Lesson 1

ALL LITTER HARMS ANIMALS

Lesson Focus

In this two-part lesson students will learn two ways that plastics are hazardous to animals, especially birds: the harmful effects of microplastic ingestion and entanglement in litter.

Lesson Objective

- Students will be able to explain how wildlife can easily mistake microplastics for food.
- Students will be able to give reasons why all litter is hazardous to wildlife no matter how small it is.
- Students will be able to describe how entanglement can be deadly to animals.

Grade Level	Duration	Subject Area	Vocabulary
K-5	1 Hour	Science	litter, consume, hazard, microplastics, entanglement

Louisiana Student Standards for Science

K-ESS3-3

Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

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 change as well.

5-ESS3-1

Generate and compare multiple solutions about ways individual communities can use science to protect the Earth's resources and environments.

Materials List - Explore - Part 1

Per Student

- 1 small paper bag (send this bag home a week before the lesson for students to collect plastic wrappers from home)
- 1 bowl
- 1 bottle of glue or a glue stick
- 1 rubber band
- 1 copy of ***Activity Sheet #1***

Per Group

- A dinner-size paper plate (pour a cup of the birdseed / microplastics mixture on it)
- 2-3 sets of colored pencils to share
- 2-3 rulers with metric units to share

Per Class

- 2 lb. bag of birdseed (rice may be substituted)
- 1 cup of microplastics (5mm or less cut from students' plastic collection bag)
- Large mixing bowl

Materials List - Explore - Part 2

Per Student

- 1 rubber band
- 1 spoon (preferably reusable)
- 1 copy of ***Activity Sheet #2***
- National Geographic Article, **10 Tips to Reduce Your Plastic Use** https://kids.nationalgeographic.com/nature/kids-vs-plastic/article/10-tips-to-reduce-your-plastic-use (view online or make copies)

Per Group

- Birdseed from **Part 1**
- A dinner-sized paper plate from **Part 1** (pour a cup of the birdseed on it)

Per Class

- Book: **Harry the Snakebird** - A copy is available to borrow from all Louisiana public libraries or can be purchased from https://keeplouisianabeautiful.org/shop

Activity Sheets

- The Hazards of Microplastics
- The Hazards of Entanglement

Advance Preparation

1. A week before you teach this lesson, give each student a small paper bag to take home. Ask the students to fill the bag with clean plastic trash items such as wrappers from candy, chips, toys. The bag does not have to be full. They should bring the bag of plastics back to school two days before the lesson is taught.
2. Cut some of the plastic trash items into tiny pieces (5mm or less) to make the microplastics for this lesson. Approximately 1 cup of microplastics will be needed for a class.
3. Mix the microplastics with 2 lbs. of bird seed in a large bowl.
4. Group tray setup:
    - 1 cup of the bird seed and microplastic mixture poured on a paper plate
    - 1 small bowl for each student
    - 2-3 sets of colored pencils for students to share

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- Make copies of ***Activity Sheet #1***
- 2-3 rulers with millimeters (these will be used in the **Explain** part of this lesson)

Background Information

In this lesson students learn about two ways that litter is a **hazard** or a danger in the environment that could seriously harm wildlife. **Litter** is defined as any type of waste that is discarded inappropriately. Litter, especially plastic, can harm wildlife in two ways: ingestion and entanglement.

Pieces of plastic that are smaller than 5mm across are called **microplastics**. Because microplastics are tiny and absorb odors, animals often mistake microplastics for food and **consume** or eat them. Microplastics remain in the animal's stomach causing a feeling of fullness. The animal, feeling full, may stop eating and eventually starve to death. Over time harmful chemicals can leach out from microplastics and enter the animals' tissues.

