6th Grade
Solar Centered Universe
Eco-Energy for Schools

Unit Overview	
Unit Title	Solar Centered Universe
Unit Summary	This unit's focus is space and its components. The students will learn how to identify and describe the contents of space, the relationship between measurement, distance, and the universe, as well as the geography of space. The unit will connect the concepts of experimentation and variables, measurement, reading literature for key ideas, determining the details presented in both literature text and informational texts, collaborating in various size groups, completing assigned roles and tasks, communicating scientific findings and evidence, presenting student work, presenting using multimedia tools, the universe's contents, the effect of space on the earth, map skills, and climate. The culminating event for this unit will be called "Meeting the Energy Needs of Our Space". The students will work in groups to comparing and contrasting alternate energy sources and their output of usable energy, create data charts and graphs describing the average energy output of solar energy technology, wind energy technology, and hydroelectric technology, study and visit Holston View's Solar Pavilion. The overall goal of this unit is to engage students though hands-on investigations in an in-depth study of the components of the universe, explore measurement and distance through the content of space, and complete the process of comparing the space themed literature to the real universe.
Subject Area Strands	Science – The Universe Math – Expressions and Equations and Geometry ELA – Reading Literature: Key Idea and Detail & Craft and Structure Reading Informational Text: Key Idea and Detail Speaking and Listening: Comprehension and Collaboration & Presentation of Knowledge and Ideas Social Studies – Human Origins in Africa through the Neolithic Age
Grade Level	6h Grade
Appropriate Time	24 days

Lesson Foundation			
Targeted Content Standards	**Common Core Standards**		

		Mathematics	• Expressions and Equations 6.EE
			Represent and analyze quantitative relationships between dependent and independent variables.
			  ○ 9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.
			
			• Geometry 6.G
			Solve real-world and mathematical problems involving area, surface area, and volume.
			  ○ 1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
			  ○ 2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = l w h and V = b h to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
			  ○ 3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
			  ○ 4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

		English / Language Arts	Reading Strands for Literature 1. Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. 2. Determine a theme or central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments. 3. Describe how a particular story's or drama's plot unfolds in a series of episodes as well as how the characters respond or change as the plot moves toward a resolution. 4. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of a specific word choice on meaning and tone. 5. Analyze how a particular sentence, chapter, scene, or stanza fits into the overall structure of a text and contributes to the development of the theme, setting, or plot. 6. Explain how an author develops the point of view of the narrator or speaker in the text. Reading Strands for Informational Text 1. Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. 2. Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal options or judgments. 3. Analyze in detail, event, or idea is introduced, illustrated, and elaborated in a text (e.g. through examples or anecdotes). Speaking and Listening 1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation by refereeing to evidence on the topic, text, or issue to probe and reflect on ideas under discussion. b. Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed. c. Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion. d. Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing. 4. Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas of themes; use appropriate eye contact, adequate volume, and clear pronunciation. 5. Include multimedia components (e.g. graphics, images, music, and sound) and visual displays in presentations to clarify information.

TN Standards			

	Science	• **GLE 0607.6.1** Analyze information about the major components of the universe.
		  ○ **SPI 0607.6.1** Use data to draw conclusions about the major components of the universe.
		• **GLE 0607.6.2** Describe the relative distance of objects in the solar system from earth.
		  ○ **SPI 0607.6.2** Explain how the relative distance of objects from the earth affects how they appear.
		• **GLE 0607.6.3** Explain how the positional relationships among the earth, moon, and sun control the length of the day, lunar cycle, and year.
		  ○ **SPI 0607.6.3** Distinguish among a day, luna cycle, and year based on the movements of the earth, sun, and moon.
		• **GLE 0607.6.6** Illustrate the relationship between the seasons and the earth sun system.
		  ○ **SPI 0607.6.6** Use a diagram that shows the positions of the earth and sun to explain the four seasons.
		• **GLE 0607.6.4** Describe the different stages of the lunar cycle.
		  ○ **SPI 0607.6.4** Explain the different phases of the moon using a model of the earth, moon, and sun.
		• **GLE 0607.6.5** Produce a model to demonstrate how the moon produces tides.
		  ○ **SPI 0607.6.5** Predict the types of tides that occur when the earth and moon occupy various positions.
		• **GLE 0607.6.7** Describe the causes of lunar and solar eclipses.
		  ○ **SPI 0607.6.7** Explain the difference between a solar and a lunar eclipse.

	Social Studies	**Human Origins in Africa through the Neolithic Age** • 6.4 Evaluate the climatic changes and human modifications of the physical environment that gave rise to the domestication of plants and animals and new sources of clothing and shelter. (C, G, H)
	Next Generation Science Standards	**MS-ESS1 Earth's Place in the Universe** Students who demonstrate understanding can: • 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. • MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. • MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system. • MS-ESS1-4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.

Lesson Foundation – Big Ideas & Cross-Curricular Connections

Big Idea

What big ideas guide human understanding about the origin and structure of the universe, Earth's place in the cosmos, and observable motions and patterns in the sky?

Cross-Curricular Connections

Students will learn about the universe:

- What is in the universe?
- How are these objects similar and different from one another?
- How do they compare to objects that we are familiar?
- How can distance be used to describe space and its components?
- How can scale be used to create accurate models?
- What is the relationship between space and the earth?
- What is the relationship between energy sources, space, and the earth?

Students will be constructing models that describe and illustrate the topics of this unit. Throughout the unit, students will be reading fiction and non-fiction texts and completing reflections and writing activities.

Lesson Foundation – Essential Questions

1. What is included in our universe?
2. How would you describe distances in our solar system?
3. What determines the length of a day and of a year?
4. What is a lunar cycle?
5. What are the phases of the moon?
6. What determines the seasons?
7. What cause ocean tides?
8. What is the difference between a lunar and a solar eclipse?

Lesson Foundation – Student Objectives

Going Beyond	• I can illustrate the relationship between the seasons and the earth-sun system. • I can describe the causes of lunar and solar eclipses. • I can use data to draw conclusions about the major components of the universe. • I can construct a model of the solar system showing accurate positional relationships and relative distances. • I can investigate how the earth, sun, and moon are responsible for a day, lunar cycle, and year. • I can explain why the positions of the earth, moon, and sun were used to develop calendars and clocks. • I can illustrate the positions of the earth, moon, and sun during specific tidal conditions.
Mastery	• I can analyze information about the major components of the universe. • I can describe the relative distance of objects in the solar system from earth. • I can explain how the positional relationships among the earth, moon, and sun control the length of the day, lunar cycle, and year. • I can describe the different stages in the lunar cycle. • I can produce a model to demonstrate how the moon produces tides.

