



Cause and Effect - Human Impact on Sea Turtle Populations: How a Plastic Bag in Kansas Can Harm a Sea Turtle in the Atlantic Ocean

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Background: Students have difficulty understanding how their actions impact the world around them, whether dealing with social media or with environmental concerns on the other side of the planet. Today's school-age generation will face challenges unlike those faced by previous generations when making decisions that impact the balance between the needs of humans with the needs of wildlife. This lesson uses a real-world problem to explore the cause and effect relationship between humans and species decline. This lesson is centered on the status of sea turtle populations, but it can be easily extended to include other species. The lesson can be broken into smaller components or you can complete just one portion of the activity.

One cause of death in sea turtles worldwide is the ingestion of plastic. Plastic can prevent the turtle from eating or absorbing nutrition. Plastic bags are especially troublesome because if they reach the ocean, they look like a favorite food of many sea turtles – jellyfish. These bags end up in the ocean through littering from land or boats and from bags that get caught in the wind or in rivers and carried to the sea, sometimes traveling thousands of miles. The beginning of the journey for every bag begins with a human. Students will think of many ways that humans inadvertently contribute to bags reaching the ocean. They should be able to contribute many ideas about how to keep the bags out of the ocean, including reducing use, recycling and reusing.

Intended Audience: Grades 5-8, with simple adjustments for reading levels

Objective: Students will understand how to define an environmental concern by its cause and effect relationship with humans with supporting evidence. They will understand how their daily choices do make a difference.

Preparation: The Tour de Turtles website contains all research information needed for this activity. The activity works best if students have access to the Internet for research. It is recommended that teachers download the Educator's Guide from the Sea Turtle Conservancy's website for background information on sea turtles before beginning the lesson. Students should be told before beginning the lesson that they may see images of dead sea turtles as evidence of human impact.

Activity:

1. *15-30 minutes.* Explain to students that they will be exploring cause and effect relationships between humans and nature. This may be a good time to review symbiosis between organisms if it has been covered in the past. Using a page in a science notebook or on a worksheet (see below), print and pass around the images, without notes, below. Pictures should be separate and numbered and it is okay to have multiple copies of each image. Students should be provided less than three minutes to view each image and fill in one line on the chart and should not talk or share ideas during this time. In the first space, the student writes the number of the picture. In the next space they write what they think happened. In the next, they write what they predict happens next. In the last, they should write one question they have about the picture. After the time limit you set ends, ask students to pass the image to another student without talking. Make sure each student views and takes notes on at least three images. After the time limit for all images is up, discuss with students their written ideas and questions before sharing what is actually happening in the image.

2. *1 hour.* After the discussion about the images, including their original predictions and their questions, explain that the students will break up into groups (any size group will work) to create a flow chart showing the steps of how a plastic shopping bag can travel from your hometown to the ocean. Students should have access to maps that show rivers and their tributaries for the U.S. If students have studied air currents and weather patterns they will be able to contribute some creative ideas. You can provide a brief demonstration in class with a shopping bag to show how easy it is to keep them in the air. Students may need to be told about street drainage systems. All flow charts should begin with a human and end in an ocean current. Allow student groups to share their ideas after the time limit is up. They can end in any ocean. A bag in Kansas can end up in the Caribbean or in the Pacific. The chart can be shown with drawings (like a graphic novel) or with text. At the end, discuss cause and effect. Big question: How can a human prevent a bag from reaching the ocean?
3. *1-2 hours.* Students work collaboratively to explore the “Causes” tab on the home page of the Tour de Turtles website. They should choose one cause and create a flow map using the information provided to show human cause and the sea turtle effect. Each group should present their chart to the class. After each presentation, students should discuss possible solutions to the problem using evidence from the site.
4. *10 minutes, repeating.* Groups can follow their cause’s turtle (each turtle from Tour de Turtles represents a cause!) online until there is a winning turtle announced on the website.

Extensions:

- The winning turtle’s cause can be turned into a class research project resulting in a public service campaign
- Lessons on satellite tracking can be found on the teacher’s section of the website, including plotting coordinates
- Go beyond sea turtles with cause and effect
- Individual reports on sea turtle species
- Discussions on the impact of students on global concerns. How can they become involved in a cause in which they believe strongly?
- Adopt a tracked sea turtle as a class and monitor the progress of its migration
- After the race is over, the lesson can be repeated with archived races
- Students can design a product that reuses plastic bags

Resources:

<http://www.tourdeturtles.org> The official website of Tour de Turtles. Track turtles fitted with satellite transmitters. Teacher tab has lessons and the Sea Turtle Conservancy Educator Guide. ***Educator’s Guide location!!!!

<http://www.conserveturtles.org/educators> Sea Turtle Conservancy website. Educator’s Corner has multiple activities available at no charge as well as ways to get involved in Sea Turtle Conservation. Lots of historical sea turtle tracking information in addition to turtles currently tracked for Tour de Turtles. Adopt Sea Turtle information. ***Educator’s Guide location!!!!

Standards:

Common Core State Standards - English Language Arts:

CCSS.ELA-LITERACY RI.5.1, RI.6.1, RI.6.7, RI.6.8, RI.7.1, RI.7.3, RI.7.7, RI.7.8, RI.8.1, RI.8.7, RI.8.8, RST.6-8.1, RST.6-8.8, RST.6-8.9, SL.5.1, SL.5.2, SL.5.3, SL.5.4, SL.5.5, SL.6.1, SL.6.2, SL.6.3, SL.6.4, SL.6.5, SL.7.1, SL.7.2, SL.7.3, SL.8.1, SL.8.2, SL.8.3, SL.8.4, SL.8.5

NEXT GENERATION SCIENCE STANDARDS:

MS-LS2-1, MS-LS2-2, MS-LS2-4, MS-LS2-5

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Image Number	What happened?	What happens next?	What questions do I have about this image?



Image from Sea Turtle Conservancy

TEACHER NOTES: This loggerhead sea turtle ingested a plastic bag and most likely suffocated or was prevented from eating. At first glance, it appears that the turtle is alive and has just crawled ashore, but this turtle is dead. Evidence in the picture to support that the turtle is dead is that the scutes (scales on the top shell) have fallen off. Living loggerheads have a dark brown carapace (top shell).



Image from www.mnn.com

TEACHER NOTES: This is a plastic bag under water that looks very similar to a jellyfish. There is other plastic floating in the water as well.



TEACHER NOTES: Plastic bag caught in an air current. We've all seen this before and your students most likely have as well. You can bring in a bag and demonstrate this in the classroom as well.



.©Flickr/Bag Monster

TEACHER NOTES: Sea turtle is about to attempt to eat a plastic bag in the water.



Image from seaturtle.org

TEACHER NOTES: Shape of sea turtle formed with plastic and other debris removed from the stomach of a dead sea turtle.