Science
Physics
Unit 9: Magnetism

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 does electricity induce magnetism in a variety of metals ▪ What is a magnetic dipole? ▪ How is a magnetic field a form of potential energy? ▪ How do generators produce alternating current? ▪ How to transformers convert electrical current to allow the long-distance transmission of electrical power?
Essential Knowledge	▪ Magnetic fields are a form of potential energy. ▪ Generators produce alternating current. ▪ Faraday's Law relating to the creation of electric fields by the relative motion of magnetic fields. ▪ Magnetic fields produce magnetic forces. ▪ Magnetic fields can interact with objects without coming into physical contact with them.
Vocabulary	▪ <u>Terms</u>: ○ electromagnet, electromagnetic induction, Faraday's Law, generator, magnetic domain, magnetic field, magnetic pole, transformer
Essential Skills	▪ Use mathematics to calculate magnetic field strength. ▪ Use mathematics to calculate change in voltage due to transformer use. ▪ Describe the shape and nature of a magnetic field. ▪ Interpret magnetic field lines to determine direction and magnitude.

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Related Maine Learning Results	Science and Technology C. The Scientific and Technological Enterprise C2. Understandings About Science and Technology Students explain how the relationship between scientific inquiry and technological design influences the advancement of ideas, products, and systems. a. Provide an example that shows how science advances with the introduction of new technologies and how solving technological problems often impacts new scientific knowledge. b. Provide examples of how creativity, imagination, and a good knowledge base are required to advance scientific ideas and technological design. c. Provide examples that illustrate how technological solutions to problems sometimes lead to new problems or new fields of inquiry. D. The Physical Setting D4. Force and Motion Students understand that the laws of force and motion are the same across the universe. 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.
Sample Lessons And Activities	▪ Word problem worksheets ▪ Magnetism labs ▪ Lectures ▪ Magnetism demonstrations ▪ Magnetism videos
Sample Classroom Assessment Methods	▪ Chapter tests ▪ Quizzes ▪ Laboratory reports
Sample Resources	▪ Publications: o Physical Science - Glencoe o MARVEL Data bases o GALE Resource Data bases ▪ Videos: o The Mechanical Universe