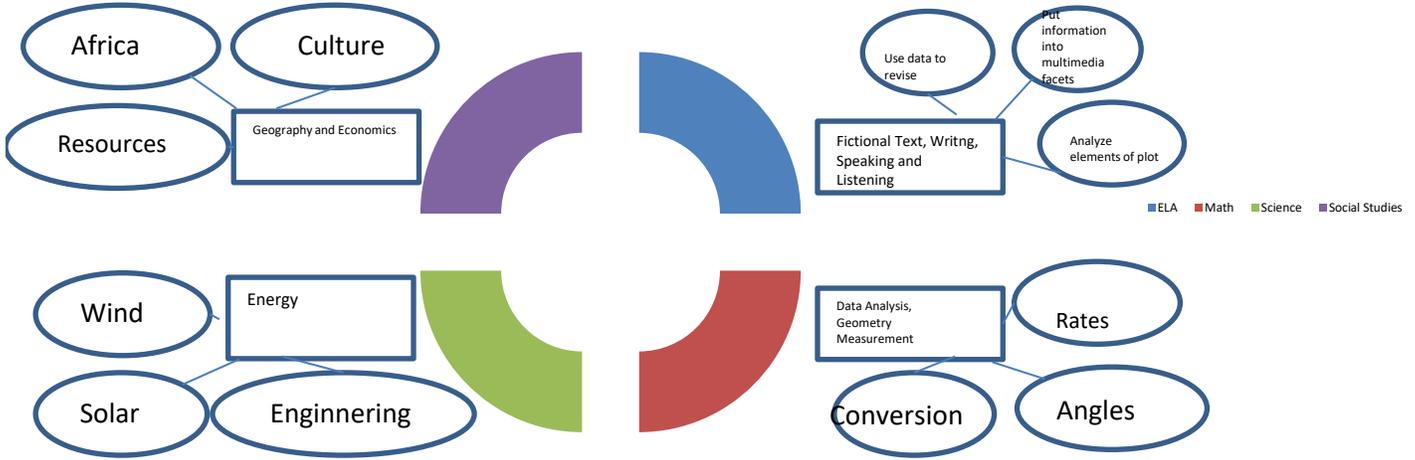


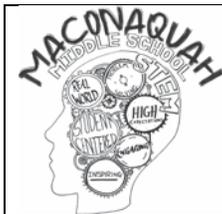


Unit: Water

# Maconaquah MS STEM Unit Plan Template



Grade Level	7 <sup>th</sup> Grade	Unit Length	9 Weeks
Unit Overview	<i>For the 4th nine-weeks grading period, we will be looking at energy use and energy alternatives.</i>		
Unit Essential Question(s)	<p>How does use of energy affect our lives?</p> <p>What types of energy are most essential to our daily lives?</p> <p>How does energy use impact the environment and climate?</p> <p>What are alternate forms of energy?</p> <p>How can we maximize are resources while minimizing our consumption of energy?</p>		
Culminating Events	<p>Students will build wind powered cars. The students will compete in a “Wind Box Derby”</p> <p>Students will build solar powered cars. Students will build and test solar light designs. Students will build a wind turbine.</p>		



# STEM Project Rubric

**Project Title:**  
**Student Name:**  
**Date:**

	<b>Advanced</b>	<b>Proficient</b>	<b>Needs Improvement</b>
<b>Math Components</b>	Students correctly calculated and converted rates and cost.	Students mostly calculated and converted rates but made errors.	Students did not correctly calculated and converted rates and cost.
<b>Science Components:</b>	Students can explain the positive and negative uses of alternative energy and give examples and evidence to support their claim and articulate their reasoning.	Students can explain the positive and negative uses of alternative energy and give examples and evidence to support their claim but cannot articulate their reasoning.	Students cannot explain the positive and negative uses of alternative energy and give examples and evidence to support their claim and cannot articulate their reasoning.
<b>Social Studies Component</b>	Student presentations will be formal and well-planned. They will correlate their product to 75% of applicable state standards.	Student presentations will be formal and sufficiently planned. They will correlate their product to 50% of applicable state standards.	Student presentations are informal and confusing or not very well planned. They correlate their product to less than 50% of applicable state standards.
<b>ELA Component</b>	<p>The writer creates a well-organized sequence of events that unfolds naturally and logically and creates a smooth progression of experiences or events.</p> <p>The writer provides an effective conclusion that follows from and reflects on the narrated experiences or events.</p>	<p>The writer sufficiently creates a sequence of events that unfolds naturally and creates a progression of experiences or events.</p> <p>The writer provides a conclusion that follows from the narrated experiences or events.</p>	<p>The writer creates a sequence of events that is very brief and /or confusing; sequence may be very hard to follow.</p> <p>The writer provides little to no conclusion; writing may stop abruptly or be disconnected from narrated experiences or events.</p>

**Unit Objectives**

- I can read and comprehend a piece of non-fictional text.
- I can read informational text and comprehend a sequence of events.
- I can analyze how an author develops and contrasts points of view.
- I can explain how energy is used in our day to day lives.
- I can explain that energy conversion has negative impact on our environment and climate.
- I can list and understand alternative forms of energy.
- I can explain limitations to various forms of energy.
- I can read and draw inferences in data charts and graphs.
- I can calculate and convert between multiple forms of measurements.
- I can explain how different cultures are affected by their geography.
- I can read and interpret a map showing the natural resources, physical landforms, and population density of a given region of the eastern hemisphere.
- I can explain the geography of regions and people living in various countries of the eastern hemisphere.

