

Unit 3—Earth, Sun, Moon System (FOSS® Planetary Science)

Essential Question: What roles do forces play in the patterns and stability of the Solar System?

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

1. Follow safety procedures in the classroom and laboratory.
2. Safely and accurately use the following measurement tools: metric ruler, stopwatch, spring scale.
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.
8. Identify cause and effect relationships.

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

1. Given the latitude and longitude of a location, indicate its position on a map and determine the latitude and longitude of a given location on a map.

Major Understandings: *quoted from NYS Performance Indicators (Note: Correlation is provided at the “investigation” level.)*

PS 1.1 Explain daily, monthly, and seasonal changes on Earth.

- 1.1a Earth’s Sun is an average-sized star. The Sun is more than a million times greater in volume than the Earth.
- 1.1b Other stars are like the Sun but are so far away that they look like points of light. Distances between stars are vast compared to distances within our solar system.
- 1.1c The Sun and the planets that revolve around it are the major bodies in the solar system. Other members include comets, moons and asteroids. Earth’s orbit is nearly circular.
- 1.1d Gravity is the force that keeps planets in orbit around the Sun and the Moon in orbit around the Earth.
- 1.1e Most objects in the solar system have a regular and predictable motion. These motions explain such phenomena as a day, a year, phases of the Moon, eclipses, tides, meteor showers, and comets.
- 1.1f The latitude/longitude coordinate system and our system of time are based on celestial observations.
- 1.1g Moons are seen by reflected light. Our Moon orbits Earth, while Earth orbits the Sun. The Moon’s phases as observed from Earth are the result of seeing different portions of the lighted area of the Moon’s surface. The phases repeat in a cyclic pattern in about one month.
- 1.1h The apparent motions of the Sun, Moon, planets, and stars across the sky can be explained by Earth’s rotation and revolution. Earth’s rotation causes the length of one day to be approximately 24 hours. This rotation also causes the Sun and Moon to appear to rise along the eastern horizon and to set along the western horizon. Earth’s revolution around the Sun defines the length of the year as 365 $\frac{1}{4}$ days.

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- 1.1i The tilt of the Earth's axis of rotation and the revolution of the Earth around the Sun cause the seasons on Earth. The length of day varies depending on latitude and season.
- 1.1j The shape of the Earth, the other planets, and the stars is nearly spherical.

PS 5.1 Describe different patterns of motion of objects.

- 5.1a The motion of an object is always judged with respect to some other object or point. The idea of absolute motion or rest is misleading.
- 5.1b The motion of an object can be described by its position, direction of motion, and speed.
- 5.1c An object's motion is the result of the combined effect of all forces action on the object. A moving object that is not subjected to a force will continue to move at a constant speed in a straight line. An object at rest will remain at rest.
- 5.1d Force is directly related to an object's mass and acceleration. The greater the force, the greater the change in motion.
- 5.1e For every action there is and equal and opposite reaction.

PS 5.2 Observe, describe, and compare effects of forces (gravity, electric current, and magnetism) on the motion of objects.

- 5.2a Every object exerts gravitational force on every other object. Gravitational force depends on how much mass the objects have and on how far apart they are. Gravity is one of the forces acting on orbiting objects and projectiles.
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FOSS® Planetary Science 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, Multimedia User Guide pp. 451 – 476) 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).

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 though home study).

In FOSS® Planetary Science the following types of multimedia will be used:

- FOSS® CD-ROM / Multimedia – used in Investigations 1, 2, 3, 5, 6, 7, 8, 9, 10
- Video/DVD – Asteroids – Deadly Impact (Investigation 5: Moon Craters, Part 2)
- Video/DVD – For All Mankind (Investigation 7: Landing on the Moon)

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 **Planetary Science page** click on the Planetary Science 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 videos included in this kit. (*Asteroids – Deadly Impact and For All Mankind.*) *Check your kit to see which format of the videos 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.

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

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. 23-28.) 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. 26) 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® Planetary Science:

- For YEAR ONE of the new Science Curriculum adoption the 8th 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® Planetary Science 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 Resources Book during class time. Spend some time with students examining the format of the Resources 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® Planetary Science Teacher Guide – Materials, p. 23-28

- Inventory all kit boxes (3) and equipment.
- Plan to secure “Materials Supplied by the Teacher,” p. 26.
- Follow the link http://www.deltaeducation.com/science/foss/foss_msdms.aspx to download the materials safety data sheets for all FOSS modules and download a list of items used in FOSS kits that contain latex.

The 10th printing of the Planetary Science Resources Book is updated to include information related to the reclassification of Pluto as a dwarf planet. If you have earlier printings of the Resources Book you can download the PDFs for the pages relating to Pluto’s reclassification at: <http://www.fossweb.com/modulesMS/PlanetaryScience/index.html>

Visit the New York City FOSS website at <http://www.fossweb.com/NYC/index.html> for additional support and PDFs of student materials in Spanish.

NOTE:

Familiarize yourself with the lunar calendar as you begin this unit. Starting in Investigation 4: Discover the Moon, students will keep individual and class Moon Logs for 5 weeks. In Investigation 9: Phases of the Moon, students use their “Moon Logs” to study the phases of the Moon and use models to explain Moon phases, eclipses and the roles of rotation and revolution of the Earth and Moon in phases and the lunar cycle.

Depending on the lunar calendar, you may wish to prepare students to make daytime observations of the Moon before you have completed Investigation 3. Consult p. 121 of the Teacher Guide. On the third day after the third-quarter Moon, the Moon will rise about 3:00 a.m. and set about 3:00 p.m. The Moon will be a waning crescent and should be clearly visible in the southwest sky on a clear day. This is a good day to start Investigation 4: Discover the Moon.

The ability to observe the Moon will depend on the daily weather (clear, cloudy, overcast skies). Using local print media (see Teacher Guide p. 141 Extending the Experience will assist in piecing together data if there is a long span of inclement weather that disrupts observations.

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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, 8 • Physical Setting Skills: 1 • Physical Science: 1.1a, 1.1b, 1.1c, 1.1d, 1.1e, 1.1f, 1.1g, 1.1h, 1.1j, 5.1a, 5.1b, 5.1c, 5.1d, 5.1e; 5.2a 		
	<p>Advanced Planning/Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, Assessment, pp. 399-403, 422-428 – Teacher Guide Overview, pp. 1-22 taking note of <ul style="list-style-type: none"> p. 7 Can I Teach This? I'm Not an Astronomer p. 10 Reading & Writing in Science p. 12 Management Strategies p. 17 Classroom Safety p. 18 Planetary Science Course Matrix – Teacher Guide Materials, pp. 23-28 taking note of <ul style="list-style-type: none"> p. 26 Materials Supplied by the Teacher p. 27 Preparation 	<p>Investigation/Activity</p> <p>Administer Pretest as a survey of student's prior knowledge: Summative Assessment TG pp. 445-450.</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:</p> <p>Download free Google Earth software @ http://earth.google.com/ to prepare satellite imagery maps of you school and neighborhood for Investigation 1: Where Am I? Part 2: Neighborhood and Community.</p>				

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	<p>Lesson 2 (45 min) Investigation 1: Where Am I (1 of 3 sessions) Objective(s): Content A map is a representation of a place or area.</p>	<p>Alignment with NYS Core Curriculum: • General Skills: 1, 2, 3, 4, 5</p>	
<p>WEEK 1 (continued)</p>	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 29-37 taking note of: pp. 30-31 Inv. 1 “At A Glance” pp. 32 Scientific and Historical Background p. 36 Why Do I Have to Learn This? p. 37 Overview – Teacher Guide Materials & Getting Ready, pp. 38-39 taking note of pp. 39 Step 1 Prepare to Go Outside pp. 39 Steps 2 & 3 Assessment – Teacher Guide, Assessment, pp. 399-405 – Teacher Guide, Extending the Experience, p. 53. Consider these activities especially No. 1 View the video “Powers of Ten.” 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 1: <i>Where Am I?</i> Part 1: <i>Map the School, Steps # 1-9</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 40-42 – Assessment Chart for Investigation 1, p. 429 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <p>Colored pencils</p>

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WEEK 1 (continued)	<p>Lesson 3 (45 min) Investigation 1: Where Am I (2 of 3 sessions)</p> <p>Objective(s):</p> <p>Content Elevation is the distance above Earth’s surface, often measured from sea level.</p> <p>Process / Conducting Investigations Interpret representations of human-made and natural structures in photographs taken from various elevations.</p> <p>Building Explanations Explain that a person’s specific location can be described in many ways, depending on the particular frame of reference.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 5
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 29-37 taking note of: pp. 30-31 Inv. 1 “At A Glance” pp. 32 Scientific and Historical Background p. 36 Why Do I Have to Learn This? p. 37 Overview – Teacher Guide Materials & Getting Ready, pp. 43-45 taking note of p. 44 Step 1. Obtain Aerial Photos p. 44 Steps 2 & 3. Size the Photos and Using the Overlay Grid p. 44 Step 4. Plan Assessment – Teacher Guide, Assessment, pp. 399-405 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 1: <i>Where Am I?</i> Part 2: <i>Neighborhood and Community, Steps # 1-8</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 46-47 – Student Lab Notebook, p. 3 – Transparency Nos. 1, 2, 3, 4 – Student Lab Notebook, Response Sheet, p. 5 – Assessment Chart for Investigation 1, p. 429 – FOSS Planetary Science Resources Book: <ul style="list-style-type: none"> - <i>Bret Harte Neighborhood, p. 4</i> - <i>Bret Harte Community, p. 5</i> 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <p>Aerial Photographs of your community (optional)</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

