


4th Grade

Out of this World

Real-Estate

Eco-Energy for Schools



Unit Overview	
Unit Title	Out of this World Real-Estate
Unit Summary	<p>This unit will focus on how energy is a key component to any system, on earth or beyond. The students will learn about different forms of energy, earth's components and structure, the universe's components and structure, moon phases, patterns, multiplication, solving word problems, using place value, poems, mythology, various view points, text structure, writing using technology, writing organization, and the process of creating a new government. The student will create solar system models utilizing geometric patterns, learn about distance and measurement, write using technology, compare and contrast earth's environment to the moon's and sun's environment, determine the patterns associated with the moon phases, how government is created and ran, and will solve word problems that include place value. The STEM project for this unit will involve the setup and design of a moon colony. This unit will encourage students to think beyond the constraints of earth while implementing the design process to trouble shoot, along with the importance and sources for collecting energy.</p>
Subject Area Strands	<p>Science – Energy, Earth, & Universe Math – Operations and Algebraic Thinking, Number and Operations in Base Ten ELA – Craft and Structure – Reading Literature and Informational Text, Production and Distribution of Writing Social Studies – Creating a New Government</p>
Grade Level	4 th Grade
Appropriate Time	15 days

Lesson Foundation

	Common Core Standards	
Targeted Content Standards	Mathematics	<p>Operations and Algebraic Thinking</p> <ul style="list-style-type: none"> • Generate and analyze patterns. <p>Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.</p> <p>Number and Operations in Base Ten</p> <ul style="list-style-type: none"> • Generalize place value understanding for multi-digit whole numbers. • Use place value understanding and properties of operations to perform multi-digit arithmetic. <ol style="list-style-type: none"> 1. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. 2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons. 3. Use place value understanding to round multi-digit whole numbers to any place.
	English / Language Arts	<p><u>Reading Strands for Literature</u> Craft & Structure:</p> <p>Compare and contrast the point of view from which different stories are narrated, including the difference between first- and third-person narrations.</p> <p><u>Reading Strands for Informational Text</u></p> <p>Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.</p> <p>Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.</p> <p>Compare and contrast a firsthand and secondhand account of the same event or topic; describe the differences in focus and the information provided.</p> <p><u>Writing</u> Production and Distribution of Writing:</p> <p>Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)</p>

		<p>With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 4 on page 29.)</p> <p>With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of one page in a single sitting.</p>
	TN Standards	
	Science	<ul style="list-style-type: none"> • SPI 0407.10.1 Identify different forms of energy, such as heat, light, and chemical. • SPI 0407.10.2 Determine which surfaces reflect, refract, or absorb light. • SPI 0407.7.2 Analyze how different earth materials are utilized to solve human problems or improve the quality of life. • SPI 0407.6.1 Organize the phases of the moon in the correct sequence. • SPI 0407.6.2 Infer that the moon’s phases are caused by the revolution of the moon and earth around the sun.
	Social Studies	<p><u>Creating a New Government</u> <i>Students describe the people and events associated with the development of the Constitution.</i></p> <p>4.37 Analyze the weaknesses of the Articles of Confederation, including no power to tax, weak central government, and the impact of Shays’ Rebellion. (P)</p> <p>4.38 Explain the events that led to the creation and failure of the Lost State of Franklin. (G, P, TN)</p> <p>4.39 Identify the various leaders of the Constitutional Convention and analyze the major issues they debated, including: (C, E, H)</p> <ul style="list-style-type: none"> • distribution of power between the states and federal government • Great Compromise • Slavery and the 3/5 Compromise • George Washington and James Madison <p>4.40 Explain the ratification process and describe the conflict between Federalists and Anti-Federalists over ratification, including the need for a Bill of Rights. (H, P)</p> <p>4.41 Describe the principles embedded in the Constitution, including: (P)</p> <ul style="list-style-type: none"> • purposes of government listed in the Preamble • separation of powers • branches of government • check and balances • the amendment process • principle of judicial review • recognition of and protection of individual rights in the 1st Amendment <p>4.42 Write an opinion piece with supporting detail from primary sources that defends the ratification of the Constitution. (P)</p> <p><i>Primary Documents and Supporting Texts to Read:</i> Preamble of the Constitution; excerpts from Articles 1, 2, and 3 of the United States Constitution; 1st Amendment</p>

	Next Generation Science Standards	4-ESS1 Earth's Place in the Universe Students who demonstrate understanding can: <ul style="list-style-type: none"> 4-ESS1-1. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
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Lesson Foundation – Big Ideas & Cross-Curricular Connections

Big Ideas:

- Energy is a key component to any system, on earth or beyond.
- Differentiate between different forms of energy.
- How do the environments and atmospheres of Earth, the Moon, and the Sun compare and contrast?
- What are the components and structure of the universe?
- How can mythology be related to the components of the universe?
- What is the relationship between patterns and Moon Phases?
- How can mythology be related to the components of the universe?
- Describe the process of how a new government is created.
- How can I use technology to write a response to or a summary of various viewpoints?

Cross-Curricular Connections:

Students will learn about how human wants and needs (Social Studies) could inhibit the colonization of the moon and other currently uninhabited places in our universe (Science). Students will be constructing a model of a moon colony (Engineering), using measurement skills and mathematical calculations to determine the amount of materials required for construction (Math). Throughout the unit, students will be reading fiction and non-fiction texts (ELA) and completing journal entries.

Lesson Foundation – Essential Questions

1. How would your life change by moving from Earth to the moon?
2. What hardships would you have to overcome?
3. How would you acquire energy for your new colony?

