Unit: Sun-Moon-Earth System

Content Area: **Science**
Course(s): **Integrated Science 5**
Time Period: **2nd Marking Period**
Length: **13 Weeks**
Status: **Not Published**

Unit Overview

The Sun, Earth, and Moon comprise a system. Most objects in the solar system are in regular and predictable motion that can explain such phenomena as the day, year, seasons, phases of the Moon, and eclipses. Gravitational interaction between the Sun, Moon, and Earth produces tides on Earth. The Sun is the largest body in the solar system and a source of energy for Earth. The apparent motion of the Sun across the sky, the Moon's phases, and eclipses result from the motions of Earth around the Sun and of the Moon around Earth. Gravitational interaction between the Sun, Moon, and Earth produces tides on Earth. The Sun is the major source of energy for Earth. Sunspots occur in a predictable cycle and influence space weather.

Transfer

Students will be able to independently use their learning to…

- Develop an affinity for wide reading on topics of astronomy
- Investigate a career in science, technology, engineering, or math
- Apply knowledge of tides to improve fishing and boating skills
- Track the movement of Earth's moon to use a navigation guide

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For more information, read the following article by Grant Wiggins.

http://www.authenticeducation.org/ae_bigideas/article.lasso?artid=60

Meaning

Understandings

- The apparent motion of the Sun across the sky, the Moon’s phases, and eclipses result from the motions of Earth around the Sun and of the Moon around Earth.
- Gravitational interaction between the Sun, Moon, and Earth produces tides on Earth.
- The Sun is the major source of energy for Earth.

- Sunspots occur in predictable cycle and influence space weather.

Essential Questions

Students will keep considering...

- Does the sun really rise and set?
- Can water fall up?
- What would the effects be if the Earth fell off its axis?
- Which technologies designed for space are widely used and have many functions?
- Does the moon affect life on earth?

Application of Knowledge and Skill

Students will know...

Students will know...

- The relative positions and motions of the Sun, Earth, and Moon result in the phases of the Moon, eclipses, and the daily and monthly cycle of tides.
- Earth’s tilt, rotation, and revolution around the Sun cause changes in the height and duration of the Sun in the Earth's sky. These factors combine to explain the changes in length of the day and seasons.
- Gravitation is a universal attractive force by which objects with mass attract one another.

Students will be skilled at...

Students will be skilled at...

- Analyze moon-phase, eclipse, and tidal data to construct models that explain how the relative positions and motions of the Sun, Earth, and Moon cause three phenomena.
- Use evidence of global variations in day length, temperature, and the amount of solar radiation striking Earth’s surface to create models that explain these phenomena and seasons.
- Predict how the gravitational force between two bodies would differ for bodies of different masses or bodies that are different distances apart.
- Graph and analyze data and draw conclusions regarding the motion of comets, planets, and moons to

find general patterns of orbital motion.

Content-Specific Vocabulary

Lesson 1	**Lesson 3**	**Lesson 4**	**Lesson 6.1**	Independent Variable
Earth	Axis	Phase	Full Moon	Radiometer
Model	Ecliptic	Rising Time	New Moon	Surface Area
Moon	Ellipse	Setting Time	Partial Eclipse	Watt
Star	Hemisphere	Reflect	Total Eclipse	**Lesson 8.2**
Sun	Radiation	**Lesson 4.1**	**Lesson 6.2**	Constant
Lesson 1.2	Season	Illuminated	Plane of the ecliptic	Solar Energy
Apparent Size	Solar Energy	Orbital Plane	**Lesson 7**	**Lesson 9.1**
Diameter	**Lesson 3.1**	**Lesson 4.2**	Biological Clock	Sunspot
Equation	Counterclockwise	Crescent Moon	Intertidal Zone	**Lesson 9.2**
Leap Year	Orbit	First Quarter Moon	Tidal Rhythm	Latitude
Scaling	**Lesson 3.2**	Full Moon	Tide	Longitude
Lesson 2	Altitude	Gibbous Moon	**Lesson 7.1**	Rotational Axis
Gnomon	Angle of Separation	New Moon	High tide	**Lesson 9.3**
Shadow	Latitude	Third Quarter Moon	Low tide	Solar Wind
Lesson 2.1	North Celestial Pole	Waning	Tidal bulge	Space Weather
Solar Noon	North Star	Waxing	**Lesson 8**	
Lesson 2.3	Polaris	**Lesson 5**	Corona	
Apparent Path	South Celestial Pole	Space spinoff	Coronagraph	
Globe	**Lesson 3.3**	**Lesson 6**	Electron	
Rotation	Revolution	Eclipse	Magnetic Field	
	Sunrise	Lunar Eclipse	Proton	
	Sunset	Penumbra	Solar wind	

