

UNIT PLANNING TEMPLATE

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| | <p>Unit Topic / Guiding Question: Science: Motions of the Earth and Moon</p> <p>What is the most significant role of the Moon in helping Earth sustain life?</p> |
| | <p>Rationale: Students will learn about the Earth, Sun, and Moon while understanding how their movements are relative to each other.</p> |

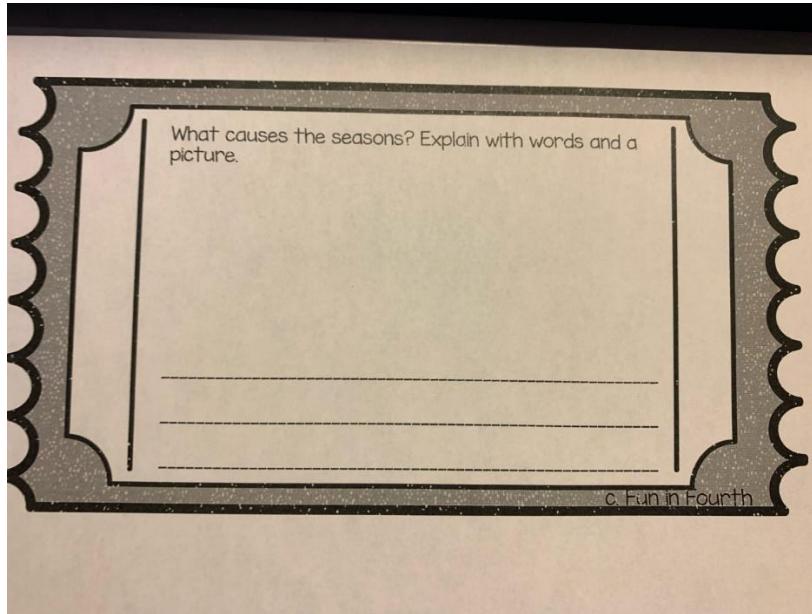
STAGE 1: Desired Results

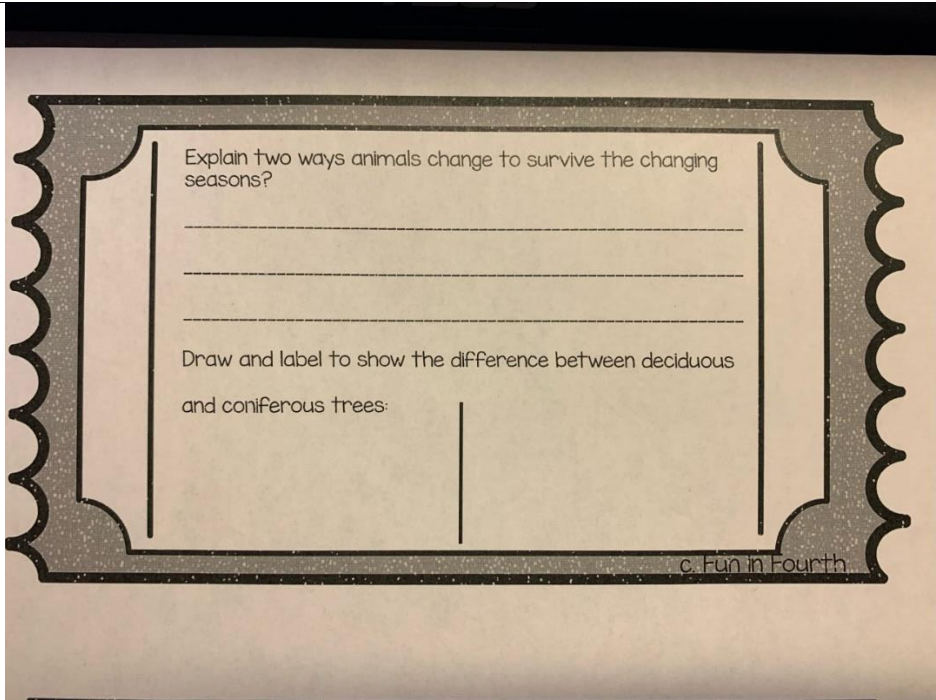
| | | Big Ideas → | Essential Questions |
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| UNDERSTAND | | <p>Big Idea: The motions of Earth and the moon cause observable patterns that affect living and non-living systems.</p> | <p>What are the different phases of the Moon? Can students demonstrate the different Moon Phases? Why do we see Moon phases? Does the Moon orbit Earth?</p> |
| DO | | <p>Core Competencies:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>C Communication</p> <ul style="list-style-type: none"> <input type="checkbox"/> Communicating <input type="checkbox"/> Collaborating <p>I participate in conversations for a variety of purposes (e.g., to connect, help, be friendly, learn and share).</p> <p>I am an engaged listener; I ask thought-provoking questions when appropriate and integrate new information.</p> <p>I contribute during group activities, cooperate with others, and listen respectfully to their ideas. I can indeed work with others for a specific purpose.</p> </div> <div style="width: 30%;"> <p>T Thinking</p> <ul style="list-style-type: none"> <input type="checkbox"/> Creative Thinking <input type="checkbox"/> Critical & Reflective Thinking <p>I can ask questions, make predictions, and use my senses to gather information.</p> <p>I can gather, select, evaluate, and synthesize information.</p> </div> <div style="width: 30%;"> <p>PS Personal & Social</p> <ul style="list-style-type: none"> <input type="checkbox"/> Personal Awareness & Responsibility <input type="checkbox"/> Positive Personal & Cultural Identity <input type="checkbox"/> Social Awareness & Responsibility <p>I recognize and can explain my role in learning activities and explorations, and I can give some extraordinary evidence of my learning.</p> </div> </div> | |

