

Project FOCUS
Best Lessons
FIRST GRADE

Title of Lesson: Oil Spill Effects on Marine Life

Theme: Life Science

Unit Number: **Unit Title:** Animal Plants

Performance Standard(s) Covered (enter code):

S1L1 b. 1,3 & d; S1CS5; S1CS4; S1CS1

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Enduring Standards (objectives of activity):

Habits of Mind

- Asks questions
- Uses numbers to quantify
- Works in a group
- Uses tools to measure and view
- Looks at how parts of things are needed
- Describes and compares using physical attributes
- Observes using senses
- Draws and describes observations (just describe)

Content (key terms and topics covered):

Aquatic/marine life's basic needs, Oceans, Oil, Oil spills,

Learning Activity (description in steps)

Abstract (limit 100 characters): Kids will be performing and visualizing the effects of an "oil spill" on life within a container of water. Life Science is selected as the theme, though ecology, if it was a theme for 1st graders, would be the appropriate choice. This lesson definitely has earth science implications, if you wish to connect concepts. There was a miniscule amount of marine life/oceans in the Best Lesson Plans, so I decided to submit one. Main points to cover are the basic needs of marine/plant life and the effects oil spills have on these plants.

Details: See if you can get the Oceans Box from UGA's Museum of Natural History! It is a great resource. You can show them fossils, dead sharks, fish, etc. from the box once the lesson is over! It's pretty neat plus it's one of the widely underused boxes.

Before starting lesson, say you will talk about oceans. Ask the group what they know about oceans and what are inside of them. They will likely list off a bunch of animals. Make sure they know that there are a lot of plants too.

Before lesson started, I told them we were talking about how oil spills in the ocean hurt marine life. I showed them this video: <http://www.youtube.com/watch?v=lg5aWcfCKGE>
There are plenty of videos available to show though. Briefly mention BP oil spill/Kuwait oil spill to understand why there are oil spills.

I also had a big blow up globe, which definitely helped their understanding of oceans. Since this is life sciences for first grade, it will probably be 2nd semester, so hopefully 1st semester they went over the

oceans in their earth sciences. Nonetheless, a lot of my kids were unsure about what oceans actually were, and some of them had trouble spotting themselves on a map (the state of Georgia). A lot of them, surprisingly, thought GA was the whole of North America! Luckily, we took care of any misconceptions slightly before the lesson began. Basically, since we're talking about "Oil Spills in the Ocean" and their adverse effects, we are going to want to make sure they know the basics of what is in the question prompt. With the globe (or any visualization), you should reaffirm that they remember the oceans and where they are in comparison to them on a globe. This ensures they understand the ocean aspect of the prompt. Next, we have to make sure they know what oil is!

Optional Facts about Oceans if you care to mention them (since this is a Life Sciences lesson, you do not have to, but with some of the more gifted groups I worked with, I did since time permitted and they find the stuff awesome):

1. For starters, did you know that 94 percent of life on Earth is aquatic? That makes us land-dwellers a very small minority.
2. About 70 percent of the planet is ocean, with an average depth of more than 12,400 feet. Given that photons (light) can't penetrate more than 330 feet below the water's surface, most of our planet is in a perpetual state of darkness.
3. Fifty percent of the United States (in terms of our complete legal jurisdiction, which includes ocean territory) lies below the ocean.
4. The deep sea is the largest museum on Earth: There are more artifacts and remnants of history in the ocean than in all of the world's museums, combined.
5. We have only explored less than 5 percent of the Earth's oceans. In fact, we have better maps of Mars than we do of the ocean floor (even the submerged half of the United States).
6. The ocean boasts an array of unusual geographic features, such as pillars that reach several stories high and chimneys that send up sulphuric acid. In the ocean-floor neighborhood of the Gulf of Mexico, brine pools mark the floor, along with underwater volcanoes that spew mud and methane, rather than lava.
7. These wonderful formations aren't barren, either. Underwater hot springs that shoot water that's 650 degrees Fahrenheit — hot enough to melt lead — boast a profusion of life, from 10-foot tall tubeworms to giant clams that function without digestive systems.

Read more: <http://www.motherearthnews.com/Nature-Community/Fun-Surprising-Facts-About-The-Oceans.aspx#ixzz2QaCcptJY>

At this point, I'd show them a bunch of pictures of animals either on a big screen, from a book, or cut-outs. I used the book from the Oceans Box from the museum. With the really gifted groups (since they are moving the most quickly), I showed them some fossils, dead fish, turtle, etc from the box.

Understanding Oil: Since they are in first grade, you do not have to go too in depth on this topic. I started out by asking my group a set of questions:

So, guys, do your parents drive cars?

YES, MY DADDY DRIVES A BIG RED TRUCK (they will probably all exclaim what their parents drive and keep talking about it; cut them off)

So how do these trucks get their "energy"? (We covered food chains slightly before this lesson, so they should understand the concept of "energy" at least in some fashion. It doesn't matter if they know or not. Just trying to get them to understand the idea of what oil is)

Hopefully someone will respond "gas station or gas"

Then you ask them where the gas comes from.

They will likely be stumped.