	• I can diagram the relationship of the earth and sun that accounts for the seasons. • I can model the positions of the earth, moon, and sun during solar and lunar eclipses. • I can use data to draw conclusions about the major components of the universe. • I can explain how the relative distance of objects from the earth affects how they appear. • I can distinguish among a day, lunar cycle, and year based on the movements of the earth, sun and moon. • I can explain the different phases of the moon using a model of the earth, moon, and sun. • I can predict the types of tides that occur when the earth and moon occupy various positions. • I can use a diagram that shows the positions of the earth and sun to explain the four seasons. • I can explain the difference between a solar and a lunar eclipse.
Building the Basics	• I can compare planets based on their known characteristics. • I can recognize that charts can be used to locate and identify star patterns. • 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.
Lesson Foundations – Prerequisite Content & Skills	
Content Knowledge	• Students can identify the sun, moon, and earth. • Students can distinguish between seasons. • Students can describe changes in the day and night sky. • Students can compare measured distances. • Students can read measurements in both standard and metric. • Students can compare lengths of time – minutes, hours, days, months, years, etc.
Skills	• Students can analyze presented and collected information. • Students can describe and explain relationships between two or more objects. • Students can create patterns. • Students can appropriately measure distances using rulers, meter sticks, or a measuring tape. • Students can create charts with appropriate headings and titles. • Students can create graphs provided information. • Students can create graphs with appropriate headings, legends, colors, and titles. • Students can create a written explanation. • Students can sequence using chronological order. • Students can organize information, grade level appropriate. • Students can diagram and illustrate a process. • Students can infer when provided content information. • Students can collaborate and work within in team. • Students can communicate effectively with other classmates.

Unit Anchor Text

Unit Anchor Text

Literature Study –

A Wrinkle in Time
by Madeleine L'Engle

Summary

Everything is wrong in Meg Murray's life. In school, she's been dropped down to the lowest section of her grade. She's teased about her five-year-old brother, Charles Wallace, who everyone mistakenly thinks is dumb. Not to mention that Meg wears braces and glasses and has mouse-brown hair.

Much will be better in her miserable life when her father gets back. But gets back from where? Meg's physicist father had been experimenting with the fifth dimension of time travel when he mysteriously disappeared. One dark and stormy night, the family is visited by a disheveled heap of a woman named Mrs. Whatsit. Eccentric and brilliant, she will turn out to be the force who spurs on Meg, Charles Wallace, and their new friend, Calvin O'Keefe, to embark on a dangerous quest through space to find their father. In doing so, they must travel behind the shadow of an evil power that is darkening the cosmos.

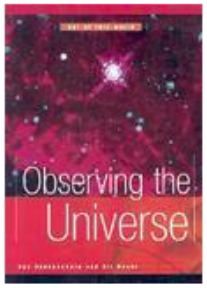
Before long, the trio discovers that Meg's and Charles Wallace's father is being held prisoner by evil forces on the planet of Camazotz, an eerie place where complete conformity is expected in exchange for personal freedom. There they engage in the fight of their lives against a giant disembodied brain named "It." And soon, Charles Wallace must be rescued, too.

Winner of the 1963 Newbery Medal, L'Engle's novel, the first in the Time Quartet, still has the power to mesmerize even the most jaded reader. A profound sense of mystery courses through every page. The novel's sophisticated concept, along with its warm and sensitive narrative tone, set the perfect stage for Meg to discover that love is the most powerful force in the universe.

Source: http://www.scholastic.com/parents/book/wrinkle-time

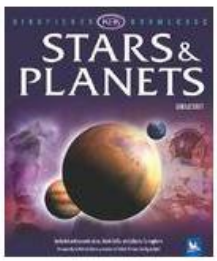
Unit Companion Texts

Informational Text(s)



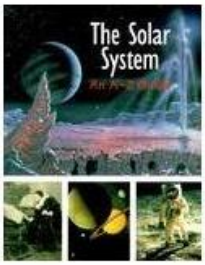
Observing the Universe
(Out of This World)
by **Ray Spangenburg**

Interest Level: Grades 7 - 9
Genre: General Nonfiction, Dictionaries, Reference, Series



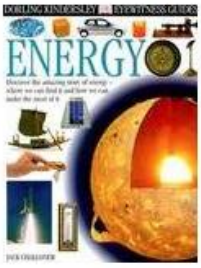
Stars & Planets
(Kingfisher Knowledge)
by **Carole Stott**

Interest Level: Grades 6 - 8
Grade Level Equivalent: 7.1
Genre: General Nonfiction



The Solar System
by **Christina Wilsdon**

Interest Level: Grades 4 - 8
Genre: General Nonfiction



Energy
(Eyewitness Books)
by **Jack Challoner**

Interest Level: Grades 6 - 8
Grade Level Equivalent: 8.9
Genre: General Nonfiction

1000 Facts About Space
by **Pam Beasant**

Interest Level: Grades 6 - 8
Grade Level Equivalent: 4.9
Genre: General Nonfiction

Source:
http://www.scholastic.com/parents/search?filters%5BResource+Type%5D%5B%5D=Book&filters%5BAge%5D%5B%5D=Ages+11-13&filters%5BGenre%5D%5B%5D=General+Nonfiction&query=The+universe&per_page=100

Assessments

Formative Assessments

- Unit Pre-Assessment
- Graphic organizers
- Partners Practice – Calculating Area and Surface Area
- Independent Practice – Calculating Volume
- Seasons Jigsaw Activity
- Interactive map
- Vocabulary Activity
- Flipbook of the phases of the moon
- Mnemonic device for remembering the phases of the moon
- Positions of the earth, sun, and moon during spring tides and neap tides drawing
- Eclipse drawings
- Spring Tides Inference Activity
- Lunar Eclipse Inference Activity
- Game Board Review

Summative Assessments

- Literature Stations
  - Art & Digital Media station
  - Tactile station
  - Character Identification and Review Station
  - Chapter Summary & Review Station
  - Content Review
- Mnemonic device on a poster with illustrations, and facts about the moon.
- RAFT writing assignments
- Unit Summative Assessment

Writing Assessments	○ Graphic Organizers ○ Literature Stations - Character Identification and Review Station - Chapter Summary & Review Station - Content Review ○ Mnemonic device on a poster with illustrations, and facts about the moon. ○ RAFT writing assignments