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| | | <p>Learning Standards – Curricular Competencies:</p> <p>Use Science inquiry processes and skills to:</p> <ul style="list-style-type: none"> • Demonstrate curiosity about the natural world. • Observe objects and events in familiar contexts. • Identify questions about familiar objects and events that can be investigated scientifically. • Make predictions based on prior knowledge. • Make observations about living and non-living things in the local environment. • Experience and interpret the local environment. • Identify First Peoples perspectives and knowledge as sources of information. • Sort and classify data and information using drawings or provided tables. • Demonstrate an understanding and appreciation of evidence. • Identify some simple environmental implications of their and others’ actions. • Transfer and apply learning to new situations. |
| | KNOW | <p>Learning Standards - Content:</p> <ul style="list-style-type: none"> • Local changes caused by Earth’s axis, rotation, and orbit. - Earth’s axis, rotation, and orbit simply cause changes locally. - Day and night: animals are <u>nocturnal</u> (active at night) and <u>diurnal</u> (active during the day) - Annual seasons: plants and animals respond to the seasons (drop leaves, and the change of color) |

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| | | <ul style="list-style-type: none"> • The effects of the relative positions of the sun, moon, and Earth including local First Peoples perspectives. <ul style="list-style-type: none"> - The phases of the moon, tides, etc. - Tides affect living organisms. - Lunar and solar eclipses. | |
| | <p>First Peoples Principles of Learning</p> | <ul style="list-style-type: none"> <input type="checkbox"/> Learning ultimately supports the well-being of the self, the family, the community, the land, the spirits, and the ancestors. <input type="checkbox"/> Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place). <input type="checkbox"/> Learning involves recognizing the consequences of one's actions. <input type="checkbox"/> Learning involves generational roles and responsibilities. <input type="checkbox"/> Learning recognizes the role of indigenous knowledge. <input type="checkbox"/> Learning is embedded in memory, history, and story. <input type="checkbox"/> Learning involves patience and time. <input type="checkbox"/> Learning requires exploration of one's identity. <input type="checkbox"/> Learning involves recognizing that some knowledge is sacred and only shared with permission and/or in certain situations. | <p>Comments on how you will address the FPPL:</p> <p>Through this science unit, students will be examining the Earth, Sun, and Moon through a means of holistic, reflexive, reflective, experiential, and relational learning as they reflect on prior knowledge, and curious wonder about the topic. Some effective experiential learning to represent the Earth, Moon phases, and the Sun will be granted through a warm and fulfilling learning environment.</p> <p>Students will learn that many of the reasons why the Earth, Moon, and Sun operate the way they do are simply because of the means of history, and stories.</p> <p>This unit will pride itself in allowing for patience and time as the classroom environment unfolds brand new knowledge, wonder, and curiosity of the Earth, Moon, and Sun.</p> |
| <p>STAGE 2: Assessment Plan</p> | | | |
| <p>Formative Assessment (Assessment as Learning and Assessment for Learning):</p> | | | |
| <p>Students will begin the unit with a means of formative assessment through a KWL chart (Know, Wonder, Learn) that is highly useful to discover the student's prior knowledge to help gear the lessons based on this valuable information in terms of the Earth, Moon, and Sun. Additionally, students will be formally assessed through a means of vocabulary acquisition through a group activity called "word graffiti" to teach and test for understanding of vocabulary words that pertain to the unit. Small group work and discussions</p> | | | |

