

Sea Turtles and Plastics



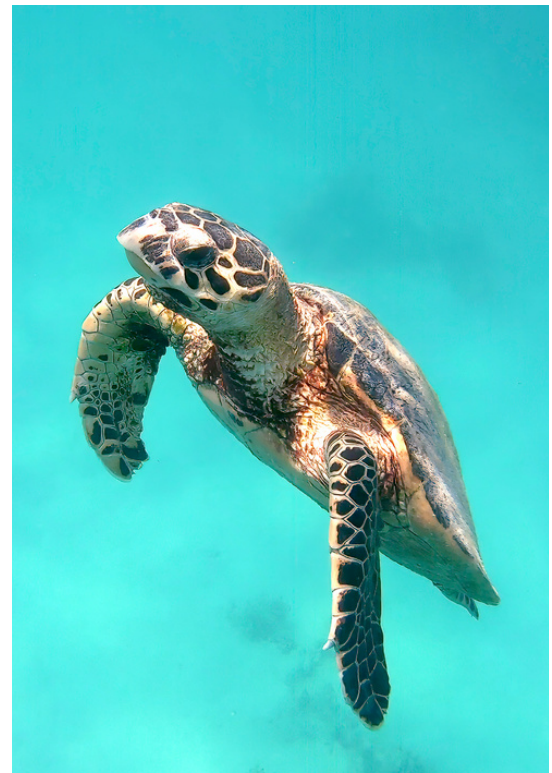
Objectives:

- Students will be able to discuss ways in which plastic pollution enters the oceans.
- Students will be able to discuss the ways in which plastic pollution impacts sea turtles.
- Students will be able to discuss ideas to reduce plastic pollution.

Grade Level: 9th, 10th, 11th and 12th Grade

Subject Area: Science

Lesson Duration: One to two 50 minute class periods



National Education Standards:

- HS-ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. Students will design an invention or a new/novel way to reduce plastic waste.
- HS-ETS1-2: Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. Students will design an invention or a new/novel way to reduce plastic waste.
- HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. Students will design an invention or a new/novel way to reduce plastic waste.

Teacher Information:

Plastic in our oceans poses a serious threat to sea turtles. They can become trapped or tangled in plastics or ingest it by mistaking plastic for food. Plastic can get into our oceans in a number of ways, but the most popular route is by river. Garbage on streets can get washed into storm drains. Many storm drains lead right into waterways. Sewage treatment plants can overflow into rivers and streams. People sometimes throw trash directly into the water.

If students are made to be aware of the amount of plastic they use, they can come up with ideas for how to reduce that use.



Lesson 1: Exploring Plastic Waste

Materials:

- A container with all of the following items for each group: latex balloon, 5 strings, 13 plastic items about the size of a quarter
- Computers or copies of the article found at <http://www.seaturtle.org/plasticpollution/>
- Pictures of plastic pollution in the ocean or computers for students to search for images

Exploring Plastic Waste (50 minutes):

- Put the students into groups of 4 or 5.
- Give each group a container with all of the materials listed.
- Ask students to come up with ideas of why they might be looking at the collection of materials.
- Allow students to share their ideas.
- Give students a copy of the article or ask them to view it online. Ask students to read the article.
- Allow students to discuss the article within their groups.
- Ask the class to share thoughts from their groups.
- Talk with the students about how plastics and other garbage end up in our oceans.
- Ask students what they might know about how plastics might affect sea turtles. They may come up with ideas such as: they get tangled in nets or they mistake plastic for food (both of which can lead to death). Discuss that sea turtles eat plastic, often mistaking it for food. A plastic bag may look like a delicious jellyfish. Eating plastic is a danger to sea turtles as the plastic may block their gastrointestinal system causing them to die.
- Optional: Click on the link to Image Library at the top of the website of the article. Show students images of turtles and plastic they ingested. **Please view the photos ahead of time to determine which are most appropriate for your group of students.**
- Ask students to go back to their small groups and create a list of all the plastic they use and throw away in one week. After giving the groups time to create a list, ask the groups to share with one another.
- As a class, generate a list of ideas for how we can reduce the amount of plastic we throw away. Write this list somewhere visible to the class. Students should easily come up with ideas such as using reusable cloth bags to shop with or drinking tap water instead of buying water in plastic bottles.
- Ask students to return to their small groups to complete a short project. Give the groups the task of coming up with an invention or a new and novel way to reduce plastic waste. Students should evaluate prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Conclusion (5 minutes):

- Invite students to share one thing they found most interesting or surprising about how sea turtles are impacted by plastic.

