Department of Cultural Affairs, provides thousands of NYC’s arts and cultural organizations, public schools, and community arts programs with the supplies they need to run and expand their programs.

Materials for the Arts gathers materials from companies and individuals that no longer need them and makes them available, for free, to the artists and educators that do. In the process, hundreds of tons are removed from the waste stream every year and kept out of landfills, which helps sustain our environment, promotes reuse, and reduces waste.

Materials for the Arts helps artists realize their visions, provides students with a richer educational experience, and furnishes businesses and individuals with a simple and efficient way to enhance the cultural life of their city.

In 1978, Angela Fremont, a young artist working out of the NYC Department of Parks and Recreation in Central Park, heard that the staff of the Central Park Zoo was looking for a refrigerator to house medicines for the animals. She put on her thinking cap and called a local radio show to make on-air appeal for a working refrigerator. Within minutes, the zoo’s office was inundated with phone calls and the idea for Materials for the Arts was born.

Starting as a one person operation with a desk and a phone, Materials for the Arts has grown into a program with over a dozen staff members, two trucks, and a 35,000 square foot facility in Long Island City, Queens. Materials for the Arts has formed a unique partnership with the following NYC agencies: Department of Cultural Affairs, Department of Education, and Department of Sanitation.

## The Education Center at Materials for the Arts

The Education Center at Materials for the Arts offers programming focused on making art with readily available materials supplemented by the ever-changing warehouse inventory. The Education Center hosts programs on-site in two studio classrooms and sends teaching artists into the community to share the art of reuse. Classes include instruction in projects that can be integrated into the regular curriculum. Learn to make no-sew costumes, hats, masks, puppets, mobiles, wind chimes, found object prints, books, game boards, and musical instruments.

Materials for the Arts helps schools prepare to apply for the NYC Department of Sanitation's Golden Apple Awards. These three contests offer cash prizes for schools in all five boroughs that present the most exemplary recycling, waste reduction, and gardening or beautification projects.

The Education Center at Materials for the Arts also offers a number of Professional Development classes and "P" In-Service credit classes for teachers. Learn how items from the trash or recycling bin and free supplies from Materials for the Arts can be creatively reused to make engaging projects for lessons in all content areas. During Material for the Arts's studio-style courses, teachers focus on developing hands-on lesson plans, aligned with the Arts Blueprint and Common Core standards.

## Become a Recipient!

Contact Materials for the Arts to find out about your school's registration status, to reserve shopping appointments, or for information about how to make a donation.

### Recipient Shopping Hours

Shopping at MFTA is restricted to recipients with appointments booked online during the following hours (check the website as hours may change):

**Tuesdays** 9:30 am to 12:30 pm (Warehouse closes at 1:30 pm)

**Thursdays** 1:30 pm to 5:00 pm (Warehouse closes at 6:00 pm)

**First Monday of every month** 3:30 pm to 6:00 pm (Warehouse closes at 7:00 pm)

### Donation Hours

Donation Drop-Offs must be pre-approved:

**Mondays, Wednesdays and Fridays** 9:00 am to 3:30 pm

### Office Hours

**Monday – Friday** 9:00 am to 5:00 pm

### Gallery Hours

**Monday – Friday** 10:00 am to 4:00 pm

### Location

Materials for the Arts  
33-00 Northern Boulevard, 3rd Floor  
Long Island City, NY 11101  
718-729-3001

[nyc.gov/mfta](http://nyc.gov/mfta)

# Supplemental Learning Opportunities

# NYC Compost Project



The NYC Department of Sanitation created the NYC Compost Project in 1993 to provide compost education and outreach to NYC residents, schools, community gardens, nonprofits, and businesses.

The NYC Compost Project is funded and managed through the Department of Sanitation's **Bureau of Waste Prevention, Reuse and Recycling**.

For more info, see: [nyc.gov/wasteless/compostproject](http://nyc.gov/wasteless/compostproject)

## contact info

Every NYC Compost Project offers a home composting demonstration site, a compost telephone helpline, and compost-related workshops and classes.

### NYC Compost Project in the Bronx

#### The New York Botanical Garden

Bronx, NY 10458-5126

**compost helpline:** (718) 817-8543

**email:** [compost@nybg.org](mailto:compost@nybg.org)

**web:** [nybg.org/compost](http://nybg.org/compost)

### NYC Compost Project in Queens

#### Queens Botanical Garden

43-50 Main Street

Flushing, NY 11355

**compost helpline:** (718) 539-5296

**email:** [compost@queensbotanical.org](mailto:compost@queensbotanical.org)

**web:** [queensbotanical.org/compost](http://queensbotanical.org/compost)

### NYC Compost Project in Brooklyn

#### Brooklyn Botanic Garden

1000 Washington Avenue

Brooklyn, NY 11225

**compost helpline:** (718) 623-7290

**workshop registration:** (718) 623-7220

**email:** [compost@bbg.org](mailto:compost@bbg.org)

**web:** [bbg.org/compost](http://bbg.org/compost)

### NYC Compost Project on Staten Island

#### Snug Harbor Cultural Center and Botanical Garden

1000 Richmond Terrace

Staten Island, NY 10301

**compost helpline:** (718) 425-3558

**workshop registration:** (718) 425-3557

**email:** [compost@snug-harbor.org](mailto:compost@snug-harbor.org)

**web:** [snug-harbor.org/compost](http://snug-harbor.org/compost)

### NYC Compost Project in Manhattan

#### Lower East Side Ecology Center

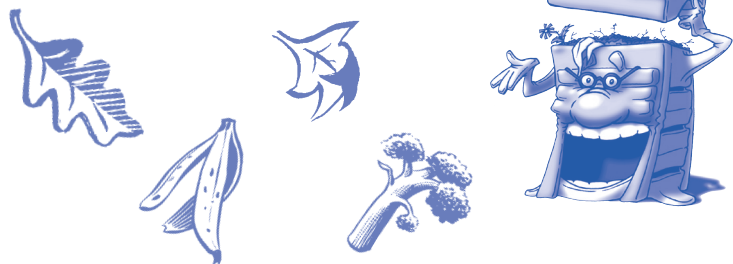
P.O. Box 20488

New York, NY 10009

**compost helpline:** (212) 477-3155

**email:** [info@lesecolgycenter.org](mailto:info@lesecolgycenter.org)

**web:** [lesecolgycenter.org](http://lesecolgycenter.org)





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## nyc compost project programs

### Outdoor Composting Workshops

Learn the essentials of composting, from choosing the right bin to harvesting your finished product. You'll know what to compost, the science of decomposition, ways to speed the process, how to use your finished compost, and helpful tips to avoid or solve common problems. No prior experience is necessary.