will be formatively assessed to assess where students are in their learning while a “Ticket Out the Door” slip will be used as a means of formative assessment, quite frequently throughout the unit:





Summative Assessment (Assessment of Learning):

Students will be expected to create a visual poster of the Moon Phases while using Oreo Cookies that include:

- Full Moon
- Waning Gibbous
- First Quarter
- Waning Crescent
- New Moon
- Waxing Crescent
- Last Quarter
- Waxing Gibbous

Stage 3: Learning Plan

| Date/Lesson | Learning Intentions | Instructional Activities (brief description here – lesson plans will be used to flesh out each lesson) |
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| <p><i>Lesson 1</i></p> | <p><i>Introduction to the Sun, Moon, and Earth</i></p> | <p>Introduce and familiarize students with the Earth, Sun, and Moon by providing them with a KWL (know, wonder, and learn) chart. Students will participate in a “Think-Pair-Share” which focusses on what they already know about the Earth, Sun, and Moon. Students will record this in the “Know” column of the KWL chart that they are provided. An anchor chart will be created for students to copy and practice this KWL activity. Students will be given the opportunity to write down anything, even though it may not be directly related to the unit. Students will have the opportunity to write down their wonderings in the “Wonder” column and will be shared as a class discussion. KWL’s are fantastic for students as they have the opportunity to reflect on their previous knowledge of a certain topic and become excited for more knowledge to learn. Throughout the unit, students can add to the “Learn” portion of their KWL chart.</p> <p>As each lesson takes place, a vocabulary word wall will be created on the “Science” bulletin board in the classroom. Vocabulary of the words for the unit will be done for each lesson. A total of 2-5 key words per lesson to go over will be chosen as the vocabulary of the unit builds to provide students with a visual as well.</p> |
| <p><i>Lesson 2</i></p> | <p><i>Word Graffiti</i></p> | <p>Today’s lesson will examine important vocabulary terms that pertain to this unit. Ahead of time, write the following words on either chart paper or mini whiteboards (1 per each):</p> <ul style="list-style-type: none"> - Hemisphere - Axis - Degrees - Counterclockwise - Cardinal directions - Equator - Clockwise - Orbit <p>Spread the chart papers/boards around the classroom.</p> <p>Split the students into eight groups, and place one group at each paper/board. Allow students three to five minutes to discuss the vocabulary written. Students will add their thoughts to the board/paper. One student will write, or students can take turns.</p> <p>Once the time is up, students will simply rotate to the next vocabulary word. They will read what the previous group wrote, discuss, and write their thoughts. Students do not need to agree with what is already written, but they are not allowed to erase anything that is written. The use of sticky notes to place down instead of the marker can be useful as well so that way, students will not be able to erase what is already written and each person can write something down. Students can place a checkmark beside ideas that they agree with (Repeat until all students have read and interacted with all words).</p> <p>Have students return to their seats and one at a time, discuss what students have written and reveal the actual definitions by reading each and providing examples as well to ensure understanding.</p> |
| <p><i>Lesson 3</i></p> | <p><i>How the Earth Moves</i></p> | <p>In today’s lesson, we will review the vocabulary learned from the day before as a class. Ensure that students have a strong understanding, as they will need these key terms for today’s work. Students will be looking at</p> |

