Lesson 6: How Do Human Activities Affect Sea Turtles?

Description: Students will learn about some of the many ways that human actions have impacted sea turtle populations worldwide.

Objectives:

By the conclusion of the activities, students will

- Have an increased awareness about the problem of marine debris
- Be able to list steps that they can take to help sea turtles by reducing marine debris
- Understand stewardship of waterways and watersheds.
- Understand the connectedness of communities from inland to the coast.

You will need:

- Copies of chapter 6, *How Do Human Activities Affect Sea Turtles?* for each student.
- Word wall words (pages 6-12 to 6-14)—printed, cut out and laminated (if desired)
- For Activity 1
    - 1 small cup (about 9 oz) or bowl per child
    - About 1 cup of play sand per child
    - Single color of plastic beads (e.g. pony beads; 10 per child; any color will work)
    - Second color of plastic beads (10 per child; any color will work, as long as it is different from the other color beads)
    - Spoons (1 per child)
    - Small plates or napkins (1 per child)
    - Timer or stopwatch (online countdown timers are available)
    - (Optional) Sieve
    - (Optional) Seed beads (any colors)
- For Activity 2
    - One item of cleaned trash per student (plastic bags, deflated balloons and fishing line are good items to include).

Standards:

Florida Sunshine State Standards-

English Language Arts

- **LAFS.5.RI.2.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.

Mathematics

- **MAFS.5.NBT.1.4** Use place value understanding to round decimals to any place.

- **MAFS.5.NBT.2.6**. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

NGSS-

- **5-ESS3-1** Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Common Core Standards-
English Language Arts

- **RI.5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.

Mathematics

- **NBT.A.4.** Use place value understanding to round decimals to any place.
- **NBT.B.6.**Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Vocabulary:

Beach nourishment: Adding sand to a beach to replace sand that washed away.
Bycatch: Animals that are not what the fisherman is trying to catch.
Entanglement: The act of becoming tangled up in something.
Eroding: Being affected by erosion. (Perhaps review that erosion is the movement of sand, soil or rock by wind or water.)
Poaching: Hunting animals or their eggs illegally.
Runoff: Water from rain or snow that flows over the surface of the ground and finally into streams.
Trawl: A type of fishing net that is dragged behind a boat.

Procedure:

1. Add words for this lesson (pages 6-12 to 6-14) to your sea turtle word wall. Review these words with students (definitions are given in Vocabulary, above).
2. Have students read "How Do Human Activities Affect Sea Turtles?" (Chapter 6 in *One in a Thousand: Those Amazing Sea Turtles*).

Activities:

There are four suggested activities to accompany this chapter:

Activity 1: **Food or Plastic?** (pages 6-4 to 6-5), students will discover how easy it is for a marine animal to eat plastic instead of food.

Activity 2: **It's All Downstream from Here** (pages 6-6 to 6-8) shows how trash travels through a watershed.

Activity 3: **Marine Debris Math** (page 6-9) has students perform division using data from the International Coastal Cleanup.

Activity 4: **Trapping Trash** has students design devices to remove marine debris. This is Lesson 2 in NAMEPA Educator's Guide to Marine Debris which can be downloaded from https://marinedebris.noaa.gov/sites/default/files/publications-files/NAMEPALearningGuideFinal.pdf

Food or Plastic?

In this activity, students will discover how easy it is for a marine animal to eat plastic instead of food.

Materials:
- 1 small cup (about 9oz) or bowl per child
- About 1 cup of play sand per child
- Clear plastic beads (e.g. pony beads; 10 per child; any color will work)
- Blue plastic beads (10 per child; any color will work, as long as it is different from the other color beads)
- Spoons (1 per child)
- Small plates or napkins (1 per child)
- Timer or stopwatch (online countdown timers are available)
- (Optional) Sieve
- (Optional) Seed beads

Procedure: (NOTE: because this involves sand, you may want to do this activity outdoors with students sitting on the ground or at picnic tables).