Strands (main ideas taught in unit)				
<u>ELA</u>	Non-Fiction text, writing, listening, speaking, and sequencing			
<u>Math</u>	Data Analysis, Geometry, and Measurement			
<u>Science</u>	Energy conversion and consumption Alternative forms of energy Solar and Wind energy Engineering			
<u>Social Studies</u>	Geography, Economics, Climate			
Vocabulary				
ELA	Inferences- conclusions or opinions that the reader forms after having read the text Point of View- perspective in which the story is told Sequencing			
Math	Angle, Perpendicular, Parallel, Adjacent, Vertical, Transversal, Rates Unit Rates, Unit Conversions Percent, Percent Efficiency			
Science	Solar Panel, Alternate Energy, Climate Change, Wind Turbines, Hemisphere, Solstice, Orbit			
Social Studies	Urbanization – the increase in the percentage of people who live in cities Globalization – the process in which countries are increasingly linked to each other through culture and trade Individual human capital – the skills and expertise people acquire from education, training, and experience Standard of living - the level of wealth, comfort, material goods and necessities available to a certain socioeconomic class in a certain geographic area World Bank - an international organization dedicated to providing financing, advice and research to developing nations to aid their economic advancement. Natural resources – A material source of wealth, such as timber, fresh water, or a mineral deposit, that occurs in a natural state and has economic value Helpful/harmful spillovers – the impact of an activity (positive or negative/ helpful or harmful) on the well-being of a third party			
Key Questions				
	ELA	Math	Science	Social Studies
	<p><i>How do you analyze elements of subplots within a plot?</i></p> <p><i>How do you analyze and contrast different points of view?</i></p> <p><i>How do you analyze elements in a work of literature?</i></p>	<p><i>What information can be inferred from a graph?</i></p> <p><i>What purpose do different types of graphs serve?</i></p> <p><i>How can we use to data to draw conclusions?</i></p> <p><i>How can we communicate with data using graphs?</i></p> <p><i>How does the mean, median, and mode allows scientist to draw conclusions from data</i></p>	<p><i>What types of energy do we use daily?</i></p> <p><i>How can we use alternative forms of energy?</i></p> <p><i>What are the issues with solar energy?</i></p> <p><i>What are the issues with wind energy?</i></p> <p><i>What are other forms of alternative energy?</i></p> <p><i>How have humans impacted the world with their use of</i></p>	<p><i>How does the GDP and Standard of Living of countries of the eastern hemisphere compare to each other (and the United States)?And how is this affected by their natural resources and climate?</i></p> <p><i>How can increasing an individual’s human capital improve their standard of living?</i></p> <p><i>How are energy problems being</i></p>

		<i>and make future predictions.</i>	<i>energy?</i>	<i>addressed in third world countries of the Eastern Hemisphere?</i>
Hook for Unit	Individual Lesson and Labs pertaining to subject area			
Literature Component	Solar Car Manual-Carolina Labs Shedding Light on Solar Energy – Dr. Curt Maxey How do Solar Panels Work-Ed TED Lessons High interest articles regarding lighting problems in Africa TedTalks Video – How We Made Peace with the Lions – Richard Turere			
Writing Closure	For closure of unit objectives, the students will compose an informative writing piece to inform the general public on uses and limitations of alternative forms of energy.			
Materials Needed for Culminating Event	Virtual Wind Lab Wind Turbine Engineering Challenge-Tape, Index Cards, Kinex Solar Panel Car Kits Ceiling Light-(20oz bottles) Cardboard, tape Wind Derby-Straws, Index Cards, Tape, Paper Clips, Life Savers			
Standards: College & Career Ready , Indiana State Standards				
ELA College & Career Ready	<p><b>7.RL.2.3:</b> Analyze the interaction of elements in a work of literature (e.g., <i>how setting shapes the characters or plot</i>).</p> <p><b>7.RL.3.1:</b> Analyze how a work of literature's structural elements such as subplots, parallel episodes, climax, and conflicts contribute to its meaning and plot.</p> <p><b>7.RL.3.2:</b> Analyze how an author develops and contrasts the points of view of different characters or narrators in a work of literature.</p> <p><b>7.RL.4.2:</b> Compare and contrast a fictional portrayal of a time, place, or character and a historical account of the same period as a means of understanding how authors of fiction use or alter history.</p> <p><b>7.W.3.3:</b> Write narrative compositions in a variety of forms that –</p> <ul style="list-style-type: none"> <li>• Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters.</li> <li>• Organize an event sequence (e.g., <i>conflict, climax, resolution</i>) that unfolds naturally and logically, using a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another.</li> <li>• Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters.</li> <li>• Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events.</li> </ul> <p>Provide an ending that follows from and reflects on the narrated experiences or events</p> <p><b>7.W.4:</b> Apply the writing process to –</p> <ul style="list-style-type: none"> <li>• Plan and develop; draft; revise using appropriate reference materials; rewrite; try a new approach; and edit to produce and strengthen writing that is clear and coherent, with some guidance and support from peers and adults.</li> </ul>			
Math College & Career	7.AF.7: Identify the unit rate or constant of proportionality in tables, graphs, equations, and verbal descriptions of proportional relationships			

