45 Minutes

Plastics in our Environment

4th - 6th

PDF Guide

Students will observe and consider the effects of plastic pollution on animals through a hands-on activity. Using the scientific method as a guide, students will ask questions, gather information, form and test a hypothesis, analyze their data, and present their conclusions in a variety of ways.

Program Details

Targeted SOLs

- English 3.6, 3.10, 4.4, 4.5, 4.7, 4.9, 6.4, 6.5
- Science 3.1, 3.8.a, 4.3, 6.1, ES.1
- Math 3.2, 4.2.b, 4.3.d, 4.4.b, 6.1, 6.2, 6.5

Supplies Needed

- Bag of beads in multiple colors
- 2 plates per group of students
- 1 bowl per group of students
- Scrap paper and pencil

Set-Up

Prepare an experiment station for each group of students. The station should include 2 plates (label one “Stomach” and the other “Used Food”) and 1 bowl of beads (there must be at least two different bead colors). Identify which bead color(s) will represent food and which color(s) will represent plastic.

Program Outline

1. Discussion

- What is litter? What materials or items are often found as litter?
- What happens to plastic when it is littered?
  - Plastic is a manmade material, and it is not the same as a natural material like paper, cardboard, or metal.
  - When plastic litter begins to decompose in the environment, it breaks into smaller and smaller pieces, releasing harmful chemicals, rather than being decomposed by microorganisms in soil, bugs, and animals.

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- How does litter affect animals?
  - Animals get tangled in litter, such as fishing line, plastic bags and cords, containers, boxes, jars, bottles, etc.
  - When animals are searching for food, they can accidentally ingest litter, including paper, metal, plastics, or microplastics.
- What can happen to an animal that eats a lot of plastic pieces?
  - The plastics do not move through animal's stomach and digestive systems as quickly or safely as food does. It could cause harm to their organs or cause them to get sick due to chemicals and bacteria the litter carries.

2. Explain the Activity

Students will pretend to be animals eating food in the environment. They will grab 3 handfuls of beads, which represent the food animals find in their natural environment. They will place these beads on the plate labeled "Stomach". Some of these beads are digestible food, but others represent plastic particles. They will repeat the activity until they have grabbed a total of 9 handfuls of beads.

3. Form a Hypothesis

Have students write a hypothesis for what could occur during the activity. Some examples include:

- If we grab 9 handfuls of beads, then 30% of our digestive system will be plastic.
- If we grab 3 handfuls of beads, then 60% what we grabbed will end up on the used food plate.

4. Gather Data and Test the Hypothesis

1. After grabbing all 3 handfuls of their "meal", students should measure the food particles by number or by weight. Then, measure the plastic particles.
2. Students should calculate the percentage of plastic versus food in the stomach during each round (% of plastic in stomach = number of plastic beads in the stomach ÷ total number of beads in the stomach)
3. After measuring, students will move only the food beads from the "Stomach" plate to the "Used Food" plate. The plastic beads remain in the stomach, modeling the failed digestion of the plastic particles.
4. Pour the beads from the "Used Food" plate back into the bag of mixed beads that represent food animals find in their natural environment.
5. Students should repeat steps 1-4 two more times, for a total of 9 handfuls of beads moving through the "Digestive system".

5. Analyze the Data

Students should summarize their observations both verbally and written, then draw conclusions to accept or reject their hypothesis. Guide them to draw line or bar graphs to visualize the change in ratio of food versus plastic over each feeding period.

- Discuss the students' findings with the class. Did most of the groups find the same results?
- Using the students' results, create a graph with all the data to show and discuss. Overall, what was the result? What changes occurred over time?

6. Discussion

- Did your hypothesis match the results?
- What could happen to an animal if they ingested the number of plastics modeled in the activity?
- What are some things that can be done to reduce plastic and litter in the environment?

7. Conclude

Thank students for listening and learning.

Supplemental Activities for Plastics in our Environment

- Have the students create an informational and persuasive poster for reduction of plastic use.
- Have students write a letter to their school, local businesses, or their families urging them to reduce their use of single-use plastic.

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