### Indoor Worm Bin Composting Workshops

Let worms convert your food scraps into compost for your plants. Vermicomposting with red worms is an easy, odor-free way to compost indoors. Learn how to set up a worm bin, troubleshoot questions, and how to harvest and use the finished vermicompost.

### Leave It On the Lawn Workshops

Grass clippings are 85% water and 5% nitrogen. Leaving grass clippings on the lawn not only prevents waste, it returns water and nutrients to the soil — reducing the need for fertilizer. These workshops provide step-by-step instructions on mulch mowing and seasonal lawn care.

### Master Composter Certificate Course

This comprehensive train-the-trainer program includes intensive classroom instruction, field trips, and 30 hours of independent community outreach to help advance on-site composting in NYC.

### Composting for Kids

Every borough offers hands-on workshops for kids, teacher “wormshops,” classroom worm bin visits, and welcomes field trips to see composting in action.

### Compost Demonstration Sites

The NYC Compost Project recognizes locations that have exemplary on-site composting operations, to show New Yorkers the benefits of composting.

### Technical Assistance

NYC Compost Project sells compost bins, worm bins, and worms at cost. Technical assistance is available for your organization’s composting efforts.



## Supplemental Learning Opportunities

# Creating a TrashMasters Museum

The TrashMasters Museum gives students a special place and time to share what they have learned about reducing, reusing, and recycling. You can create the Museum in a classroom or in an all-purpose room where students can display the Activities they've completed. You can involve just one class, the entire grade, or even the whole school community.

Once you've decided to create your own TrashMasters Museum, begin by focusing on the following steps:

### Step 1:

You and your students first need to decide what you are going to display in your TrashMasters Museum. What you decide on may vary; however, you should attempt to display all of the work the students did as part of the Activities for each chapter.

Next, with the students, look at a calendar and pick a time, date, and place.

### Step 2:

The next decision you and your students will need to make is how you want the Museum to look once they've finished making their exhibits. Start by creating a map of the museum location and designating areas that you'll use for different RRR Activities.

When the map is finished, ask the students to include a key indicating which activities are taking place in each area, then clear the actual spaces to make room for the exhibits. Make copies of the maps to hand out to visitors on the day of the TrashMasters Museum.

### Step 3:

Summarize important information about the Museum, such as the date, day, time, location, and purpose of the event. Have some students draw posters or create signs to promote the Museum.

In addition to family members, have each student pick one person in the school to invite to the Museum. This can be a teacher, custodian, administrator, or another student. Have each student create invitations for the member of the school community they wish to invite, as well as for family members.

Write a letter to send home to students' families to explain what the class is doing. Attach a copy of the invitation their child created. Have the students hand deliver the invitations to the school member they invited.

As they plan their TrashMasters Museum, remind the students to be aware of practicing reducing, reusing, and recycling, like using scrap paper for drafts of the maps, promotional posters, and invitations.



### Step 4:

With input from students, decide how you are going to prepare the museum space. For example, determine what each student will do to set up on the day before the Museum opens. Keep in mind that you will probably do a good amount of the setup, but your students can do many things to contribute.

As you make your plans, consider opening the TrashMasters Museum at the beginning of the day, and keeping it open to visitors for 45 – 60 minutes. The day before the actual event, talk with your students about what's expected of them during Museum hours: What will each student do? What will they wear? Who will be in charge of admissions? Will people rotate jobs, or will everyone have the same job throughout? Answer these questions with the students. Send a note or email home the night before with the final reminder of the TrashMasters Museum event.

### Step 5:

Open your TrashMasters Museum to the public! It's important that you and the students enjoy the day's events, and that the students take pride in their work. Remember to lavish well-earned praise on all the students, especially in front of family members.

### Step 6:

After the TrashMasters Museum closes, bring the class together to discuss a strategy for putting everything back to normal. Assign jobs to different groups of students and, when the work is finished, reward the entire class.

### Expanded:

You can also produce the TrashMasters Museum on a much larger scale. For example, by inviting other teachers who are also using **RRR You Ready?** you can collaboratively plan a more extensive grade-wide or school-wide version of the TrashMasters Museum. You might want to hold this larger event in your gymnasium, all-purpose room, lunchroom, or outside on school grounds if the weather permits.

Another way to enhance your Museum is to have your students create sculptures using materials you've been studying. For example, a sculpture might be created from reusable materials. To prepare them for display, have each student title his or her sculpture, write about it, and explain the materials they chose for their sculpture.

To make your museum more interactive, students can create games out of waste items (such as checkers from bottle caps). With your guidance, students can make modern versions of simple games that were played with long ago, or invent a variety of games or toys that reinforce the concepts introduced in **RRR You Ready?**

## Supplemental Learning Opportunities

# Creating a TrashMasters Street Fair

Students can exhibit information and ideas about reducing, reusing, and recycling on an even larger scale by holding a TrashMasters Street Fair.

Your TrashMasters Street Fair can be an ambitious school-wide event that includes students and teachers from your school community. You can also include people, businesses, and organizations from the neighborhood. Or, it can be a simple, small, comfortable, and easily managed event. Your TrashMasters Street Fair can take place in the school auditorium or gym, on school grounds, or in your school's neighborhood.

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A TrashMasters Street Fair can:

- Provide a celebratory function for the school and its community members.
- Give students a chance to share what they've learned about reducing, reusing, and recycling.
- Inform the community about issues associated with trash and recycling.
- Demonstrate specific how-to tips for reducing, reusing, and recycling.
- Encourage a commitment by individuals, families, and community members to reduce, reuse, and recycle.

### Who Can Participate

You can invite people outside the classroom to attend, as well as to help organize and publicize your Street Fair.

Here are some suggestions for people you may want to consider including:

- Students, teachers, and volunteers who may also be using the **RRR You Ready?** program
- Parent groups like PA/PTAs or other community parent groups
- Members of block associations, or community recycling or environmental organizations
- Members of City service organizations and clubs
- Local business owners
- Members of local churches, synagogues, and other religious organizations
- Local and state elected officials and representatives from other City agencies

## Start the Planning Process

Begin by setting up a steering committee with a chairperson and subcommittees, if appropriate. Some subcommittees that you might want to include are: publicity and media, finances, information, site planning, neighborhood outreach, booths, speakers, student presentations, refreshments, event setup, and cleanup.

Be sure to choose the date and place for the Street Fair well in advance and to clear it with key players. Obtain any permits or licenses that may be needed.

