

The Great Sea Turtle Rescue

Activity Description:

Students listen to presentation about oil spills (with the Buzzards Bay Oil spill as a reference). There is an introduction to a hazardous material clean-up, and students join in a relay race to rescue sea turtles from demise.

Students Will:

- Learn about the affects of oil on sea turtles
- Recognize the difficulty in restoring habitats after an oil spill
- Relate abstract ideas about oil spills to recent Cape Cod history

Take Home Message:

The oil that leaks or is dumped into the oceans directly affects the animals that live there

Massachusetts Frameworks:

Life Science

- Organisms are adapted to their habitats #5
- Food Chains and Webs #6

Supplies:

- 1 large plastic/glass beaker or shallow tray
- Water
- Vegetable oil spray
- Paper towels/ plastic hair curlers- stuff with “absorbent” materials.
- Container of motor oil
- Oil spill pictures
- 2 stuffed turtles
- Black nylon stockings
- Painted beans (“oil”) and strips of black felt
- Haz Mat Collection Tools : bean bins, dust pans, broom
- Gloves, goggles, aprons
- Ocean/Island/Beach props
- Turtle Eggs, “Bead Sand” and Plastic Containers to hold them
- Oven/ Egg Hatchery

Set-Up

Set up the beaker/tray with a few inches of water in it, with the oil container next to it. Bury ping pong balls in beads in egg buckets. Set up the turtle relay race. Home base (the Wildlife Sanctuary) at start, Hazardous Waste Clean-up (the Fire Station) bin to one side, ocean with island in the middle w/ egg buckets on beach, turtles off to side of home base.

Background Science and Vocabulary

Please refer to the science sections on wildlife and oil spills.

Activity Procedure/Script

Have you ever stopped to think what oil is used for?

Everyone uses oil a lot. The whole world used nearly 3 billion gallons of oil every day. We all use it to fuel our cars, trucks, buses and even to heat our home. You can find examples of oil at a toy store, hardware store, or drugstore because oil is made into plastics, which could be any of your toys or ipods. Oil is also used in the production of medicines, paints, polyester clothing, and to generate electricity. We can all help reduce the risk of oil spills by reducing our use of oil-based products. This means that not only would we use less oil, but less oil would be used to transport all of those oil-based products as well.

Tell students they are going to learn about how oil spills can affect marine life. Tell the students they are going to see what happens when you spill oil in water.

- Squirt spray of oil on the water surface

Ask them if they notice what is happening

- The oil spreads out and floats on top. The water molecules are more strongly attracted to each other (cohesion) than they are to the oil molecules and so the oil and water molecules don't mix
- The oil molecules are less dense than the water molecules and so they float on top of the water forming an "oil slick." This is also what happens when water is spilled in the ocean.

Have them guess how big an oil slick could be created by spilling just a quart of oil

- The oil would spread out very quickly and cover an area about as big as 3 football fields
- One quart of oil can contaminate 250, 000 gallons of drinking water

Does anyone know how sea turtles could be affected by oil in the water?

- The oil could coat them, but that is not the biggest concern...
- Other effects of oil spills on turtles include:
- Digestion/absorption of oil through food contamination or direct physical contact, leading to damage to the digestive tract and other organs.
- Females may refuse to nest on an oiled beach, and crossing it could cause external oiling of the skin and carapace.
- Eggs may be contaminated, either because there is oil in the sand high up on the beach at the nesting site, or because the adult turtles are oiled as they make their way across the oiled beach to the nesting site. Oiling of eggs may inhibit their development.
- Newly hatched turtles, after emerging from the nests, make their way over the beach to the water and may become oiled.
- If eggs are exposed to fresh oil during the last half to last quarter of the incubation period, there is a significant decrease in hatchling survival. If hatchlings do survive to emerge from the nest, they tend to have developmental deformities.

- Oil could prevent oxygen from getting through the sand to the eggs and could change the nest incubation temperature, which could negatively affect the development of the baby sea turtles.
- <http://www.conserveturtles.org/seaturtleinformation.php?page=oilspills>

Is it bad for humans to drink gasoline?

