

Grade 7

Unit 2—Interactions Between Matter and Energy (FOSS® Chemical Interactions)

Essential Question: How do the properties and interactions of matter and energy explain physical and chemical change?

General Skills: *quoted from the NYS Core Curriculum (Note: Correlation is provided at the level of FOSS “Investigation & Part.” All “Steps” of an investigation must be completed to meet the standard.)*

1. Follow safety procedures in the classroom and laboratory.
2. Safely and accurately use the following measurement tools: balance, graduated cylinder, thermometer, spring scale, voltmeter.
3. Use appropriate units for measured or calculated values.
4. Recognize and analyze patterns and trends.
5. Classify objects according to an established scheme and a student generated scheme.
7. Sequence events.
9. Use indicators and interpret results.

Physical Setting Skills: *quoted from the NYS Core Curriculum (Note: Correlation is provided at the “investigation” level.)*

10. Determine the density of liquids, and regular- and irregular-shaped solids.
12. Using the periodic table, identify an element as a metal, a nonmetal, or a noble gas.
13. Determine the identity of an unknown element, using physical and chemical properties. *Investigation 1 does this with compounds – “mystery mixture”*
14. Using appropriate resources, separate the parts of a mixture.
15. Determine the electrical conductivity of a material, using a simple circuit. *Done in FOSS Magnetism & Electricity (Grade 4).*

Major Understandings: *quoted from NYS Performance Indicators (Note: Correlation is provided at the “Lesson” level, i.e., Investigation & Part.)*

PS 3.1 Observe and describe properties of materials, such as density, conductivity, and solubility.

- 3.1a Substances have characteristic properties. Some of these properties include color, odor, phase at room temperature, density, solubility, heat and electrical conductivity, hardness, and boiling and freezing points.
- 3.1b Solubility can be affected by the nature of the solute and the solvent, temperature, and pressure. The rate of solution can be affected by the size of the particles, stirring, temperature, and the amount of solute already dissolved.
- 3.1c The motion of particles helps to explain the phases (states) of matter as well as changes from one phase to another. The phase in which matter exists depends on the attractive forces among its particles.
- 3.1d Gases have neither a determined shape nor a definite volume. Gases assume the shape and volume of a closed container.
- 3.1e A liquid has a definite volume, but takes the shape of a container.

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- 3.1f A solid has definite shape and volume. Particles resist a change in position.
- 3.1g Characteristic properties can be used to identify different materials, and separate a mixture of substances into its components. For example, iron can be removed from a mixture by means of a magnet. An insoluble substance can be separated from a soluble substance by such processes as filtration, settling, and evaporation.
- 3.1h Density can be described as the amount of matter that is in a given amount of space. If two objects have equal volume, but one has more mass, the one with more mass is denser.

PS 3.2 Distinguish between chemical and physical changes.

- 3.2a During a physical change a substance keeps its chemical composition and properties. Examples of physical changes include freezing, melting, condensation, boiling, evaporation, tearing and crushing.
- 3.2b Mixtures are physical combinations of materials and can be separated by physical means.
- 3.2c During a chemical change, substances react in characteristic ways to form new substances with different physical and chemical properties. Examples of chemical changes include burning of wood, cooking of an egg, rusting of iron, and souring of milk.
- 3.2d Substances are often placed in categories if they react in similar ways. Examples include metals, nonmetals and noble gases.

PS 3.3 Develop mental models to explain common chemical reactions and changes in states of matter.

- 3.3a All matter is made up of atoms. Atoms are far too small to see with a light microscope.
- 3.3b Atoms and molecules are perpetually in motion. The greater the temperature, the greater the motion.
- 3.3c Atoms may join together in well-defined molecules and may be arranged in regular geometric patterns.
- 3.3d Interactions among atoms and / or molecules result in chemical reactions.
- 3.3e The atoms of any one element are different from the atoms of other elements.
- 3.3f There are more than 100 elements. Elements combine in a multitude of ways to produce compounds that account for all living and nonliving substances. Few elements are found in their pure form.
- 3.3g The periodic table is one useful model for classifying elements. The periodic table can be used to predict properties of elements (metals, nonmetals, noble gases).

PS 4.1 Describe the sources and identify the transformations of energy observed in everyday life.

- 4.1d Different forms of energy include heat, light, electrical, mechanical, sound, nuclear, and chemical. Energy is transformed in many ways.

PS 4.2 Observe and describe heating and cooling events.

- 4.2e Temperature affects the solubility of some substances in water.

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PS 4.3 Observe and describe energy changes as related to chemical reactions.

- 4.3a In chemical reactions, energy is transformed into or out of a system. Light, electricity, or mechanical motion may be involved in such transfers in addition to heat.

PS 4.4 Observe and describe the properties of sound, light, magnetism, and electricity.

- 4.4a Different forms of electromagnetic energy have different wavelengths.
- 4.4b Light passes through some materials, sometimes refracting in the process. Materials absorb and reflect light, and may transmit light. To see an object, light from that object, emitted by or reflected from it, must enter the eye.
- 4.4c Vibrations in materials set up wave-like disturbances that spread away from the source. Sound waves are an example. Vibrational waves move at different speeds in different materials. Sound cannot travel in a vacuum.
- 4.4f Without touching them, material that has been electrically charged attracts uncharged material, and may either attract or repel other charged materials.
- 4.4g Without direct contact, a magnet attracts certain materials and either attracts or repels other magnets. The attractive force of a magnet is greatest at its poles.

PS 4.5 Describe situations that support the principle of conservation of energy.

- 4.5a Energy cannot be created or destroyed, but only changed from one form into another.
- 4.5b Energy can change from one form to another, although in the process some energy is always converted to heat. Some systems transform energy with less loss of heat than others.

IMPORTANT NOTES**FOSS® Chemical Interactions Multimedia:**

The FOSS® CD-ROM based multimedia component is an integral part of the course. It may be accessed through your browser and Internet connection *or* using the CD-ROM installed on your computer. In either case you will need to use a large screen monitor or LCD projector when making presentations to the entire class.

It is essential that you review the installation requirements (Teacher Guide, CD-ROM User Guide pp. 467 – 496) check system requirements and necessary “plug-in” software, install the CD and review **ALL** interactive components **on the computer that you will be using in the classroom** (and have the installation completed on other computers (ex.: computer lab) **PRIOR TO PRESENTING THE LESSON**. Request local (school based) technical support to complete installation if you have problems. Emails for additional technical assistance requests should be sent through the link at the bottom of the FOSSweb Welcome Page (www.fossweb.com/index.php).

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IMPORTANT NOTES

The Multimedia is used throughout the course and you will need to be able to switch between the variety of formats (computer/ VCR) and decide how your students will best benefit from the different instructional formats (group instruction, computer lab, classroom computers, learning centers, reinforcement through home study).

In FOSS® Chemical Interactions the following types of multimedia will be used:

- FOSS® CD-ROM / Multimedia_– used in Investigations 1, 2, 3, 4, 5, 7, 8 & 9
- Video – *Atoms and Molecules* (Investigation 10: More Reactions, Part 2)

As an alternate or in addition to the CD-ROM, you may access the Multimedia via the Internet through the FOSS® website (www.fossweb.com/NYC). At the **Chemical Interactions page** click on the *Chemical Interactions Multimedia* link where you will register for a username and password that will be shared with your students and allow student access from any networked computer. Daily use of the Multimedia through the Internet is a great option if you have a reliable network connection. In other cases using the online Multimedia will be the preferred option for use in the computer lab.

You will need a **VCR or DVD player and monitor** to view the video included in this kit (*Atoms and Molecules*.) *Check your kit to see which format of the “Atoms and Molecules” video is included.*

Homework / Extra Practice for FOSS® Chemical Interactions:

Homework for the Middle School FOSS® modules can take a variety of forms. Throughout the unit specific homework is assigned as a step in “*Guiding the Investigation*.” The teacher may decide to assign readings for homework as prompted at the end of an investigation to support and extend experiment content. The readings and/or the questions posed after the readings, reflections in student notebooks and FOSS® Response Sheets can all be used as homework. Other suggestions for extra practice with challenging concepts are included in the “*Extending the Experience*” section of some investigations.

Extending the Experience: Consider these enrichment activities AT ANY TIME DURING THE MODULE. These experiences that follow many investigations may be suitable for enrichment, homework or for a lesson plan to be delivered by a substitute teacher when a hands-on investigation may not be appropriate.

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IMPORTANT NOTES

Science Materials Supplied by the Teacher/School for FOSS® Chemical Interactions:

The FOSS® Middle School modules are designed to be used in classrooms where a teacher sees several sections of students working on the same unit of study each day. Typically this takes place in the ‘science lab’ (See Materials section of the Teacher Guide, pp. 21-32.) The kit provides consumable equipment for five classes of 32 students. Teachers using this unit will have consumable materials for 160 student uses. Materials supplied by the teacher (listed on p. 24) include common classroom supplies, perishable materials and science equipment frequently found in the middle school setting. Review this list to determine if you need any additional materials.

The section of this Planning Guide called “**Science Materials Supplied by the Teacher**” details the equipment, tools, resources and other significant items needed for the daily lesson. It does not include common classroom supplies like paper, pencils, marking pens, staplers, etc.

Time on Task in FOSS® Chemical Interactions:

- For YEAR ONE of the new Science Curriculum adoption the 7th grade Planning Calendar has been designed to incorporate **all** parts of the curriculum into the classroom instruction time. Specific comments have been added to note portions of investigations that may be moved out of direct instruction time and used as reinforcement (as homework or at the teacher’s discretion). It is recommended that teachers modulate the use of the variety of instructional experiences to address student learning styles, classroom management and student interest. As noted in the Teacher Guide, the first time user of the FOSS® Chemical Interactions Course is encouraged to follow the path of the Teacher Guide. In future years, modifications that will enhance student understanding will be well grounded in curriculum objectives and teacher experiences.

Students new to the FOSS® Middle School modules benefit from the initial use of the Student Resource Book during class time. Spend some time with students examining the format of the Resource Book as it differs from the traditional textbook format with which they are familiar. As you proceed through the course, you will be reminded in the Teacher Guide that you will need to decide whether to assign the reading and questions as homework or devote class time to the reading.

Consult FOSS® Chemical Interactions Teacher Guide – Materials, p. 21 - 32

- Inventory all boxes (4) and equipment.
- Plan to secure “Materials Supplied by the Teacher,” p. 24.
- Review “Preparation,” p. 25 - 28
- Review “Safety in the Chemistry Classroom,” p. 29 - 32
- Set up a MSDS (Materials Safety Data Sheets) binder for your classroom. Follow the link http://www.deltaeducation.com/science/foss/foss_msdms.aspx to download the materials safety data sheets BEFORE teaching the course. Familiarize yourself with potential hazards and actions to be taken in case of an accident or spill.
- Follow ALL local (NY State, NY City DOE and school specific) guidelines and regulations for use of chemicals in the classroom.
- Consider using the Chemical Interactions Safety Contract (p. 374) or modifying it to conform to local requirements.

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WEEK 1	<p>Lesson 1 (45 min) Objective(s): Pre-assessment</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 5, 7, 9 • Physical Setting Skills: 10, 12, 13, 14, 15 • Physical Science: 3.1a, 3.1b, 3.1c, 3.1d, 3.1e, 3.1f, 3.1g, 3.1h; 3.2a, 3.2b, 3.2c, 3.2d; 3.3a, 3.3b, 3.3c, 3.3d, 3.3e, 3.3f, 3.3g, 4.1d; 4.3a; 4.5a, 4.5b 		
	<p>Advanced Planning/Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, Assessment, pp. 433-436, 440-444 (omit pp. 445-446) – Teacher Guide Overview, pp. 1-20 taking note of <ul style="list-style-type: none"> p. 7 Using FOSS Technology p. 10 Reading & Writing in Science p. 12 Management Strategies p. 15 Classroom Safety p. 16 Chemical Interactions Course Matrix – Teacher Guide Materials, pp. 21-32 taking note of <ul style="list-style-type: none"> p. 24 Materials Supplied by the Teacher p. 25 Preparation p. 29 Safety in the Chemistry Classroom 	<p>Investigation/Activity</p> <p>Administer Pretest as a survey of student’s prior knowledge: Summative Assessment TG pp. 556-562.</p>	<p>Science Materials Supplied by the Teacher</p> <p>AV Equipment</p> <p>Determine the Multimedia set-up that best fits your classroom setting. See FOSS® Chemical Interactions Teacher Guide, page 7.</p>	
<p>Advance Preparation Note: See pp. 48-50 Getting Ready for Part 2 to set up the vials of “white substances” that students will use in Lessons 3 through 7.</p>				

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	<p>Lesson 2 (45 min) Investigation 1: Substances (1 of 6 sessions)</p> <p>Objective(s):</p> <p>Content A substance is a form of matter with a unique composition and distinct properties.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 5, 7 • Physical Setting Skills: 13 • Physical Science: 3.1a 	
WEEK 1 (continued)	<p>Advanced Planning/Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 33-40 taking note of: pp. 34-35 Inv. 1 “At A Glance” pp. 36 Scientific and Historical Background p.40 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 41-43 taking note of pp. 42 Steps 1 through 6, Preparation, Safety and Materials pp. 43 Steps 7 through 11, Notebooks, Multimedia, Reading and Assessment – Teacher Guide, Assessment, pp. 433-437 	<p>Investigation/Activity</p> <p>Investigation 1: <i>Substances</i> Part 1: <i>Mystery Mixture, Steps # 1-9</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 44-46 – Student Lab Notebook, p. 5 – Transparency No.1 – Assessment Chart for Investigation 1, p. 521 – <i>FOSS Chemical Interactions Resource Book: Safety Practices</i>, pp. 89 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective Eyewear • Pitcher of water • Paper towels <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

