Phoenixville Area School District UbD Science Unit Plan

Grade Level: 7th Grade **Unit Name:** Energy **Author:** A. Gottschall

Stage 1 Desired Results

Overarching NGSS & PA

3.2.6-8.M Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.*

3.2.6-8.N 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.

Transfer

Students will be able to independently use their learning to…

1. Ask questions and/or define problems
2. Develop and/or use models
3. Plan and/or carry out investigations
4. Analyze and interpret data using computational thinking
5. Obtain, evaluate, and communicate information (supported by evidence)
6. Construct explanations and design solutions

Meaning-Making

Students will understand that…

- There are two main types of energy: Kinetic and Potential.
- Kinetic energy contains Sound, Radiant, Electrical, Thermal, and Motion.
- Potential energy contains Gravitational, Tension, Nuclear, and Chemical.
- Energy is neither created nor destroyed, just changes form.
- Energy transformations are when energy changes from form to form.
- Force is needed for energy to be in motion.

ESSENTIAL QUESTIONS
Students will keep considering...

- What is energy?
- What is the difference between kinetic and potential?
- How is energy used in different forms?
- What is an energy transformation?
- What happens at the end of an energy transfer?
- What is relationship between force and energy?

Knowledge and Skills Acquisition

3.2.6-8.O
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.

3.2.6-8.P
Develop a model to describe that when the arrangement of objects interacting at a distance change, different amounts of potential energy are stored in the system.

Which branch(es) of science apply:

PS

Students will understand that…

- Energy is neither created nor destroyed, just changes form.
- Energy is the ability to do work.
- Potential energy is stored energy waiting to be used and changed into kinetic
- Kinetic energy is energy in motion.
- There are different forms of energy.
- Potential contains energies that do not use motion to move, but store energy to be used any time.
- Kinetic energy contains energy that is being used and will need to be restored at a certain time.
- Energy Transfers occur when one form changes into another. Transfers can have more than one transfer. Turning on a light switch is motion to electric to radiant and heat.
- Some energy transfers that can have multiple outcomes.

KEY VOCABULARY

• Energy • Kinetic Energy • Potential Energy • Work • Force • Motion • Sound	• Chemical • Radial • Electrical • Thermal • Nuclear • Tension • Gravitational • Mechanical

Students will be skilled at…

- Identify what the definition of energy is in general terms.
- Identify the different forms of energy and what main type they belong to.
- Describe the transformation of everyday energy transformations.
- Develop their own transformations and explain how energy is changing.
- Provide evidence in when energy has changed into a different form
- Conducting investigations and describing how energy is changing.
- Design and conduct an experiment to determine the energy form from potential to kinetic.
- Compare different forms and how they are similar and different.

Stage 2 – Evidence

Evaluative Criteria	***Assessment Evidence***	
Rubric	PERFORMANCE TASK(S): 1. Illustrate and explain each Energy form with pictures and words. • You may draw, use images from magazines or the Internet. • Include an explanation of how the illustration demonstrates or describes the law of motion. • Put the explanation next to the illustration. 2. Project should be planned out, neat, and creative. 3. Include color and be creative Energy Form Stations Law of Conservation: PhET Simulation	Differentiation Considerations: Different modes of presentation – PowerPoint, poster, choice Use of notes and resources Chunked Assignment
Graded Quizzes Observation	OTHER EVIDENCE: Teacher Summatives: Roller Coaster Lab, Types of Energy Quiz Participation in hands-on labs Science Notebook a. Concept maps b. Vocabulary/Glossary entries c. Guided Research d. Lab Reports described above e. Daily Journal Entries Checklists of collaborative behaviors in labs and activities Checklists of collaborative behaviors in class discussions Self-assessments for Performance Tasks	Differentiation Considerations: Adapted Quizzes Homogeneously grouped labs to allow for teacher support Notes/Resources available for more exposure Pictures to support vocabulary

	TO CONSIDER FOR LATER: UNIT TEST(S) Class Participation	