

Name \_\_\_\_\_ Date \_\_\_\_\_

## Oil Spills in Marine Environments

Read the background information below independently or in small groups.

Oil enters freshwater and marine ecosystems around the globe daily because of natural leaks and accidental oil spills. Oil leaks from oil transport pipes, boats, and oil wells. Some of the biggest and most publicized spills include the 1989 *Exxon Valdez* oil spill, the 1979 Ixtoc I spill, the 1991 Arabian Gulf spill, and the 2010 *Deepwater Horizon* spill. In 1989, the *Exxon Valdez* tanker ran aground and released 10.8 million gallons of crude oil into Prince William Sound, Alaska. The two-mile-deep well, Ixtoc I, blew out in June 1979 in the Bay of Campeche in Mexico. By the time the well was controlled in March 1980, an estimated 140 million gallons of oil had spilled into the bay. The most oil ever spilled in water occurred in 1991 during the Gulf War. Tankers and oil terminals in Kuwait were destroyed, releasing about 336 million gallons of oil into the Persian Gulf.

On April 20, 2010, an oil-drilling rig called the *Deepwater Horizon* exploded in the Gulf of Mexico, killing 11 people and causing a well deep below the surface to leak for 86 days—the world's largest accidental release of oil into the ocean. The federal task force estimates that 4.9 million barrels of oil were released from the time of the accident until the leak was contained in mid-July 2010. British Petroleum (BP), the company responsible for the spill, uses many different methods for oil cleanup, including booms, skimmers, absorbers, and dispersants. For this particular oil spill, BP used a dispersant called Corexit 9500. BP maintains that the dispersant is harmless; however, little is known about how it will affect the environment over time.

As of October 2010, government scientists estimated that BP had removed a quarter of the oil. They believed another quarter had evaporated or dissolved into scattered molecules. The third quarter was dissolved into smaller molecules by dispersants, and the last quarter remained in slicks or invaded the shorelines and estuaries of Louisiana, Mississippi, Alabama, and Florida.

### Oil Spill Cleanup Vocabulary

Words	Parts of Speech	Definitions
<b>absorber</b>	<i>noun</i>	material used to make up booms that help absorb oil while it is being contained
<b>boom</b>	<i>noun</i>	an oil-containment device that floats on the surface of the water and is used as a barrier to keep oil in or out of a specific location
<b>dispersant</b>	<i>noun</i>	chemicals sprayed on oil to cause it to break up and sink
<b>skimmer</b>	<i>noun</i>	a floating boom system that sweeps oil across the water surface, concentrating the oil

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Our increasing reliance on oil and petroleum products has resulted in multiple marine oil spills at offshore drilling sites and from transport vessels. Oil spills are detrimental to the health of marine environments and marine organisms. Scientists and volunteers try to remove oil from the open ocean and coastal environments when oil is spilled in order to lessen the effects that the oil will have on the ecosystem. Cleanup strategies include corralling and burning, skimming, absorbing, and dispersing oil. Some of these methods are more effective than others.

**Learning Objectives:**

- *simulate an environmental disaster in a classroom environment*
- *analyze the effectiveness of oil cleanup efforts*
- *discuss cleanup tactics and the environmental impacts of using dispersants*
- *Consider perspectives of an environmental engineer and an oil company owner*

**1. Hypothesis:** Will skimming, using the absorbing pad, or dispersing the oil be the best method for cleanup?

**2.** What might the vegetable oil represent?

**3.** What might the food dye within the oil represent?

**Observations Before the Use of dispersants:**

Type of Material	Materials Role (Boom/skimmer/ absorber)	Effectiveness Rating 1-5 (5 being most effective)[Quantify using volume of oil collected in cylinder]	Observations

### Observations After the Use of dispersants:

Type of Material	Materials Role (Boom/skimmer/absorber)	Effectiveness Rating 1-5 (5 being most effective) [quantify using volume of oil collected in cylinder]	Observations

4. Prepare two vertical bar graphs: one to compare the effectiveness of oil spill clean-up methods and another to compare the cost of each oil spill clean-up method based on the perspective of an environmental engineer and an oil company owner.

#### Assume you are the Environmental Engineer (High, Medium or Low)

	Effectiveness		Cost
Skimming:	_____	_____	_____
Absorbing:	_____	_____	_____
Dispersants:	_____	_____	_____

#### Assume you are the Oil Company Owner (High, Medium or Low)

	Effectiveness		Cost
Skimming:	_____	_____	_____
Absorbing:	_____	_____	_____
Dispersants:	_____	_____	_____

5. Did you prove or disprove your hypothesis based on your findings of the experiment? Explain.

6. Did any of your observations change the way you view the possible effects cleanup strategies may have on the water quality and wildlife of the Gulf or other areas experiencing oil spills?

7. Research the dispersant **Corexit 9500**. Is there any information yet about whether or not it will affect the environment over time?

8. What is your opinion on using dispersants for oil spill cleanup?