



LESSON 6: Trash Effects on Wildlife

OVERVIEW

The students will use role-playing, models and a simulated entanglement to learn about trash in our environment and how it affects our wildlife in water and on land.

Learning Targets

- Students will demonstrate how litter is dangerous to our environment and harms wildlife both on land and water.
- Students will investigate how items that don't break down, such as plastic, can make wildlife sick or die as they are consumed.
- Students will model plastic entanglement and discuss and evaluate methods to prevent it from occurring.

GLEs

See attachment

Materials Needed

- Plastic six-pack drink holders, fishing line, plastic bags, nets and other pieces of trash that could harm wildlife
- An aquarium or other transparent container of water
- One small plastic fish or turtle
- Stuffed animals brought in by the students (optional)
- Shoeboxes (one per child)
- Spoons (one per child)
- "Wildlife food" (bird seed or popcorn)
- Dried beans
- Rubber bands (one per child)

Background Information

Have you seen a picture of a sea bird with its neck stuck in a plastic six-pack holder? Many have, and were inspired to cut up their six-pack rings before disposing them. This is an example of trash and its impact on wildlife. Properly disposing of waste is critical in minimizing these impacts.

Ingestion

Much of our trash looks like food to wildlife, especially plastics. Sea turtles mistake plastic bags for jellyfish, Laysan albatross will mistake plastic pieces for fish, and there is an entire industry that exploits how fish look at plastic like it is food.

Animals are not able to get nutritional energy from plastic. A belly full of plastic will create a sense of fullness, but in reality, the animal is starving. Many birds found dead on the beach have stomachs full of plastic. Plastic fragments can also damage the digestive tracks of animals as it passes through them. The damage can range from micro-abrasions to complete puncture, and can lead to infections and sepsis. Other items that wildlife consume could block their digestive track. With no way to pass food through, the animal will eventually starve.

Entanglement

A large component of marine debris includes discarded fishing gear. An abandoned crab trap will continue to attract crabs, and other marine wildlife. Once these creatures die in the traps, they will attract even more marine organisms. This is known as ghost fishing. Fishing nets and lines can entangle wildlife and restrict their movement. This may result in starvation, predation, bodily injury, or drowning.

Reduced Fecundity

Fecundity is the reproductive potential of an organism. Eating microplastics has been shown to lead to reduced fecundity in a variety of marine organisms. The exact mechanisms are poorly understood, but it appears to be a combination of malnutrition, exposure to toxic chemicals, and behavioral changes that all result from feeding on microplastics.

Baiting

When litter accumulates, it attracts wildlife looking to utilize it as a resource. This is known as baiting, and it can have negative consequences. For example, an apple core that is thrown out of a car will attract insects and rodents, which will then attract owls and other birds of prey. This sets up a situation for increased vehicle collisions.

Habitat Destruction

Litter that impacts the food and shelter resources of wildlife can be said to destroy its habitat. A tire dump can prevent native plants from growing, used fishing gear can destroy portions of coral or oyster reefs, and a tossed cigarette butt can ignite a wildfire that consumes thousands of acres. Without a habitat to call home, wildlife will vanish.

Invasive Species

Litter travels. As litter is carried by wind and water, it often picks up some hitchhikers along the way. These can be seeds, spores, plants, barnacles, algae, or microorganisms. These organisms can then find their way into new habitats, reproduce, and become an invasive species. An extreme example is found on a floating dock from Japan that was dislodged by the 2011 Tōhoku earthquake and tsunami. When the dock washed ashore in Oregon, it carried with it over 47 different non-native species that were still living.

Bio-accumulation

Plastic loves chemicals. Plastics contain chemicals that leach into the environment, as they are broken apart by ultraviolet radiation. However, plastics also adsorb chemical contaminants in the environment, such as PCB's and pesticides. The amount of chemicals the plastics can adsorb are biologically significant. It has been shown that these chemicals can accumulate in the tissues of wildlife that is feeding on them and contaminate the food chain – including the food that humans eat.

Sources

- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4780651/>
- https://www.researchgate.net/publication/270662401_The_Impact_of_Polystyrene_Microplastics_on_Feeding_Function_and_Fecundity_in_the_Marine_Copepod_Calanus_helgolandicus
- <https://pubs.acs.org/doi/full/10.1021/es504525u>
- <https://marinedebris.noaa.gov/file/4168/download?token=SkOSYDWE>
- <https://www.epa.gov/trash-free-waters/impacts-mismanaged-trash>

ACTIVITY

Part I (Suggested for grades 2 to 4)

1. Fill the aquarium with enough water so that the turtle and trash items can float. You will use these to demonstrate how trash can affect wildlife and let students demonstrate their ideas.
2. Show the students this video clip, which shows what happens when plastic trash goes into our waterways. <http://thekidshouldseethis.com/post/85747435912>
3. Have a short discussion with students about what they learned from the video, and then explain that they will be doing a couple of activities that explore how plastic affects wildlife.