Lesson Foundation – Student Objectives

Going Beyond	<ul style="list-style-type: none"> • I can conduct experiments on the transfer of heat energy through conduction, convection, and radiation. • I can describe the differences among conduction, convection, and radiation. • I can demonstrate difference ways that energy can be transferred from one object to another. • I can use data from an investigation to determine the method, which heat transfers energy from one object or material to another. • I can compare planets based on their known characteristics. • I can recognize that charts can be used to locate and identify star patterns.
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	<ul style="list-style-type: none"> • I can develop a chart that communicates the major characteristics of each planet. • I can use images of the night sky to identify different seasonal star patterns. • I can research a star pattern using a chart. • I can distinguish among the planets according to their known characteristics such as appearance, location, composition, and apparent motion. • I can select information from a complex data representation to draw conclusions about the planets. • I can identify methods and tools for identifying star patterns.
Mastery	<ul style="list-style-type: none"> • I can distinguish among heat, radiant, and chemical forms of energy. • I can investigate how light travels and is influenced by different types of materials and surfaces. • I can design an investigation to demonstrate how different forms of energy release heat or light. • I can identify different forms of energy, such as heat, light, and chemical. • I can determine which surfaces reflect, refract, or absorb light. • I can evaluate how some earth materials can be used to solve human problems and enhance the quality of life. • I can list factors that determine the appropriate use of an earth material. • I can use data from a variety of informational texts to analyze and evaluate man's impact on non-renewable resources. • I can analyze how different earth materials are utilized to solve human problems or improve the quality of life. • I can analyze patterns, relative movements, and relationships among the sun, moon, and earth. • I can chart the movements of the sun, moon, and earth to develop an explanation for the phases of the moon and solar and lunar eclipses. • I can sequence the major phases of the moon during a lunar cycle. • I can organize the phases of the moon in the correct sequence. • I can infer that the moon's phases are caused by the revolution of the moon and earth around the sun.
Building the Basics	<ul style="list-style-type: none"> • I can investigate phenomena that produce heat. • I can associate the sun's energy with the melting of an ice cube placed in a window. • I can use an illustration to identify various sources of heat energy. • I can distinguish between natural and man-made objects. • I can design a simple investigation to demonstrate how earth materials can be conserved or recycled. • I can use a magnifier to observe, describe, and compare materials to determine if they are natural or man-made. • I can design and evaluate a method for reusing or recycling classroom materials. • I can create a web that demonstrates the link between basic human needs and the earth's resources. • I can identify an object as natural or man-made. • I can determine how methods for conserving natural resources

	<ul style="list-style-type: none"> • I can identify and compare the major components of the solar system. • I can create a model of the solar system depicting the major components and their relative positions and sizes. • I can use a table to compare and contrast the major solar system component. • I can identify the major components of the solar system, i.e. sun, planets and moons.
Lesson Foundations – Prerequisite Content & Skills	
Content Knowledge	<ul style="list-style-type: none"> • I can define energy. • I can provide examples of energy on Earth. • I can provide examples of energy beyond Earth. • I can identify components of the universe. • I can describe the shape of the moon. • I can identify simple patterns. • I can describe the purpose of government.
Skills	<ul style="list-style-type: none"> • I can make simple patterns. • I can use technology appropriately. • I can follow directions when using technology for classroom assignments. • I can listen to a text. • I can verbally describe a text. • I can describe a text using writing.
Unit Anchor Text	
Unit Anchor Text	<ul style="list-style-type: none"> • Montgomery, Anson. <i>Moon Quest</i> (Choose Your Own Adventure, No 167). Bantam Books. 1996. ISBN: 0553566210.
Unit Companion Texts	
Informational Text(s)	<ul style="list-style-type: none"> • Cole, Michael D. <i>Moon Base: First Colony in Space</i> (Countdown to Space). Enslow Publishers, Inc. 1999. ISBN: 0766011186. • Uttley, Colin and Sara Angliss, Alex Pang. <i>Cities in the Sky: A Beginner's Guide to Living in Space</i> (Future Files). Copper Beech Books. 1998. ISBN: 0761307419.
Assessments	
Formative Assessments	<ul style="list-style-type: none"> • Unit Pre-Test • Energy Audit • Cookie Challenge • Light Energy • Unit Post-Test

Summative Assessments	<ul style="list-style-type: none"> • Solargize Project • Solar System Model • Constitution • STEM Project Presentation • Unit Test
Writing Assessments	<ul style="list-style-type: none"> • Unit Pre-Test Writing – Daily Schedule & Energy Pie Chart – What do they give their energy? • Comic Strip • Mind Map • Adjectives Galore Activity • Cookie Monster Reflection • Opinion / Viewpoint Space Travel Writing • Compare and Contrast Viewpoints Space Travel Writing • Flow Map – Space Geography • NASA Radio Conversation – Perspective Writing • Author’s Perspective Activity • Jigsaw Recording • Venn Diagram – Earth’s & Moon’s Environment • T-chart Solar Panel Pros vs. Cons • Bubble Map – Government • Constitution Creation • Unit Post-Test Writing – How do our needs and wants affect our energy needs and choices (Think, Write, Draw Activity)

Unit Vocabulary

Term	Definition
<u>ELA</u>	
Author’s purpose	An author’s purpose is the reason an author decides to write about a specific topic. Then, once a topic is selected, the author must decide whether his purpose for writing is to inform, persuade, entertain, or explain his ideas to the reader.
Compare	To examine (two or more objects, ideas, people, etc.) in order to note similarities and differences: <i>to compare two pieces of cloth; to compare the governments of two nations.</i>
Contrast	To compare in order to show unlikeness or differences; note the opposite natures, purposes, etc., of: <i>Contrast the political rights of Romans and Greeks.</i>
Metaphor	A figure of speech in <u>which</u> a term or phrase is applied to something to which it is not literally applicable in order to suggest a resemblance, as in “A mighty fortress is our God.” Compare <u>mixed metaphor</u> , <u>simile</u>
Proofread	To read (printers' proofs, copy, etc.) in order to detect and mark errors to be corrected.
Simile	A figure of speech in <u>which</u> two unlike things are explicitly compared, as in “she is like a rose.” Compare <u>metaphor</u> .
Topic sentence	A figure of speech in <u>which</u> two unlike things are explicitly compared, as in “she is like a rose.” Compare <u>metaphor</u> .