		Shadow Solar Eclipse Umbra	**Lesson 8.1** Dependent Variable Distance Energy	

Cognitive Vocabulary

analyze

apparent

bibliography

brainstorming

compare

conclusion

construct

data

determine

equation

guidelines

identify

illuminated

investigate

maximum

minimum

model

oral presentation

outline

pattern

research plan

rubric

scaling

sphere

system

tilt

tracking

Learning Goal 1

Student will be able to support an argument that the gravitational force exerted by Earth on objects is directed down.

- Student will be able to support an argument that the gravational force exerted by Earth on obects is directed down.

	Key Ideas and Details
LA.RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.
LA.RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LA.RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.
LA.RST.6-8.9	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
LA.WHST.6-8.1.A	Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.
LA.WHST.6-8.1.B	Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.
LA.WHST.6-8.1.C	Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.
LA.WHST.6-8.2.A	Introduce a topic and organize ideas, concepts, and information using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aiding comprehension.
LA.WHST.6-8.2.D	Use precise language and domain-specific vocabulary to inform about or explain the topic.
LA.WHST.6-8.2.F	Provide a concluding statement or section that follows from and supports the information or explanation presented.
MA.5.MD	Measurement and Data
MA.5.MD.A	Convert like measurement units within a given measurement system.
MA.5.MD.B	Represent and interpret data.

MA.5.MD.B.2	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots.
LA.WHST.6-8.7	Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
LA.WHST.6-8.8	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
LA.WHST.6-8.10	Write routinely over extended time frames (time for research, reflection, metacognition/self correction, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.1	Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.2	Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.3	Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.4	Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.5	Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.10	Read and comprehend complex literary and informational texts independently and proficiently.
LA.6-8.CCSS.ELA-Literacy.CCRA.W.1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
LA.6-8.CCSS.ELA-Literacy.CCRA.W.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
LA.6-8.CCSS.ELA-Literacy.CCRA.W.6	Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
SCI.5-PS2-1	Support an argument that the gravitational force exerted by Earth on objects is directed down.
SCI.MS-ESS1-3	Analyze and interpret data to determine scale properties of objects in the solar system.
SCI.MS-ESS1-1	Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
SCI.MS-ESS1-2	Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
TECH.8.1.5.A.2	Format a document using a word processing application to enhance text and include graphics, symbols and/or pictures.
TECH.8.1.5.A.3	Use a graphic organizer to organize information about problem or issue.
TECH.8.1.5.A.4	Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.
TECH.8.1.5.A.CS2	Select and use applications effectively and productively.
TECH.8.1.5.D.4	Understand digital citizenship and demonstrate an understanding of the personal

	consequences of inappropriate use of technology and social media.
TECH.8.1.5.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.5.D.CS2	Demonstrate personal responsibility for lifelong learning
TECH.8.1.5.E.CS1	Plan strategies to guide inquiry.
TECH.8.1.5.E.CS2	Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
TECH.8.1.5.F.1	Apply digital tools to collect, organize, and analyze data that support a scientific finding.

Target 1 (Lesson 1)

Students will be able to identify what they already know about the Sun-Earth-Moon system by using spheres to represent the relative sizes of the Sun, Earth, and Moon.

- Students will be able to identify what they already know about the Sun-Earth-Moon system by using spheres to represent the relative sizes of the Sun, Earth, and Moon.

Target 2 (Lesson 4)

Students will be able to determine how much of the Moon is illuminated at various points in its orbit and model lunar phases.

- Students will be able to determine how much of the Moon is illuminated at various points in its orbit and model lunar phases.

Target 3 (Lesson 5)

Student will be able to research how space technology has influenced our lives through spinoff products that result from materials developed for manned missions to the Moon and space station.

- Student will be able to research how space technology has influenced our lives through spinoff products that result from materials developed for manned missions to the Moon and space station.

Target 4 (Lesson 6)

Students will be able to investigate how motion within the Sun-Earth-Moon system creates solar eclipses, lunar phases and lunar eclipses.

- Students will be able to investigate how motion within the Sun-Earth-Moon system creates solar eclipses, lunar phases and lunar eclipses.

