

Lesson #2-Searching For Oil

With this lesson plan, students will develop an understanding of how geophysicists and geologists use scientific methods to find oil.

This lesson plan was developed by The Black Gold Regional Division No. 18 and teachers Margaret Lyall and Kimberly Epp.

Black Gold: the Story of Oil

Section Three

Searching for Oil

Black Gold: the Story of Oil

Section 3: Searching for Oil

Purpose:

Students will develop an understanding of how geophysicists and geologists use scientific methods to find oil.

Materials:

- ◆ Rolecards: the names of the group roles written on small tags, to be worn by the students: leader, recorder, reporter, collector
- ◆ Clue Card Scenarios Worksheet
- ◆ Searching for Oil Worksheet
- ◆ Fill in the Blanks Worksheet
- ◆ Atlases or Maps of Canada or Alberta

Procedure:

1. Review

Have the students speculate why fossil fuels would be called *buried sunshine*, knowing what they do about how oil is formed underground. Guide the students to realize that crude oil and natural gas started out millions of years ago as plants that used the sun's energy to produce their own food, and animals that fed on these plants and thus indirectly relied on the sun's energy.

2. Role Play: How is Oil Discovered?

The clues on the Clue Card Scenarios Worksheet should be written on paper, so that students can record their responses.

Introduce the idea that finding oil is like a treasure hunt, and that scientists look for clues that tell them where oil can be found underground.

Divide the class into groups of four. Give each group member one of the role cards to wear. The role card describes the student's responsibilities:

- ◆ The **collectors** are to come and get (1) a copy of the Searching for Oil Worksheet; and (2) a clue card from the teacher and take them to the group. The group is then to discuss, and record on the clue card, how their hint could help them find oil.
- ◆ The **leaders** ensure that everyone has an opportunity to participate in the discussions.
- ◆ The **recorders** write down the ideas upon which the group agree.
- ◆ When all the groups have had 5-8 minutes to work together, bring the class back as one, and have the **reporters** tell the rest of the class the clue their group had to work with, and the ideas they came up with.

3. Review How Oil is Discovered

Have the students read and complete the activity on the Fill in the Blanks Worksheet.

4. Mapping: Where Has Oil Been Found in Alberta?

Using an atlas/ map of Canada or Alberta, have students find where oil and gas reserves and drilling sites are located in Alberta. Label these areas on a map of Alberta. Note where communities and main transportation routes are located...are there any conclusions that can be drawn?

5. Evaluation

The map of Alberta: how accurately are locations mapped according to the atlases used?

Role Cards

<p>Collector</p> <p>--gather supplies & materials</p>	<p>Leader</p> <p>--make sure everyone has a chance to participate</p> <p>--make sure people listen to each other & take turns speaking</p>
<p>reporter</p> <p>--report the group findings</p>	<p>recorder</p> <p>--write down the group findings</p>

Searching for Oil: Clue Card Scenarios

You are a geologist and have found some sedimentary rocks in a new location.

What information does this give you about whether or not the area has oil?

You are a geologist and have been given some aerial photographs of the land's surface.

What does this tell you that could help you find oil?

You are a geologist and have just chipped some pieces of rock from the ground. You are studying them.

What might you see that would help you find oil?

You are a geophysicist and are using your magnetometer and gravitometer (two pieces of very sensitive equipment) to make maps of the rocks below the ground.

Since you're searching for oil, what would you be looking for on these maps?

You are a geophysicist, and have just set off an explosion to measure the echoes of the sound waves from the explosion as they travel through the rocks underground.

What sort of clues could this give you about where oil might be located?

You are a geologist and have just been given a core sample from the drillers. A core is a long cylinder of rock taken from deep in the ground.

To find oil, what hints would you look for in this core sample?

Searching for oil

Name _____

Oil and gas are usually far beneath the ground, perhaps even several kilometers down. How can we find them?

Finding oil is a difficult task. It's like a treasure hunt: oil companies must hunt for clues that suggest where oil might be found. The people hired are **geologists** and **geophysicists**. Geologists study the earth's crust and its history. Geophysicists make pictures of the rock formations beneath the surface of the earth. With help from petroleum engineers, they choose places that might hold oil.

- One clue geologists look for is sedimentary rocks, because they know that oil and gas (and coal too) are only found in these kinds of rocks. Luckily for us, Alberta is mostly covered with sedimentary rocks. This is why Alberta has most of Canada's oil and gas.
- Geologists look at aerial photographs of the land's surface to look for areas that might have oil.
- Geologists chip pieces of rock from the ground and study them.
- Geophysicists use very sensitive instruments called magnetometers and gravimeters to make maps of the rocks below the ground. They study the magnetism and gravity.
- Geophysicists also use **seismographs**. They set off an explosion, and measure the echoes of the sound waves from the explosion as they travel through the rocks.
- **Core drilling**. Have you ever seen a core sample? When oilmen drill for core samples, they pull up cores from the rocks. A core is a long cylinder of rock.

After everything has been tried, the only way to find out for sure is to drill a **wildcat well**. If you don't know if an area has oil or not, the well you drill is a wildcat.

Don't get confused:

Don't mix up a regular drilling well with a well that is taking core samples. Most drilling rigs chew up the rock into rock chips, which come up with the mud. These rock chips are strained out of the mud, and can be studied to see if there is any oil or gas.

Core sampling rigs bring up long cylinders of rock, not small chips.

Fill in the blanks:

Finding oil is like a treasure hunt. Oil companies must hunt for _____ that suggest where oil might be found.
_____ study the earth's crust and its history.
_____ make pictures of the rock formations beneath the surface.

Geologists look for _____ rocks, because they know that oil and gas are found in these kinds of rocks. They look at _____ photographs. They chip pieces of _____ from the ground and study them.

Geophysicists use magnetometers and gravimeters to study the _____ and the _____ beneath the ground. Sometimes they use seismographs: they set off an

_____ and measure the _____
of the sound waves as they travel through the earth.

Sometimes oilmen drill for _____ samples.