

# The Great Penguin Rescue

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

## **Students Will:**

- Learn about the affects of oil and how it changes the way a bird's feathers work
- 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:**

- Feathers: 2-4 per student
- 2 large plastic/glass pans
- Water
- Vegetable oil
- Paper towels
- Container of motor oil
- Oil spill pictures
- 2 stuffed penguins
- Black nylon stockings
- Painted beans ("oil")m and strips of black felt
- Haz Mat Collection Tools : bean bins, dust pans, broom
- Avian cleaning Materials: Inflatable pool, "soap" brushes
- Icebergs- pop-up structures covered in snow-white sparkly felt
- Gloves, goggles, aprons

## **Procedure:**

### **Set-Up**

Set up one pan with about 1-2 inches of water in it. Place a few paper towels next to the pan. On the other side of the table, place a second pan with about 1-2 inches of water. Place the large container of feathers on the back edge of the table, near the presenter. Set up the penguin relay race. Home base at start, Hazardous bin to one side, pool in the middle, penguin icebergs at the end. Cover the penguins in "oil" and place them on their icebergs.

### **Background Science and Vocabulary**

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

### **Activity Procedure/Script**

(For the most part the "Oil Slick" script can be used)

### **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 b/c 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 create some electricity. We can

all help reduce the risk of oil spills by reducing our use of oil based products (and therefore reducing the need to transport them).

**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.**

- Put a few drips of oil into one pan of water

**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

**Ask them why birds need feathers**

- Feathers provide many important features for birds including waterproofing, insulating, and flying
- The bird's feathers overlap which creates a waterproof external layer. It looks a lot like the tiles on a roof. These layers also provide the necessary insulation the bird's skin needs to be protected from the cold.
- Birds spend a lot of time picking at or "preening" their feathers in order to keep dirt particles out and the intricate layers intact.

**Ask each student to dip one feather in the water only pan and to place it on the paper towel to dry.**

- The students will notice that the water runs right off the feathers.
- They may also notice the sleek look the feather gets while it is still wet.
- As the feather dries, it will regain its original look and feel
- You can share with the students the fact that some birds will spread out their wings to dry their feathers because it provides more surface area and therefore the feathers dry faster.

**Now we're going to see what happens to a bird's feathers when it lands in an oil slick.**

- Have each student dip a new feather in the oil pan and place on paper towel
- Have them observe the differences as the feather dries
- They should notice that the oil gets stuck in all the parts of the feather and they are unable to dry properly. They stick together; the residue and oil remain on the feather.

**Ask the students if they think that birds can properly clean themselves after an oil spill.**

- They instinctively try to remove some of the oil, but when ingested it can damage their internal organs.
- In addition, because the oil clogs the feathers, they are no longer waterproof or provide the proper insulation the birds need to survive. The birds become cold and they have trouble floating, many beach themselves.
- Finally, if the oil is thick enough the birds will not be able to fly, making it harder for the bird to find food.

**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
- 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, lost their habitats (had no place to nest or raise young)
- Also, 90,000 acres of shellfish beds closed. (the spill also affected many people's livelihood)

### **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.
- 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)
- 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

### **How do they rescue the birds? (show pictures)**

- These birds 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.
- After a bird is stable, it take 2 people 45 minutes and 300 gallons of water with dawn dishwashing liquid to clean on bird. Proctor and Gamble, the company that makes dawn, has made countless donations to help oil soaked birds.
- IF you see a bird covered in oil call the Cape Cod Stranding Network.

### **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 o foil 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 o 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. Hopefully the students will get into this part...try and make it sound fun!**

Set up Stations for the relay race in advance:

- 1) Ice berg and ocean- icebergs are pop-up blocks covered in white-snowy felt placed around the "ocean" small blue tarp- place penguins on top
- 2) Spill material in a "drum"- beans, strips of black felt and black nylon stockings (singles not panty hose)
- 3) Cleaning station: small inflatable wading pool, brushes, "soap", cages for transportation
- 4) Spill Response Station: aprons, gloves, goggles, bin with "pigs", brushes
- 5) Home Base- a chair is fine

As students gather (coming from the oil slick activity)- initiate the Spill event: ***An Irresponsible Party*** ruptures drum into ocean ( throw beans into ocean, drape icebergs with black felt strips and cover the penguins with black stockings

**Tell the students:**

"Now, we're going to have a little adventure. Let's pretend we're all on a lovely cruise in the Antarctic. We're having a wonderful time we see some adorable penguins who here likes penguins? (show them the picture of cute little happy penguins). All of a sudden we notice an oil slick and realize a terrible oil spill has just occurred! The first on sight, just so happened you're all trained haz mat officials, volunteer to help rescue the penguins from the oil! (we need to name the penguins!). Now let's race to see who can save the penguins first! "

Steps in the Relay Race- divide students into two teams of 2-3 persons ( 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 – give protective gear to student B

Student B: Put on protective gear, run to 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 haz materials collection bin, take off protective gear- run back to base.

Student A: Run to cleaning station and get a cage and gloves, run to the ocean, Rescue the penguin from the iceberg, bring him to the volunteer pool and clean him up (remove the stocking) run back to base- give the cage and gloves to Student B!

Student B: Don the gloves and take the cage back to cleaning station, Fetch the Cleaned penguin from pool, put in cage and returned to his ice berg and run back to cleaning station to return cage and then to home base.

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 haz materials collection bin- run back to base.

Student C: Run to cleaning station and get a cage and gloves, put on the gloves and take the cage to the ocean, Rescue the penguin, bring him to the volunteer pool and clean him up (remove the stocking), put in cage and return to his ice-berg–run back to cleaning station to return the cage and then to home base

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!)

- The penguins will have to get “oiled” up again with the materials in the pool after each session, and return everything else where it started at beginning of the race

*After the festival*

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