

EXPERIENCE THE ENERGY

For Teachers

Curriculum Connections:

- Science 9 - Electrical Principles and Technologies
- Science 10 - Energy Flow in Technological Systems, Energy Flow in Global Systems
- Science 14 - Understanding Energy Transfer Technologies
- Science 24 - Understanding Common Energy Conversion Systems
- Science 30 - Energy and the Environment
- CTS - Natural Resources

Objective:

- Students will investigate the oil and gas industry in Alberta through a series of 360° videos.
- Students will explore some of the technologies associated with the natural resource industries in Alberta, including mining, conventional and automated drilling, SAG-D, processing plants, and pipelines.

Materials:

- [Experience the Energy](#) videos
- Student instruction sheet

Time: 60 minutes

This activity uses 360° video technology to teach students about the natural resource industry and associated technologies in Northern Alberta. It is designed to be given to students to work on individually with minimal instructions. Students will need to access the [Experience the Energy](#) videos as well as the internet to do their own research, since most answers will not be found directly in the videos. Students will work through the worksheet below to answer questions. An answer key is provided at the end.

Answer Key:

Watch the [Automated Drilling](#) videos

1. **Automated drilling** uses more technology and requires fewer workers than conventional drilling.
 - a. What is the name of the room where the driller operates the drill controls (using computer systems)?
The doghouse.
 - b. What warns the workers that something in the drill needs to be addressed (*hint: watch the second Automated Drilling video until the end!*)?
An alarm.

Watch the [Conventional Drilling](#) videos

2. **Conventional drilling** operations use many workers to extract bitumen from deep in the ground.
 - a) One substance used, called drilling _____ can be composed of clay, water, chemicals or other liquids, and helps to lubricate and cool the drill bit.
Fluid.
 - b) Go to the **drilling floor**. Look up at the Derrickhand who is climbing the ladder adjacent to the drill. What are two other job titles at a conventional drilling site?
Roughneck, Technician, etc.

Watch the [Mining](#) videos

3. **Mining** involves using large machinery and haul trucks to dig for and extract crude oil.
 - a) What percentage of the oil sands are close enough to the surface to be mined?
20%.
 - b) What type of crude oil is mined from the oil sands in Alberta? (*hint: it starts with a b*).
Bitumen.

Watch the [SAG-D](#) videos

4. **SAG-D** is a method of drilling for bitumen that uses water and natural gas to liquify bitumen so it can be brought to the surface.
 - a. What does SAG-D stand for? *Steam Assisted Gravity Drainage.*

- b. Bitumen is buried deep underground and is difficult to extract because it is very a) hard b) gaseous c) runny
(a: hard)

Watch the [Processing Plant](#) videos

5. Oil and natural gas are converted to useful products at the **processing plant**.
- a. What useful, marketable products is raw natural gas is converted to at the processing plant?
Natural gas, natural gas liquids, condensate, sulphur.
- b. What structures are used to transport natural gas from the well to the processing plant, and again from the processing plant throughout the country?
Pipelines.

Watch the [Liquids Pipeline](#) videos

6. After bitumen is extracted through mining or drilling, It will be transported using a **liquids pipeline**.
- a. Name three safety items that the worker is wearing.
Helmet, high vis vest, gloves, safety glasses, steel-toed boots.
- b. How long does it take for liquids to travel from Alberta to Southern Ontario? (Hint: explore this [About Pipelines](#) resource)
30-35 days.

Watch the [Natural Gas Pipeline](#) videos

7. A **natural gas pipeline** transports natural gas from the processing plant to homes, offices, and other consumer sites.
- a. List three ways natural gas is used in homes or at school.
Heating, plastics, pharmaceuticals, fabrics, fertilizer, electricity (sometimes)
- b. What mechanical object travels through the pipeline to determine the condition of the pipe? (Hint: it's named after a farm animal!).
Pig.