Decide on the scope and size of your TrashMasters Street Fair:

- A large Street Fair can include booths, games, food, information, displays, presentations, and hands-on projects.
- A smaller Street Fair can include displays and information as part of an existing annual school or city function.
- Decide on a budget and investigate funding sources.

## Step-by-Step Planning

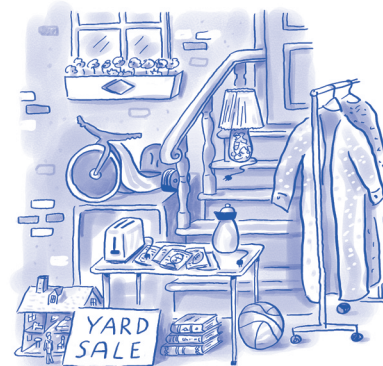
- First, you and your students should consider which projects, displays, and Activities covered in **RRR You Ready?** you want to share. If other classes are involved, coordinate with other teachers to determine which classes will be in charge of specific activities or displays.
- Work with the Principal or person in charge of the premises to select your definite date. You'll need to complete any required permits or documents. Get all confirmations in writing. If you're holding it outside, consider arranging a rain date as a contingency.
- Carefully examine and measure the area you'll be using to hold your TrashMasters Street Fair. Look for details such as electrical outlets, water sources, traffic, access for loading and unloading displays or equipment, parking, and proximity to the street for picking up the trash and recyclables.
- Along with the other people working on the event, create a schedule of regular planning meetings to check on your group's progress.
- Plan publicity for the event, which can include sending notices home to families, an article in the school e-newsletter, a blog on the school website, news releases for local newspapers and publications, and radio publicity. Create a Facebook event and promote on other social media outlets; post your TrashMasters Street Fair on local online calendars of events.
- Enlist the help of volunteers for setup and cleanup. Don't forget to get labeled recycling bins, trash baskets, and a day's supply of clear bags. Ask for help from more people than you think you'll need, just in case some can't make it.
- You can even plan for on-site local newspaper, TV, or radio news coverage. If you do, have several students and teachers available to provide interviews or background on the event.



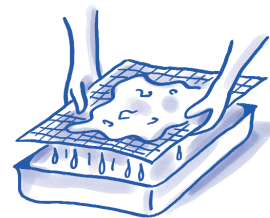
## Displays and Activities

You can use any of the following ideas to help you design a TrashMasters Street Fair that works with your schedule and your school. Ask students for their own ideas, too!

- **How to Recycle Area.** Show examples of items properly sorted into Green and Blue bins.
- **Waste Toss Game.** Have visitors toss clean trash and recyclables into the appropriate categories — Blue bin, Green bin, or regular garbage. Give prizes to the winners.
- **Informational Posters.** Have students illustrate ways to reduce, reuse, or recycle.
- **Waste Reduction Display.** Create a display showing what steps the students have taken to decrease the amount of waste they create in their school and homes.
- **Student Stuff Exchange.** Set up areas for people to donate or swap used clothes, books, sports equipment, toys, or other items that they might otherwise throw away.
- **TrashMasters Contracts.** Plan an exhibit where the public can see examples of students' TrashMaster Contracts. Part of the exhibit can include an area for people to write their own contracts, which they can display or take with them.



- **Trash-Weighing Station.** Demonstrate how much trash Americans create each day.
- **Bulk Food Display.** Compare the amount of packaging needed for a large container versus several small containers that hold the same volume of product, such as cereal or detergent.
- **Packaging Displays.** Compare sensible, appropriate packaging with over-packaged products.
- **Anti-Litter Campaign.** Provide visual displays of useful information that the students researched and wrote themselves. Handout homemade signs for buildings to display, requesting "no menus, flyers, or ads".
- **Letter Writing Campaign.** Provide mailing or e-mail addresses for legislators, industries, and other groups for people to send a message about specific issues related to waste prevention and recycling. Provide sample text that people can use as a guide.
- **Reusable Bag and Cloth Napkin Display.** The students can make and decorate a variety of examples to display and/or sell.
- **Papermaking Station.** Have students demonstrate that making paper is not only easy, it's fun and creative.
- **Plant Sale.** Have students sell plants they've grown from seeds, using compost they made in class. Plant seedlings in cut-down plastic bottles or milk cartons. The compost itself can also be sold in one-pound bags. Include a student-written sheet about how they made the compost, or how to care for the plant.
- **Landfill Exhibit.** Show what happens in a landfill by displaying the ones designed and built by students.
- **Recycling Stations:** Place recycling bins next to each trash basket, and arrange in advance for collection after the event. Assign someone to make sure bins are emptied and relined with clear bags throughout the event.
- **Guest Speakers or Performers.** Consider inviting people with particular areas of expertise to speak or conduct demonstrations.





# Supplemental Learning Opportunities

## Talking Trash at Home



You may be surprised at how much your family throws away every day. This Activity helps you guess how much, and helps you see what might not be trash at all.

### Part 1 - How Much Do We Throw Away?

1. How many pounds of trash do you think your family throws away each day? \_\_\_\_\_ lbs
2. Using the chart below, ask each family member to write down everything that he or she can remember throwing away at school, work, and home today. Don't forget to write down your own name, too, so you can participate as well.

Make sure to include small things like paper napkins, soda cans, packaging, food leftovers, and office paper, as well as big things like broken toys and unwanted furniture. If you run out of space on the chart, you can use additional sheets of lined paper.

name	name	name	name
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

3. Once each family member has filled in the chart, ask them to estimate the total weight of everything they listed.

name	name	name	name
weight _____	weight _____	weight _____	weight _____



- 4. Add together the weights that each family member wrote down to see how much your family throws away each day.

My family throws away about \_\_\_\_\_ lbs. of trash each day.

- 5. Was it more or less than your estimate in question 1? By how much? \_\_\_\_\_ oz, \_\_\_\_\_ lbs.

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## Part 2 - How Can We Reduce Waste?

- 1. Even if your family members are already very good at recycling, there may be some recyclable items on your lists. Circle any recyclable items — paper products, aluminum cans, soda bottles, glass, etc. — that your family members threw away today. For more information on what items are recyclable in NYC, visit [nyc.gov/recycle](http://nyc.gov/recycle).

How many items did you circle? \_\_\_\_\_

- 2. Recycling isn't the way to only cut down on the amount of trash your family produces. Write down two items from the chart that could have been reused, repaired, or given away instead of thrown out.

1. \_\_\_\_\_

2. \_\_\_\_\_

- 3. Thinking about exactly what we throw away each day can help us change our habits. Draw a star (★) next to each food-related item on your family's lists.