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	<p>Lesson 4 (45 min) Investigation 1: Where Am I (3 of 3 sessions)</p> <p>Objective(s):</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Explain that the number of Earth structures that can be identified decreases with elevation due to the ability of the eye (and other optical instruments) to resolve detail. • Explain that a person’s specific location can be described in many ways, depending on the particular frame of reference. 	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 5 	
WEEK 1 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 29-37 taking note of: pp. 30-31 Inv. 1 “At A Glance” pp. 32 Scientific and Historical Background p. 36 Why Do I Have to Learn This? p. 37 Overview – Teacher Guide Materials & Getting Ready, pp. 48-49 taking note of p. 48 Step 1. Use Multimedia Images p. 48 Steps 2 & 3. Plan Assessment – You will need to make copies of a map of your school. – Teacher Guide, Assessment, pp. 399-405 	<p>Investigation/Activity</p> <p>Investigation 1: <i>Where Am I?</i> Part 3: <i>The View from Space, Steps # 1-12</i></p> <ul style="list-style-type: none"> – Teacher Guide, pp. 50-52 – Student Lab Notebook, p. 3 (from Part 2) – Student Lab Notebook, Response Sheet, p. 5 (from Part 2) – Assessment Master, Mid-Summative Exam 1, p. 434 Assessment Chart for Investigation 1, p. 429 Assessment Scoring Guide, Response Sheet, p. 404 Assessment Scoring Guide, Mid-Summative Exam 1, p. 405 – FOSS Planetary Science CD-ROM / Multimedia: <i>Bret Harte Fly-away</i> (from the Planetary Science Resource Room go to: “the Earth” binder on the bookshelf / click on “Views” / click on “Bret Harte Fly-away”) – FOSS Planetary Science Resources Book: <ul style="list-style-type: none"> - <i>San Francisco Bay Area</i>, p. 6 - <i>Southwest Region</i>, p. 7 - <i>North America</i>, p. 13 - <i>Planet Earth</i>, p. 14 	<p>Science Materials Supplied by the Teacher</p> <p>Map of your school</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 5 (45 min) Investigation 2: Round Earth / Flat Earth (1 of 4 sessions) Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • The horizon is where the sky and Earth appear to meet. • Line of sight is the straight, unimpeded path taken by light from an object to an eye. <p>Process / Conducting Investigations Use models and simulations to observe ships sailing on round and flat Earths.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Discuss how objects can disappear over the horizon. • Explain how the apparent disappearance of ships over a horizon is evidence for a round Earth. 	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 8 • Physical Setting Skills: 1 • Physical Science: 1.1f, 1.1j 	
WEEK 1 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 55-63 taking note of: pp. 56-57 Inv. 2 “At A Glance” pp. 58 Scientific and Historical Background p. 63 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 64-66 taking note of p. 65 Steps 1 & 2, Prepare Flat Earth & Globes p. 65 Step 4, Preview the Multimedia p. 66 Step 5, Plan Assessment – Teacher Guide, Assessment, pp. 406-407 – Teacher Guide, Extending the Experience, p. 78. Consider these activities especially No. 2 Measure a Shadow 	<p>Investigation/Activity</p> <p>Investigation 2: <i>Round Earth / Flat Earth</i> Part 1: <i>Sailing Ships, Steps # 1-13</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 67-70 – Student Lab Notebook, p. 7 – Transparency No. 5 – Student Lab Notebook, Response Sheet, p. 9 – Assessment Chart for Investigation 2, p. 429 Assessment Scoring Guide, Response Sheet, p. 406 – FOSS Planetary Science CD-ROM / Multimedia: <i>Round Earth / Flat Earth</i> – FOSS Planetary Science Resources Book: <i>The Accidental Discovery of America</i>, p. 47 <p>Note: You may wish to keep the boats prepared by students in Step 7 for use in subsequent classes. Be sure to review and demonstrate the construction for each class.</p>	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Masking Tape • Transparent Tape <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 6 (45 min) Investigation 2: Round Earth / Flat Earth (2 of 4 sessions) Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • The horizon is where the sky and Earth appear to meet. • Line of sight is the straight, unimpeded path taken by light from an object to an eye. <p>Process / Conducting Investigations Use models and simulations to observe ships sailing on round and flat Earths.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Discuss how objects can disappear over the horizon. • Explain how the apparent disappearance of ships over a horizon is evidence for a round Earth. 	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 8 • Physical Setting Skills: 1 • Physical Science: 1.1f, 1.1j 	
WEEK 2	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 55-63 taking note of: pp. 56-57 Inv. 2 “At A Glance” pp. 58 Scientific and Historical Background p. 63 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 64-66 taking note of p. 65 Steps 1 & 2, Prepare Flat Earth & Globes p. 65 Step 4, Preview the Multimedia p. 66 Step 5, Plan Assessment – Teacher Guide, Assessment, pp. 406-407 	<p>Investigation/Activity</p> <p>Investigation 2: <i>Round Earth / Flat Earth</i> Part 1: <i>Sailing Ships, Steps # 14-21</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 67-70 – Student Lab Notebook, p. 7 – Transparency No. 5 – Student Lab Notebook, Response Sheet, p. 9 – Assessment Chart for Investigation 2, p. 429 Assessment Scoring Guide, Response Sheet, p. 406 – FOSS Planetary Science CD-ROM / Multimedia: Round Earth / Flat Earth – FOSS Planetary Science Resources Book: <i>The Accidental Discovery of America</i>, p. 47 <p>Note: Track the voyage of Columbus on the globe using the latitude and longitude details given in the story.</p>	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Masking Tape • Transparent <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 2: Round Earth / Flat Earth (3 of 4 sessions) Objective(s): Content Illuminated opaque objects cast shadows on the side away from the source of light; the length of the shadow depends (in part) upon the angle of the incoming light. Process / Conducting Investigations Model sunlight shining on poles inserted vertically into round and flat Earths, and observe, collect, and graph shadow data. Building Explanations Explain how the relationship between latitude and shadow length is evidence for a round Earth.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 8 • Physical Setting Skills: 1 • Physical Science: 1.1f, 1.1j
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 55-63 taking note of: pp. 56-57 Inv. 2 “At A Glance” pp. 58 Scientific and Historical Background p. 63 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 71-72 taking note of p. 72 Step 2, Cut Strips of Index Cards p. 72 Step 3, Prepare to Darken Room p. 72 Steps 4 & 5, Plan Assessment – Teacher Guide, Assessment, pp. 406-407 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 2: <i>Round Earth / Flat Earth</i> Part 2: <i>Shadows, Steps # 1-15</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 73-77 – Student Lab Notebook, p. 11 Teacher Answer Master, p. 383 – Transparency Nos. 6 – Student Lab Notebook, Response Sheet, p. 9 (from Part 1) – Assessment Master, Mid-Summative Exam 2, p. 435-436 Assessment Chart for Investigation 2, p. 429 Assessment Scoring Guide, Response Sheet, p. 406 Assessment Scoring Guide, Mid-Summative Exam 2, p. 407 – FOSS Planetary Science CD-ROM / Multimedia: – FOSS Planetary Science Resources Book: <i>Eratosthenes: The First Person to Measure Earth</i>, p. 52 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Metric ruler • Meter tapes • Lamp with bare bulb, 75-100 watt <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 8 (45 min) Investigation 2: Round Earth / Flat Earth (4 of 4 sessions) Objective(s): Content Illuminated opaque objects cast shadows on the side away from the source of light; the length of the shadow depends (in part) upon the angle of the incoming light Process / Conducting Investigations Model sunlight shining on poles inserted vertically into round and flat Earths, and observe, collect, and graph shadow data. Building Explanations Explain how the relationship between latitude and shadow length is evidence for a round Earth.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 8 • Physical Setting Skills: 1 • Physical Science: 1.1f, 1.1j
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 55-63 taking note of: pp. 56-57 Inv. 2 “At A Glance” pp. 58 Scientific and Historical Background p. 63 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 71-72 taking note of p. 72 Step 2, Cut Strips of Index Cards p. 72 Step 3, Prepare to Darken Room p. 72 Steps 4 & 5, Plan Assessment – Teacher Guide, Assessment, pp. 406-407 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 2: <i>Round Earth / Flat Earth</i> Part 2: <i>Shadows, Steps # 16-17</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 73-77 – Student Lab Notebook, p. 11 Teacher Answer Master, p. 383 – Transparency Nos. 6 – Student Lab Notebook, Response Sheet, p. 9 (from Part 1) – Assessment Master, Mid-Summative Exam 2, p. 435-436 Assessment Chart for Investigation 2, p. 429 Assessment Scoring Guide, Response Sheet, p. 406 Assessment Scoring Guide, Mid-Summative Exam 2, p. 407 – FOSS Planetary Science CD-ROM / Multimedia: <i>Round Earth / Flat Earth</i> – FOSS Planetary Science Resources Book: <i>Eratosthenes: The First Person to Measure Earth</i>, p. 52 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Metric ruler • Meter tapes • Lamp with bare bulb, 75-100 watt <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 3: Day and Night (1 of 6 sessions) Objective(s): Content</p> <ul style="list-style-type: none"> • At all times, half of Earth (an opaque sphere) is illuminated (day) and half is dark (night). • The Sun is a light source. • Illuminated opaque objects produce shadows. <p>Process / Conducting Investigations Use light and spheres to model day and night, and to determine the direction of Earth's rotation.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 8 • Physical Setting Skills: 1 • Physical Science: 1.1e, 1.1h, 1.1j, 5.1a 	
WEEK 2 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 79-88 taking note of: pp. 80-81 Inv. 3 “At A Glance” pp. 82 Scientific and Historical Background p. 87-88 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 89-90 taking note of p. 90 Step 1, Get a Light Source p. 90 Step 2, Prepare Multimedia Setup p. 90 Step 3, Day / Night Think Questions p. 90 Step 4, Plan Assessment – Teacher Guide, Assessment, pp. 408-409 – Teacher Guide, Extending the Experience, p. 110. Consider these activities especially No. 3 Explore the International Date Line 	<p>Investigation/Activity</p> <p>Investigation 3: <i>Day and Night</i> Part 1: <i>Introducing Day and Night, Steps # 1-14</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 91-93 – Student Lab Notebook, p. 13 Teacher Answer Master, p. 384 – Assessment Chart for Investigation 3, p. 430 – FOSS Planetary Science CD-ROM / Multimedia: <i>Day / Night Simulation</i> <p>Note: The “Quick Write” from Part 1 is used as a Self-Assessment in Part 4.</p>	<p>Science Materials Supplied by the Teacher</p> <p>Lamp with bare bulb, 75-100 watt</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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WEEK 2 (continued)	<p>Lesson 10 (45 min) Investigation 3: Day and Night (2 of 6 sessions) Objective(s): Content</p> <ul style="list-style-type: none"> • At all times, half of Earth (an opaque sphere) is illuminated (day) and half is dark (night). • The Sun is a light source. • Illuminated opaque objects produce shadows. <p>Process / Conducting Investigation Use information in the periodic table to analyze substances in terms of their elemental composition.</p> <p>Building Explanations Explain how to determine the direction of Earth’s rotation.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 8 • Physical Setting Skills: 1 • Physical Science: 1.1e, 1.1h, 1.1j, 5.1a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 79-88 taking note of: pp. 80-81 Inv. 3 “At A Glance” pp. 82 Scientific and Historical Background p. 87-88 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 94-95 taking note of p. 95 Step 1, Get a Light Source p. 95 Step 2, Get a Slide Projector p. 95 Step 4, Plan Assessment – Teacher Guide, Assessment, pp. 408-409 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 3: <i>Day and Night</i> Part 2: <i>Day and Night with Globes, Steps # 1-5</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 96-98 – Student Lab Notebook, (open ended response) – Transparency Nos. 7 – Assessment Chart for Investigation 3, p. 430 – FOSS Planetary Science CD-ROM / Multimedia: <i>Day / Night Simulation</i> 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Light source • Earth globe, 9-12” • Transparent tape <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

