

Litter Decomposition Activity



How Litter Affects Our Environment

Activity Summary

This activity teaches students the negative impacts of littering in our environment. They will also learn how easily we contribute to excess waste and how we can help alleviate the issue. Students will learn background information, have discussion questions and complete an activity.

Objective

Students will learn how much time it takes litter to decompose, where it ends up, how it gets there and other impacts on the environment.

They will also learn ways to modify the current system to better the environment and what they can do to help reduce the amount of debris entering the ocean.

TEKS:

Elementary school:

3rd grade: 1A-B, 2A&C, 2E

4th grade: 2E, 3B

5th grade: 1B; 2A, D, E; 5B; 9A-B

Middle school:

Grade 6:

1A (with the cleanup activity), 1B, 2A-C, 2E, 3A&D, 4A&B (with the cleanup activity), 5B

Grade 7:

1A (with cleanup activity), 1B, 2A, 2C&E, 3A&D, 10B,

Grade 8:

1A (with cleanup activity), 1B, 2A, 2C&E, 3A&D

High School:

Aquatic Science: 1A (with cleanup activity), 2E-H, 3B, 11A, 12A-C

Biology: 1A (with cleanup activity), 2E, 2G, 3B, 11B, 12D, 12F

Environmental Systems: 1A (with cleanup activity), 3B, 5F, 9A, 9D

Litter Decomposition Activity

Background

Litter in our area

Litter is everywhere. Unfortunately, you have seen it on the beach, on the seawall, in our streets and parks and playgrounds. Bags caught in trees or rolling around in the surf, bottle caps on the beach where shells should be, or plastic bottles hastily discarded on a sidewalk. Litter is any waste or debris that has unintentionally been left behind (Coke can that flies out of a truck bed) or intentionally discarded (illegal dumping) outside of a trash can or recycling bin.

Why do you think people litter? A great discussion can be had over this topic. Are people deliberately hurting the environment? Do they just not care? Maybe they do not know better. Or perhaps they are just lazy. With your class, think of reasons to change these poor habits.

Some of the most commonly discarded items are cigarette butts, aluminum cans, straws, plastic bags or food wrappers, and unfortunately a lot of them were accidentally misplaced. Each year, The Texas General Land Office hosts a beach cleanup. This past year's event cleaned up 110,663 pounds of trash from 151 miles of the Texas Coastline. Galveston Island alone had 1,130 volunteers clean-up 14,400 pounds of trash! People often do not realize that trash is a huge issue in Galveston County and that it takes a lot of effort from people all over to help keep the beaches clean.

All litter has the possibility of ending up in the ocean, when a trash can overflows or sea gulls will pull out parts of the trash causing them to be strewn far and wide. 90% of seabirds have plastic in their gut, and seabirds also have been known to feed plastic to their young, essentially starving them to death.

Sea turtles and other sea animals confuse plastic bags for jellyfish. We often find trash on the beach with "turtle bites" taken out of them. They leave little diamond shape impressions and are from a turtle biting it to see if it is food. Plastic fills up their stomachs making them think they are full, when really, the plastic has no nutritional value and often is hard to digest.

Plastic bags are also an issue because they don't biodegrade, they photodegrade. This means they need light to break down and when they "break down" they tear into smaller pieces but don't actually dissolve but remain in the sand, soil and water for extended periods of time.

Some of this litter makes it out to Flower Garden Banks National Marine Sanctuary 115 miles off the coast of Galveston. Two species of turtles, loggerhead and green, can easily mistake plastic bags and other trash for food. Many other animals also live in the sanctuary and can mistakenly try to eat trash or get tangled in things like discarded fishing line.

Litter Decomposition Activity

Materials:

Bags of trash filled with items commonly found in our area. Papers, cardboard, newspaper, plastics including straws, bottles, bottle caps, aluminum cans, juice box, chip bag, etc.

