

## SEED Lesson Plan

**Session # 3**

**Objective:**

Students will be able to\_\_ Identify energy sources

Define renewable energy and identify sources and renewable or non-renewable

Rank sources by pollution and cost

**Assessment**

*Ideal “What did you learn” Sentence*

We get energy from a lot of sources, including coal, oil, solar, wind...Some are better because they are renewable, so they won't run out, and because they cause less pollution, including global warming.

*2-3 End of Semester Quiz Questions*

Identify these sources as renewable or not renewable, as high, or low-polluting, as expensive, medium cost, or inexpensive, and as easily available, or hard to find.

Coal, Oil, Natural Gas, Photovoltaics, Solar Thermal, Nuclear, Wind, biofuels

<b>Lesson Cycle</b>	<b>Estimated Time at End of Section</b>
<p><b>As You Enter Question</b> Where do we get energy from?</p>	<b>5 min</b>
<p><b>Introduction to Lesson 1</b> Write a list of different energy sources on the board: Coal, Oil, Natural Gas, Photovoltaics, Solar Thermal, Nuclear, Wind, biofuels.</p>	<b>10 min</b>
<p><b>Student Practice/Engagement 1</b> Each group chooses one and, with readings and their teacher as resources, fills out a worksheet detailing the cost per kWh, pollution and environmental effects, and availability of the resource.</p>	<b>25 min</b>
<p>Students present the worksheet to the class.</p>	<b>33 min</b>
<p><b>Teacher Presentation 2</b> Fill in table on the board like “end of semester questions.” Use input from students for the sources that have been presented, and fill in blanks for others. Each group copies the table on the back of their worksheet.</p>	<b>40 min</b>
<p><b>Student Practice/Engagement 2</b> Energy mix activity. Students are given 4 pennies, a cup, and a second cup with a line halfway up. They need to fill their cup to the line with “energy” in the form of nuts, raisins, chocolate chips, etc. Each time they buy a unit of a certain kind of energy, they are also given “pollution” along with it.</p> <p>In a 10-ounce cup, draw a line 4/5 of the way up, and make 1 unit 1 tablespoon (using a measuring spoon). One unit of pollution can be smaller, or you'll need several cups!</p>	<b>55 min</b>

Energy Type	Parts in 1 unit	Pollution parts	
PV/wind	2	1	
Biofuels	5	10	
Oil	6	12	
Coal	7	15	
Nuclear	5	8	
<b>Conclusion/Wrap Up</b> Write “what did we learn” and teachers choose a sentence for poster			60 min

**Worksheets/Readings Teacher Needs to Print/Copy and Number Needed of Each**

(1 per student for whole class, group of 3, group of 4, half of class, etc.)

- Worksheet for students, 1 per group

**Other Materials Teacher Needs to Bring to Lesson**

(Lab or demo materials, presentation materials, etc)

- Nuts, chocolate chips, rasins, etc.
- “Pollution” material, eg. dirt...
- Clear plastic cups, marker for line
- Pennies

**Classroom Resources Needed**

(Individual computers, overhead projector, television / DVD player, etc.)

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Group Name \_\_\_\_\_

## Energy Source Data Sheet

***Our Energy Source*** \_\_\_\_\_

1. How does your energy source get to people, how is it converted to usable energy?
2. Where in the United States is there a lot of this source? Where is there only a little?
3. Can you store and transport this source?
4. What kind of pollution or environmental problems does it cause?
5. How much does your source cost per kilowatt-hour?
6. Is this source renewable or not renewable? How do you know?

Source	Pollution	Cost	Availability	Renewable?
Oil				
Coal				
Natural Gas				
Biofuels				
Wind				
Photovoltaics				
Solar Thermal				
Nuclear				

*Teacher's Copy!!*

<b>Source</b>	<b>Pollution</b>	<b>Cost</b>	<b>Availability</b>	<b>Renewable?</b>
Oil	<i>high</i>	<i>low</i>	<i>medium</i>	<i>no</i>
Coal	<i>high</i>	<i>low</i>	<i>good</i>	<i>no</i>
Natural Gas	<i>high</i>	<i>low</i>	<i>good</i>	<i>no</i>
Biofuels	<i>medium</i>	<i>medium</i>	<i>Medium-limited amount of land</i>	<i>yes</i>
Wind	<i>low</i>	<i>high</i>	<i>low</i>	<i>yes</i>
Photovoltaics	<i>low</i>	<i>high</i>	<i>high</i>	<i>yes</i>
Solar Thermal	<i>low</i>	<i>medium</i>	<i>high</i>	<i>yes</i>
Nuclear	<i>medium</i>	<i>low</i>	<i>medium</i>	<i>no</i>