- Just as people don't want to drink gasoline, turtles don't either.

Ask them if they've heard of any big oil spills.

- Some may have heard of Exxon Valdez in Alaska in 1989, which spilled over 11,000,000 gallons of oil, covering an area of 1000 miles of shoreline and killing over 250, 000 sea birds and otter.
- Also, Deep Water Horizon in 2010 in the Gulf of Mexico. During this oil spill, about 210 million gallons of oil were released, and 609 dead sea turtles were found and 535 turtles were rescued from the oil and cleaned off and 397 of those were later released.
- Tell them that we've had oil spills right here on Cape Cod (you don't have to list them all, the main one that is important to talk about is the 2003 event)
 - Sept. 1969, a tanker, the Florida, spilled about 200, 000 gallons of oil into Buzzards Bay. It closed Wild Harbor in West Falmouth to shell fishing for more than 20 years and is still affecting fiddler crabs in the salt marsh today.
 - Dec. 1976, the Argo Merchant ran aground off Nantucket and spilled more than 7 million gallons
 - Nov. 1989, 2, 000 gallons of fuel oil spilled into the Cape Cod Canal when tank was unloading.

Buzzards Bay Oil Spill 2003

- April 27, 2003, A Bouchard Transportation Co. Barge, heading toward the power plant in Sandwich, struck an underground ledge and spilled 98,000 gallons of oil
- The oil leaked into the ocean and reached land contaminating more than 100 miles of shoreline
- 450 birds died immediately, but there were also more long-term effects. For example, even if they didn't die, many birds lost their habitats and thus had no place to nest or raise young.
- Also, 90,000 acres of shellfish beds closed affecting many people's livelihood)
- Luckily, no turtles were caught in the spill, though cold-stunned sea turtles do get stranded on Cape Cod

Tell them that cleaning up oil spills can be difficult and involves many different processes.

- If a tanker leaks in the ocean officials will often put up a containment boom to prevent further spreading of the slick (show example of a boom).
- Since the oil floats in a slick the first step is to try and skim it off the top of the water

- Once oil reaches the shore things become even more complicated as they have to try and clean up land and animals too. This involves removing oil-saturated materials if possible (for example: sand) and soaking up liquid. Workers have to wear special “Tyvek” suits to protect themselves. (Show them picture from Cape Cod times, and sample tyvek suit if we still have one available.)
- Sometimes, officials spread chemicals to force the oil to break down. But, the chemicals are also dangerous and not good for marine life.
- Oil is sneaky; it hides in crevices...on some beaches 5 years later still finding rocks with oil spots

Have students use available materials to try and soak up the oil from the water, they might use paper towel, or float the “booms” to absorb the oil.. Show the students the real “pigs” and other absorbant materials.

How do they rescue the turtles? (show pictures)

- These turtles are very stressed, cold, hungry, exhausted, and sick. It’s important to give them food and medicine before trying to wash the oil off or they may die.
- Turtles are cleaned off with Dawn dishwashing soap sometimes. Proctor and Gamble, the company that makes dawn, has made countless donations to help oil soaked animals.
- Also, rescuers will use mayonnaise to wipe off the oil, because the oil in the mayo attaches to the oil on the turtle. The turtles are also fed mayonnaise, because the mayo will bind with the oil in the turtles’ stomachs and help the turtle get rid of all the oil in its’ system.
- Finally, in most situations rescuers don’t want to move nests of eggs in the sand, because that can be bad for the baby turtles. However, faced with thousands of hatchling having to cross oil soaked sand to get to oily water, rescuers in the Gulf recently decided to move turtle eggs to non-oily beaches. They have to do this very carefully, not rotating or jostling the eggs at all, however even the danger of moving the eggs is less than if the hatchlings had to be born into an oil-soaked world.

Ask students, Do you think that using booms with mayonnaise might work to clean up the oil on the water? Yes, why? No, why not? (no, will disperse in the water)

We’ve talked about big oil spills from tankers that have been in a collision or grounded on the ocean floor, but most oil gets into our water in other ways. Can you think of a few examples?

