

Background:**Fossil Fuels**

Fossil fuels like coal, oil and natural gas, are a large part of everyday life. They are used in many products including plastic, medicines and cosmetics. Many Americans take fossil fuels for granted because they are used so often with so little thought. Many don't even realize the extent to which they are used in our everyday lives. Without these fossil fuels we would not have many of the products we use on a daily basis.

Scientific Understanding

Oil is found underground in the pore spaces in rocks. It was formed beginning millions of years ago as microscopic organisms died and sank to the bottom of the ocean. Over millions of years it became covered with layers of sand and rock. These layers created heat and pressure and turned the remains of the animals into oil. Humans have discovered this oil as a means of producing products such as gasoline for combustion engines as well as many other common household products such as plastics and cosmetics. Once the oil is removed from the ground it is sent to a refinery where it is separated into useable petroleum products (U.S. Department of Energy, 2010).

Misconceptions

Many students do not know the extent to which fossil fuels such as oil are used in society. Many confuse oil with things like cooking oil and motor oil. They do not recognize the multiple meanings of the word. Other students lack the knowledge of the origins of products made from petroleum. Comments from a study done in 2005 that illustrate these misconceptions include: "Oil isn't really important to most people. All it is used for is oiling trucks, motors and go-carts" (Rule, 2005). "Oil comes from companies that make cars. They make the oil for their cars so they will run. You can get the oil for frying pans from them. Both oils are made at the same place" (Rule, 2005). There are multiple examples found in this study about student's confusion of cooking oils and petroleum. 51% of students interviewed in grades 4-6 held misconceptions about the uses of petroleum. As Rule points out, "teachers can help by raising student awareness of multiple meanings of words and pointing to their uses in context" (Rule, 2005).

Example Lesson Plan

I. Subject/Topic/Grade

- This lesson will introduce the uses of petroleum. It will also give a brief overview of the process of petroleum formation, exploration and refining processes. It is designed to be taught to later elementary/middle school students (5-7 grade).
- This lesson has been adapted from a lesson found at:
<http://www.sciencenetlinks.com/lessons.php?DocID=455>

II. Context

- I plan to teach this lesson to fifth grade students as part of a unit on energy. This lesson should follow a review of the basics of porosity/permeability and how fossil fuels are formed.

III. Specific Learning Objectives

- Students will be able to describe several places petroleum is used.

IV. Strategies and Activities

Day One

- Ask students to write down everything they know about petroleum including where it is found and what it is used for. Also ask them to include things they are not sure about. They should write down everything they think is true or false.
- After students have written everything they know, ask them to write a few questions they have about petroleum.
- Ask students to share their questions and write them on a large sheet of paper that can be hung in the classroom or on a board that will not be erased so they may continually refer back to the questions.
- Have a classroom discussion about the facts students have written down. Decide if they are true or false. If students are unsure, write these statements down with the questions.

- Pose the following question to students: What are some energy sources? Spend some time discussing these sources and the difference between renewable and non-renewable resources. Since this lesson follows a discussion on how fossil fuels are formed this discussion should flow rather smoothly.
- Pass out a card to each student with various renewable and non-renewable resources. For example, the sun, oil, coal and wind energy.
- Designate one side of the classroom as renewable and the other side as non-renewable. Have students stand on the side of the room that best describes their card. Talk about the answers and send students back to their seats.

Day Two

- Tell students they will be doing a webquest to find answers for their questions. Direct them to the following website: <http://www.sciencenetlinks.com/Esheet.php?DocID=155>
- Have students follow the directions on this website to complete their webquest. Have them answer the questions on the webpage as they go. Students may complete this activity individually or in partners depending on the grade level and available computer space.
- As a class discuss the following questions: What are oil and natural gas used for? What are some of the products that are made with oil? Our society has become so dependent on oil. What would be different in your life if there were no petroleum products?
- Assign students homework. Have them keep a journal of all the products they use that are products of petroleum. Have them keep the journal for two days, then discuss as a class the amount of products they recorded. Were they surprised by the results?

VI. Materials

- Energy source cards
- Paper
- Pencils
- Computers



References

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