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	<p>Lesson 3 (45 min) Investigation 1: Substances (2 of 6 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Chemical names communicate information about the composition of substances. • Chemical formulas communicate the composition of substances. • A chemical reaction occurs when substances interact to form new substances (products). <p>Process / Conducting Investigations</p> <ul style="list-style-type: none"> • Mix substances with water in order to determine the identity of an unknown mixture of substances. • Evaporate experimental results to obtain information about the identity of a mystery mixture. <p>Building Explanations</p> <p>A reaction provides evidence that starting substances change into new, different substances.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 5, 7 • Physical Setting Skills: 13 • Physical Science: 3.1a, 3.1g 	
WEEK 1 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 33-40 taking note of: pp. 34-35 Inv. 1 “At A Glance” pp. 36 Scientific and Historical Background p.40 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 46-50 taking note of pp. 48-49 Steps 1 through 4, Preparation and assembly of the vial sets. p. 50 Step 6 Check the Evaporation Trays (prepared in Step 20 of Part 2) p. 50 Steps 8 through 10 Student Resource Books, Multimedia and Assessment – Teacher Guide, Assessment, pp. 433-437 	<p>Investigation/Activity</p> <p>Investigation 1: <i>Substances</i> Part 2: <i>Mixing Substances, Steps # 1-7</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 44-46 – Student Lab Notebook, p. 7, 9, 11 – Transparency Nos. 2-3 – Assessment Chart for Investigation 1, p. 521 – <i>FOSS Chemical Interactions CD-ROM / Multimedia: Two Substances Reactions</i> – <i>FOSS Chemical Interactions Resource Book: White Substances Information</i>, pp. 97-101 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective Eyewear • Construction Paper, black • Sucrose • Paper towels <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

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	<p>Lesson 4 (45 min) Investigation 1: Substances (3 of 6 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Chemical names communicate information about the composition of substances. • Chemical formulas communicate the composition of substances. • A chemical reaction occurs when substances interact to form new substances (products). <p>Process / Conducting Investigations</p> <ul style="list-style-type: none"> • Mix substances with water in order to determine the identity of an unknown mixture of substances. • Evaporate experimental results to obtain information about the identity of a mystery mixture. <p>Building Explanations</p> <p>A reaction provides evidence that starting substances change into new, different substances.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 5, 7 • Physical Setting Skills: 13 • Physical Science: 3.1a, 3.1g 	
WEEK 1 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 33-40 taking note of: pp. 34-35 Inv. 1 “At A Glance” pp. 36 Scientific and Historical Background p.40 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 46-50 taking note of pp. 48-49 Steps 1 through 4, Preparation and assembly of the vial sets. p. 50 Step 6 Check the Evaporation Trays p. 50 Steps 8 through 10 Student Resource Books, Multimedia and Assessment – Teacher Guide, Assessment, pp. 433-437 	<p>Investigation/Activity</p> <p>Investigation 1: Substances Part 2: Mixing Substances, Steps # 8-15</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 44-46 – Student Lab Notebook, p. 7, 9, 11 – Transparency Nos. 2-3 – Assessment Chart for Investigation 1, p. 521 – <i>FOSS Chemical Interactions CD-ROM/Multimedia: Two Substances Reactions</i> – <i>FOSS Chemical Interactions Resource Book: White Substances Information</i>, pp. 97-101 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective Eyewear • Construction Paper, black • Sucrose • Paper towels <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

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Lesson 5 (45 min) Investigation 1: Substances (4 of 6 sessions)**Objective(s):****Content**

- Chemical names communicate information about the composition of substances.
- Chemical formulas communicate the composition of substances.
- A chemical reaction occurs when substances interact to form new substances (products).

Process / Conducting Investigations

- Mix substances with water in order to determine the identity of an unknown mixture of substances.
- Evaporate experimental results to obtain information about the identity of a mystery mixture.

Building Explanations

A reaction provides evidence that starting substances change into new, different substances.

Alignment with NYS Core Curriculum:

- General Skills: 1, 4, 5, 7
- Physical Setting Skills: 13
- Physical Science: 3.1a, 3.1g

WEEK 1 (continued)

**Advanced Planning/
Notes to Teachers**

- Teacher Guide Overview, pp. 33-40 taking note of:
pp. 34-35 Inv. 1 “At A Glance”
pp. 36 Scientific and Historical Background
p.40 Why Do I Have to Learn This?
- Teacher Guide Materials & Getting Ready, pp. 46-50 taking note of
pp. 48-49 Steps 1 through 4, Preparation and assembly of the vial sets.
p. 50 Step 6 Check the Evaporation Trays
p. 50 Steps 8 through 10 Student Resource Books, Multimedia and Assessment
- Teacher Guide, Assessment, pp. 433-437

Investigation/Activity

Investigation 1: *Substances* Part 2: *Mixing Substances*, Steps # 16-21

- Teacher Guide, pp. 44-46
- Student Lab Notebook, p. 7, 9, 11
- Transparency Nos. 2-3
- Assessment Chart for Investigation 1, p. 521
- *FOSS Chemical Interactions CD-ROM/Multimedia: Two Substances Reactions*
- *FOSS Chemical Interactions Resource Book: White Substances Information*, pp. 97-101

**Science Materials Supplied
by the Teacher**

- Protective Eyewear
- Water
- Construction Paper, black
- Sucrose
- Paper towels

AV Equipment

- Extension cord
- Overhead projector
- Multimedia set-up for CD-ROM

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	<p>Lesson 6 (45 min) Investigation 1: Substances (5 of 6 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Chemical names communicate information about the composition of substances. • Chemical formulas communicate the composition of substances. • A chemical reaction occurs when substances interact to form new substances (products). <p>Process / Conducting Investigations</p> <ul style="list-style-type: none"> • Mix substances with water in order to determine the identity of an unknown mixture of substances. • Evaporate experimental results to obtain information about the identity of a mystery mixture. <p>Building Explanations</p> <p>A reaction provides evidence that starting substances change into new, different substances.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 5, 7 • Physical Setting Skills: 13 • Physical Science: 3.1a, 3.1g 	
WEEK 2	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 33-40 taking note of: pp. 34-35 Inv. 1 “At A Glance” pp. 36 Scientific and Historical Background p.40 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 46-50 taking note of pp. 48-49 Steps 1 through 4, Preparation and assembly of the vial sets. p. 50 Step 6 Check the Evaporation Trays p. 50 Steps 8 through 10 Student Resource Books, Multimedia and Assessment – Teacher Guide, Assessment, pp. 433-437 	<p>Investigation/Activity</p> <p>Investigation 1: <i>Substances</i> Part 2: <i>Mixing Substances</i>, Steps # 22-26</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 44-46 – Student Lab Notebook, p. 7, 9, 11 – Transparency Nos. 2-3 – Assessment Chart for Investigation 1, p. 521 – <i>FOSS Chemical Interactions CD-ROM / Multimedia: Two Substances Reactions</i> – <i>FOSS Chemical Interactions Resource Book: White Substances Information</i>, pp. 97-101 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective Eyewear • Water • Construction Paper, black • Sucrose • Paper towels <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

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WEEK 2 (continued)	<p>Lesson 7 (45 min) Investigation 1: Substances (6 of 6 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Chemical names communicate information about the composition of substances. • Chemical formulas communicate the composition of substances. • A chemical reaction occurs when substances interact to form new substances (products). <p>Process / Conducting Investigations</p> <ul style="list-style-type: none"> • Mix substances with water in order to determine the identity of an unknown mixture of substances. • Evaporate experimental results to obtain information about the identity of a mystery mixture. <p>Building Explanations</p> <p>A reaction provides evidence that starting substances change into new, different substances.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 5, 7 • Physical Setting Skills: 13 • Physical Science: 3.1a, 3.1g
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 33-40 taking note of: pp. 34-35 Inv. 1 “At A Glance” pp. 36 Scientific and Historical Background p.40 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 46-50 taking note of pp. 48-49 Steps 1 through 4, Preparation and assembly of the vial sets. p. 50 Step 6 Check the Evaporation Trays p. 50 Steps 8 through 10 Student Resource Books, Multimedia and Assessment – Teacher Guide, Assessment, pp. 433-437 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 1: <i>Substances</i> Part 2: <i>Mixing Substances</i>, Steps # 27-30</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 44-46 – Student Lab Notebook, p. 7, 9, 11 – Transparency Nos. 2-3 – Assessment Chart for Investigation 1, p. 521 – <i>FOSS Chemical Interactions CD-ROM / Multimedia: Two Substances Reactions</i> – <i>FOSS Chemical Interactions Resource Book: White Substances Information</i>, pp. 97-101 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective Eyewear • Water • Construction Paper, black • Sucrose • Paper towels <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

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Advance Preparation Note:

See p. 71 Getting Ready for Part 1, Step 3 – Gather Consumer Product Packages (1 per student) to search for elements in everyday products.

	<p>Lesson 8 (45 min) Investigation 2: Elements (1 of 5 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • An element is a basic substance that cannot be broken into simpler substances during chemical interactions. • There are 90 naturally occurring elements on Earth. • Elements combine to make all of the substances on the Earth. • The periodic table of the elements displays all the naturally occurring and synthesized elements. • The relative abundance of elements varies with location in the universe. 	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 5 • Physical Setting Skills: 12 • Physical Science: 3.1a; 3.2d; 3.3f, 3.3g 	
WEEK 2 (continued)	<p>Advanced Planning/Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 59-69 taking note of: pp. 60-61 Inv. 2 “At A Glance” pp. 62 Scientific and Historical Background p.69 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 70-71 taking note of p. 71 Step 2 Prepare Multimedia Setup p. 71 Step 3 Gather Consumer Product Packages p. 71 Steps 4 through 5 Student Resource Books and Assessment – Teacher Guide, Assessment, p. 438 	<p>Investigation/Activity</p> <p>Investigation 2: <i>Elements</i> Part 1: <i>Periodic Table</i>, Steps # 1-5</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 72-73 – Student Lab Notebook, p. 13, 15 Teacher Answer Master, p. 375, 376 – Assessment Chart for Investigation 2, p. 522 – <i>FOSS Chemical Interactions CD-ROM / Multimedia: Periodic Table</i> – <i>FOSS Chemical Interactions Resource Book: The Periodic Table of the Elements</i>, pp. 90-91 	<p>Science Materials Supplied by the Teacher</p> <p>Consumer Product Packages</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

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	<p>Lesson 9 (45 min) Investigation 2: Elements (2 of 5 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • An element is a basic substance that cannot be broken into simpler substances during chemical interactions. • There are 90 naturally occurring elements on Earth. • Elements combine to make all of the substances on the Earth. • The periodic table of the elements displays all the naturally occurring and synthesized elements. • The relative abundance of elements varies with location in the universe. 	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 5 • Physical Setting Skills: 12 • Physical Science: 3.1a; 3.2d; 3.3f, 3.3g 	
WEEK 2 (continued)	<p>Advanced Planning/Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 59-69 taking note of: pp. 60-61 Inv. 2 “At A Glance” pp. 62 Scientific and Historical Background p.69 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 70-71 taking note of p. 71 Step 2 Prepare Multimedia Setup p. 71 Step 3 Gather Consumer Product Packages p. 71 Steps 4 through 5 Student Resource Books and Assessment – Teacher Guide, Assessment, p. 438 	<p>Investigation/Activity</p> <p>Investigation 2: <i>Elements</i> Part 1: <i>Periodic Table</i>, Steps # 6-9</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 72-73 – Student Lab Notebook, p. 13, 15 Teacher Answer Master, p. 375, 376 – Assessment Chart for Investigation 2, p. 522 – <i>FOSS Chemical Interactions CD-ROM/Multimedia: Periodic Table</i> – <i>FOSS Chemical Interactions Resource Book: Elements</i>, pp. 3-8 	<p>Science Materials Supplied by the Teacher</p> <p>Consumer Product Packages</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

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	<p>Lesson 10 (45 min) Investigation 2: Elements (3 of 5 sessions)</p> <p>Objective(s):</p> <p>Content Elements combine to make all of the substances on Earth.</p> <p>Process / Conducting Investigation Use information in the periodic table to analyze substances in terms of their elemental composition.</p> <p>Building Explanations Explain that all common matter is made of elements.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 5 • Physical Setting Skills: 12 • Physical Science: 3.1a; 3.2d; 3.3e, 3.3f, 3.3g 	
WEEK 2 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 59-69 taking note of: pp. 60-61 Inv. 2 “At A Glance” pp. 62 Scientific and Historical Background p.69 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 75-76 taking note of p. 76 Step 1 Consider an Element-Use Table p. 76 Step 2 Bring in Consumer Product Packages p. 76 Steps 3 through 6 Student Reading, Multimedia and Assessment – Teacher Guide, Assessment, p. 439-443 	<p>Investigation/Activity</p> <p>Investigation 2: <i>Elements</i> Part 2: <i>Elements in the World, Steps # 1-10</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 77-81 – Student Lab Notebook, p. 16, 17, 21 – Student Lab Notebook, Response Sheet, p. 19 Teacher Answer Master, p. 377, 378 – Assessment Master, Mid-Summative Exam 1-2, p. 531-533 Assessment Chart for Investigation 2, p. 522 Assessment Scoring Guide, Response Sheet, p. 439 Assessment Scoring Guide, Mid-Summative Exam 1-2, p. 440-443 – <i>FOSS Chemical Interactions CD-ROM / Multimedia: Periodic Table – Element Identification Games</i> – <i>FOSS Chemical Interactions Resource Book: Elements in the Universe</i>, pp. 9-13 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Consumer Product Packages • Chart Paper • 1.5” x 2” self-stick notes • 3” x 3” self-stick notes • Marking pens • Colored pens/pencils <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