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| | | <p>the article “How the Earth Moves” and will read and highlight or underline essential terms. After reading, we will discuss the article as a class while displaying “The Seasons Change” diagram to help solidify understanding.</p> <p>We will progress into a demonstration: Place a lamp somewhere in the classroom where all the students can see – remove the lampshade, plug it in, and turn it on. This will be explained to the class through a means of that the light bulb will represent the sun and how the sun is always shining. Students will then locate the approximate area of the city of Quesnel on the globe (taping a pompom over it for easy reference during this exciting demonstration). Dimming the classroom lights at this time will intrigue the students even more. Placing the globe so that the pompom is in direct light of the lamp while informing the students that this is midday when the sun is the brightest. As the demonstration goes further, the globe will spin slowly counterclockwise. As the Earth rotates, it is daytime where the sun lights up the Earth, and nighttime where it does not. Students will then look at the demonstration of rotation (give the globe a few pushes so it spins independently, and use hand to slowly push the globe around the light bulb indicating to students that it would take a year in real life, for the Earth to revolve around the Sun.</p> <p>As a class, an anchor chart will be developed to help students remember the difference between the two key terms. Students will demonstrate their understanding by completing a “Rotation vs. Revolution” activity.</p> |
| Lesson 4 | Seasons | <p>Today, students will look at the article “What Causes the Seasons?” Students will read and highlight what they find important. After a few moments, discuss the article as a class. Through demonstration, direct and indirect light by using a flashlight. Dim the classroom lights. Inform students that the light of the flashlight is to simply represent the sun. Shine the light onto a blank paper and have a student trace the outline of the light. Inform students that all of the light energy is concentrated in this circle. Afterwards, tilt the flashlight and have a second student trace this outline. Inform the students that this is called indirect light. Students will examine how the light is not as bright in all areas and they will find that this is because the same amount of light energy is spread out in a larger area. Tilting the flashlight even more, have a third student come up to the front of the class and trace the outline of the light in the third marker color. Students will notice the more indirect the sunbeam, the larger the area, but the same amount of energy. Note to students that if this was a real situation, the direct sunlight would be warmer than the indirect light. While assessing student knowledge and understanding, students will fill out a “Ticket Out the Door” slip (What causes the seasons? Explain with words and a picture).</p> |
| Lesson 5 | Plants and Animals Response to the Seasons | <p>In today’s lesson, students will examine plants and animals’ response to the seasons. Students will be shown various images that include a deer in the winter and a deer in the summer. Students will be asked questions that consist of:</p> <ul style="list-style-type: none"> - What is the weather like in this photograph? - What season was this photograph taken in? |