<p><u>MATH</u></p> <p>Accuracy</p> <p>Convert</p> <p>Equation</p> <p>Expression</p> <p>Pattern rules</p> <p>Relationship</p> <p>Scale of instrument/graph</p> <p><u>SCIENCE</u></p> <p>chemical energy</p> <p>climate</p> <p>solar eclipse</p> <p>lunar eclipse</p> <p>electricity</p> <p>lunar cycle</p> <p>mass</p> <p>opaque</p> <p>radiant energy</p>	<p>The condition or quality of being true, correct, or exact; freedom from <u>error</u> or defect; precision or exactness; correctness.</p> <p>To change (something) <u>into</u> a different form or properties; transmute; transform.</p> <p>The act of <u>equating</u> or making equal; equalization: <i>the symbolic equation of darkness with death.</i></p> <p>The act of expressing or setting forth in words: <i>the free expression of political opinions.</i></p> <p>An explicit pattern rule is a pattern rule that tells you how to get any term in the pattern without listing all the terms before it. For example, an explicit pattern rule for 5, 8, 11, 14, uses the first term (5) and the common difference (3).</p> <p>A connection, association, or involvement.</p> <p>A system of ordered marks at fixed intervals used as a reference standard in measurement. Example: a ruler with 1/4, 1/2 and inch marks....</p> <p><u>Energy</u> liberated by a <u>chemical reaction</u> or absorbed in the formation of a chemical compound.</p> <p>The composite or generally prevailing weather conditions of a region, as temperature, air pressure, humidity, precipitation, sunshine, cloudiness, and winds, throughout the year, averaged over a series of years.</p> <p>The obscuration of the light of the moon by the intervention of the earth between it and the sun (lunar eclipse) or the obscuration of the light of the sun by the intervention of the moon between it and a point on the earth (solar eclipse)</p> <p>The obscuration of the light of the moon by the intervention of the earth between it and the sun (lunar eclipse) or the obscuration of the light of the sun by the intervention of the moon between it and a point on the earth (solar eclipse)</p> <p>The science dealing with <u>electric charges</u> and currents.</p> <p>Another word for metonic cycle - A cycle of 235 synodic months, very nearly equal to 19 years, after <u>which</u> the new moon occurs on the same day of the year as at the beginning of the cycle with perhaps a shift of one day, depending on the number of leap years in the cycle.</p> <p>A body of coherent matter, usually of indefinite shape and often of considerable size: <i>a mass of dough.</i></p> <p>Not transparent or translucent; impenetrable to light; not allowing light to pass through.</p> <p>Energy transmitted in wave motion, especially electromagnetic wave motion.</p>
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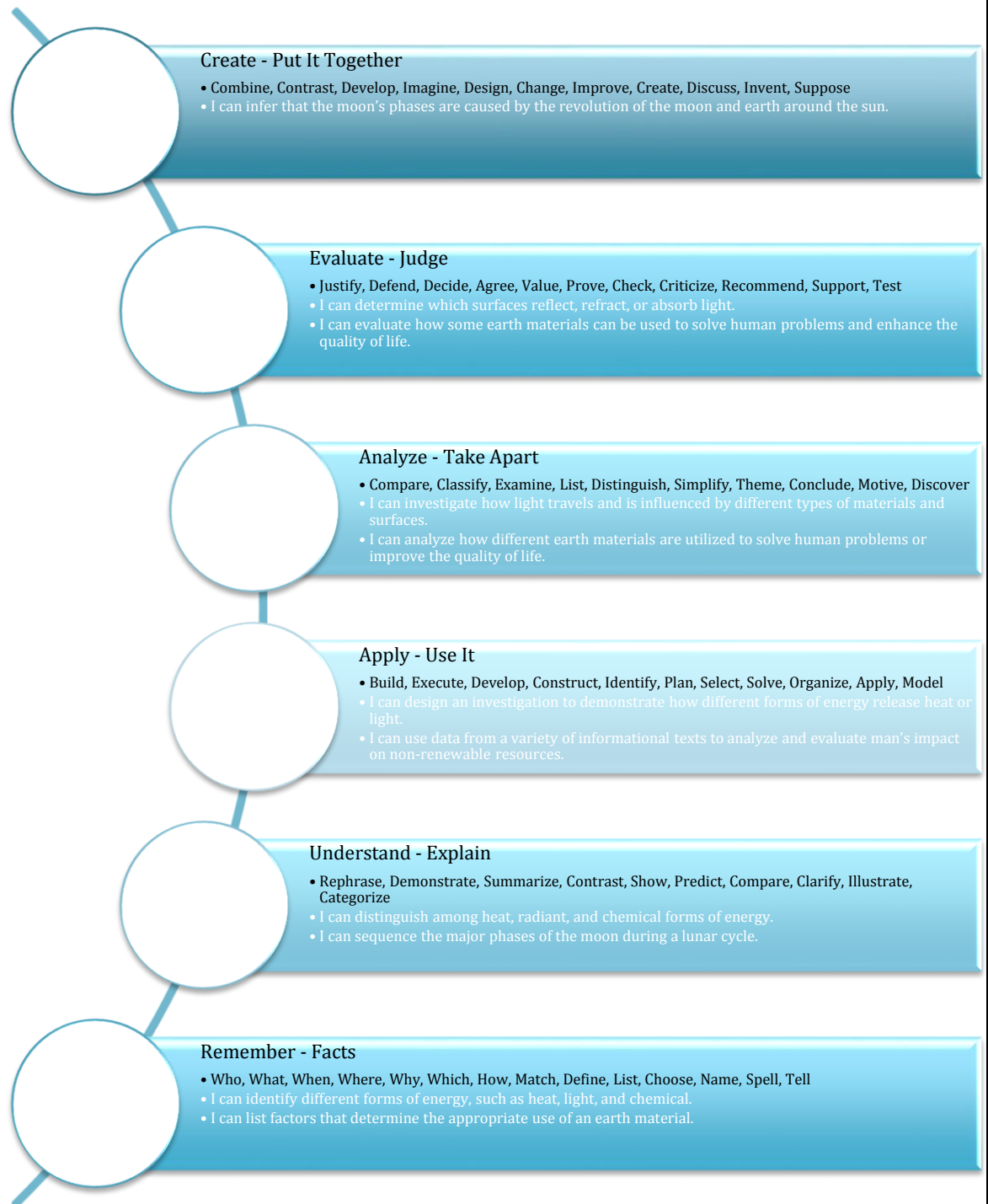
reflection	The act of reflecting or the state of being reflected.
refraction	The change of direction of a ray of light, <u>sound</u> , heat, or the like, in passing obliquely from one medium into another in <u>which</u> its wave velocity is different.
translucent	Permitting light to pass through but diffusing it so that persons, objects, etc., on the opposite side are not clearly visible: <i>Frosted window glass is translucent but not transparent.</i>
<u>SOCIAL STUDIES</u> Amendment	
Bill of Rights	The act of <u>amending</u> or the state of being <u>amended</u> ; an alteration of or addition to a motion, bill, <u>constitution</u> , etc.
Document	A formal statement of the fundamental rights of the people of the United States, incorporated in the <u>constitution</u> as Amendments 1–10, and in all state constitutions.
Constitution	A written or printed paper furnishing information or evidence, as a passport, deed, bill of sale, or bill of lading; a legal or official paper.
Executive branch	The way in <u>which</u> a thing is composed or made up; makeup; composition: <i>the chemical constitution of the cleanser.</i>
Judicial branch	<u>The</u> branch of government charged with the execution and enforcement of laws and policies and the administration of public affairs; the <u>executive</u> .
Legislative branch	<u>The</u> branch of government charged with the interpretation of laws and the administration of justice; the <u>judiciary</u> .
Preamble	<u>The</u> branch of government having the power to make laws; the <u>legislature</u> .
	The introductory statement of the U.S. <u>constitution</u> , setting forth the general principles of American government and beginning with the words, “We the people of the United States, in order to form a more perfect union. ...”

