

# How Long Does It Last?

Provided by Youth Environmental Program,  
part of the West Virginia Department of Environmental Protection

## Objective

To teach students about the process of decomposition; to recognize the length of time that different compounds take to decompose; and to understand why it is important to reduce landfill waste and make their communities cleaner.

<b>Grade Level</b>	K-5
<b>Duration</b>	45-60 minutes
<b>Group Size</b>	Any
<b>Setting</b>	Indoor or Outdoor

## Vocabulary

Environment, Decompose, Reduce, Reuse, Recycle, Landfill, Leachate, Methane, Greenhouse Gases, Toxins

## Materials

Collection of materials with a wide range of decomposition times. Examples:

- frozen vegetables and the packaging they came in (shows the difference between organic and inorganic)
- paper, cardboard, juice box, plastic straw, old shoe, plastic bag, styrofoam

Note: See additional resource sheet for various item suggestions, along with estimated decomposition times. It's more effective to show the actual items. However, printed photos can be used as substitution.

## Introduction

Opening questions:

- What does "reduce" mean?
- Does anyone reuse items?
- Where does trash go once it's hauled away by a garbage truck? Explain that most of it goes to a **landfill**, or dump, where it is buried.

Today we are going to learn different ways that we can take care of the environment. We're going to find out about how long items last after they are thrown away.

## Warm-up

### Step 1

Review the three R's: Reduce, Reuse, and Recycle

Ask the class if anyone has heard the phrase, "**Reduce, Reuse, Recycle.**" Explain that the phrase gives us steps we can use to handle trash or waste products to make our community, and even the planet, a healthier place.

### Step 2

Review the meaning of each term/action and give an example of each.

- **Reduce = Use Less** (Cut back on the amount of trash you make)
- **Reuse = Use Again** (Find new ways to use things instead of throwing them away)
- **Recycle = Use Materials to Make Something New** (Collect recyclables in a box and drop them off at a recycling center)

Emphasize that each step is important but the biggest impact is made when we incorporate each step in our everyday lives.

### Step 3

Reiterate the difference between **Reuse** and **Recycle**.

When you **reuse** something, the item stays the same, but you find a new purpose for it. For example: after a pickle jar is empty, you use it as a pencil holder. It's still a jar, but you are using it in a new way.

When you **recycle** a plastic bottle, it may not end up being another bottle. It is broken down and remanufactured to make something new – which could be another bottle, a picnic table, or even fabric for a t-shirt.

## Activity

### Step 1

Provide a brief overview of the negative effects of landfills.

Example: Rotting trash causes pollution by sending harmful gasses into our atmosphere. These include **methane** and **carbon dioxide**, which are known as **greenhouse gases**. They contribute to air pollution and heat our climate. Many materials that end up in landfills, such as batteries, TVs, and electronics contain hazardous substances called **toxins**. Over time, these toxins seep into soil and groundwater and become an environmental hazard. **Leachate** is a liquid that is formed when waste breaks down in the landfill, and water, such as rainwater, filters through and mixes with the waste.

### Step 2

- Show a food item and its packaging and tell the students that most people throw something in the garbage and they think, "OK, that's gone." But just because you don't see it anymore doesn't mean it's not there. It still exists in the dump doing this smelly process called decomposing.
- Explain that some things decompose faster than others. Natural materials decompose faster than man-made materials which are constructed to be strong and durable. Plastic is a great example. Let's say you have broccoli for dinner. The leftover pieces of broccoli you couldn't quite finish are natural, or organic, so they can decompose quickly (possibly as short as a week or two). However, the plastic packaging that the broccoli came in could stay in a landfill for thousands of years.

### Step 3

- Display a mix of 10 to 12 items that could be reused or recycled. Have students estimate how long it will take for each item to decompose. See the **attached teacher reference sheet** for suggested items with decomposition times and relative notes.
- Place the items in order from shortest to longest decomposition time. For effectiveness, you can give occasional reference points to help students determine the actual time required for the item to decompose.

*Example:* Your presentation date is in April. You're discussing a paper lunch bag and its breakdown time is two months. You can explain that it will take until the end of the school year to break down.

## **Ideas to engage students**



### **Individual**

Line the items up on a table in front of the class. Have each student write down a list of the items along with their estimate of the amount of time the item will remain in a landfill. They can self-grade their answers as the correct decomposition times are revealed. Alternately, pass each item around the room, allowing each student an opportunity to hold and view items.

### **Team**

Separate the class into two or more teams. For each item, give the teams approximately one minute to discuss how long they think it will take for the item at hand to decompose and agree on their answer. Record each team's answer. Award points to the teams that provided the closest breakdown time for each item. Reveal the correct time for each item as you proceed.

### **Group**

Engage some volunteers to come to the front of the room, bringing up one student for each item. Have them take turns identifying the item they are holding and showing it to the remaining student audience. Have students in the audience raise their hands to offer their best estimate for how long the item will take to decompose. Call on one to three students per item. Reveal the correct time for each item as you proceed.

## **Closing**



- Explain the decomposition times given are estimates, and many factors can affect the time it takes for something to decompose. Scientists do many experiments so they can get accurate estimates.
- The main point of this activity is to show that many items take a long time, or may never decompose. That's why it's a good idea to reduce, reuse, and recycle rather than throwing items away.
- Have students offer suggestions on ways they can prevent waste or employ the 3 R's. This can be done at the conclusion of the lesson as a group discussion or it can be an alternate assignment with ideas expressed through writing, art, community service, etc. Employing the 3R's is important for our environment because it saves energy, helps conserve natural resources, and helps reduce the amount of trash that goes in our landfills.