- Over half of oil pollutions comes from oil dumped in the ground or washed into storm drains
- Jest skis, motor boats
- Natural seepage off the ocean floor and eroding sedimentary
- Smoke from oil consumption in automobiles and industry. Typically the oil hydrocarbons find their way into the ocean through atmospheric fallout.

Ask the students what are some things they can do to prevent oil spills, large or small.

- Properly dispose of boat and motor vehicle oil by taking it to a town transfer station. Don't ever dump it...keep oil absorbent pads in your boat in case of an oil spill
- Have the car serviced at a location where it can be properly disposed
- Use less electricity and gasoline. Think about how many lights you have on in your house. Also think about all the electronics like computers or televisions. All of these things use electricity. If we all turn off lights, computers, or televisions when not in use, we wouldn't be using as much oil to create electricity throughout the house.
- Use less oil based products like plastics.

Next is the relay race. Be enthusiastic!!

Set up Stations for the relay race in advance:

- 1) Ocean and beach: blue tarp with buckets of eggs on it to represent beach
- 2) Spill material in a "drum"- beans, strips of black felt and black nylon socks
- 3) Cleaning station: small inflatable wading pool, brushes, "soap"
- 4) Spill Response Station: aprons, gloves, goggles, bin with "pigs", brushes
- 5) Home Base-Wildlife Sanctuary: a chair is fine, with turtles off to side

As students gather (coming from the oil slick activity)- initiate the Spill event: An Irresponsible Party ruptures drum into ocean (throw beans into ocean)

Tell the students:

"Now, we're going to have a little adventure. Let's pretend we're all walking on the beach in Louisiana on the Gulf of Mexico (Show Map). We're having a great time, and we even see some endangered sea turtles on the beach. (Show pictures of sea turtles). We recognize these sea turtles as Kemp Ridley sea turtles, because those also get stranded on Cape Cod. But all of a sudden we notice that there is an oil slick on the water, and fragile turtle eggs buried in nests on the beach. We're the first on site, and it just so happens that we are all trained in dealing with hazardous materials like oil, and are experienced turtle rescuers, so we all volunteer to save the turtles from the oil! Now let's race to see who can save the turtles the fastest."

Note: Please mention that if a student should come upon a stranded turtle on the beach, call the Wellfleet Mass Audubon, and do not touch or move it!

Steps in the Relay Race- divide students into two teams of 2-3 people (if groups of 5 one AC member should join one of the teams to even things off) Students sit or stand at home base (a chair will do for this)

Describe the steps in the relay race:

- 1) for a 2 person relay- all start at the base station

Student A: Run to spill response station and don protective gear, run to ocean and contain the spill with the pigs, run back to base. Pick up brush and dust pan, run to the spill site & sweep up the beans, bring back to the spill response station and empty into hazard materials collection bin, take off protective gear- run back to base.

Student B: ride turtle to nest, uncover nest carefully, move eggs into container without tipping or rotating the eggs, cover eggs with sand, carry container carefully back to the base without the container tipping or being jostled.

Both students: transfer eggs from egg container to incubator

Winner must be sitting first!

2) for a 3 person relay- all start at the base station

Student A: Run to spill response station and don protective gear, run to ocean and contain the spill with the pigs, run back to base – give protective gear to student B

Student B: Put on protective gear, run to the spill response station, Pick up brush and dust pan, run to the spill site & sweep up the beans, bring back to the spill response station and empty into the hazardous materials collection bin- run back to base.

Student C: ride to nest, uncover nest carefully, move eggs into container without tipping or rotating the eggs, cover eggs with sand, carry container carefully back to the base without the container tipping or being jostled.

All: transfer eggs from container to incubator

Winner must be sitting first!

Clean-Up

During the Festival

- Dump oil water and replace with clean... (Don't fill tray all the way...the less water you use the better since we're trying to teach them about water conservation!)
- Return everything to where it started at the beginning of the race

After the festival

- Dump out pans
- Clean and dry everything thoroughly
- Clean off eggs, pick up wayward beans, and pack up everything into its proper containers

Something to Note:

If the relay race is too difficult or too time consuming for the students, the race can be done without cleaning up the beans and felt pieces.