Lifespan of Trash chart (General Land Office)

Pictures of wildlife impact

Rubber bands

Containers of recycled materials; plastic bottle, single-use plastic bag, tin can, aluminum can, Styrofoam cup, glass jar, picture of fruit and vegetables, paper, cardboard

Vocabulary

1. Litter- waste, debris, junk left behind in an open or public area. Items discarded outside of a trash or recycling bin.
2. Decomposition- the state or process of rotting or decay, breaking down.
3. Trash- discarded items no longer needed or used.
4. Contaminant- a substance that is where it shouldn't be and is at high enough levels to have a negative effect on our health or on the health of the environment.
5. Decay- to break down, when something rots or decomposes through the action of bacteria and fungi.
6. Pollution- the presence or introduction into the environment of a substance or thing that has harmful effects on the system.
7. Biodegrade- when a substance or object breaks down with the assistance of bacteria and fungi, to decay.
8. Photodegrade- when a substance or object is decomposed by the action of light, specifically sunlight.

Procedures:

A. Introduction to Litter

- Introduce vocabulary listed above.
- Have students discuss why they think people litter and what effect it has on our environment.

B. Litter Impacts on the Environment

Litter Decomposition Activity

Litter not only looks aesthetically displeasing, but it also poses a huge risk for our environment. Millions of animals are injured or killed every year from litter and pollution. As plastics and oils degrade they leach into our soil and water supply. People often don't realize the impact litter potentially has on each individual. The chart shown below demonstrates a few different impacts on our wildlife, water and food quality, and human and financial aspects.

Wildlife Impacts	Water and Food Quality	Human and Financial Impacts
<ol style="list-style-type: none"> 1. Ingestion, choking, or starvation can occur due to waste mimicking food – sea birds will often feed plastic on shore to offspring. 2. Toxic and harmful chemicals leach into soils and food sources 3. Plastic ring entanglement around beaks, necks, and flippers 	<ol style="list-style-type: none"> 1. Oil and paint running off from the roads can enter water ways such as rivers, creeks, storm drains and the ocean 2. Harmful chemicals like BPA can be leached into our water or soil from plastic 3. Waste can affect microscopic organisms and bacteria levels 4. It can cause damage to fishing and recreational boats 5. Litter blocks storm drains which can cause flooding and carry trash outside of normal environments 	<ol style="list-style-type: none"> 1. Plastic bags have on average a lifespan of 12 minutes 2. Walking on the beach or swimming can be harmful if you step on broken glass or buried coals 3. Trashed areas lead to a decrease in tourism and use of recreation areas 4. Chemicals in the water can be harmful to our bodies

- Ask a student or students to volunteer. Loop a rubber band around their thumb and stretch it to also loop around their pinky. Ask them to try and get it off with that same hand. Show pictures of wildlife, such as birds, turtles or fish with plastic six pack rings wrapped around them.

C. Lifetime of Litter

Litter Decomposition Activity

- Pass out bags of trash items to small groups of students. Have them go through the bag and put the trash items in a line of quickest to break down to slowest to break down.
- If a student gets stuck, it helps if they think of what the items are made of.
- Have students guess how long it takes for each item to decompose.
- Review the litter timeline chart provided.
(<http://www.glo.texas.gov/adopt-a-beach/pdf/marine-debris-poster.pdf>)
 - Discuss the various methods of decomposition and time it takes for items to break down.
 - Allow students a chance to reorder their timelines
 - Reveal the correct timeline and discuss differences between yours and theirs
- Discussion points for after completion of activity
 - Go through each item in the bag and discuss whether it could be Reduced, Reused or Recycled.
 - What are commonly littered items around your school or home?
 - How can the students as individuals make an impact on our environment?

D. Extensions

- Creative Writing- Have students pick a piece of litter. Write a background story including where it could have come from, who it belonged to, why they used it and how it ended up where it did.
- Start a litter awareness campaign with your school or group. Students can make posters, develop recycling programs or host awareness booths.
- Host a class debate. Divide students into two groups. If a student dropped a banana peel/ apple core/ watermelon rind out the window of a car is it considered litter? Have each group debate one side of the argument.

Resources

- <http://www.bringthebag.org/>
- <http://www.cityofgalveston.org/172/Recycling>
- [https://scienceleadership.org/blog/Littering and its Effect on the Environment](https://scienceleadership.org/blog/Littering_and_its_Effect_on_the_Environment)
- <http://www.glo.texas.gov/adopt-a-beach/pdf/marine-debris-poster.pdf>
- <http://flowergarden.noaa.gov>