



LESSON OF THE MONTH:

# CLEANIN' UP THE MESS (OIL SPILL EXPERIMENT)

## Title: Cleanin' Up the Mess

### CONTENT AREA:

Environmental Science

### GRADE LEVEL:

Middle School

### STANDARDS:

Populations, Resources, and Environments

- When an area becomes overpopulated, the environment will become degraded due to the increased use of resources.

Natural Hazards

- Human activities also can induce hazards through resource acquisition, urban growth, land-use decisions, and waste disposal. Such activities can accelerate many natural changes.

### PURPOSE:

Students will create a visual representation of an oil spill and identify the effects it has on the environment.

### LENGTH OF TIME:

45 minutes

### MATERIALS:

Student Sheet

Resource Sheet

Activity Materials

-See Student Sheet for materials



### Fast Facts

**Crude Oil**-oil in its natural form, right out of the ground. Crude oil is transported from the oil field by huge ocean tankers or by pipeline to oil refineries where it is refined into petroleum. Oil is a fossil fuel, made from the remains of creatures that lived millions of years ago.

**Petroleum** is used in a number of consumer products such as lighter fluid, candles, lipstick, motor oil, and diesel fuel.

Giant ocean tankers that transport petroleum can leak or spill the oil.

**Properties of Oil and Water** - Oil is lighter than water, so it floats on the surface in a thick, blanket of blackness. Marine animals like seals and sea otters become coated in this oil and can't clean themselves off because as oil mixes with water, it forms a substance called "mousse," which sticks to feathers and fur.

**Consequences of oil usage** - When fossil fuels are burned, they release gases like carbon dioxide into the air, which are referred to as greenhouse gases. These gases build up over time and clog up our atmosphere creating a heavy quilt that is way too warm. As a result, the planet's temperature rises a tiny bit each year. This rise in temperature is referred to as global warming. As our population and our needs for energy rise, we try to exploit ever more difficult sources of energy.

The current USA population is 311 million people. At least half of the cause of the oil-spill disaster in the Gulf is the unprecedented rise in population. If we had only 150 million people in the country, we would not be rushing to drill wells one mile deep in the ocean before we have developed safe technologies to do so.

**Sorbent**-a material that can absorb a liquid or semi-liquid.

### **WHOLE GROUP:**

1. Show the class some images from the recent “Gulf Oil Spill of 2010”. Ask the students to discuss what they see in the pictures. Ask the students to share what they know about oil spills and how they occur.
2. Discuss oil, its uses, properties, its potential effect on the environment, and how overpopulation has contributed to the increased use of resources such as oil, using the information in Fast Facts.



**Note to Teacher:** Images of the “Gulf Oil Spill” of 2010 are displayed on the Resource Sheet, however many other images of different oil spills may be found on the internet. Some key words that can assist you in finding oil spill images are “Oil Spill New Zealand,” “Gulf of Mexico Oil Spill,” “Exxon Valdez,” and “BP Oil Spill.”

### **SMALL GROUP:**

1. Place the students into small groups and prepare them for the Oil Spill Simulation activity.
2. Distribute the Student Sheet and introduce the activity. Have the students follow the directions on it to complete the activity.

### **WHOLE GROUP:**

3. After completing the activity, lead an open discussion with the students in which they share their responses to the Analysis Questions on the Student Sheet.

### **FOLLOW-UP QUESTIONS:**

1. What environmental changes can occur due to oil spills? What environmental changes can occur due to the production of oil?
2. How has the production of oil helped us? How has it hurt us?
3. What are some things we can do so that we can cut back on the usage of petroleum?

### **EXTENSION ACTIVITIES:**

1. Break up the students into small groups and have them research some of the pros and cons of using petroleum. Have the students decide if their group is Pro-Petroleum or Con-Petroleum. Have the students create a poster campaign advertising their side for the use/disuse of petroleum. After each group has created their poster, have them share it. (Encourage the students to use images).

## **STUDENT SHEET:**

### Oil Spill Simulation

#### Introduction:

Millions of tons of petroleum end up in our Earth's waters every year. What people do not realize is that when this crude oil spills out into our oceans, thousands of animals are negatively affected and the mess is not easy to clean up. This activity will provide some insight on just how difficult it is to clean up our waters from these oil spills.

#### Materials (Per Group)

- Shallow baking dish
- 2-3 cups of water
- 3 drops of blue food coloring
- 1 stirring stick or spoon
- 1 cup
- 3 tablespoons of vegetable oil
- 2 tablespoons of cocoa powder
- A variety of sorbents: 2 cotton balls, 1 paper towel, 1 small piece of peat moss and 1 bird feather

#### Procedure – Simulating the Oil Spill

1. Fill the baking dish with 2-3 cups of water.
2. Add 3 drops of blue food coloring and mix it into the water until it is dispersed evenly. Set the baking dish with the blue water aside.
3. In the cup, measure 3 tablespoons of vegetable oil and 2 tablespoons of cocoa powder. Mix together with the stirring stick. This is the crude oil.
4. Slowly pour the "crude oil" into the blue water. Take your time and "ease" the oil onto the surface of the water so it floats, but does not mix in.
5. Test each sorbent, one at a time, by dipping it in the blue water.
6. Observe how the different sorbents absorb and react to the oil.

#### Analysis:

1. Which sorbent best absorbed the oil? Why do you think so?
2. How are oil spills detrimental to the environment? How are the animals affected?
3. If animals, such as birds can't fly away because of the oil on their feathers, what do you think will happen to them?
4. Explain the difficulties of cleaning up an oil spill. Do you think oil spills have long term effects on marine habitats? If so, what are the long term effects? Are they negative or positive?

**RESOURCE SHEET:**

Images of the Gulf Oil Spill 2010



Web. 6 Sept. 2011. <[www.congressratings.com](http://www.congressratings.com)>



Web. 21 Nov. 2011. <[www.panikgulfspill.wikispaces.com](http://www.panikgulfspill.wikispaces.com)>



Web. 6 Sept. 2011. <[www.thechicecologist.com](http://www.thechicecologist.com)>



Web. 21 Nov. 2011 <[www.oilspillnews.net](http://www.oilspillnews.net)>