Effects of Oil Spills on Environment and Marine Life

Grades: 3-5
Subject: Science, Language Arts, Health
Time: 75 minutes (could be split into two sessions)

*** Standards:** Students will..

Science Standard 6: Understand relationships among organisms and their physical environment.
Benchmark 4: Know that changes in the environment can have different effects on different organisms (e.g., some organisms move in, others move out; some organisms survive and reproduce, others die).

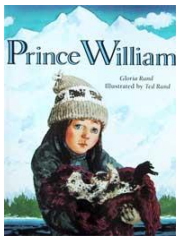
Science Standard 11: Understand the nature of scientific knowledge.
Benchmark 5: Understand that models (e.g., physical, conceptual, mathematical models, computer simulations) can be used to represent and predict changes in objects, events, and processes.

Health Standard 2: Know environmental and external factors that affect individual and community health.
Benchmark 1: Know how the physical environment can impact personal health (e.g., the effects of exposure to pollutants).

Language Arts Standard 5: Use the general skills and strategies of the reading process.
Benchmark 3: Make, confirm, and revise simple predictions about what will be found in a text (e.g., uses prior knowledge and ideas presented in text, illustrations, titles, topic sentences, key words, and foreshadowing clues).

Objective: Students will be able to...
- Know that physical models can be used to represent changes in objects, events, and process
- Know that when the environment changes, some organisms die and understand how the environment is affected by an oil spill
- Uses illustrations and ideas presented in text to make predictions
- Know how exposure to pollutants can affect personal health

Materials:
- A copy or multiple copies of "Prince William" by Gloria Rand
- Overhead projector (optional)
- One clear glass large bowl or baking dish
- Four medium bowls
- One measuring cup
- Water
- Cooking oil
- Different dish washing detergents
- Paper towels or a piece of cloth
- Sponges
- String
- Craft feathers
- Recycled newspaper to cover table or floor
- "Effects of Oil Spills on Environment and Marine Life Observation and Conclusion Worksheet" provided below



153 Washington Street | Fourth Floor | Walpole | MA | 02032 | 1.888.668.2298

Overview: We use oil every day in many products. Oil, a nonrenewable fossil fuel, is obtained from the Earth but is also potentially harmful to the Earth. Oil spills are accidents caused by human error or carelessness as well as natural disasters like storms or earthquakes. These accidents often involve barges, tankers, pipelines, refineries, and storage facilities. Oil leaks or spills onto land or into bodies of water. It floats in oceans, rivers, and lakes quickly spreading across the surface of the water forming a thin oil slick.

Oil spills are harmful to marine birds, marine mammals, fish, and shellfish. The feathers of birds protect them from sun, rain, cold, and injury to the skin. Oil prevents feathers from protecting the bird and compromises their ability to fly and obtain food. Additionally, oil can harm sea otters, seals, and other marine mammals by diminishing their natural insulating ability. When animals attempt to clean themselves they can be poisoned by ingesting the toxic oil.

In the book "Prince William" students will see the tragic effects of the Valdez oil spill on the wildlife that inhabits Prince William Sound and one young girl's efforts to save a baby seal drenched in oil. Students will observe the procedures used by a group of volunteers to rescue and revive the animals and to clean the beaches affected by this environmental disaster. Vibrant watercolor illustrations capture the horror of the oil spill on the environment, the natural beauty of the Alaskan landscape, and the heart tugging innocence of the baby seal named Prince William.

In the activities provided below students will observe how oil and water affect the feathers of birds. They will see methods used to rid both marine animals and the environment of pollutants and water contaminants after an oil spill. Finally, they will see how one individual and many volunteers can make a difference- not matter what their age.

Kid's Speak: Oil spills can be caused by human mistakes or natural disasters. Oil spills onto the land or into water causing damage to the environment and those who live in it.

Eco-Fact: A spot of oil the size of a quarter is enough to kill a seabird.

Procedure:

Read "Prince William" Before Two Experiments:
- Students will look at front cover and make predictions about what happened to the baby seal.
- Read silently, aloud with partner or aloud to class "Prince William" by Gloria Rand.
- Based on the illustrations and text students will continue to make predictions on the fate of Prince William.

After Reading "Prince William":
- Discuss the effects that the oil spill had on the environment and animals.
- Discuss the steps taken to clean the environment and help the animals.
- Discuss how people can become environmentally active at any age.
- Explain that the class will do two experiments to see the effects of an oil spill on a marine ecosystem. The first experiment will show how oil can break apart, spread, and cause environmental pollution to a wide area making cleaning difficult. The second experiment will show how oil affects the feathers of birds and their ability to function in their environment.