How many ★s did you draw? \_\_\_\_\_

See if you and your family can write down three ways to reduce waste at meal times.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

- 4. What are three other ways that your family can reduce the amount that gets thrown away each day?

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

## Supplemental Learning Opportunities

# Supermarket Shopping Scavenger Hunt

This Activity is a fun way to examine what we buy and to explore how we might change some of our buying habits to help reduce or prevent waste. Go to a grocery store, department store, or bodega with your family and take a look at some of the items being sold. Pay attention to packaging, how long products last, and what gets thrown away. Work with your family to come up with ideas for substitute replacements for wasteful products.

---

Products that are **non-recyclable** (such as Styrofoam®):

Examples: \_\_\_\_\_

Substitutes: \_\_\_\_\_

Products that can be **reused** (such as glass jars):

Examples: \_\_\_\_\_

How reused: \_\_\_\_\_

Products that are **overpackaged** (such as multiple wrappings):

Examples: \_\_\_\_\_

Substitutes: \_\_\_\_\_

Products that are **disposable** (made to be used once and then thrown away):

Examples: \_\_\_\_\_

Substitutes: \_\_\_\_\_

Products that we buy because **advertisements make them appealing**:

Examples: \_\_\_\_\_

Substitutes: \_\_\_\_\_



### Supplemental Learning Opportunities

# Keep On Unwrapping

In this Activity, you will take a closer look at the groceries that your family buys and the packaging that they come in. Take a few moments before you put everything away and try this together:

1. Place the full grocery bags on a table or counter.
2. Take each item out and examine how it is packaged. For example, you might have cereal in boxes, fruit on plastic-wrapped trays, and other items in plastic and paper bags or waxed paper cartons.
3. Write down four items with appropriate packaging (just enough packaging to keep the product safe and clean).

Item: \_\_\_\_\_ Wrapping: \_\_\_\_\_

Item: \_\_\_\_\_ Wrapping: \_\_\_\_\_

Item: \_\_\_\_\_ Wrapping: \_\_\_\_\_

Item: \_\_\_\_\_ Wrapping: \_\_\_\_\_

4. Write down four items that are overpackaged (additional wrappings that are not really needed to protect the product).

Item: \_\_\_\_\_ Wrapping: \_\_\_\_\_

Overpackaged because: \_\_\_\_\_

Item: \_\_\_\_\_ Wrapping: \_\_\_\_\_

Overpackaged because: \_\_\_\_\_

Item: \_\_\_\_\_ Wrapping: \_\_\_\_\_

Overpackaged because: \_\_\_\_\_

Item: \_\_\_\_\_ Wrapping: \_\_\_\_\_

Overpackaged because: \_\_\_\_\_

5. Which wrappings are recyclable?

If you are not sure if something can be recycled, you can find out by visiting [nyc.gov/recycle](https://www.nyc.gov/recycle).

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6. Some wrappings can be reused instead of recycled. Write down ways that you could reuse three different types of packaging:

Package: \_\_\_\_\_

Reuse: \_\_\_\_\_

Package: \_\_\_\_\_

Reuse: \_\_\_\_\_

Package: \_\_\_\_\_

Reuse: \_\_\_\_\_

7. Write down three ways that manufacturers can reduce waste when packaging their products

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

The next time you go shopping, remember what you discovered by doing this Activity. When possible, consider buying products in bulk, or that come in containers that can be reused or recycled.

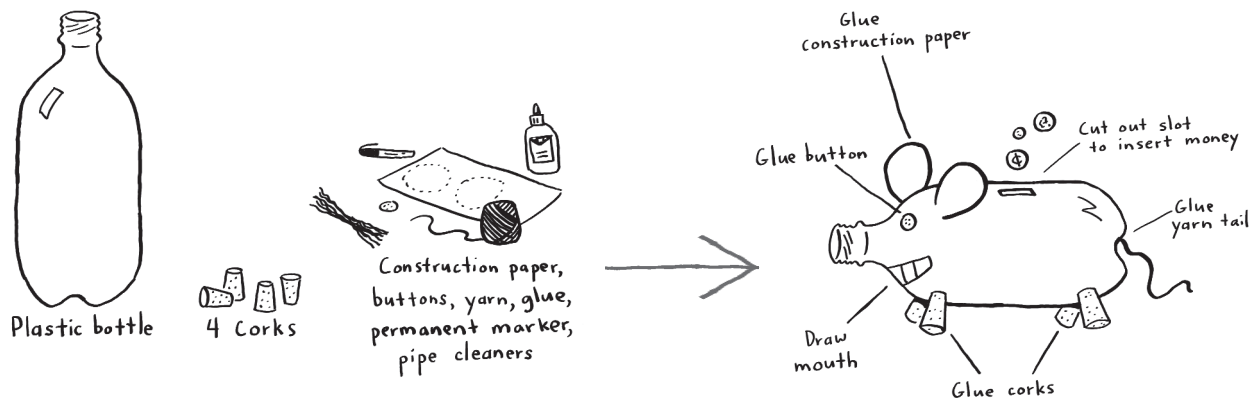
## Supplemental Learning Opportunities

# From Trash to Cash

Create your own Savings Bank from recycled materials. You can make the piggy bank shown here, or design your own fun animal or creature. This Activity will help you save money and learn about reducing, reusing, and recycling.

### Part 1 - How to Start Saving

1. To make your bank, start with a clean plastic container with an opening large enough to allow a quarter to easily pass through, so you can get your money out later.
2. Use the bottle cap as a nose.
3. Use buttons for the eyes and draw a mouth with permanent marker. Make ears using construction paper and glue them on.
4. Use a coiled pipe cleaner, yarn, or string to make a tail. Poke a small hole in the bottle and insert the tail. Use a little glue, if needed, to keep it in place.
5. For feet, glue corks or plastic bottle caps to the bottle.
6. To make a coin slot, cut a slit that's large enough for money to fit through. Your bank is now ready for deposits.



## Part 2 - Smart Saving and Smart Spending

Now that you have a brand new reused bottle bank, it is time to start thinking of how you can save money and save the environment at the same time.

1. Don't throw your money away! There are many ways that you can reduce spending while reducing waste. Some examples are:



- Drinking from a reusable water bottle instead of buying bottled water, juice, or soda.
- Using both sides of each page in your notebooks so that they last longer.
- Trading toys and games with friends instead of buying brand new ones.

Can you think of three more examples?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

2. Think about ways that you can use the money that you collect in your bank to help the environment.

- You can make a donation to an organization that supports waste reduction, reuse, or recycling.
- Even if you don't want to donate the money you collect, you can reduce waste by spending your money on second-hand items instead of new ones. Many stores sell second-hand musical instruments, video games, clothing, and other items that work just as well as new ones, but cost much less.