Teaching the Unit

Initial Strategies	<p>Who do you think you are, the Energizer Bunny?</p> <ul style="list-style-type: none"> • The teacher will begin by stating: Some days we may feel so busy completing our schedules and routines that we are like then energizer bunny • Students begin the unit by discussing and writing about a typical day in their lives, including home activities, school activities, providing for basic human needs, and extracurricular activities. • Students are instructed to make a written schedule for their typical day, including time, activity, and location. • The teacher will instruct students to share their written schedules with a partner in a Think-Pair-Share activity. • The teacher will play a montage of energizer bunny commercial for the class. Students may watch in pairs if your classroom has the necessary technology. • The teacher will then ask student the following:
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	<p>How does the energizer bunny symbolize the patterns of society and our daily activities?</p> <p>Students will discuss this question with their table groups and then the class will discuss as a whole.</p> <ul style="list-style-type: none"> • The students will create a comic strip that is modeled after the energizer bunny. The comic strip will illustrate their daily or weekly routine and schedule. • The teacher will provide the newspaper “funny papers” and the rubric for students to reference how to write a comic strip and what must be included (color, wording, etc.). • The students will present and share their comic strip stories with the class. • The students will return to their table groups. • The teacher will ask the students to discuss, within their small group (3 to 4 students) how (or if) they could perform all these same activities on the moon. • Students will create a mind map to illustrate their table discussion. • The mind maps will be posted at the front of the class and the teacher will have a whole group discussion about the earth’s environment compared to the moon’s environment.
<p>Direct Instruction</p>	<p>The teacher will direct close reads during literacy circles.</p> <p>The teacher will facilitate group discussions.</p> <p>The teacher will present information on the following items in the form of a PowerPoint, Prezi, keynote, oral discussion, video, demonstration, etc.:</p> <p>ELA</p> <ul style="list-style-type: none"> • Writing using technology • Comparing and contrasting various view points • Literature Circles • Mythological Literature • Poems and Literary Structure • Group Discussions <p>Math</p> <ul style="list-style-type: none"> • Patterns • Multiplication • Place Value • Distance & Measurement • Data Collection, Organization, and Analysis <p>Science</p> <ul style="list-style-type: none"> • Components of the Solar System • Environment and Atmosphere of the earth, moon, and sun • Differentiate between forms of energy • Characteristics of light energy <p>Social Studies</p> <ul style="list-style-type: none"> • Hierarchy of government • Creation and components of government

Higher-Level Cognitive Function Strategies



Guided Practice & Activities

Lesson 1

- **ELA**
 - **Point of View Activity**
 - The teacher will take students outside to three locations (location A, B, and C)
 - The teacher will need to select a common focal point that can be seen (from a student's height) from each of the locations. There will be one focal point that the students will view from each location (1 focal point & 3 different locations = 3 different viewpoints).
 - Students will travel to each location and record their view of the focal point. They may take a picture if your class has tablets or they may draw and illustrate their view in their science journal or notebook.
 - Students will also include a list of adjectives (words or phrases, a minimum of 5 for each location) that describe their view of the focal point from each location. This should be recorded at the same time as the students either take a picture or draw their illustration.
 - After each location has been viewed the class will compare and contrast their viewpoints and the corresponding images and adjectives.
 - The teacher will instruct the class to think about why they saw different things from each location. The students will then Think-Pair-Share. The teacher will then guide students to discuss points of view and perspective.
 - The students will then discuss how viewpoint and perception can influence other situations.
 - **Direct Instruction**
 - Point of View PPT
 - **Independent Practice**
 - Point of View and Perspective Activity
 - **Energizer Bunny Activity Extension**
 - Students will be assigned the following assignment to be completed outside of class.
 - Work with your siblings or parents to create a second comic strip that represents your (the student's) daily or weekly routine.
 - The students will only be the recorder and explain the process of completing this assignment (referencing their work completed during the introduction of this unit).
 - The student will gather the information, but will not give their input. The purpose of this assignment is to gather the information from another person's viewpoint.
 - The students will begin this assignment by recording a list of activities that their sibling or parent recalls about the student's daily or weekly schedule.
 - The student will then work with their sibling or parent to illustrate this list in a comic strip. At this point the student and the sibling or parent may utilize the rubric for creating a comic strip story to ensure that the comic strip has all of the

necessary components.