Grade 8

WEEK 3	<p>Lesson 11 (45 min) Investigation 3: Day and Night (3 of 6 sessions) Objective(s): Content</p> <ul style="list-style-type: none"> • At all times, half of Earth (an opaque sphere) is illuminated (day) and half is dark (night). • The Sun is a light source. • Illuminated opaque objects produce shadows. <p>Process / Conducting Investigations Use information in the periodic table to analyze substances in terms of their elemental composition.</p> <p>Building Explanations Explain how to determine the direction of Earth’s rotation.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 8 • Physical Setting Skills: 1 • Physical Science: 1.1e, 1.1h, 1.1j, 5.1a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 79-88 taking note of: pp. 80-81 Inv. 3 “At A Glance” pp. 82 Scientific and Historical Background p. 87-88 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 94-95 taking note of p. 95 Step 1, Get a Light Source p. 95 Step 2, Get a Slide Projector p. 95 Step 4, Plan Assessment – Teacher Guide, Assessment, pp. 408-409 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 3: <i>Day and Night Part 2: Day and Night with Globes, Steps # 6-8</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 96-98 – Student Lab Notebook, (open ended response) – Transparency Nos. 7 – Assessment Chart for Investigation 3, p. 430 – FOSS Planetary Science CD-ROM / Multimedia: <i>Day / Night Simulation</i> 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Light source • Earth globe, 9-12” • Transparent tape <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

Grade 8

	<p>Lesson 12 (45 min) Investigation 3: Day and Night (4 of 6 sessions) Objective(s): Process / Conducting Investigations Use astronomical data to determine local noon, the time when the Sun is at its highest in point overhead.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 8 • Physical Setting Skills: 1 • Physical Science: 1.1e, 1.1h, 1.1j, 5.1a 	
WEEK 3 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 79-88 taking note of: pp. 80-81 Inv. 3 “At A Glance” pp. 82 Scientific and Historical Background p. 87-88 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 99-100 taking note of p. 100 Step 1, Determine Local Sunrise p. 100 Step 2, Think About Student Math Skills p. 95 Step 4, Plan Assessment – Teacher Guide, Assessment, pp. 408-409 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 2: <i>Elements</i> Part 3: <i>Day and Night</i> Part 3: <i>Timekeeping, Steps # 1-12</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 101-103 – Student Lab Notebook, p. 15, 17 – Teacher Answer Master, p. 385 – Transparency Nos. 8, 9 – Assessment Chart for Investigation 3, p. 430 <p>Note: Visit The Time Services Department of the U.S. Naval Observatory for local sunrise and sunset data. http://aa.usno.navy.mil/data/docs/RS_OneDay.php</p> <p>This website will soon be consolidated. The new link will be: http://www.usno.navy.mil/USNO/astronomical-applications/data-services/rs-one-day-us</p>	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <p>Current newspaper</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 8

	<p>Lesson 13 (45 min) Investigation 3: Day and Night (5 of 6 sessions) Objective(s): Process / Conducting Investigations Use astronomical data to determine local noon, the time when the Sun is at its highest in point overhead. Building Explanations Explain why it is a different time in other parts of the world, using time zones.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 8 • Physical Setting Skills: 1 • Physical Science: 1.1e, 1.1h, 1.1j, 5.1a 	
WEEK 3 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 79-88 taking note of: pp. 80-81 Inv. 3 “At A Glance” pp. 82 Scientific and Historical Background p. 87-88 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 99-100 taking note of p. 100 Step 1, Determine Local Sunrise p. 100 Step 2, Think About Student Math Skills p. 95 Step 4, Plan Assessment – Teacher Guide, Assessment, pp. 408-409 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 3: <i>Day and Night</i> Part 4: <i>Time Zones, Steps # 1-9</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 107-109 – Student Lab Notebook, p. 19, 21 – Teacher Answer Master, p. 386, 387 – Transparency Nos. 10, 11 – Assessment Master, Mid-Summative Exam 3, p. 437 – Assessment Chart for Investigation 3, p. 430 – Assessment Scoring Guide, Quick Write, p. 408 – Assessment Scoring Guide, Mid-Summative Exam 3, p. 409 – FOSS Planetary Science Resources Book: <ul style="list-style-type: none"> - <i>Time Zones of the Lower 48 States</i>, p. 36 - <i>World Time-Zone Map</i>, p. 37 <p>Note: Visit The Time Services Department of the U.S. Naval Observatory for a world time zone map http://aa.usno.navy.mil/AA/faq/docs/world_tzones.html</p> <p>This website will soon be consolidated. The new link will be: http://www.usno.navy.mil/USNO/astronomical-applications/astronomical-information-center/TimeZoneMap0802.pdf/view?searchterm=time+zone+map</p>	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Pliers • Thumbtack • Scissors <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 8

	<p>Lesson 14 (45 min) Investigation 3: Day and Night (6 of 6 sessions) Objective(s): Process / Conducting Investigations Use maps and globes to investigate time zones. Building Explanations Explain why it is a different time in other parts of the world, using time zones.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 8 • Physical Setting Skills: 1 • Physical Science: 1.1e, 1.1h, 1.1j, 5.1a 	
WEEK 3 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 79-88 taking note of: pp. 80-81 Inv. 3 “At A Glance” pp. 82 Scientific and Historical Background p. 87-88 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 104-106 taking note of p. 106 Step 3, Prepare the <i>Global Time Finder</i> p. 106 Step 4 & 5, Plan Assessment – Teacher Guide, Assessment, pp. 408-409 	<p>Investigation/Activity Investigation 3: <i>Day and Night</i> Part 4: <i>Time Zones, Steps # 10-12</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 107-109 – Student Lab Notebook, p. 19, 21 – Teacher Answer Master, p. 386, 387 – Transparency Nos. 10, 11 – Assessment Master, Mid-Summative Exam 3, p. 437 Assessment Chart for Investigation 3, p. 430 Assessment Scoring Guide, Quick Write, p. 408 Assessment Scoring Guide, Mid-Summative Exam 3, p. 409 – FOSS Planetary Science Resources Book: - <i>Time Zones of the Lower 48 States</i>, p. 36 - <i>World Time-Zone Map</i>, p. 37 	<p>Science Materials Supplied by the Teacher</p>

Grade 8

	<p>Lesson 15 (45 min) Investigation 4: Discover the Moon (1 of 4 sessions) Objective(s): Content The Moon’s appearance (shape) changes predictably over a month. The phases are called new, first quarter, full and third quarter. Process / Conducting Investigations Observe and record the Moon’s appearance day and night for at least a month.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 5 • Physical Science: 1.1e, 5.1a, 5.1b 	
WEEK 3 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 111-119 taking note of: pp. 112-113 Inv. 4 “At A Glance” pp. 114 Scientific and Historical Background p. 119 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 120-121 taking note of p. 121 Step 1, Plan Around the Moon p. 121 Step 4 & 5, Plan Assessment – Teacher Guide, Assessment, pp. 410-411 – Teacher Guide, Extending the Experience, p. 141. Consider these activities especially: No. 2 – Collect Moon Information from the Newspaper No. 3 – Chart Moonrise Information 	<p>Investigation/Activity</p> <p>Investigation 4: <i>Discover the Moon</i> Part 1: <i>Finding the Moon, Steps # 1-13</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 122-125 – Student Lab Notebook, p. 23 – Transparency No. 12 – Assessment Chart for Investigation 4, p. 430 – FOSS Planetary Science Resources Book: <i>Lunar Myth 1: Father Moon</i>, p. 54 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Binoculars • Spotting scopes • Masking tape <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 8