Unit Vocabulary

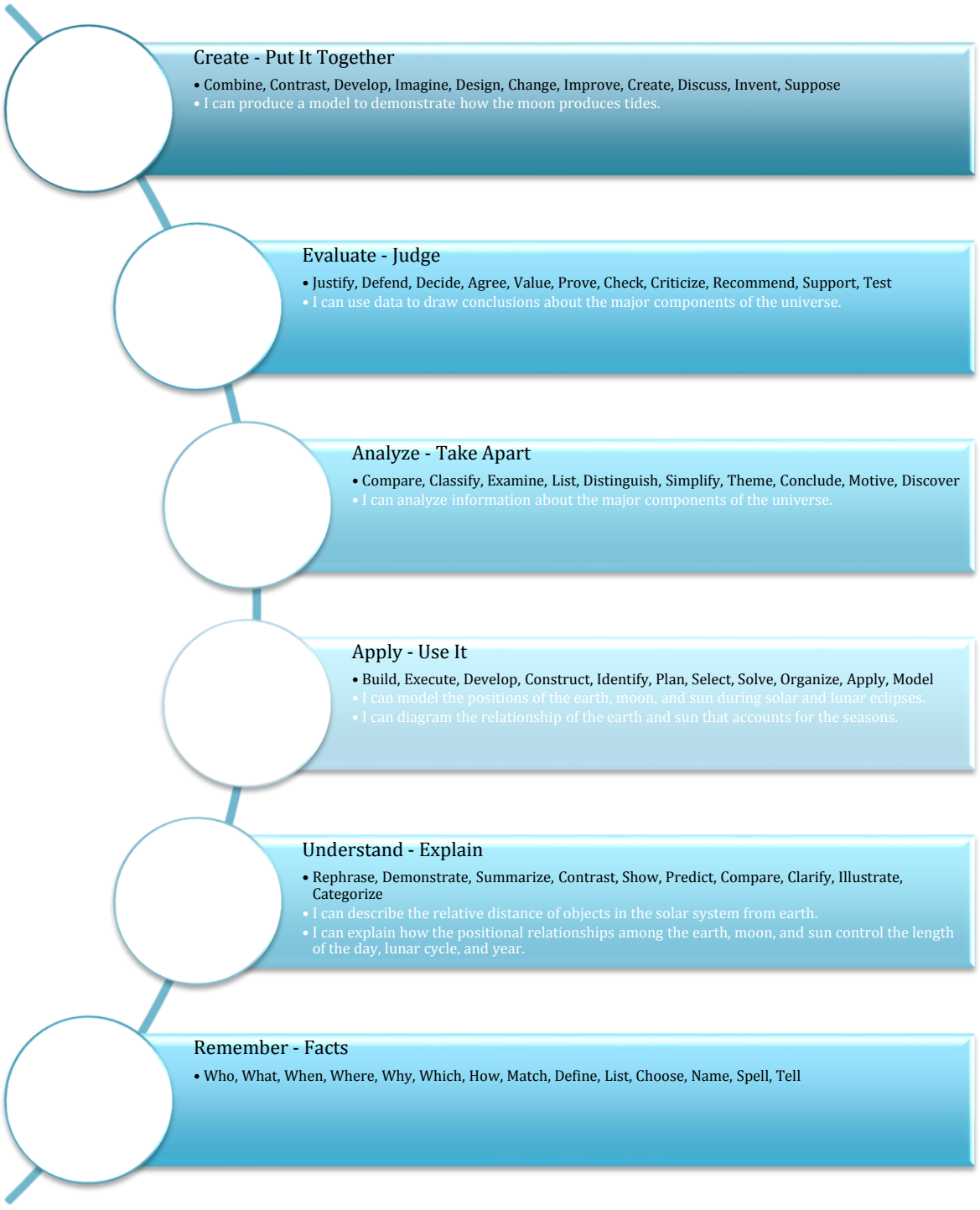
Term	Definition
Tides	Tides are the rise and fall of sea levels caused by the combined effects of the gravitational forces exerted by the Moon and the Sun and the rotation of the Earth. There are two high tides each day with different heights (and two low tides also of different heights),
Asteroid	A small rocky body orbiting the sun.
Asteroid Belt	The asteroid belt is a region of the solar system falling roughly between the planets Mars and Jupiter where the greatest concentration of asteroid orbits can be found.
Planet	An astronomical object orbiting a star.
Star	A star is a massive, luminous sphere of plasma held together by its own gravity.
Meteoroid	A meteoroid is a small rocky or metallic body travelling through space. Meteoroids are significantly smaller than asteroids, and range in size from small grains to 1 meter-wide objects.
Sun	The Sun is the star at the center of the Solar System. It is almost perfectly spherical and consists of hot plasma interwoven with magnetic fields.
Moon	The moon is Earth's only natural satellite and the only astronomical body other than Earth ever visited by human beings. The moon is the brightest object in the night sky but gives off no light of its own. Instead, it reflects light from the sun.
Lunar Eclipse	Lunar eclipses occur when Earth's shadow blocks the sun. A lunar eclipse can only occur the night of a full moon.
Solar Eclipse	As seen from the Earth, a solar eclipse is a type of eclipse that occurs when the Moon passes between the Sun and Earth, and the Moon fully or partially blocks the Sun. This can happen only during a new moon.
Lunar Cycle	The phases the moon goes through in a cycle.
Revolution of the Earth	The traveling of the Earth around the sun, which takes 1 year.
Orbit	The path of the Earth around the sun.
Rotation of the Earth	The spinning of the Earth on its axis which takes 24 hours.
Spring Tide Neap Tide	A tide just after a new or full moon, when there is the greatest difference between high and low water.

Teaching the Unit	

Initial Strategies	"Moon-Ball"
	• The students will complete the following Problem Based Learning Scenario:
	  ○ "You have been elected commissioner of the newly formed Moon Basketball Association. As you establish league play at the recently created moon base station, what changes will you make to the game of basketball for the MBA? You will need to prepare a written justification for any rule changes based on scientific explanations that require the game to be played differently than it is on Earth."
	• Students will begin by determining the following:
	  ○ What do you know?
	  ○ What additional information do you need to determine if rule changes are necessary and what they will be?
	• The students will share their justification and rule changes with the class.
	• The teacher will then introduce the content that will be covered in the unit.
	• The students will complete the unit pre-assessment.
	
	Source:
	"Problem-Based Learning in Middle and High School Classrooms: A Teacher's Guide to Implementation" by Ann Lambros

Direct Instruction	Science:
	  ○ The Universe PPT
	  ○ Moon, Earth, and Sun PPT
	  ○ Moon Phases PPT
	  ○ "Ocean Tides" PPT
	  ○ "Lunar and Solar Eclipses" PPT
	Math:
	  ○ Distance and Measurement PPT
	ELA:
	  ○ "A Wrinkle in Time - 1" PPT
	Social Studies
	  ○ "Space Geography" PPT