Grade 7

	<p>Lesson 11 (45 min) Investigation 2: Elements (4 of 5 sessions)</p> <p>Objective(s):</p> <p>Content Elements combine to make all of the substances on Earth.</p> <p>Process / Conducting Investigations Use information in the periodic table to analyze substances in terms of their elemental composition.</p> <p>Building Explanations Explain that all common matter is made of elements.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 5 • Physical Setting Skills: 12 • Physical Science: 3.1a; 3.2d; 3.3e, 3.3f, 3.3g 	
WEEK 3	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 59-69 taking note of: pp. 60-61 Inv. 2 “At A Glance” pp. 62 Scientific and Historical Background p.69 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 75-76 taking note of p. 76 Step 1 Consider an Element-Use Table p. 76 Step 2 Bring in Consumer Product Packages p. 76 Steps 3 through 6 Student Reading, Multimedia and Assessment – Teacher Guide, Assessment, p. 439-443 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 2: <i>Elements Part 2: Elements in the World, Steps # 11-12</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 77-81 – Student Lab Notebook, p. 16, 17, 21 – Student Lab Notebook, Response Sheet, p. 19 Teacher Answer Master, p. 377, 378 – Assessment Master, Mid-Summative Exam 1-2, p. 531-533 Assessment Chart for Investigation 2, p. 522 Assessment Scoring Guide, Response Sheet, p. 439 Assessment Scoring Guide, Mid-Summative Exam 1-2, p. 440-443 – <i>FOSS Chemical Interactions CD-ROM / Multimedia: Periodic Table – Element Identification Games</i> – <i>FOSS Chemical Interactions Resource Book: Elements in the Universe</i>, pp. 9-13 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Consumer Product Packages • Chart Paper • 1.5” x 2” self-stick notes • 3” x 3” self-stick notes • Marking pens • Colored pens/pencils <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

Grade 7

	<p>Lesson 12 (45 min) Investigation 2: Elements (5 of 5 sessions)</p> <p>Objective(s):</p> <p>Content Elements combine to make all of the substances on Earth.</p> <p>Process / Conducting Investigations Use information in the periodic table to analyze substances in terms of their elemental composition.</p> <p>Building Explanations Explain that all common matter is made of elements.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 5 • Physical Setting Skills: 12 • Physical Science: 3.1a; 3.2d; 3.3e, 3.3f, 3.3g 	
WEEK 3 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 59-69 taking note of: pp. 60-61 Inv. 2 “At A Glance” pp. 62 Scientific and Historical Background p.69 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 75-76 taking note of p. 76 Step 1 Consider an Element-Use Table p. 76 Step 2 Bring in Consumer Product Packages p. 76 Steps 3 through 6 Student Reading, Multimedia and Assessment – Teacher Guide, Assessment, p. 439-443 	<p>Investigation/Activity</p> <p>Investigation 2: <i>Elements Part 2: Elements in the World, Steps # 13-14</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 77-81 – Student Lab Notebook, p. 16, 17, 21 – Student Lab Notebook, Response Sheet, p. 19 Teacher Answer Master, p. 377, 378 – Assessment Master, Mid-Summative Exam 1-2, p. 531-533 Assessment Chart for Investigation 2, p. 522 Assessment Scoring Guide, Response Sheet, p. 439 Assessment Scoring Guide, Mid-Summative Exam 1-2, p. 440-443 – <i>FOSS Chemical Interactions CD-ROM / Multimedia: Periodic Table – Element Identification Games</i> – <i>FOSS Chemical Interactions Resource Book: Elements in the Universe</i>, pp. 9-13 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Consumer Product Packages • Chart Paper • 1.5” x 2” self-stick notes • 3” x 3” self-stick notes • Marking pens • Colored pens/pencils <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM
<p>Advance Preparation Note: See p. 101 Getting Ready for Investigation 3, Part 2, Step 4 – Obtain a Balance (sensitive to 0.1g).</p>			

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	<p>Lesson 13 (45 min) Investigation 3: Particles (1 of 5 sessions)</p> <p>Objective(s):</p> <p>Process / Conducting Investigations</p> <p>Use standardized procedures to determine the volume of gas produced in a reaction.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.1d 	
WEEK 3 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 83-91 taking note of: <ul style="list-style-type: none"> pp. 84-85 Inv. 2 “At A Glance” pp. 86 Scientific and Historical Background p.91 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 92-94 taking note of <ul style="list-style-type: none"> p. 93 Step 1 Prepare Materials for Demonstration p. 93 Step 2 Repackage Substances p. 93 Step 5 Prepare the Balloon Demonstration – Teacher Guide, Assessment, p. 444 	<p>Investigation/Activity</p> <p>Investigation 3: <i>Particles</i> Part 1: <i>Capture the Gas</i>, Steps # 1-7</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 95-98 – Student Lab Notebook, p. 22, 23 – Teacher Answer Master, p. 379 – Transparency Nos. 4 – Assessment Chart for Investigation 3, p. 523 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective eyewear • Plain paper ¼ sheets <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

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	<p>Lesson 14 (45 min) Investigation 3: Particles (2 of 5 sessions) Objective(s): Process / Conducting Investigations Use standardized procedures to determine the volume of gas produced in a reaction.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.1d 	
WEEK 3 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 83-91 taking note of: pp. 84-85 Inv. 2 “At A Glance” pp. 86 Scientific and Historical Background p.91 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 92-94 taking note of p. 93 Step 1 Prepare Materials for Demonstration p. 93 Step 2 Repackage Substances p. 93 Step 5 Prepare the Balloon Demonstration – Teacher Guide, Assessment, p. 444 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 3: <i>Particles</i> Part 1: <i>Capture the Gas, Steps # 8-10</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 95-98 – Student Lab Notebook, p. 22, 23 Teacher Answer Master, p. 379 – Transparency Nos. 4 – Assessment Chart for Investigation 3, p. 523 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective eyewear • Plain paper ¼ sheets <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 7

WEEK 3 (continued)	<p>Lesson 15 (45 min) Investigation 3: Particles (3 of 5 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> Gas is matter – it has mass and occupies space. Gas compresses when force is applied; gas expands when force is withdrawn. <p>Process / Conducting Investigations</p> <p>Use syringes to observe the effects of pressure on gases.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> Use drawings and words to explain gas compression and expansion. Explain the composition of gas in terms of individual particles in constant motion. 		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> General Skills: 1, 2, 3, 4 Physical Science: 3.1c, 3.1d
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> Teacher Guide Overview, pp. 83-91 taking note of: <ul style="list-style-type: none"> pp. 84-85 Inv. 2 “At A Glance” pp. 86 Scientific and Historical Background p.91 Why Do I Have to Learn This? Teacher Guide Materials & Getting Ready, pp. 99-101 taking note of <ul style="list-style-type: none"> p. 100 Step 1 Practice with Syringes p. 100 Step 3 Prepare Bubble-Wrap Bubbles p. 100 Steps 4 & 5 Obtain a Balance and Practice Ball Inflation Teacher Guide, Assessment, p. 445 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 3: <i>Particles</i> Part 2: <i>Air is Matter</i>, Steps # 1-6</p> <ul style="list-style-type: none"> Teacher Guide, pp. 102-107 Student Lab Notebook, p. 24, 25 26, 27, 29 Teacher Answer Master, pp. 380, 381, 382, 383, 384 Transparency Nos. 5, 6, 7, 8 Assessment Chart for Investigation 3, p. 523 <i>FOSS Chemical Interactions Resource Book: Particles, pp. 14-15</i> 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> Metal fork Electronic balance, 1.0g accuracy <p>AV Equipment</p> <ul style="list-style-type: none"> Extension cord Overhead projector

Grade 7

	<p>Lesson 16 (45 min) Investigation 3: Particles (4 of 5 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> Gas is matter – it has mass and occupies space. Gas compresses when force is applied; gas expands when force is withdrawn. <p>Process / Conducting Investigations</p> <p>Use syringes to observe the effects of pressure on gases.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> Use drawings and words to explain gas compression and expansion. Explain the composition of gas in terms of individual particles in constant motion. 	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> General Skills: 1, 2, 3, 4 Physical Setting Skills: Physical Science: 3.1c, 3.1d 	
WEEK 4	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> Teacher Guide Overview, pp. 83-91 taking note of: pp. 84-85 Inv. 2 “At A Glance” pp. 86 Scientific and Historical Background p.91 Why Do I Have to Learn This? Teacher Guide Materials & Getting Ready, pp. 99-101 taking note of p. 100 Step 1 Practice with Syringes p. 100 Step 3 Prepare Bubble-Wrap Bubbles p. 100 Steps 4 & 5 Obtain a Balance and Practice Ball Inflation Teacher Guide, Assessment, p. 445 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 3: <i>Particles</i> Part 2: <i>Air is Matter</i>, Steps # 7-17</p> <ul style="list-style-type: none"> Teacher Guide, pp. 102-107 Student Lab Notebook, p. 24, 25, 26, 27, 29 Teacher Answer Master, pp. 380, 381, 382, 383, 384 Transparency Nos. 5, 6, 7, 8 Assessment Chart for Investigation 3, p. 523 Assessment Scoring Guide, Lab Notebook Sheet p. 27 – Air in a Syringe B, p.445 <i>FOSS Chemical Interactions Resource Book: Particles, pp. 14-15</i> <p>NOTE: Air in Syringe Student Sheets assessed at the end of this investigation are returned to students at the beginning of Part 3: Air as Particles.</p>	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> Metal fork Electronic balance, 1.0g accuracy <p>AV Equipment</p> <ul style="list-style-type: none"> Extension cord Overhead projector

Grade 7

	<p>Lesson 17 (45 min) Investigation 3: Particles (5 of 5 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • During compression and expansion, the number and character of particles in a sample of gas do not change; space between particles does change. • Gases are composed of widely spaced individual particles in constant motion. • There is nothing between particles except space. 	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.1c, 3.1d, 3.2d 	
WEEK 4 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 83-91 taking note of: pp. 84-85 Inv. 2 “At A Glance” pp. 86 Scientific and Historical Background p.91 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 108-109 taking note of p. 109 Step 1 Preview Multimedia p. 109 Step 2 Collect Empty Water Bottles p. 109 Steps 4 & 5 Reading and Assessment – Teacher Guide, Assessment, p. 446-451 	<p>Investigation/Activity</p> <p>Investigation 3: <i>Particles</i> Part 3: <i>Air as Particles, Steps # 1-9</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 110-113 – Student Lab Notebook, p. 26, 27, 31 Teacher Answer Master, pp. 382, 383, 385 – Transparency Nos. 8, 9, 10 – Assessment Master, Mid-Summative Exam, pp. 534-536 Assessment Chart for Investigation 3, p. 523 Assessment Scoring Guide, Lab Notebook Sheet p. 27 – Air in a Syringe B, p. 445 Assessment Scoring Guide, Mid-Summative Exam, pp. 446-451 – <i>FOSS Chemical Interactions CD-ROM / Multimedia: Periodic Table and Gas in a Syringe</i> – <i>FOSS Chemical Interactions Resource Book: Three Phases of Matter, pp. 16-22</i> 	<p>Science Materials Supplied by the Teacher</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

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WEEK 5 (continued)	<p>Lesson 18 (45 min) Investigation 4: Kinetic Energy (1 of 5 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Kinetic energy is energy of motion. • The particles in substances gain kinetic energy as they warm, and lose kinetic energy as they cool. • Matter expands when the kinetic energy of its particles increases; matter contracts when the kinetic energy of its particles decreases. <p>Process / Conducting Investigations</p> <p>Heat and cool gas to observe expansion and contraction.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Setting Skills: • Physical Science: 3.1c, 3.1d
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 115-121 taking note of: pp. 116-117 Inv. 4 “At A Glance” pp. 118-120 Scientific and Historical Background p. 121 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 122-124 taking note of p. 123 Step 1 Collect Plastic Bottles p. 123 Step 4 Plan for Hot and Cold Water p. 123 Step 5 Plan Assessment: Lab Notebook Sheet – Teacher Guide, Assessment, p. 452 	<p>Investigation/Activity</p> <p>Investigation 4: <i>Kinetic Energy</i> Part 1: <i>Gas Expansion, Steps # 1-10</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 125-129 – Student Lab Notebook, p. 32, 33 – Student Lab Notebook, Teacher Answer Master, pp. 386-387 – Assessment Chart for Investigation 4, p. 524 Assessment Scoring Guide, Lab Notebook Sheet, p. 32, 33 – Heating and Cooling Air A, B, p. 452 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Water Bottles, 500 ml, disp., clear, WITH CAP • Dishwashing detergent, liquid for bubble solution • Glycerin (optional) • HOT and COLD water <p>AV Equipment</p>