Assessment:

- Evaluate students' participation in group discussion.
- Review projects for completeness and accuracy. Students should have taken into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.



Lesson 2: Tracking Plastic Use

Materials:

- Plastic Tracking Worksheet (provided)
- The Big Plastic Picture Worksheet (provided)
- Computer with a projector or student computers
- Calculators

Tracking Plastic Waste (35 minutes):

- One week prior to beginning this lesson, ask students to track the amount of plastic they use in one week using the Plastic Tracking Worksheet provided in this lesson. Allow students to keep the sheets anonymous to increase their accuracy in answering truthfully.
- Collect the Plastic Tracking Worksheets and calculate the average total amount of plastic used per student in a week, the averages for the number of plastic bottles used in one week, and the total number of recyclable plastic items used in one week. You will need to provide the students with these numbers when they complete The Big Plastic Picture.
- Hand out copies of The Big Plastic Picture Worksheet to each student or one per group. Give students the numbers you averaged from the Plastic Tracking Worksheet. Students will also need to know how many students are in the school and how many people are in their community.
- Give students time to complete the sheet.
- Go over and discuss their answers. Ask students for their reactions to the information.

Assessment:

- Ask students to write a short reflection essay about their reaction to the numbers on The Big Plastic Picture Worksheet. They should include a discussion on how we can reduce those numbers.

Extensions:

- Communication Arts Connection
- Have students conduct research on garbage patches in the oceans.
- Earth Science Connection
- Have students analyze ocean currents and their connection to the location of garbage patches.
- Chemistry/Biology Connection (for more advanced students)
- Have students research what happens to plastic as it degrades in our oceans. Students will discover that plastics do not go away, but instead become smaller and have many negative impacts in their smaller state.
- Art/Home Economics Connection
- Have students make their own reusable bags from old shirts:
<http://www.marthastewart.com/266942/t-shirt-bag>

Resources:

- www.BillionBabyTurtles.org
- www.education.nationalgeographic.com/education/encyclopedia/great-pacific-garbage-patch/?ar_a=1
- www.whoi.edu/science/B/people/kamaral/plasticarticle.html
- www.seaturtle.org/plasticpollution/
- www.terracycle.com/en-US/



These materials are provided by SEE Turtles. SEE Turtles helps save sea turtles through conservation tours, supporting important nesting beaches, working to end demand for turtleshell, helping clean up plastic waste from turtle habitats, educating people about how to help these animals, and promoting inclusivity in the turtle community. For lesson plans, fundraising ideas, online presentations, and field trips, please visit www.seeturtles.org/schools. For more information, please contact Brad Nahill, SEE Turtles Director, at brad@seeturtles.org or 5800-215-0378.



Name: _____

Date: _____

Plastic Tracking Worksheet

Directions: Over the next 7 days, you will tally the number of plastic items you throw away or recycle in one week.

	Recyclable Plastic Bottles	Plastic Food Wrappers (including candy wrappers)	Recyclable Plastic Bags (such as grocery bags)	Non-Recyclable Bags (ie – sandwich bags)	Other Items (including wrappers of non-food items)
Day 1					
Day 2					
Day 3					
Day 4					
Day 5					
Day 6					
Day 7					
Total From Each Column					

Total Number of Bottles from the Week: _____

Number of Non-recyclable Plastic Items from the Week: _____

Total Number of Recyclable Plastic Items from the Week: _____

Total Number of Recyclable Bottles from the Week: _____

Name: _____

Date: _____

The Big Plastic Picture Worksheet

1. What is the average number of plastic items from your class in one week?

2. How many students are in your school?

3. Based upon the average number of plastic items from your class, how many plastic items are thrown away or recycled in one week by all of the students in your school?

4. Find out how many people are in your community. How many items are thrown away or recycled by your community in one week?

Name: _____

Date: _____

The Big Plastic Picture Worksheet

5. That is just one week's worth of plastic. How much would be thrown away or recycled in one year.

6. One easy way to cut down on plastic waste is to drink from a reusable bottle. How many bottles are thrown away or recycled on average by each student in one week?

7. Based on the number you calculated in number 6, about how many bottles would not end up in our trash or need to be recycled in one year if all people drank from reusable bottles?

8. How many recyclable items total were thrown away or recycled in one week?