

Analyzing Oil Spills

Grade Level: 4, 5, 6, 7

Duration: 30 - 60 minutes

Classification: Classroom

Subject(s): Environmental Science, Biology

Categories (STEM): Science, Technology

Keywords: Density, viscosity, oil, spill, observation

Introduction

- Summary: Students will observe the differences in density and viscosity of oil versus water.
- Description:
 - Students will investigate the way materials are impacted by ocean oil spills
 - *Note: This activity can get messy, if desired, educators can opt for a demonstration over a completely hands-on activity*

Online Resources: <https://www.engineergirl.org/127813/try-this-clean-oil-spill>

Materials

Material	Quantity	Reusable?
Shallow Pan	1 per 3-4 students	Yes
Clear Plastic Cups	1 per 3-4 students	Yes
Paper Towels	1 roll per classroom	No
Vegetable Oil	3 tablespoons per 3-4 students	No
Water Pitcher	1 per classroom	Yes
Small rocks or seashells	1 handful per 3-4 students	Yes
Oil/Water Jar*	1 per classroom	Yes
Straws	1-2 per 3-4 students	No
Aluminum Foil	1 roll per classroom	No
Popsicle Sticks	1-2 per 3-4 students	No
Cotton Balls/Gauze	5-6 per 3-4 students	No
Plastic Spoons	2-3 per 3-4 students	Yes
Dish soap (Dawn works best)	1 small bottle per classroom	No
Clear Packing Tape	1-2 rolls per classroom	No

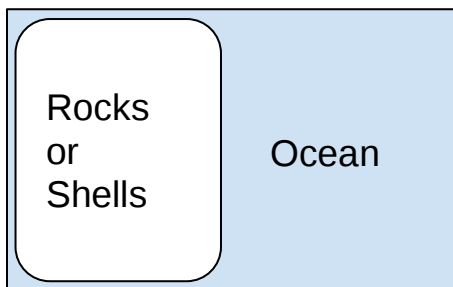
*Made ahead of time, using colored water and oil. Seal so bottle can be shaken without spilling

Directions

- Show students the oil/water jar, have them predict what will happen if the bottle is shaken. Demonstrate and discuss.
- Discuss oil spills and the impact that they have on the environment. Brainstorm among group's ways to create an **oil boom** to contain spilled oil in their ocean.
 - Oil booms are temporary floating barriers used to reduce oil spread during spills



- Split students into groups of 3-4. Pass out the shallow pans and small rocks or shells.
- Create a “beach” using the materials and water, push the materials to one side to create a distinct beach and ocean.



- Design an oil boom and float it in to protect the newly created ocean. Allow students to choose from the straws, cotton, Popsicle sticks, aluminum foil, and paper towels.
- Have students pour 3 tablespoons of oil into a cup and mark its height. Then pour it into their ocean behind the boom.
- Gently create waves in the ocean by lifting the corner of the container. Does the oil make it to the beach?
- Using a spoon, scoop out as much oil from behind the boom as possible and put it back into the cup. How does it compare to the original mark?
- Add a little dish soap to the ocean to disperse the remaining oil. Is it still noticeable?

Activity Extension

- Clean out the pan and add new water. Modify the oil boom design and try the activity again.
- Try creating a larger “oil spill” by adding $\frac{1}{4}$ cup of oil. Can your current oil boom handle the larger spill?

Discussion Questions

- What can be done to prevent oil spills?
- Why don't oil and water mix?
- Are there advantages to the oil and water staying separated?
- After the oil reaches the beach, do the rocks ever go back to the way they were before?
- What may be a more effective way to remove the oil from the behind the boom than spoons?

What is happening?

- Oil booms are used after an oil spill to try and contain the spread, they are used both preemptively when drilling in the ocean and after a spill occurs.
- Many booms are made of flexible fabric filled with foam similar to a lifejacket.
- They can vary in shape and size depending on the wind levels, type of water, and size of the spill

Applications:

- Majors
 - Environmental Engineering
- Jobs
 - Environmental Protection Agency
 - Environmental Engineers
 - Petroleum Engineer
- Hobbies
 - Recycling
 - Animal rehabilitation/wildlife care
- Real world applications
 - Sensory bottles used for calming anxiety are often made of oil and water
 - 2010 BP oil spill in the Gulf of Mexico (largest in petroleum industry's history)
 - They used nylons filled with human hair as booms to soak up oil during the BP oil spill.



PROGRAM FOR WOMEN
IN SCIENCE AND ENGINEERING

This activity was last updated in fall 2020 by Student Role Models.