a. Measure out (or have students measure out) about ½ to ¾ cup of sand into each cup or bowl.
b. Have students add their 20 beads (10 of each color) to their cup/bowl. (If you want, you can have the bowls or cups set up ahead of time).
c. Give each student a spoon. Instruct students to stir the sand CAREFULLY to mix in the beads. They should not shake the cups (this will make the beads rise to the surface).
d. Give each student a small plate, napkin or small container.
e. Explain to students that they are all sea turtles. The cup represents their feeding area. The sand represents the water and the beads are food items in the water.
f. Explain that you will be giving them 20 seconds to find as many food items as they can. The cup must stay on the ground/table top, but they may hold onto it with one hand. They will use the spoon to scoop food items out of the sand and put them onto their small plate.
g. Set your timer for 20 seconds. Have students swap cups (this is not necessary, but may stop kids from failing to mix their beads in very thoroughly!). Say “go” and start your timer.
h. After 20 seconds, call out “stop.”

i. Ask students to count the number of each color of bead, and the total number of beads on their plate. Have them record these numbers on a piece of paper.
j. Have students mix the beads back into their cups of sand.
k. Explain that you are going to repeat the process, but that this time, one of the colored beads will be pieces of plastic (pick a color) and the other color beads will be food items. The turtles want to avoid eating pieces of plastic.
l. Repeat steps g-i.
m. Ask students to compare the total number of pieces collected the first time with the total number collected the second time. Was it harder to collect food because they had to avoid the plastics?
n. If you want, you can repeat this, but adding in a spoonful of seed beads. These tiny beads represent the tiny pieces of plastic (microplastics) in the ocean that result from the breakdown of larger pieces, or come from personal care products that contain plastic microbeads. (If you want, you can show them examples of products that contain polyethylene—search for that term on the Household Products Database at the website http://householdproducts.nlm.nih.gov/).
o. Have students mix the all the beads (pony and seed) into their cups of sand.
p. Repeat steps g-i, but also have the students report if they collected any seed beads. Remind them to look inside the holes of the pony beads for any microplastics.
q. Lead a discussion with your students (or ask them to provide you a written response) based on the questions, “Do you think it is possible for sea turtles to avoid plastic completely in the ocean? Why or why not?”

It's All Downstream from Here

This activity is modified from *Traveling Litter* in *Educator's Guide to Marine Debris: Southeast and Gulf of Mexico*. http://marinedebris.noaa.gov/sites/default/files/TheEducatorsGuidetoMarineDebris_SE%20and%20GoM%20Education%20Kit.pdf.)

You will need one item of cleaned trash per student.

1. Have students line up in a straight line with each student holding 1 piece of clean garbage.

2. Designate the student at the far left of the line as "upstream" (or the headwaters), designate the student at the far right of the line as the "ocean", and all students in between represent the many tributaries and water bodies from the headwaters to the ocean.

3. Read the following story. As the story progresses, have the upstream (headwaters) student pass his/her trash to the next student, that student will pass both pieces of trash to the 3rd student, and so on down the line until it all reaches the last student. The last student, representing the ocean, will be left holding and juggling all pieces of trash.

Story for "It's All Downstream From Here":

On a recent vacation, I visited a community near the St. Johns River. During my week-long visit, I noticed visitors throwing trash on the ground. The wind was blowing paper plates and napkins into the nearby stream. (PASS ONE PIECE OF GARBAGE) When asked why they were littering, they replied, "It's OK, as it's all downstream from here." As their picnics continued, more winds blew more trash and litter into the stream. (PASS ONE PIECE OF GARBAGE) The lightweight paper objects floated away and the stream quickly cleared up and appeared as if no litter had been dumped into the water at all! Where did it go? I was curious and decided to see where it went, so I packed my belongings and followed the stream in search of the garbage.

I spent the night in another town located along the St. Johns River, which connected to the tributary that I had visited that morning. As I was eating dinner, I noticed various people sitting by the stream flipping cigarette butts into the water. (PASS ONE PIECE OF GARBAGE) As cigarette butts contain harmful chemicals that can make animals sick if ingested, I yelled for them to stop. They replied, "Don't worry; it's all downstream from here!" (PASS ONE PIECE OF GARBAGE) In an instant, the litter had been carried out of sight by the swift stream current. (PASS ONE PIECE OF GARBAGE) Where is this litter going? The next morning, I continued on my

journey to find where this garbage was going. It has to end up somewhere and what does this "somewhere" look like?

