MAPPING GRADE 6 SCIENCE INSTRUCTION

Concept: Energy

PWC Objective: 6.2 / Infused

The student will investigate and understand basic sources of energy, their origins, transformations, and uses. Key concepts include:

- potential and kinetic energy **(SOL 6.2a)**
- the role of the sun in the formation of most energy sources on Earth **(SOL 6.2b)**
- nonrenewable energy sources (fossil fuels, including petroleum, natural gas, and coal) **(SOL 6.2c)**
- renewable energy sources (wood, wind, hydro, geothermal, tidal, solar) **(SOL 6.1d)**
- energy transformations (heat/light to mechanical, chemical, electrical) **(SOL 6.2e)**

What Students Should Know (Critical Attributes)	**What Students Should Be Able To Do** (Essential Skills)
Essential Questions: • What are the basic forms of energy? • What are specific sources of energy? • In what ways are primary energy sources transferred?	
Critical Attributes:	
6.2a Potential energy is energy that is not "in use" and is available to do work. Kinetic energy is energy that is "in use" and is the energy a moving object has due to its motion. For example, moving water and wind have kinetic energy. The chemical energy in fossil fuels is considered potential energy until released.	• Compare and contrast potential and kinetic energy through common examples found in the natural environment.
6.2b Solar energy from the ancient past is stored in fossil fuels such as coal and petroleum. Fossil fuels are rich in the elements carbon and hydrogen. These sources of energy take very long periods of time to develop and once depleted, are essentially nonrenewable.	
6.2c Some important sources of energy include fossil fuels, wood, wind, water (hydropower), solar, and thermal energy from the Earth's interior.	• Compare and contrast energy sources in terms of their origins, how they are utilized, and their availability.

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What Students Should Know (Critical Attributes)		**What Students Should Be Able To Do** (Essential Skills)
6.2d	Many of the Earth's energy resources are available on a perpetual basis. These include solar, wind, water, and geothermal energy. Some energy sources can be replaced over relatively short periods of time. These include wood and other biomass. All are considered renewable.	• Compare and contrast renewable and nonrenewable energy sources. • Design an application of the use of solar and wind energy.
6.2e	Heat and light can be converted into mechanical energy, chemical energy, and electrical energy and back again.	• Design an investigation that demonstrates light energy being transformed into other forms of energy. • Analyze and describe the transformation of energy involved with the formation and burning of coal and other fossil fuels. • Create and interpret a model or diagram of an energy transformation.
Stem	Modern industrial society is dependent upon energy. Fossil fuels are the major sources of energy in developed and industrialized nations.	• Chart and analyze the energy a person uses during a 24-hour period and determine its sources. • Analyze and describe how the United States' energy use has changed over time. • Predict the impact of unanticipated energy shortages. • Analyze the advantages and disadvantages of using various energy sources.