



Lesson 16: North Atlantic right whales and ship strikes

Objective: Students will learn why ship strikes are a threat to North Atlantic right whale survival, and what conservation measures are in place to reduce this threat.

You will need:

- Ability to project PowerPoint presentation
- Copy of PowerPoint presentation, “*Slow Down, Whale Crossing.*”
- Speakers
- For the activity:
 - An area (like a hallway or outside lawn) that is around 10ft wide and 30ft long: this is the designated “shipping lane”
 - Optional: flagging tape or painter’s tape to mark off “shipping lane” area
 - Materials to make id tags or costumes for students playing “right whales” (about ¼ of the students)
 - Materials to make id tags or costumes for students playing “ships”
 - Baseball cap, hat, or visor to wear for students playing the “ship’s captain” (optional)
 - Materials to mark the edges of the “shipping lane”, including a starting line and a destination port at the far end of the marked area (examples: sidewalk chalk, paint, crayons, string, cones, colored tape)
 - Writing utensils for “right whale” students
 - Copies of the “*Ship Strike Tally Sheet*” (page 16-7; one for each “right whale” student)

Sunshine State Standards: SC.4.E.6.5; SC.4.L.17.4

Vocabulary: Ship strike, Shipping port, Shipping lane, Mariner, Aerial survey, Knot, Nautical mile

Strategy: There is an instructional PowerPoint presentation and an (optional) activity that reinforces concepts introduced in the presentation.

Presentation: *Slow down...whale crossing* (PowerPoint)

Teacher Script

- Slide 1. This presentation contains background information on North Atlantic right whales and ship strikes; and the conservation methods put into place in order to decrease right whale deaths due to ship strikes.
- Slide 2. [Read slide] Why do you think there are so few North Atlantic right whales in the ocean today compared to years ago? [Write student responses on the board. *Hunting, entanglement and ship strikes are all good answers.*]
- Slide 3. In this lesson, we are going to focus on the threat of ships and boats (also called vessels) hitting whales.



- Slide 4. *[Read slide]*. Vessel strikes are one of the greatest human-caused threats to North Atlantic right whales. Whales can be killed if they are cut by propellers and also from the force of being hit by the vessel.
- Slide 5. The ocean is very large, and there are not very many right whales. So why do so many of these whales get hit by boats?
- Slide 6. North Atlantic right whales are vulnerable to being hit by vessels because of where they live and migrate (their habitat), their appearance (in other words, what the whales look like), and their behavior. We will discuss each of these separately.
- Slide 7. As we have learned in other lessons, North Atlantic right whales migrate along the east coast of the U.S. from their northern feeding and mating ground to the southern calving area. Right whales are often found within 20 miles of shore. Many ships and boats pass through this area as they come into port or move offshore.
- Slide 8. Shipping ports are places where ships and boats can dock to load and unload what they are carrying. The southeastern US is home to some of the biggest shipping ports in the world. Many shipping ports, like Boston, Massachusetts and Jacksonville, Florida are near areas where right whales spend a lot of time.
- Slide 9. Even though we do not have roads in the ocean, ships often use specific routes to travel from one place to another—we call these routes “shipping lanes.” Ships use shipping lanes because they have deep enough water, the currents go in the right direction, and so on. Many shipping lanes are located in the North Atlantic right whale habitat.
- Slide 10. Large ships are not the only type of vessel that can hurt right whales. Whales can even be killed if they are hit by a small recreational boat.
- Slide 11. Why does the right whale’s appearance make it likely to be hit by a ship? Mariners (people in charge of sea-going vessels) have a hard time seeing the whales in the water because they are dark in color, and they don’t have a dorsal fin to stick out of the water.
- Slide 12. How does a right whale’s behavior make it likely to be hit by a ship? Right whales tend to stay near the surface of the ocean, and they usually only have a very small portion of their head (and sometimes back) sticking out of the water when they breathe.
- Slide 13. Like other marine mammals, whales do not know that boats can be dangerous to them. Have any of you ever seen a wild animal crossing a road? These animals often do not realize that cars can hurt them. Even if a whale did know that a ship was dangerous, ships are often traveling faster than the whales, so it would be difficult for the whale to get out of the way fast enough.
- Slide 14. *[Read slide]*
- Slide 15. There are many conservation efforts to help protect North Atlantic right whales. These include the Early Warning System, laws and regulations such as the Ship Strike Reduction Rule and No Approach Rule, as well as extensive education and outreach for mariners and boaters. We are going to talk more about each of these.
- Slide 16. To try and help protect North Atlantic right whales, a program called “The Early Warning System” was started in 1993. The Early Warning System relies on planes flying over the North Atlantic right whale’s critical habitat areas to perform aerial surveys. These surveys are done in the calving area in winter months and in the feeding grounds at other times of the year. People in the planes act as “spotters” and use binoculars to



