Science
Physics
Unit 4: Energy

Essential Understandings	▪ Causation: Nothing "just happens." Everything is caused. ▪ Interrelatedness: Everything in the universe is connected to everything else in the universe. ▪ Dynamism: Everything is changing in some way all the time. ▪ Entropy: Change has direction. Generally, simple precedes complex. Generally, order changes toward disorder. ▪ Uniformitarianism: The way the universe works today is the way it worked yesterday and the way it will work tomorrow.
Essential Questions	▪ How is energy conserved? ▪ How is energy transferred? ▪ How are work, kinetic energy, momentum, and potential energy interconnected?
Essential Knowledge	▪ Work transfers energy. ▪ Energy is conserved. ▪ Work, kinetic energy, and potential energy are measured by the same quantity: joules.
Vocabulary	▪ <u>Terms</u>: ○ conserved, elastic collision, impulse, inelastic collision, law of conservation of momentum, momentum, efficiency, energy, fulcrum, joule, kinetic energy, law of conservation of energy, lever, machine, mechanical advantage, mechanical energy, potential energy, power, work, watt, gravitational potential energy
Essential Skills	▪ Use mathematics to calculate momentum, impulse, work, power, kinetic energy and potential energy. ▪ Determine where energy is transferred throughout a system. ▪ Analyze simple machines and compound machines to determine efficiency.
Related Maine Learning Results	<u>Science and Technology</u> D. The Physical Setting D4.Force and Motion Students understand that the laws of force and motion are the same across the universe. a. Describe the contribution of Newton to our understanding of force and motion, and give examples of and apply Newton's three laws of motion and his theory of gravitation. b. Explain and apply the ideas of relative motion and frame of reference. f. Describe kinetic energy (the energy of motion), potential energy (dependent on relative position), and energy contained by a field (including electromagnetic waves) and apply these understandings to energy problems.

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Sample Lessons And Activities	▪ Word problem worksheets ▪ Motion Labs, i.e., constant velocity, acceleration ▪ Lectures ▪ Work and momentum demonstrations ▪ Work and momentum videos
Sample Classroom Assessment Methods	▪ Chapter tests ▪ Motion quizzes ▪ Laboratory reports
Sample Resources	▪ Publications: o Physical Science - Glencoe o MARVEL Data bases o GALE Resource Data bases ▪ Videos: o The Mechanical Universe o ESPN Sports Figures