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	<p>Lesson 19 (45 min) Objective(s): Content</p> <ul style="list-style-type: none"> • Kinetic energy is energy of motion. • The particles in substances gain kinetic energy as they warm, and lose kinetic energy as they cool. • Matter expands when the kinetic energy of its particles increases; matter contracts when the kinetic energy of its particles decreases. <p>Process / Conducting Investigations Heat and cool gas to observe expansion and contraction.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Setting Skills: • Physical Science: 3.1c, 3.1d 	
<p>WEEK 5 (continued)</p>	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 115-121 taking note of: pp. 116-117 Inv. 4 “At A Glance” pp. 118-120 Scientific and Historical Background p. 121 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 122-124 taking note of p. 123 Step 1 Collect Plastic Bottles p. 123 Step 4 Plan for Hot and Cold Water p. 123 Step 5 Plan Assessment: Lab Notebook Sheet – Teacher Guide, Assessment, p. 452 	<p>Investigation/Activity</p> <p>Investigation 4: Kinetic Energy Part 1: Gas Expansion, Steps # 11-14</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 125-129 – Student Lab Notebook, p. 32, 33 – Student Lab Notebook, Teacher Answer Master, pp. 386-387 – Assessment Chart for Investigation 4, p. 524 Assessment Scoring Guide, Lab Notebook Sheet, p. 32, 33 – Heating and Cooling Air A, B, p. 452 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Water Bottles, 500 ml, disp., clear, WITH CAP • Dishwashing detergent, liquid for bubble solution • Glycerin (optional) • HOT and COLD water <p>AV Equipment</p>

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WEEK 5 (continued)	<p>Lesson 20 (45 min) Investigation 4: Kinetic Energy (3 of 5 sessions)</p> <p>Objective(s):</p> <p>Content Matter expands when the kinetic energy of its particles increases; matter contracts when the kinetic energy of its particles decreases.</p> <p>Process / Conducting Investigations Heat and cool liquid matter to observe expansion and contraction.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Discuss expansion and contraction at the macroscopic and particle levels. • Explain expansion and contraction in terms of kinetic energy. 		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.1c, 3.1e
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 115-121 taking note of: pp. 116-117 Inv. 4 “At A Glance” pp. 118-120 Scientific and Historical Background p. 121 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 130-132 taking note of p. 131 Step 1 Make a Bottle System p. 132 Step 3 Prepare Blue Water p. 132 Step 4 Bring a Washcloth p. 132 Step 6 & 7 Plan Reading and Assessment: Response Sheet – Teacher Guide, Assessment, p. 453 	<p>Investigation/Activity</p> <p>Investigation 4: <i>Kinetic Energy</i> Part 2: <i>Liquid Expansion, Steps # 1-8</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 133-138 – Student Lab Notebook, p. 34, 35, 37, 39 – Student Lab Notebook, Teacher Answer Master, pp. 388-391 – Transparency Nos. 11 – Assessment Chart for Investigation 4, p. 524 Assessment Scoring Guide, Response Sheet, p. 39 – Kinetic Energy, p. 453 – <i>FOSS Chemical Interactions Resource Book: Particles in Motion</i>, p. 23-27 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • HOT (60°C) and COLD (5°C) water • Paper towels • Washcloth <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

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	<p>Lesson 21 (45 min) Investigation 4: Kinetic Energy (4 of 5 sessions)</p> <p>Objective(s):</p> <p>Content Matter expands when the kinetic energy of its particles increases; matter contracts when the kinetic energy of its particles decreases.</p> <p>Process / Conducting Investigations Heat and cool liquid matter to observe expansion and contraction.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Discuss expansion and contraction at the macroscopic and particle levels. • Explain expansion and contraction in terms of kinetic energy. 	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • Expanded Process Skills: S1.2b • General Skills: 1, 3, 4, 7, 8 • Physical Setting Skills: 7 	
WEEK 5 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 115-121 taking note of: pp. 116-117 Inv. 4 “At A Glance” pp. 118-120 Scientific and Historical Background p. 121 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 130-132 taking note of p. 131 Step 1 Make a Bottle System p. 132 Step 3 Prepare Blue Water p. 132 Step 4 Bring a Washcloth p. 132 Step 6 & 7 Plan Reading and Assessment: Response Sheet – Teacher Guide, Assessment, p. 453 	<p>Investigation/Activity</p> <p>Investigation 4: <i>Kinetic Energy Part 2: Liquid Expansion, Steps # 9-17</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 133-138 – Student Lab Notebook, p. 34, 35, 37, 39 – Student Lab Notebook, Teacher Answer Master, pp. 388-391 – Transparency Nos. 11 – Assessment Chart for Investigation 4, p. 524 Assessment Scoring Guide, Response Sheet p. 39 – Kinetic Energy, p. 453 – <i>FOSS Chemical Interactions Resource Book: Particles in Motion, p. 23-27</i> 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • HOT (60°C) and COLD (5°C) water • Paper towels • Washcloth <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 7

	<p>Lesson 22 (45 min) Investigation 4: Kinetic Energy (5 of 5 sessions)</p> <p>Objective(s):</p> <p>Process / Conducting Investigations Heat and cool solid matter to observe expansion and contraction.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Discuss expansion and contraction at the macroscopic and particle levels. • Explain expansion and contraction in terms of kinetic energy. 	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.1c, 3.1d, 3.1f 	
WEEK 5 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 115-121 taking note of: pp. 116-117 Inv. 4 “At A Glance” pp. 118-120 Scientific and Historical Background p. 121 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 139-140 taking note of p. 139 Step 1 Test the Sphere and Ring p. 139 Step 2 Preview Multimedia p. 139 Step 3 & 4 Plan Reading and Assessment – Teacher Guide, Assessment, p. 454-459 	<p>Investigation/Activity</p> <p>Investigation 4: <i>Kinetic Energy</i> Part 3: <i>Solid Expansion, Steps # 1-8</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 141-142 – Student Lab Notebook, p. 41 – Student Lab Notebook, Teacher Answer Master, pp. 392 – Assessment Master, Mid-Summative Exam, pp. 537-539 Assessment Chart for Investigation 4, p. 524 Assessment Scoring Guide, Mid-Summative Exam, pp. 454-459 – <i>FOSS Chemical Interactions CD-ROM / Multimedia: Particles in Solid, Liquid and Gas</i> – <i>FOSS Chemical Interactions Resource Book: Expansions and Contraction, p. 28-31</i> 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • 1 Burner – electric (preferred) or gas • ICE water <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Multimedia set-up for CD-ROM

Grade 7

	<p>Lesson 23 (45 min) Investigation 5: Energy Transfer (1 of 6 sessions)</p> <p>Objective(s):</p> <p>Content Mixing water of two temperatures results in an intermediate temperature.</p> <p>Process / Conducting Investigations Mix hot and cold water to observe energy transfer</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.3b; 4.1d 	
WEEK 5 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 143-152 taking note of: pp. 144-145 Inv. 5 “At A Glance” pp. 146-151 Scientific and Historical Background p. 152 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 153-154 taking note of p. 154 Step 1 Prepare Hot and Cold Water p. 154 Step 2 Preview the Student Equipment p. 154 Step 3 Plan Assessment – Teacher Guide, Assessment, p. 460 	<p>Investigation/Activity</p> <p>Investigation 5: <i>Energy Transfer</i> Part 1: <i>Mixing Hot and Cold, Steps # 1-11</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 155-158 – Student Lab Notebook, p. 43 – Student Lab Notebook, Teacher Answer Master, pp. 393 – Transparency Nos. 12 – Assessment Chart for Investigation 5, p. 525 Assessment Scoring Guide, Teacher Observation, p. 460 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • HOT water (60°C) • COLD water (5°C) <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

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WEEK 5 (continued)	<p>Lesson 24 (45 min) Investigation 5: Energy Transfer (2 of 6 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Substances heat or cool as a result of energy transfer. • Energy transfers between particles when they collide. Energy transfer by contact is conduction. • Energy always transfers from high kinetic energy to low kinetic energy. • Equilibrium occurs when temperature is uniform. <p>Building Explanations</p> <p>Explain energy transfer as change of kinetic energy resulting from collision.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.3b; 4.1d
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 143-152 taking note of: pp. 144-145 Inv. 5 “At A Glance” pp. 146-151 Scientific and Historical Background p. 152 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 159-160 taking note of p. 159 Step 1 Read Lesson Plan Carefully p. 159 Step 2 & 3 Plan for Multimedia and Reading p. 159 Step 4 Plan Assessment – Teacher Guide, Assessment, p. 461 	<p>Investigation/Activity</p> <p>Investigation 5: <i>Energy Transfer</i> Part 2: <i>Particle Collisions, Steps # 1-7</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 161-164 – Student Lab Notebook, p. 45, 47 – Student Lab Notebook, Teacher Answer Master, pp. 394-395 – Assessment Chart for Investigation 5, p. 525 Assessment Scoring Guide, Response Sheet, Energy Transfer, p. 461 – <i>FOSS Chemical Interactions CD-ROM / Multimedia:</i> <i>Energy Transfer by Collision</i> <i>Mixing Hot and Cold Water</i> <i>Thermometer</i> <i>Energy Flow</i> – <i>FOSS Chemical Interactions Resource Book: Energy on the Move</i>, p. 32-37

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	<p>Lesson 25 (45 min) Investigation 5: Energy Transfer (3 of 6 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Substances heat or cool as a result of energy transfer. • Energy transfers between particles when they collide. Energy transfer by contact is conduction. • Energy always transfers from high kinetic energy to low kinetic energy. • Equilibrium occurs when temperature is uniform. <p>Building Explanations</p> <p>Explain energy transfer as change of kinetic energy resulting from collision.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.3b; 4.1d 	
WEEK 5 (continued)	<p>Advanced Planning/Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 143-152 taking note of: pp. 144-145 Inv. 5 “At A Glance” pp. 146-151 Scientific and Historical Background p. 152 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 159-160 taking note of p. 159 Step 1 Read Lesson Plan Carefully p. 159 Step 2 & 3 Plan for Multimedia and Reading p. 159 Step 4 Plan Assessment – Teacher Guide, Assessment, p. 461 	<p>Investigation/Activity</p> <p><i>Investigation 5: Energy Transfer Part 2: Particle Collisions, Steps # 8-11</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 161-164 – Student Lab Notebook, p. 45, 47 – Student Lab Notebook, Teacher Answer Master, pp. 394-395 – Assessment Chart for Investigation 5, p. 525 Assessment Scoring Guide, Response Sheet, Energy Transfer, p. 461 – <i>FOSS Chemical Interactions CD-ROM / Multimedia: Energy Transfer by Collision Mixing Hot and Cold Water Thermometer Energy Flow</i> – <i>FOSS Chemical Interactions Resource Book: Energy on the Move, p. 32-37</i> 	<p>Science Materials Supplied by the Teacher</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Multimedia set-up for CD-ROM

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	<p>Lesson 26 (45 min) Investigation 5: Energy Transfer (4 of 6 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> Heat is measured in calories. One calorie will raise the temperature of 1 g of water 1°C. Temperature is measured in degrees Celsius (°C). Temperature is the average kinetic energy of particles. Energy is conserved. <p>Process / Conducting Investigations</p> <p>Calculate energy transfer in calories.</p> <p>Building Explanations</p> <p>Discuss energy transfer in terms of calories.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> General Skills: 1, 2, 3, 4 Physical Science: 3.3b; 4.1d; 4.5a, 4.5b
WEEK 6	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> Teacher Guide Overview, pp. 143-152 taking note of pp. 144-145 Inv. 5 “At A Glance” pp. 146-151 Scientific and Historical Background p. 152 Why Do I Have to Learn This? Teacher Guide Materials & Getting Ready, pp. 165-166 taking note of p. 166 Step 1 Practice Water Weighing p. 166 Step 2 Plan Hot and Cold Water p. 166 Step 3 Plan Assessment Teacher Guide, Assessment, p. 462-469 <p>Investigation/Activity</p> <p>Investigation 5: <i>Energy Transfer Part 3: Heat, Steps # 1-3</i></p> <ul style="list-style-type: none"> Teacher Guide, pp. 167-171 Student Lab Notebook, p. 48, 49, 51, 52, 53 Student Lab Notebook, Teacher Answer Master, pp. 396-399 Transparency Nos. 13, 14 Assessment Master, Mid-Summative Exam, pp. 540-543 Assessment Chart for Investigation 5, p. 525 Assessment Scoring Guide, Mid-Summative Exam, pp. 462-469 <i>FOSS Chemical Interactions CD-ROM / Multimedia: Mixing Hot and Cold Water Energy Flow</i> <p>NOTE: Correction to p. 397 Chemical Interactions Teacher Guide (1st Printing)</p> <p>Please note this correction to Page 397, Teacher Answer Master for Lab Notebook, page 49, Calculating Heat in Calories B.</p> <p>On item #4, the fourth line of copy is hidden.</p> <p>The fourth line should read:</p> $T_f = T_i + \Delta T = 20^\circ\text{C} + 60^\circ\text{C} = 80^\circ\text{C}$ <p>You can download the PDF of the updated page at: http://lhsfoss.org/fossweb/news/pdfs/13-Teacher_Answer_p._397.pdf</p>	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> Electronic Balance HOT water (60°C) COLD water (5°C) Calculators <p>AV Equipment</p> <ul style="list-style-type: none"> Extension cord Overhead projector Multimedia set-up for CD-ROM