Target 5 (Lesson 7)

Student will be able to analyze data on tides to determine patterns in high and low tides and the position of the Moon in the sky when these tides occur. Student will realize the position of the Sun, Earth and Moon cause tides.

- Student will be able to analyze data on tides to determine patterns in high and low tides and the position of the Moon in the sky when these tides occur. Student will realize the position of the Sun, Earth and Moon cause tides.

Target 6 (Lesson 8)

Explain the effects of distance on the amount of energy received from a light source and use these concepts to relate to the energy Earth receives from the Sun.

- Explain the effects of distance on the amount of energy received from a light source and use these concepts to relate to the energy Earth receives from the Sun.

Learning Goal 2

The student will be able to represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

- The student will be able to represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

MA.5.NBT.B	Perform operations with multi-digit whole numbers and with decimals to hundredths.
LA.RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.
LA.RST.6-8.2	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
LA.RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LA.RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

LA.RST.6-8.6	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.
MA.5.NF.B	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.
LA.RST.6-8.9	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
LA.WHST.6-8.1.B	Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.
LA.WHST.6-8.1.E	Provide a concluding statement or section that follows from and supports the argument presented.
LA.WHST.6-8.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
LA.WHST.6-8.2.A	Introduce a topic and organize ideas, concepts, and information using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aiding comprehension.
LA.WHST.6-8.2.B	Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.
LA.WHST.6-8.2.C	Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.
LA.WHST.6-8.2.D	Use precise language and domain-specific vocabulary to inform about or explain the topic.
LA.WHST.6-8.2.F	Provide a concluding statement or section that follows from and supports the information or explanation presented.
MA.5.MD	Measurement and Data
MA.5.MD.A	Convert like measurement units within a given measurement system.
MA.5.MD.A.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.
MA.5.MD.B	Represent and interpret data.
MA.5.MD.B.2	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.1	Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.2	Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.3	Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.4	Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.10	Read and comprehend complex literary and informational texts independently and proficiently.
LA.6-8.CCSS.ELA-Literacy.CCRA.W.1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
LA.6-8.CCSS.ELA-Literacy.CCRA.W.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

LA.6-8.CCSS.ELA-Literacy.CCRA.W.10	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.
SCI.5-ESS1-1	Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.
SCI.5-ESS1-2	Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.
TECH.8.1.5.A.1	Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.
TECH.8.1.5.A.2	Format a document using a word processing application to enhance text and include graphics, symbols and/or pictures.
TECH.8.1.5.A.3	Use a graphic organizer to organize information about problem or issue.
TECH.8.1.5.A.4	Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.
TECH.8.1.5.A.CS2	Select and use applications effectively and productively.
TECH.8.1.5.D.4	Understand digital citizenship and demonstrate an understanding of the personal consequences of inappropriate use of technology and social media.
TECH.8.1.5.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.5.D.CS2	Demonstrate personal responsibility for lifelong learning
TECH.8.1.5.E.1	Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
TECH.8.1.5.E.CS1	Plan strategies to guide inquiry.
TECH.8.1.5.E.CS2	Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
TECH.8.1.5.F.1	Apply digital tools to collect, organize, and analyze data that support a scientific finding.
TECH.8.1.5.F.CS3	Collect and analyze data to identify solutions and/or make informed decisions.

Target 1 (Lesson 2)

Students will be able to analyze shadow tracking data to draw conclusions about the Sun's apparent motion in the sky due to the rotation of the Earth. Students model and compare winter and summer shadows.

Learning Goal 3

Students will be able to support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.

- Students will be able to support an argument that differences in the apparent brightness of the sun

compared to other stars is due to their relative distances from Earth.

MA.5.OA.A.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
MA.5.OA.B.3	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.
LA.RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.
LA.RST.6-8.2	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
LA.RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LA.RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.
LA.RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LA.RST.6-8.9	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
LA.WHST.6-8.1.A	Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.
LA.WHST.6-8.1.B	Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.
LA.WHST.6-8.1.C	Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.
LA.WHST.6-8.1.D	Establish and maintain a formal/academic style, approach, and form.
LA.WHST.6-8.1.E	Provide a concluding statement or section that follows from and supports the argument presented.
LA.WHST.6-8.2.A	Introduce a topic and organize ideas, concepts, and information using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aiding comprehension.
LA.WHST.6-8.2.B	Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.
LA.WHST.6-8.2.C	Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.
LA.WHST.6-8.2.D	Use precise language and domain-specific vocabulary to inform about or explain the topic.
LA.WHST.6-8.2.E	Establish and maintain a formal/academic style, approach, and form.
LA.WHST.6-8.2.F	Provide a concluding statement or section that follows from and supports the information or explanation presented.
LA.WHST.6-8.4	Produce clear and coherent writing in which the development, organization, voice, and style are appropriate to task, purpose, and audience.
MA.5.MD.A.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.
MA.5.MD.B.2	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots.