Higher-Level Cognitive Function Strategies



Guided Practice & Activities	**<u>Lesson 1</u> (approximately 2 days)** Essential Question What is included in our universe? Activating Strategy Word Splash on Promethean Board to assess what the students know. Teaching Strategy Science: o Direct Instruction – The Universe PPT o Graphic organizer showing components of the universe and notes taken about each component. Students may also draw these components on their organizer. ELA: o Literature Introduction – "A Wrinkle in Time" The teacher will read the first chapter aloud to the class as a whole. There are a total of twelve chapters in this book. Students will be provided class time to read each chapter. The teacher will review each chapter with students after they have completed their reading. Teachers will use the following reading guide to aid students in their comprehension of the text: http://www.scholastic.com/teachers/sites/default/files/asset/file/a-wrinkle-in-time-bookfile.pdf. o Literature Stations The teacher will setup five stations that are based on Chapter 1 for students to rotate through. The students should rotate every thirty minutes. The stations will include the following: - Art & Digital Media station - Tactile station - Character Identification and Review Station - Students will create a missing persons poster or milk carton for Meg Murray's father. - Chapter Summary & Review Station - Students will create a comic strip story illustrating the key components of chapter one. - Content Review - The students will complete a content review for chapter one. The content review will require students to support their constructed response answers with rationale and facts from the text. o Independent Reading Students will be given class time to read chapter two independently. Summarizing Strategy Ticket out the door – List 3 things you learned about our universe you did not know. **<u>Lesson 2</u> (approximately 5 days)** Essential Question How would you describe distances in our solar system? Activating Strategy Think, Pair, and Share - List 3 reasons why you would not use a yardstick to measure the distance between Abingdon and Bristol. Teaching Strategy

Science:

- Use one of the websites below to do a hands-on activity modeling the distance of objects in the solar system.

STEM Activity:

- Jump to Jupiter Activity
  "Students will create and navigate an outdoor course of the traditional planets, which are represented by small common objects. By counting the jumps needed to reach each object, children will experience firsthand the scale of our solar system."
  http://www.lpi.usra.edu/education/explore/solar_system/activities/familyOfPlanets/jumpJupiter/

Math:

- Direct Instruction – Distance and Measurement PPT
- The teacher will discuss how distance and measurement can be used to determine area, surface area, and volume.
- Partners Practice – Calculating Area and Surface Area
- Independent Practice – Calculating Volume
- The Candy Conundrum - Volume of a Sphere Lab
- The teacher will discuss how calculating the volume of a sphere is related to space and the volume of planets (spheres).

STEM Activity:

- Students will work in groups of two to construct a three-dimensional model of the solar system.
- Students must create a model that demonstrates the solar system's orbits.
- The solar system model must be scaled, both planet size and distances.

ELA:

- Students will read a variety of informational texts on distance and space.
- The students will create a graphic organizer that represents the information provided in the texts.

Activity:

- Solar System Scale Activity
  Students will work in groups of two to model the scaled distance of the solar system.

ELA:

- Literature Review – "A Wrinkle in Time"
  The teacher will review the second chapter of the book with the class as a whole.
- Students will be provided class time to read chapter three. After students complete their reading they will rotate through literature stations.
- Literature Stations
  The teacher will setup five stations that are based on Chapters two and three for students to rotate through. The students should rotate every thirty minutes. The stations will include the following:
  - Art & Digital Media station
  - Tactile station
  - Character Identification and Review Station
    - Students will create a character's traits poster for Meg Murray. The students will represent who is Meg Murray with adjectives that describe the person on the inside.
  - Chapter Summary & Review Station
    - Students will create a newspaper story illustrating the key components of chapter two.
  - Content Review
    - The students will complete a content review for chapters two and three. The

content review will require students to support their constructed response answers with rationale and facts from the text.

- Independent Reading
  Students will be given class time over the next few days to read chapters four and five independently.

Summarizing Strategy

In 2 or 3 sentences explain why the moon appears so much larger than Jupiter, but it really isn't.

<u>Lesson 3</u> (approximately 2 days)

Essential Questions –

What determines the length of a day and of a year?
What is a lunar cycle?
What determines the seasons?

Activating Strategy

Word Splash on Promethean Board to assess what the students know about the essential questions used each day

Teaching Strategy

Science:

- Direct Instruction
  The teacher will present the Moon, Earth, and Sun PPT.
- Modeling the movements of the earth and moon.
  1. Model with the students using a light for the sun, a ball for the moon, and a globe for Earth, the movements of the earth and moon to create a day and a year. Be sure to show the tilt of the Earth and the various seasons.
  2. Model the spinning of the moon on its axis as a complete lunar cycle. Explain why we only see 1 side of the moon.
  3. Allow students to draw the revolution of the Earth around the sun and the moon around the Earth on 8x12 paper. Be sure they use arrows indicating the direction of the movement of the Earth around the sun. Arrows need to be used indicating the direction of the rotation of the earth and the direction of the rotation of the moon. They must show the Earth and its tilt while labeling each season. Also, this should be an elliptical orbit.

ELA:

- Seasons Jigsaw Activity
- The teacher will guide students in completing the Seasons Jigsaw Activity by providing informational texts on the relationship between seasons and the movement of the earth, moon, and sun. The teacher will explain how students will work with home or base groups to create a Seasons and Space Book (or iBook) and study specific informational text for their expert group assignment.

Social Studies:

- Students will compare and contrast a particular season's climate, such as summer, of various geographic locations and their location in relation to the sun and moon.
- The students will work in pairs to create an interactive map that includes illustrations, labels, and information regarding the city's geographic location in relation to the sun and moon.
- Direct Instruction
  The teacher will review and present "Space Geography" PPT. The class will review and discuss key vocabulary.
- Vocabulary Activity

Students will review the following terms – hemisphere, equator, and degree of longitude, degree of latitude, elevation, altitude, and topography.

STEM Activity

- Equatorial Sundial

  There are many types of sundials. An equatorial sundial is easy to make and teaches fundamental astronomical concepts. The face of the sundial represents the plane of Earth's equator, and the stick represents Earth's spin axis.
  http://stardate.org/sites/default/files/pdfs/teachers/EquatorialSundial.pdf

ELA:

- Literature Review – "A Wrinkle in Time"

  The teacher will review the fourth and fifth chapters of the book with the class as a whole.
- Direct Instruction

  The teacher will present "A Wrinkle in Time - 1" PPT. The class will discuss chapters four and five during the presentation and review of the power point. After the class completes the review the students will rotate through literature stations.
- Literature Stations

  The teacher will setup five stations that are based on Chapters 4 and 5 for students to rotate through. The students should rotate every thirty minutes. The stations will include the following:
  - Art & Digital Media station
  - Tactile station
  - Character Identification and Review Station
  - Chapter Summaries & Review Station
  - Content Review
    - The students will complete a content review for chapter four and five. The content review will require students to support their constructed response answers with rationale and facts from the text.
- Independent Reading

  Students will be given class time over the next few days to read chapter six independently.

Summarizing Strategies

- Group the following words: Earth, day, year, rotation, sun, revolution, moon, lunar cycle, 24 hours, 365 days
  - In 2 or 3 sentences explain why we see only 1 side of the moon.
  - Why are we colder in the winter in the northern hemisphere even though we are closer to the sun in our elliptical orbit?

<u>Lesson 4</u> (approximately 2 day)

Essential Question

What are the phases of the moon?

Activating Strategy

Write full moon, new moon, quarter moon on the Promethean Board and allow students to discuss to assess prior knowledge.

