

Berryville Lesson Plan–Middle School

Teacher Name: **Ashley Hill (Stracener)**

Grade Level and Content: **7th grade science**

Unit Title: **UNIT 4 – Newton’s Laws, Energy, Experimental Design (Review)**

Lesson Title: **Energy and Alternative Energy Sources**

Timeline of Lesson Plan: Start Date: **March 16, 2015**

End Date: **March 20, 2015**

GOALS: Common Core State Standards/AR Frameworks

Number	Description
PS.6.7.1	Compare and contrast Newton’s three laws of motion
PS.6.7.2	Conduct investigations demonstrating Newton’s first law of motion
PS.6.7.3	Demonstrate Newton’s Second law of motion
PS.6.7.4	Conduct investigations of Newton’s third law of motion
PS.6.7.5	Explain how Newton’s three laws of motion apply to real world situations (e.g. sports, transportation)
PS.6.7.6	Investigate careers, scientists, and historical breakthroughs related to laws of motion
PS.7.7.1	Identify natural resources used to supply energy needs
PS.7.7.2	Describe alternatives to the use of fossil fuels: -solar energy -geothermal energy -wind -hydroelectric power -nuclear energy -biomass
PS.7.7.3	Conduct investigations to identify types of potential energy and kinetic energy
PS.7.7.4	Investigate alternative energy sources
PS.7.7.5	Investigate careers, scientists, and historical breakthroughs related to natural resources, alternative resources, electricity, and magnetism
NS.1.7.1	Interpret evidence based on observations
NS.1.7.2	Analyze components of experimental design used to produce empirical evidence: hypothesis, replication, sample size, appropriate use of control, use of standardized variable

NS.1.7.3	Interpret scientific data using mean, median, mode, and range in SI units
NS.1.7.4	Construct and interpret scientific data using: histograms, circle graphs, scatter plots, double line graphs, line graphs by approximating line of best fit
NS.1.7.5	Communicate results and conclusions from scientific inquiry
NS.1.7.6	Develop and implement strategies for long-term, accurate data collection
NS.1.7.7	Distinguish between questions that can and cannot be answered by science
NS.1.7.8	Explain the role of testability and modification in the development of a theory
NS.1.7.9	Compare and contrast hypothesis, theory, and law
RST.6-8.3	<i>Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks</i>
RST.6-8.9	<i>Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.</i>
RST.6-8.10	<i>By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.</i>

Enduring Understandings and Essential Questions

Enduring Understandings for Content or Grade Level	Essential for Content or Grade Level
Scientists use observations to pose questions about the world around them. Scientists collect, measure, analyze, and organize their data in logical ways as part of a scientific process. Forces and energy are a key concept in science. A secure understanding of forces and energy will help students understand the difference between force and energy and how Newton's Laws describe motion.	Essential Questions: 1. How do scientists make sure that their experiments and research are valid? 2. Do forces always cause motion? 3. Why do cars have headrests?
Guiding Questions for Content or Grade Level	
1. Why is replication used in science experiments? 2. What are an independent variable and a dependent variable? 3. How do you make a histogram, a circle graph, a scatter plot, and a double line graph? 4. What questions can be answered by science and what questions cannot be answered by science? 5. What is the difference between a hypothesis, a law, and a theory? 6. What is Newton's first law of motion and how can you demonstrate it? 7. What is Newton's second law of motion and how can you demonstrate it? 8. What is Newton's third law of motion and how can you demonstrate it? 9. What are the natural resources used to supply energy needs? 10. What are alternative energy sources to use instead of fossil fuels?	

Day	Instructional Plan	Resources	DOK
Monday 3/16	Bell Ringer: Explain how Newton's laws relate to energy. Teacher will present a PowerPoint on the basics of energy, focusing on reviewing the forms of energy and teaching about the sources from which we obtain energy. Teacher should show videos about the different sources of energy (wind energy 101). Students should take notes as directed by the teacher.	Science Notebooks	1
		Lesson 1 PPT: http://energy.gov/ne/downloads/lesson-1-energy-basics	2
		Videos: http://energy.gov/education-toolbox/search	
Tuesday 3/17	Bell Ringer: Give an example of how energy can change form. Finish the PowerPoint/Video/Notes from the previous day if needed. Students will watch a TedEd Video "A guide to the energy of the Earth" by Joshua M. Sneideman. (2x) The students will answer the questions on the "Think" section (quiz), after the video. Skipping numbers 4 & 8. Students will turn in their paper for a grade.	TedEd Video	1
		Notebook Paper	2
Wednesday 3/18	Bell Ringer: 3 rd – PARCC testing 6 th /8 th –		1
			2
Thursday 3/19	Bell Ringer: What does it mean when we "harness" energy? Students will build a "Pizza Box Solar Oven" to observe how to harness the sun's energy. OR... Students will come up with a survey focusing on energy usage.	Solar Oven Materials	2
		Energy.gov resources	3
Friday 3/20	Students will test out their solar ovens if weather permits. OR... Students will get people to take their survey. They will look at the data, and report the findings.	Solar Ovens	2
		Food to cook in oven	
		Surveys	3

Assessment Evidence:

Type and Tools	DOK Level
Formative: Class Discussion and Questioning	1, 2
Formative: Bellringers	1
Summative: TedEd quiz/ "Think" section	1, 2
Summative:	

Differentiated Instruction

- extra time for completing assignment
- appropriate activities
- emphasis on major points
- check for understanding
- frequent feedback opportunity to repeat and explain instructions
- visual aids
- read aloud directions
- inquiry learning
- help other students with experiments
- deeper questioning and reasoning