

# ENERGIZING WYOMING

Submitted for Wyoming Geographic Alliance  
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## Overview:

The purpose of this lesson is to introduce students to the energy resources available in Wyoming both in their location and terminology.

Teaching Level: middle school

## Connections to the Curriculum:

Geography, social studies, current events, history

## Connections to the National Geography Standards:

- ✎ Standard 1: "How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective."
- ✎ Standard 4: "The physical and human characteristics of places."
- ✎ Standard 5: "That people create regions to interpret earth's complexity."
- ✎ Standard 16: "The changes that occur in the meaning, use, distribution, and importance of resources."

## Wyoming Social Studies Standards:

3. PRODUCTION, DISTRIBUTION, AND CONSUMPTION-Students demonstrate an understanding of economic principles and concepts and describe the influence of economic factors on societies.

### CODE GRADE 8 BENCHMARKS

- ✎ SS8.3.1 Students communicate how economic considerations influence personal, local, state, national, and international decision-making.
- ✎ SS8.3.2 Students describe the systems of exchange of past and present.
- ✎ SS8.3.3 Students recognize basic concepts of economic systems.

4. TIME, CONTINUITY AND CHANGE- Students demonstrate an understanding of the people, events, problems, ideas, and cultures that were significant in the history of our community, state, nation and world.

### CODE GRADE 8 BENCHMARKS

- ✎ SS8.4.1 Students identify people, events, problems, conflicts, and ideas and explain their historical significance.
- ✎ SS8.4.2 Students discuss current events to better understand the world in which they live.
- ✎ SS8.4.3 Students analyze the impact of historical events and people on present conditions, situations, or circumstances.

## 5. PEOPLE, PLACES, AND ENVIRONMENTS

Students demonstrate an understanding of interrelationships among people, places, and environments.

### CODE GRADE 8 BENCHMARKS

- ✎ SS8.5.1 Students use charts, maps, and graphs to answer questions dealing with people, places, events, or environments.

- ✎ SS8.5.2 Students apply the themes of geography to topics being studied.
- ✎ SS8.5.3 Students demonstrate an ability to organize and process spatial information; i.e., You Are Here maps of various areas.

Time: 45 minutes

#### Materials Required:

- ✎ Computer and projector for “Zoom in Inquiry”
- ✎ Large Wyoming map
- ✎ Read-Around Wyoming’s Energy Resources cards/strips
- ✎ 3-D icons with read-around strips

#### Objectives: The Students will:

- ✎ Use primary resources to provide a visual connection to the history of Wyoming’s energy resources.
- ✎ To identify key terms and names of several energy resources and related topics in Wyoming.
- ✎ Locate Wyoming’s energy resources using the large map of Wyoming.

#### Geographic Skills:

- ✎ Acquiring Geographic Information
- ✎ Organizing Geographic Information
- ✎ Answering Geographic Questions

#### Suggested Procedure

##### Opening: Procedure:

- ✎ Anticipatory Set - Zoom In to History
- ✎ Students will discuss key terms related to energy sources in Wyoming.
- ✎ Guided Practice – Students will locate key locations for Wyoming’s energy resources.

##### Development:

Introduce students to the discovery and use of energy resources in Wyoming. The questioning on the PowerPoint uses Bloom’s Taxonomy and allows students to inquire about resources in knowledge based as well as analytically.

Begin with the Zoom in Inquiry on Wyoming Energy. Present the slides with opportunity for the students to respond both at their tables and then whole group. Ending slides are used to introduce a variety of terminology that students will encounter throughout the unit. At the conclusion of the PowerPoint students will select an icon to be placed on the large Wyoming map. Directions for the map activity: Read the card with the “I have the first card...” and listen for the clues for each of the remaining icons. After icon card is read, place the icon on the map and step back waiting for the remaining cards to be read. If there are more icons than students, some may read more than one.

### Closing:

Discuss the location of the major resources, mines, plants, refineries, etc. Ask questions that students may need to research in later lessons. Main goal is to draw students in – spark their interest in Wyoming Energy Resources. Is there any location that seems to have a wealth of resources? Is there a reason why energy resources and plants or refineries are close in proximity? What forms of transportation are used to move resources? Allow students time to process the information and generate their own questions?

