

**Grade Level:** Elementary School

**Subject Correlation:** Science, History

**Objectives: Students will be able to:**

1. Differentiate between renewable and non-renewable resources.
2. Identify different forms of energy and list the advantages or disadvantages of different forms of energy.
3. Determine the benefits as well as the environmental harms of using energy to improve our quality of life.
4. Describe the necessity of developing renewable or inexhaustible energy resources.
5. Describe the ways in which technology affects nature, both good and bad.

**Length:** 35 minutes

**Teacher Preparation:** Visit the [Teachers Corner](#) at Earth Day Network's website, [www.earthday.net](http://www.earthday.net), where you can download [Renew Our Future](#), an informational packet about different energy sources. Attached is a simplified version of *Renew Our Future*.

**Outline (with times)**

10 minutes

*Introduction – Life without Energy*

Energy figures into almost every human activity: it heats our homes, fuels our cars, ploughs our soil, and powers our machinery. Harnessing the world's energy supply has brought standards of living to new heights. We are so accustomed to energy use that one can scarcely imagine surviving at a time before it existed.

Humans have only learned to harness energy in our personal daily lives in the last 150 years or so. As a class, list five to ten ways we use energy in our daily lives. How did our ancestors live without these devices 150 years ago?

Examples:

Light bulbs – candles

Heaters – fire places

Air conditioners – open windows

Microwaves – fire powered ovens

Television – books

movies – theater

cars – horse and buggies

telephones – letters

radios – live entertainment

synthesizers – pianos and organs

15 minutes

*Where Do We Get Our Energy?* Read the following handout to learn about where our energy comes from. Then complete the attached worksheet differentiating between different forms of energy.

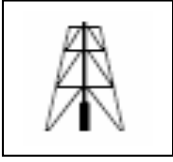
Additional Exercises:

1. Keep a daily journal that keeps track of your energy use. Review your journal to discover where you can conserve energy. Think about your personal activities as well as activities your family and friends participate in.
2. Be sure to look over the energy experiments page. (See the *Energy Experiments* lesson.)

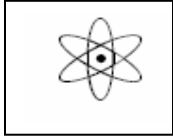


*Energy is Everywhere*

**Nonrenewable energy sources either are unable to be replaced naturally, or would take millions of years for natural processes to replace.**

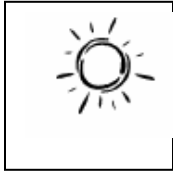


**Fossil Fuels** provide most of the energy that creates electricity and powers cars and industry. Fossil fuels come from plants and animals. Over millions of years, their buried remains were changed into useful forms of fuel such as coal, petroleum, and natural gas. These fuels take millions of years to create and they are becoming more difficult to find. When these fuels are burned to make energy, they create pollution and release carbon dioxide into the atmosphere, a major cause of global warming.



**Nuclear Energy** is produced by splitting tiny atoms. Although it is not a source of global warming pollution, using this type of energy is still harmful to the environment. Along with the risk of accidents, nuclear wastes are dangerous to all life for tens of thousands of years. There is no safe way to dispose of them.

**Renewable energy sources are replaced naturally. There is not a fixed supply that can eventually be used up.**



**Solar Energy** is power from the heat of the sun, the most plentiful source of energy known to humankind. Enough clean, renewable solar energy falls from the sky in one day to power the world for 27 years. When the sun is shining, solar cells produce electricity. The energy from sunlight can be stored in batteries to use on cloudy days. Energy from the sun can be used directly – to provide heat for living space and water, or stored in solar panels such as on calculators, watches, and rooftops.



**Wind Energy** produces electricity by turning blades on a *wind turbine*, or a windmill. Wind energy is very useful in places with a lot of strong winds. Wind energy can be stored in batteries for later use and is safe because it does not produce waste. Unfortunately, some wind power stations can be dangerous to certain birds, can be considered unattractive to look at, and can create excessive noise.



**Geothermal Energy** comes from the heat inside the Earth that causes hot springs, geysers, and volcanoes. This natural heat can be captured and used to produce electricity. Geothermal energy is limited to certain locations with a lot of volcanic activity, but is already used in places such as New Zealand, Iceland, and the United States to warm buildings and generate electricity.



**Biomass Energy** is produced from crops or waste materials. Heat, electricity, and transportation fuels can be made from plant materials and wastes such as banana peels, paper, and human waste – anything that was once alive or part of a living thing. While wood is still the most widely used source of biomass fuel worldwide, other biomass sources are being developed. Methane gas from landfills produces electricity while corn and vegetable oils can be converted to fuels for cars.



**Hydroelectric Power** takes the energy in flowing water to generate electricity. For example, a dam can collect energy from a river. Hydropower production can cause environmental harm by flooding habitats and preventing fish from spawning. We try more and more to obtain hydroelectric power in ways that are less damaging to freshwater habitats and fish.



*Energy is Everywhere*



*Now that you have read a little bit about the different forms energy can take, both renewable and non renewable, draw a line from the energy form in the first column to the definition in the second column and interesting fact in the third column.*

Type of Energy	Description	Facts
1. Fossil fuels	<ul style="list-style-type: none"> <li>• Produces energy by spinning windmills or wind turbines</li> </ul>	<ul style="list-style-type: none"> <li>• Very difficult and dangerous to store waste produced from creating this type of energy</li> </ul>
2. Hydroelectric Power	<ul style="list-style-type: none"> <li>• Energy from sunlight</li> </ul>	<ul style="list-style-type: none"> <li>• Energy from garbage!</li> </ul>
3. Geothermal Power	<ul style="list-style-type: none"> <li>• Energy produced by decomposing organic materials</li> </ul>	<ul style="list-style-type: none"> <li>• Environmentally friendly form of renewable energy. Birds beware!</li> </ul>
4. Solar Power	<ul style="list-style-type: none"> <li>• Energy comes from heat generated inside the Earth</li> </ul>	<ul style="list-style-type: none"> <li>• Humans rely heavily on this form of energy even though it causes pollution and global warming and has a limited supply</li> </ul>
5. Nuclear Energy	<ul style="list-style-type: none"> <li>• Extracted from the earth. Formed by plants and animals alive millions of years ago</li> </ul>	<ul style="list-style-type: none"> <li>• Causes hot springs, volcanoes and geysers</li> </ul>
6. Wind Energy	<ul style="list-style-type: none"> <li>• Comes from flowing water such as rivers, streams and ocean currents</li> </ul>	<ul style="list-style-type: none"> <li>• The most abundant form of energy – will not run out for billions of years</li> </ul>
7. Biomass Energy	<ul style="list-style-type: none"> <li>• Produces energy by splitting tiny atoms so small you cannot see them without a microscope</li> </ul>	<ul style="list-style-type: none"> <li>• US generated 40% of its energy from damned streams in the 1930s. Today, less than 10% of US energy comes from this power.</li> </ul>