153 Washington Street | Fourth Floor | Walpole | MA | 02032 | 1.888.668.2298

Procedure for Oil Floats and Spreads:
This experiment can be done as a whole class demonstration. Also it can be conducted on an the glass portion of an overhead projector. Light shines through the glass showing the oil floating on the water. A layer of plastic wrap can be put over the glass to protect the projector.
1. Fill half of the bowl with water.
2. Measure 1/4 cup of oil and pour into the bowl of water.
3. Gently shake the bowl to create "waves".
4. Try to clean up the oil using a paper towel or cloth.
5. Use string to make a border around the oil and try to drag the oil to one side of the bowl.
6. Use the sponge to try to soak up the oil.
7. Try to clean up the oil with each kind of detergent.
8. Students will record on included observation sheet what methods or materials where helpful in cleaning up oil.

Procedure for How Oil Affects Bird Feathers:
Students will work in pairs. Students will be imitating what happens to a bird that lands on an oil slick on the ocean.
1. Fill three medium sized bowls with water to two inches below the rim of bowl. Pour some oil on the water.
2. The first student can drop a feather (from a craft store) and observe how it floats to the newspaper covered table or floor.
3. Next, the second student will dip the feather with vegetable oil and drop it.
4. Students will record on included observation sheet the different results each time the feather was dropped and relate it to animals coated with oil.
What happened to the feathers when they got oiled?
How do you think this might affect a water bird wearing these feathers ?

Observations and Conclusions:
(For a printable worksheet of these questions, click on thumbnail below.)
- Students will record what methods or materials where helpful in cleaning up oil in experiment and in story.
What materials were most helpful in removing oil from the water in the bowl?
How was oil cleaned from water and rocks in “Prince William”?

- Students will compare how the oil floating in the bowl was similar to the oil polluting the environment in the story.
What happened to the oil after the bowl shaken?
Compare this to what happened in “Prince William” after the storm.

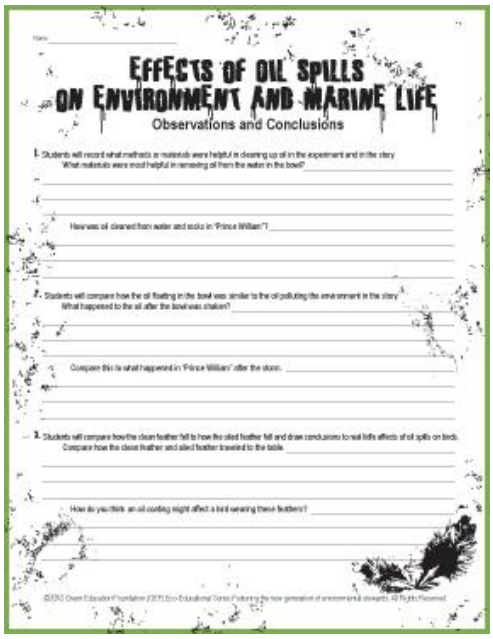
- Students will compare how the clean feather fell to how the oiled feather fell and draw conclusions to real life effects of oil spills on birds.
Compare how the clean feather and oiled feather traveled to the table.
How do you think an oil coating might affect a bird wearing these feathers?

Adaptations:
- Students can try the experiment with different sized bowls to see different amounts of water pollution.
- Students can try using syrup or food coloring instead of cooking oil to understand different types of water pollution.

Extensions:
- Students can take a field trip to a local stream to see if they can find any types of water pollution.

153 Washington Street | Fourth Floor | Walpole | MA | 02032 | 1.888.668.2298

GEF Community: Students can share their results of the experiment with the GEF Community. Students can blog or create journal entries about the difficulty of cleaning up the cooking oil. In addition, students can discuss how difficult they may or may not think it would be to clean a real oil spill.


EFFECTS OF OIL SPILLS ON ENVIRONMENT AND MARINE LIFE

Observations and Conclusions

To view full-size lesson plan and print, follow these directions:

1. Click on the image above
2. Click on the small "print" icon at the top left of the lesson
3. Make sure your "Page Scaling" is set to "Fit to Printable Area"
4. Click "OK" and your lesson will be printed!

Click on the second icon from the print button to save your lesson to your computer.

For technical assistance with printing any of the GEF lessons, please contact:
service@greeneducationfoundation.org

* All lessons listed on the GEF website have been aligned with the McREL Compendium of Standards and Benchmarks for K-12 Education. GEF curriculum has been developed in accordance with the McREL standards in order to reflect nationwide guidelines for learning, teaching, and assessment, and to provide continuity in the integrity of GEF curricular content from state to state. The decision to utilize McRel's standards was based upon their rigorous and extensive research, as well as their review of standards documents from a variety of professional subject matter organizations in fourteen content areas. Their result is a comprehensive database that represents what many educational institutions and departments believe to be the best standards research accomplished to date. To access the McREL standards database, or for additional information regarding the supporting documentation used in its development, please visit http://www.mcrel.org.

153 Washington Street | Fourth Floor | Walpole | MA | 02032 | 1.888.668.2298

153 Washington Street | Fourth Floor | Walpole | MA | 02032 | 1.888.668.2298