- Science
 - The teacher will pose the following question:
What do we need to live?
 - Students will verbally respond to the questions as a whole group. The teacher will record a list on the board.
 - The teacher will then ask students to think back the Energizer Bunny activity. The teacher will ask the class - What keeps the energizer bunny going?
 - Students will verbally respond to the questions as a whole group. The teacher will record a list on the board.
 - The teacher will circle energy from the listed words on the board. If energy is not on the list created from student answers the teacher will guide the students to form the response – energy.
 - Direct Instruction
 - Energy and Forms of Energy
 - Guest Speaker
 - The teacher will invite a guest speaker who can speak about energy use and effect of the use of different energy sources on the environment.
 - Students will record notes from the guest speaker's presentation.
 - Students will create a graphic organizer on energy, forms of energy, energy use, and the effects of energy use on the environment. The graphic organizer must also utilize information from the guest speaker's presentation.
 - Energy Audit Activity
 - Students will complete a brief energy audit of our school.
 - Students will also complete a brief energy audit of their home for homework.
- Math
 - Energy Audit Analysis
 - Students will review data collected during the school energy audit.
 - The teacher will ask students the following questions:
 - Does any of the numerical data have decimals?
 - What does a decimal signify?
 - What does this mean?
 - The teacher will lead students in a discussion about parts of a whole and fractions.
 - Cookie Monster Challenge
 - The teacher will give each student a cookie (ex. a regular size chips ahoy chocolate chip cookie).
 - The students will record data for the cookie using scientific measurement tools. The students will record the cookie's mass, length, width, and volume. The students will record the data in a provided chart. The teacher will review place value and how to use decimals with the class before they collect any data. The teacher will also demonstrate how to collect each measurement using the proper tools. The tools will be setup in stations so that students can rotate at their own pace. The students must collect the numerical data using a decimal to the nearest hundredths place.
 - The teacher will instruct students to take one bite of the cookie.

- The teacher will then ask – Do you still have a whole cookie?
- The teacher will then explain that we could represent this change with a fraction or place value.
- The students will then visit the stations to record the cookie's measurement data (mass, volume, length, and width) after one bit has been taken. The students will record their data in the provided chart. The teacher will assist students as they rotate through the stations and guide any students who need extra help or assistance using the scientific tools.
- The students will then take another bite, measure, and record. This will continue until the cookie is gone.
- The students will then complete a reflection writing activity for this activity. The students will write and reflect on how using decimals increased the accuracy of their measurements.
- Direct Instruction
 - Fractions and Place Value PPT
- Guided Practice
 - Decimal and Place Value Practice
 - The teacher will guide students through the process of converting their decimal data from the Cookie Monster Activity to fractions.
 - The teacher will provide students with a second chart that students will complete by converting their decimal data into fractions.
- Independent Practice
 - Fraction Conversions Practice

Lesson 2

- What is perspective?
 - The teacher will instruct students to write your opinion about space travel from the following perspectives:
 - Student
 - Astronaut
 - Business Person
 - President or Lawmaker
 - The teacher will play video clips of each perspective (student, astronaut, business person, and president) from the past news and media. The video clips will include, but are not limited to, the following people – John Glenn, Neil Armstrong, Richard Branson, Christa McAuliffe, and President John Kennedy.
 - The students will complete a written reflection that compares and contrasts the presented perspectives.
- Science
 - Direct Instruction
 - Space Components PPT
 - Solar System Model
 - Students will work in teams of three to create three dimensional solar system models. The teacher will allow student groups to determine the size and style of their group model. The teacher will assist student groups who struggle to develop how they will design and construct their model. The students will use the following materials to create their model: construction paper, fuzzy sticks, coat hangers, paint, marker, shoe boxes, tape, glue, play-doh, fuzzy

balls, glitter paint, Styrofoam shapes, yarn, and fishing string.

- Independent Informational Text Reading
- Space Geography Flow Map
 - Student will create a flow map that illustrates the order of the planets in reference to the sun – closest to farthest away.
- Math
 - Direct Instruction
 - Measurement and Distance PPT
 - Space and Distance – Measurement Activity
 - The students will measure our space (our classroom or the teacher can select smaller or larger portions of space). Students will measure the length, width, and height of the classroom space using the metric system.
 - The teacher will provide each student a map of the classroom (or location if the teacher selects) with the desks, teacher's desk, chairs, and other furniture drawn and labeled in the map.
 - Students will record their length, width, and height measurements on the provided map.
 - The teacher will then pair the students up and the student groups will measure the distance from one their group member's own, assigned desk to the other drawn and labeled objects on the map using the metric system. The measurements will radiate from their desk to the other objects in the room.
 - The student pairs will then research the solar system. They will use technology or the library to determine the distance between the sun and each planet. The teacher will take students outside to create a scaled interactive model the solar system. The students will model the components of the solar system and the distance between each planet and the sun. The teacher will assign a student to represent each planet and one student to represent the sun. The remaining students will then take toilet paper rolls to create an interactive solar system model illustrating distance by scaling the distance to squares of toilet paper. Each square of toilet paper will represent a specific distance so that the overall model will be a scaled representation. After the distance from the sun to each planet is represented the teacher will tack down the length and place a tag representing the name of the planet. The students will then be able to explore and view the scaled interactive solar system model. Students will measure each distance and record the data in a provided chart. The students will then use this data to reflect on the use of place value and fractions when measuring distance. Students will use this data to return to the classroom and create a map.
 - Students will create a map that includes the sun and the planets, along with the distance data that they have collected. The students will draw lines with the data that radiate from the sun to each planet to illustrate how the sun is the center of our solar system.
 - The teacher will review the information gathered through research to check accuracy and address any misconceptions.
 - Students will continue to work in pairs. The students will complete a compare and contrast writing activity that describes how their classroom space map is similar and different from the solar system map.

- Visualizing Space with Perspective Activity
 - Students will learn continue to study perspective. This activity will focus on comparing and contrasting the moon, the sun, and the earth.
 - Students will return to the outdoor scaled, interactive solar system model (created with measurement and toilet paper). Students will locate the earth, moon, and sun in the solar system model.
 - The students will stand at each of the three locations and imagine what they would see from each location. The students will illustrate what they imagine in their science journal or notebook. Students will sketch what they would see from each viewpoint. The teacher will provide students with a three column graphic organizer to record their sketches. Each column will be labeled according to the location – earth, moon, and sun.
 - The students will share their illustrations of the various viewpoints with their table groups.
 - The teacher will then review point of view and perspective with students. The teacher will also review the contents of the solar system while students share their sketches.
- ELA
 - The class will continue their review of point of view and perspective.
 - The students will write a transcript from a NASA radio conversation from the astronaut to mission control. The students will create a minimum of five lines from each participant. The content for the radio conversation must clearly illustrate the astronaut's perspective and the mission controller's perspective. The content regarding the solar system components and distance must also be accurate.
 - The teacher will provide example transcripts from radio shows or radio conversations.
 - The teacher can also review the perspectives represented in the comic strip story at the beginning of the unit.
 - Students will volunteer to present their NASA radio conversation with a partner in front of the class.
- ELA
 - The teacher will introduce the literary text for this unit.
 - *Moon Quest* (Choose Your Own Adventure, No 167)
 - The teacher will setup literary circles and roles.
 - The teacher will read the first section of the book to the class as a whole. The students will record key words, concepts, and sketch important components while the teacher is reading the text. At the end of the reading students will share their key worlds, concepts, and sketches with their table groups, and the class will discuss the text.
 - Students will begin independent reading, approximately 20 minutes.
 - Student groups will discuss text in their literature circles.
 - The teacher will assign independent reading to prepare for next literature circle activity.
- Science
 - Informational Text – Moon Phases
 - Students will independently read an informational text about the phases of the moon.
 - Direct Instruction
 - Phases of the Moon PPT
 - Hands-on Activity

