

OVERVIEW

After creating an artificial oil spill with popcorn, the youngsters estimate the spill's impact on the environment.



OBIS OIL SPILL

BIO Simulation
KEY Oil Spill
Environmental Impact

BACKGROUND



In these days of oil shortages and heightened environmental awareness, great efforts are being made to prevent oil spills. Yet in spite of precautionary measures, oil spills from ships, offshore drilling operations, pipe lines, and natural seepage continue. As past spills have so tragically demonstrated, a major oil spill can take a devastating toll of wildlife. Inshore fisheries, shore birds, intertidal organisms, and shallow subtidal organisms are most often harmed because spills usually occur in the shallow coastal areas where these organisms are concentrated. The environmental impact of an oil spill depends on the size of the spill, the prevailing wind and water conditions during the spill, and the variety and abundance of life (both wild and human) in the affected area.

CHALLENGE: ESTIMATE THE ENVIRONMENTAL IMPACT OF A SIMULATED OIL SPILL.

MATERIALS



For the group:

- 1 25-meter length of light rope*, marked off in 5-meter intervals with a permanent-ink marking pen*
- 1 Popcorn Slinger (See the equipment card.)
- 20 liters of popped popcorn (plus another 20 liters for "Branching Out")
- kitchen timer* or watch with a second hand
- 1 "Popcorn Slinger" Equipment Card*
- 1 sheet of Impact Challenge Cards*
- 1 copy of each Impact Challenge Card
- pencils

For optional use:

- guides for identifying seashore organisms
- 1 tablespoon of salad oil* or motor oil*
- 1 cup or small bowl of water

* Available from Delta Education.



PREPARATION



Group Size. This activity is suitable for any size group.

Time. Plan on forty-five to sixty minutes for this activity.

Site. Although developed for the seashore, this activity may also be conducted at a lake, river, or stream. Reduce the amount of popcorn for smaller bodies of water. The activity will be more exciting if you choose a site with strong dispersal features (such as water currents and wind) and an abundance of life. Breakwaters or docks are convenient places from which to toss popcorn into the water. If you conduct the activity at an inland site where oil spills rarely occur, tell the youngsters that the activity simulates a toxic chemical discharge from an industrial or agricultural source.



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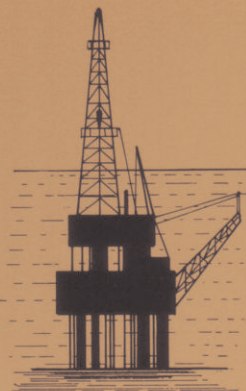
Materials

1. Popcorn. You can usually obtain stale popped popcorn free of charge or for a nominal fee from popcorn suppliers. Look under "Popcorn" in the yellow pages of your phone book. If you cannot get stale popcorn, pop a two-pound bag of corn. This makes about 24 liters. You may substitute dry leaves, sawdust, or woodshavings for the popcorn. None of these materials will harm the environment.

2. Popcorn Slinger. See the equipment card for instructions on making and using a popcorn slinger.

3. Impact Challenge Cards. Make a copy of the Impact Challenge Cards and cut them apart. If the cards supplied are not appropriate for your site, make up your own.

Safety. When working around the water, use the buddy system. (See the "Safety" section of the *Leader's Survival Kit* folio.) Although OBIS does not suggest going into the water, just working near the water makes safety a prime consideration. Find out who the nonswimmers are and keep a close eye on them.



ACTION



1. At the site, tell the youngsters that they are going to pretend to be environmental impact experts who have been rushed to the scene of an oil spill to estimate its impact (damage) on the seashore environment. Say that you will simulate the oil spill by tossing out a large bucket of popcorn to represent the oil. Tell the youngsters that you are using popcorn because it will not harm the environment, and it floats like refined oil. You may want to pour a tablespoon of salad oil or motor oil into a container of water to show the kids that oil floats.

2. Explain to your group of "experts" that they are responsible for estimating the impact of the spill on (a) the landscape, (b) the plant life, (c) the animal life, and (d) human activities. Divide the group into four smaller groups, and give each group an Impact Challenge Card. Ask the youngsters to pick a buddy in their groups to work with at all times. Tell the teams to assume that *anything* the popcorn touches would be covered with oil.

3. Before you toss out the popcorn, ask the youngsters to predict in which direction the spill will move and how long it will take to reach the shore. Ask someone to measure the time it takes for the spill to reach the shore or some other reference point.

