Oil Spill Cleanup

OBJECTIVES

Super Six Connection: At Headfirst, we set Stretch goals. Campers will learn that stretch goals are just out of our reach and push us to do something we have never done before.

Development and Learning: This project explores oil spills, one of the worst environmental disasters. Spilled or leaked oil can contaminate water, making it unsafe for animals and humans who live near the accident. Luckily, scientists have figured out ways to help reverse some of the effects of a spill. There are several ways to clean up a spill, but most have downsides and limitations. Dispersants, a type of chemical, are the main cleanup tool. These break the oil into fragments that bacteria that already live in the water can decompose. Dispersants, however, have a downside; they can further contaminate the environment. If there is enough oil, it could be burned, but that leads to air pollution. Perhaps the best way to clean a spill is to use machines that can separate the oil and water.

MATERIALS

1. Eye Dropper
2. Vegetable Oil
3. Cotton Ball (1 per camper)
4. Feather (1 per camper)
5. String (1 3” piece per camper)
6. Dish Soap
7. Coffee Filter (1 per 4 campers)
8. Blue Food Coloring
9. Paper Towels
10. Water
11. Plastic Storage Bin Container
12. Table Covers

VIDEOS

1. National Geographic – Gulf Spill Still Threatens Millions of Migrating Birds
2. Does Oil Spill Damage Last Forever?

SET UP & PREP

- Fill the plastic containers with about 3 inches of water. Mix a few drops of blue food coloring to the water so the vegetable oil is easier to see.
- Cover tables.
- Cut the string into 3 inch pieces, one per camper.

INTRODUCTION

- Today we're exploring WATER AS A PRECIOUS RESOURCE, meaning it is something we need to protect and preserve. CONSERVATION means taking actionable steps to protect things found in nature including water, soil, minerals, wildlife, and forests. We know that POLLUTION occurs when the environment is contaminated, or dirtied, by waste, chemicals, and other harmful substances.
- One of the worst pollutants that can affect bodies of water are OIL SPILLS. OIL SPILLS typically occur when tankers, barges, pipelines, oil refineries, drilling rigs, and/or storage facilities have an accident, dumping lots of petroleum into rivers, bays, and oceans. OIL SPILLS are dangerous for many reasons. They can make water undrinkable, kill animals and plants, contaminate the air, and cause fires and explosions on the water due to oil's FLAMABILITY, or its ability to ignite and catch on fire, even when in water. (Show Oil Spill Visual.) Since Oil Spills are such a HUGE problem for the environment, we're going to explore how these can be cleaned up during today's exploration.

INSTRUCTIONS

1. Create an "oil spill" in each container by adding 10 drops of vegetable oil to the plastic container with water mixed with food coloring. **NOTE**: The oil will be visible, but it might not be quite as yellow as it is in its container due to diffusion.
2. Provide each camper a feather. Instruct campers to dip their feathers into the oil and then pull it out. READ: "What happened to the feather when it touched the oil? How do you think this might affect the bird? READ: "You're right! When oil sticks to a bird's feathers, it causes them to mat and separate, which harms the bird's ability to be waterproof, like how we explored with duck feathers. It can cause birds to freeze to death or overheat because they can no longer control their temperature."
3. Next, campers will test materials to observe their effectiveness in cleaning up the oil spill. If campers 'run out' of oil as they test, add more oil to their plastic bin. READ: "As you can see, oil spills are a BIG problem for many reasons so it's crucial that humans have a plan to clean them up immediately. Today we'll test (show materials as you read) coffee filters, string, cotton balls, paper towels, and dish soap to see what works best to clean up the spill. What do you think will work best and why?."
4. Provide campers with string, cotton balls, paper towels, and a coffee filter. Campers will use materials to attempt to 'clean up' the spill.
5. Campers will observe the effect of dish soap last. Squirt a few drops of dish soap on to the spill. It should cause the oil to disintegrate and disperse.

DEBRIEF

- Which material seemed to work the best cleaning up the oil? Did this surprise you? Why or why not?
- While some materials helped 'soak up' the oil, you probably saw the oil break down and disperse when we added the dish soap. Dish soap is commonly used to treat animals that are covered in oil because one end of the soap molecules is HYDROPHILIC, and the other end is HYDROPHOBIC. This means that one end of the dish soap molecules wants to stick to water, the HYDROPHILIC end, and one end wants to repel the water, the HYDROPHOBIC end. This results in the oil being 'cut' and dispersed, making it easier to clean up. Whoa!
- There are several ways to clean up an oil spill, but most have downsides. DISPERANTS, a type of chemical, are the main cleanup tool. These break the oil into fragments that bacteria already in the water can decompose. Dispersants, however, have a downside; they can further contaminate the environment. If there is enough oil, it could be burned, but that leads to air pollution. The best way to preserve our aquatic ecosystems is to prevent spills from happening in the first place with more safety checks!