## **Additional Activities**



- Have students find out about recycling in your local area
- Start a school recycling collection program or encourage students to begin recycling at home
- Look to buy products made from recycled materials
- Go plastic-free, and say "no" to plastics that are only used one time- i.e. grocery bags and straws
- Encourage students to share what they know about recycling with family and friends
- Fix and adapt items that can easily be reused

## Additional Resources

Attached Teacher Reference Sheet:  
Decomposition Times for Common Landfill Waste

Website Links:

SciShow Kids Field Trip | How Compost Is Made

<https://www.youtube.com/watch?v=26IO95Xt5WU>

How to Make a Mini Compost Bin!:

<https://www.youtube.com/watch?v=qef7YUxtkZg>

PepsiCo Ideas for Teaching Kids How Things Decompose:

<https://resources.pepsicorecycling.com/resources/how-materials-decompose/>



Learn more about the West Virginia Department of Environmental Protection's Youth Environmental Program or to schedule a presentation visit our website:  
<https://dep.wv.gov/environmental-advocate/YEP/Pages/default.aspx>

## DECOMPOSITION TIMES FOR COMMON LANDFILL WASTE

To be used with “How Long Does It Last?” Environmental Education Activity

Item	Time Needed to Decompose	Notes
Potato	Approximately 1 month	A potato is organic. It could decompose, or “rot,” in about a month. But there is something else you can do with food scraps like vegetables instead of putting them in the trash. Have you ever heard of composting? Composting is an easy way to turn natural waste like leaves, grass and vegetable scraps into useable material. Once the materials break down, many people use the compost in their garden. It helps the soil by making it rich and moist, which helps the flowers or vegetables planted there. So composting is a form of recycling.
Paper Lunch Bag or Newspaper	Approximately 2 months	Paper bags/newspapers are made from trees, so this also comes from something organic. So, in the right conditions, the bag could decompose in about 2 months.
Cardboard Box	Approximately 1 Year	Many people recycle cardboard boxes, and this is a great way to help protect the environment.
Waxed Cardboard Juice Container	Approximately 5 Years	Some cardboard is treated with wax like this juice carton. Because of the wax treatment, it would probably take about 5 years. In your head, add five years to your age. That’s how long this would be sitting in the landfill.
Tin Can	Approximately 50 Years	In your head, add 50 years to your age. That’s how long a tin can thrown away today will likely be sitting in the landfill.
Battery	Approximately 100 Years	Regular alkaline, manganese and carbon-zinc batteries are not considered hazardous waste and can be disposed of with ordinary trash. Other common single-use or rechargeable batteries, such as lithium and button batteries, are recyclable, but access to recycling may not be available in all locations.
Plastic Straw	Approximately 200 Years	Americans use millions of straws every day. Did you know there are reusable straws and paper straws?

## DECOMPOSITION TIMES FOR COMMON LANDFILL WASTE

<p><b>Aluminum Can</b></p>	<p><b>Approximately 250 Years</b></p>	<p>Recycling aluminum cans saves 92% of the energy that's required to produce cans from new aluminum. Aluminum can be recycled time and time again without losing any quality.</p>
<p><b>6 Pack Holder</b></p>	<p><b>Approximately 450 Years</b></p>	<p>Most six-pack rings are made from polyethylene, which is not biodegradable. Plastic rings can trap birds, small mammals and turtles around the neck, choking them.</p>
<p><b>Plastic Water or Soft Drink Bottle</b></p>	<p><b>Approximately 450 Years</b></p>	<p>Make a pledge to use a reusable water bottle to help keep plastic out of the landfill.</p>
<p><b>Athletic Shoe</b></p>	<p><b>Approximately 40 to 1,000 Years</b></p>	<p>Most athletic shoes are made with a combination of materials. Some materials may be organic or natural, while other parts are man-made. We already know that organic materials decompose faster than man-made items, so the time it takes the athletic shoe to decompose varies. Some parts, like a leather upper or cotton shoelaces, are made from natural materials and could decompose in around 40 years. The man-made sole could take up to 1,000 years.</p>
<p><b>Plastic Grocery Bag</b></p>	<p><b>Approximately 500 to 1,000 Years, depending upon the amount of sunlight available.</b></p>	<p>Wow! That's a long time. The reason why is because most common types of plastic shopping bags are made of polyethylene, which is a man-made polymer that doesn't decompose. Instead, they go through a much longer process called photodegradation, where they become brittle and start to crack and shred after being exposed to the ultraviolet rays that come from the sun over a long period of time. So, think about this. If these bags are at the bottom of a pile and no sunlight can get to them, they won't break down. Some states have laws that ban the use/distribution of plastic bags.</p>

## DECOMPOSITION TIMES FOR COMMON LANDFILL WASTE

<b>Tires</b>	<b>Approximately 2000 Years</b>	Almost 250 million tires are discarded every year in the U.S., and only 7% are recycled. The WV DEP hosts numerous free tire collection events across the state each year.
<b>Glass Jar</b>	<b>Approximately 1 Million Years</b>	Since it breaks so easily, people tend to think glass decomposes quickly. But it's one of the most durable materials on Earth in terms of decomposition. Relics from the earliest days of glass-making in 2000 B.C. Egypt still exist, and experts estimate that a glass jar or bottle would take 1 million years or more to fully decompose on its own.
<b>Styrofoam Egg Carton or Take Out Container</b>	<b>Never</b>	Avoid this type of packaging whenever possible.