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WEEK 6 (continued)	<p>Lesson 27 (45 min) Investigation 5: Energy Transfer (5 of 6 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> Heat is measured in calories. One calorie will raise the temperature of 1 g of water 1°C. Temperature is measured in degrees Celsius (°C). Temperature is the average kinetic energy of particles. Energy is conserved. <p>Process / Conducting Investigations</p> <p>Calculate energy transfer in calories.</p> <p>Building Explanations</p> <p>Discuss energy transfer in terms of calories.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> General Skills: 1, 2, 3, 4 Physical Science: 3.3b; 4.1d; 4.5a, 4.5b
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> Teacher Guide Overview, pp. 143-152 taking note of: <ul style="list-style-type: none"> pp. 144-145 Inv. 5 “At A Glance” pp. 146-151 Scientific and Historical Background p. 152 Why Do I Have to Learn This? Teacher Guide Materials & Getting Ready, pp. 165-166 taking note of <ul style="list-style-type: none"> p. 166 Step 1 Practice Water Weighing p. 166 Step 2 Plan Hot and Cold Water p. 166 Step 3 Plan Assessment Teacher Guide, Assessment, p. 462-469 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 5: <i>Energy Transfer</i> Part 3: <i>Heat</i>, Steps # 4-12</p> <ul style="list-style-type: none"> Teacher Guide, pp. 167-171 Student Lab Notebook, p. 48, 49, 51, 52, 53 Student Lab Notebook, Teacher Answer Master, pp. 396-399 Transparency Nos. 13, 14 Assessment Master, Mid-Summative Exam, pp. 540-543 Assessment Chart for Investigation 5, p. 525 Assessment Scoring Guide, Mid-Summative Exam, pp. 462-469 <i>FOSS Chemical Interactions CD-ROM / Multimedia: Mixing Hot and Cold Water Energy Flow</i> 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> Electronic Balance HOT water (60°C) COLD water (5°C) Calculators <p>AV Equipment</p> <ul style="list-style-type: none"> Extension cord Overhead projector Multimedia set-up for CD-ROM

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WEEK 6 (continued)	<p>Lesson 28 (45 min) Investigation 5: Energy Transfer (6 of 6 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> Heat is measured in calories. One calorie will raise the temperature of 1 g of water 1°C. Temperature is measured in degrees Celsius (°C). Temperature is the average kinetic energy of particles. Energy is conserved. <p>Process / Conducting Investigations</p> <p>Calculate energy transfer in calories.</p> <p>Building Explanations</p> <p>Discuss energy transfer in terms of calories.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> General Skills: 1, 2, 3, 4 Physical Science: 3.3b; 4.1d; 4.5a, 4.5b
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> Teacher Guide Overview, pp. 143-152 taking note of: <ul style="list-style-type: none"> pp. 144-145 Inv. 5 “At A Glance” pp. 146-151 Scientific and Historical Background p. 152 Why Do I Have to Learn This? Teacher Guide Materials & Getting Ready, pp. 165-166 taking note of <ul style="list-style-type: none"> p. 166 Step 1 Practice Water Weighing p. 166 Step 2 Plan Hot and Cold Water p. 166 Step 3 Plan Assessment Teacher Guide, Assessment, p. 462-469 	<p>Investigation/Activity</p> <p>Investigation 5: <i>Energy Transfer</i> Part 3: <i>Heat</i>, Steps # 13-14</p> <ul style="list-style-type: none"> Teacher Guide, pp. 167-171 Student Lab Notebook, p. 48, 49, 51, 52, 53 Student Lab Notebook, Teacher Answer Master, pp. 396-399 Transparency Nos. 13, 14 Assessment Master, Mid-Summative Exam, pp. 540-543 Assessment Chart for Investigation 5, p. 525 Assessment Scoring Guide, Mid-Summative Exam, pp. 462-469 <i>FOSS Chemical Interactions CD-ROM / Multimedia: Mixing Hot and Cold Water Energy Flow</i> 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> Electronic Balance HOT water (60°C) COLD water (5°C) Calculators <p>AV Equipment</p> <ul style="list-style-type: none"> Extension cord Overhead projector Multimedia set-up for CD-ROM

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WEEK 6 (continued)	<p>Lesson 29 (45 min) Investigation 6: Heat of Fusion (Optional – 1 of 2 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> Heat of fusion is the energy needed to change a solid substance into liquid. Heat of fusion does not change the kinetic energy of particles in a substance. The heat of fusion for water is about 80 calories per gram. <p>Process / Conducting Investigations</p> <ul style="list-style-type: none"> Mix hot water and ice water to discover heat of fusion. Calculate heat of fusion from data. <p>Building Explanations</p> <p>Explain the apparent discrepancy in energy transfer when hot water melts ice.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> General Skills: 1, 2, 3, 4 Physical Science: 3.1a; 3.3b
	<p>Advanced Planning/Notes to Teachers</p> <ul style="list-style-type: none"> Teacher Guide Overview, pp. 173-177 taking note of: <ul style="list-style-type: none"> pp. 174-175 Inv. 6 “At A Glance” pp. 176-177 Scientific and Historical Background p. 177 Why Do I Have to Learn This? Teacher Guide Materials & Getting Ready, pp. 178-180 taking note of <ul style="list-style-type: none"> p. 179 Step 1 Freeze a Thermometer in Ice p. 179 Steps 2 & 3 Plan for Ice and Hot and Cold Water p. 179-180 Steps 5-7 Plan Reading and Assessment Teacher Guide, Assessment, p. 470-475 	<p>Investigation/Activity</p> <p>Investigation 6: <i>Heat of Fusion: Melting Ice, Steps # 1-14</i></p> <ul style="list-style-type: none"> Teacher Guide, pp. 181-187 Student Lab Notebook, p. 54, 55, 56, 57, 59 Student Lab Notebook, Teacher Answer Master, pp. 400-404 Transparency Nos. 15, 16, 17 Assessment Master, Mid-Summative Exam, pp. 544-545 Assessment Chart for Investigation 6, p. 526 Assessment Scoring Guide, Lab Notebook Sheet: Ice Water and Hot Water A-B, p. 470 Assessment Scoring Guide, Mid-Summative Exam, pp. 472-475 <i>FOSS Chemical Interactions Resource Book: Heat of Fusion, p. 38-41</i> 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> Electronic Balance ICE CUBES HOT water (75-80°C) ICE water (0°C) ICE chest/cooler <p>AV Equipment</p> <ul style="list-style-type: none"> Extension cord Overhead projector

Grade 7

WEEK 6 (continued)	<p>Lesson 30 (45 min) Investigation 6: Heat of Fusion (Optional – 2 of 2 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> Heat of fusion is the energy needed to change a solid substance into liquid. Heat of fusion does not change the kinetic energy of particles in a substance. The heat of fusion for water is about 80 calories per gram. <p>Process / Conducting Investigations</p> <ul style="list-style-type: none"> Mix hot water and ice water to discover heat of fusion. Calculate heat of fusion from data. <p>Building Explanations</p> <ul style="list-style-type: none"> Explain the apparent discrepancy in energy transfer when hot water melts ice. Explain that heat of fusion is energy that melts ice without changing the kinetic energy of the particles. 		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> General Skills: 1, 2, 3, 4 Physical Science: 3.1a; 3.3b
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> Teacher Guide Overview, pp. 173-177 taking note of: <ul style="list-style-type: none"> pp. 174-175 Inv. 6 “At A Glance” pp. 176-177 Scientific and Historical Background p. 177 Why Do I Have to Learn This? Teacher Guide Materials & Getting Ready, pp. 178-180 taking note of <ul style="list-style-type: none"> p. 179 Step 1 Freeze a Thermometer in Ice p. 179 Steps 2 & 3 Plan for Ice and Hot and Cold Water p. 179-180 Steps 5-7 Plan Reading and Assessment Teacher Guide, Assessment, p. 470-475 	<p>Investigation/Activity</p> <p>Investigation 6: <i>Heat of Fusion: Melting Ice, Steps # 15-18</i></p> <ul style="list-style-type: none"> Teacher Guide, pp. 181-187 Student Lab Notebook, p. 54, 55, 56, 57, 59 Student Lab Notebook, Teacher Answer Master, pp. 400-404 Transparency Nos. 15, 16, 17 Assessment Master, Mid-Summative Exam, pp. 544-545 Assessment Chart for Investigation 6, p. 526 Assessment Scoring Guide, Lab Notebook Sheet: Ice Water and Hot Water A-B, p. 470 Assessment Scoring Guide, Mid-Summative Exam, pp. 472-475 FOSS Chemical Interactions Resource Book: Heat of Fusion, p. 38-41 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> Electronic Balance ICE CUBES HOT water (75-80°C) ICE water (0°C) ICE chest/cooler <p>AV Equipment</p> <ul style="list-style-type: none"> Extension cord Overhead projector
<p>Advance Preparation Note:</p> <p>See p. 211 Getting Ready for Investigation 7, Part 2, Steps 1 & 2 – Prepare Wax and Margarine; Prepare Sugar.</p>			

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	<p>Lesson 31 (45 min) Investigation 7: Phase Change (1 of 8 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Matter exists on Earth in three common phases (states) – solid, liquid and gas. • Melting is a change of state caused by heat. • Dissolving is an interaction between two substances in which one substance breaks apart and goes into another substance. <p>Process / Conducting Investigations</p> <p>Use hot water to transfer heat to substances to observe phase change.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 7 • Physical Science: 3.1a, 3.1c, 3.1d, 3.1e, 3.1f; 3.2a; 4.2e 	
WEEK 7	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 189-203 taking note of: pp. 190-195 Inv. 7 “At A Glance” pp. 196-202 Scientific and Historical Background p. 203 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 204-205 taking note of p. 205 Step 1 Plan for M&Ms p. 205 Steps 2 & 3 Prepare for Al Foil Cups p. 205 Step 5 Plan Assessment – Teacher Guide, Assessment, p. 476 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 7: <i>Phase Change, Part 1: Dissolve and Melt, Steps # 1-13</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 206-209 – Student Lab Notebook, p. 60, 61 – Student Lab Notebook, Teacher Answer Master, pp. 405 – Transparency Nos. 18 – Assessment Chart for Investigation 7, p. 527 – Assessment Scoring Guide, Quick Write and Lab Notebook Sheet: Dissolve or Melt B, p. 476 <p>NOTE: Correction to p. 60 Chemical Interactions Student Lab Notebook</p> <p>Student Lab Notebook, page 60, "Dissolve or Melt? A": "Prepare foil cups" step “a” should read: "Place a paper cup" (instead of "Place a plastic cup").</p> <p>You can download the PDF of the updated Student Lab Notebook sheet at: http://lhsfoss.org/fossweb/news/pdfs/CI_LabNotes_p.60.pdf</p>	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • M&M’S® candies • HOT water • COLD water • ROOM TEMPERATURE water <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 7

WEEK 7 (continued)	<p>Lesson 32 (45 min) Investigation 7: Phase Change (2 of 8 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Melting is a change of state caused by heat. • In solids, particles are held in place and move only by vibrating. • In liquids, particles are held close, but are able to move around and over one another. • Change of state is the result of change of energy in the particles in a sample of matter. <p>Process / Conducting Investigations</p> <p>Use ice, hot water, and flame to transfer heat to and from substances to observe phase change.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Explain phase in terms of the relationship of particles to one another in a substance. • Discuss phase change in terms of kinetic energy and energy transfer. 		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 7 • Physical Science: 3.1c; 3.2a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 189-203 taking note of: pp. 190-195 Inv. 7 “At A Glance” pp. 196-202 Scientific and Historical Background p. 203 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 210-211 taking note of p. 205 Step 1 Prepare Wax and Margarine (Cut extra wax pieces for Part 3) p. 205 Step 2 Prepare Sugar p. 205 Step 5 Plan Self-Assessment – Teacher Guide, Assessment, p. 477 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 7: <i>Phase Change, Part 2: Melting Temperature, Steps # 1-12</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 212-214 – Student Lab Notebook, p. 63 – Student Lab Notebook, Teacher Answer Master, pp. 406 – Transparency Nos. 19 – Assessment Chart for Investigation 7, p. 527 – Assessment Scoring Guide, Self-Assessment: Quick Write, p. 477 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Margarine • HOT water • Granulated sugar • Knife • ICE (optional) <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 7

WEEK 7 (continued)	<p>Lesson 33 (45 min) Investigation 7: Phase Change (3 of 8 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Melting is a change of state caused by heat. • Change of state is the result of change of energy in the particles of matter. • During phase change, particles do not change; relationships between particles do change. • The temperatures at which phase changes occur are different for different substances. <p>Process / Conducting Investigations</p> <p>Use flame to transfer heat to substances to observe phase change.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Explain phase in terms of the relationships of particles to one another in a substance. • Discuss phase change in terms of kinetic energy and energy transfer. 		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.1c; 3.2a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 189-203 taking note of: pp. 190-195 Inv. 7 “At A Glance” pp. 196-202 Scientific and Historical Background p. 203 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 215-217 taking note of p. 216 Steps 1-3 Prepare Al Foil Spoons and Wax p. 216 Steps 4 & 5 Review Safety p. 217 Steps 6 & 7 Plan Reading and Assessment – Teacher Guide, Assessment, p. 478 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 7: <i>Phase Change, Part 3: More Heat, Steps # 1-10</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 218-221 – Student Lab Notebook, p. 64, 65, 67 – Student Lab Notebook, Teacher Answer Master, pp. 407-409 – Transparency Nos. 20, 21 – Assessment Chart for Investigation 7, p. 527 – Assessment Scoring Guide, Response Sheet – Phase Change, p. 478 – <i>FOSS Chemical Interactions Resource Book: Rock Solid, p. 42-48</i> 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Wooden safety matches • Granulated sugar • Protective eyewear <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