Talk to your family and write down three ways that you can spend or donate the money you collect to make a difference.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

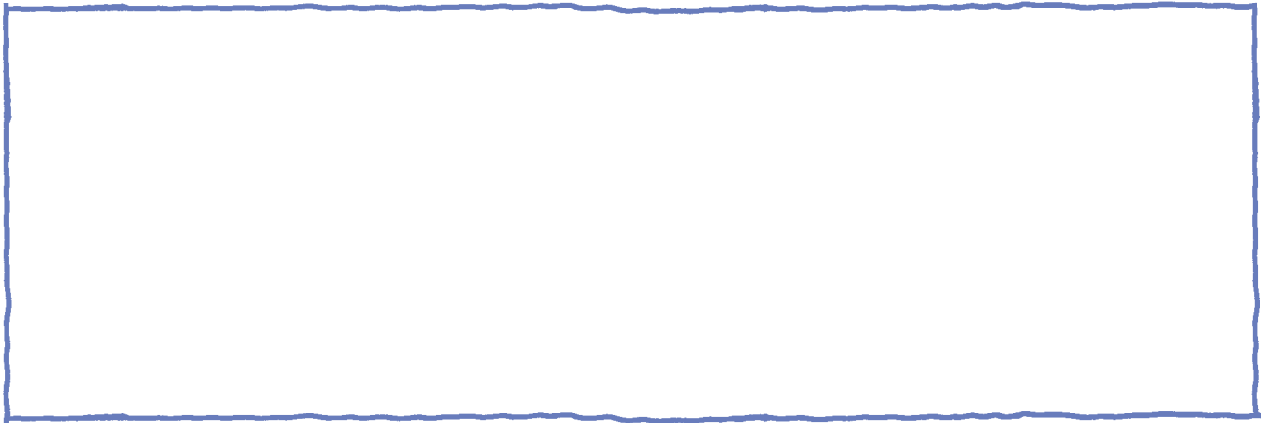
## Supplemental Learning Opportunities

# Toys Through the Generations

## Part 1 - Today's Toys

Think about the toys that you play with most often and answer the following questions. If you no longer play with toys very often, then describe toys that younger family members play with or that you played with when you were younger.

1. Choose one of your toys and draw a detailed picture of it in the box below.



2. What materials or resources were used to make the toy?

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3. How long have you used it?

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4. How much longer will you use the toy before throwing it away? Or, will you keep it or give it away?

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5. How could the toy have been designed differently to last longer?

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## Part 2 - Toys From the Past

Interview your grandparents or other people from an older generation about the toys that they had when they were your age. Ask them the following questions:

1. How many toys did you have as a child?

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2. What were your favorite toys?

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3. What were your toys made of?

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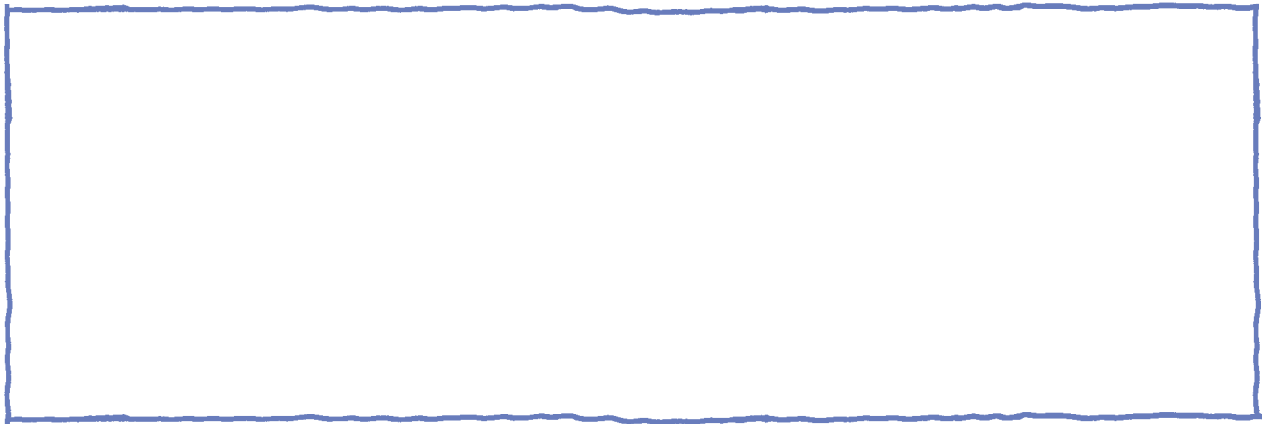
4. How long did your toys last?

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5. Could they be fixed if they were broken?

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6. Draw a detailed picture of one of the toys described by the person you are interviewing.



7. What are some differences between today's toys and the toys that the person you interviewed played with as a child?

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## Supplemental Learning Opportunities

# Trash and RRR at Home

Waste can happen when people do not think about different ways to reuse and recycle unwanted items. In this Activity, you will take a close look at what is in your family's trash can, and help them think about alternatives.

**1. Reduce, Reuse.** Before your family takes out the trash, put some gloves on and look through what is being thrown away.

- **In space one** on the back of this page, make a small poster that shows at least three items from your trash that could be reused or recycled instead of thrown away. Label each item and write down how it can be reused or recycled.

This poster can be cut out and displayed on your refrigerator to remind family members to reduce, reuse, and recycle. If you have access to a photocopy machine, you can even make copies of it, color them in, and tape them to each wastebasket in your house.

**2. Recycle.** Make sure you have three places for waste in your home: one for garbage; one for metal, glass, and plastic recyclables; and one for mixed paper. See [nyc.gov/recycle](http://nyc.gov/recycle) to learn what to recycle in New York City.

- **In space two** on the back of this page, make a sign that you can hang in the place where you put your bottle and can recyclables.
- **In space three**, make a sign that to hang in the place where your family puts mixed paper for recycling.

Don't forget to illustrate your signs and make them colorful so they can't be missed.

**3.** Assign one family member each week to be the Home Waste Monitor, checking all garbage and recycling containers to make sure everything has been put in the right place.

**4.** After doing this for four weeks, make a new poster showing ways that your family has reduced, reused, and recycled.



# These Items Can Be Reused or Recycled!

Draw at least three items from your trash that could be reused or recycled instead of thrown away.



Make a sign to hang in the place where you put your metal, glass, and plastic recyclables.



Make a sign to hang in the place where you put your mixed paper recyclables.