	<p>Lesson 16 (45 min) Investigation 4: Discover the Moon (2 of 4 sessions) Objective(s): Process / Conducting Investigations</p> <ul style="list-style-type: none"> • Study an image of the Moon to discover the major surface features. • Generate a list of questions about the Moon that will guide further study. 	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 5 • Physical Science: 1.1e, 5.1a, 5.1b 	
WEEK 4	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 111-119 taking note of: pp. 112-113 Inv. 4 “At A Glance” pp. 114 Scientific and Historical Background p. 119 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 126-127 taking note of p. 127 Step 2, Use the Rona Transparency p. 127 Step 4, Plan Assessment – Teacher Guide, Assessment, pp. 410-411 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 4: <i>Discover the Moon Part 2: A Close Look at the Moon, Steps # 1-14</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 128-131 – Student Lab Notebook, p. 23, 25, 27 Teacher Answer Master, pp. 388 – Transparency Nos. 13, 14, 15 – Assessment Chart for Investigation 4, p. 430 – FOSS Planetary Science Resources Book: <ul style="list-style-type: none"> - <i>Moon Photo</i>, p. 17 - <i>Lunar Myth 2: Rona in the Moon</i>, p. 55 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 8

	<p>Lesson 17 (45 min) Investigation 4: Discover the Moon (3 of 4 sessions) Objective(s): No new content in introduced in this lesson.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 5 • Physical Science: 1.1e, 5.1a, 5.1b 	
WEEK 4 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 111-119 taking note of: pp. 112-113 Inv. 4 “At A Glance” pp. 114 Scientific and Historical Background p. 119 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 126-127 taking note of p. 127 Step 2, Use the Rona Transparency p. 127 Step 4, Plan Assessment – Teacher Guide, Assessment, pp. 410-411 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 4: <i>Discover the Moon</i> Part 3: <i>Organizing Moon Questions, Steps # 1-10</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 134-135 – Assessment Chart for Investigation 4, p. 430 – FOSS Planetary Science Resources Book: <i>Lunar Myth 3: Moon and His Sister</i>, p. 56 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 8

WEEK 5 (continued)	<p>Lesson 18 (45 min) Investigation 4: Discover the Moon (4 of 4 sessions) Objective(s): Content The Moon has features that can be identified in telescope images: craters, maria, and mountains. Building Explanations Write a modern myth to explain some aspect of the Moon’s natural history.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 5 • Physical Science: 1.1e, 5.1a, 5.1b
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 111-119 taking note of: pp. 112-113 Inv. 4 “At A Glance” pp. 114 Scientific and Historical Background p. 119 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 136-137 taking note of p. 137 Step 1, Prepare Summary of Moon Questions p. 137 Step 2, 3 Plan Assessment – Teacher Guide, Assessment, pp. 410-411 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 4: <i>Discover the Moon</i> Part 4: <i>Modern Lunar Myths, Steps # 1-9</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 138-140 – Student Lab Notebook, p. 23 (from Part 2) – Assessment Chart for Investigation 4, p. 430 Assessment Scoring Guide, Student Journal, p. 410 – FOSS Planetary Science Resources Book: - <i>Lunar Myth 4: Tale of the Rabbit</i>, p. 57 - <i>Lunar Myth 5: Bahloo, Moon Man</i>. p. 58 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p>
<p>Note: Review the Physical Science Major Understandings quoted at the beginning of this document to directly address PS 5.1a, b, d, e, and 5.2a through teacher formulated questions in Lessons 19-26.</p>			

Grade 8

	<p>Lesson 19 (45 min) Investigation 5: Moon Craters (1 of 8 sessions)</p> <p>Objective(s):</p> <p>Content Craters of various sizes result when meteoroids of various sizes hit the Moon’s surface.</p> <p>Process / Conducting Investigations Simulate impact events to discover the variables that determine crater characteristics.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 5, 8 • Physical Science: 1.1d; 5.1a, 5.1b, 5.1c, 5.1d, 5.1e; 5.2a 	
WEEK 5 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 143-153 taking note of: pp. 144-147 Inv. 5 “At A Glance” pp. 148 Scientific and Historical Background p. 152-153 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 154-155 taking note of p. 155 Step 2, Prepare to Read About the Controversy p. 155 Step 3-8 Prepare Basins for Crater Experiments p. 155 Step 9, Plan Assessment – Teacher Guide, Assessment, pp. 412-413 – Teacher Guide, Extending the Experience, p. 183. Consider these activities especially: No. 4 – Who was Eugene Shoemaker? 	<p>Investigation/Activity</p> <p>Investigation 5: <i>Moon Craters</i> Part 1: <i>The Moon-Crater Controversy, Steps # 1-12</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 156-157 – Student Lab Notebook, p. 29 – Transparency Nos. 16 – Assessment Chart for Investigation 5, p. 431 – FOSS Planetary Science CD-ROM / Multimedia: <i>Moon Binder/Geology/ (follow prompts in reading “The Controversy about Lunar Crater Formation”)</i> – FOSS Planetary Science Resources Book: <i>The Controversy about Lunar Crater Formation</i>, p. 59 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Cocoa powder (1 lb. per class) • Flour (20 lb.) • Newspaper <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

Grade 8

WEEK 5 (continued)	<p>Lesson 20 (45 min) Investigation 5: Moon Craters (2 of 8 sessions)</p> <p>Objective(s):</p> <p>Process / Conducting Investigations</p> <ul style="list-style-type: none"> • Conduct experiments to determine the effect of meteoroid speed on crater characteristics. • Organize data to draw conclusions. 		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 5, 8 • Physical Science: 1.1d; 5.1a, 5.1b, 5.1c, 5.1d, 5.1e; 5.2a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 143-153 taking note of: pp. 144-147 Inv. 5 “At A Glance” pp. 148 Scientific and Historical Background p. 152-153 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 158-160 taking note of p. 159 Steps 1 - 3, Prepare Materials and Measuring Tools p. 160 Step 4 Plan Student Recording p. 160 Step 5, Plan Assessment – Teacher Guide, Assessment, pp. 412-413 	<p>Investigation/Activity</p> <p>Investigation 5: <i>Moon Craters Part 2: Impact Simulations – Variable Speed, Steps # 1-12</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 161-163 – Student Lab Notebook, p. 31, 33, 35 Teacher Answer Master, p. 389, 390 – Transparency Nos. 17, 18, 19 – Assessment Chart for Investigation 5, p. 431 <p>Note: You may wish to keep the Tagboard Dividers prepared by students (see Step 3 of “Getting Ready”) for use in subsequent classes. Be sure to review and demonstrate the construction for each class.</p>	<p>Science Materials Supplied by the Teacher</p> <p>From Part 1:</p> <ul style="list-style-type: none"> • Cocoa powder • Flour • Newspaper <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 8

	<p>Lesson 21 (45 min) Investigation 5: Moon Craters (3 of 8 sessions)</p> <p>Objective(s):</p> <p>Content Design and conduct experiments to determine the effect of meteoroid size on crater characteristics.</p> <p>Building Explanations Describe the processes that produce craters with various characteristics and of various sizes.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 5, 8 • Physical Science: 1.1d; 5.1a, 5.1b, 5.1c, 5.1d, 5.1e; 5.2a 	
WEEK 5 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 143-153 taking note of: pp. 144-147 Inv. 5 “At A Glance” pp. 148 Scientific and Historical Background p. 152-153 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 164-165 taking note of p. 165 Steps 1 & 3 Prepare Materials and Measuring Tools p. 165 Step 2, Plan Assessment p. 165 Step 4 Plan Student Recording – Teacher Guide, Assessment, pp. 412-413 	<p>Investigation/Activity</p> <p>Investigation 5: <i>Moon Craters</i> Part 3: <i>Impact Simulations – Variable Mass, Steps # 1-10</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 166-167 – Student Lab Notebook, p. 37 Teacher Answer Master, p. 391 – Transparency Nos. 20 – Assessment Chart for Investigation 5, p. 431 Assessment Scoring Guide, Student Journal, p. 412 	<p>Science Materials Supplied by the Teacher</p> <p>From Part 1:</p> <ul style="list-style-type: none"> • Cocoa powder • Flour • Newspaper • Balances (1g. accuracy) • Mass sets (if needed) <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 8

	<p>Lesson 22 (45 min) Investigation 5: Moon Craters (4 of 8 sessions)</p> <p>Objective(s):</p> <p>Building Explanations Reconstruct the history of impact events that resulted in the present appearance of the Moon.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 5, 8 • Physical Science: 1.1d; 5.1a, 5.1b, 5.1c, 5.1d, 5.1e; 5.2a 	
WEEK 5 (continued)	<p>Advanced Planning/Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 143-153 taking note of: pp. 144-147 Inv. 5 “At A Glance” pp. 148 Scientific and Historical Background p. 152-153 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 168-169 taking note of p. 169 Step 1 Consider Graphing p. 169 Step 2, Preview Multimedia p. 169 Step 4 Plan Assessment – Teacher Guide, Assessment, pp. 412-413 	<p>Investigation/Activity</p> <p>Investigation 5: <i>Moon Craters</i> Part 4: <i>Crater Analysis and Classification, Steps # 1-9</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 170-171 – Student Lab Notebook, p. 37, 39 Teacher Answer Master, p. 391, 392 – Transparency Nos. 20, 21 – Assessment Chart for Investigation 5, p. 431 – FOSS Planetary Science CD-ROM / Multimedia: <i>Crater Formation Animation</i> – FOSS Planetary Science Resources Book: <ul style="list-style-type: none"> - <i>Moon Photo</i>, p. 17 - <i>Archimedes</i>, p. 18 - <i>Aristillus</i>, p. 19 - <i>Lunar Alps</i>, p. 20 - <i>Copernicus</i>, p. 21 - <i>Sea of Serenity</i>, p. 22 - <i>Posidonius</i>, p. 23 - <i>Stofler</i>, p. 24 - <i>Tycho and Clavius</i>, p. 25 - <i>Craters: Real and Simulated</i>, p. 63 	<p>Science Materials Supplied by the Teacher</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

