

HYDROKINETIC POWER

Overview:

Hydroelectric power is a clean, renewable energy source abundant in Alaska.

Objectives:

The student will:

- read about hydrokinetic energy and answer questions; and
- construct a simple model with a magnet and wire using kinetic energy to show the generation of electricity.

Targeted Alaska Performance Standards for the High School Graduation Qualifying Exam:

R4.4 Read and follow multi-step directions to complete complex tasks.

Targeted Alaska Grade Level Expectations

Science

[11] SA1.1 The student develops an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, analyzing data, developing models, inferring, and communicating.

[11] SB2.1 The student demonstrates an understanding of how energy can be transformed, transferred, and conserved by demonstrating energy (e.g., nuclear, electromagnetic, chemical, mechanical, thermal) transfers and transformations by comparing useful energy to total energy (entropy) (L)

Vocabulary:

BTU (British thermal unit) – the amount of heat that is needed to raise the temperature of one pound of water by one degree Fahrenheit; this unit is used mainly to measure heat

calorie – a small calorie is a unit of heat equal to the amount of heat needed to raise the temperature of one gram of water by one degree Celsius; a large calorie or kilocalorie is the amount of heat needed to raise the temperature of 1,000 grams, or one kilogram, of water by one degree Celsius

electricity – the collection of physical effects resulting from the existence of charged particles, especially electrons and protons, and their interactions; the electric current generated by the flow of electrons around a circuit and used as a source of power

energy – the capacity or power to do work; energy can exist in a variety of forms such as electrical, mechanical, chemical, thermal, or nuclear, and can be transformed from one form to another; it is measured by the amount of work done, usually in joules (J) or watts (J/s)

hydro – a prefix that means water, as in hydroelectric; or hydrogen, as in hydrocarbon

hydroelectric – generating electricity through the use of the energy of moving water

hydroelectric power plant – a power plant that produces electricity by the force of water falling through a hydro turbine that spins a generator

hydrokinetic – relating to the kinetic energy and motion of fluids; often refers to in-river power generation

hydrothermal – relating to thermal energy stored in water, especially water heated by Earth's internal heat; power that is generated using Earth's hot water is called hydrothermal energy

joule – a unit used to measure energy or work; one joule is equal to the work done when a force of one newton acts over a distance of one meter; named after British physicist James Prescott Joule who established the law of conservation of energy, stating that energy is never destroyed but may be converted from one form into another

kinetic – work done by an external force; energy an object possesses due to its motion