LA.WHST.6-8.6	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.
LA.WHST.6-8.7	Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
LA.WHST.6-8.8	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
LA.WHST.6-8.9	Draw evidence from informational texts to support analysis, reflection, and research.
LA.WHST.6-8.10	Write routinely over extended time frames (time for research, reflection, metacognition/self correction, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
MA.5.G.A.1	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).
MA.5.G.A.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.1	Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.2	Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.3	Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.4	Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.8	Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
LA.6-8.CCSS.ELA-Literacy.CCRA.R.10	Read and comprehend complex literary and informational texts independently and proficiently.
SCI.5-ESS1-1	Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.
TECH.8.1.5.A.1	Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.
TECH.8.1.5.A.2	Format a document using a word processing application to enhance text and include graphics, symbols and/or pictures.
TECH.8.1.5.A.3	Use a graphic organizer to organize information about problem or issue.
TECH.8.1.5.A.4	Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.
TECH.8.1.5.A.CS2	Select and use applications effectively and productively.
TECH.8.1.5.D.3	Demonstrate an understanding of the need to practice cyber safety, cyber security, and cyber ethics when using technologies and social media.

TECH.8.1.5.D.4	Understand digital citizenship and demonstrate an understanding of the personal consequences of inappropriate use of technology and social media.
TECH.8.1.5.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.5.D.CS2	Demonstrate personal responsibility for lifelong learning
TECH.8.1.5.F.1	Apply digital tools to collect, organize, and analyze data that support a scientific finding.

Target 1 (Lesson 3)

Student will be able to construct a model to explain the tilt of the Earth's axis and the motion of the Earth around the Sun is the reason for the seasons on Earth.

Target 2 (Lesson 9)

Students will be able to track sunspots and analyze sunspot data to determine how changes in the Sun's energy output affect Earth and space weather.

- Students will be able to track sunspots and analyze sunspot data to determine how changes in the Sun's energy output affect Earth and space weather.

Summative Assessment

All assessments are differentiated and aligned to the science standards and curriculum. Alternate assessment may include projects or presentations, or a common paper/pencil assessment, or both. Common summative assessments, which include inquiry reflection are developed based on corresponding STC Kit and are computer based (LinkIt).

Career Ready Practices

CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of

	their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP6.1	Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.
CRP.K-12.CRP7.1	Career-ready individuals are discerning in accepting and using new information to make decisions, change practices or inform strategies. They use reliable research process to search for new information. They evaluate the validity of sources when considering the use and adoption of external information or practices in their workplace situation.
CRP.K-12.CRP8.1	Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.
CRP.K-12.CRP11.1	Career-ready individuals take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.

Formative Assessment and Performance Opportunities

- Current Events
- exit cards
- Graphic Organizers
- Group Work
- Notebook Check

- Observations
- paper and pencil tests
- Quiz
- science notebook
- simulations and class discussions
- student displays
- student experiments
- student presentations
- Student Response System
- student sheets
- Teacher Observation
- Think Pair Share
- Web Concept Map

Differentiation

- Choice Boards
- Flex Grouping
- Games & Tournaments
- Guided Reading
- Homework Options
- Independent Research
- Project-Based Learning
- Student notebook entries
- Tiered Activities

Enrichment

- Cross-curricular extension activities
- Independent Research
- Project-Based Learning
- Tiered Activities

