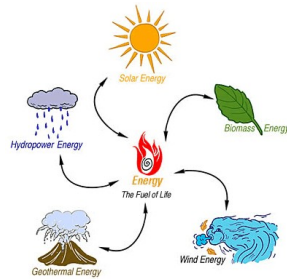


Unit 1-Renewable Energy

How can we use renewable resources to generate energy with the purpose of improving the world around us?

PBL BIG IDEA	Grade Level	NGSS Addressed (but not limited to)	Week 1 Focus	Week 2 Focus	Week 3 & 4 Focus
Conservation	K	*K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface. *K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area. *K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.	What is Energy? How does it exist in our environment?	What is Conservation? What impact can it have on our environment?	How can we conserve energy in our environment?
Solar Powered Energy	1	*1-PS4-2. Make observations to construct an evidence-based account that objects can be seen only when illuminated. *1-PS4-3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. *1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. *1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year.	What is Energy? How does it exist in our environment?	What is Solar Energy? What impact can it have on our environment?	How can we model/create Solar Energy as a renewable?
Wind Powered Energy	2	*2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. *2-PS1-3. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. *2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.	What is Energy? How does it exist in our environment?	What is Wind Energy? What impact can it have on our environment?	How can we model/create Wind Energy as a renewable resource?
Magnetic Energy	3	*3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. *3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. *3-PS2-3. Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. *3-PS2-4. Define a simple design problem that can be solved by applying scientific ideas about magnets. *3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.	What is Energy? How does it exist in our environment?	What is Magnetic Energy? What impact can it have on our environment?	How can we model/create Magnetic Energy as a renewable resource?
Hydroelectric Energy	4	4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object. *4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. *4-PS3-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide. *4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. *4-PS4-1. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. *4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. *4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.	What is Energy? How does it exist in our environment?	What is Hydroelectric Energy? What impact can it have on our environment?	How can we model Hydroelectric Energy as a renewable resource?
Geothermal Energy	5	*5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen. *5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. 5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down. 5-ESS2-2. Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. *5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.	What is Energy? How does it exist in our environment?	What is Geothermal Energy? What impact can it have on our environment?	How can we model/create Geothermal Energy as a renewable resource?

Biomass Energy	6	<p>*MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.</p> <p>*MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.</p> <p>*MS-PS1-4. Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.</p> <p>*MS-PS1-5. Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.</p> <p>*MS-PS1-6. Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.</p> <p>*MS-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.</p> <p>*MS-PS3-4. Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.</p> <p>*MS-PS3-5. Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.</p>	<p>What is Energy? How does it exist in our environment?</p>	<p>What is Biomass Energy? What impact can it have on our environment?</p>	<p>How can we model/create Biomass Energy as a renewable resource?</p>
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Engineering Standards	
<p>Grades K-2</p>	<p><i>Students who demonstrate understanding can:</i></p> <p>*K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</p> <p>*K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</p> <p>*K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.</p>
<p>Grades 3-5</p>	<p><i>Students who demonstrate understanding can:</i></p> <p>*3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.</p> <p>*3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.</p> <p>*3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.</p>
<p>Grade 6-8</p>	<p><i>Students who demonstrate understanding can:</i></p> <p>*MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.</p> <p>*MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.</p> <p>*MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.</p> <p>*MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.</p>