Teaching Strategies

Science

- Direct Instruction
  - "Moon Phases" PPT
- Allow students to take notes while discussing the phases of the moon.
- Allow students to draw the phases of the moon in its rotation around the Earth and label

these phases.
- Allow students to make a flipbook of the phases of the moon.

STEM Activity
- Students will model the moon phases using Oreos.
- The students will record videos of themselves explaining their Oreo representation of the moon phases using content specific vocabulary.

ELA
- Students will create a mnemonic device for remembering the phases of the moon.
- Students will record their mnemonic device on a poster with illustrations, and facts about the moon.

ELA
- Literature Review – "A Wrinkle in Time"
  The teacher will review the sixth chapter of the book with the class as a whole.
- Students will be provided class time to read chapter seven. After students complete their reading they will rotate through literature stations.
- Literature Stations
  The teacher will setup five stations that are based on Chapters six and seven for students to rotate through. The students should rotate every thirty minutes. The stations will include the following:
  - Art & Digital Media station
  - Tactile station
  - Character Identification and Review Station
  - Chapter Summary & Review Station
  - Content Review
    - The students will complete a content review for chapters six and seven. The content review will require students to support their constructed response answers with rationale and facts from the text.
- Independent Reading
  Students will be given class time over the next few days to read chapter eight independently.

Summarizing Strategy
Think, Pair, and Share – List the stages of the moon in order.

Lesson 5 (approximately 7 days)

Essential Question
What cause ocean tides?

Activating Strategy
Think, Pair, Share – You leave your beach towel on the beach overnight and it is not there in the morning? Explain what happened.

Teaching Strategy
ELA
- Literature Review – "A Wrinkle in Time"
  The teacher will review the eighth chapter of the book with the class as a whole.
- Students will be provided class time to read chapter nine. After students complete their reading they will rotate through literature stations.
- Literature Stations
  The teacher will setup five stations that are based on Chapters eight and nine for students to rotate through. The students should rotate every thirty minutes. The stations will include the following:

- Art & Digital Media station
- Tactile station
- Character Identification and Review Station
- Chapter Summary & Review Station
- Content Review
  - The students will complete a content review for chapters six and seven. The content review will require students to support their constructed response answers with rationale and facts from the text.

- Independent Reading

  Students will be given class time over the next few days to read chapter ten independently.

Science

- Direct Instruction

  The teacher will present "Ocean Tides" PPT. The class will review key concepts and vocabulary included in the lesson.
- Use the Internet images to teach tides.
- Allow students to draw positions of the earth, sun, and moon during spring tides and neap tides.
- They should determine that high tides would always be higher during full and new moon phases and low tides would always be lower during 1st and 3rd quarter moon phases.

STEM Activity:

- Weather and Circulation Systems

  "Students develop an understanding that the large ocean circulations affecting Alaska mimic major weather patterns. They begin by creating and observing wave and riffle patterns and motions of objects in a tub. They plot possible current patterns on their map and organize meteorological data to determine how well wind patterns match their predictions. After a lecture/discussion to learn more about currents and weather patterns, they role-play shipping captains who must consider wind and current patterns to find the quickest route from Seattle to Anchorage. They finish up with a discussion that takes them back to the question about the toys' movements."
  http://seagrant.uaf.edu/marine-ed/curriculum/grade-7/investigation-2.html?task=view

STEM Activity:

- Waves and Tides

  "Students develop an understanding of waves and tides and their motion through discussion, demonstration, and hands-on investigation. They demonstrate wave motion in containers, and create marigrams to show local tide data and to compare tide patterns from different parts of the world. They use their knowledge to consider whether waves or tides could account for the movement of the bath toys to their final locations."
  http://seagrant.uaf.edu/marine-ed/curriculum/grade-7/investigation-3.html?task=view

Summarizing Strategy

- Use your leg to demonstrate the positions of the earth, moon, and sun during spring tides. (Leg would be straight)
- Use your leg demonstrate the positions of the earth, moon, and sun during neap tides. (Leg would bend at the knee to show 90 degree angle)

Lesson 6 (approximately 2 day)

Essential Question

What is the difference between a lunar and a solar eclipse?

Activating Strategy

Write the word eclipse on the Promethean Board and do a word splash to assess students' knowledge.

Teaching Strategy

ELA

- Literature Review – "A Wrinkle in Time"
  The teacher will review the tenth chapter of the book with the class as a whole.
- Students will be provided class time to read chapter eleven. After students complete their reading they will rotate through literature stations.
- Literature Stations
  The teacher will setup five stations that are based on Chapters ten and eleven for students to rotate through. The students should rotate every thirty minutes. The stations will include the following:
  - Art & Digital Media station
  - Tactile station
  - Character Identification and Review Station
  - Chapter Summary & Review Station
  - Content Review
    - The students will complete a content review for chapters six and seven. The content review will require students to support their constructed response answers with rationale and facts from the text.
- Independent Reading
  Students will be given class time over the next few days to read chapter twelve independently.

Science:

- Direct Instruction
  The teacher will present "Lunar and Solar Eclipses" PPT. The class will review key concepts and vocabulary included in the lesson.
- Video Review
  The teacher will show a brief video on "Lunar and Solar Eclipses"
- Teach this by allowing the students to draw each eclipse and label the components.
- Allow the students to infer that spring tides happen during eclipses.
- Make sure they write this on their drawings.
- Also, allow them to infer that lunar eclipses would be during the night and only during a full moon phase while solar eclipses would be during the day and only during a new moon phase.

ELA

- Students will complete a RAFT writing assignments.

Summarizing Strategy

Ticket out the door –Draw the positions of the Earth, moon, and sun in a solar eclipse or a lunar eclipse.

<u>Lesson 7</u> (approximately 2 day)

Essential Question

What big ideas guide human understanding about the origin and structure of the universe, Earth's place in the cosmos, and observable motions and patterns in the sky?

Activating Strategy

Students will complete a state assessment style review of the standards presented in the unit. The students will then Think-Pair-Share.

Teaching Strategy

STEM Activity

- Moon Message
  - Students will work in groups of three to complete this problem-based learning activity.
  - The students will work to solve the following scenario:
    "You are an inhabitant of the moon colony Luna. You wish to send a message by spotlight to your friend on Earth. You must determine at which phase of the moon your message will be best viewed."
  - Students will complete an Engineering Design Process packet to document their innovation and how their group plans to transmit their message.
  - The students will create a model using classroom materials of how and when they will send their message from the moon to the earth.

Source:
"Problem-Based Learning in Middle and High School Classrooms: A Teacher's Guide to
Implementation" by Ann Lambros

<u>Lesson 8</u> (approximately 2 day)

Essential Question

What big ideas guide human understanding about the origin and structure of the universe, Earth's place in the cosmos, and observable motions and patterns in the sky?

