Oil Spill Clean-up

(modified from Environment Canada)

This experiment will simulate an oil spill and let students experiment with methods of clean-up similar to those used by oil spill clean-up professionals. This oil-spill will use environmentally friendly ingredients.

This will work best with groups of 3-5, 1/2 the groups can do the experiment with fresh water, and the other 1/2 should make salt water.

Materials:

Aluminum dish
Water
Blue food coloring
3 Tbsp. Vegetable oil per experiment
2 Tbsp. Cocoa powder per experiment
1 Tbsp. Salt per saltwater experiment
a tablespoon measure
a teaspoon measure
Popsicle sticks
A cup for mixing the oil and cocoa
Sorbents (paper towel, cotton balls, rags, cotton string, nylon pot scrubber, sponge, Styrofoam cup, nylon yarn, etc.)
1 squirt of dishwashing detergent
tweezers or tongs
bird feathers
dropper
rocks, sand or other objects

To prepare the fresh/salt water:

1. Fill the aluminum pan with cold tap water to within 1/2 an inch from the top
2. Add 5-6 drops of food coloring.
3. Mix the dye into the water with a popsicle stick.
4. Let the solution settle
5. To make saltwater add 1 tsp of salt to the water before step 2.
6. (optional) Add rocks, sand or other objects, to have some obstacles for the oil to interact with. If you chose this step, pay attention to how the oil behaves around the object.

To simulate the crude oil:

1. Place 3 Tbsp. vegetable oil into paper cup
2. Add 2 Tbsp. cocoa powder.
3. Mix the cocoa powder and the oil thoroughly with a popsicle stick. Make sure you mix this up really well, or it will separate after you add it to the water.

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To contaminate the water:

1. Very slowly pour the oil and cocoa powder mix into the water from a height of 1/2 inch or so. If you pour it too quickly the experiment won't work. If this happens, just try again.
2. Observe and record what happened to the oil mixture as it hit the water. Did it sink? Did it float? Did it mix in?
3. Wait 3 minutes.
4. Do you observe the same thing as before or do you want to alter your observations?

To test the sorbents:

1. Create an observation chart for all the sorbents that you plan on testing like this:

Sorbent type	Amount of oil cleaned up	Amount of water picked up	Did it sink or float?	Description of contaminated sorbent

2. Place a small amount of the selected sorbent in the middle of the oil spill.
3. Make observations and record them in the chart.
4. Remove the sorbent with the tweezers or tongs.
5. Repeat the procedure with the other sorbents.
6. Dip a feather into the contaminated water.
7. Record what happened to the oiled feather.
8. What problems might oiled feathers cause for birds?
9. Try to make waves in the pan (be careful not to spill the water out of the pan). How does movement of the water change the behavior of the oil?
10. Add detergent to the contaminated water and record what happens.
11. How clean do you think this water is?
12. Do you think using detergent is an appropriate tool for cleaning up oil spills in nature? Why or why not?
13. Compare your results for fresh water to those of a group that used saltwater. Are the results similar or different? Why do you think they were similar/different?
14. (To think about) How would you determine how much oil each sorbent picks up? How could you measure which sorbent does the most efficient job?