

4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

<p><u>PE</u> Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.]</p>	<p><u>DCI</u> • Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not.</p>	<p><u>CCC</u> • Cause and Effect – Cause and effect relationships are routinely identified and used to explain change.</p>	<p><u>Practices</u> Obtaining, Evaluating, and Communicating Information – <i>Obtaining, evaluating, and communicating information in 3-5 builds on K-2 experiences and progresses to evaluate the merit and accuracy of ideas and methods.</i> Obtain and combine information from books and other reliable media to explain phenomena.</p>
<p><u>Activity</u> Whole Class: Brainstorm different types of energy sources. After the list is complete, classify the items according to area of use: power plants, transportation, or both. Have students vote whether they think the energy source is renewable or nonrenewable.</p>	<p><u>Question</u> What are some sources of energy?</p>	<p><u>Objectives / Next Steps</u> • There are many energy sources. • Some sources of energy are easily transported, so they are more commonly used in transportation than power plants. <i>How do these energy technologies work?</i></p>	<p><u>Notes</u> Energy sources which are primarily used for transportation include ethanol and oil/petroleum. Other energy sources are listed in the third activity.</p>
<p>Whole Class: Show how small generators create power when magnets move past one another.</p>	<p>How do these energy technologies work?</p>	<p>• All generators make use of magnets to turn the energy of motion into electrical energy.</p>	<p>We provide an educational AC/DC generator and shake-powered flashlights. Both are good ways to show the</p>

		<i>What makes one source of energy better than another?</i>	magnets in motion as well as how much motion is required to power something. If you are purchasing your own flashlight, find one with translucent sides so students can see the magnet as it slides back and forth when shaken.
Small Groups: Choose a type of fuel to research: biomass, coal, natural gas, nuclear, solar, water behind dams, wave motion, or wind. Create a labeled flowchart drawing to show how the technology works and describe the advantages and disadvantages of your technology versus others.	How do these energy technologies work? [Continued] What makes one source of energy better than another?	<ul style="list-style-type: none"> • Energy is always derived from natural resources. • The use of natural resources for energy impacts the environment. • Technology can often be used to reduce the environmental impact of power generation. 	There are a number of reading resources provided, but there are many more resources available. When seeking additional resources, be sure they are written at the students' level, especially where the technology is concerned.
Whole Class: Have students share their research and drawing. Try to help students make connections between the different technologies.	How do these energy technologies work? [Continued] What makes one source of energy better than another? [Continued]	<ul style="list-style-type: none"> • Many technologies use a spinning turbine to generate electrical power. • Each of the different technologies has reasons it is both better and worse than the alternatives. • One key difference between energy sources is whether they are renewable or not. <p><i>Which energy sources are considered renewable?</i></p>	Since there is a lot of new information coming from each group, students might benefit from making quick “pros and cons” notes and using them as conversations continue.
Whole Class: Revisit the original brainstorming list to determine if renewable/non-renewable classification was valid.	Which energy sources are considered renewable?	<ul style="list-style-type: none"> • Renewable resources are an important part of creating sustainable energy. 	