Another way that plastic litter can harm animals is through entanglement. **Entanglement** occurs when litter becomes wrapped around an animal and restricts the animal's ability to move. Once entangled, these animals cannot free themselves. If the litter is entangled around a beak, limb, or their neck, they can grow in deformed ways, have difficulty getting and eating food, escaping from predators, and eventually die. According to National Oceanic and Atmospheric Administration (NOAA) entanglement of marine life is a global problem that results in the death of hundreds of thousands of aquatic birds, marine mammals, and sea turtles worldwide every year.

Even if you don't litter, your trash could still end up causing problems if it falls out of a trash can or blows out of a garbage truck. One excellent way to prevent trash from entering the environment is cutting back on the waste we produce on a daily basis. If you want to take an extra step, consider cleaning up the trash already in our environment (Martin and Silling, 2021).

References

- National Oceanic and Atmospheric Administration (NOAA) Fisheries. (No date). Entanglement of Marine Life: Risks and Response. Available at https://www.fisheries.noaa.gov/insight/entanglement-marine-life-risks-and-response
- Silling, C., Martin, K. (November 15, 2021). Plastic Kills Birds: Learn Why and How You Can Help. Available at https://abcbirds.org/blog21/plastic-kills-birds

Procedure

Engage – 5 Minutes

1. Distribute the material trays and ***Activity Sheet #1***.
2. Explain to your students that they will pretend to be birds today.
   - **What do most birds eat?** *Seeds, berries, worms, and insects*
3. Have students examine the mixture on their plate.
   - **What is in the bowl?** *Birdseed and some tiny pieces of plastic.*
   - **Are the tiny pieces of plastic food?** *No.*

- **Will they help the bird grow big and strong?** *No.*
- **Do you think that birds might eat the plastic pieces? Why or why not?** *Yes, birds might eat both the birdseed and the plastic pieces because they are both tiny and the birds might not know the difference.*

Explore - Part 1 - *The Hazards of Microplastics* - 20 Minutes

1. Explain to students that they will pretend that they are a flock of birds eating a mixture of birdseed.
2. Ask the questions:
   - **What tools do you use to eat?** *We use knives and forks.*
   - **What does a bird use to eat?** *Birds use their beaks.*
3. Demonstrate how to make a bird beak with your fingers (see picture). Explain to students, that they are to eat as much seed from the plate as they can with their bird beak in three seconds. The seed they eat with their beaks should be placed into their bowls. They continue eating until you say, STOP. The bowl represents their stomach. When they put the seed in their bowl, they are consuming or eating the birdseed.

4. When the three seconds are up, instruct your students to examine the contents of their stomachs (the seed in the bowls). Then, on ***Activity Sheet #1***, in **Circle 1** draw what they see in their bowls using colored pencils. Students should notice the tiny plastic pieces. Visit groups as they observe and draw. If they don't notice the microplastics, point them out.
5. Next, students will pick out and count the microplastics. Then, they will glue the microplastics in **Circle 2** on ***Activity Sheet #1***.
6. Students will record the number of microplastics on ***Activity Sheet #1*** in the blank.
7. Students will answer the two questions on ***Activity Sheet #1***.

Explain - Part 1 - 10 Minutes

1. Begin the discussion by asking the following questions:
   - **What did you see in your bowl?** *Birdseed and pieces of plastic.*
   - **Do you think that a bird would eat plastic? Why?** *Yes. It's hard to separate the plastic pieces from the birdseed when eating. The plastic pieces are tiny and look like birdseed.*
   - Explain to students that tiny pieces of plastic that are 5mm or less in size are called microplastics. Show students the length of 5mm on a ruler. Give students two to three minutes to measure a few microplastics with their rulers. After examining and measuring them, students should glue the microplastics in **Circle 2** on ***Activity Sheet #1***.
   - Have students save the birdseed for **Part 2**.
2. Ask the questions:
   - **How could eating or consuming these microplastics harm birds?** Accept students' responses and explain the following information: *Swallowed plastics often cannot pass through animals' digestive systems and cannot be broken down by their stomach acids. As a result, plastics can accumulate in animals' stomachs, causing them to stop eating and starve (Martin and Silling, 2021). Also, the microplastic pieces do not have the nutrition that animals need to survive.*
   - **Could other animals like turtles and fish consume plastics while feeding?** *Yes. Any animal could easily mistake microplastics for food because it looks and possibly smells like their food.*