## Supplemental Learning Opportunities

# Brainstorm and Bag It!

Stores give away thousands of paper and plastic bags each year. Bringing your own reusable bags lets you say “**No Thanks**” to unneeded packaging.

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### Part 1 - Observation

Go to a bodega or grocery store and observe what happens as people purchase items.

1. Write down how many bags are given to the customer at the front of the line. \_\_\_\_\_
  2. Does the store double bag? \_\_\_\_\_
  3. Does the store fill each bag to the top? \_\_\_\_\_
  4. How could the store have used fewer bags? \_\_\_\_\_
- 

### Part 2 - Action

1. When you shop, make sure to bring your own backpack or reusable bag.
  2. When you make a purchase, ask the person working at the cash register how many bags you would have been given you if you had not brought your own. Next ask the sales clerk how many bags he or she gives out each day. Write down his or her response.
- 
- 

### Part 3 - Brainstorming Bag Reduction

Try with your family various ways you can reduce the number of plastic and/or paper bags, and other unneeded items that are given to you when you shop.

1. Bring bags or a backpack with you every time you go shopping.
  2. Ask all family members to experiment by saying “no bag, thanks” when a bag isn’t necessary.
  3. Reuse plastic bags and keep a record of how many times you’ve “saved” a bag by not using a new one.
  4. Work with your family to think of ways to use fewer paper and plastic bags when you shop. Write your ideas on the lines below.
- 
-



## Supplemental Learning Opportunities

# Fast Food Throwaways

Fast food and takeout restaurants are a popular convenience. However, they use a lot of packaging and disposable items that almost immediately go into the trash. When you go to a fast food or takeout restaurant, think about ways to reduce waste.

- 
1. Go to a fast food or take-out restaurant and write down all of the non-food items given to each customer.

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2. What materials were used to make the items listed above?

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3. Were any of the items made from recycled products?

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4. What items could be reused?

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5. What items could be recycled?

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6. When you order anything, make sure to say, "No bag, please; and please DON'T give me..." for any condiments or non-food items that you don't need. Write down the response you get from the restaurant. Were you still given any items that you did not need?

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Make sure to get the food you want without all of the extra stuff, every time you order fast food or takeout!



**Supplemental Learning Opportunities**

# Family RRR Contest

The challenges on this sheet will help you and your family think of new ways to Reduce, Reuse, and Recycle!

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**Challenge #1 - Who can produce the least amount of trash for one week?**

Which family members are participating in this challenge?

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How will you judge who has been the most successful?

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**Challenge #2 - Who can reuse a particular item the longest before throwing it out?**

What items did your family members choose to reuse?

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How will you judge who has been the most successful in this challenge?

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**Challenge #3 - Who has the cleverest idea for reusing an item? Let the family vote to decide.**

What ideas did your family members come up with?

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Which idea did your family vote for? What were other good or creative ideas?

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**Challenge #4 - Who can most successfully use scrap paper instead of clean paper for one week?**

To get started, list three activities when scrap paper could be used instead of new paper.

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How will you judge who has been the most successful in this challenge?

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**Challenge #5 - Who can think of the most creative ways to reduce family trash?**

Name \_\_\_\_\_

Ideas \_\_\_\_\_

Name \_\_\_\_\_

Ideas \_\_\_\_\_

Name \_\_\_\_\_

Ideas \_\_\_\_\_

Name \_\_\_\_\_

Ideas \_\_\_\_\_

Which of the ideas listed above do you think will be interesting to try?

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Which of the ideas do you think your family will be able to keep doing for a long time?

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**RRR is about the small changes that can have a big impact on the amount of waste we produce. Keep thinking of new challenges and keep up the good work!**

**Supplemental Learning Opportunities**

# How I Can Be a TrashMaster at Home

Being a TrashMaster means thinking about the environment every time you buy, use, or get rid of a product. If you reduce, reuse, and recycle, you can have a big impact on the amount of trash created in New York.



**Follow these instructions and check the appropriate boxes on the list of RRR tips below (it is okay to check more than one box):**

**Reduce** means cutting down on waste before it is created. If a tip shows you how to reduce waste by cutting down on the number products that need to be produced, check the Reduce box.

**Reuse** means making the most out of every object before you throw it away. If a tip shows you how to reduce waste by reusing products, check the Reuse box.

**Recycle** means making sure that the materials are collected separately to make into new products. If a tip helps remind you to recycle, check the Recycle box.

Check the appropriate box or boxes for each tip	Reduce	Reuse	Recycle
Use discarded paper as scrap paper for notes.			
Make double-sided copies and printouts.			
Bring your own water bottle instead of buying drinks.			
Make sure you have three places for waste in your home: one for garbage; one for metal, glass, plastic, and carton recyclables; and one for mixed paper recyclables.			
Wrap your sandwiches in foil instead of plastic bags. (Plastic bags are discarded as trash.)			
Use a ceramic plate turned upside down to cover food in the microwave, instead of plastic wrap or paper towels.			
Bring your own shopping bag to the store.			

Check the appropriate box or boxes for each tip	Reduce	Reuse	Recycle
Return wire hangers and plastic bags to the dry cleaners.			
Buy brands with sensible packaging. Avoid overpackaged items when possible, such as vegetables or fruit that are packaged in several layers of plastic wrap.			
Buy eggs in cardboard or clear plastic egg cartons instead of polystyrene foam (which should be discarded as trash).			
Say “ <b>NO</b> ” to items you’re not going to use, such as extra napkins, straws, bags, or packages of condiments. If you don’t need them, leave them.			
If your family uses a lot of paper towels, suggest that they use sponges and rags, instead.			
Hold a school-wide fundraiser to collect cans and bottles, and redeem them for the deposits.			
Buy products that are built to last, such as refillable pens and pencils, razors with replaceable blades, and batteries that can be recharged.			
Create a local stuff exchange at school to trade items that you no longer want.			
Teach your friends and family how to recycle and which items go in each bin.			

Now think of five tips of your own!

How do you RRR?	Reduce	Reuse	Recycle

Which box did you check most often? \_\_\_\_\_

# The NYC K-12 School Resource Guide

## Glossary

### A

**Acrostic** A series of lines in which particular letters, such as the first or the last, spell out a different word or phrase when read in order.

**Advisory Committee** A group that counsels and offers recommendations on certain topics and decisions.

**Aeration** The circulation of air.

**Aluminum** A lightweight, silver-white, metallic element that makes up approximately 7% of the earth's crust. Though aluminum is used in many ways, soft drink cans are its most common use.