4. Toss out the popcorn with the popcorn slinger, and ask your environmental experts to begin their investigations.

5. Join in and follow the movement of the spill with the rest of the group.

SLICK TALK

Near the end of the allotted time or after the spill has been thoroughly dispersed, gather the youngsters together to report their findings. In addition, consider the following questions:

1. How quickly did the spill reach the shore?

2. What agents dispersed the spill?
(Wind, tide)

3. How might different wind or water conditions affect the spill?

4. How could an oil spill be prevented from spreading?

5. Who should be responsible for cleaning up a spill?

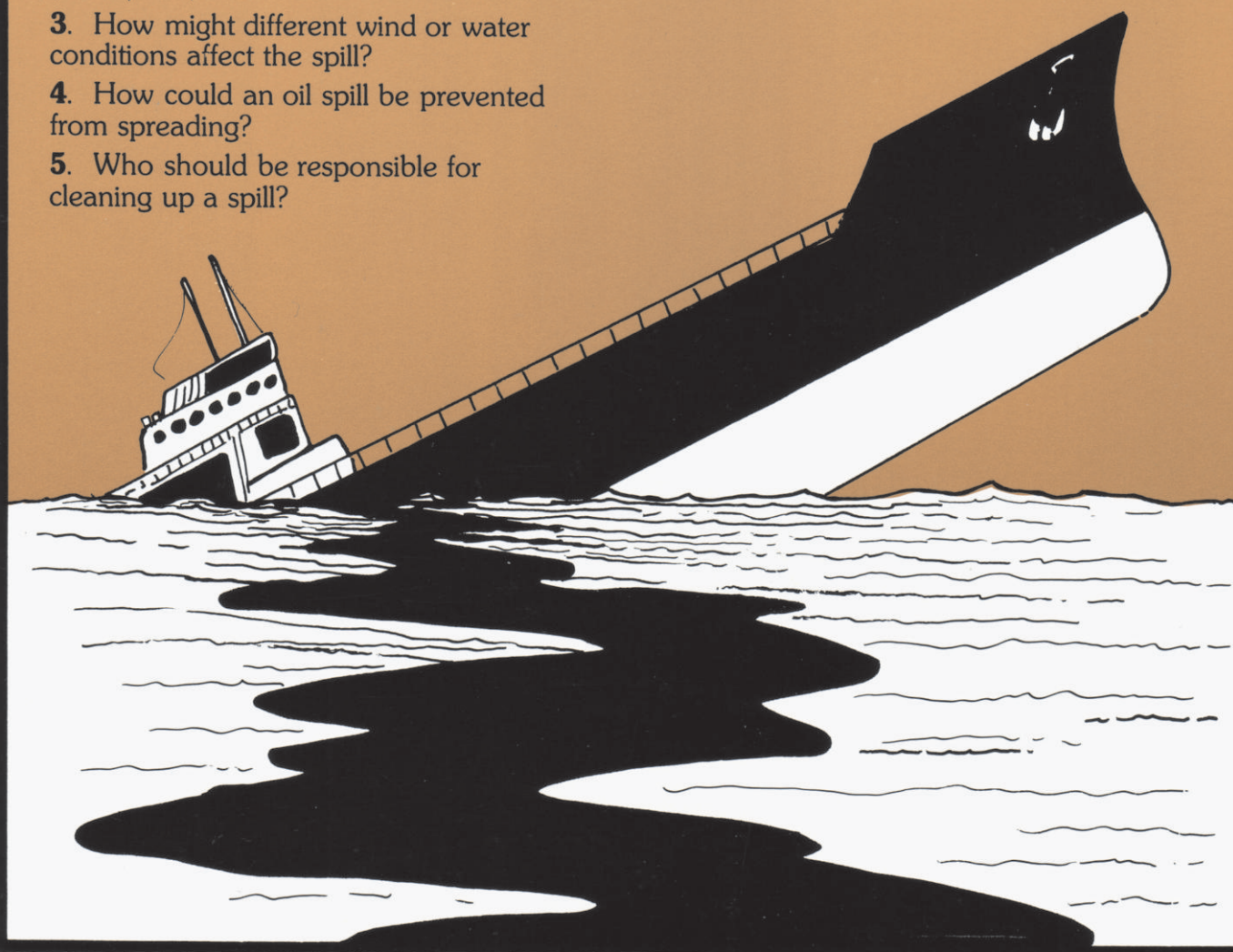
BRANCHING OUT



1. Create another oil spill under different conditions (e.g. when the tide is going out rather than coming in) or in a different site (e.g. a river rather than a lake, or on one side of a breakwater rather than the other side). Compare the effects of the second spill with those of the first.