- look for whales in the water below. If an aerial surveyor spots a right whale, they relay the GPS location of the whale to everyone in the area who should know to look out for a whale. “Everyone in the area” includes commercial mariners, U.S. Navy, harbor pilots, Army Corps of Engineers, U.S. Coast Guard, port authorities, and recreational boaters. What this means to a ship captain is that if they receive a radio notice that there is a whale nearby, they have to assign a crew member to look for the whale. They also need to communicate with other ships in the area in case one of them spots the whale. This helps everyone figure out exactly where the whale is. The ships need to avoid the whale, and should not steer in a direction that would put the ship in front of the whale. The closer a ship is to a whale, the more it needs to slow down. This is so that if the ship accidentally does hit the whale, it hopefully will not hurt the whale badly.
- Slide 17. In 2008, the Right Whale Ship Strike Reduction Rule was started. This rule requires ships that are more than 65 feet long (about 10 feet longer than a right whale!) to slow down to 10 knots (about 11.5 miles/hour) when in certain areas at certain times of the year.
- Slide 18. In the next couple of slides, we will see where the right whale ship strike reduction rule is in effect. Off the northeast Florida and Georgia coasts, ships must go slowly during calving season. From November 1 through April 30, ships entering major ports along the east coast of the US between Georgia and Massachusetts must slow down because there could be migrating right whales present.
- Slide 19. Off Boston and Cape Cod, right whales may feed year-round. If whales are present, ships must slow down no matter what time of year it is.
- Slide 20. The No Approach Rule helps protect right whales from being disturbed by humans. This is especially important for mother whales that are pregnant or nursing newborn calves. The rule says we must not move towards or remain within 500 yards of a right whale....that’s as long as 5 football fields. If a mother whale is scared by a vessel, kayaker, surfer, paddleboard, Jet Ski or even a swimmer, she may swim away and leave her calf. The baby right whale cannot survive without its mother. Also, if vessels keep 500 yards from right whales, this minimizes the chance that they will hit a whale.
- Slide 21. Many groups try to teach people about right whales so that everyone can help protect them. We can all do our part to tell other people what we know.
- Slide 22. We are going to watch two videos that were created to help teach people how they should behave around North Atlantic right whales. [*Click on video clip to play it (video is 60 seconds long, and has narration, so you will want to have your sound turned on.)*] What is the important message taught by this video? [*Answer: People need to stay 500 yards away from right whales.*]
- Slide 23. Let’s watch another video. [*Click on video clip to play it (video is 630 seconds long)*] What is the message of this one? [*Answer: Boats need to slow down when whales are nearby.*]
- Slide 24. Why do we have all of these rules in place? We want to try and help the endangered North Atlantic right whale population continue to grow in size. In the last ten years or so, the estimated population of these whales has increased by about 100 or more individuals! You may have noticed that the videos we just watched said there were as



few as 400 North Atlantic right whales. They were made a few years ago. We now think there are at least 450 of these whales in the North Atlantic.