Grade 8

WEEK 5 (continued)	<p>Lesson 23 (45 min) Investigation 5: Moon Craters (5 of 8 sessions)</p> <p>Objective(s):</p> <p>Building Explanations Reconstruct the history of impact events that resulted in the present appearance of the Moon.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 5, 8 • Physical Science: 1.1d; 5.1a, 5.1b, 5.1c, 5.1d, 5.1e; 5.2a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 143-153 taking note of: pp. 144-147 Inv. 5 “At A Glance” pp. 148 Scientific and Historical Background p. 152-153 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 168-169 taking note of p. 169 Step 1 Consider Graphing p. 169 Step 2, Preview Multimedia p. 169 Step 4 Plan Assessment – Teacher Guide, Assessment, pp. 412-413 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 5: <i>Moon Craters</i> Part 4: <i>Crater Analysis and Classification, Steps # 10-14</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 170-171 – Student Lab Notebook, p. 37, 39 Teacher Answer Master, p. 391, 392 – Transparency Nos. 20, 21 – Assessment Chart for Investigation 5, p. 431 – FOSS Planetary Science CD-ROM / Multimedia: <i>Crater Formation Animation</i> – FOSS Planetary Science Resources Book: <ul style="list-style-type: none"> - <i>Moon Photo</i>, p. 17 - <i>Archimedes</i>, p. 18 - <i>Aristillus</i>, p. 19 - <i>Lunar Alps</i>, p. 20 - <i>Copernicus</i>, p. 21 - <i>Sea of Serenity</i>, p. 22 - <i>Posidonius</i>, p. 23 - <i>Stofler</i>, p. 24 - <i>Tycho and Clavius</i>, p. 25 - <i>Craters: Real and Simulated</i>, p. 23

Grade 8

WEEK 5 (continued)	Lesson 24 (45 min) Investigation 5: Moon Craters (6 of 8 sessions) Objective(s): Content Craters can be categorized by size and physical characteristics such as simple, complex, terraced, ringed (or basin), and flooded.		Alignment with NYS Core Curriculum: <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 5, 8 • Physical Science: 1.1d; 5.1a, 5.1b, 5.1c, 5.1d, 5.1e; 5.2a
	Advanced Planning/ Notes to Teachers – Teacher Guide, pp. 143-153 taking note of: pp. 144-147 Inv. 5 “At A Glance” pp. 148 Scientific and Historical Background p. 152-153 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 174 taking note of p. 174 Step 1 Plan Mid-Summative Assessment p. 174 Step 2, Decide When to Read about Dinosaurs – Teacher Guide, Assessment, pp. 412-413	Investigation/Activity Investigation 5: <i>Moon Craters</i> Part 5: <i>The Face of the Moon Assessment, Steps # 1-4</i> – Teacher Guide pp. 175 – Student Lab Notebook, p. Teacher Answer Master, p. – Transparency Nos. – Assessment Master, Mid-Summative Exam 5, p. 439 Assessment Chart for Investigation 5, p. 431 Assessment Scoring Guide, Mid-Summative Exam 5, p. 413 – FOSS Planetary Science Resources Book: - <i>Face of the Moon</i> , p. 26 - <i>The Crater That Ended the Reign of the Dinosaurs</i> , p. 67	Science Materials Supplied by the Teacher

Grade 8

	<p>Lesson 25 (45 min) Investigation 5: Moon Craters (7 of 8 sessions)</p> <p>Objective(s):</p> <p>Building Explanations Explain the difference in appearance between the Moon and the Earth.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 5, 8 • Physical Science: 1.1d; 5.1a, 5.1b, 5.1c, 5.1d, 5.1e; 5.2a 	
WEEK 5 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 143-153 taking note of: pp. 144-147 Inv. 5 “At A Glance” pp. 148 Scientific and Historical Background p. 152-153 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 176-177 taking note of p. 177 Step 1 Plan to Read the Dinosaur Extinction Article p. 177 Step 3 - 4, Preview Multimedia; Plan for Video p. 177 Step 5, Plan Assessment – Teacher Guide, Assessment, pp. 412-413 	<p>Investigation/Activity</p> <p>Investigation 5: <i>Moon Craters</i> Part 6: <i>Impacts on Earth, Steps # 1-9</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 178-179 – Assessment Chart for Investigation 5, p. 431 – FOSS Planetary Science CD-ROM / Multimedia: <i>Crater Binder / Earth</i> – FOSS Planetary Science Resources Book: <ul style="list-style-type: none"> - <i>The Crater That Ended the Reign of the Dinosaurs</i>, p. 67 - <i>Barringer Crater, Arizona</i>, p. 27 - <i>Ulysses Crater, Mars</i>, p. 30 - <i>Mars – Reull Valles</i>, p. 31 	<p>Science Materials Supplied by the Teacher</p> <p>State map</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • VCR and monitor • Multimedia set-up for CD-ROM

Grade 8

	<p>Lesson 26 (45 min) Investigation 5: Moon Craters (8 of 8 sessions)</p> <p>Objective(s):</p> <p>Process / Conducting Investigations Calculate energy transfer in calories.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 5, 8 • Physical Science: 1.1d; 5.1a, 5.1b, 5.1c, 5.1d, 5.1e; 5.2a 	
WEEK 6	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 143-153 taking note of: pp. 144-147 Inv. 5 “At A Glance” pp. 148 Scientific and Historical Background p. 152-153 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 180 taking note of p. 180 Step 1 Preview Multimedia p. 180 Step 2, Plan Assessment – Teacher Guide, Assessment, pp. 412-413 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 5: <i>Moon Craters</i> Part 7: <i>Origin of the Moon, Steps # 1-7</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 181-182 – Assessment Chart for Investigation 5, p. 431 – FOSS Planetary Science CD-ROM / Multimedia: <i>Moon Binder / Origin of the Moon</i> – FOSS Planetary Science Resources Book: <ul style="list-style-type: none"> - <i>How to Get and Hold onto a Moon</i>, p.69 - <i>Gene Shoemaker: The First Man on the Moon?</i>, p.71 	<p style="text-align: center;">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

Grade 8

WEEK 6 (continued)	Lesson 27 (45 min) Investigation 6: Mapping the Moon (1 of 3 sessions) Objective(s): Process / Conducting Investigations Identify and measure craters on a Moon photo and transfer the data to a map.		Alignment with NYS Core Curriculum: <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 8 • Physical Setting Skills: 1
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> – Teacher Guide, pp. 185-191 taking note of: pp. 186-187 Inv. 6 “At A Glance” pp. 188 Scientific and Historical Background p. 191 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 192-193 taking note of p. 193 Step 2 Be Prepared to Name Craters p. 193 Step 5, Plan Assessment – Teacher Guide, Assessment, pp. 414-415 – Teacher Guide, Extending the Experience, p. 206. 	Investigation/Activity <i>Investigation 6: Mapping the Moon Part 1: Crater Survey, Steps # 1-10</i> <ul style="list-style-type: none"> – Teacher Guide pp. 194-196 – Student Lab Notebook, p. 41, 49 – Transparency Nos. 13, 22 – Assessment Chart for Investigation 6, p. 431 – FOSS Planetary Science Resources Book: <ul style="list-style-type: none"> - <i>Moon Photo</i>, p.17 - <i>Gene Shoemaker: The First Man on the Moon?</i>, p.71 	Science Materials Supplied by the Teacher AV Equipment <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 8

WEEK 6 (continued)	<p>Lesson 28 (45 min) Investigation 6: Mapping the Moon (2 of 3 sessions)</p> <p>Objective(s):</p> <p>Content</p> <ul style="list-style-type: none"> • Scale is the size relationship between a representation of an object and the object. • Scale can be expressed as a ratio when an object and its representation are measured in the same units. <p>Process / Conducting Investigations</p> <p>Calculate actual dimensions of lunar structures from photographs.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Use mathematical reasoning to describe how to determine the size of lunar features. • Describe a sequence of events that accounts for the formation and appearance of lunar maria. 		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 8 • Physical Setting Skills: 1
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 185-191 taking note of: pp. 186-187 Inv. 6 “At A Glance” pp. 188 Scientific and Historical Background p. 191 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 197-198 taking note of p. 198 Step 3 Consider Practice with Scaling p. 198 Step 4 Plan Assessment – Teacher Guide, Assessment, pp. 414-415 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 6: <i>Mapping the Moon</i> Part 2: <i>Scaling Lunar Features, Steps # 1-13</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 199-200 – Student Lab Notebook, p. 43, 45, 47, 49 Teacher Answer Master, p. 393, 394, 395 – Transparency Nos. 13, 23, 24, 25 – Assessment Chart for Investigation 6, p. 431 – FOSS Planetary Science Resources Book: <ul style="list-style-type: none"> - <i>Moon Photo</i>, p. 17 - <i>Earth / Moon Comparison</i>, data, p. 39 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Metric rulers • Calculators <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 8

	<p>Lesson 29 (45 min) Investigation 6: Mapping the Moon (3 of 3 sessions)</p> <p>Objective(s):</p> <p>Process / Conducting Investigations</p> <p>Draw accurately scaled representations of lunar craters on a map of your state.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 8 • Physical Setting Skills: 1 	
WEEK 6 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 185-191 taking note of: <ul style="list-style-type: none"> pp. 186-187 Inv. 6 “At A Glance” pp. 188 Scientific and Historical Background p. 191 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 201-202 taking note of <ul style="list-style-type: none"> p. 202 Step 1 Get Maps p. 202 Step 2 Check Maps for Scaling, consider converting untis p. 202 Step 4 & 5 Plan Assessment – Teacher Guide, Assessment, pp. 414-415 	<p>Investigation/Activity</p> <p>Investigation 6: <i>Mapping the Moon</i> Part 3: <i>Scaling Lunar Craters to Your Area, Steps # 1-13</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 203-205 – Transparency Nos. 13 – Assessment Master, Mid-Summative Exam 6, p. 440 – Assessment Chart for Investigation 6, p. 431 – Assessment Scoring Guide, Quick Write, p. 414 – Assessment Scoring Guide, Mid-Summative Exam 6, p. 415 – FOSS Planetary Science CD-ROM / Multimedia (optional): <ul style="list-style-type: none"> <i>Crater Binder</i> / <i>Mare Formation on the Moon</i> / <i>Mare Formation Video</i> <p>Note: Have students record latitude and longitude of locations when drawing scaled representations of lunar craters on the map of your state.</p>	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Maps of state, region, or county • Pencil compasses • Transparent tape <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM (optional)

