



<b>Title:</b> Research and Debate	
<b>Author:</b> Kathy Rusert Acorn High School Mena	
<b>Course:</b> Environmental Science	<b>Duration:</b> 3 to 4 Class periods
<b>Grade:</b> 9-12	
<b>Objective:</b> Students will learn about the benefits and disadvantages of drilling for oil	
<b>Summary of Lesson:</b> Students will research oil drilling in national wildlife areas and debate the pros and cons.	
<b>Standards:</b> Common Core State Standards, Arkansas State Frameworks	
<b>CODE</b>	<b>STANDARD</b>
SP.3.ES.1-13	Students shall understand the impact of human activities on the environment
NS.4.ES.3	Utilize technology to communicate research findings
NS.5.ES.1-4	<ol style="list-style-type: none"> <li>1. Compare and contrast environmental concepts in pure science and applied science</li> <li>2. Explain why scientists should work within ethical parameters</li> <li>3. Evaluate long-range plans concerning resource use and by-product disposal for environmental, economic and political impact</li> <li>4. Explain how the cyclical relationship between science and technology results in reciprocal advancements in science and technology</li> </ol>
PD.1.ES.1-10	<ol style="list-style-type: none"> <li>1. Describe the structure, origin, and evolution of the Earth's components: <ul style="list-style-type: none"> <li>• atmosphere</li> <li>• biosphere</li> <li>• hydrosphere</li> <li>• lithosphere</li> </ul> </li> <li>2. Relate eras, epochs, and periods of Earth's history to geological development</li> </ol>



	<ol style="list-style-type: none"> <li>3. Determine the relative and absolute ages of rock layers</li> <li>4. Categorize the type and composition of various minerals</li> <li>5. Explain the processes of the rock cycle</li> <li>6. Describe the processes of degradation by weathering and erosion</li> <li>7. Describe tectonic forces relating to internal energy production and convection currents</li> <li>8. Describe the relationships of degradation (a general lowering of the earth's surface by erosion or weathering) and tectonic forces:             <ul style="list-style-type: none"> <li>• volcanoes</li> <li>• earthquakes</li> </ul> </li> <li>9. Construct and interpret information on topographic maps</li> <li>10. Describe the characteristics of each of the natural divisions of Arkansas:             <ul style="list-style-type: none"> <li>• Ozark Plateau</li> <li>• Arkansas River Valley</li> <li>• Ouachita Mountains</li> <li>• Coastal Plain</li> <li>• Mississippi Alluvial Plain (Delta)</li> <li>• Crowley's Ridge</li> </ul> </li> </ol>
PD.1.ES.19	Describe the cycling of materials and energy: <ul style="list-style-type: none"> <li>• nitrogen</li> <li>• oxygen</li> <li>• carbon</li> <li>• phosphorous</li> <li>• hydrological</li> <li>• sulfur</li> </ul>
BD.2.ES.1-10	Students shall understand the biological dynamics of Earth
<b>Teacher Excellence Support System (TESS):</b> 3b: Using questioning/prompts and discussion, 3d: Using assessment in instruction	
<b>Instructional Strategies and Practices</b> Cues, Questions, Advance Organizers, Discussion, Problem-Based Instruction, Reciprocal Teaching and Cooperative Learning, Role Plays, Technology	
<b>Bloom's Level:</b> Highest Level Only Creating	
<b>Materials and Resources:</b> <ul style="list-style-type: none"> <li>• Computers with internet access</li> </ul>	

**Formative Assessment:**

Panel discussion of research, Exit Slip

**Notes to Teacher:**

Prepare several questions in advance that will encourage students to clarify their position—pro or con.

**Student Activity**

1. The U.S. Fish and Wildlife Service states that their primary goal is “to protect the wildlife and habitats ...for the benefit of people now and in the future.”

Based on this goal students will research the current status of oil exploration and drilling projects in wildlife areas in the United States.

2. Divide the class into two teams and assign one team to address the short-term and long-term advantages and one team to address the short-term and long-term consequences for drilling for natural gas and oil on these public lands.
3. Each group will designate a spokesperson to represent it on a panel, and a “specialist” to sit on a panel to answer questions or clarify information.
4. When deciding about environmental issues, students should use the following steps:
  - gather information
  - consider values
  - explore consequences
  - make an informed decision
5. Provide class time for groups to develop the research.
6. A panel made up of a spokesperson and specialist from each group will present the research and respond to questions from the “audience.” Encourage students to ask probing questions that challenge both sides of the debate.
7. Exit Slip: Ask each student to respond to the following questions and be prepared to share their responses the following class period.



**Student Handout  
Research and Debate  
Exit Slip**

In your evaluation, did you consider short-term or long-term consequences to be most important? Why?

What influenced your decision the most?

**Student Handouts:** ( A printable copy of the handout is available at:  
<http://www.arkansasenergyrocks.com/educators/index.html>. (Select Curriculum, then 9-12 Lesson Plan – student handouts accompany each lesson plan.)