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| | | <p>When showing the students, the photograph of a deer in the summer (repeat previous questions) and ask:</p> <ul style="list-style-type: none"> - What is different in a forest in the winter, compared to the summer? (Discussing plant life, as well) - How do you think the life of a deer is different in the winter compared to the summer season? <p>Students will be split into four groups by the use of popsicle sticks. Each group will be given a season to research. After students read their one-page article, students will engage in discussion about the key points of their season as a group. As students become scientific experts on their topic, the groups will shuffle to ensure that one scientific expert of each season is in a group. Students will teach each other about each season and use the four quadrants paper to demonstrate their understanding. Students will then fill out a "Ticket Out the Door" slip (Explain two ways animals change to survive the changing seasons? And draw and label to show the difference between deciduous and coniferous trees).</p> |
| Lesson 6 | Phases of the Moon | <p>In today's lesson, students will interact with "The Moon and Its Phases" article by reading and highlighting essential information. Afterwards, we will discuss the article as a class while displaying the "Order of the Phases" poster to ensure understanding (pictures/visuals of the different Moon phases).</p> <p>Students will progress into an all-class demonstration/activity that demonstrates the moon phases such as the new moon phase, the waxing crescent phase, the waxing gibbous phase, the full moon phase, the last quarter phase, and the waning crescent moon. This demonstration will consist of:</p> <ol style="list-style-type: none"> 1) In the classroom space, we will have the lights dimmed. The lamp will be placed in the middle of the room. Each student will poke their pencil into the Styrofoam ball and hold it out like a lollipop. Inform students that the ball represents the moon and that the light bulb represents the sun. The students' body will represent the Earth. Students will be positioned so that they are in a circle, with the lamp in the middle. Students should be facing the lamp. 2) Next, each student will hold their arm straight out. This will show the new moon phase. Here, the sunlight is shining on the far side of the Moon and the Moon can not be seen from Earth. 3) Now, students will rotate their body about 45 degrees counterclockwise. They will see a thin crescent lit up on the right-hand side of the Moon. This is called the waxing crescent phase. 4) Turning again, students will now be 90 degrees from the lamp. The right half of the ball will be lit up and the left side will be dark. Students will recognize that this is the right quarter. 5) Students will again turn, and this will show the waxing gibbous phase. 6) Students will turn again while standing with their back to the lamp. The moon is opposite the sun and the near side of the moon is fully lit up. This is called the full moon phase. 7) Students will turn again to see the waning gibbous phase in which they will now see less of the moon lit up. 8) Being $\frac{3}{4}$'s of the way around, students will turn and will now be looking at the last quarter phase. Here, they will see the left side lit up, and the right side will be dark. It will be noted that this is the opposite of the first quarter. |

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| | | <p>9) As they turn one more time, students will see only a small portion of the left side lit up while the rest will be dark. This is called the waning crescent moon phase.</p> <p>10) Finally, the final turn will have students standing in their original position in which they are looking at the new moon phase again. Students will be reminded/taught that this pattern takes 28 days and repeats.</p> <p>Afterwards, students will explain their understanding with words and pictures on blank or lined paper.</p> |
| Lesson 7 | Tides | <p>In today's lesson, students will read and highlight/underline important information in the "What Causes the Tides?" article. After a few moments, we will discuss the article as a class.</p> <p>Afterwards, there will be an all-class demonstration of the concept of tidal bulges, or high tides to solidify understanding. Materials needed will include one rubber band per student and one for teacher, one mini whiteboard and one whiteboard pen per student and one each for the teacher. This demonstration will consist of:</p> <ol style="list-style-type: none"> 1) Each student will use a whiteboard marker to draw a small Earth in the center of the rubber band on a mini whiteboard while also drawing a small moon outside of the rubber band. 2) Students will then place a finger on the inside edge of the rubber band that will represent the gravitational pull of the Moon. It is important that the finger is in line with the moon and students should place another finger inside the rubber band on the side opposite of the Moon. 3) As we follow a straight line, students will slowly pull the fingers out away from the Earth. The rubber band will stretch here to indicate that the Moon is pulling on the water molecules in the oceans on the near side of the Earth. It will be taught that on the far side, there is little pull, and the differences cause the tidal bulges, or high tides. |
| Lesson 8 | Solar Eclipses | <p>In today's lesson, students will explore the concept of solar eclipses through a means of reading and interacting with the article "Solar Eclipses" and highlighting/underlining significant information. In a few moments, we will discuss the article as a class and students will be granted the opportunity to watch an informative video of a real solar eclipse Total Solar Eclipse (2017) - YouTube Followed by this, we will discuss the video we just watched as a class. Showing the students an image of the Earth, Moon, and Sun to scale will be beneficial in explaining how an eclipse operates through a more visual operation.</p> <p>Afterwards, students will demonstrate their understanding by completing the "Solar Eclipses" worksheet.</p> |
| Lesson 9 | Lunar Eclipses | <p>In today's lesson, students will read the "Lunar Eclipses" article to explore information about lunar eclipses and will highlight/underline important information that they deem essential. Followed by this, we will discuss the article as a class and students will be given the opportunity to watch a video of a real lunar eclipse for visual learning. 2022 Full Lunar Eclipse ~ Time Lapse - YouTube</p> <p>Afterwards, students will complete the "Lunar Eclipses" worksheet to demonstrate their understanding followed by completing a Venn Diagram that will compare solar eclipses and lunar eclipses. Teach students what a Venn Diagram is used for and where you put similarities and differences.</p> |
| Lesson 10 | Nocturnal and Diurnal Animals of North America | <p>In today's lesson, students will explore nocturnal and diurnal animals of North America. Through reading and highlighting/underlining important information in the "Nocturnal and Diurnal Animals" article, students</p> |