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WEEK 7 (continued)	<p>Lesson 34 (45 min) Investigation 7: Phase Change (4 of 8 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Melting is a change of state caused by heat. • Change of state is the result of change of energy in the particles of matter. • During phase change, particles do not change; relationships between particles do change. • The temperatures at which phase changes occur are different for different substances. <p>Process / Conducting Investigations</p> <p>Use flame to transfer heat to substances to observe phase change.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Explain phase in terms of the relationships of particles to one another in a substance. • Discuss phase change in terms of kinetic energy and energy transfer. 		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.1c; 3.2a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 189-203 taking note of: pp. 190-195 Inv. 7 “At A Glance” pp. 196-202 Scientific and Historical Background p. 203 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 215-217 taking note of p. 216 Steps 1-3 Prepare Al Foil Spoons and Wax p. 216 Steps 4 & 5 Review Safety p. 217 Steps 6 & 7 Plan Reading and Assessment – Teacher Guide, Assessment, p. 478 	<p style="text-align: center;">Investigation/Activity</p> <p><i>Investigation 7: Phase Change, Part 3: More Heat, Steps # 11-13</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 218-221 – Student Lab Notebook, p. 64, 65, 67 – Student Lab Notebook, Teacher Answer Master, pp. 407-409 – Transparency Nos. 20, 21 – Assessment Chart for Investigation 7, p. 527 – Assessment Scoring Guide, Response Sheet – Phase Change, p. 478 – <i>FOSS Chemical Interactions Resource Book: Rock Solid, p. 42-48</i> 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Wooden safety matches • Granulated sugar • Protective eyewear <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

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WEEK 7 (continued)	<p>Lesson 35 (45 min) Investigation 7: Phase Change (5 of 8 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Change of state is the result of change of energy in particles. • The processes of phase change are evaporation, condensation, melting, freezing, sublimation, and deposition. • During phase change, particles do not change; relationships between particles do change. <p>Process / Conducting Investigations</p> <p>Use ice to transfer heat to observe phase change.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Explain phase in terms of the relationship of particles to one another in a substance. • Discuss phase change in terms of kinetic energy and energy transfer. 		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.1c; 3.2a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 189-203 taking note of: pp. 190-195 Inv. 7 “At A Glance” pp. 196-202 Scientific and Historical Background p. 203 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 222-224 taking note of p. 223 Steps 1-3 Prepare Ice and the Freezing-Water-in-Ice Demonstration p. 223 Step 4 Set Up Two Materials Stations p. 224 Step 6 Plan Assessment – Teacher Guide, Assessment, p. 527 	<p style="text-align: center;">Investigation/Activity</p> <p><i>Investigation 7: Phase Change, Part 4: Freeze Water, Steps # 1-10</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 225-228 – Student Lab Notebook, p. 69, 70, 71 – Student Lab Notebook, Teacher Answer Master, pp. 410-411 – Transparency Nos. 22, 23 – Assessment Chart for Investigation 7, p. 527 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective eyewear • Plastic bags: large, sturdy • Piece of lumber (2 ft. length of a 2x4) or a mallet to crush ice <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 7

	<p>Lesson 36 (45 min) Investigation 7: Phase Change (6 of 8 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Change of state is the result of change of energy in particles. • The processes of phase change are evaporation, condensation, melting, freezing, sublimation, and deposition. • During phase change, particles do not change; relationships between particles do change. <p>Process / Conducting Investigations</p> <p>Use ice to transfer heat to observe phase change.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Explain phase in terms of the relationship of particles to one another in a substance. • Discuss phase change in terms of kinetic energy and energy transfer. 	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.1c; 3.2a 	
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">WEEK 8</p>	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 189-203 taking note of: pp. 190-195 Inv. 7 “At A Glance” pp. 196-202 Scientific and Historical Background p. 203 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 222-224 taking note of p. 223 Steps 1-3 Prepare Ice and the Freezing-Water-in-Ice Demonstration p. 223 Step 4 Set Up Two Materials Stations p. 224 Step 6 Plan Assessment – Teacher Guide, Assessment, p. 527 	<p>Investigation/Activity</p> <p>Investigation 7: <i>Phase Change, Part 4: Freeze Water, Steps # 11-14</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 225-228 – Student Lab Notebook, p. 69, 70, 71 – Student Lab Notebook, Teacher Answer Master, pp. 410-411 – Transparency Nos. 22, 23 – Assessment Chart for Investigation 7, p. 527 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective eyewear • Plastic bags: large, sturdy • Piece of lumber (2 ft. length of a 2x4) or a mallet to crush ice <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 7

WEEK 8 (continued)	<p>Lesson 37 (45 min) Investigation 7: Phase Change (7 of 8 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Change of state is the result of change of energy in the particles of a sample of matter. • The processes of phase change are evaporation, condensation, melting, freezing, sublimation, and deposition. • During phase change, particles do not change; the relationships between particles do change. <p>Process / Conducting Investigations</p> <p>Use ice and hot water to transfer heat to observe phase change.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Explain phase in terms of the relationship of particles to one another in a substance. • Discuss phase change in terms of kinetic energy and energy transfer. 		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.1c; 3.2a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 189-203 taking note of: pp. 190-195 Inv. 7 “At A Glance” pp. 196-202 Scientific and Historical Background p. 203 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 229-230 taking note of p. 230 Steps 1-3 Prepare Ice; Plan Salt Distribution; Think About Timing p. 230 Steps 4 & 5 Plan Multimedia and Assessment – Teacher Guide, Assessment, p. 480-485 	<p style="text-align: center;">Investigation/Activity</p> <p><i>Investigation 7: Phase Change, Part 5: Gas to Solid, Steps # 1-8</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 231-234 – Student Lab Notebook, p. 73 – Student Lab Notebook, Teacher Answer Master, pp. 412 – Assessment Master, Mid-Summative Exam, pp. 546-548 Assessment Chart for Investigation 7, p. 527 Assessment Scoring Guide, Mid-Summative Exam, pp. 480-485 – <i>FOSS Chemical Interactions CD-ROM / Multimedia: Particles in Solid, Liquid and Gas</i> 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective eyewear • Plastic bags: large, sturdy • Piece of lumber (2 ft. length of a 2x4) or a mallet to crush ice • ICE • HOT water <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Multimedia set-up for CD-ROM

Grade 7

WEEK 8 (continued)	<p>Lesson 38 (45 min) Investigation 7: Phase Change (8 of 8 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Change of state is the result of change of energy in the particles of a sample of matter. • The processes of phase change are evaporation, condensation, melting, freezing, sublimation, and deposition. • During phase change, particles do not change; the relationships between particles do change. <p>Process / Conducting Investigations</p> <p>Use ice and hot water to transfer heat to observe phase change.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Explain phase in terms of the relationship of particles to one another in a substance. • Discuss phase change in terms of kinetic energy and energy transfer. 		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.1c; 3.2a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 189-203 taking note of: pp. 190-195 Inv. 7 “At A Glance” pp. 196-202 Scientific and Historical Background p. 203 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 229-230 taking note of p. 230 Steps 1-3 Prepare Ice; Plan Salt Distribution; Think About Timing p. 230 Steps 4 & 5 Plan Multimedia and Assessment – Teacher Guide, Assessment, p. 480-485 	<p style="text-align: center;">Investigation/Activity</p> <p><i>Investigation 7: Phase Change, Part 5: Gas to Solid, Steps # 9-16</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 231-234 – Student Lab Notebook, p. 73 – Student Lab Notebook, Teacher Answer Master, pp. 412 – Assessment Master, Mid-Summative Exam, pp. 546-548 Assessment Chart for Investigation 7, p. 527 Assessment Scoring Guide, Mid-Summative Exam, pp. 480-485 – <i>FOSS Chemical Interactions CD-ROM / Multimedia: Particles in Solid, Liquid and Gas</i> 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective eyewear • Plastic bags: large, sturdy • Piece of lumber (2 ft. length of a 2x4) or a mallet to crush ice • ICE • HOT water <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Multimedia set-up for CD-ROM

Grade 7

WEEK 8 (continued)	<p>Lesson 39 (45 min) Investigation 8: Solutions (1 of 6 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • A mixture is a combination of two or more substances. • A solution is a mixture in which one substance dissolves and “disappears” in a second substance. • Dissolving occurs when one substance (solute) is reduced to particles and is distributed uniformly throughout the particles of a second substance (solvent). <p>Process / Conducting Investigations</p> <p>Mix substances to observe some solids dissolve and others don’t.</p> <p>Building Explanations</p> <p>Explain the process of dissolving.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Setting Skills: 14 • Physical Science: 3.1g; 3.2a, 3.2b
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 235-247 taking note of: pp. 236-239 Inv. 8 “At A Glance” pp. 240-246 Scientific and Historical Background p. 247 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 248-250 taking note of p. 249 Steps 1-3 Plan a Substance Station; Select Filter Papers; Plan for Evaporation p. 250 Steps 4 - 7 Preview Multimedia Plan Reading and Assessment – Teacher Guide, Assessment, p. 486 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 8: <i>Solutions, Part 1: Mixtures, Steps # 1-12</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 251-255 – Student Lab Notebook, p. 74, 75, 77 – Student Lab Notebook, Teacher Answer Master, pp. 413, 414, 415 – Transparency Nos. 24 – Assessment Chart for Investigation 8, p. 528 Assessment Scoring Guide, Self-Assessment: Quick Write, p. 486 – <i>FOSS Chemical Interactions CD-ROM / Multimedia: Exploring Dissolving</i> – <i>FOSS Chemical Interactions Resource Book: How Things Dissolve, p. 49-53</i> 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective eyewear • Water <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

Grade 7

WEEK 8 (continued)	<p>Lesson 40 (45 min) Investigation 8: Solutions (2 of 6 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • A mixture is a combination of two or more substances. • A solution is a mixture in which one substance dissolves and “disappears” in a second substance. • Dissolving occurs when one substance (solute) is reduced to particles and is distributed uniformly throughout the particles of a second substance (solvent). <p>Process / Conducting Investigations</p> <p>Mix substances to observe some solids dissolve and others don't.</p> <p>Building Explanations</p> <p>Explain the process of dissolving. Building Explanations</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Setting Skills: 14 • Physical Science: 3.1g; 3.2a, 3.2b
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 235-247 taking note of: pp. 236-239 Inv. 8 “At A Glance” pp. 240-246 Scientific and Historical Background p. 247 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 248-250 taking note of p. 249 Steps 1-3 Plan a Substance Station; Select Filter Papers; Plan for Evaporation p. 250 Steps 4 - 7 Preview Multimedia Plan Reading and Assessment – Teacher Guide, Assessment, p. 486 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 8: <i>Solutions, Part 1: Mixtures, Steps # 13-16</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 251-255 – Student Lab Notebook, p. 74, 75, 77 – Student Lab Notebook, Teacher Answer Master, pp. 413, 414, 415 – Transparency Nos. 24 – Assessment Chart for Investigation 8, p. 528 Assessment Scoring Guide, Self-Assessment: Quick Write, p. 486 – <i>FOSS Chemical Interactions CD-ROM / Multimedia: Exploring Dissolving</i> – <i>FOSS Chemical Interactions Resource Book: How Things Dissolve, p. 49-53</i> 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective eyewear <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

Grade 7

	<p>Lesson 41 (45 min) Investigation 8: Solutions (3 of 6 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • A saturated solution has as much solute dissolved in it as possible. • Dissolving involves both kinetic interactions (collisions) and attractive forces (bonds). <p>Process / Conducting Investigations</p> <p>Determine the mass of two different substances needed to saturate 30 g of water.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Explain how to determine the amount of solute needed to saturate a volume of solvent. • Describe the characteristics of a solution at the particle level. 	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 7 • Physical Setting Skills: 10, 12, 13, 14, 15 • Physical Science: 3.1a 	
WEEK 9	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 235-247 taking note of: pp. 236-239 Inv. 8 “At A Glance” pp. 240-246 Scientific and Historical Background p. 247 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 256-257 taking note of p. 257 Step 3 Get the Right Spoons p. 257 Step 4 Plan Assessment – Teacher Guide, Assessment, p. 487 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 8: <i>Solutions, Part 2: Saturation, Steps # 1-11</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 258-262 – Student Lab Notebook, p. 78, 79, 81 – Student Lab Notebook, Teacher Answer Master, pp. 416, 417, 418 – Transparency Nos. 25, 26 – Assessment Chart for Investigation 8, p. 528 Assessment Scoring Guide, Response Sheet - Solutions, p. 487 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective eyewear • Water • Paper towels <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 7

WEEK 9 (continued)	<p>Lesson 42 (45 min) Investigation 8: Solutions (4 of 6 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • A saturated solution has as much solute dissolved in it as possible. • Dissolving involves both kinetic interactions (collisions) and attractive forces (bonds). <p>Process / Conducting Investigations</p> <p>Determine the mass of two different substances needed to saturate 30 g of water.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Explain how to determine the amount of solute needed to saturate a volume of solvent. • Describe the characteristics of a solution at the particle level. 		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 7 • Physical Setting Skills: 10, 12, 13, 14, 15 • Physical Science: 3.1a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 235-247 taking note of: pp. 236-239 Inv. 8 “At A Glance” pp. 240-246 Scientific and Historical Background p. 247 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 256-257 taking note of p. 257 Step 3 Get the Right Spoons p. 257 Step 4 Plan Assessment – Teacher Guide, Assessment, p. 487 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 8: <i>Solutions, Part 2: Saturation, Steps # 12-14</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 258-262 – Student Lab Notebook, p. 78, 79, 81 – Student Lab Notebook, Teacher Answer Master, pp. 416, 417, 418 – Transparency Nos. 25, 26 – Assessment Chart for Investigation 8, p. 528 Assessment Scoring Guide, Response Sheet - Solutions, p. 487 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective eyewear • Water • Paper towels <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 7