**Anaerobic** Existing without air.

**Anus** The posterior opening of the alimentary canal through which waste passes from the body.

**Anterior** Situated before or toward the front; the head of a worm.

**Aortic Arches** One of the arterial branches in vertebrate embryos that exist in a series of pairs with one on each side of the embryo, that connect the ventral arterial system lying anterior to the heart to the dorsal arterial system above the alimentary tract, and that persist in adult fishes but are reduced or much modified in the adult of higher forms. Red wiggler worms have five of these "hearts," which regulate blood flow and produce a pulse.

**Appropriate Packaging** The wrapping or presentation of an item in a way that uses minimal materials to preserve or protect an item.

### B

**Bacteria** A division of spherical, spiral, rod-shaped, or comma-shaped microscopic organisms. Some bacteria are responsible for processes like decomposition and fermentation, while other bacteria can cause disease.

**Baled** Bundled or wrapped up in a contained package for transporting or storing.

**Bauxite** A rock in which high concentrations of aluminum are found.

**Behavior** A person's actions or reactions under specified circumstances.

**Biodegradable** Capable of being broken down by microorganisms, such as fungi and bacteria, into simple compounds that can be absorbed by the environment.

**Biodiversity** The variety of living things or biological diversity within a species, ecosystem, or planet.

**Bottle Bill** A law, passed in some states, which requires that the price of a beverage container include a redeemable deposit. The deposit is refunded to the consumer when the bottle or can is returned to the retailer.

**Bristles** Short stiff hairs or something like hair.

**Bulk Quantities** Food or other products that are sold unpackaged or in large containers. This allows consumers to buy goods in large amounts, which cuts down on packaging materials.

### C

**Campaign** A strategic movement of a person or group of people to convince a community or communities to do something; the act of pursuing this goal.

**Carbon** A chemical element that occurs in many compounds and mixtures, including diamond, graphite, coal, limestone, and petroleum. Carbon is found in high amounts in many composting "bins" or dead and dry items for compost, like autumn leaves.

**Cerebral Ganglion** One of a pair of ganglia situated in the head or anterior part of the body in many invertebrates in front of or dorsal to the esophagus.

**Climate Change** The long-lasting and significant change in global weather patterns, including storms and severe heat.

**Clitellum** The part of an adult worm's anatomy used in reproduction, which makes mucus to form an egg-carrying cocoon.

**Coelomic Fluid** A worm's yellow, foul-smelling secretion that remoistens its body when conditions are dry and used as a defense mechanism against predators. The fluid within the coelom; in some animal groups it functions as a hydrostatic skeleton and it may also serve as a circulatory medium.

**Coiled Sheets** In the aluminum can recycling process, cans are melted and cast in 2800-pound blocks, which are rolled into long sheets and coiled for later transportation to a can manufacturing plant.

**Combustible** Something that can catch on fire or ignite; flammable.

**Commitment** A pledge or bond to do something.

**Community** A unified group of individuals with common interests who live in an area. Also, the area itself in which people live, like a neighborhood.

**Community Relations** The interaction with a neighborhood or with a group of individuals that share common interests.

**Compacted Solid Waste** Solid waste that has been compressed, condensed, or consolidated to stabilize the landfill and extend its lifespan. The higher the compaction rate, the more trash the landfill can receive and store. This will also reduce landslides, cave-ins and minimize the risk of fire.

**Compost** Decomposed organic material that results from the process of composting. It is used to enrich or improve soil for growing.

**Composting** The natural conversion of most organic materials by active microorganisms, resulting in a soil-like component called compost.

**Compost Pile** Compost that is collected in either an enclosed outdoor area or in a large ventilated can or bin.

**Consumer** A person who buys goods or services for personal consumption, rather than resale.

**Contaminate** To make something dirty or unfit for use.

**Contract** An agreement, pledge, or bond to accomplish something.

**Contribution** The act of giving time, energy, or goods to benefit others.

**Corrosive** Something that is harmful, damaging or destructive.

**Crop** A crop (sometimes also called a croup or a craw) is a thin-walled expanded portion of the alimentary tract used for the storage of food prior to digestion.

**Cullet** Clean, color-sorted scrap glass that is broken into dime-sized pieces. Glass cullet is melted down and used to make new products.

**Custodian** A person who maintains the cleanliness and safety of a building or place of business.

## D

**Decay** The act of rotting or disintegrating.

**Decompose** To break down organic waste materials by bacteria and fungi; to rot or decay.

**Decomposition** The process of decomposing or being broken down into simpler components by active microorganisms.

**Disposable** Designed to be thrown away after a single use or within a short time, rather than reused.

## E

**Earth Cover** The layer of soil that is placed over compacted solid waste in landfills to minimize odor, pests, and wind disturbances.

**Ecosystem** The connection between a community of organisms and their environment.

***Eisenia Fetida*** More commonly known as the red wiggler worm, a species adapted from the earthworm for decomposing organic material.

**Environment** The circumstances and conditions that surround living organisms, including soil, water, plants, animals, and buildings.

**Esophagus** A muscular tube that leads from the cavity behind the mouth to the stomach.

**Extinction** The end of existence for a group of living organisms or a species.

## F

**Fiber** A thin thread or strand; a root of a plant.

**Flammable** Something that can ignite or catch on fire easily; combustible.

**Fossil Fuels** Energy-producing remains of fossils or organic materials that occur naturally and are formed over thousands of years. Examples include coal, crude oil, and natural gas.

**Fungi** A major branch of organisms that absorb their nutrients from dead or living organisms. Examples of fungi are mushrooms, yeasts, toadstools, rusts, molds, and mildews.

## G

**Gizzard** An organ found in the digestive tract of some animals. This specialized stomach constructed of thick, muscular walls is used for grinding up food.

**Goal** An end purpose, aim, or objective.

**Groundwater** Water from beneath the earth's surface.

## H

**Harvesting** The act or process of gathering in a crop.

**Hazardous Waste** Materials that are potentially harmful to our health and to the environment and must be handled very carefully. This dangerous waste can be found in liquid or solid form or anything in between. Examples include: automotive products, rechargeable batteries, cleaning products, computers and electronics, paint, paint thinners, paint strippers, pesticides, herbicides, fertilizers, thermostats, and mercury devices.

**HDPE (high density polyethylene)** Tough, lightweight, colorful plastic that makes up 62% of milk jugs, detergent bottles, bleach bottles, and butter tubs; also used to make bags. It's marked with the number 2 inside the recycling logo printed on the bottom of the container.

**Humus** Don't confuse humus with hummus. Humus is organic matter that cannot be broken down further; this word is often used to describe finished compost.