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| | | <p>will become intrigued and wanting to learn more about the topic. Followed by this, discuss the article as a class and focus on each of the five adaptations. As the talk progresses, create a class anchor chart to help students remember the five adaptations. Afterwards, have students complete the “Nocturnal and Diurnal Animals” sorting worksheet to solidify understanding.</p> <p>Afterwards, have students complete the “Nocturnal and Diurnal Animals” t-chart to compare nocturnal and diurnal animals (students can write point form notes or use pictures to demonstrate their thinking and understanding)</p> <p>Afterwards, have the students demonstrate what they know by creating a comic strip with templates or blank paper. Students can have the opportunity to choose what their comic strip entails whether it be:</p> <ul style="list-style-type: none"> - Selecting one of the animals discussed in the article and explain a day (and night) in their life. - Explain the five adaptations of nocturnal animals. - Demonstrate an interaction between a diurnal and nocturnal animal in which they are being compared. <p>Students can use the internet to research their animals further to help them with this task if they wish.</p> |
| Lesson 11 | <i>Plants and Animals Response to the Moon</i> | <p>In today’s lesson, students will be taught information from a valuable PowerPoint resource called the “Plants and Animals Response to the Moon”. Students will respond to this teaching by being given a response sheet in which they will use words or pictures to demonstrate their understanding and give a thoughtful response (students will need to give at least three responses). Students will be given the response sheet ahead of time so that we can work through it together as a class to increase discussion about the questions and answers.</p> |
| Lesson 12 | <i>Final Project: Moon Phases Visual Poster</i> | <p>To finalize this science unit, students will be given the opportunity to create their own labelled moon phases visual poster board demonstrating the full moon, waning gibbous, first quarter, waning crescent, new moon, waxing crescent, last quarter, and waxing gibbous surrounding a drawing of the Earth and the Sun facing the detailed visual to ensure understanding. Using Oreo cookies, students will create their Moon phases on their poster and the teacher will model these steps:</p> <ol style="list-style-type: none"> 1) Students use the frosting of Oreo cookies to visualize the phases of the moon using the contrast of the frosting and cookie to represent light and shadows on the surface of the moon as seen from Earth. Each student will need 8 Oreo cookies and a popsicle stick or other tool for scraping the frosting. 2) Students will slowly twist open an Oreo cookie to leave as much frosting on one side of the cookie as possible. 3) Students will then use the popsicle stick or scraper to create the Moon phases out of the frosting (the Moon phases will be arranged in order and in a circle like motion since the phases occur in cycles while also surrounding a drawing of the Earth and a Sun on the outside of the Moon phases circle to represent the light source). 4) Before students begin this poster/project, an exemplar will be provided. |

