



One-Day Lesson Oil Spill Solutions

We live in a fossil-fuel dependent society, but rarely do we consider the unintended social and ecological consequences of oil consumption. This lesson focuses on oil extraction and uses a real-world environmental disaster, the BP oil spill, to highlight the many detrimental impacts when our technology fails us. Students will have the opportunity to work in teams to conceptualize, design, and build an oil spill containment device. This laboratory will be reinforced with a power-point presentation that introduces students to the actual technologies employed by BP to clean up the 2010 oil spill in the Gulf of Mexico. It also goes over the social, economic, and environmental consequences of the spill. This would be ideal during a unit on ecology.

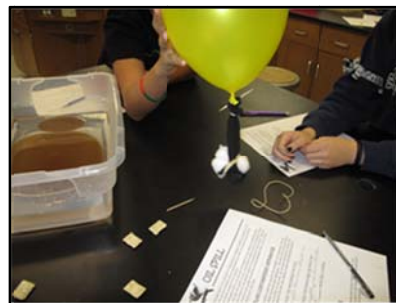
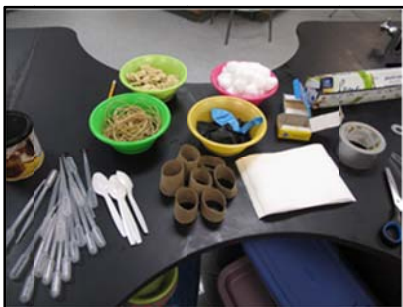
Set up Instructions: For this laboratory, students will be working in groups of 4-5. Each group will need a shallow bin deep enough to hold 2-3 gallons of water, a smaller waste bowl, and oil. To create the oil spill, mix a liter of vegetable oil with 3-4 tablespoons of cocoa powder, or until oil is the desired darkness. Each group requires ½ cup of oil, and there are roughly 8 ½ cups in one liter, so plan accordingly. Fill bins half way with water and add oil. For cleanup, be sure to have paper towels and soap on hand.

In addition to the bin, the bowl, and the oil identified above, the following materials should be acquired:

Rubber bands
Cotton Balls
Plastic wrap
Shredded wheat cereal
Balloons
Women's panty hose

Medical gauze
Duct tape
Paper clips
Cork
Popsicle sticks
Toothpicks

String
Solo cups
Spoons
Paper towels
Pipettes
Paper towel cores



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Essential Questions: What are the social and ecological consequences of oil spills, such as the one in the Gulf of Mexico?

The objective of this lesson is to explore the broader impacts of oil spills and understand the challenges associated with removing it from the environment.

At the end of the lesson, students will be able to:

1. Pinpoint one negative and one positive aspect of using oil
2. Describe strategies currently in place to clean up oil spills
3. Identify how environmental disasters may have broader social and economic impacts

Standards Addressed: Science: Concept 2. Science and Technology in Society
Develop Viable Solutions to a Need or Problem (PO 1)

Themes: Trade-offs, scale

Skills: Teamwork, problem solving

Teaching Instructions

1. Purchase the supplies for the laboratory. Instructions for set-up are listed above. You will need to print off a copy of the lab sheet for each student. Found under "OilSpillHandout"
2. The day before the lab, assign the students the take-home background assignment. This will get the students thinking about the consequences of oil spills.
3. On the day of the lab, pass out the lab sheets and split the students into teams. Inform them that they are members of engineering design teams creating a containment device for an oil spill.
4. Provide 35 minutes work time: 15 minutes to design the device, 15 minutes to test it, and 5 minutes for cleanup. Have the students finish their lab sheets and return to their seats.
 - a. Give the students approximately 10 minutes to complete the Lab Sheet in their groups. Randomly select four groups, one at a time, to answer each of the questions.
5. Give the presentation. Roughly 15 minutes. Each slide contains additional background information in the "notes" section.
6. Following the PowerPoint, create a roundtable and have each group present their design to the class and analyze whether or not their strategies were similar to what BP employed.

Additional Resources: This unit was adapted from "Try Engineering"

http://www.tryengineering.org/lesson_detail.php?lesson=55

CNN Timeline of the Gulf Oil Spill

<http://www.cnn.com/2010/US/05/03/timeline.gulf.spill/index.html>

Natural Resource Damage Assessment from NOAA

http://media.nola.com/2010_gulf_oil_spill/photo/graphic-ecosystem-042011jpg-353cc347dea0efad.jpg

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