

## Unit 2—Electricity and Magnetism

### Essential Question: What are the properties of electricity and magnetism?

#### Major Understandings:

- 3.1c** Objects have properties that can be observed, described, and/or measured: length, width, volume, size, shape, mass or weight, temperature, texture, flexibility, reflectiveness of light.
- 3.1e** The material(s) an object is made up of determine some specific properties of the object (sink/float, conductivity, magnetism). Properties can be observed or measured with tools such as hand lenses, metric rulers, thermometers, balances, magnets, circuit testers, and graduated cylinders.
- 3.1f** Objects and/or materials can be sorted or classified according to their properties.
- 4.1a** Energy exists in various forms: heat, electric, sound, chemical, mechanical, light.
- 4.1b** Energy can be transferred from one place to another.
- 4.1c** Some materials transfer energy better than others (heat and electricity).
- 4.1d** Energy and matter interact: water is evaporated by the Sun's heat; a bulb is lighted by means of electrical current; a musical instrument is played to produce sound; dark colors may absorb light, light colors may reflect light.
- 4.1e** Electricity travels in a closed circuit.
- 5.1e** Magnetism is a force that may attract or repel certain materials.
- 5.2a** The forces of gravity and magnetism can affect objects through gases, liquids, and solids.
- 5.2b** The force of magnetism on objects decreases as distance increases.

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<b>WEEK 1</b>	<b>Lessons 1 and 2 (90 min)</b> <b>Objective(s):</b> To assess and develop prior knowledge as it pertains to making and using electricity.		<b>Alignment with NYS Core Curriculum:</b> PS 3.1c, e, f; PS 4.1a-e; PS5.1e, PS5.2a, PS5.2b	
	<b>Advanced Planning/ Notes to Teachers</b>  Prepare vocabulary cards.  <b>Science Background:</b> Are energy, current, and voltage all the same thing?	<b>Investigation/Activity</b>  Unit F Chapter 14 Opener Pp. 470-471		<b>Homework/Extra Practice</b>  Reading Support and HW: P. 102
	<b>Lesson 3 and 4 (90 min)</b> <b>Objective(s):</b> <ul style="list-style-type: none"> <li>• To demonstrate how to construct a simple circuit.</li> <li>• To explain static and current electricity.</li> <li>• To recognize how electricity moves in circuits.</li> </ul>		<b>Alignment with NYS Core Curriculum:</b> PS 14.1a-e, PS 4.1g, PS 3.1c, e, f	
	<b>Advanced Planning/ Notes to Teachers</b>  Prestrip wires for students. Do not allow students to use more than one wire.  <b>Science Background:</b> Electric Circuits	<b>Investigation/Activity</b>  Unit F Chapter 14.1 What Is Electricity? Pp. 472-473		<b>Homework/Extra Practice</b>  <b>Investigate Further:</b> P. 168, Lab Manual <b>Transparency:</b> 44

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<b>WEEK 2</b>	<b>Lessons 5 and 6 (90 min)</b> <b>Objective(s):</b> <ul style="list-style-type: none"> <li>To demonstrate how to construct a simple circuit.</li> <li>To explain static and current electricity.</li> <li>To recognize how electricity moves in circuits.</li> </ul>		<b>Alignment with NYS Core Curriculum:</b> PS 14.1a-e, PS 4.1g, PS 3.1c, e, f
	<b>Advanced Planning/ Notes to Teachers</b>  <b>Science Background:</b> How Does A Battery Work?	<b>Investigation/Activity</b>  <b>Unit F Chapter 14.1</b> What Is Electricity? Pp. 474-477	<b>Homework/Extra Practice</b>
	<b>Lesson 7 and 8 (90 min)</b> <b>Objective(s):</b> <ul style="list-style-type: none"> <li>To demonstrate how to construct a simple circuit.</li> <li>To explain static and current electricity.</li> <li>To recognize how electricity moves in circuits.</li> </ul>		<b>Alignment with NYS Core Curriculum:</b> PS 14.1a-e, PS 4.1g, PS 3.1c, e, f
	<b>Advanced Planning/ Notes to Teachers</b>	<b>Investigation/Activity</b>  <b>Unit F Chapter 14.1</b> What Is Electricity? Pp. 478-483	<b>Homework/Extra Practice</b> Reading Support and HW: Pp. 103 and 104