- Students will model the phases of the moon using Oreos. Students will create a representation of each moon phases.
- The students will also create a Moon Phase Foldable to coincide with the Oreo Moon Phases Model.

- Math

- The teacher will review place value and fractions. The class will discuss how fractions and place value can be used to describe the phases of the moon.
- Independent Practice
 - Students will complete an independent practice activity reviewing place value, fractions, and the relationship between place value and fractions.

Lesson Three

- ELA

- Literature Circles
 - Students will continue with their assigned roles.
 - Students will discuss their reading.
- Close Reads
 - The teacher will direct close reads during literacy circles.
- Group Discussions
 - The class will discuss the assigned reading.

Lesson Four

- Moon Colony Project - Research

- What do we need to live on the moon?
 - The teacher will pose this question to the class. The teacher will instruct students to make a quick list of items that are needed to live on the moon.
 - Students will then create a Venn diagram that compares and contrasts the moon's environment and the earth's environment along with human needs for life on earth and human needs for life on the moon.
 - The students will then discuss their Venn diagrams as a whole class.
 - The teacher will then show the students a video clip regarding moon exploration and landing on the moon.
- Class discussion of human needs vs. human wants.
 - Have students come up with 5 or 6 systems that would be necessary for survival in another world (eg. Oxygen/breathable air production and transport system, electricity/energy production/storage system, food production system, water production/transport system, transportation system, etc.).
 - Assign each small group of 4 or 5 students one of these systems to be responsible for throughout the rest of the unit.
 - The teacher will provide informational texts on the 5 or 6 systems. The students groups will participate in a jigsaw activity to read informational text and share with their group. Each student must create a written outline of their reading along with a graphic organizer from their expert group to share with their home or base group. The home or base groups will then begin discussing their plans for the lunar colony.

○ Science

- Direct Instruction

Where will we get our energy? – Light Energy PPT

- Foldable

Students will create a foldable on light energy and how surfaces affect light energy. The students will also include a section on how to harness and use light energy to meet human needs.

- Light Energy Challenge - Mini Lab Activity

Students will complete the lab entitled: “Light: A Rainbow of Explorations”. The students will learn about the following terms related to light energy: reflection, refraction, opaque, and translucent.

- The teacher will lead the class in a discussion about how light can be used to meet human needs. The teacher will ask the class the following questions: how do we use light energy on earth? How are heat lamps used? How are solar panels used?

- Direct Instruction

- How does a Solar Panel Work? PPT and Video Clip

- Students will create a T-chart that compares the “Pros” and “Cons” of using Solar Panels for your main energy source and supply.

- Guest Speaker

The teacher will invite a guest speaker that installs or builds solar panels to discuss this topic with the class at greater length. The students will review their Energy Audits from the school and their home with the guest speaker.

- The teacher will then lead the students in a discussion about energy for their moon colony. The teacher will ask students – Where will our energy on the moon come from? The students will discuss with their table groups and brainstorm to create a list of at least three possible sources for a moon colony. The list must include at least two options that do not focus on using the sun’s energy.

○ Math – Solargizing Activity

- Students will then access the Eco Energy for Schools website to learn about how the school is using solar energy through the Solar Pavilion.

- The students will learn about the energy output of the Holston View Solar Pavilion and how the energy is used in the community.

- The teacher may setup a skype interview with Mr. Poteat the principal of Holston View to discuss how the Solar Pavilion gather’s energy and how it is used.

- The teacher will ask students to determine how this amount of energy output compares to other sources of energy. The teacher can refer to the Energy Audit project to complete this task and further the discussion.

- Students will research how much energy is produced by various energy sources – solar, wind, hydro, coal, natural gas, geothermal, etc. Students will record their research in the provided graph. The students’ research must include numerical data that utilizes place value and decimals.

- After the charts are completed the teacher will then ask student how many solar panels would your house need to produce the amount of energy used according to the completed Energy Audit. The

students will also calculate the number of solar panels needed for their school.

- The students will then calculate the cost of the needed solar panels and where they should be located. The teacher will discuss how place value and decimals are necessary for currency and money use.
- The students will then work in teams to solve a provided word problem on energy use and meeting human needs. The word problem will require students to multiply using place value.
- Students will use iPads/computers to research lunar and space colonization.
 - NASA has several links to lunar colonization sites.
 - Each group will focus on learning ways to create/build a system to provide their assigned need to the colony.
 - Students should record their findings in journals along with sketches of their system structures.
- ELA
 - Literature Circles
 - Students will continue with their assigned roles.
 - Students will discuss their reading.
 - Close Reads
 - The teacher will direct close reads during literacy circles.
 - Group Discussions
 - The class will discuss the assigned reading.

Lesson Five

- Moon Colony Project - Construction
 - Today students should begin construction of their system models.
 - Using strips of cardstock, students create the framework for their structures.
 - They can use colored tissue or plastic wrap to create walls. In order to practice measurement standards, students should measure the dimensions of their structures and label their sketches with measurements.
 - (Enrichment: scale drawings).
- ELA
 - Literature Circles
 - Students will continue with their assigned roles.
 - Students will discuss their reading.
 - Close Reads
 - The teacher will direct close reads during literacy circles.
 - Group Discussions
 - The class will discuss the assigned reading.