### Suggested Student Assessment:

Assessment for this introduction is performance based- students are expected to participate in the question and answer section of the Zoom In and listen and respond to one another by placing their icon on the map.

### Extending the Lesson:

- ✎ Define the terminology discussed. Students create a set of energy flash cards with the list of words below. Adapt flash cards to student needs decrease number and/or use pictures for English Language Learners or special need students. Vocabulary list should be available to students.
- ✎ Students select an energy topic and the location in Wyoming where that energy may be found, research and develop a brochure or PowerPoint to share with the class.
- ✎ Map out the areas on the map associated with energy (mines, plants, refineries etc.)
- ✎ Read- around-- Assessment For Learning – rather than the introduction model use the read- around to give clues to others to check student learning.

### Terminology to be discussed

coal	coal mine	crude oil	energy	export	fracking
import	natural gas	nonrenewable	oil field	oil refinery	oil well
pipeline	power plant	reclamation	renewable	resource	solar
thorium	transmission line	uranium	wind farm	wind turbine	

### RESOURCES:

- ✎ <http://www.elitelawyerproject.com/blog/oil-rig-accidents-see-a-wyoming-wrongful-death-attorney/>
- ✎ <http://www.wyomingtalesandtrails.com/rockspringsmines.htm>
- ✎ <http://www.energyproaz.com/SolarPumping>
- ✎ <http://warlickenergy.com/oil-gas-articles/gas-shale-and-cbm-development-in-north-america/>
- ✎ <http://www.epa.gov/radiation/tenorm/uranium.html>
- ✎ <http://ahc.uwyo.edu/images/features/photos/2003jan02.jpg>
- ✎ <http://www.treehugger.com/files/2011/03/dept-of-interior-ignoring-ethical-violations-blm-secret-dealings-with-energy-industry.php>
- ✎ [http://www.travelpod.com/travel-photo/sassyones/1/1213466580/oil\\_fields\\_in\\_wyoming.jpg/tpod.html](http://www.travelpod.com/travel-photo/sassyones/1/1213466580/oil_fields_in_wyoming.jpg/tpod.html)

- ✦ <http://www.loc.gov/teachers/classroommaterials/connections/chinese-cal/thinking5.html>
- ✦ <http://www.flickr.com/photos/dukeenergy/4605020688/sizes/m/in/photostream/>
- ✦ <http://www.wyomingcarboncounty.com/images/citypics/hanna/historypics/4lg.jpg>
- ✦ <http://www.wordle.net/create>
- ✦ Roberts, Phil. Wyoming Almanac.

## Read-Around Wyoming's Energy Resources

I have the **first card** which is OIL WELL. Oil is a **NONRENEWABLE RESOURCE**. The first oil strike was Dallas Dome in 1884 near Lander, WY.

Who has OIL FIELD?

I have OIL FIELD. The first oil field was Salt Creek near Casper, WY, in 1887.

Who has PIPELINE?

I have PIPELINE the first one built was to transport oil from Salt Creek to Casper, WY, in 1910.

Who has OIL REFINERY?

I have COAL which was initially used to power steam engines. The first commercial coal mine was in Carbon County in 1867.

Who has COAL MINE?

I have COAL MINE. The Black Thunder Mine in Wright set a national record by producing 2 million tons of coal in a single month and **EXPORTS** coal to 116 power plants.

Who has THE LARAMIE RIVER STATION BASIN ELECTRIC POWER PLANT?

I have LARAMIE RIVER STATION BASIN ELECTRIC POWER PLANT, located in Wheatland, is one of the largest consumer operated plants. The electricity produced at Laramie River is sent to substations in Wyoming, Nebraska and Colorado, where it is then delivered to Missouri Basin Power Project

Who has POWDER RIVER BASIN?

I have POWDER RIVER BASIN near Gillette, which is number one in coal production in the United States providing coal to many of Wyoming's Power Plants as well as exporting to other states and countries.

Who has DAVE JOHNSTON POWER PLANT?

I have DAVE JOHNSTON POWER PLANT which is 6 miles east of Glenrock. It is one of the largest coal-fired plants in the Rockies, receiving coal from mines in Wyoming's Powder River Basin.