Optional for younger students

1. Ask the students to bring a stuffed animal from home, including toy birds, turtles, bears
2. Place the transparent bag in an aquarium, with a plastic fish or plastic turtle
3. Ask the students how the bag could create a problem for the animals living in the sea. Demonstrate how the fish or the turtle can get trapped in the plastic bag.
4. Have the students share the animals they brought to class
5. Have the students use the plastic bags, six-pack holders and other litter to demonstrate ways that the animals could get hurt by using the litter.

Part II (Suggested for grades 2 to 4)

1. Make sure each student has a shoebox, spoon, cup, wildlife "food" and dried beans.
2. Have each child take a shoebox and add 1 ½ cups of the birdseed or popcorn. Explain that this represents the food that wildlife such as fish or ducks may eat.
3. Have the students add ½ cup of the dried beans to the shoebox. Explain to students that this represents trash, such as plastic, that has wound up in the environment as litter.
4. Explain to students that they are about to feed from their shoeboxes. The spoons represent their mouths, while the cups are their stomachs. They need to "eat" as much food as they can in 30 seconds. Start the timer and go!

5. When time is up, have the children examine their cups for any trash that was mistakenly eaten. As an option you may have students create a table or pie chart to show the amounts of trash and food that was eaten.
6. Discuss with students what they think may happen to an animal that ingests plastic or other litter. Do they get sick? Are they able to feed as well? You may approach this by asking students what would happen to them if they ate plastic. Use the aquarium as a demo as appropriate.
7. You may also choose to do multiple rounds of feeding as a game.
 - a. Have students create data sheets in order to record the amount of natural food and plastic litter consumed. Have one column for the plastic litter and the other for natural food.
 - b. After a round of "feeding" have students analyze their food. If $\frac{1}{4}$ or more of the food they ate was plastic, the plastic blocks the student's digestive tract and they "die." Continue for several rounds.
8. Ask students how they can help keep animals safe from litter, and what actions they will personally take.

Part III – All Tangled Up (Suggested for grades K to 4)

1. Animals do not have to eat trash in order to be harmed by it. Discuss the term entanglement with students, and explain that they are going to become entangled today. Using the plastic fish or turtle, discuss and show some common ways that animals may become entangled, in plastic bags, monofilament fishing line and plastic rings from soft drinks.
2. Make sure each student has a rubber band. Show them the proper way to put it on their hand.
 - a. Hold your left hand up in front of your face, with the back of your hand towards your face.
 - b. Hold the rubber band in your right hand and hook one end of it over the little finger of your left hand.
 - c. Hook the other end of the rubber band over the left-hand thumb. The rubber band should be taut and resting across the bottom knuckles on the back of your left hand.
 - d. Place your right hand on the bottom of your left elbow, and keep it there.
3. Have students try to free their hand of the rubber band without using their right hand, teeth, face or other body parts.
4. While the students are struggling, ask the class to imagine that they are animals that have gotten pieces of fishing line, abandoned net or other trash wrapped around their flippers, beaks, or necks. Tell them: imagine that you are birds that are unable to eat until they are free from the trash. Ask the students the following questions (Encourage students to share their feelings about being entangled as they answer these questions):
 - a. How would you feel after struggling like this all morning?
 - b. How would you feel after missing breakfast?
 - c. What would happen if you continued to miss meals and spent all of your strength fighting to get free?
 - d. What would happen if a predator was chasing you?
5. Discuss what students can do to help prevent problems like entanglement. If they see any trash, they should pick it up, cut up plastic soda rings before disposal, and recycle monofilament fishing line whenever possible.

CALL TO ACTION

1. Ask the students to create a poster asking their school community to help keep animals safe by properly disposing of their litter.
2. Encourage students to create a recycling program for harder-to-recycle items like plastic grocery bags and monofilament fishing line.
3. Have students make a pledge to reduce the amount of trash they produce by using reusable grocery bags and water bottles.

OTHER RESOURCES

- **Lasell, Fen H. Kiya the Gull.** Reading, Mass: Adison-Welsey Publishing Company, 1969. **A boy rescues a gull that became injured in a tangled fishing line**
- **Learn more about Marcus Erikson's work at** <http://www.5gyres.org/>
- **Background Material Source:** http://www.humanesociety.org/news/magazines/2009/07-08/the_deadly_truth_about_trash.html
- **Instructions for building a monofilament collector** <http://www.boatus.org/monofilament/>
Mail collected monofilament to:
Berkley Recycling
1900 18th Street
Spirit Lake, Iowa 51360
- **Keep Louisiana Beautiful** <http://keeplouisianabeautiful.org/>
- **Keep America Beautiful** <https://www.kab.org/>
- **Activities modified from "Marine Wildlife and Harmful Trash" from the National Park Service, and "Mistaken Munchies" from the Marine Mammal Center.**