Activating Strategy

The teacher will pose the following question: Why is the sun the center of the universe? Students will complete a Think-Write-Draw activity that explains their answer. Students will then share their Think-Write-Draw activity with their table groups. The class will then discuss the sun's role in the universe.

Teaching Strategy

Culminating Event – Meeting the Energy Needs of Our Space:

- The students will begin this project by comparing and contrasting alternate energy sources and their output of usable energy.
- The teacher may want to invite guest speakers to discuss alternate energy technologies with the class.
- Students will create a data chart and graph describing the average energy output of solar energy technology, wind energy technology, and hydroelectric technology.
- The teacher will then discuss Holston View's Solar Pavilion and the energy output of the Solar Pavilion. The students will then compare this reading with the data collected through their research and recorded in their data charts and graphs.
- The teacher will then state, "We have studied the moon in depth. Is there a way that we can harness energy by collecting the moon's reflection of the sun? Does this technology exist? If not how can we invent a tool or technology that will harness this energy? If so how can we improve this technology so that we can harness a higher amount of energy?
- Students will complete an Engineering Design Process graphic organizer and packet for this project. The students will then build scaled models of their design.
- The students will prepare power point presentations and then present their models, engineering design graphic organizer, and explain their reasoning for their design and construction to the class.

Unit Review

- The students will create game board style review for the concepts covered in this unit.
- Unit Summative Assessment

STEM Projects	• Moon-Ball • The Candy Conundrum - Volume of a Sphere Lab • Jump to Jupiter Activity • Solar System Scale Activity • Modeling the Movements of the Earth and Moon • Equatorial Sundial • Model the Moon Phases using Oreos • Weather and Circulation Systems • Waves and Tides • Moon Message
STEM Culminating Event	Meeting the Energy Needs of Our Space o Comparing and Contrasting alternate energy sources and their output of usable energy. o Guest speakers - alternate energy technologies o Create a data chart and graph describing the average energy output of solar energy technology, wind energy technology, and hydroelectric technology. o Holston View's Solar Pavilion and the energy output of the Solar Pavilion. The students will then compare this reading with the data collected through their research and recorded in their data charts and graphs. o "We have studied the moon in depth. Is there a way that we can harness energy by collecting the moon's reflection of the sun? Does this technology exist? If not how can we invent a tool or technology that will harness this energy? If so how can we improve this technology so that we can harness a higher amount of energy? o Engineering Design Process graphic organizer and packet o Build scaled models of their design. o Prepare power point presentations and then present their models, engineering design graphic organizer, and explain their reasoning for their design and construction to the class.
Differentiated Instruction	Teachers will vary the following to adapt the unit plans to the needs of every learner: o Presentation of Content • Leveled Readers • Textbooks or iBooks that provide appropriate depth for each student • Guided notes for lecture and direct instruction • Small group demonstrations • Creating podcast and videos for a flipped curriculum style classroom to provide support for the work being completed during the class o Process • Scaffolding • Flexible grouping • Creating interest centers based on Gardner's Multiple Intelligences or Career Paths to present and work with content • Manipulatives and models • Vary length of time for a student to master content • Encourage an advanced learner to pursue a topic in greater depth o Products • Provide different ways for students to demonstrate their knowledge • Provide different ways for students to meet content and academic expectations at various levels of difficulty • Group and individual work • Various means of scoring o Learning Environment • Areas where students can work quietly • Areas that promote communication and collaboration with others

	• Materials that represent diverse cultures and demographics • Routines that encourage students to work as independent learners Source: "Designing Lessons for Diverse Learners" by Natalie Olinghouse, 2008.
Re-teaching Strategies	• Direct Instruction o Small group teacher led instruction o Various modes of presentation o Utilizing software applications to provide digital interaction with content o Providing manipulatives and models for a concrete representation of concepts o Providing exemplars of content processes • Graphic Organizers o Templates for individuals o Guides for components and how to complete graphic organizers o Examples of good work and work that needs revision o Provide previews of the completed graphic organizers • Literature Stations - Art & Digital Media station - Provide various options for students to express their understanding of concepts utilizing creativity that they are interested. - Provide examples - Peer Tutoring - Abbreviated Assignments - Tactile station - Provide models that represent the basics of a concept and models that represent the content in more depth and detail - Provide multiple options for creating and building models of the content - Character Identification and Review Station - Provide textual guidance and clues - Provide key questions and characteristics for students to review the text - Chapter Summary & Review Station - Various methods of summarizing - Provide options that guide the students summarization (Ex. multiple choice style questions and matching rather than student constructed response style questions) - Content Review - Provide options that meet the interests and needs of all students • Independent Reading o Provide guide maps for reading o Leveled Readers • Jig-Saw Activities o Leveled Readers o Heterogeneous Grouping • Compare and Contrast Activities o Provide students with guides, prompts, and clues for completing activities • Drawing and Labeling o Provide students with exemplars that represent expectations and the rubric • Inference o Provide small group discussions and teaching that give students practice with inferring and evaluating text. • Writing Prompts o Create writing prompts that meet the needs of all learners o Create options for each writing assignment that allows students to choose the format and style o Provide outlines and goals o Provide examples of good work and work that needs revision

	○ Small group instruction
Enrichment Strategies	Moon-Ball Activity Extension: • The teacher can extend the initial strategy for the unit by asking students to provide a written response to the following questions: 1. You have now been asked to consider expanding the league to an intergalactic league. 2. Prepare an additional report on the locations you would consider and if rule changes are required for these locations. • Graphic Organizers ○ The teacher can create graphic organizers that allow student to explore and explain the content more in-depth. ○ Teachers can also modify graphic organizer to include multiple concept maps that allow students to study the relationships between terms and concepts more in-depth. • Provide alternate activities with more depth, cross-curricular connections, and advanced writing strategies for the Literature Stations - Art & Digital Media station - Tactile station - Character Identification and Review Station - Chapter Summary & Review Station - Content Review • Independent Reading – Allow students to read at their own pace and provide author's notes for the text, critiques, and adaptations of the text for further study as the students are reading the book. • Jig-Saw Activities – Allow students be leaders of the "home" or "base" teams and provide more rigorous and challenging reading opportunities • Peer Tutoring • Compare and Contrast Activities – Provide a more in-depth option for comparing and contrasting items, consider more intangible items for students to describe, compare, and contrast. • Drawing and Labeling – Provide an alternate rubric with more content depth • Inference - Provide an alternate rubric with more content depth • Writing Prompts - Provide an alternate rubric with more content depth
Independent Practice Activities	**<u>Lesson 1</u>** ○ Graphic organizer • Showing components of the universe and notes taken about each component. ○ Literature Stations Chapter 1: - Art & Digital Media station - Tactile station - Character Identification and Review Station - Students will create a missing persons poster or milk carton for Meg Murray's father. - Chapter Summary & Review Station - Students will create a comic strip story illustrating the key components of chapter one. - Content Review - The students will complete a content review for chapter one. The content review will require students to support their constructed response answers with rationale and facts from the text. ○ Independent Reading Students will be given class time to read chapter two independently. **<u>Lesson 2</u>**

Math:

- Partners Practice – Calculating Area and Surface Area
- Independent Practice – Calculating Volume

ELA:

- The students will create a graphic organizer that represents the information provided in the texts.

