

# **OIL SPILL CLEANUP**

This lesson plan developed by:



### **Overview:**

Oil spills can happen in any place where oil is being drilled, transported, or used. Small spills can occur when fueling a vessel, for example, while large spills can occur when pipelines break, or drilling operations go array. Oil spill cleanup activities can never remove all the oil spilled from the marine environment, and some methods may cause additional harm. In this activity, children will simulate an oil spill and use different methods and materials to try to clean up the pollution.

### Materials:

- Dark olive oil (easier to see, but can also use vegetable oil)
- Tap water
- 2 shallow tin pans or glass dishes
- Dish soap
- Variety of liquid collectors (ex. spoon medicine dropper)
- Variety of absorbent materials (ex. small pieces of paper towel, cardboard, cotton balls, feathers, small cloths, pipe cleaners)
- Dish soap

Duration:

30 minutes

**Physical Activity:** Low

### **Background:**

Crude oil, also known as petroleum, is a fossil fuel that is used to make a wide range of fuels and

# Oil Spill Cleanup (cont.)



products, including plastics. Extracting, refining, and burning petroleum all release large quantities of greenhouse gases, which significantly contribute to climate change. Another negative environmental impact is the direct release of petroleum into the environment through oil spills.

### How do oil spills happen?

Oil spills can occur in any place where oil is being drilled, transported, or used. Oil spills in the ocean are generally more damaging than those on land since the oil can spread over long distances. Small spills can occur when fueling a vessel, for example, while large spills can occur when pipelines break, an oil tanker ship sinks or drilling operations go array.



### What is the impact of an oil spill?

When an oil spill occurs, it can harm wildlife, damage ecosystems, and negatively impact human health. Oil spills generally impact ocean life in two ways: fouling or oil toxicity. Fouling happens when oil physically harms an animal or plant. For example, oil can coat a bird's feathers rendering it unable to fly or oil can strip insulating properties of a sea otter's fur, which can cause hypothermia in the animal. Oil also contains a variety of toxic compounds which can cause severe health problems for ocean animals who are exposed to or ingest the oil.

### How are large oils spills cleaned up?

There are a variety of methods used to contain or remove oil from the environment when a spill occurs. Below are examples of the mostly commonly used cleanup methods for large spills in aquatic environments:

- Boom: A large, floating physical barrier that is used to help contain an oil spill or keep the oil away from sensitive habitats.
- Sorbents: Materials that can recover oil through absorption (pulling in through pores) or adsorption (forming a layer on the surface). This method works best with small oil spills or to manage the leftover traces of a larger spill.
- Skimmer: Devices that are used off boats to "skim" the oil from the sea surface by physically separating and collecting the floating oil from the water.
- In situ burning: Oil floating on the surface of the water is ignited to burn it off. This method

# Oil Spill Cleanup (cont.)



works on fresh spills but can release toxic fumes.

• Dispersant: Chemicals sprayed onto an oil spill to cause it to break up an oil slick into smaller droplets in the water column. The toxicity of dispersants can negatively impact marine life and ecosystems.

Oil spill cleanup activities can never remove all the oil spilled from the marine environment, and some methods may cause additional harm to marine life and sensitive habitats.



### Activity:

- 1. Fill one of the containers halfway with tap water.
- 2. Pour in a small amount of olive or vegetable oil to the water to mimic an oil spill. Lay out the liquid collectors and absorbent materials.
- 3. Ask the following questions to start a discussion about oil spills:
  - What is petroleum? How is petroleum collected, processed and distributed for use?
  - What are some of the potential negative impacts of extracting and using oil?
  - How and where do think oil spills occur?
  - Ask students to observe the variety of supplies they have available and discuss which materials might represent the type of equipment used to clean up oil spills.
- 4. Have the students start with the absorbent materials and liquid collectors, which mimic booms, sorbents, and skimmers (examples below). Use one material or method at a time. Record your observations.
  - Booms: string, pipe cleaners
  - Sorbents: small cloths, feathers, cotton balls, paper towels, sponges
  - Skimmers: spoons, droppers
- 5. Have the students add a few drops of dish soap to the oil to mimic a chemical dispersant. Record your observations.
- 6. Finally, have the students use the same absorbent materials and liquids collectors after the dish soap has been applied. Record your observations.

# **Discussion:**

You have just simulated a variety of methods to clean up an oil spill. Discuss the following questions with the students.

- 1. Did any method completely remove the oil?
- 2. What method or material was the most effective cleaning up the oil?
- 3. Was it easier or more challenging to clean up the oil after the use of a dispersant (dish soap)?
- 4. What are ways that we can prevent oil spills from happening in the future?

# Oil Spill Cleanup (cont.)



### **Ocean Literacy Principles:**

Ocean literacy is an understanding of the ocean's influence on us, and our impact on the ocean. There are seven <u>Ocean Literacy Essential Principles</u> that all people of our blue planet should have an opportunity to learn and understand. This activity touches upon the following Essential Principles:

- 2. The ocean and life in the ocean shape the features of Earth
- 5. The ocean supports a great diversity of life and ecosystems
- 6. The ocean and humans are inextricably interconnected
- 7. The ocean is largely unexplored

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**Oil Spill Cleanup Observations** Record information about your cleanup materials (what type you are using and what they represent) and your observations prior to and after adding dish soap (i.e. chemical dispersant).

6	Б	4	З	2	4		
						<b>Type of Material</b> (ex. spoon, cotton)	Oil Spill Clean
						Material's Role (ex. boom, skimmer)	up Materials
						<b>Effectiveness</b> (1-5 with 5 being the best)	Prior to
						Observations	Adding Dish Soap
						<b>Effectiveness</b> (1-5 with 5 being the best)	Aft
						Observations	er Adding Dish Soap