

Oil Spills Lesson

4th or 5th Grade

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Benchmarks:

(4th) SLC 14: A. Students will investigate how human activity effects the environment and discuss the issue from a variety of views (advantages and disadvantages).

(5th) SLC 17: B. Students will identify the impact of human activities on the earth's ecosystems (pollution, conservation, erosion, and soil fertility).

Objectives:

The point of this lesson will be to show the students that a sudden change in an ecosystem can have long term ramifications (over time). In the case of an oil spill, the students will learn about the changing ecosystem as well as the importance of protecting our environment.

Materials:

- Containers for water that is shallow and wide (i.e. Aluminum pie pan)
- Used motor oil (get at an oil changing station?)
- Cotton balls
- Nylon
- String
- Paper towels
- Liquid detergent
- Feathers.

Initial Observation:

Begin the lesson by talking about ecosystems. What are some examples of ecosystems? What makes an ecosystem? What lives in an ecosystem? Can ecosystems change? What types of changes are long-term and short-term? What are some Earth-wide changes that can affect ecosystems?

Target Observations:

- An ecosystem can be a forest, stream, coral reef, etc...
- An ecosystem is characterized by food webs, an energy cycle, a nitrogen cycle, and a disturbance cycle (floods, fires, storms, etc...)
- Bacteria, plants, insects, animals, and humans can live in an ecosystem
- An ecosystem is always changing through seasons and its energy, nitrogen, and disturbance cycles.
- One thing changing in an ecosystem can affect the entire system.
- Energy and nitrogen cycles are short-term cycles, seasons and disturbance cycles are long-term cycles.
- Global warming is something that can affect ecosystems Earth-wide.

Target Model:

-An ecosystem is characterized by food webs, energy cycles, nitrogen cycles, and disturbance cycles, and can be affected by small changes.

Procedure:

Pick out a cold ecosystem like Alaska, talk about penguins, icebergs and other characteristics of an arctic environment and then try to get the students to talk about some changes that may occur within that cold environment. What types of changes can be caused by humans?

Target Observations:

- The seasons can cause changes in the landscape of Alaska by melting ice and snow
- Global warming, perhaps caused by humans, can change the environment in Alaska by melting ice and snow and making it unlivable for some animals
- Air pollution by factories and cars can change the environment of Alaska
- Roads and logging can destroy trees and forests

Target Model:

-An ecosystem is characterized by food webs, energy cycles, nitrogen cycles, and disturbance cycles, and can be affected by small changes.

-Humans can cause changes in ecosystems through pollution, roads, logging, and global warming.

Procedure:

Discuss oil and what it is used for. Show the students some oil in a clear container and have them describe it. How is oil transported? Where is it transported from?

Target Observations:

- Oil is used in cars as a lubricant, burned in power plants to make electricity, is used to make gasoline, etc...
- Oil is slippery, toxic, hard to clean up, etc...
- Oil is transported by pipeline, semi truck, or by tanker boat
- Oil is transported from cold places like Alaska, Siberia, etc...

Discussion:

Does anyone know what the Exxon oil spill was? What do you think the effects on the environment and ecosystem of Alaska would be if there was an oil spill in the ocean there?

Demonstration:

Break the class up into groups. Give each group a water container, which will be their "ocean." Ask the students what they think would happen when oil is dropped into the water. Give each group a cotton ball, a piece of nylon, a paper towel, and a string, and ask them to predict which one will work the best at getting the oil out of the ocean. Have the students record their predictions on the attached Oil Spill worksheet.

Target Predictions:

- The oil will probably float
- The oil will probably sink
- The paper towel will probably clean up the oil better because it is designed to clean up messes

- The cotton ball will probably clean up the oil better because it can absorb lots of water

Demonstration:

Have the students drop a glob of oil into their ocean and observe what happens. Have the students simulate wind and waves in their ocean by blowing on the surface of the water. What does this do to the oil spill? Try cleaning up the oil with the materials given. Which one works best? Why do you think so?

Make another oil spill by dropping another glob of oil into the ocean. Pour a little bit of detergent into the oil spill and observe what happens. Where would all of the oil go if this were a real ocean? Dip a feather into the oil spill and observe. What would this do to the bird wearing the feather? How would the oil spill affect the environment and the ecosystem?

Target Observations:

- The oil floats on the surface
- The wind and waves spread the oil out over the surface
- The nylon is very bad at cleaning up the oil, the paper towel is okay, the string is better, and the cotton ball is the best at cleaning up the oil
- The detergent makes the oil spread to the outside of the ocean – if the ocean were real, it would spread to the beaches
- The oil sticks to the feather when it is dipped – the bird wearing the feather would probably be covered in oil
- The oil spill would kill off wildlife, cover the ocean and rocks of the beach with black, slimy oil, and disrupt the energy and nitrogen cycles of the ecosystem.

Target Model:

-An ecosystem is characterized by food webs, energy cycles, nitrogen cycles, and disturbance cycles, and can be affected by small changes.

-Humans can cause changes in ecosystems through pollution, roads, logging, and global warming.

-An oil spill is a human accident that can cause lots of change and destruction of an ecosystem.

OIL SPILLS!

What do you think will happen to the oil if you drop it into the water? Will it sink, float or mix in?

Which material (cotton, nylon, paper towel, or string) do you think can clean up the most oil in the least amount of time?

Now create an oil spill placing a cup of oil in your model ocean. Record what happens. Were your predictions correct?

What effect will wind and waves have on the oil and water? You can simulate this by blowing on and moving the water in the pan.

What happened?

Next, rate the effectiveness of each of the cleanup materials: 1 is the best, four is the worst.

Cotton

Nylon

Paper Towel

String

Were your predictions correct?

Make another spill and then add a cup of detergent to your ocean. Observe and record what happens. Where do you think the oil would go in a real ocean?

Dip a feather in the ocean and the oil. Observe the feather and then describe what it may be like for a bird to have oil on it. How would the animals react to this change in the environment? Do you think the birds, fish and other creatures in this environment would be choosing to make this their home anymore?

Will the change in the ecosystem affect other ecosystems?