

# Unit Plan: Magnetism and Electromagnetism

| Stage 1: Desired Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                        |
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| <b>Learning Expectations:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                        |
| <p><b>Systems and Cycles</b> Students in grade 7 focus on systems and cycles using their understanding of structures and functions, connections and relationships in systems, and flow of matter and energy developed in earlier grades. A focus on systems requires students to apply concepts and skills across disciplines, since most natural and designed systems and cycles are complex and interactive. They gain experience with plate tectonics, interactions of humans and Earth processes, organism systems to support and propagate life, ecosystem dynamics, motion and energy systems, and key technological systems used by society. Through grade 7, students begin a process of moving from a more concrete to an abstract perspective, since many of the systems and cycles studied are not directly observable or experienced. This also creates a foundation for exploring cause and effect relationships in more depth in grade 8. (MA STE Frameworks)</p> |                                                                                                                                                                                                                                                                                                        |
| <b>Curriculum Frameworks and Learning Standards</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                        |
| <p><b>MA: Science and Technology/Engineering</b><br/> <i>*see standards for classification statements and state assessment boundaries</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                        |
| <ul style="list-style-type: none"> <li>● <b>7.MS-PS2-5.</b> Use scientific evidence to argue that fields exist between objects with mass, between magnetic objects, and between electrically charged objects that exert force on each other even though the objects are not in contact.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                        |
| Enduring Understandings<br><i>Discovery Education Lesson Objectives</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Essential Questions<br><i>Discovery Education Overarching/Lesson Questions</i>                                                                                                                                                                                                                         |
| <ul style="list-style-type: none"> <li>● Describe the relationship between magnetism and electricity.</li> <li>● Explain how the size of the wire, the strength of the magnet, and the amount of mechanical energy used all affect the amount of electricity produced by a generator.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>● How are electricity and magnetism related?</li> <li>● How can mechanical energy, electric forces, and magnetic forces be used to generate electricity?</li> <li>● What factors affect the strength of electric and magnetic forces in a generator?</li> </ul> |
| Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Skills (Science and Engineering Practices)<br><i>Massachusetts STE Frameworks - 2016</i>                                                                                                                                                                                                               |
| <div>  <b>ME Notes/Study Guide</b> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>● Asking questions (for science) and defining problems (for engineering).</li> <li>● Developing and using models.</li> <li>● Planning and carrying out investigations.</li> </ul>                                                                               |

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|  | <ul style="list-style-type: none"> <li>Analyzing and interpreting data.</li> <li>Using mathematics and computational thinking.</li> <li>Constructing explanations (for science) and designing solutions (for engineering).</li> <li>Engaging in argument from evidence.</li> <li>Obtaining, evaluating, and communicating information.</li> </ul> |
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| Stage 2: Assessment Evidence                                                                                                                                  |                                                                                                                                                                                                  |
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| Performance Tasks<br><i>Performance Expectations (NGSS)</i>                                                                                                   | Other Evidence                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.</li> </ul> | <ul style="list-style-type: none"> <li>Laboratory Experiments</li> <li>Group Projects/Presentations</li> <li>Interactive Gizmos</li> <li>Quizzes/Tests</li> <li>Formative Assessments</li> </ul> |

| Stage 3: Learning Activities                                                                                                                                                                                                                  |                                                             |
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| Optional Learning Activities                                                                                                                                                                                                                  | Vocabulary                                                  |
| <ul style="list-style-type: none"> <li><a href="#">Activity Padlet</a></li> <li>Magnet Stations</li> </ul>                                                                                                                                    | Poles, force, field,electromagnetism, attraction, repulsion |
| Instructional Resources                                                                                                                                                                                                                       |                                                             |
| <ul style="list-style-type: none"> <li><a href="#">Discovery Education</a></li> <li><a href="#">ExploreLearning Gizmos</a></li> <li><a href="#">Generation Genius</a></li> <li><a href="#">CK-12</a></li> <li><a href="#">Phet</a></li> </ul> |                                                             |