Lesson Six

- Moon Colony Project – Construction
 - Students should concentrate on setting up the colony – connecting the system components using straws (pipelines) to connect the structures within each system, and also to connect the systems together.
 - Using their iPads, students should videotape an explanation and description of each structure in their system including the structures function and how it fits into the system operation.

- ELA
 - Literature Circles
 - Students will continue with their assigned roles.
 - Students will discuss their reading.
 - Close Reads
 - The teacher will direct close reads during literacy circles.
 - Group Discussions
 - The class will discuss the assigned reading.

Lesson Seven

- Social Studies
 - The teacher will begin the lesson by stating – Now that we have people on the moon and our colonies are inhabited. How will the colony be governed? What will be the rules and expectations for lunar society?
 - The class will begin by looking at the class rules. The teacher will guide students to discuss the purpose of the rules, why our classroom needs rules, and what happens without rules?
 - Students will discuss the presented questions with their table groups and the teacher will then guide the class discussion.
 - The teacher will instruct students to research the following terms using their tablet, laptop, or provided informational texts: anarchy, monarchy, democracy, republic, and dictatorship. The teacher will review how to use and create bubble maps. The teacher will draw a template for the bubble map on the board. The students will create bubble map that describes the meaning of each term, along with an example of each term from history.
 - After creating the bubble the teacher will ask students – Which of the terms best describe as the government and society of America? The students will provide an answer and a rationale. The students will then be instructed to research and find a country that uses the other three systems of government that they have defined in their bubble map. The students will provide a picture and a rationale for each example.
 - The student will work with their Moon Colony Project groups to determine how their moon colony will be governed. The groups will note their choice and provide a paragraph that explains why the team selected this form of government.
 - Direct Instruction
 - Types of Government PPT
 - How the United States Government was formed PPT

The teacher will review the various leaders of the Constitutional Convention.
 - Guided Review and Practice
 - Students will work in pairs to analyze the weaknesses of the Articles of Confederation, including no power to tax, weak central government, and the impact of Shays' Rebellion. Identify the various leaders of the Constitutional Convention and analyze the major issues they debated – distribution of power between the states and federal government, Great Compromise, Slavery and the 3/5 Compromise, George Washington and James Madison.
- ELA
 - Literature Circles

- Students will complete their lit circle activities. The students will discuss the book and create a book review. The teacher will provide students with instruction on book reviews and their purpose, examples of book reviews, and a template for their book review.
- Written Reflection
 - Students will write a reflection on how the historical events studies will impact the way that their group will form their lunar government.

Lesson 8

- Social Studies
 - The teacher will read the Preamble to the Constitution to the class.
 - The students will discuss the meaning and the important of the Preamble with their table groups.
 - The teacher will then review the Constitution with the whole class.
 - The teacher will guide students in describing the principles embedded in the Constitution – purposes of government listed in the Preamble, separation of powers, branches of government, checks and balances, the amendment process, principle of judicial review, recognition of and protection of individual rights in the 1st Amendment.
 - Jigsaw Activity
 - Students will work in small groups of four to read and learn about the Constitution.
 - The expert groups will include – excerpts from Article 1, 2, and 3 from the United States Constitution and the 1st Amendment.
 - The home group will then construct a graphic organizer that describe the importance of Articles 1, 2, and 3 from the United States Constitution and the 1st Amendment. The graphic organizer will also include information on the effect of these and the interdependence of Articles 1, 2, and 3 from the United States Constitution and the 1st Amendment
 - Independent Practice
 - The students will write an opinion piece with supporting details from primary sources that defends the ratification of the Constitution.
 - Team Project
 - The Moon Colony Project teams will write a Constitution for their Moon Colony.
 - The teacher will instruct teams to develop a rough draft version and then the teacher will provide students will paper that resembles an aged document.
 - When student groups complete their final draft writing on the provided paper the teacher will burn the edges of the paper to give the paper an authentic look and feel for the group's presentation.
 - Students will prepare and practice for the unit presentation. The teacher will provide students with a presentation rubric and expectations. The teacher will discuss appropriate dress and demonstrate the expected presentation skills. Students will work in pairs to practice presentation skills and discuss appropriate dress.

	<p>Lesson 9</p> <ul style="list-style-type: none"> • Unit Presentations <ul style="list-style-type: none"> ○ The teacher will invite parents and administration to the student presentations. ○ The Moon Colony Project student groups will present their moon colony and Constitution. Students will describe what they have learned throughout the unit, they will describe their design process and rationale for their design choices, they will explain the creation of their Constitution and they will read their Constitution. Student groups will also answer any questions from the audience.
STEM Projects	<ul style="list-style-type: none"> • Energy Audit • Cookie Monster Challenge • Space Model • Space and Distance Activity • Visualizing Space with Perspective • Oreo Moon Phases • Light Energy Challenge • Solargizing
STEM Culminating Event	<ul style="list-style-type: none"> • Students will create a model of their lunar colony. • They can use cardstock cut into thin (1/2 inch) strips to build the framework for their structures, and colored tissue paper, or thin plastic wrap, to close in the walls. Plastic straws can be used as “pipelines” to carry breathable air, water, etc. from structure to structure within the colony.
Differentiated Instruction	<ul style="list-style-type: none"> • Provide support and prompting • Small group teacher led instruction and remediation • Provide leveled books and articles • Alter writing assignments to accommodate different learners • Small group activities allow for peer collaboration and tutoring • Allow calculators
Re-teaching Strategies	<ul style="list-style-type: none"> • The teacher can re-teach and provide guided notes for each of the direct instruction portions of the unit. • The teacher will provide small group teacher led instruction and remediation utilizing models and manipulatives. • Students will be allowed to use calculators. • To aid in comprehension of texts, students reread parts of text with peers and teacher. • Students keep a literacy journal on each text with notes on themes, supporting details, and draw pictures of events in sequence. • Students will create thinking maps and flashcards on points such as plot, set, characters, and vocabulary. • Students will create mnemonic device to remember skills, formulas, and key facts. • Students will be given visual support in understanding key concepts.
Enrichment Strategies	<ul style="list-style-type: none"> • The teacher will setup Enrichment Centers for each lesson. The Enrichment Center will be based on the interdisciplinary content being covered in that lesson. The Enrichment Centers will include the following:

	<ul style="list-style-type: none"> - Viewing Center – Videos with Content Review and Reflection - Reading Center – Fiction with Prediction - Reading Center – Informational Text with Pre-Reading Vocabulary - Reading Center – Informational Text with Reading Response Activity - Listening Center – Audio Content with Content Review and Reflection - Speaking and Presentation Center – Reader’s Theater - Communication Center – Emails and Letters - Math and Science Center – Exploring Concepts through manipulatives and models - Assessment and Review Center – Creating Questions and Game Reviews - Art Center – Illustrating Content accurately with labels and numerical detail <ul style="list-style-type: none"> • Peer Tutoring • The teacher will also guide students to enrichment activities available on the following website: http://bach.a2schools.org/bach.home/bach.sit/fourth_grade_enrichment
Independent Practice Activities	<ul style="list-style-type: none"> • Point of View and Perspective Activity • Energizer Bunny Activity Extension • Energy Audit – Student Home • Fraction Conversion Practice • Independent Informational Text Reading • Place Value, Fractions, and the Relationship between Place Value and Fractions • Defining the ratification of the Constitution - Opinion Piece
Materials & Resources	<p>Technology Hardware:</p> <ul style="list-style-type: none"> • iPads • AppleTV <p>Technology Software:</p> <ul style="list-style-type: none"> • NASA App (Free) • Moon Map App (\$0.99) • Space Truck Delivery Mission – The Moon’s First Colony (Free) <p>iPads – for research and videotaping AppleTV (optional) – for viewing student videos</p> <p>Initial Strategy:</p> <ul style="list-style-type: none"> • Energizer Bunny commercials montage • Comic Strip template (2) • Comic Strip rubric (2) • Newspaper “Funny” Papers • Crayons & Colored Pencils <p>Lesson 1:</p> <ul style="list-style-type: none"> • Location Makers (A, B, & C) • Marker for the selected Focal Point • Science journal or notebook • iPad or tablet • Cameras

- Point of View PPT
- Point of View and Perspective Activity
- Board and Expo Markers or Projector with Computer Technology
- Energy and Forms of Energy PPT
- Guest Speaker – Energy and Energy Use
- Energy Audit Activity for School
- Energy Audit Activity for Homes
- Chips Ahoy Chocolate Chip cookies – regular size, one for each student
- Wax Paper
- Napkins
- Coffee Filters
- Meter sticks and rulers
- Triple Beam Balances or Electronic Balance
- Volume measurement device
- Lab Goggles
- Chart
- Fractions and Place Value PPT
- Guided Practice – Decimal and Place value Practice
- Fraction Conversions Practice

Lesson 2

- Video Clips
- Space Components PPT
- Construction Paper
- Fuzzy Sticks (Pipe Cleaners)
- Coat Hangers (metal)
- Paint
- Marker
- Shoe Boxes
- Tape
- Glue
- Play-doh
- Fuzzy balls
- Glitter paint
- Styrofoam shapes
- Yarn
- Fishing String
- Informational Text on Space
- Space Geography Flow Map
- Measurement and Distance PPT
- Meter Sticks
- Classroom Map
- Toilet Paper
- Index Cards for labeling
- Paper
- Compasses
- Science journal or notebook
- Crayons
- Radio Transcript example

- Radio Transcript podcast
- Transcript template
- Literature Text
- Lit Circle Roles and Descriptions
- Name Tags for Lit Circle Roles
- Informational Text – Lunar Phases
- Phases of the Moon PPT
- Oreos (5 per student – regular size)
- Black construction paper
- White chalk or crayons
- Moon Phases Foldable
- Glue
- Hot Glue Gun and Glue
- Place Value and Fractions Review
- Independent Practice

Lesson 4

- Literature Text
- Lit Circle Roles and Descriptions
- Name Tags for Lit Circle Roles

Lesson 5

- Venn diagram
- Informational texts
- Home Group Directions
- Expert Group directions
- Outline Template
- Construction Paper
- Markers
- Scissors
- Glue
- Where will we get our energy? - Light Energy PPT
- Colored Paper
- Window with direct sunlight exposure or table lamp
- Trays (2 per student or student group)
- Water (enough to fill each tray 2/3 full)
- Sand (enough to fill each tray 2/3 full)
- Thermometers (2 per student or student group)
- Black and white construction paper (1 piece for teacher demonstration #1)
- Table lamp if no window/sun is available in the classroom (teacher demonstration #1)
- Hand lens (teacher demonstration #2)
- Container with water (e.g., squirt bottle) for teacher demonstration #2
- Pictures or real devices that harness sunlight to assist humankind (e.g., solar panels, photoelectric cells and telescopes).
- How does a Solar Panel Work? PPT
- T-chart
- Guest Speaker
- Energy Audits

- Computer and Internet Access
- Skype Conversation with Mr. Poteat
- Research through internet, library, or provided informational texts
- Solargizing Math Activity Documents
- NASA links
- Literature Text
- Lit Circle Roles and Descriptions
- Name Tags for Lit Circle Roles

Lessons 5 & 6

- Moon Colony Project:
- Poster board – 1 for each group (to set up colony on)
- Cardstock, or file folders, cut into thin strips (1/2 inch)
- Tape
- Colored Tissue paper
- Thin plastic or trash bags
- Straws
- Literature Text
- Lit Circle Roles and Descriptions
- Name Tags for Lit Circle Roles

Lesson 7

- Class Rules
- Tablet, Laptop, or Provided information test
- Bubble Map template
- Colored Paper
- Rationale Template
- Types of government PPT
- How the United States Government was formed PPT
- Guided Review and Practice
- Literature Text
- Lit Circle Roles and Descriptions
- Name Tags for Lit Circle Roles
- Book Review Instructions
- Book Review Template
- Book Review Examples
- Writing Reflection

Lesson 8

- Preamble to the Constitution
- Jigsaw Activity Informational Texts
- Independent Practice
- Aged Style Paper
- Lighter
- Black Fine Tipped Marker (Sharpies)

Lesson 9

- Classroom Décor for Presentations and Guests

Comments	If you have an questions you may contact: Leigh Ann Zollo at leigh.zollo@sullivank12.net Jessica Carr at jessicawcarr@hotmail.com