At this point, using one of the books in the Oceans box, I showed them a picture of an oil drill, oil tanker, and how this drill was deep under the ocean floor. I proceeded to tell them that their gas they put in their vehicles originally probably came from oil deep under the ocean (If time permits, I showed them hotspots on the big blow up of the globe of oil concentration [Gulf coast (like off Kuwait), Venezuela, Canada, etc. May mention some current news facts about the price of oil and how it relates to their parent's gas to seal in the concept.]

The Experiment:

So now they know what the oceans and oil are. I then gave my group (perhaps 3 people each) a little cup filled with this vegetable oil.

Then I asked them to tell me about this oil. Guide them to understand its differences with water. Most notably its viscosity (good vocabulary word for them to know). Then, ask them why they think plants and animals wouldn't be able to live in this oil. They may not have any ideas. What you need to focus on is that some ocean animals have gills by which they get oxygen. They can't get oxygen without being in water as effectively. Also, the animals, even the ones not requiring gills, become covered in the oil (note again oil's increased viscosity and refer to beginning video on oil spills and how covered in oil the birds were). For plants, mention that plants need carbon dioxide which they convert to oxygen (Here I mentioned that ocean algae and plant-life provide 70% of the oxygen in our world for us to breathe through this conversion, sweet stuff). Then, I mentioned that plants weren't able to get this CO₂ as effectively when drenched in oil.

Note (for yourself):

1.<http://www.prweb.com/releases/gulf-oil-oxygen/extech-meter/prweb4046434.htm>

"Dissolved oxygen (DO) analysis measures the amount of gaseous oxygen (O₂) dissolved in the water. Adequate dissolved oxygen is necessary for good water quality that is conducive to marine life. Normal ranges for DO in the Gulf area are 4 milligrams per liter (mg/l). The lower the concentration of dissolved oxygen, the greater the stress is on aquatic life. The evaluation criteria to determine further use of subsea dispersant include DO levels that are less than 2mg/l and the results of toxicity tests." [note 2nd sentence]

2.<http://www.nist.gov/data/PDFfiles/jpcrd219.pdf> (literature regarding gas solubility in various solvents including oil)

At this point I began with the actual experiment. I had 3 containers that I divided the kids up.

I essentially followed this youtube lesson sans the part actually cleaning up the oil:

<http://www.youtube.com/watch?v=6CCgiD16jfM>

So basically have the kids all put their plants in the containers.

Have them pour the water in

With the oil you made previously (from YouTube video, the vegetable oil + paint), get them to pour it in containers of water and plants.

Have them mix it in with the plants, wearing gloves.

The oil should stick on the plants making them gross looking and dark, while at the same time emulsifying at the surface and creating bubbles.

Make sure they remember this oil is coming from the bottom of the ocean floor, so basically everything is affected, even though oil is less dense than water, since the oil has to come up it pretty much hits most of the aquatic life (besides, it decreases the oxygen solubility in water anyway, so even if it doesn't hit the aquatic animals directly, it will probably affect them in some way or another. Maybe mention food chains really quickly for a tie in).

Reinforce the fact that these were just plants, but animals would have been covered with oil too.

At this point just reinforce all the concepts.

End lesson by asking a bunch of questions for even more reinforcement (where does the oil come from, how does it affect plants and animals separately, etc.)

For clean up, just have them put the gloves in the container. I just put it down the toilet and put plants in dumpster even though everything was non-toxic. You might be able to just throw it out outside. Throw gloves away.

Materials Needed (type and quantity): If possible, not needed: Oceans box from UGA Natural History Museum (REALLY HELPS understand the beginning), Blow up globe (great for understanding oceans in relation to us, makes it "real", especially for kids who have never been to an ocean. If not, just print out some pictures or show them digitally.

The experiment (making the apparatus): <http://www.youtube.com/watch?v=6CCgiD16ifM>

Vegetable/olive oil (any sort of oil, can be cheap).

Non-toxic black/brown paint (see in video)

Tiny cups (or big solo cups if you can't find any tiny cups).

Random plants from outside (pulled gas, weeds, flowers, whatever). (I thought about doing dead insects but thought against it)

Some plastic containers (had 3) that you can fill with water, plants, and oil (refer to above youtube link).

Water

Jar to put water in containers.

Gloves for kids to mix oil with plants in water

Notes and Tips (general changes, alternative methods, cautions):

Safety Concerns: Make sure kids don't splash each other or get oil everywhere. I made a point to be really careful/good or there'd be consequences. They were surprisingly very good. Also I used non-toxic paint in making the oil. Make sure they don't try and eat anything, though I didn't have this problem. A lot of them were pretty grossed out of the oil anyway, which I used to my advantage in promoting conservationism.

There will definitely be a few students who just don't understand something. I may have spent too much time away from the lesson plan to try and help them as I do not like to students left behind. Try and explain at the end of the lesson to them instead so as to not hold up the whole group. A lot of kids will ask questions, bring up anecdotes, play around, etc. This is all good and fine, especially the

questions, but you will have to keep it to a minimum if you want to get through this lesson.

If you think you have time/resources, you could may create a pantyhose with hair in it sort of material to try sopping up the oil and discuss how to fix oil spills. This may be a bit much though.

Sources/References:

- 1) Ocean Facts: <http://www.sciencekids.co.nz/sciencefacts/earth/oceans.html>
- 2) Making experiment: <http://www.youtube.com/watch?v=6CCgiD16jfM>
- 3) Possible video to show prior to experiment beginning:
<http://www.youtube.com/watch?v=lg5aWcfCKGE>