ELA:

- Literature Stations

  Chapters two and three:

  - Art & Digital Media station
  - Tactile station
  - Character Identification and Review Station
    - Students will create a character's traits poster for Meg Murray. The students will represent who is Meg Murray with adjectives that describe the person on the inside.
  - Chapter Summary & Review Station
    - Students will create a newspaper story illustrating the key components of chapter two.
  - Content Review
    - The students will complete a content review for chapters two and three. The content review will require students to support their constructed response answers with rationale and facts from the text.

- Independent Reading

  Students will be given class time over the next few days to read chapters four and five independently.

Lesson 3

ELA:

- Seasons Jigsaw Activity

Social Studies:

- Students will compare and contrast a particular season's climate, such as summer, of various geographic locations and their location in relation to the sun and moon.
- The students will work in pairs to create an interactive map.
- Vocabulary Activity

ELA:

- Literature Stations

  Chapters 4 and 5:

  - Art & Digital Media station
  - Tactile station
  - Character Identification and Review Station
  - Chapter Summaries & Review Station
  - Content Review
    - The students will complete a content review for chapter four and five. The content review will require students to support their constructed response answers with rationale and facts from the text.

- Independent Reading

  Students will be given class time over the next few days to read chapter six independently.

Lesson 4

Science

- Draw the phases of the moon in its rotation around the Earth and label these phases.

- Flipbook of the phases of the moon.

ELA

- Mnemonic device for remembering the phases of the moon.
- Record their mnemonic device on a poster with illustrations, and facts about the moon.

ELA

- Literature Stations

  Chapters six and seven:

  - Art & Digital Media station
  - Tactile station
  - Character Identification and Review Station
  - Chapter Summary & Review Station
  - Content Review
    - The students will complete a content review for chapters six and seven. The content review will require students to support their constructed response answers with rationale and facts from the text.
- Independent Reading

  Students will be given class time over the next few days to read chapter eight independently.

Lesson 5

ELA

- Literature Stations

  Chapters eight and nine:

  - Art & Digital Media station
  - Tactile station
  - Character Identification and Review Station
  - Chapter Summary & Review Station
  - Content Review
    - The students will complete a content review for chapters six and seven. The content review will require students to support their constructed response answers with rationale and facts from the text.
- Independent Reading

  Students will be given class time over the next few days to read chapter ten independently.

Science

- Draw positions of the earth, sun, and moon during spring tides and neap tides.

Lesson 6

ELA

- Literature Stations

  Chapters ten and eleven:

  - Art & Digital Media station
  - Tactile station
  - Character Identification and Review Station
  - Chapter Summary & Review Station
  - Content Review
    - The students will complete a content review for chapters six and seven. The content review will require students to support their constructed response answers with rationale and facts from the text.
- Independent Reading

  Students will be given class time over the next few days to read chapter twelve independently.

	Science: ○ Draw each eclipse and label the components. ○ Infer that spring tides happen during eclipses. ○ Infer that lunar eclipses would be during the night and only during a full moon phase while solar eclipses would be during the day and only during a new moon phase. ELA ○ Students will complete a RAFT writing assignments. **Lesson 8** Unit Review ○ Create game board style review for the concepts covered in this unit.
Materials & Resources	**Materials** **Lesson 1** ○ Direct Instruction – The Universe PPT ○ Graphic organizer ELA: ○ "A Wrinkle in Time" ○ Reading guide to aid students in their comprehension of the text: http://www.scholastic.com/teachers/sites/default/files/asset/file/a-wrinkle-in-time-bookfile.pdf. ○ Chapter 1 Literature Stations ○ Art & Digital Media station ○ Tactile station ○ Character Identification and Review Station - Poster Template - Poser Rubric - Cardstock, Markers, Crayons, Glue, Construction Paper ○ Chapter Summary & Review Station - Comic Strip Story Template - Comic Strip Story Rubric - Pencils and Crayons - Newspaper "Funny" papers ○ Content Review ○ Ticket out the door **Lesson 2** ○ Think, Pair, and Share - yardstick ○ Computer access or one-to-one technology ○ A 24" sentence strip, or a strip of paper 3" wide by 24" long. ○ Pencil ○ Distance and Measurement PPT ○ Partners Practice – Calculating Area and Surface Area ○ Independent Practice – Calculating Volume ○ The Candy Conundrum ○ Index cards, Zip-lock baggies, About 300-400 Hershey Whoppers (or other candy), Knife or other sharp instrument to slice candy in half, Rulers, Poster board or similar material to create candy boxes, Tape / glue / other assembly material, Art Supplies to design candy container, Calculators, Computer with Internet access (for supplemental activities), Projector, Clipboards for all students, Rulers, 2 baseballs (1 sliced in half), 2 softballs (1 sliced in half), 2 tennis balls (1 sliced in half), 2 racquet balls (1 sliced in half), Large foam sphere, 2 – 1 inch foam spheres, 2 canisters of oatmeal (1 sliced to show the area is just 2 circles and a rectangle), 2 canisters of crystal light lemonade mix, Kleenex box, Empty CD case, Large foam rectangular prism, Different shaped foam cylinders, Large Foam stick (noodle)

STEM Activity:

- Construct a three-dimensional model of the solar system – students will choose and supply their group materials for this project – ideas: Styrofoam balls, coat hangers, yarn, cardboard, glue, paint, paintbrush, etc.
- Variety of informational texts on distance and space.
- Graphic organizer – colored paper, scissors, glue, tape, colored pencils, markers
  Solar System Scale Activity
- Large craft pony beads in 11 suggested colors (1 of each listed below) per student
- Yellow (Sun)
- Opaque Red (Mercury)
- Cream (Venus)
- Clear Blue (Earth)
- Clear Red (Mars)
- Black (Asteroid belt)
- Orange (Jupiter)
- Clear Gold (Saturn)
- Dark Blue (Uranus)
- Light Blue (Neptune)
- Brown (Pluto - dwarf planet)
- 4.5 meters of string for each student
- Small piece of cardboard to wrap the Solar System string around (10 cm X 10 cm) after the project is complete
- Measuring tapes (with centimeters), meter sticks, or other metric measuring tools
- A 24" sentence strip
- Pencil
- "A Wrinkle in Time"
- Chapters two and three Literature Stations:
- Art & Digital Media station
- Tactile station
- Character Identification and Review Station
  - Students will create a character's traits poster for Meg Murray. The students will represent who is Meg Murray with adjectives that describe the person on the inside.
- Chapter Summary & Review Station
  - Students will create a newspaper story illustrating the key components of chapter two.
- Content Review
  - The students will complete a content review for chapters two and three. The content review will require students to support their constructed response answers with rationale and facts from the text.
- Independent Reading
  Students will be given class time over the next few days to read chapters four and five independently.