Grade 8

WEEK 6 (continued)	<p>Lesson 30 (45 min) Investigation 7: Landing on the Moon (1 of 6 sessions) Objective(s): Process / Conducting Investigations Identify important elements of a mission to the Moon.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 8 • Physical Science: 1.1g, 1.1h 	
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 207-217 taking note of: pp. 208-211 Inv. 7 “At A Glance” pp. 212 Scientific and Historical Background p. 217 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 218-219 taking note of p. 219 Step 1 Prepare to Set the Stage p. 219 Step 2 Schedule the Video p. 202 Step 3 Plan Assessment – Teacher Guide, Assessment, pp. 416 – Teacher Guide, Extending the Experience, p. 238. Consider these activities especially: 1. Investigate Orbiting Satellites and Spacecraft 5. View <i>Apollo 13</i> 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 7: <i>Landing on the Moon</i> Part 1: <i>The Kennedy Challenge, Steps # 1-8</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 220-221 – Assessment Chart for Investigation 7, p. 432 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • VCR and monitor

Grade 8

	<p>Lesson 31 (45 min) Investigation 7: Landing on the Moon (2 of 6 sessions) Objective(s):</p> <p>Process / Conducting Investigations</p> <ul style="list-style-type: none"> • Construct a model Earth / Moon system. • Calculate the time needed to complete a mission to the Moon. <p>Building Explanations Describe the sequence and timing of events that will result in a successful Moon mission.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 8 • Physical Science: 1.1g, 1.1h 	
WEEK 7	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 207-217 taking note of: pp. 208-211 Inv. 7 “At A Glance” pp. 212 Scientific and Historical Background p. 217 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 222-223 taking note of p. 223 Step 2 Think about Time p. 202 Step 3 Plan Assessment – Teacher Guide, Assessment, pp. 416 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 7: <i>Landing on the Moon Part 2: How Far / How Fast?, Steps # 1-12</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 224-225 – Student Lab Notebook, p. 51 – Transparency No. 26 – Assessment Chart for Investigation 7, p. 432 – FOSS Planetary Science Resources Book: - <i>Sun, Planets, and Satellites by Size</i>, p.35 <p style="text-align: center;">Science Materials Supplied by the Teacher</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • VCR and monitor 	

Grade 8

WEEK 7 (continued)	<p>Lesson 32 (45 min) Investigation 7: Landing on the Moon (3 of 6 sessions) Objective(s): Process / Conducting Investigations</p> <ul style="list-style-type: none"> Construct a model Earth / Moon system. Calculate the time needed to complete a mission to the Moon. <p>Building Explanations Describe the sequence and timing of events that will result in a successful Moon mission.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> General Skills: 1, 2, 3, 4, 8 Physical Science: 1.1g, 1.1h
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> Teacher Guide, pp. 207-217 taking note of: pp. 208-211 Inv. 7 “At A Glance” pp. 212 Scientific and Historical Background p. 217 Why Do I Have to Learn This? Teacher Guide Materials & Getting Ready, pp. 222-223 taking note of p. 223 Step 2 Think about Time p. 202 Step 3 Plan Assessment Teacher Guide, Assessment, pp. 416 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 7: <i>Landing on the Moon Part 2: How Far / How Fast?</i>, Steps # 13-15</p> <ul style="list-style-type: none"> Teacher Guide pp. 224-225 Student Lab Notebook, p. 51 Transparency No. 26 Assessment Chart for Investigation 7, p. 432 FOSS Planetary Science Resources Book: - <i>Sun, Planets, and Satellites by Size</i>, p.35 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <p>AV Equipment</p> <ul style="list-style-type: none"> Extension cord Overhead projector VCR and monitor

Grade 8

WEEK 7 (continued)	<p>Lesson 33 (45 min) Investigation 7: Landing on the Moon (4 of 6 sessions) Objective(s): Content Moon exploration involves robotic probes and manned spacecraft. Process / Conducting Investigations Collect and analyze data for the purpose of selecting a Moon-mission landing site.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 8 • Physical Science: 1.1g, 1.1h
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 207-217 taking note of: pp. 208-211 Inv. 7 “At A Glance” pp. 212 Scientific and Historical Background p. 217 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 228-229 taking note of p. 229 Step 1 Preview the Reading p. 229 Step 2 Review the Multimedia CD-ROM p. 229 Step 3 Plan Assessment – Teacher Guide, Assessment, pp. 416 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 7: <i>Landing on the Moon</i> Part 3: <i>A Place to Land, Steps # 1-10</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 230-231 – Assessment Chart for Investigation 7, p. 432 – FOSS Planetary Science CD-ROM / Multimedia: <i>Space Exploration Binder / Moon / Before Apollo (1959-1968)</i> – FOSS Planetary Science Resources Book: <ul style="list-style-type: none"> - <i>Moon Photos</i>, pp. 18-25 - <i>Moon with Landing Sites</i>, data, p. 40 - <i>Lunar Probes: Paving the Way for Apollo</i>, p. 74 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • VCR and monitor • Multimedia set-up for CD-ROM

Grade 8

WEEK 7 (continued)	<p>Lesson 34 (45 min) Investigation 7: Landing on the Moon (5 of 6 sessions) Objective(s): Content The Moon’s rotation produces lunar day and night. Building Explanations Discuss similarities and differences between day and night on Earth and the Moon.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 8 • Physical Science: 1.1g, 1.1h
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 207-217 taking note of: pp. 208-211 Inv. 7 “At A Glance” pp. 212 Scientific and Historical Background p. 217 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 232-233 taking note of p. 233 Step 1 Prepare for Multimedia p. 233 Step 2 Prepare to Show <i>For All Mankind</i> p. 233 Step 4 Plan Assessment – Teacher Guide, Assessment, pp. 416 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 7: <i>Landing on the Moon</i> Part 4: <i>Lunar Day and Night, Steps # 1-8</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 230-231 – Student Lab Notebook, p. 53 – Assessment Chart for Investigation 7, p. 432 Assessment Scoring Guide, Response Sheet, p.233 – FOSS Planetary Science CD-ROM / Multimedia: <i>Day / Night Simulation</i> – FOSS Planetary Science Resources Book: (as needed for reference) 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <p>Weather page of newspaper</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • VCR and monitor • Multimedia set-up for CD-ROM

Grade 8

WEEK 7 (continued)	Lesson 35 (45 min) Investigation 7: Landing on the Moon (6 of 6 sessions) Objective(s):		Alignment with NYS Core Curriculum: <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 8 • Physical Science: 1.1g, 1.1h
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> – Teacher Guide, pp. 207-217 taking note of: pp. 208-211 Inv. 7 “At A Glance” pp. 212 Scientific and Historical Background p. 217 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 236 taking note of p. 236 Step 1 Consider Part 5 as Homework p. 236 Step 2 Prepare to Show <i>For All Mankind</i> p. 236 Steps 3 & 4 Plan Assessment – Teacher Guide, Assessment, pp. 416 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 7: <i>Landing on the Moon</i> Part 5: <i>A Trip to the Moon, Steps # 1-5</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 237 – Assessment Master, Mid-Summative Exam 7, p. 441 Assessment Chart for Investigation 7, p. 432 Assessment Scoring Guide, Mid-Summative Exam 7, p. 416 – FOSS Planetary Science CD-ROM / Multimedia: <i>various resources</i> – FOSS Planetary Science Resources Book: (as needed for reference) 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • VCR and monitor • Multimedia set-up for CD-ROM
	<p>If you have not yet prepared the Rock and Mineral Keys and the Moon Rock Canisters as noted in the Materials section, you must do so for the next lesson.</p>		

Grade 8

WEEK 8	Lesson 36 (45 min) Investigation 8: Moon Rocks (1 of 6 sessions) Objective(s): Content The Moon is composed of rocks and minerals similar to those found on Earth, including basalt, breccia, pyroxene, ilmenite, feldspar, and olivine.		Alignment with NYS Core Curriculum: General Skills: 1, 2, 3, 4, 5, 8
	Advanced Planning/ Notes to Teachers – Teacher Guide, pp. 239-249 taking note of: pp. 240-241 Inv. 8 “At A Glance” pp. 242 Scientific and Historical Background p. 249 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 250-252 taking note of p. 251 Step 1 Prepare Rock and Mineral Keys p. 251 Step 2 Prepare Moon Rock Canisters p. 251 Step 5 Plan Assessment – Teacher Guide, Assessment, pp. 417 – Teacher Guide, Extending the Experience, p. 271. Consider these activities.	Investigation/Activity Investigation 8: <i>Moon Rocks</i> Part 1: <i>Observing Moon Rocks, Steps # 1-13</i> – Teacher Guide pp. 253-254 – Student Lab Notebook, p.55 – Transparency No. 27, 28 – Assessment Chart for Investigation 8, p. 432	Science Materials Supplied by the Teacher AV Equipment <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 8