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Explore - Part 2 - *The Hazards of Entanglement* - 20 Minutes

1. **For the first feeding:**
   - Students will make a beak with their fingers and eat birdseed as they did in **Part 1.** Remind students to put the seed that they have eaten in their bowls.
   - Students will measure the "eaten" or consumed seed (seed in their bowls) by filling their spoon with seed and counting how many spoons they fill.
   - As students count the spoonfuls of seed, they should carefully pour each spoonful in a pile on their desks.
   - Students will then record the number of spoonfuls consumed in the **Feeding 1** space on ***Activity Sheet #2***.

2. **For the second feeding:**
   - Students will repeat the above eating process, but this time their beaks will be "entangled" by a rubber band (see picture).
   - Have students wrap a rubber band around the end of their fingers and thumb twice (about ½" behind the fingernails).
   - Be sure to check each rubber band. The rubber band should hold the fingers together snuggly but should not be too tight. They should be able to open their fingers at least ½".
   - Explain that the rubber band represents litter entangling the bird's beak.
   - Students will eat as much birdseed as possible with their "entangled beaks" in 3 seconds. Remind students to put the seed they have eaten in their bowls.
   - Students will measure the "eaten" or consumed seed (seed in their bowls) by filling their spoon with seed.
   - Students will then count and record the number of spoonfuls in the **Feeding 2** space on ***Activity Sheet #2***.
   - Show students how to subtract the numbers from their data table.

Number of **Spoonfuls in Feeding 1**
— Number of **Spoonfuls in Feeding 2**

Difference ____

Explain - Part 2 - 10 Minutes

1. Ask:
   - **Describe your experience of "feeding" with your beak entangled by a rubber band.** *In the second feeding I ate fewer spoonfuls of seed. It was hard to pick up the seed when I could barely open my beak.*
   - **In which feeding were you able to eat more birdseed?** *Students should report that they could eat more birdseed in Feeding 1 because they could open their beaks more.*
   - **Why is entanglement deadly to animals?** *Once entangled, these animals cannot free themselves. If the litter is entangled around a beak, limb, or their neck, they can grow in deformed ways, have difficulty getting and eating food, escaping predators, and may eventually die.*
2. Use the ***Harry the Snakebird*** book that can be found at all libraries (see materials list), to tell the true story of a bird called an Anhinga. Read this book aloud to your students.

3. Open **Harry the Snakebird** to the section in the book entitled, Meet the Real Brian and Marie. Show your students the photographs of the real characters, litter in the lake, and other birds entangled in litter. Then, read these pages to your students and discuss how the real Marie and Brian worked to make the lake a safer place for wildlife by removing litter from Capitol Lake. This book should be available for students to read or for the teacher to read aloud later.

Expand – 30 Minutes *(Optional)*

1. Watch LPB's Critters Don't Litter video to learn that small things like picking up a candy wrapper can help keep wildlife safe. This site also has links to background reading and discussion questions.
   - **PBS Learning Media. Critters Don't Litter** https://lpb.pbslearningmedia.org/resource/critters-dont-litter-wildlife-video/untamed-the-wildlife-center-of-virginia (26:37)
   - Learn about one of the biggest impacts that humans have on their environment—Litter. It isn't just an aesthetic problem; it has serious impacts on habitats, wildlife health, as well as human health and safety. The consequences of even small acts of littering can be far-reaching and long-lasting. Join the Wildlife Center staff and watershed conservation authorities to learn more about the problems litter can pose, as well as a variety of ways that you can help reduce litter. Ages 5 years to Adult.
2. Students should read these two **National Geographic Kids** articles (online or printed copies).
   - **Plastic Pollution** https://kids.nationalgeographic.com/nature/kids-vs-plastic/article/pollution-1
   - **10 Tips to Reduce Your Plastic Use** https://kids.nationalgeographic.com/nature/kids-vs-plastic/article/10-tips-to-reduce-your-plastic-use
3. Ask the question: **Based on this video and what we have learned from our readings and lessons, how can we reduce litter to help protect wildlife?**
   - *Reduce use of single-use or disposable plastics (refuse straws, use a reusable water bottle, etc.).*
   - *Dispose of plastic and other litter properly and never litter.*
   - *Pick up litter on land before it gets to the waterways.*

