**Student Handout 4**

**Digging Into Energy from Arkansas Rocks**

**A Unit for Discovery**

**Lesson 4: Drilling for Oil and Natural Gas**

Energy trapped in rocks can be in a gas form like natural gas or in a liquid form like oil. In Arkansas, we have rocks that produce both natural gas and oil in various regions of the state.

Your teacher will show you one or more of the following videos in class to see what happens in the drilling processes used to extract this energy resource. You may research others if you need more information.

**Video of shale drilling:**

[www.chevron.com/deliveringenergy/naturalgas/shalegas/howweoperate/](file:///C:\Documents%20and%20Settings\lab\My%20Documents\www.chevron.com\deliveringenergy\naturalgas\shalegas\howweoperate\)

**Video of oil drilling:**

[www.neok12.com/Natural-Resources.htm](file:///C:\Documents%20and%20Settings\lab\My%20Documents\www.neok12.com\Natural-Resources.htm) (scroll down to watch videos and click on offshore drilling 2:50, and then watch extreme oil drilling 3:00)

**Video of oil and gas drilling using newest technology—hydraulic fracturing**

<http://www.oerb.com/Default.aspx?tabid=437>

**The map below shows where oil and natural gas are found in Arkansas.**



**Working with a shoulder or face partner, answer the following questions.**

1. How do we get the energy that is trapped inside rocks out and into a usable form?
2. What is one difference between natural gas drilling and oil drilling?
3. If you could ask and expert anything about **natural gas drilling,** what would it be?

Why?

1. If you could ask an expert anything about **oil drilling**, what would your question be?

Why?

1. What is one everyday thing natural gas is used for?
2. What is one everyday thing oil is used for?
3. Why do we need oil and natural gas as energy sources for our everyday lives?

**Activity: You be the expert—Drilling for Sweet Energy.**

You will receive a land mass filled with sweet energy (cream-filled cupcake / desert cake). Working with a partner, you must design a method to remove the **most sweet energy** from your landmass with the **least damage to the land mass,** using only the tools provided at the table at the front of the room (popsicle sticks, plastic spoons, plastic knives, plastic forks, regular straws, bendable straws, coffee stirrer straws, toothpicks, string, small paper cups,). You must also keep your sweet energy source to see whose design actually removes the most “sweet energy.”

You must have an **illustration and a written plan** of your engineering design before you attempt to carry out the plan. Make sure you write down all needed materials to conduct this drilling and removal plan. You must show your plan to your teacher and have it approved before you begin – once approval is granted – begin the process of drilling.

To see who wins this engineering design challenge, you will first measure the amount of sweet energy retrieved using the classroom scale. To determine the amount of damage done to the land mass, have the teacher examine the “energy sample” and “land mass” and rank it 0-10 with 0 being no damage and 10 being extensive damage. Record your weight and damage assessment on the chart provided by the teacher. Once all measurements have been made and recorded the winning engineering design will be announced.

You may now eat your land mass and sweet energy sample!

**Engineering Design Challenge – Sweet Energy Drilling Design Plan**

Illustration of Plan:

Written Plan:

Amount of sweet energy retrieved: (Measure by using scale in classroom – place cup with energy source on scale and record the value.)

Is your energy source clean? Only pure sweet energy (white filling) no crumbs or rock debris in your sample). Your rank?

**EXTENSION: Game for oil drilling**

[**http://www.earthscienceworld.org/games/VirtualOilWell/content/page1.htm**](http://www.earthscienceworld.org/games/VirtualOilWell/content/page1.htm) or search the internet for a suitable drilling game.