Activity “Slow Down...Whale Crossing!” Follow the activity directions below to have students demonstrate why ship strikes are a threat to right whale survival, and how the North Atlantic right whale recovery depends upon reducing ship strikes. Students should have heard and seen the accompanying PowerPoint presentation before starting this activity.

Set up:

- Find an area (approximately 10' x 30') to use as the “shipping lane.” Mark the edges of the shipping lane, the starting line, and a destination port at the end
- Divide students into groups of “ships” and “right whales”. Assign about $\frac{1}{4}$ of the class to be “right whales”. Assign the “ship” students to groups to represent different-sized ships (try groups of 1, 3 & 7). Each ship will have one student to represent the “ship’s captain”. Use id tags or costumes to represent the different groups of whales and ships. (Optional) Use a hat to represent the captain of each ship.

Instructions to “ship” students: Have students line up in their “ship” groups. They should place their hands on the shoulders of the student in front of them and bend their elbow to get closer together. Have the students tilt their heads forward to look at their feet. The “ship’s captains” should be located at the front of the ship. The “ship’s captain” should put on a baseball cap, hat, or visor so while looking down at their feet they can only see a few feet in front of them. (Note: to achieve the same result students can shield their eyes as if wearing a visor). Explain that by letting the students see only what is right in front of them, they are simulating the fact that right whales are hard to see because their dark bodies blend in with the ocean and normally only a small part of their body shows above the surface.

The “ships” will start at the front edge of the “shipping lane” and try to move in straight lines towards a “destination port”. Explain that ships try to move in lines to their destinations as straight as possible because it saves time and fuel.

The “ships” may deviate from their path in order to avoid hitting a “right whale”. In order for a ship not to hit a whale the “ship’s captain” must spot the whale and give the directions, “**right whale spotted, turn left**” (or **right**). “Ships” should try to steer behind the “right whales” whenever possible. “Ships” may slow down when turning to avoid a “right whale”; however, they may not stop and must speed back up to their original pace after their evasive maneuver. Single student “ships” should act the same as the students at the front of the larger ships, but they will not need to give verbal directions in order to perform an evasive maneuver.

Instructions to “right whale” students: The “right whale” students will crawl on the ground with the heels of their hands pressed against their knees or simulate another way for them to move slowly just like right whales. Ask them to space themselves out in the “shipping lane” and move around, stopping for periods to rest. Tell the students not to try to avoid being in the path of a “ship”, because it does not appear that right whales take evasive action to avoid being hit by oncoming



vessels (Note: to avoid student injury tell “right whale” students and “ship” students not to actually collide, just simulate the act). Give the “right whale” students the “Ship Strike Tally Sheet” and a writing utensil, and ask them to keep track of: 1.) How many times a “ship” hits them and what size the ship was 2.) How many times a “ship” narrowly missed them and what size the ship was.

Simulation 1: Business as Usual

Have your “ship” students make a run through the “seasonal management area” (aka the shipping lanes) while walking fast. “Right whale” students should make their tallies in the “Stimulation 1” tally chart. After all of the “ships” have reached the destination port bring all of the students back together and combine the ship encounter tallies from all the “right whales”.

Look at the tallies as a class and ask the students:

1. Which ships posed the greatest danger to the “right whale” students? i.e. Which ships hit or narrowly missed the right whales?
2. Did the “ships” of different sizes have different abilities to maneuver around the “right whales”?
3. Ask the “ships” that hit or narrowly missed a “right whale” why they had trouble avoiding the “right whales.”
4. Did the “ships” have enough time to avoid the whales?
5. Would it have been easier to avoid the right whales if they had some kind of warning system?

Simulation 2: Early Warning System

Hand the tally sheet back to the “right whale” students and have them redistribute in the “shipping lane”. Tell them to stay still while the other students mark an area with about a five foot radius around each “right whale” student (Note: Leave these markings in place after Simulation 2 because they will be used in Simulation 3 as well). Bring all of the students back together and explain that these marked areas function similarly to the Early Warning System.