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| | | <p>The students' finished products will be hung up on the bulletin board in the hallway or in the classroom when completed. An exemplar will be provided for students to take note of before beginning.</p> |
| <p>Resources needed:</p> | | |
| | <p>Resources that are needed within this unit include a variety of worksheets, outlines, templates, and printables. Additionally, through various demonstrations, a lamp, globe, pompoms, flashlight, elastic bands, whiteboards, sticky notes, markers, and poster boards are needed to be made available.</p> | |
| <p>Interdisciplinary connections: (e.g. How did you weave ELA, Social Studies, Science, Math, Fine Arts, and/or ADST together in this instructional sequence?)</p> | | |
| | <p>English Language Arts – Students will be working on highlighting/underlining information and deciphering important information from the text. Fine Arts – Students will be practicing drawing/sketching certain features such as in a comic strip while demonstrating understanding and communicating messages to their viewers of each Moon phase through a creative, visual poster.</p> | |
| <p>Reflection</p> | | |
| | <p>How did the unit go? How do I know?</p> | |
| | <p>Where to next?</p> | |

CARDINAL DIRECTIONS

North, East, South,
West

EQUATOR

an imaginary circle around the Earth that is the same distance from the North and South Poles

DEGREES

measurement of an
angle

CLOCKWISE

motion that occurs in the
same direction as the
clock's hands

COUNTER CLOCKWISE

motion that occurs in the
opposite direction of the
clock's hands

ORBIT

curved path of an object
around a point in space

ROTATE

to spin around

REVOLVE

to move around
another object

DIRECT SUNLIGHT

sunlight that shines
straight on an object

INDIRECT SUNLIGHT

sunlight that shines on
an angle on an object

SEASON

a time of year with certain
weather patterns and day
lengths

DECIDUOUS

a tree that sheds its
leaves each year

CONIFEROUS

a tree that stays
green all year

HIBERNATE

a state of deep sleep in
the winter months

MIGRATE

when animals move to another
place to meet their needs

NEW MOON

the moon is completely
dark

WAXING CRESCENT

a small part of the right side
of the moon is lit, but the
rest is still dark

FIRST QUARTER

the right half of the moon is lit, but the left half is dark

WAXING GIBBOUS

most of the moon is lit, but
a small part on the left side
is still dark

FULL MOON

the entire moon is lit

WANING GIBBOUS

most of the moon is lit, but a small part on the right is dark

LAST QUARTER

the left half of the moon is lit, but the right half is dark

WANING CRESCENT

a small part of the left side
of the moon is lit, but the
rest is dark

TIDE

the rise and fall of ocean
water

GRAVITATIONAL PULL

the attraction between two
masses

NOCTURNAL

animals that sleep during the day and are active at night

DIURNAL

animals that sleep at night
and are active during the day

HEMISPHERE

“hemi” means half in Greek;
a hemisphere is half of the Earth

SOLAR ECLIPSE

when the sun is blocked by
the moon

LUNAR ECLIPSE

when the moon passes behind
the Earth's shadow

UMBRA

the fully shaded inner region
of a shadow

PENUMBRA

the partially shaded outer
region of a shadow

AXIS

an imaginary line around
which Earth spins

Name: _____

Poster Scoring Rubric

Topic: _____

| Criteria | 1 | 2 | 3 | 4 |
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| Identifies the topic | Topic is unclear | Topic is somewhat clear | Topic is clear and represented throughout | Topic is clearly and neatly represented throughout |
| Illustrations support text | Illustrations support text in a limited way | Illustrations support text with some effectiveness | Illustrations support text with considerable effectiveness | Illustrations support text with a high degree of effectiveness. Thorough research is evident |
| Key words support poster (Labels, title, bullet points, etc.) | Key words support poster topic in a limited way | Key words support poster with some effectiveness | Key words support poster with considerable effectiveness | Key words support poster with a high degree of effectiveness. Research is evident. |
| Use of Conventions (Spelling) | Uses conventions with limited effectiveness | Uses conventions with some effectiveness | Uses conventions with considerable effectiveness | Uses conventions with a high degree of effectiveness |

Total Score: /16 7

Comments: