

Cleaning up an oil spill

Oil, Water and Chocolate Mousse

An Environmentally-Friendly Oil Spill Experiment

Based on a student activity from Environment Canada Website www.ec.gc.ca

Materials (per team)

- Science journal (per student) or observation sheet (per student or group)
- one clear glass baking dish or bowl
- water
- blue food coloring
- 12 tbsp. vegetable oil
- 8 tbsp. pure cocoa powder
- 1 tsp. table salt
- 5 popsicle sticks
- measuring spoons
- disposable cup
- sorbents (paper towel, cotton balls, rag, string, nylon pot scrubber, sponge, styrofoam cup, garden peat moss, Shredded Wheat, coconut husks, animal hair)
- 1 squirt of liquid dishwashing detergent
- tweezers or tongs
- bird feathers (available at a pet or craft store)
- salt

How difficult is it to clean up an oil spill? Students back from summer vacation may have seen this first hand or have friends and family that were impacted by the oil spill in the Gulf.

No two oil spills are the same because of the variation in oil types, locations, and weather conditions involved. However, broadly speaking, there are four main methods of response.

1. Leave the oil alone and let it break down by natural means.
2. Contain the spill with booms and collect with skimmers.
3. Use dispersants, chemical compounds that break up the oil into smaller particles.
4. Introduce biological elements that break down the oil in a process called biodegradation.

(Source: <http://www.appea.com.au/edusite/html/pt/oceans.html>)

Directions

Do you want to try cleaning up an oil spill for yourself? This experiment will help you understand why it is such a difficult task. All of the tools you will need are environmentally friendly and easy to find.

Begin by recording observations about how oil mixes with fresh water. Then choose a sorbent to test. **Sorbents** are materials that recover oil either through absorption or adsorption. They are used for

final clean-up of trace amounts of oil or to remove oil from areas that skimmers can't get at. There are two basic types: natural organic materials like peat moss and sawdust; and synthetic organic sorbents like polypropylene, polyester foam, polystyrene and polyurethane. Sorbents are normally applied by hand, and recovered with nets, rakes, forks and pike poles. (www.ec.gc.ca)

OBSERVATION A Prepare the fresh water

1. Fill the baking dish with cold tap water to within 1 cm of rim.
2. Add 5-6 drops of food dye and mix with stick.
3. Let the solution settle.
4. Record observations in the journal.

OBSERVATION B Simulate crude oil mix

1. Place 3 tbsp. of vegetable oil in a disposable cup.
2. Add 2 tbsp. of cocoa powder. Mix cocoa powder and oil thoroughly with a popsicle stick.
3. Record observations in the journal.

OBSERVATION C Contaminate the fresh water

1. Very slowly pour simulated crude oil from a height of 1 cm onto the top of the fresh water dish. If you pour the oil too quickly, the experiment won't work - start over!
1. Wait 3 minutes.
2. Record observations in the journal.

OBSERVATION D Test the sorbents

1. Place a small sorbent sample into the centre top of the contaminated fresh water.
2. Record observations in the journal.
3. Remove sorbent with tweezers or tongs.
4. Repeat step 1 with other sorbent samples.
5. Clean out contaminated fresh water.
6. Prepare new simulated fresh water following instructions above.
7. Add detergent to the oil-contaminated freshwater.
8. Record observations in the journal.

OBSERVATION E Test how oil affects feathers

1. Dip feather into oil-contaminated fresh water.
2. Use a paper towel to clean it off.
3. Add a drop of dish detergent.
4. Record observations in the journal.

OBSERVATION F Simulate ocean water

Repeat all of the above procedures substituting an ocean for the fresh water. To prepare the ocean, follow the fresh water procedures except add 1 tsp. of salt and mix it with the water before step 2.

Websites

www.ec.gc.ca
www.incidentnews.gov/science
eosweb.larc.nasa.gov/

Lesson from TSTA Newsletter, TNSTA.COM