	<p>Lesson 43 (45 min) Investigation 8: Solutions (5 of 6 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> The concentration of a solution is an expression of the ratio of solute particles to solvent particles. Solutions of different concentrations made with the same substances have different densities. <p>Process / Conducting Investigations</p> <p>Use balances to compare densities of solutions and to infer concentration.</p> <p>Building Explanations</p> <p>Explain concentration.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> General Skills: 1, 2, 3, 4 Physical Setting Skills: 10 Physical Science: 3.1a, 3.1b, 3.1h 	
WEEK 9 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> Teacher Guide Overview, pp. 235-247 taking note of: <ul style="list-style-type: none"> pp. 236-239 Inv. 8 “At A Glance” pp. 240-246 Scientific and Historical Background p. 247 Why Do I Have to Learn This? Teacher Guide Materials & Getting Ready, pp. 263-264 taking note of <ul style="list-style-type: none"> p. 264 Step 1 Prepare Stock Solutions p. 264 Step 3 Plan Materials Stations p. 264 Step 4 & 5 Plan Reading and Assessment Teacher Guide, Assessment, p. 488-493 	<p>Investigation/Activity</p> <p>Investigation 8: <i>Solutions, Part 3: Concentration, Steps # 1-13</i></p> <ul style="list-style-type: none"> Teacher Guide, pp. 265-268 Student Lab Notebook, p. 83, 85 Student Lab Notebook, Teacher Answer Master, pp. 419, 420 Transparency Nos. 27 Assessment Master, Mid-Summative Exam, pp. 549-551 Assessment Chart for Investigation 8, p. 528 Assessment Scoring Guide, Mid-Summative Exam, pp. 488-493 <i>FOSS Chemical Interactions Resource Book: Concentration, p. 54-62</i> 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> Protective eyewear Water Electronic balance <p>AV Equipment</p> <ul style="list-style-type: none"> Extension cord Overhead projector

Grade 7

WEEK 9 (continued)	<p>Lesson 44 (45 min) Investigation 8: Solutions (6 of 6 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> The concentration of a solution is an expression of the ratio of solute particles to solvent particles. Solutions of different concentrations made with the same substances have different densities. <p>Process / Conducting Investigations</p> <p>Use balances to compare densities of solutions and to infer concentration.</p> <p>Building Explanations</p> <p>Explain concentration.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> General Skills: 1, 2, 3, 4 Physical Setting Skills: 10 Physical Science: 3.1a, 3.1b, 3.1h
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> Teacher Guide Overview, pp. 235-247 taking note of: pp. 236-239 Inv. 8 “At A Glance” pp. 240-246 Scientific and Historical Background p. 247 Why Do I Have to Learn This? Teacher Guide Materials & Getting Ready, pp. 263-264 taking note of p. 264 Step 1 Prepare Stock Solutions p. 264 Step 3 Plan Materials Stations p. 264 Step 4 & 5 Plan Reading and Assessment Teacher Guide, Assessment, p. 488-493 	<p>Investigation/Activity</p> <p>Investigation 8: <i>Solutions, Part 3: Concentration, Steps # 1-13</i></p> <ul style="list-style-type: none"> Teacher Guide, pp. 265-268 Student Lab Notebook, p. 83, 85 Student Lab Notebook, Teacher Answer Master, pp. 419, 420 Transparency Nos. 27 Assessment Master, Mid-Summative Exam, pp. 549-551 Assessment Chart for Investigation 8, p. 528 Assessment Scoring Guide, Mid-Summative Exam, pp. 488-493 <i>FOSS Chemical Interactions Resource Book: Concentration, p. 54-62</i> 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> Protective eyewear Water Electronic balance <p>AV Equipment</p> <ul style="list-style-type: none"> Extension cord Overhead projector

Grade 7

	<p>Lesson 45 (45 min) Investigation 9: Reaction (1 of 7 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Atoms are the fundamental particles of elements. • A compound is a substance composed of two or more different kinds of elements. • Atoms combine to make particles of substances: molecular and ionic compounds. • Molecules and ionic compounds are held together by attractive forces called bonds. 	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.1a; 3.3a, 3.3b, 3.3c, 3.3d, 3.3e 	
WEEK 9 (continued)	<p>Advanced Planning/Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 269-279 taking note of: pp. 270-273 Inv. 9 “At A Glance” pp. 274-278 Scientific and Historical Background p. 279 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 280-281 taking note of p. 281 Step 1 Prepare Sets of Coding Dots p. 281 Step 2 Prepare Atom Demonstration Sets p. 281 Step 3 Plan Assessment – Teacher Guide, Assessment, p. 494 	<p>Investigation/Activity</p> <p>Investigation 9: <i>Reaction, Part 1: Substance Models, Steps # 1-15</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 282-287 – Student Lab Notebook, p. 86, 87 – Student Lab Notebook, Teacher Answer Master, pp. 421, 422 – Transparency Nos. 28, 29 – Assessment Chart for Investigation 9, p. 529 Assessment Scoring Guide, Teacher Observation, p. 494 	<p>Science Materials Supplied by the Teacher</p> <p>Fine-tip pens to write on coding dots.</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 7

	<p>Lesson 46 (45 min) Investigation 9: Reaction (2 of 7 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • A chemical reaction is a process in which the atoms of substances (reactants) rearrange to form new substances (products). • Atoms are neither created nor destroyed during chemical reactions, only rearranged. <p>Process / Conducting Investigations</p> <ul style="list-style-type: none"> • Use atom tiles to model the rearrangement of atoms to form new substances during reactions. • Use chemical formulas and balanced chemical equations to represent chemical reactions. <p>Building Explanations</p> <p>Explain chemical reaction as a process in which atoms rearrange to form new substances.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 9 • Physical Science: 3.1a; 3.2c, 3.2d; 3.3a, 3.3b, 3.3c, 3.3d, 3.3e 	
WEEK 10	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 269-279 taking note of: pp. 270-273 Inv. 9 “At A Glance” pp. 274-278 Scientific and Historical Background p. 279 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 288-292 taking note of p. 289 Step 1 Prepare Atom Tile Sets p. 290 Step 2 Prepare Limewater p. 291 Step 3 Prepare for the Air-in-Limewater Demonstration p. 291 Step 6 Plan Materials Station p. 291 Step 7 Plan an Acid Wash p. 292 Step 8 Plan Safety p. 292 Step 9 & 10 Plan Reading and Assessment – Teacher Guide, Assessment, p. 495 	<p>Investigation/Activity</p> <p>Investigation 9: <i>Reaction, Part 2: Limewater Reaction, Steps # 1-7</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 293-297 – Student Lab Notebook, p. 88, 89, 91 – Student Lab Notebook, Teacher Answer Master, pp. 423, 424, 425 – Special Teacher Master, Atom Tile Inventory, p. 373 – Transparency Nos. 30 – Assessment Chart for Investigation 9, p. 529 Assessment Scoring Guide, Lab Notebook Sheet, p. 495 – <i>FOSS Chemical Interactions Resource Book: How Do Atoms Rearrange?</i> p. 63-68 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Balance, electronic • Protective eyewear • Plastic bottles, 2 liter • Vinegar (1 liter) in a basin <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 7

WEEK 10 (continued)	<p>Lesson 47 (45 min) Investigation 9: Reaction (3 of 7 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> A chemical reaction is a process in which the atoms of substances (reactants) rearrange to form new substances (products). Atoms are neither created nor destroyed during chemical reactions, only rearranged. <p>Process / Conducting Investigations</p> <ul style="list-style-type: none"> Use atom tiles to model the rearrangement of atoms to form new substances during reactions. Use chemical formulas and balanced chemical equations to represent chemical reactions. <p>Building Explanations</p> <p>Explain chemical reaction as a process in which atoms rearrange to form new substances.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> General Skills: 1, 2, 3, 4, 9 Physical Science: 3.1a; 3.2c, 3.2d; 3.3a, 3.3b, 3.3c, 3.3d, 3.3e
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> Teacher Guide Overview, pp. 269-279 taking note of: pp. 270-273 Inv. 9 “At A Glance” pp. 274-278 Scientific and Historical Background p. 279 Why Do I Have to Learn This? Teacher Guide Materials & Getting Ready, pp. 288-292 taking note of p. 289 Step 1 Prepare Atom Tile Sets p. 290 Step 2 Prepare Limewater p. 291 Step 3 Prepare for the Air-in-Limewater Demonstration p. 291 Step 6 Plan Materials Station p. 291 Step 7 Plan an Acid Wash p. 292 Step 8 Plan Safety p. 292 Step 9 & 10 Plan Reading and Assessment Teacher Guide, Assessment, p. 495 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 9: <i>Reaction, Part 2: Limewater Reaction, Steps # 8-16</i></p> <ul style="list-style-type: none"> Teacher Guide, pp. 293-297 Student Lab Notebook, p. 88, 89, 91 Student Lab Notebook, Teacher Answer Master, pp. 423, 424, 425 Special Teacher Master, Atom Tile Inventory, p. 373 Transparency Nos. 30 Assessment Chart for Investigation 9, p. 529 Assessment Scoring Guide, Lab Notebook Sheet, p. 495 <i>FOSS Chemical Interactions Resource Book: How Do Atoms Rearrange? p. 63-68</i> 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> Balance, electronic Protective eyewear Plastic bottles, 2 liter Vinegar (1 liter) in a basin <p>AV Equipment</p> <ul style="list-style-type: none"> Extension cord Overhead projector

Grade 7

WEEK 10 (continued)	<p>Lesson 48 (45 min) Investigation 9: Reaction (4 of 7 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Atoms combine to make particles of substances. • A chemical reaction is a process in which the atoms of substances (reactants) rearrange to form new substances (products). • Atoms are neither created nor destroyed during chemical reactions, only rearranged. <p>Process / Conducting Investigations</p> <p>Use limewater to confirm that carbon dioxide is produced when hydrochloric acid and sodium bicarbonate react.</p> <p>Building Explanations</p> <p>Explain chemical reaction as a process in which atoms rearrange to form new substances.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 7 • Physical Science: 3.1a, 3.1g; 3.2b, 3.2c
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 269-279 taking note of: pp. 270-273 Inv. 9 “At A Glance” pp. 274-278 Scientific and Historical Background p. 279 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 298-300 taking note of p. 299 Step 2 Reconfigure the Stopper-and-Tubes Setups p. 299 Step 3 Preview the Reaction System p. 299 Step 4 Dilute the 3-Molar Acid p. 299 Step 5 Check Limewater p. 299 Step 6 Plan an Acid Wash p. 292 Step 7 Plan Reading and Assessment – Teacher Guide, Assessment, p. 496 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 9: <i>Reaction, Part 3: Baking Soda and Acid, Steps # 1-5</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 301-307 – Student Lab Notebook, p. 93, 95, 97 – Student Lab Notebook, Teacher Answer Master, pp. 426, 427, 428 – Transparency Nos. 31, 32 – Assessment Chart for Investigation 9, p. 529 Assessment Scoring Guide, Response Sheet, p. 496 – <i>FOSS Chemical Interactions Resource Book: Antoine-Laurent Lavoisier, p. 69-72</i> 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective eyewear • Plastic bottles, 2 liter • Plastic Bottle for dilute acid • Vinegar (1 liter) in a basin <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 7

WEEK 10 (continued)	<p>Lesson 49 (45 min) Investigation 9: Reaction (5 of 7 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Atoms combine to make particles of substances. • A chemical reaction is a process in which the atoms of substances (reactants) rearrange to form new substances (products). • Atoms are neither created nor destroyed during chemical reactions, only rearranged. <p>Process / Conducting Investigations</p> <p>Use limewater to confirm that carbon dioxide is produced when hydrochloric acid and sodium bicarbonate react.</p> <p>Building Explanations</p> <p>Explain chemical reaction as a process in which atoms rearrange to form new substances.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 7 • Physical Science: 3.1a, 3.1g; 3.2b, 3.2c
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 269-279 taking note of: pp. 270-273 Inv. 9 “At A Glance” pp. 274-278 Scientific and Historical Background p. 279 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 298-300 taking note of p. 299 Step 2 Reconfigure the Stopper-and-Tubes Setups p. 299 Step 3 Preview the Reaction System p. 299 Step 4 Dilute the 3-Molar Acid p. 299 Step 5 Check Limewater p. 299 Step 6 Plan an Acid Wash p. 292 Step 7 Plan Reading and Assessment – Teacher Guide, Assessment, p. 496 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 9: <i>Reaction, Part 3: Baking Soda and Acid, Steps # 6-13</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 301-307 – Student Lab Notebook, p. 93, 95, 97 – Student Lab Notebook, Teacher Answer Master, pp. 426, 427, 428 – Transparency Nos. 31, 32 – Assessment Chart for Investigation 9, p. 529 Assessment Scoring Guide, Response Sheet, p. 496 – <i>FOSS Chemical Interactions Resource Book: Antoine-Laurent Lavoisier, p. 69-72</i> 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective eyewear • Plastic bottles, 2 liter • Plastic Bottle for dilute acid • Vinegar (1 liter) in a basin <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 7

