

Litter, Material Decomposition, and Recycling Lesson Plan

Learning Objectives:

- Give students a basic understanding of decomposition and how long it takes various materials to decompose in a natural environment.
- Connect the understanding of decomposition to litter.
- Students will understand what litter is and why it is bad for natural environments.
- Students will have a basic introduction to the concept of where trash goes and why we want to reduce materials sent to landfills.
- Students will learn the concepts of reduce, reuse, recycle, and compost.
- Students will have a basic understanding of what can be recycled or composted.

Oklahoma Academic Standards Addressed:

- 1.ESS3.1 Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.
- 2.PS1.1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
- 2.ESS2.3 Obtain information to identify where water is found on Earth and that it can be solid or liquid.
- 3.LS1.1 Develop and use models to describe that organisms have unique and diverse life cycles but all have a common pattern of birth, growth, reproduction, and death.
- 3.LS4.4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.
- 5.PS1.1 Develop a model to describe that matter is made of particles too small to be seen.
- 5.PS1.3 Make observations and measurements to identify materials based on their properties.
- 5.LS2.1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
- 5.LS2.2 Use models to explain factors that upset the stability to local ecosystems.
- 5.ESS3.1 Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environments.

Decomposition

Vocabulary

- **Decomposition** – The process where an object breaks down into organic material.
- **Decomposers** – Organisms which break organic matter down into compost.
- **Organic Matter** – Previously living things such as dead plants or insects.
- **Compost** – A naturally occurring plant fertilizer that looks like rich garden soil – the end result of decomposition.
- **Composting** – harnessing the decomposition process by building a pile or a bin of organic matter and encouraging decomposers to make compost.
- **Material** - What an object is made out of. This could include paper, plastic, wood, aluminum, and much more!

Lesson Talking Points:

Decomposition

Nature does all of this recycling through a process called **decomposition**.

Decomposition is the natural breakdown of matter. We see bananas decompose all of the time in the kitchen!

Have you ever carved a pumpkin? Do you remember if it began to get moldy and squishy and saggy after a few weeks? Objects begin to change when they decompose and can change shape and reduce in size.

Organic matter decomposes into a substance called compost, which contains a lot of nutrients. Compost is full of nutrients that plants need. It feeds the roots of plants that are growing. Who does all this decomposition? The simple answer is **decomposers!**

Decomposers

Decomposers are the many types of critters that eat organic matter and turn it into compost. Examples of decomposers include:

- **Visible** – pill bug aka roly poly, sow bugs, worms, ants, millipedes, centipedes, beetles, earwigs, spiders, snails. Also, chickens, cows, horses and any animal whose manure (poop) we can add to the soil are also decomposers. Most visible decomposers are **invertebrates**.
- **Invisible** – bacteria, fungi and more. In a teaspoon of soil there are billions of microorganisms that break down organic matter.

Trash Decomposition



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What about items that are not organic materials and don't decompose as quickly? Think about your bicycle or your school desk or your book bag. While most of these items do also decompose, it takes a really, really long time for them to do so. How long it takes an item to decompose depends on what type of material it is made out of and how it is made. A material is what an object is made out of and could include paper, plastic, wood, aluminum, and much more!

****Hold up some examples of trash and ask what type of material it is made out of. Some good objects to include are plastic bottles, aluminum cans, books, cardboard box.****

How big an object is and how it is made also affects how long it takes to decompose. For instance, a plastic bag and a plastic bottle decompose at different rates, because the plastic bag is very thin and can get torn up easily.

Now, based on what type of materials and objects, how long do you think it takes these items to decompose?

- Leaf - 1 to 3 months
- Paper - 2 to 4 weeks
- Aluminum can - more than 200 years!
- Plastic bottle - 450 years!
- Glass Bottle - never
- Styrofoam cup - never
- Plastic bag - 10 to 20 years
- Paper bag - one month

Some of these items can take a really long time to decompose!

Litter:

Who can tell me what litter is?

Litter is when trash is in a place where it shouldn't be. Have you ever seen a plastic bottle or paper or a can laying outside on the playground and not in a trash can? This is litter!

Why do you think litter could be a bad thing?

When you think about how long it takes for some of those items to decompose, that means a piece of trash that is littered can stay in that spot for many, many years!

Here are ways that litter hurts our planet:

- It can hurt our wildlife and animals. An animal swallowing a bottle cap could choke it, or broken down pieces of trash can affect what it eats.