Ready	<p>7.DSP.1: Understand that statistics can be used to gain information about a population by examining a sample of the population and generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.</p> <p>7.DSP.2: Use data from a random sample to draw inferences about a population. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.</p> <p>7.DSP.3: Find, use, and interpret measures of center (mean and median) and measures of spread (range, interquartile range, and mean absolute deviation) for numerical data from random samples to draw comparative inferences about two populations.</p> <p>7.DSP.4: Make observations about the degree of visual overlap of two numerical data distributions represented in line plots or box plots. Describe how data, particularly outliers, added to a data set may affect the mean and/or median.</p> <p>7.DSP.6: Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its relative frequency from a large sample.</p> <p>7.DSP.7: Develop probability models that include the sample space and probabilities of outcomes to represent simple events with equally likely outcomes. Predict the approximate relative frequency of the event based on the model. Compare probabilities from the model to observed frequencies; evaluate the level of agreement and explain possible sources of discrepancy.</p> <p>PS.5: Use appropriate tools strategically.</p> <p>PS.6: Attend to precision.</p> <p>PS.8: Look for and express regularity in repeated reasoning.</p>
<u>Science</u> College & Career Ready	<p>7.1.1 Explain that when energy is transferred from one system to another, the total quantity of energy does not change.</p> <p>7.1.2 Describe and give examples of how energy can be transferred from place to place and transformed from one form to another through radiation, convection and conduction.</p> <p>7.1.3 Recognize and explain how different ways of obtaining, transforming and distributing energy have different environmental consequences.</p> <p>7.1.4 Recognize and provide evidence of how light, sound and other waves have energy and how they interact with different materials.</p> <p>7.4.1 Understand that energy is the capacity to do work.</p> <p>7.4.2 Explain that energy can be used to do work using many processes (e.g., generation of electricity by harnessing wind energy).</p> <p>7.4.3 Explain that power is the rate that energy is converted from one form to another.</p>

	7.4.4 Explain that power systems are used to provide propulsion for engineered products and systems.
<u>Social Studies</u> Indiana State Standards	7.3.1 Formulate a broad understanding of the location of countries of Africa, Asia and the Southwest Pacific 7.3.4 Identify major physical characteristics of regions of Africa, Asia, and the Southwest Pacific, such as deserts, basins, plains, mountains, and rivers, and describe their formation 7.3.5 Describe ecosystems of Africa’s deserts, Asia’s mountain regions, and the coral reefs of Australia and use multiple information resources to discover environmental concerns that these ecosystems are facing today 7.3.6 Compare and contrast the distribution of natural resources in Africa, Asia and the Southwest Pacific; describe how natural resource distribution can impact the wealth of a country. 7.3.7 Describe the limitations that climate and land forms place on land or people in regions of Africa, Asia and the Southwest Pacific. 7.3.8 Identify current trends and patterns of rural and urban population distribution in selected countries of Africa, Asia and the Southwest Pacific and analyze the causes for these patterns. Example: Life expectancy, income, literacy rate, industry, education, natural resources, and climate 7.4.1 Explain how voluntary trade benefits countries and results in higher standards of living in Africa, Asia, and the Southwest Pacific. 7.4.4 Compare and contrast the standard of living of various countries in Africa, Asia, and the Southwest Pacific using Gross Domestic Product per capita as an indicator; hypothesize how factors, including urbanization, industrialization, and globalization could affect the differences in the standard of living statistics. 7.4.5 Analyze different methods that countries in Africa, Asia, and the Southwest Pacific have used to increase their citizens’ individual human capital 7.4.6 Identify ways that societies deal helpful and harmful externalities (spillovers) in Africa, Asia or the Southwest Pacific. 6-8.LH.2.1 Cite specific textual evidence to support analysis of primary and secondary sources. 6-8.LH.4.2 Distinguish among fact, opinion, and reasoned judgment in a text. 6-8.LH.4.3 Compare and contrast treatments of the same topic in a primary and secondary source.