Take Action

1. Plan a School Litter Clean Up Day.
   - Explain to students that the best ways to protect wildlife from hazards of litter is to reduce our plastic waste and pick up the litter at home and school.
   - Divide your class into teams of four to five students. Give each team a copy of your school map. Explain that you are taking them on a ten-minute walk around your school campus to locate "litter problem" areas. As you find these areas, each group is to mark the areas on their map.
   - When students return to the classroom each group will choose an area that they marked as a "litter problem" area to clean up. As a class, develop a plan for a "school litter clean up day." The **Mapping School Litter** lesson in this guide can be used for their "school litter clean up day."
   - The litter cleanup could be done at recess. You will need to supervise what students pick up and provide gloves and trash bags.

Evaluate

1. Students' answers on ***Activity Sheets #1*** and ***#2***.

Online Resources

National Geographic Kids. **Plastic Pollution.**
https://kids.nationalgeographic.com/nature/kids-vs-plastic/article/pollution-1
This is a short article that explains that plastics are a useful material that has become a problem due to overuse and improper disposal especially of single-use plastics. The article explains how litter makes its way to the ocean. Ages 8 years to Adult.

National Geographic Kids. **10 Tips to Reduce Your Plastic Use.**
https://kids.nationalgeographic.com/nature/kids-vs-plastic/article/10-tips-to-reduce-your-plastic-use
This article lists and explains 10 ways to reduce your plastic use, particularly single-use plastics. Ages 8 years to Adult.

National Oceanic Atmospheric Administration (NOAA) Fisheries. **Entanglement of Marine Life: Risks and Response.** https://www.fisheries.noaa.gov/insight/entanglement-marine-life-risks-and-response
This article explains the risks that marine debris, particularly plastics, pose for wildlife. It explains how wildlife gets entangled in plastic, and what NOAA Fisheries is doing to reduce entanglements. Ages 10 years to Adult.

Children's Books

Carbo, W. (2022). **Harry the Snakebird.**
Ally-Gator BookBites Publishing House. ISBN 979-8-9860811-1-3
This book is based on a true story of Harry the Anhinga, commonly called a snakebird. Readers learn about the hazards of entanglement through the story and the actions the characters took to make the Baton Rouge Capitol Lake a safer place for wildlife. Ages 5 years to Adult.

Din, R., & Din, C. (2020). **Lily Litter-Picker and The Whale.**
Monkey in a Barrel Publishing. ISBN-13: 978-1838017828
Readers will meet Lily, a determined eco-warrior. She discovers a whale on the beach that is full of rubbish dumped into the sea. Ages 4 - 10 years.

Galat, J.M. (2023). **Too Much Trash: How Litter Is Hurting Animals.**
Orca Book Publishers. ISBN-13: 9781459831827
Readers will discover how garbage ends up everywhere — from city streets and the wilderness to farmland and the ocean. But there's good news: litter is a problem everyone can help prevent. Find out how you can help clean up the planet for all species. Ages 9 - 12 years.

Harrison, J. (2019). **Lol: Leave Zero Litter.**
Janet Harrison Publisher. ISBN-13: 978-1916021778
This story encourages children to get involved in planet Earth's future by making them aware of the distress animals encounter from plastic, glass, and litter, enabling them to make changes — no matter how small. Ages 3 - 10 years.