Unit Resources

- Apollo Project Brainpop: https://www.brainpop.com/technology/transportation/apolloproject/
- Auroras What Causes Them: https://www.youtube.com/watch?v=7Mz2laHjVoQ
- Bill Nye Videos
- Black Line Masters
- calculators
- Carolina STC kits
- Chromebooks
- Digital Interactive Game
- Digital Resources
- Document Camera
- DVD's/CD's/Tapes/Video
- Eclipse Brainpop: https://www.brainpop.com/science/space/eclipse/
- Graphics/Charts
- Gravity Brainpop: https://www.brainpop.com/science/motionsforcesandtime/gravity/
- Guest Speakers
- How Sunspots Affect Climate: https://www.youtube.com/watch?v=lKkVWHl0Yt0
- Interactive White Board
- Internet
- Lab Equipment/Supplies
- Listening Centers
- Moon Brainpop: https://www.brainpop.com/science/space/moon/
- Moon Phase Rap: https://www.youtube.com/watch?v=xBc8QHSsFgE
- Mysterious Heartbeat Sunspots:
https://www.youtube.com/watch?v=mq3F13VdRrU&disable_polymer=true
- Object Wall
- Planet Compare Website: http://callumprentice.github.io/apps/planet_compare/#
- Publisher Produced Power Points
- Seasons Brainpop: https://www.brainpop.com/science/earthsystem/seasons/
- Solstice and Equinox Brainpop: https://www.brainpop.com/science/earthsystem/solsticeandequinox/
- Starry Night CD-Rom
- Student Response System
- Sun Brainpop: https://www.brainpop.com/science/space/sun/
- Supplemental Textbooks
- Teacher Laptops
- Television
- The New Space Weather Mission: https://youtu.be/HNbi3Jj3EQI
- Tides Brainpop: https://www.brainpop.com/science/earthsystem/tides/
- What Are Sunspots: https://www.youtube.com/watch?v=ZC2dfDS8g0Q
- What is an Aurora: https://www.youtube.com/watch?v=czMh3BnHFHQ
- What's Wrong with the Sun:

https://www.youtube.com/watch?v=vsULoSebWnE&disable_polymer=true

- Word Wall

Materials

- 1 12 cm globe of Earth
- 1 Black Sharpie Fine Point Marker
- 1 brad
- 1 cm marble
- 1 metric measuring tape
- 1 metric measuring tape
- 1 metric ruler, 30 cm (12 in)
- 1 Radiometer
- 1 white 3.5 cm sphere
- 1 white 7.5 cm sphere
- 150-W bulb
- 2 AA batteries
- 2 bookends
- 2 D-cell batteries
- 2 Mounted Globes on Axes
- 3 sheets of white paper taped together
- 4 large binder clips
- 5 Removable Dots
- 50 cm string
- 50-W Bulb
- 72-W Bulb
- 8 1/2 x 11 piece of cardboard
- 8 1/2 x 11 piece of cardboard
- Adhesive Putty
- Bill Nye Seasons Guided Viewing
- Black Sharpie Markers
- Chalk
- Clamp Lamp (with Reflector)
- Clamp Lamp (without reflector)
- Color Image 3.1
- Colored Pencils
- End of Unit Review
- Extension Cord
- flashlight

- foam sleeve
- Glue
- Index Card with a 1 x 1 cm notch at the top and a 1x3 hole in the center
- Inquiry 1.1 Notebook pages
- Inquiry 9.2: Tracking Sunspots
- Inquiry 9.3 Graph Paper
- Inquiry Master 4: Assessment Identifying Lunar Phases
- Inquiry Master 4.2: Moon Phase Wheel
- Inquiry Master 7.1A: Earth's Tidal Bulge
- Inquiry Master 7.1B: Tides for Virginia Beach
- Inquiry Master 8.1: Planning Sheet: Sample Experimental Design
- Inquiry Master 8.2: Graph Paper
- Inquiry Master 8.3: Scoring Rubric: Assessing Experimental Design
- Legal Paper
- Metric Measuring Tape
- Metric Ruler
- Modeling Clay
- Modeling Shadows Mat
- Newsprint
- Pair of binoculars
- Paper Plate
- Pencils/Pens
- Protractor
- Refracting telescope 50 mm
- Removable Dot
- Resealable Bag
- Rod #1
- Rod #2
- Rod #3
- Rod E
- Scissors
- Set of Eight Rods: Labeled #1-8
- Sheet of White paper 8 1/2 x 14"
- Small adjustable beam flashlight
- Starry Night Enthusiast CD-Rom
- Stopwatch
- Student Sheet 2.1
- Student Sheet 2.2
- Student Sheet 3: Review Sheet Lessons 1-3

- Student Sheet 3.3a
- Student Sheet 3.3b
- Student Sheet 4: Recording Lunar Phases Over Time
- Student Sheet 4.1: Investigating the Moon's Reflected Light
- Student Sheet 4.2: Modeling the Phases of the Moon
- Student Sheet 6.2
- Student Sheet 8: Planning Sheet
- Student Sheet 8.1: Collecting Radiant Data
- Sun Earth Moon Board
- Super jumbo plastic straw
- Toothpick
- Transparency of the Sun
- Yellow Cloth 1 meter in diameter