WEEK 10 (continued)	<p>Lesson 50 (45 min) Investigation 9: Reaction (6 of 7 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Atoms combine to make particles of substances. • A chemical reaction is a process in which the atoms of substances (reactants) rearrange to form new substances (products). • Atoms are neither created nor destroyed during chemical reactions, only rearranged. <p>Process / Conducting Investigations</p> <p>Use limewater to confirm that carbon dioxide is produced when hydrochloric acid and sodium bicarbonate react.</p> <p>Building Explanations</p> <p>Explain chemical reaction as a process in which atoms rearrange to form new substances.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 7 • Physical Science: 3.1a, 3.1g; 3.2b, 3.2c
	<p>Advanced Planning/Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 269-279 taking note of: pp. 270-273 Inv. 9 “At A Glance” pp. 274-278 Scientific and Historical Background p. 279 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 298-300 taking note of p. 299 Step 2 Reconfigure the Stopper-and-Tubes Setups p. 299 Step 3 Preview the Reaction System p. 299 Step 4 Dilute the 3-Molar Acid p. 299 Step 5 Check Limewater p. 299 Step 6 Plan an Acid Wash p. 292 Step 7 Plan Reading and Assessment – Teacher Guide, Assessment, p. 496 	<p>Investigation/Activity</p> <p>Investigation 9: <i>Reaction, Part 3: Baking Soda and Acid, Steps # 14-16</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 301-307 – Student Lab Notebook, p. 93, 95, 97 – Student Lab Notebook, Teacher Answer Master, pp. 426, 427, 428 – Transparency Nos. 31, 32 – Assessment Chart for Investigation 9, p. 529 Assessment Scoring Guide, Response Sheet, p. 496 – <i>FOSS Chemical Interactions Resource Book: Antoine-Laurent Lavoisier, p. 69-72</i> 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Protective eyewear • Plastic bottles, 2 liter • Plastic Bottle for dilute acid • Vinegar (1 liter) in a basin <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 7

	<p>Lesson 51 (45 min) Investigation 9: Reaction (7 of 7 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • A chemical reaction is a process in which the atoms of substances (reactants) rearrange to form new substances (products). • Acid is neutralized when it is changed into new substances as a result of a reaction. <p>Process / Conducting Investigations</p> <p>Conduct a neutralization reaction to determine the effectiveness of an antacid tablet.</p> <p>Building Explanations</p> <p>Explain how to determine the effectiveness of an antacid using a neutralization reaction.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.1a; 4.3a 	
WEEK 11	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 269-279 taking note of: pp. 270-273 Inv. 9 “At A Glance” pp. 274-278 Scientific and Historical Background p. 279 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 208-309 taking note of p. 309 Step 1 Check HCl Supply p. 309 Step 2 Consider Antacid Tablets p. 309 Step 3 Review Safety p. 299 Steps 4 & 5 Plan Reading and Assessment – Teacher Guide, Assessment, p. 498-505 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 9: <i>Reaction, Part 4: Antacid, Steps # 1-10</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 310-312 – Student Lab Notebook, p. 99 – Student Lab Notebook, Teacher Answer Master, pp. 429 – Transparency Nos. 33, 34 – Assessment Master, Mid-Summative Exam, pp. 552-555 Assessment Chart for Investigation 9, p. 529 Assessment Scoring Guide, Mid-Summative Exam, pp. 498-505 – <i>FOSS Chemical Interactions Resource Book: Organic Compounds, p. 73-77</i> <i>Dr. Donna Nelson, Chemist, p. 78-79</i> 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <p>Protective eyewear</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 7

WEEK 9 (continued)	<p>Lesson 52 (45 min) Investigation 10: More Reactions (1 of 5 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> The quantities of reactants available at the start of a reaction determine the quantities of products. The limiting factor is the reactant present in the lowest concentration. <p>Process / Conducting Investigations</p> <p>Measure the volume of gas produced in a reaction to infer the concentrations of reactants.</p> <p>Building Explanations</p> <p>Explain the concept of limiting factor in chemical reactions.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> General Skills: 1, 2, 3, 4 Physical Science: 3.1c; 3.2a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> Teacher Guide Overview, pp. 313-322 taking note of: <ul style="list-style-type: none"> pp. 314-315 Inv. 10 “At A Glance” pp. 316-321 Scientific and Historical Background p. 322 Why Do I Have to Learn This? Teacher Guide Materials & Getting Ready, pp. 323-324 taking note of <ul style="list-style-type: none"> p. 324 Step 1 Prepare Two Stock Solutions of Citric Acid p. 324 Step 3 Prepare for Demonstration p. 324 Steps 4 & 5 Plan Reading and Assessment Teacher Guide, Assessment, p. 506 	<p>Investigation/Activity</p> <p>Investigation 10: <i>More Reactions, Part 1: Citric Acid and Baking Soda, Steps # 1-13</i></p> <ul style="list-style-type: none"> Teacher Guide pp. 325-329 Student Lab Notebook, p. 101 Student Lab Notebook, Teacher Answer Master, pp. 430 Transparency Nos. 35 Assessment Chart for Investigation 10, p. 530 <i>FOSS Chemical Interactions Resource Book: New Technologies, p. 80-83</i> <i>Gertrude B. Elion, p. 84-85</i> 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> Protective eyewear Balance, electronic Plastic bottles Water <p>AV Equipment</p> <ul style="list-style-type: none"> Extension cord Overhead projector

Grade 7

WEEK 9 (continued)	<p>Lesson 53 (45 min) Investigation 10: More Reactions (2 of 5 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> The quantities of reactants available at the start of a reaction determine the quantities of products. The limiting factor is the reactant present in the lowest concentration. <p>Process / Conducting Investigations</p> <p>Measure the volume of gas produced in a reaction to infer the concentrations of reactants.</p> <p>Building Explanations</p> <p>Explain the concept of limiting factor in chemical reactions.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> General Skills: 1, 2, 3, 4 Physical Science: 3.1a; 3.2c
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> Teacher Guide Overview, pp. 313-322 taking note of: <ul style="list-style-type: none"> pp. 314-315 Inv. 10 “At A Glance” pp. 316-321 Scientific and Historical Background p. 322 Why Do I Have to Learn This? Teacher Guide Materials & Getting Ready, pp. 323-324 taking note of <ul style="list-style-type: none"> p. 324 Step 1 Prepare Two Stock Solutions of Citric Acid p. 324 Step 3 Prepare for Demonstration p. 324 Steps 4 & 5 Plan Reading and Assessment Teacher Guide, Assessment, p. 506 	<p>Investigation/Activity</p> <p>Investigation 10: <i>More Reactions, Part 1: Citric Acid and Baking Soda, Steps # 14-15</i></p> <ul style="list-style-type: none"> Teacher Guide pp. 325-329 Student Lab Notebook, p. 101 Student Lab Notebook, Teacher Answer Master, pp. 430 Transparency Nos. 35 Assessment Chart for Investigation 10, p. 530 <i>FOSS Chemical Interactions Resource Book: New Technologies, p. 80-83</i> <i>Gertrude B. Elion, p. 84-85</i> 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> Protective eyewear Balance, electronic Plastic bottles Water <p>AV Equipment</p> <ul style="list-style-type: none"> Extension cord Overhead projector

Grade 7

WEEK 9 (continued)	<p>Lesson 54 (45 min) Investigation 10: More Reactions (3 of 5 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Rusting is a reaction between atmospheric oxygen and iron. • Reactants that remain in their original form after a reaction has run to completion were present in excess. <p>Process / Conducting Investigations</p> <p>Use water displacement to determine the volume of oxygen consumed during oxidation of iron.</p> <p>Building Explanations</p> <p>Discuss rusting in terms of reactants and products.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.1a, 3.1c, 3.1d, 3.1e, 3.1f; 3.2c; 3.3a, 3.3b, 3.3c, 3.3d, 3.3e, 3.3f, 3.3g
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 313-322 taking note of: pp. 314-315 Inv. 10 “At A Glance” pp. 316-321 Scientific and Historical Background p. 322 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 330-332 taking note of p. 331 Step 1 Modify 50 ml Graduated Cylinders p. 331 Step 2 Modify Lids for the Tall ½ liter Cups p. 331 Step 3 Practice Setting Up the Demonstration. p. 332 Step 4 Wash Steel Wool p. 332 Prepare for Video p. 332 Plan Assessment – Final Exam – Teacher Guide, Assessment, p. 508-519 	<p>Investigation/Activity</p> <p>Investigation 10: <i>More Reactions, Part 2: Rust, Steps # 1-6</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 333-329 – Student Lab Notebook, p. 103 – Student Lab Notebook, Teacher Answer Master, pp. 431 – Assessment Master, Final Summative Exam, pp. 556-562 Assessment Chart for Investigation 10, p. 530 Assessment Scoring Guide, Final Summative Exam, pp. 508-519 – <i>Video: Atoms and Molecules</i> 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Balance, electronic • Pushpin • Jar with lid • Dishwashing detergent • Mat knife • Water <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Video system (VCR or DVD)

Grade 7

WEEK 9 (continued)	<p>Lesson 55 (45 min) Investigation 10: More Reactions (4 of 5 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Change of state is the result of change of energy in particles. • The processes of phase change are evaporation, condensation, melting, freezing, sublimation, and deposition. • During phase change, particles do not change; relationships between particles do change. <p>Process / Conducting Investigations</p> <p>Use ice to transfer heat to observe phase change.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Explain phase in terms of the relationship of particles to one another in a substance. • Discuss phase change in terms of kinetic energy and energy transfer. 		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.1a, 3.1c, 3.1d, 3.1e, 3.1f; 3.2c; 3.3a, 3.3b, 3.3c, 3.3d, 3.3e, 3.3f, 3.3g
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 313-322 taking note of: pp. 314-315 Inv. 10 “At A Glance” pp. 316-321 Scientific and Historical Background p. 322 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 330-332 taking note of p. 331 Step 1 Modify 50 ml Graduated Cylinders p. 331 Step 2 Modify Lids for the Tall ½ liter Cups p. 331 Step 3 Practice Setting Up the Demonstration. p. 332 Step 4 Wash Steel Wool p. 332 Prepare for Video p. 332 Plan Assessment – Final Exam – Teacher Guide, Assessment, p. 508-519 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 10: <i>More Reactions, Part 2: Rust, Steps # 7-10</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 333-329 – Student Lab Notebook, p. 103 – Student Lab Notebook, Teacher Answer Master, pp. 431 – Assessment Master, Final Summative Exam, pp. 556-562 Assessment Chart for Investigation 10, p. 530 Assessment Scoring Guide, Final Summative Exam, pp. 508-519 – <i>Video: Atoms and Molecules</i> 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Balance, electronic • Pushpin • Jar with lid • Dishwashing detergent • Mat knife • Water <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Video system (VCR or DVD)

Grade 7

WEEK 9 (continued)	<p>Lesson 56 (45 min) Investigation 10: More Reactions (5 of 5 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Rusting is a reaction between atmospheric oxygen and iron. • Reactants that remain in their original form after a reaction has run to completion were present in excess. <p>Process / Conducting Investigations</p> <p>Use water displacement to determine the volume of oxygen consumed during oxidation of iron.</p> <p>Building Explanations</p> <p>Discuss rusting in terms of reactants and products.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4 • Physical Science: 3.1a, 3.1c, 3.1d, 3.1e, 3.1f; 3.2c; 3.3a, 3.3b, 3.3c, 3.3d, 3.3e, 3.3f, 3.3g
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide Overview, pp. 313-322 taking note of: pp. 314-315 Inv. 10 “At A Glance” pp. 316-321 Scientific and Historical Background p. 322 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 330-332 taking note of p. 331 Step 1 Modify 50 ml Graduated Cylinders p. 331 Step 2 Modify Lids for the Tall ½ liter Cups p. 331 Step 3 Practice Setting Up the Demonstration. p. 332 Step 4 Wash Steel Wool p. 332 Prepare for Video p. 332 Plan Assessment – Final Exam – Teacher Guide, Assessment, p. 508-519 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 10: <i>More Reactions, Part 2: Rust, Steps # 11-12</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 333-329 – Student Lab Notebook, p. 103 – Student Lab Notebook, Teacher Answer Master, pp. 431 – Assessment Master, Final Summative Exam, pp. 556-562 Assessment Chart for Investigation 10, p. 530 Assessment Scoring Guide, Final Summative Exam, pp. 508-519 – <i>Video: Atoms and Molecules</i> 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Balance, electronic • Pushpin • Jar with lid • Dishwashing detergent • Mat knife • Water <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Video system (VCR or DVD)

Grade 7

WEEK 9 (continued)	<p>Lesson 57 (45 min) Final Summative Assessment</p> <p>Objective(s): Post-assessment</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 5, 7, 9 • Physical Setting Skills: 10, 12, 13, 14 • Physical Science: 3.1a, 3.1b, 3.1c, 3.1d, 3.1e, 3.1f, 3.1g, 3.1h; 3.2a, 3.2b, 3.2c, 3.2d; 3.3a, 3.3b, 3.3c, 3.3d, 3.3e, 3.3f, 3.3g, 4.1d; 4.3a; 4.5a, 4.5b
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Consider a Review Session before giving the Final Summative Exam. – Plan on a full session for the exam 	<p style="text-align: center;">Investigation/Activity</p> <ul style="list-style-type: none"> – Assessment Master, Final Summative Exam, pp. 556-562 Assessment Chart for Investigation 10, p. 530 Assessment Scoring Guide, Final Summative Exam, pp. 508-519 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p>