2. Try several methods of keeping an oil spill from spreading. For example:

- Surround the spill with logs or floats.
- Scoop the "popcorn oil" out of the water.
- Clean up the spill after it reaches shore.
- Herd the spill with a giant squeegee into a pen so it can be scooped up.



OBIS Oil Spill POPCORN SLINGER

Equipment Card



MATERIALS:

- 1 plastic bucket* or can with a metal handle (about 20 liters in volume)
- 1 50 cm × 50 cm piece of plastic window screen*, nylon mosquito netting*, or several 50 cm × 50 cm sheets of small mesh cheese cloth*
- 1 large rubber band*, strip of inner tube, or elastic band that will fit snugly around the plastic bucket
- 3 100-cm lengths of wide duct tape* or masking tape*
- 25 meters of heavy twine* or light rope* marked off in 5-meter intervals
- 1 mini-hacksaw, jigsaw, or serrated knife
- 1 permanent-ink marking pen*

* Available from Delta Education.

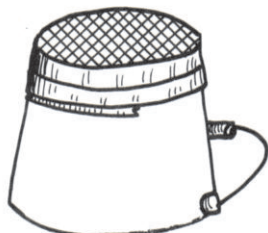
TO MAKE THE POPCORN SLINGER:

1. Cut out the bottom of the bucket with a hacksaw, jigsaw, or serrated knife.



2. With the bucket turned upside down, place the screen material over the open end of the bucket. Let the material drape over the side.

3. With the duct tape or masking tape, tightly tape the edge of the screen material to the bucket.



4. Firmly tie the 25-meter line to the metal handle on the bucket and tie a loop (large enough to go over a nearby rock or post) at the other end of the line.



TO USE YOUR POPCORN SLINGER:

1. With the loop end of the rope anchored to a rock or post, practice tossing the bucket a few times before putting in the popcorn. Take a strategic but secure position on a dock, breakwater, or large rock. The rope should be loosely coiled on a flat surface below your tossing arm so the rope will fly out freely when the bucket is tossed. Make sure you are not standing on the rope.
2. When you are ready, grab the rope about a meter from the metal handle and start swinging the popcorn slinger over your head. When the bucket has gathered momentum, let it fly out over the water. Try to pick a location where you can toss the bucket with the wind instead of against it.
3. After you have gotten the knack for tossing the bucket, place a small flat rock (about 200 grams) in the bucket and then put in about 20 liters of popcorn. With the teams ready to time and follow the spill, toss out the slinger. After landing, the rock will help pull the bucket under the water and the buoyant popcorn will be forced out the top of the bucket. Let the bucket sink beneath the surface before hauling it in so the spill won't be disturbed.
4. Count the marked intervals on the rope as you haul in the bucket to determine the spill's starting distance from the shore.

OBIS Oil Spill Impact Challenge Card #1



Landscape. Follow the spill and estimate its impact on the landscape. Get the 25-meter length of rope from the popcorn slinger, and use it to estimate the area the spill covers.

Estimates: Water ____sq. meters (length times width)
Land ____sq. meters (length times width)

Where did most of the popcorn end up? Why? How might the underwater landscape be affected? How did the spill change the general appearance of the landscape?

OBIS Oil Spill Impact Challenge Card #3



Animal Life. Follow the spill and estimate the impact of the spill on the animal life.

How many different types of animals were covered with oil?

Which animals were hardest hit by the spill? Why?

Which animals do you think would be capable of escaping from a spill? Which animals might not be able to escape?

How might an oil spill affect animals that live under rocks in the water?

OBIS Oil Spill Impact Challenge Card #2



Plant Life. Follow the spill and estimate its impact on plant life. How many different types of plants were affected?

Which water plants were hardest hit by the spill? Why?

How might an oil spill affect land plants?

How would animals that eat aquatic plants be affected?

OBIS Oil Spill Impact Challenge Card #4



Human Activities. Follow the spill and estimate its impact on human activities.

How might an oil spill affect fishing and recreation activities such as swimming, water skiing, surfing, and diving?

How might boats, docks, breakwaters, and other structures in the water be affected?

How might drinking water or food be affected by an oil spill?