WEEK 8 (continued)	Lesson 37 (45 min) Investigation 8: Moon Rocks (2 of 6 sessions) Objective(s): Process / Conducting Investigations <ul style="list-style-type: none"> Establish and apply criteria for lunar rock sampling, and analyze the results of a sample. Observe, measure, and organize the properties of lunar rocks, including cleavage, color, luster, texture and density. 		Alignment with NYS Core Curriculum: General Skills: 1, 2, 3, 4, 5, 8
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> Teacher Guide, pp. 239-249 taking note of: pp. 240-241 Inv. 8 “At A Glance” pp. 242 Scientific and Historical Background p. 249 Why Do I Have to Learn This? Teacher Guide Materials & Getting Ready, pp. 255-256 taking note of p. 256 Step 1 Think about Timing p. 256 Step 2 & 3 Prepare Materials p. 251 Step 5 Plan Assessment Teacher Guide, Assessment, pp. 417 	Investigation/Activity Investigation 8: <i>Moon Rocks Part 2: Sampling Moon Rocks, Steps # 1-11</i> <ul style="list-style-type: none"> Teacher Guide pp. 257-258 Student Lab Notebook, p.57, 59, 61 Teacher Answer Master, p. 396 Transparency No. 29, 30, 31 Assessment Chart for Investigation 8, p. 432 FOSS Planetary Science Resources Book: - <i>Moon Rock and Mineral Key</i>, data, p.41 	Science Materials Supplied by the Teacher AV Equipment <ul style="list-style-type: none"> Extension cord Multimedia set-up for CD-ROM

Grade 8

	<p>Lesson 38 (45 min) Investigation 8: Moon Rocks (3 of 6 sessions)</p> <p>Objective(s):</p> <p>Process / Conducting Investigations</p> <ul style="list-style-type: none"> Establish and apply criteria for lunar rock sampling, and analyze the results of a sample. Observe, measure, and organize the properties of lunar rocks, including cleavage, color, luster, texture and density. 	<p>Alignment with NYS Core Curriculum:</p> <p>General Skills: 1, 2, 3, 4, 5, 8</p>	
WEEK 8 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> Teacher Guide, pp. 239-249 taking note of: <ul style="list-style-type: none"> pp. 240-241 Inv. 8 “At A Glance” pp. 242 Scientific and Historical Background p. 249 Why Do I Have to Learn This? Teacher Guide Materials & Getting Ready, pp. 255-256 taking note of <ul style="list-style-type: none"> p. 256 Step 1 Think about Timing p. 256 Step 2 & 3 Prepare Materials p. 256 Step 5 Plan Assessment Teacher Guide, Assessment, pp. 417 	<p>Investigation/Activity</p> <p>Investigation 8: <i>Moon Rocks</i> Part 2: <i>Sampling Moon Rocks, Steps # 12-14</i></p> <ul style="list-style-type: none"> Teacher Guide pp. 257-258 Student Lab Notebook, p.57, 59, 61 Teacher Answer Master, p. 396 Transparency No. 29, 30, 31 Assessment Chart for Investigation 8, p. 432 FOSS Planetary Science Resources Book: <ul style="list-style-type: none"> - <i>Moon Rock and Mineral Key</i>, data, p.41 	<p>Science Materials Supplied by the Teacher</p> <p>AV Equipment</p> <ul style="list-style-type: none"> Extension cord Overhead projector

Grade 8

	<p>Lesson 39 (45 min) Investigation 8: Moon Rocks (4 of 6 sessions) Objective(s):</p>	<p>Alignment with NYS Core Curriculum: General Skills: 1, 2, 3, 4, 5, 8</p>	
WEEK 8 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 239-249 taking note of: pp. 240-241 Inv. 8 “At A Glance” pp. 242 Scientific and Historical Background p. 249 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 260-261 taking note of p. 261 Step 1 Cut Apples p. 261 Step 2 Prepare Density Samples p. 261 Step 5 Plan Assessment – Teacher Guide, Assessment, pp. 417 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 8: <i>Moon Rocks</i> Part 3: <i>Exploring Density, Steps # 1-12</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 262-264 – Student Lab Notebook, p. 63 – Transparency No. 32 – Assessment Chart for Investigation 8, p. 432 – FOSS Planetary Science Resources Book: - <i>Top Ten Discoveries Made during Apollo Exploration of the Moon</i>, p. 78 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Apple (1 large or 2 small) • Knife • Balance or scale • Mass sets if needed • Calculators <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 8

WEEK 8 (continued)	<p>Lesson 40 (45 min) Investigation 8: Moon Rocks (5 of 6 sessions)</p> <p>Objective(s):</p> <p>Content On the Moon denser minerals are in low lying areas; less-dense minerals are in the highlands.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Explain the mineral composition of rocks collected from different locations of the Moon in terms of the density of those materials. • Discuss several theories of the origins of the Moon and support one theory with evidence. 		<p>Alignment with NYS Core Curriculum:</p> <p>General Skills: 1, 2, 3, 4, 5, 8</p>
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 239-249 taking note of: pp. 240-241 Inv. 8 “At A Glance” pp. 242 Scientific and Historical Background p. 249 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 265-267 taking note of p. 266 Step 1 -3 Prepare Materials and Demonstration p. 266 Step 5 - 6 Plan Assessment – Teacher Guide, Assessment, pp. 417 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 8: <i>Moon Rocks</i> Part 4: <i>Lunar Density</i>, Steps # 1-11</p> <ul style="list-style-type: none"> – Teacher Guide pp. 268-270 – Student Lab Notebook, p. 65 – Transparency No. 33, 34 – Assessment Master, Mid-Summative Exam 8, p. 442 – Assessment Chart for Investigation 8, p. 432 – Assessment Scoring Guide, Mid-Summative Exam 8, p. 417 – FOSS Planetary Science Resources Book: - <i>Moon Rock Formation</i>, data, p. 42 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Balance or scale • Mass sets if needed • Calculators • 1,000 ml graduated cylinder or equivalent container (see p. 270) <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 8

	<p>Lesson 41 (45 min) Investigation 8: Moon Rocks (6 of 6 sessions)</p> <p>Objective(s):</p> <p>Content On the Moon denser minerals are in low lying areas; less-dense minerals are in the highlands.</p> <p>Building Explanations</p> <ul style="list-style-type: none"> • Explain the mineral composition of rocks collected from different locations of the Moon in terms of the density of those materials. • Discuss several theories of the origins of the Moon and support one theory with evidence. 	<p>Alignment with NYS Core Curriculum:</p> <p>General Skills: 1, 2, 3, 4, 5, 8</p>	
WEEK 9	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 239-249 taking note of: pp. 240-241 Inv. 8 “At A Glance” pp. 242 Scientific and Historical Background p. 249 Why Do I Have to Learn This? – Teacher Guide Materials & Getting Ready, pp. 265-267 taking note of p. 266 Step 1 -3 Prepare Materials and Demonstration p. 266 Step 5 - 6 Plan Assessment – Teacher Guide, Assessment, pp. 417 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 8: <i>Moon Rocks</i> Part 4: <i>Lunar Density</i>, Steps # 12-16</p> <ul style="list-style-type: none"> – Teacher Guide pp. 268-270 – Student Lab Notebook, p. 65 – Transparency No. 33, 34 – Assessment Master, Mid-Summative Exam 8, p. 442 Assessment Chart for Investigation 8, p. 432 Assessment Scoring Guide, Mid-Summative Exam 8, p. 417 – FOSS Planetary Science Resources Book: - <i>Moon Rock Formation</i>, data, p. 42 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Balance or scale • Mass sets if needed • Calculators • 1,000 ml graduated cylinder or equivalent container (see p. 270) <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 8

	<p>Lesson 42 (45 min) Investigation 9: Phases of the Moon (1 of 4 sessions) Objective(s): Content Identify and name Moon phases. Building Explanations</p> <ul style="list-style-type: none"> • Explain the roles of rotation and revolution of Earth and the Moon in the presentation of phases. • Describe how the Moon revolves around the Earth once a month, resulting in the Moon rising 50 minutes later each day. 	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 3, 4, 5, 8 • Physical Science: 1.1e, 1.1g, 1.1h, 5.1a 	
WEEK 9 (continued)	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 273-282 taking note of: pp. 274-275 Inv. 9 “At A Glance” pp. 276 Scientific and Historical Background p. 281-282 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 283-284 taking note of p. 284 Step 1 Complete Moon Logs p. 284 Step 2 Plan Assessment – Teacher Guide, Assessment, pp. 418-419 – Teacher Guide, Extending the Experience, p. 302. Consider these activities. 1. Use the Computer Lab / CD-ROM or Online access for students to work with the <i>Phases of the Moon Simulation</i>. 2. Investigate Moon Rotation. 	<p>Investigation/Activity</p> <p>Investigation 9: <i>Moon Phases of the Moon</i> Part 1: <i>Study Moon Logs, Steps # 1-12</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 285-287 – Student Lab Notebook, p. 23 – Transparency No. 13, 35 – Assessment Chart for Investigation 9, p. 433 – FOSS Planetary Science CD-ROM / Multimedia: <i>Lunar Calendar</i> – FOSS Planetary Science Resources Book: - <i>Moonrise / Sunrise Data</i>, data, p. 38 	<p>Science Materials Supplied by the Teacher</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

Grade 8

WEEK 9 (continued)	<p>Lesson 43 (45 min) Investigation 9: Phases of the Moon (2 of 4 sessions) Objective(s): Process / Conducting Investigations Use models of the Sun, Moon, and Earth to explain the mechanics of Moon phases and eclipses. Building Explanations Explain the roles of rotation and revolution of Earth and the Moon in the presentation of phases, and when and where they are observed in the heavens.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 3, 4, 5, 8 • Physical Science: 1.1e, 1.1g, 1.1h, 5.1a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 273-282 taking note of: pp. 274-275 Inv. 9 “At A Glance” pp. 276 Scientific and Historical Background p. 281-282 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 288-289 taking note of p. 289 Step 1 Darken the Room p. 289 Step 3 Plan Assessment – Teacher Guide, Assessment, pp. 418-419 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 9: <i>Moon Phases of the Moon</i> Part 2: <i>What Causes Moon Phases, Steps # 1-13</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 290-292 – Assessment Chart for Investigation 9, p. 433 – <i>FOSS Planetary Science Resources Book: - The Search for New Moons</i>, p. 80 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Large globe or volleyball • Volleyball • Lamp with a bare bulb • Masking tape <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector

