

	Steam Turbine	Renew a Chip	Extracting Fossil Fuels and Uses
Student Experience	<p>Students will:</p> <ol style="list-style-type: none"> 1. Generate questions about electricity 2. Observe the effects of heat energy on water 3. Model the action of a turbine 4. Revise their model design of a turbine 5. Compare a model to a representation of a real turbine 6. Make connections between the various forms of energy 	<p>Students will:</p> <ol style="list-style-type: none"> 1. Conduct a simulation of energy use 2. Collect and analyze data 3. Organize data in a variety of ways 4. Communicate what they have learned about energy resources 	<p>Students will:</p> <ol style="list-style-type: none"> 1. Model an oil reserve 2. Read an article about finding oil and drilling 3. Compare the model to real life 4. Use the model to predict effects on the environment 5. Write a journal entry
T4T Material	Various materials from the cart	Black and Red Chips Black specimen cups	.Shoe boxes, cat litter
Big Idea	Energy can come in many forms. Electricity is a widely used source of energy. Electricity is produced from fossil fuels that power turbines. Energy can be changed from one form to another, but in the process, some of the energy is converted into heat.	Students know that energy resources are both renewable and nonrenewable and that humans use both kinds of energy. Students know the benefit to using renewable resources as opposed to non-renewable. Students analyze data to investigate energy use over time.	Fossil fuels are found in key places around the world. A reserve is the amount of resource obtainable with current technologies. Reserves of fossil fuels are found below the earth. Extraction of fossil fuels can be harmful to the environment. Petroleum is a raw material for a wide variety of products.
Connection to Culminating Activity	Electricity is produced using fossil fuels	There are 2 types of energy and as a society we are moving towards using more renewable resources.	How using fossil fuels is impacting our environment.
CA Standards	<p>6a. Students know the utility of energy sources is determined by factors that are involved in converting these sources to useful forms and the consequences of the conversation process.</p> <p>3b. Students know that when fuel is consumed, most of the energy released becomes heat energy.</p>	<p>6a. Students know the utility of energy sources is determined by factors that are involved in converting these sources to useful forms and the consequences of the conversation process.</p> <p>6b. Students know different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife and forests and know how to classify them as renewable or nonrenewable.</p>	<p>6a. Students know the utility of energy sources is determined by factors that are involved in converting these sources to useful forms and the consequences of the conversation process.</p> <p>6b. Students know different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife and forests and know how to classify them as renewable or nonrenewable.</p> <p>6c. Students know the natural origin of the materials used to make common objects.</p>

Next Generation Science Standards	-	MS-ESS3-4	MS-ESS3-4
Time	About three 40 minute time periods	About four 40 minute time periods	Two 40 minute time periods

	Energy is Blowin' in the Wind	Renewable Energy: Wind
Student Experience	<p>Students will:</p> <ol style="list-style-type: none"> 1. Be introduced to the project 2. Be introduced to the materials available to build their particulate matter sampler. 3. Design and construct particulate matter sampler. 4. Use particulate matter sampler to collect data. 5. Analyze data and record data using Google pages 6. Share data and reflect on design <p>EXTRA: Write a letter to the principal to suggest ways that students can reduce the amount of pollution on campus.</p>	<p>Students will:</p> <ol style="list-style-type: none"> 1. Read about wind energy 2. Be introduced to the project 3. Be introduced to the materials available to design windmill 4. Develop a plan for their windmill 5. Execute their plan 6. Test and redesign 7. Evaluate and communicate results
T4T Material	Vaseline, various cart materials	Various cart materials
Big Idea	Air pollution is one of the effects nonrenewable resources has on the environment. Air quality is rated based on the amount of particulate matter. Scientists use particulate matter samplers to collect particulate matter.	There are alternate sources of energy to fossil fuels such as wind, solar energy, water power, nuclear fission and geothermal energy. Wind energy can be generated on both a large and small scale. The design and materials used can enhance the efficiency of windmills.
Connection to Culminating Activity	How does pollution affect their own environment and ways to reduce pollution.	Alternatives to using fossil fuels
CA Standards	-	6b. Students know different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife and

		forests and know how to classify them as renewable or nonrenewable.
Next Generation Science Standards	MS-ESS3-3	MS-ESS3-3
Time	Two to three 40 minute time periods	Two to three 40 minute time periods

Culminating Activity – Building an Energy Efficient Life

	Retaining Heat Energy	Energy House	Creating a brochure and sell house
Student Experience	Make predictions as to which material is the best insulator Identify the best source of insulation	Build an energy house Calculate the cost of building Calculate the money saved	Create a sales pitch Create a brochure
T4T Material	Plastic wrap	Various cart materials, plastic bags, glue guns	-
Big Idea	Material affects insulation.	Residential buildings require energy for heating, cooling and lighting (among other uses). Buildings can lose heated or cooled air to the outside through openings. Building design and materials can be used to minimize loss of heated or cooled air.	People can make choices in the products that they buy and their daily lives to minimize human impact on the environment
CA Standards	3b. Students know that when fuel is consumed, most of the energy released becomes heat energy.	-	-
Next Generation Science Standards	MS-ESS3-3	MS-ESS3-3	-
Time	One 40 minute time period	Two 40 minute time periods	2-3 40 minute time periods

Total Time:

(19) 40 minute class periods

*Teacher can adjust pacing for any lesson and lab write up based on student needs

Readings for the Unit:

<http://www.need.org/files/curriculum/guides/Intermediate%20Energy%20Infobook.pdf>

Lesson Plans for Steam Turbine

Essential Question: Where does electricity come from?