

Derricks to Desks Lesson Plan
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Objective:

This lesson will help the students gain an understanding of how oil reserves are explored, drilled, pumped and ultimately refined into the products that we use every day. In addition to looking at the oil aspect each student will learn about the geology that affects oil exploration.

Time:

The length of this lesson is designed for 1 to 2 weeks. Depending on how much time is spent on the geology portion.

Outline:

- I. Exploration
- II. Drilling
- III. Refining
- IV. End Products
- V. Social Issues

Lesson Plan

Introduce geology to the students

- a. Vocabulary
- b. Plate tectonics. Look at the history of their movement.
- c. Different Rock formations (Include a lab using the Nerd taffy candy strips. By pulling, twisting, pushing, and slapping them on a hard surface the different rock formations can be shown to the students. Kids then can eat taffy at end of lab.)
- d. If there are enough funds available take a field trip to the surrounding mountains to look at the different types of rock formations in the area.
- e. Different Types of rocks (look at how each rock type impacts oil recovery.) Discuss Igneous, sedimentary, and metamorphic rock types.
- f. Have students go out in the area and find and classify 15 different rocks. They must have at least 2 rocks from each category.
- g. Look at where oil and gas reserves would likely accumulate within the different rock formations.

Drilling

- a. Vocabulary
- b. Talk about the history of drilling. Look at bits, derricks, and other recovery methods.
- c. Have students research the different types of crude oil. Most the students will only think that there is only one kind of crude.
- d. Discuss that oil is not in large free flowing lakes under the earth's surface.
- e. Lab: have a cake with different things in the center that could act as oil deposits. Put a Plastic bag filled with a liquid like syrup or water. Also hide a bag with water and a sponge. Give students a straw and have them explore. They must determine how to get the liquid out of the bags once they find them. Add a twist to it by giving them each a certain amount of money and each time the drill it costs them so much money.

f. Look at core sample and discuss how oil companies could get the oil out of the sand when it will not just flow.

g. Lab: Bring in a sample of sand that has been exposed to crank case oil and tell the students that a company is working on extracting the oil from the sand. They want our help to find the best method of removing the oil. They want to get maximum recovery and minimum effort.

Refining

a. Vocabulary

b. Talk about the refining process and what is the desired outcome. Introduce the different methods used and also introduce catalysts.

c. Lab: Distillation of water and Isopropyl alcohol.

Products that contain oil.

a. Vocabulary

b. Have students make a list of as many different products that they can think of that they use in one day that contain oil. Present the lists in a unique way to the class. (Like a poster board.)

c. Research on the Internet to find what on their lists they had correct and what additional ones they need to add. There are more than 6000 different products.

d. Watch 10 min video "Fuel- Less".

Social Issues (Have classroom discussions in the following areas.)

a. Vocabulary

b. Supply and demand

c. Emissions (emissions from one 1970 car = 590 of today's cars)

d. Industry profits in perspective

e. Oil companies vs. environmentalists.

f. Where should drilling take place?

g. What oil companies do to recover the land after the wells go dry?

h. Politics and oil.

i. As other issues come up discuss as a class.

j. How do all of these issues affect you right now?

k. Try and find sites on the Internet that cover some of the social aspects of oil exploration and oil refinement.

Test:

- Quiz over vocabulary and some of the main topics discussed.

- Each student will write a two-page paper on the pros and cons of drilling oil/gas wells in our area.

Vocabulary Words

Introduction to Geology

<i>Sandstone</i>	<i>Limestone</i>	<i>Silt</i>	<i>Permeability</i>
<i>Shale</i>	<i>Granite</i>	<i>Geosciences</i>	
<i>stratigraphic Traps</i>	<i>Metamorphic rock</i>	<i>Igneous rock</i>	<i>Formation</i>
<i>Sedimentary rock</i>	<i>Cap Rock</i>	<i>Porosity</i>	<i>Continental Shelf</i>
<i>Tectonic Plates</i>	<i>Porous</i>	<i>Impermeable rock</i>	<i>Salt dome</i>
<i>Gilsonite</i>	<i>Oil Field</i>		

Drilling

<i>Microbes</i>	<i>Plankton</i>	<i>Bit</i>	<i>Derricks</i>
<i>Dry Hole</i>	<i>Barrel</i>	<i>Crude oil</i>	<i>Hydrocarbon</i>
<i>By products</i>	<i>Core sample</i>	<i>H₂S</i>	<i>Pressure</i>
<i>Seep</i>	<i>Repressuring</i>	<i>Reservoir</i>	<i>Reservoir Rock</i>
<i>Oil deposit</i>	<i>Gushers</i>		

Refining

<i>Thermal Cracking</i>	<i>Distilled</i>	<i>Separation</i>	<i>Conversion</i>
<i>Catalytic Cracking</i>	<i>Refine</i>	<i>Coking</i>	
<i>Light gases</i>	<i>Gasoline</i>	<i>Diesel</i>	<i>Motor oil</i>
<i>Wax</i>	<i>Asphalt</i>	<i>Fractional distillation</i>	

Products

<i>Plastic</i>	<i>Petroleum</i>	<i>Petrochemical</i>	<i>Nonrenewable</i>
<i>Natural gas</i>	<i>Fossil fuel</i>	<i>Consumables</i>	

Social Issues

<i>Pollution</i>	<i>Supply</i>	<i>demand</i>	<i>emissions</i>
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*More words will be added as we work through each section.