As evening came, I ended up in a large city, known as Jacksonville, which is located along the St. Johns River. What a magnificent sight to watch the sun set over such a beautiful waterway! After a good night's rest, I woke up to enjoy a delicious breakfast along the river and noticed a boat owner changing his oil with his boat in the water. Worse yet, he dumped the oily refuse straight into the river! "STOP!" I yelled. He replied, "What's your problem? It's all downstream from here!" In a few moments, the outgoing tide had taken the oily water out to the ocean and only a slight rainbow pattern appeared on the surface of the water. (PASS A PIECE OF GARBAGE DOWN THE LINE UNTIL ALL GARBAGE ENDS UP WITH THE LAST STUDENT. COMPLETE THE STORY.)

Heading downstream on the St. Johns River, I ended up on a barrier island known as Fort George Island. It seemed like a clean little area, but the residents seemed very angry. As I walked out along the marsh, I understood why they were so angry. I saw all the residents walking the beautiful grassy saltmarsh with huge bags! Were their shellfish that plentiful? NO! They were picking up paper plates, napkins, and cigarette butts that had washed up on the shoreline.

I asked one of them what had happened and he told me that the trash comes from upstream each day and collects out in the ocean. With each high tide, litter is deposited in the wrack line along the coast. Problems have also resulted from unseen pollution; such as E. coli and Enterococci bacteria. He continues to talk and discuss various times that the area beaches have closed due to high levels of bacteria entering the rivers, wetlands, and oceans after high rainfall events. The bacteria that result from wildlife and pet wastes left on the ground, or from leakage into waterways from failing septic systems can be really harmful to swimmers.

"It seems that the folks upstream don't understand that rivers and streams are part of watersheds that eventually meet up with the ocean. Along the way, their garbage and lazy practices pollute waterways and negatively affect water quality. When all the pollution accumulates, this bioaccumulation greatly affects the wildlife and human health. Their garbage does end up somewhere, just somewhere away from them!"

Observations:

- Ask the student representing the ocean, how it felt to be left balancing everyone's trash?
- Which of the trash items used in the scenario could have been recycled or reused?

- As our trash fills the land at nearby landfills, we must destroy new habitats to create new landfills. How can you reduce the amount of trash removed from your home each week?
- How can your watershed be affected by pollution?
- Which items can be labeled as biodegradable? Which ones are non-biodegradable?

After conducting this activity, share with students the top ten items found in the most recent Coastal Cleanup (see http://www.oceanconservancy.org/our-work/international-coastal-cleanup/ and click on the report or infographics to find this list and the quantities). Explain that every year, on the third Saturday in September, people all around the world volunteer to collect trash on beaches and that these data are collected and sent to the Ocean Conservancy. Challenge your students to come up with ways to prevent these items from getting into the ocean. Have students create posters to teach people what actions they could take to help reduce a specific type of marine pollution.

Name: _____

Marine Debris Math

Use this data from the 2014 International Coastal Cleanup to calculate how much trash was found per mile of beach in each location (US state or country). To do this, divide the number of pieces of trash (in hundreds) by the number of miles (in hundreds). Write your answers in the last column.

Location	# of hundreds of pieces of trash collected	# of hundreds of miles cleaned	# of pieces of trash/mile (rounded to the nearest whole number)
Florida, USA	7,150	9	
Hawaii, USA	2,327	1	
India	4,499	2	
Jamaica	5,074	1	
Japan	1,937	2	
North Carolina, USA	1,029	13	
Puerto Rico	4,828	3	
United Kingdom	2,273	7	

Marine Debris Math Answers

Location	# of hundreds of pieces of trash collected	# of hundreds of miles cleaned	# of pieces of trash/mile (rounded to the nearest whole number)
Florida, USA	7,150	9	**794**
Hawaii, USA	2,327	1	**2327**
India	4,499	2	**2250**
Jamaica	5,074	1	**5074**
Japan	1,937	2	**969**
North Carolina, USA	1,029	13	**79**
Puerto Rico	4,828	3	**1609**
United Kingdom	2,273	7	**325**

Trapping Trash

This is an activity where students design devices to remove trash from the ocean (Lesson 2 in NAMEPA Educator's Guide to Marine Debris http://marinedebris.noaa.gov/sites/default/files/NAMEPALearningGuideFinal.pdf)

Poaching

Bycatch

Trawl

Entanglement

Eroding

Beach

nourishment

Runoff