Who has JIM BRIDGER POWER PLANT?

I have JIM BRIDGER POWER PLANT located east of Point of Rocks. The power plant burns coal provided by the Bridger Coal Company Mine and generates power for customers in six Western states. (east of Rock Springs)

Who has WYODAK POWER PLANT?

I have WYODAK POWER PLANT in Gillette which is a coal-fired plant that uses an air-cooled operation to produce electricity for more than 170,000 residents.

Who has NAUGHTON POWER PLANT?

I have NAUGHTON POWER PLANT near Kemmerer. It is a coal-fired power station owned and operated by MidAmerican Energy that is ranked 58<sup>th</sup> on a list of most polluting power plants as far as coal waste.

Who has URANIUM ?

I have URANIUM which is used to produce nuclear energy. The largest uranium reserve in the United States is found in Wyoming in Converse County.

Who has THORIUM?

I have THORIUM which is used with uranium to produce nuclear energy and is mined in Sundance.

Who has LUMBER?

I have LUMBER which is one of our states natural resources. Wyoming's 23 sawmills produced about 168 million board feet of lumber, timbers, and other sawn products per year. Park County has 10 sawmills which provides employment to many people.

Who has BLM?

I have OIL REFINERY. The first one was the Pennsylvania Refinery near Casper, WY in 1895. The city has operated a refinery ever since, although many have been built and closed over the years; the Little America Refining Company remains in the Casper area and has the capacity of producing 24,500 barrels per day.

Who has FRONTEIR OIL REFINERY?

I have FRONTEIR OIL REFINERY located in Cheyenne; it has the capacity of producing 52,000 barrels per day. Oil refining is a process where crude oil is changed into useable products like gasoline and EXPORTED across state lines.

Who has WYOMING REFINING?

I have WYOMING REFINING located in Newcastle, which Wyoming's smallest refinery producing only 12,500 barrels per day. Other by-products of crude oil that are IMPORTED by other states include; diesel, jet fuel, natural gas, heating oil, kerosene, asphalt, road oil, and petrochemicals used to make plastic

Who has SINCLAIR OIL REFINERY?

I have SINCLAIR OIL REFINERY near Rawlins. The original refinery, located in the center of the town, remains in use to this day. The town was originally called Parco, after the Producers & Refiners Corporation which founded the refinery and the company town. It was renamed Sinclair after PARCO was acquired during the Great Depression by Sinclair Consolidated Oil Corporation. It has the largest capability in Wyoming, producing 66,000 barrels per day.

Who has COAL?

I have BLM which is the Bureau of Land Management. The BLM in Wyoming manages more than 18 million acres of public land resources for a variety of uses, such as ENERGY development, livestock grazing, recreation, and timber harvesting, while protecting a wide array of natural, cultural, and historical resources. (Headquartered in Cheyenne.)

Who has RENEWABLE RESOURCE?

I have RENEWABLE RESOURCE. Wind Energy is a renewable resource. Wyoming's first wind farm was Foote Creek Rim, near Arlington in Albany County.

Who has WIND FARM?

I have WIND FARM. Philip Anschutz (An-shoots) has begun construction of a 3,000 megawatt wind farm in Carbon County that will carry wind energy to southern California via a 900 mile TRANSMISSION LINE.

Who has RECLAMATION?

I have RECLAMATION. The Rolling Hills Wind Farm near Glenrock sits on the site of the Dave Johnson Coal Mine and is a great example of RECLAMATION.

Who has SOLAR?

I have SOLAR which is an energy alternative for homes and businesses. The University of Wyoming in Laramie has been conducting studies using photovoltaics on irrigation systems in rural areas across Wyoming.

Who has GEOHERMIC ?

I have GEOHERMIC, which includes two forms of energy use - one for electrical generation and one for home heating and cooling. Wyoming's geothermal resources are concentrated in the northwest corner of the state in Yellowstone National Park.

Who had the NATURAL GAS?

I have NATURAL GAS so you may want to stand back. The Jonah Field located 32 miles south of Pinedale and is one of the largest on-shore natural gas fields in the United States. (squeeze the air out before placing on map)

Who had the First Card?