Grade 8

WEEK 9 (continued)	<p>Lesson 44 (45 min) Investigation 9: Phases of the Moon (3 of 4 sessions) Objective(s): Building Explanations Explain the roles of rotation and revolution of Earth and the Moon in the presentation of phases.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 3, 4, 5, 8 • Physical Science: 1.1e, 1.1g, 1.1h, 5.1a
	<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. 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 9: <i>Moon Phases of the Moon</i> Part 3: <i>Thinking About Moon Phases, Steps # 1-10</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 296-297 – Student Lab Notebook, p. 67 – Transparency No. 36 – Assessment Chart for Investigation 9, p. 433 – FOSS Planetary Science CD-ROM / Multimedia: <i>Day / Night Simulation</i> 	<p>Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Masking tape <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

Grade 8

WEEK 9 (continued)	<p>Lesson 45 (45 min) Investigation 9: Phases of the Moon (4 of 4 sessions) Objective(s): Process / Conducting Investigations Sequence representations of the phases of the Moon. Building Explanations Predict relative positions of the Sun, Earth, and Moon when shown a representation of a Moon phase.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 3, 4, 5, 8 • Physical Science: 1.1e, 1.1g, 1.1h, 5.1a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 273-282 taking note of: pp. 274-275 Inv. 9 “At A Glance” pp. 276 Scientific and Historical Background p. 281-282 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 298-299 taking note of p. 299 Step 1 Prepare Moon-Phase Puzzles p. 299 Step 2 Prepare for Multimedia p. 299 Step 3 & 4 Plan Assessment – Teacher Guide, Assessment, pp. 418-419 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 9: <i>Moon Phases of the Moon</i> Part 4: <i>Moon-Phase Puzzles, Steps # 1-11</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 300-301 – Assessment Master, Mid-Summative Exam 9, p. 443 Assessment Chart for Investigation 9, p. 433 Assessment Scoring Guide, Quick Write, p. 418 Assessment Scoring Guide, Mid-Summative Exam 9, p. 419 – <i>FOSS Planetary Science CD-ROM / Multimedia:</i> - <i>Moon-phase Simulation</i> 	<p style="text-align: center;">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

Grade 8

	<p>Lesson 46 (45 min) Investigation 10: Explore the Planets (1 of 5 sessions) Objective(s): Process / Conducting Investigations</p> <ul style="list-style-type: none"> • Simulate a photographic technique for determining the difference between stars and planets in the night sky. • Simulate producing a digital image of a distant object. 	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 8 • Physical Science: 1.1b, 1.1c, 1.1d, 1.1e, 1.1g, 1.1h, 1.1j, 5.1a; 5.2a 	
WEEK 10	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 303-311 taking note of: pp. 304-305 Inv. 10 “At A Glance” pp. 306 Scientific and Historical Background p. 310-311 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 312-313 taking note of p. 313 Step 1 Become Familiar with the Planet-Finding Pictures p. 313 Step 2 Preview Digital Data Sheets p. 313 Step 3 Copy Digital Image Grid p. 313 Step 5 Plan Assessment – Teacher Guide, Assessment, pp. 420-421 – Teacher Guide, Extending the Experience, p. 325. Consider the activities supported by the <i>Planetary Science Resources Book</i>. 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 10: <i>Explore the Planets</i> Part 1: <i>Moving Stars, Steps # 1-11</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 314-317 – Student Lab Notebook, p. 69, 71 – Transparency No. 37, 38 – Assessment Chart for Investigation 10, p. 433 – FOSS Planetary Science CD-ROM / Multimedia: <i>Solar System Binder / Digitizer / Digitizer / Simulation</i> 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <ul style="list-style-type: none"> • Transparent tape <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

Grade 8

WEEK 10 (continued)	<p>Lesson 47 (45 min) Investigation 10: Explore the Planets (2 of 5 sessions) Objective(s): Content The Solar System includes nine planets, scores of moons, and millions of asteroids and comets, all orbiting the Sun. Process / Conducting Investigations Review the current knowledge about the planets and propose a planetary tour to apply the knowledge.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 8 • Physical Science: 1.1b, 1.1c, 1.1d, 1.1e, 1.1g, 1.1h, 1.1j, 5.1a; 5.2a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 303-311 taking note of: pp. 304-305 Inv. 10 “At A Glance” pp. 306 Scientific and Historical Background p. 310-311 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 318-319 taking note of p. 319 Step 1 Consider Additional Subjects for Solar System Research p. 319 Step 2 Gather Solar System Resources p. 319 Step 3 Secure Solar System Lithographs p. 319 Step 4 Plan Assessment – Teacher Guide, Assessment, pp. 420-421 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 10: <i>Explore the Planets</i> Part 2: <i>Planet Research, Steps # 1-8</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 320-321 – Student Lab Notebook, p. 73, 75, 77, 79, 81, 83 Teacher Answer Master, p. 397 – Transparency No. 39, 40, 41, 42, 43, 44 – Assessment Chart for Investigation 10, p. 433 – <i>FOSS Planetary Science CD-ROM / Multimedia: Solar System Binder / View / select planet</i> – FOSS Planetary Science Resources Book: <ul style="list-style-type: none"> - <i>Space Probes</i>, p. 90 - <i>The Solar System in a Nutshell</i>, p. 84 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

Grade 8

WEEK 10 (continued)	<p>Lesson 48 (45 min) Investigation 10: Explore the Planets (3 of 5 sessions) Objective(s): Content The Solar System includes nine planets, scores of moons, and millions of asteroids and comets, all orbiting the Sun. Process / Conducting Investigations Review the current knowledge about the planets and propose a planetary tour to apply the knowledge.</p>		<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 8 • Physical Science: 1.1b, 1.1c, 1.1d, 1.1e, 1.1g, 1.1h, 1.1j, 5.1a; 5.2a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 303-311 taking note of: pp. 304-305 Inv. 10 “At A Glance” pp. 306 Scientific and Historical Background p. 310-311 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 318-319 taking note of p. 319 Step 1 Consider Additional Subjects for Solar System Research p. 319 Step 2 Gather Solar System Resources p. 319 Step 3 Secure Solar System Lithographs p. 319 Step 4 Plan Assessment – 420-421 	<p style="text-align: center;">Investigation/Activity</p> <p>Investigation 10: <i>Explore the Planets</i> Part 2: <i>Planet Research, Steps # 8-9</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 320-321 – Student Lab Notebook, p. 73, 75, 77, 79, 81, 83 Teacher Answer Master, p. 397 – Transparency No. 39, 40, 41, 42, 43, 44 – Assessment Chart for Investigation 10, p. 433 – FOSS Planetary Science CD-ROM / Multimedia: <i>Solar System Binder / View / select planet</i> – FOSS Planetary Science Resources Book: <ul style="list-style-type: none"> - <i>Space Probes</i>, p. 90 - <i>The Solar System in a Nutshell</i>, p. 84 	<p style="text-align: center;">Science Materials Supplied by the Teacher</p> <p>AV Equipment</p> <ul style="list-style-type: none"> • Extension cord • Overhead projector • Multimedia set-up for CD-ROM

Grade 8

WEEK 10 (continued)	<p>Lesson 49 (45 min) Investigation 10: Explore the Planets (4 of 5 sessions) Objective(s): Building Explanations Prepare and deliver to the class a presentation describing one of the planets in the Solar System.</p>	<p>Alignment with NYS Core Curriculum:</p> <ul style="list-style-type: none"> • General Skills: 1, 4, 8 • Physical Science: 1.1b, 1.1c, 1.1d, 1.1e, 1.1g, 1.1h, 1.1j, 5.1a; 5.2a
	<p>Advanced Planning/ Notes to Teachers</p> <ul style="list-style-type: none"> – Teacher Guide, pp. 303-311 taking note of: pp. 304-305 Inv. 10 “At A Glance” pp. 306 Scientific and Historical Background p. 310-311 Why Do I Have to Learn This? / Overview – Teacher Guide Materials & Getting Ready, pp. 322-323 taking note of p. 323 Steps 1, 2, 3 Consider Plan Presentations p. 323 Steps 4, 5 Plan Assessment p. 323 Step 6 Plan Final Assessment – Teacher Guide, Assessment, pp. 420-421 	<p>Investigation/Activity</p> <p>Investigation 10: <i>Explore the Planets</i> Part 3: <i>Present Planetary Tours, Steps # 1-6</i></p> <ul style="list-style-type: none"> – Teacher Guide pp. 324 – Assessment Master, Mid-Summative Exam 10, p. 444 Assessment Chart for Investigation 10, p. 433 Assessment Scoring Guide, Mid-Summative Exam 10, p. 421 – FOSS Planetary Science CD-ROM / Multimedia: <i>Solar System Binder / View / select planet</i> – FOSS Planetary Science Resources Book: <ul style="list-style-type: none"> - <i>Finding Planets Outside the Solar System</i>, p. 97 - <i>U.S. Planetary Missions</i>, p. 43 - <i>Naming Comets</i>, p. 101

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WEEK 10 (continued)	Lesson 50 (45 min) Investigation 10: Explore the Planets (5 of 5 sessions) Objective(s): Post-assessment.		Alignment with NYS Core Curriculum: <ul style="list-style-type: none"> • General Skills: 1, 2, 3, 4, 5, 8 • Physical Science: 1.1a, 1.1b, 1.1c, 1.1d, 1.1e, 1.1f, 1.1g, 1.1h, 1.1j, 5.1a, 5.1b, 5.1c, 5.1d, 5.1e; 5.2a
	Advanced Planning/ Notes to Teachers <ul style="list-style-type: none"> – Consider a Review Session before giving the Final Summative Exam. – Plan on a full session for the exam 	Investigation/Activity <ul style="list-style-type: none"> – Assessment Master, Final Summative Exam, pp. 445-450 – Assessment Chart for Investigation 10, p. 433 – Assessment Scoring Guide, Final Summative Exam, pp. 422-428 	Science Materials Supplied by the Teacher