

# Oil Spill Solutions

## Lesson Objective

In this lesson, students will focus on how engineers use various techniques to provide speedy solutions to oil spills or other threats to natural water resources by creating a system that removes oil from water.

## Activating Prior Knowledge & Concept Building

Begin the activity by showing students images of oil spills in the ocean. Ask students if they know why oil spills occur. Ask your students how they believe oil spills can affect marine life, human life, and the environment as a whole.

**Background knowledge:** An oil spill is an accidental release of liquid petroleum hydrocarbons (usually during transportation of oil) into the environment. Oil spills usually refer to the release of oils into water, but of course an oil spill can take place on land as well. While spills can take place quickly, as when a ship sinks, or a leak occurs in a pipeline, the cleanup can be a long term project. And, the longer the oil sits in the water, the greater the impact on the environment.

## The Science Behind It

In order to reduce the chances of an oil spill, engineers have designed different types of cleaning methods. These methods include:

- **Bioremediation**- using microorganisms or biological agents to break down or remove oil
- **Dredging**- some oils are actually denser than water, and would sink. These would require cleaning below the surface of the impacted water.
- **Skimming**- can be effective areas where the water is calm.
- **Dispersion**- materials such as some detergents can disperse oil into smaller clusters that may be easier to remove than larger areas. However, the detergents can sink deeper into the water than oil does, so it may cause harm deeper in the water while reducing negative environmental impact on the surface.
- **Burning**- controlled burning can often eliminate a large proportion of oil in water, but of course requires great care to avoid having the fire spread. The burning oil can also cause air pollution.

## Materials:

- Student Worksheet
- Water basin or sink for testing
- "Oil" (use ½ cup vegetable oil mixed with
- cocoa powder for more realistic oil)
- Rubber bands, paper towels, string, toothpicks, cotton balls, plastic wrap, popsicle sticks, balloons, grass, cork, suction tube/cooking baster, spoon, other items.

## Instructions for Instructor:

1. Divide students into groups, providing a set of materials per group.
2. Explain that students must work as a team to design a system to clean-up after an oil spill. The spill will be a controlled ½ cup of vegetable oil that is poured into water which is held in a container such as a water trough, large bucket, or sink.

3. Students meet and develop a two-tiered plan to first contain the oil and then to remove it. They can select from a range of everyday items provided to serve as their tools. Student teams will describe their plan in writing and with a drawing and then present their plan to the class. Plans may be adjusted after feedback from the presentation stage.
4. Student groups then execute their engineered clean-up system step-by-step as described in their plan.

## Closing

Review the activities of the day with the students and assess what concepts they took away or what they missed. List the key learning points on the board. Have students reflect on the activity by sharing out and writing about it in their science journals (or activity document).

**Debrief Questions:** Did you decide to revise your plan while actually doing the containment or clean-up? Why? How? Why might a team of environmental engineers change their planned approach to an oil spill clean-up once they arrived on the site? Do you think it is common that professionals change their plans while on the job? (You can find more questions on the student evaluation sheet).

Source: <http://tryengineering.org/lesson-plans/oil-spill-solutions>