



ENERGIZING Our Lives

What is energy and where does electricity come from? This module explores the energy sources that fuel our electrical needs, with special emphasis on renewable energy and emerging technologies.

Best for second through sixth grade.

OBJECTIVES

- Differentiate between renewable and non-renewable energy sources
- Identify the resources we use to generate electricity
- Understand the benefits and challenges of using various energy sources

METHODS

Specific methods used will vary depending on age group and setting and may include:

- **Energy Model**—This large colorful instructional model provides an overview of primary energy resources, basic fuels, energy conversion processes, and how these resources are consumed in the US.
- **Renewable Energy Classroom Lab**—Students will investigate the output from renewable energy sources of wind, solar and hydro with these generator models.
- **Wind Energy Generator Model**—This functional model is connected to a DC generator and 1.5 volt bulb to indicate electrical output, a great way to showcase the properties of wind energy.
- **Van de Graaff Generator**—Always a crowd pleaser, a variety of experiments can be used with this hair-raising electrostatic generator to demonstrate electric fields and fundamentals of electricity.
- **Alternative Energy Clever Catch**—This fun and interactive ball generates discussion via the alternative energy-related questions printed on it.

CONTENT STANDARDS ADDRESSED

South Dakota

- 3.P.3.1. Students are able to define energy and differentiate between sources of renewable and non-renewable energy.
- 3.L.3.3. Students are able to describe ways humans impact air, water, and habitat quality.
- 3.E.1.2. Describe how humans use Earth's natural resources.
- 3.S.1.1. Students are able to recognize ways to recycle, reuse, and reduce consumption of natural resources.
- 4.S.1.1. Students are able to describe how people continue to invent new ways of doing things, solving problems, and getting work done.
- 4.S.1.2. Students are able to explain how new ideas and inventions often affect people.
- 5.L.3.1. Students are able to describe how natural events and/or human influences may help or harm ecosystems.
- 5.P.3.2. Students are able to describe the Sun's ability to produce energy in the forms of light and heat.
- 5.P.2.1 Students are able to identify forces in specific situations that require objects to interact, change directions, or stop.
- 5.S.1.2. Students are able to describe how designing a solution may have constraints.
- 5.S.2.1. Students are able to explain the interrelationship of populations, resources, and environments.
- 6.P.3.1. Students are able to identify types of energy transformations.
- 6.N.2.1 Students are able to pose questions that can be explored through scientific investigations.
- 6.S.2.1. Students are able, given a scenario, to identify the problem(s) of human activity on the local, regional, or global environment.
- 6.S.1.1. Students are able to describe how science and technology have helped society to solve problems.
- 6.E.1.2 Students are able to examine the role of water on the Earth.
- 6.P.2.1. Students are able to describe how push/pull forces acting on an object produce motion.

Minnesota

- 0.2.3.1.1 Identify the sun as a source of heat and light.
- 1.2.2.1.3 Demonstrate how push and pull forces can make objects move.
- 1.1.3.1.5 Describe how the parts of a system, when put together, can do things that are not possible when the parts are separated.
- 4.1.3.3.1 Describe a technology that is an intrinsic part of human cultures and how the availability of that technology greatly influences human life.
- 4.1.3.3.2 Describe a situation in which one invention led to other inventions.
- 4.1.3.3.3 Provide an example where science or technology does not provide an acceptable solution to a problem or fulfill every human need.
- 4.2.3.2.3 Demonstrate how the flow of electricity produces heat, light and sound.
- 5.3.4.1.1 Categorize energy resources and material resources into renewable and non-renewable.
- 5.3.4.1.3 Give examples of how mineral and energy resources are obtained and processed to be used by human systems (for example, extraction of iron for steel, oil or coal for energy).
- 5.3.4.1.4 Explain how naturally occurring materials may be processed and changed to modify their properties into more useful products.
- 6.1.2.1.1 Identify a common engineered system and evaluate its impact on the daily life of humans, the local environment and wildlife habitat.
- 6.1.2.1.2 Recognize that there is no perfect design and that new technologies have side effects that may increase some risks and decrease others.
- 6.2.3.2.1 Recognize that objects and substances in motion have kinetic energy.
- 6.2.3.2.3 Differentiate between kinetic and potential energy and identify situations where kinetic energy is converted to potential energy and vice versa.
- 6.2.3.2.4 Trace the changes of energy forms, including thermal, electrical, mechanical, or others as energy is used for transportation, lighting or other purposes.