<u>Lesson 3</u>

- Word Splash on Promethean Board
- Moon, Earth, and Sun PPT
- Modeling the movements of the earth and moon.
- Light source, ball, globe, 8 x 12 paper, arrows
- Seasons Jigsaw Activity Informational Texts
- Seasons and Space Book (or iBook) and study specific informational text
- Globes
- Map examples
- Space Geography PPT
- Vocabulary Activity
- Equatorial Sundial

- Dial Face Template. Scissors, Glue, Straw, Markers, Rulers
- "A Wrinkle in Time"
- "A Wrinkle in Time - 1" PPT.
- Chapter 4 & 5 Literature Stations
- Art & Digital Media station
- Tactile station
- Character Identification and Review Station
- Chapter Summaries & Review Station
- Content Review
  - The students will complete a content review for chapter four and five. The content review will require students to support their constructed response answers with rationale and facts from the text.

Lesson 4

- Flipbook of the phases of the moon.
  - Construction Paper, Colored Paper, Crayons, Colored Pencils, Pencils
- Oreos (4 full-size cookies per student)
- iPad or device capable of video taping
- Poster board (1 per student), crayons, markers, scissors, construction paper, tape, and glue
- "A Wrinkle in Time"
- Chapter 6 & 7 Literature Stations
- Art & Digital Media station
- Tactile station
- Character Identification and Review Station
- Chapter Summary & Review Station
- Content Review

Lesson 5

- "A Wrinkle in Time"
- Literature Stations: Chapter 8 & 9
- Art & Digital Media station
- Tactile station
- Character Identification and Review Station
- Chapter Summary & Review Station
- Content Review
- "Ocean Tides" PPT.
- Internet and Computer or iPad
- Colored Paper, crayons, colored pencils, pencils

Weather and Circulation Systems

- Science notebooks
- Wind Data Table
- Blank data table
- Map (for shipping routes)
- Student maps

Waves and Tides

- Student Lab directions
- Marigram Information and Example
- Blank Graph
- Student worksheet
- Tides and Moon
- Tide diagrams
- Four New Marigrams
- Glass jar (1 pint to 1 quart size) with tight-fitting lid
- Mineral oil
- Rubbing alcohol
- Water

- Blue food coloring
- Glue
- Plastic tub, 5 gal aquarium,
- Baking dish
- Corks
- Thumbtacks
- Fishing line
- Metal washers
- Ruler
- Ground pepper
- Tide books or tide data from Internet

Lesson 6

- Promethean Board
- "A Wrinkle in Time"
- Chapter 10 & 11 Literature Stations
  - Art & Digital Media station
  - Tactile station
  - Character Identification and Review Station
  - Chapter Summary & Review Station
  - Content Review
- "Lunar and Solar Eclipses" PPT.
- Video Review
- Brief Video on "Lunar and Solar Eclipses"
- Colored Paper, crayons, colored pencils, pencils
- RAFT writing assignments.
- Ticket out the door

Lesson 7

- State assessment style review of the standards presented in the unit
- Moon Message Scenario
- Moon Message Rubric
- Engineering Design Process packet
- Model – Students will choose and supply their group materials for this project

Lesson 8

- Think-Write-Draw activity

Meeting the Energy Needs of Our Space:

- Comparing and contrasting alternate energy sources document
- Guest speakers to discuss alternate energy technologies
- Graph Paper
- Solar Pavilion images
- Models - Students will choose and supply their group materials for this project
- iPad or Computer, and internet
- Engineering Design Process graphic organizer and packet f
- Scaled models of their design.
- Power point software
- Game board style review activity - Students will choose and supply their group materials for this project
- Unit Summative Assessment

Resources

Lesson 1

http://solarsystem.nasa.gov/planets/profile.cfm?Object=SolarSys

http://solarsystem.nasa.gov/planets/whatisaplanet.cfm

http://solarsystem.nasa.gov/planets/profile.cfm?Object=Asteroids

http://solarsystem.nasa.gov/planets/profile.cfm?Object=Meteors

http://solarsystem.nasa.gov/planets/profile.cfm?Object=Comets

http://solarsystem.nasa.gov/planets/profile.cfm?Object=Moon

Lesson 2
http://nssdc.gsfc.nasa.gov/planetary/education/schoolyard_ss/

http://www.lpi.usra.edu/education/explore/solar_system/activities/familyOfPlanets/solarSystem/

http://www.exploratorium.edu/ronh/solar_system/

Lesson 3
https://www.youtube.com/watch?v=W47Wa7onrIQ

https://www.youtube.com/watch?v=OZIB_leg75Q

https://www.google.com/search?q=animation+movement+of+earth+and+moon&rlz=1T4TSNJ_enUS443US444&tbm=isch&tbo=u&source=univ&sa=X&ei=HDomU7uLLNTyyAH18YGICQ&ved=0CEQQsAQ

http://science.howstuffworks.com/dark-side-of-moon2.htm

Lesson 4
https://www.google.com/search?q=phases+of+the+moon+flip+book&rlz=1T4TSNJ_enUS443US444&tbm=isch&tbo=u&source=univ&sa=X&ei=JkgmU4T_CeHsyQGFyYGoCw&ved=0CDUQ7Ak&biw=1821&bih=751&dpr=0.75

http://www.pinterest.com/hodgescience/lunar-cycle-moon-phases/

https://www.google.com/search?q=phrases+of+the+moon+animation&rlz=1T4TSNJ_enUS443US444&tbm=isch&tbo=u&source=univ&sa=X&ei=TEkmU6OYG8bbyQH0qIDoCA&ved=0CCcQsAQ&biw=1821&bih=751&dpr=0.75

https://www.youtube.com/watch?v=7vUObZwLJ8A

Lesson 5
http://etc.usf.edu/maps/pages/2600/2607/2607.htm

https://www.google.com/search?q=spring+and+neap+tides+diagram&rlz=1T4TSNJ_enUS443US444&tbm=isch&tbo=u&source=univ&sa=X&ei=lUwmU_-EG8jcyQHh_4HoBg&ved=0CCcQsAQ&biw=1821&bih=751&dpr=0.75

Lesson 6
https://www.google.com/search?q=solar+and+lunar+eclipse&rlz=1T4TSNJ_enUS443US444&tbm=isch&tbo=u&source=univ&sa=X&ei=FFQmU6aJNsKiyAHa4IDQBg&ved=0CCcQsAQ&biw=1821&bih=751&dpr=0.75

http://www.moonconnection.com/lunar_vs_solar.phtml

https://www.youtube.com/watch?v=Qm4ZFyF8vmc

Comments	If you have an questions you may contact: Jessica Carr at jessicawcarr@hotmail.com