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- It can make our water dirty. When trash like plastic and styrofoam get into our water and start to break down, it releases harmful chemicals.
- Litter looks bad and can make a place dirty.
- Litter takes a lot of time and money to pick up.
- Bacteria and germs can grow on litter and attract creatures that spread disease.

So, how can you help?!

You can help be part of protecting our planet! Make sure you only throw away trash where it is supposed to go. When you see litter, pick it up and throw it away properly. You can prevent more trash from being created by using less stuff. Mother Earth will be grateful and you are helping make our world a more beautiful place!

Resources:

“A Lesson on Littering” Video: <https://www.youtube.com/watch?v=4pbXLw6NDBM>

“What is Plastic Pollution?” Video: https://youtu.be/ODni_Bey154?t=54

Where does garbage go?

Vocabulary

- Trash
- Landfill
- Groundwater
- Pollution
- Methane
- Reduce
- Reuse
- Recycle
- Compost

Trash is what we call something we are throwing away. Think about the things you have thrown away today. You probably put stuff in a trash can. But what happens when the trash truck empties your cart and rolls away?

An average trash truck can hold 14 tons of trash. This 28,000 pounds of trash.. That's around the same weight as 70 lions!

Trash from your trash carts are taken to a final location called a landfill. These are giant areas of land that have piles and piles of trash dumped at them. In Oklahoma City alone, we send 300,000 tons of trash to landfills each year. That is 600,000,000 pounds of trash. That is a lot!

Landfills have a lots of layers to prevent trash from poisoning our groundwater.

Groundwater is water found underneath our soil and rock, and we need to keep it clean so it doesn't affect our drinking water.

Materials in landfills can contribute to pollution. Pollutants are harmful materials that end up in natural environments. It can affect the air, water, and land. When organic material decomposes in landfills, it puts off a chemical compound called **methane**. Landfills have systems that vent out the methane from the ground. Methane pollutes our air and causes our planet to get warmer by eroding layers of our air.

Landfills also take up a lot of space with the amount of trash they take. It also wastes materials that will no longer be able to be used again and will stay at that landfill forever.

So, how can we limit the amount of trash sent to landfills?

We can use four core concepts of **Reduce, Reuse, Recycle, and Compost**.



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Reduce is the first thing we can do to limit the amount of trash we produce. To reduce just means to use less stuff. For example, instead of using a lot of plastic bottles for water, you can use a single cup over and over again. It could also be borrowing a book from the library instead of buying a brand new one.

To **reuse** means to give multiple uses to an item. If you are finished using a object like a toy or clothing, you can donate it or give it to someone else to use again. Too, you can reuse an object by getting something from a garage sale or thrift store instead of buying something brand new.

Recycling is when you take existing objects, break them down into their main material, and remake them into new objects. For instance, your soda can be recycled, melted down, and remade into a new can for someone else to use. This is important because it reduces the amount of new materials we need to use. For example, paper that you are using today can be recycled into new paper, instead of other trees being chopped down to make new paper.

Composting is another way we can reduce waste we throw away, and it is a great way to feed our plants if you have a garden or houseplants. Compost is the finished product of organic matter decomposing, and once it is made, it is a nutrient-filled soil that helps plants grow really big and strong. Examples of things that can be composted are banana peels, lettuce, egg shells, and apple cores. There are a few different ways compost can be made. You can make a compost pile outdoors or use a compost bin. Or, you can compost inside using a worm bin, and the worms will eat the food and create compost.

Let's practice how we would sort our trash and keep in mind, reusing, recycling, and composting!

Hold up different types of trash and explain what can be recycled, composted, reused, or has to be thrown away.

“Where Does Trash Go” Activities:

1. Demonstration of sorting trash into compost, recycling, and waste bins.
 - Option 1: A tarp is laid out and different types of waste are scattered on it. (Use non-perishable items to stand in for compostable items, ie. a cut out of an orange instead of a real orange). Students are divided into teams of two. One at a time, players from each team will toss a ring onto an article of trash. They have to decide which bin it belongs in. The team that finishes first wins.
 - Option 2: Students in various stations have cut outs of various pieces of trash and sort them into which bins they belong to.
 - Option 3: Worksheet titled “Let’s sort trash!”
www.okcbeautiful.com/uploads/Trash_Sorting_Worksheet.pdf

2. Landfill Simulation Activity:
https://www.okcbeautiful.com/uploads/Landfill_Simulation_Activity.pdf

3. Organize a LitterBlitz with students to give them exposure to litter problems.
<https://www.okcbeautiful.com/programs/litterblitz/>