## I

**Impunity** Free from harm or negative consequences.

**Incinerator** A furnace or apparatus designed to reduce the volume of waste by burning it.

**Intestine** A long tube that helps to digest food and absorb nutrients and water, and that carries waste matter to be discharged.

## J

**Junk Mail** Any mail which is not requested and arrives unsolicited. Examples include catalogs and credit card offers.

## L

**Landfill** A specially engineered land site for disposing solid waste. It should be designed to reduce risks to public health and safety.

**Landfill Gases** A natural by-product of decomposing organic matter consisting mostly of methane and carbon dioxide.

**Leachate** Rainfall that has penetrated through the solid waste in a landfill. It contains dissolved or suspended materials that could contaminate groundwater or surface water if not collected and treated.

**Leaf Litter** Dead plant materials that have fallen to the ground.

**Litter** Waste materials that are carelessly discarded in an inappropriate place or that escape from waste-handling systems.

## M

**Macroorganism** An organism large enough to be seen by the normal unaided human eye

**Manufacture** to make something.

**Material** Anything composed of matter; a component part or element.

**Melt** To apply enough heat to reduce material from a solid state to a liquid state.

**Microorganisms** Any microscopic or ultra-microscopic organism, like a bacterium or protozoan.

**Millipede** A small, plant-eating arthropod with many legs.

**Mulch** A covering for soil made from wood chips or partially finished compost, that will enhance the soil as it decomposes further.

## N

**Natural Resources** Materials created by nature that are either useful or necessary for life. Examples are wood, water, and minerals.

**Nature** The entire material universe and its phenomena; the overall pattern or system of natural objects, existences, forces, and events.

**Nitrogen** A chemical element that is found in high amounts in composting “greens,” including live flowers and freshly cut grass.

**Non-biodegradable** Not able to decompose or break down naturally.

**Nonrenewable Resource** Natural materials that are considered finite or exhaustible due to their limited supply, their scarcity, time required for their formation, and their rapid depletion. Oil, minerals, and natural gas are examples.

**Nutrients** Substances that provide food or nourishment, like vitamins, minerals, proteins, and carbohydrates.

## O

**Obstacle** Someone or something that stands in the way, is a hindrance, or creates a barrier to achieving an end result.

**Open Dump** An uncovered space used for depositing municipal garbage, and often a source of sanitation and health problems. Most open dumps have been replaced by modern sanitary landfills that cover wastes and contain environmental controls to prevent contamination of the surrounding areas.

**Operational Definition** A set meaning of something within the context of certain conditions or circumstances.

**Organic** Derived from the animal or vegetable world (living organisms) or containing carbon compounds.

**Overpackaging** Excess wrapping or containment of a product. Overuse of materials to display, protect, or transport a product.

**Oxygen** A colorless, odorless, gaseous element constituting about one-fifth of the volume of the atmosphere and present in a combined state in nature.

## P

**Packaging** A container or wrapping made from a variety of materials which is used to store, display, protect, or transport a product.

**PET (polyethylene terephthalate)** Usually clear, or transparent green, plastic that makes up most of the recyclable plastic containers, like soda and vegetable oil bottles, and peanut butter jars. It has the number 1 in the recycling logo printed on the bottom of the container, and can be recycled to make many new products.

**Pharynx** An organ found in animals that is part of the digestive system and also respiratory system.

**Poisonous** Containing poison; toxic, extremely harmful and damaging.

**Pollution** The contamination of an environment caused by human behavior or activities.

**Posterior** Near or toward the back of something (such as the body).

**Public Relations** The management of information presented about a person or an organization to the public.

**Pulp** Crushed or soggy material.

## R

**Recovered Materials** Natural resource materials that are used again.

**Recycle** To collect and reprocess materials such as glass, newsprint, steel, and aluminum for reuse, either in the same form or as the raw material to manufacture a different product.

**Recycled Content** Containing raw material that has been recycled.

**Recycling Loop** The process of using the same material, like glass from bottles or aluminum from cans, over and over again to make the same product or its equivalent.

**Red Wiggler Worm** A common name for the *Eisenia fetida*. Red wiggler worms thrive in rotting organic materials and are used for vermicomposting.

**Reduce** To use less of; to decrease in extent, amount, number, or other quantity.

**Refund** An amount paid back or reimbursed. For example, in some states, we can get a refund of the deposit paid on a soda bottle when it is brought back to the store (redeemed).

**Renewable Resource** A naturally occurring raw material or form of energy derived from an endless or cyclical source like the sun, wind, falling water (hydroelectric), plants, and animals.

**Resolution** The act of making a decision or commitment to do something.

**Reusable** Able to be used again, either as it is or by repairing or altering it.

**Reuse** To extend the life of an item by using it more than once, repairing or modifying it, or by creating new uses for it.

## S

**Segments** Any of the parts into which a thing is divided or naturally separates. In worm anatomy, these are the small rings that surround the worm's body.

**Shredded** Torn or cut into strips or shreds.

**Slurry** A pulpy liquid formed when paper collected for recycling is mixed with warm water. It is further processed to make recycled paper.

**Smelt** To melt metal and separate the metal from other materials.

**Solid Waste** Any unwanted material, either solid or semi-solid, that is discarded from households, industries, or communities, including recyclables and trash (garbage).

**Sow Bug** A bug also called a wood louse or a pill bug, gray in color and oval in shape, capable of curling itself into a ball. Sow bugs like dark and moist places, like leaf litter and the earth beneath stones.

**Sustainability** The act of preserving or not damaging the environment and not depleting natural resources, striving for long-term, balanced ecological systems.

**Sustainability Coordinator** A representative at a school or place of business that defines and implements sustainability standards and policies, including energy conservation and recycling.

## T

**Toxic** Something that is poisonous or contains poisonous or extremely dangerous substances.

**Transported** Taken from one place to another, usually by truck, car, train, barge, or airplane.

**Trash** Things that are made or used by people that are discarded as garbage because they are considered worthless, unnecessary, or offensive.

## V

**Vapor** A gas, steam, or mist.

**Ventilation** The circulation of air.

**Vermicompost** A soil amendment made of food scraps processed by worms into worm castings. Vermicomposting is the act of using worms to create nutrient-enriched soil.

**Virgin Materials** Natural resources that are being mined or extracted for the first time and have never been recycled, as opposed to Recycled Content.

**Volume** The quantity of a three-dimensional enclosed space.

## W

**Waste** A thing that has been discarded because it is worn out, used up, or no longer needed. "Waste" includes recyclables and trash (garbage). Many things thrown away could be recycled or reused.

**Worm Casting** The processed food scraps after the worm has digested and expelled it from its system; worm manure.