Tell the “ship” students that when they see the marked boundary around where a “right whale” was recently seen, it is like a ship being notified by the Early Warning System. Tell the “ship’s captains” that they may choose to look up and/or slow down when they see a marked boundary. When the Early Warning System was first implemented, mariners were requested, but not required, to take extra precautionary measures when a whale was reported in their area or along their path of travel. These precautionary measures included posting extra lookouts for whales and reducing ship speed. Instruct the “ships” to resume their positions and the “right whales” to return to the middle of their respective marked areas with their tally sheet. This time, they should make their tallies in the Simulation 2 tally chart. Point out to the “right whale” students that if they are hit or narrowly missed by a “ship”, they should differentiate on the tally sheet whether the “ship” was traveling fast or slow. This differentiation is labeled on the Simulation 2 tally chart for ships of all sizes. Instruct the “right whale” students to move about as they had in Part 1. Let them know that it is their decision whether or not they stay within their marked area.



As in Part 1, have your “ship” students make a run through the shipping lane while walking fast. After all of the “ships” have reached the destination port, bring all of the students back together and combine the ship encounter tallies from all the “right whale” students.

Look at the new tallies as a class and ask your students:

1. How are the new results different from the results of Part 1?
2. Why might these results have been different?
3. Were there any ships that still posed the danger to the “right whales”?
4. Again, ask any “ships” that hit or narrowly missed a “right whale” why they had trouble avoiding the “right whales.”
5. Did the “ships” still not have enough time to avoid a “right whale”? Why or why not?
6. Were they going too fast to slow down or turn in time?

Simulation 3: Right Whale Ship Strike Reduction Rule

Explain to the students that in the last part of this activity they will simulate the conditions of the Right Whale Ship Strike Reduction Rule. Tell your students that all but the single-student ships are required to reduce their speed and slowly walk through the shipping lane. Single-student “ships” may choose their speed (slow or fast). Point out to the “right whale” students that if they are hit or narrowly missed by a single-student “ship”, they should differentiate on their tally sheet whether the “ship” was traveling fast or slow. This differentiation is labeled on the Simulation 3 tally chart. Instruct the “ships” to resume their positions and tell the “right whale” students to return to the middle of their respective marked areas. Instruct them to move around as they did in Part 1 and 2.

Have your “ship” students make a run through the shipping lane simulating the Right Whale Ship Strike Reduction Rule. After all of the “ships” have reached the destination port, bring all of the students back together and combine the ship encounter tallies from all the “right whale” students.

Look at the new tallies as a class and ask students:

1. How are the new results different from the results of Parts 1 and 2? How are they similar?
2. Why might these results have been different?
3. Were there any ships that still posed the danger to the “right whales”?
4. Again, ask any “ships” that hit or narrowly missed a “right whale” why they had trouble avoiding the “right whale.”
5. Is there anything else those “ships” could have done to help them to avoid the “right whales”?

Evaluation Suggestions:

Use your student’s participation in the reflection discussions at the end of each activity section to evaluate whether or not they understand how the results of their simulations relate to right whale conservation.

Activity based on *Shipstrike Rule lesson plan* by Jessica Hardy, NOAA Fisheries, Marine Mammal Education Intern, Summer 2010



Student name: _____

Ship Strike Tally Sheet

(Record the number of each type of ship that hits or almost hits a whale)

Simulation 1 "Business as Usual"	Small Ship	Large Ship	Huge Ship
"Hit"			
"Narrowly Missed"			

Simulation 2 "Early Warning System"	Small Ship		Large Ship		Huge Ship	
	slow	fast	slow	fast	slow	fast
"Hit"						
"Narrowly Missed"						

Simulation 3 "Right Whale Ship Strike Reduction Rule"	Small Ship		Large Ship	Huge Ship
	slow	fast		
"Hit"				
"Narrowly Missed"				