

## **LESSON TITLE: ENERGY PROS AND CONS**

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*(This lesson was developed as part of the Wyoming Geographic Alliance's summer PD for Wyoming teachers in 2011).*

**OVERVIEW:** *The students will synthesize information learned in previous lessons. Prior to this lesson they will learn about each of the different types of energy (especially those available in Wyoming) and will have created a map showing the distribution of those resources in the state. This lesson focuses on the interplay of different aspects of energy industries (environmental, economic, pros/cons, etc.) and to help students understand the complexity of energy issues.*

**TEACHING LEVEL:** *4<sup>TH</sup> grade*

**CONNECTION TO THE CURRICULUM:** *Geography, Science, Social Studies*

### **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 11: The Patterns and Networks of Economic Interdependence on Earth's Surface*

*Standard 16: The Changes That Occur in the Meaning, Use, Distribution, and Importance of Resources*

*Standard 18: How to Apply Geography to Interpret the Present and Plan for the Future*

### **WYOMING SOCIAL STUDIES STANDARDS:**

*SS4.2.1 Students describe how human needs and concerns (i.e. freedom, justice, and responsibility) are addressed within cultures.*

*SS4.3.1 Students describe the importance of major resources, industries, and economic development of the local community and Wyoming.*

*SS4.5.1 Students use physical maps, political maps, and globes to identify locations using scale, cardinal and intermediate direction, legends, keys, and symbols.*

*SS4.5.4 Students describe relationships among people and places, and the environmental context in which they take place.*

**TIME:** *Allow one to one and a half class periods for this activity, one for the activity and further time for discussion/debriefing if needed.*

### **MATERIALS:**

- 1. Paper circles (cut so that sizes are relative to the proportion of Wyoming's energy economy)*

Coal – 31.37%

Oil – 19.96%

Uranium – 0.19%

Natural Gas – 47.95%

Wind – 0.53%

Solar – 0%

2. Three colors of dot stickers (red, yellow, and green)
3. Graphic organizer with columns for pros, cons, and other considerations
4. Completed resource distribution map (created in earlier lesson)
5. Information about different energy resources, to be used as a reminder/reference

**OBJECTIVES:** Students will:

1. Analyze the pros and cons of multiple energy sources in Wyoming
2. Analyze the portion of Wyoming's energy economy represented by each source of energy
3. Compare the geographic size of each industry, the economic size of each industry, and how the pros and cons of different industries compare.
4. Develop an understanding of the complexity of energy issues and the many factors that are at play.

**GEOGRAPHIC SKILLS:**

- Asking Geographic Questions
- Acquiring Geographic Information
- Organizing Geographic Information
- Analyzing Geographic Information
- Answering Geographic Questions

**SUGGESTED PROCEDURE:**

**Opening:**

Review with students the map created in the previous lesson: Introduction to Wyoming Energy Resources. (Giant Wyoming floor map with symbols added to represent the location of different energy resources in the state.) The students will be synthesizing information about the pros/cons of each industry, so it may be beneficial to review some of the information learned about each of the energy industries prior to the lesson (or have written materials on-hand for students to refer back to). Tell students that today they will be working at synthesizing information about Wyoming's energy resources in order to better understand the many different factors that contribute to the complexity of energy issues.

**DEVELOPMENT:**

1. Give each student group a circle for the energy source assigned to the group. The size of the circle is representative of the percentage of Wyoming's energy economy made up of that resource.

2. Using the graphic organizer, have groups generate a list of the pros and cons associated with their assigned energy source. They can also list other considerations.
3. Once they have the main ideas listed on their graphic organizers, have them place dots on their circles – one green dot for each pro they listed, one red dot for each con, and one yellow for other considerations.
4. Distribute to each group the Discussion Questions and have students discuss the questions in small groups first, and then continue the discussion as a whole group.
5. Have each group share their list of pros and cons with the rest of the class.
6. Using the information shared and represented on the map and the circles, discuss the results using the Discussion Questions provided to the small groups.

### **CLOSING:**

The following suggested questions are to assist the students in completing the objectives. Additional questions might be added as students discuss energy issues in the large group.

#### **Discussion Questions:**

- What do you notice about the sizes of the different circles?
- Does this relate to the representation of that resource on the map? If so, how?
- Why do you think some forms of energy are so much larger than others? Why are some smaller?
- Which energy sources have the most pros? Which have the most cons?
- Is it a fair system to have all pros and cons worth the same amount (each is one sticker)? How might we show that some aspects are a “bigger deal” than others?
- What is the significance of the fact that all energy resources have both pros and cons?
- Choose a county; In terms of energy and economic development, what do you think this county might look like in 5 years? 10 years? 30 years?

**ASSESSMENT:** As a form of assessment, students might be asked to write their responses to several of the questions, or complete an “exit card” listing 3 reasons why energy issues are complex.

### **IDEAS FOR EXTENDING THE LESSON:**

- Students can have a panel discussion “debating” the merits of each type of energy source.
- Explore the feasibility of alternative energies, or barriers in the way of more efficient

energy development.

- Brainstorm ways to “tip the scales” in favor of alternative energy sources.

**RESOURCES:**

<http://revenue.state.wy.us/portalvbvs/uploads/2010%20DOR%20Annual%20Report.pdf> (page 53 of this document was used to find the valuation of mineral industries in WY and p89 was used to look at other energy industry valuations)

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Your Industry \_\_\_\_\_

<i>Pros</i>	<i>Cons</i>	<i>Other Considerations</i>

Sample map with energy resources labeled where they are currently being commercially mined/tapped