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<b>WEEK 3</b>	<b>Lessons 9 and 10 (90 min)</b> <b>Objective(s):</b> <ul style="list-style-type: none"> <li>To compare the effects of a magnet and an electric current on a compass.</li> <li>To compare the properties of magnets with those of electromagnets.</li> <li>To recognize the usefulness of magnets, electromagnets, generators and motors.</li> </ul>		<b>Alignment with NYS Core Curriculum:</b> PS3.1c, e, f; PS 4.1d
	<b>Advanced Planning/ Notes to Teachers</b>  Wires get hot. Be sure not to let students hold them too long.  <b>Science Background:</b> Magnetism	<b>Investigation/Activity</b>  <b>Unit F Chapter 14.2</b> How Are Electricity and Magnetism Related? Investigation pp. 484-485	<b>Homework/Extra Practice</b>  <b>Investigate Further:</b> Lab Manual p. 171
	<b>Lesson 11 and 12 (90 min)</b> <b>Objective(s):</b> <ul style="list-style-type: none"> <li>To compare the effects of a magnet and an electric current on a compass.</li> <li>To compare the properties of magnets with those of electromagnets.</li> <li>To recognize the usefulness of magnets, electromagnets, generators and motors.</li> </ul>		<b>Alignment with NYS Core Curriculum:</b> PS 3.1c, e, f; PS 4.1d
	<b>Advanced Planning/ Notes to Teachers</b>	<b>Investigation/Activity</b>  <b>Unit F Chapter 14.2</b> How Are Electricity and Magnetism Related? Pp. 486-489	<b>Homework/Extra Practice</b>  <b>Reading Mini-Lesson:</b> Distinguishing Fact from Opinion  <b>InstaLab:</b> Needle Dance, p. 489

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<b>WEEK 4</b>	<b>Lessons 13 and 14 (90 min)</b> <b>Objective(s):</b> <ul style="list-style-type: none"> <li>To compare the effects of a magnet and an electric current on a compass.</li> <li>To compare the properties of magnets with those of electromagnets.</li> <li>To recognize the usefulness of magnets, electromagnets, generators and motors.</li> </ul>		<b>Alignment with NYS Core Curriculum:</b> PS 3.1c, e, f; PS 4.1d	
	<b>Advanced Planning/ Notes to Teachers</b>  <b>Science Background:</b> Magnetic Resonance Imaging  <b>Science Background:</b> Electromagnets	<b>Investigation/Activity</b> <b>Unit F Chapter 14.2</b> How Are Electricity and Magnetism Related? Pp. 490-493		<b>Homework/Extra Practice</b>
	<b>Lessons 15 and 16 (90 min)</b> <b>Objective(s):</b> <ul style="list-style-type: none"> <li>To compare the effects of a magnet and an electric current on a compass.</li> <li>To compare the properties of magnets with those of electromagnets.</li> <li>To recognize the usefulness of magnets, electromagnets, generators and motors.</li> <li>To identify energy uses and their sources.</li> <li>To describe the uses of chemical and mechanical energy and how chemical energy can be changed to other forms of energy.</li> <li>To identify the need for energy conservation.</li> </ul>		<b>Alignment with NYS Core Curriculum:</b> PS 3.1c, e, f; PS 4.1d PS 4.1g	
	<b>Advanced Planning/ Notes to Teachers</b>  <b>Science Background:</b> Measuring Electricity	<b>Investigation/Activity</b> <b>Unit F Chapter 14.2</b> How Are Electricity and Magnetism Related? Pp. 494-495  <b>Unit F Chapter 14.4</b> How Do People Use Energy Resources? Pp. 504-505		<b>Homework/Extra Practice</b> <b>Reading Support and HW:</b> Pp. 105 and 106  <b>Transparency:</b> GO 45  <b>Investigate Further:</b> Lab Manual pg. 177  <b>Transparency:</b> IS 47

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<b>WEEK 5</b>	<b>Lessons 17 and 18 (90 min)</b> <b>Objective(s):</b> <ul style="list-style-type: none"> <li>To identify energy uses and their sources.</li> <li>To describe the uses of chemical and mechanical energy and how chemical energy can be changed to other forms of energy.</li> <li>To identify the need for energy conservation.</li> </ul>		<b>Alignment with NYS Core Curriculum:</b> PS 4.1g
	<b>Advanced Planning/Notes to Teachers</b>  <b>Science Background:</b> Mechanical Energy	<b>Investigation/Activity</b> <b>Unit F Chapter 14.4</b> How Do People Use Energy Resources? Pp. 506-509	<b>Homework/Extra Practice</b> <b>Transparency:</b> RS 47  <b>InstaLab:</b> Chemical Energy
	<b>Lesson 19 and 20 (90 min)</b> <b>Objective(s):</b> <ul style="list-style-type: none"> <li>To identify energy uses and their sources.</li> <li>To describe the uses of chemical and mechanical energy and how chemical energy can be changed to other forms of energy.</li> <li>To identify the need for energy conservation.</li> </ul>		<b>Alignment with NYS Core Curriculum:</b> PS 4.1g
	<b>Advanced Planning/Notes to Teachers</b>	<b>Investigation/Activity</b> <b>Unit F Chapter 14.4</b> How Do People Use Energy Resources? Pp. 510-511	<b>Homework/Extra Practice</b> <b>Transparency:</b> GO 47

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<b>WEEK 6</b>	<b>Lessons 21 and 22 (90 min)</b> <b>Objective(s):</b> <ul style="list-style-type: none"> <li>To identify energy uses and their sources.</li> <li>To describe the uses of chemical and mechanical energy and how chemical energy can be changed to other forms of energy.</li> <li>To identify the need for energy conservation.</li> <li>To discuss how scientists are developing new ways to provide electricity. To describe how chemicals can be used to power devices.</li> </ul>		<b>Alignment with NYS Core Curriculum:</b> PS 4.1g
	<b>Advanced Planning/ Notes to Teachers</b>  <b>Science Background:</b> Artificial Arm Wrestling	<b>Investigation/Activity</b> <b>Unit F Chapter 14.4</b> How Do People Use Energy Resources?  <b>Reading Support and HW:</b> Pp. 109-110  <b>Science Spin</b> These Boots Were Made for Walking Pp. 512	<b>Homework/Extra Practice</b>
	<b>Lesson 23 and 24 (90 min)</b> <b>Objective(s):</b> <ul style="list-style-type: none"> <li>To identify electricity as the source of light for a light bulb.</li> <li>To recognize Lewis Latimer invented a light bulb that lasted more than a few days.</li> </ul>		<b>Alignment with NYS Core Curriculum:</b> PS 3.1c, e, f
	<b>Advanced Planning/ Notes to Teachers</b>  <b>Science Background:</b> Latimer's Other Inventions	<b>Investigation/Activity</b> Science Spin Lighting the Way Pp. 514  <b>Review</b>	<b>Homework/Extra Practice</b>

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<b>WEEK 7</b>	<b>Lessons 25 and 26 (90 min)</b> <b>Objective(s):</b> To experiment to determine which materials are insulators and which materials are conductors of electricity.		<b>Alignment with NYS Core Curriculum:</b> PS 4.1c
	<b>Advanced Planning/ Notes to Teachers</b>	<b>Investigation/Activity</b> <b>Science Projects:</b> Insulators and Conductors P. 515	<b>Homework/Extra Practice</b> Teaching Resource Book
	<b>Lesson 27 and 28 (90 min)</b> <b>Objective(s):</b> To experiment to determine which materials are insulators and which materials are conductors of electricity.		<b>Alignment with NYS Core Curriculum:</b> PS 4.1c
	<b>Advanced Planning/ Notes to Teachers</b>  Science Background	<b>Investigation/Activity</b> <b>Science Projects:</b> Insulators and Conductors	<b>Homework/Extra Practice</b>

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<b>WEEK 8</b>	<b>Lessons 29 and 30 (90 min)</b> <b>Objective(s):</b> To make a model of a simple generator.		<b>Alignment with NYS Core Curriculum:</b> PS 5.1e; PS 5.2 a, b; PS 4.1d
	<b>Advanced Planning/ Notes to Teachers</b>	<b>Investigation/Activity</b> <b>Science Projects:</b> Design Your Own Investigation Generate Electricity	<b>Homework/Extra Practice</b>
	<b>Lesson 31 and 32 (90 min)</b> <b>Objective(s):</b> To make a model of a simple generator.		<b>Alignment with NYS Core Curriculum:</b> PS 5.1e; PS 5.2 a, b; PS 4.1d
	<b>Advanced Planning/ Notes to Teachers</b>	<b>Investigation/Activity</b> <b>Science Projects:</b> Design Your Own Investigation Generate Electricity	<b>Homework/Extra Practice</b>

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<b>WEEK 9</b>	<b>Lessons 33 and 34 (90 min)</b> <b>Objective(s):</b> To review core content and prepare for the Unit Assessment.		<b>Alignment with NYS Core Curriculum:</b> PS 3.1c, e, f; PS 4.1a-e; PS5.1e, PS5.2a, PS5.2b
	<b>Advanced Planning/ Notes to Teachers</b>	<b>Investigation/Activity</b>  <b>Chapter 14</b> Review and Test Prep	<b>Homework/Extra Practice</b>
	<b>Lesson 35 and 36 (90 min)</b> <b>Objective(s):</b> To formally assess students' knowledge of content addressed in Unit 2.		<b>Alignment with NYS Core Curriculum:</b> PS 3.1c, e, f; PS 4.1a-e; PS5.1e, PS5.2a, PS5.2b
	<b>Advanced Planning/ Notes to Teachers</b>  <b>Science Background</b>	<b>Investigation/Activity</b>  Assessment	<b>Homework/Extra Practice</b>