

Rigorous Curriculum Design

Unit Planning Organizer

Subject(s)	Science
Grade/Course	4th
Unit of Study	Moon
Unit Type(s)	Topical
Pacing	3-5 school days of lessons; 30 days of student observations

Priority Essential Standards

Essential Standard: 4.E.1 Explain the causes of day and night and phases of the moon.

*4.E.1.1 Explain the cause of day and night based on the rotation of Earth on its axis.

*4.E.1.2 Explain the monthly changes in the appearance of the moon, based on the moon's orbit around the Earth.

“UNWRAPPED” Priority Standards

Explain why day and night happen. Discuss that Earth rotates on its axis.

Explain how we can see the moon and why it looks different throughout the month. Discuss that the moon orbits around Earth.

“Unwrapped” Concepts (students need to know)	“Unwrapped” Skills (students need to be able to do)	Bloom's Taxonomy Levels
<ul style="list-style-type: none"> - day vs. night → caused by rotation (turn) on axis - moon phases happen because of sun's reflection on moon as it orbits around Earth 	<ul style="list-style-type: none"> - make independent observations - take notes - build a model - work with a cooperative group 	

Essential Questions	Corresponding Big Ideas
1. How are day and night caused? 2. Why does the moon shine at night? 3. Why does the moon look different every night?	1. Day and night are caused by the rotation of Earth on its axis. 2. The moon reflects the light of the sun. 3. The moon goes through phases because it orbits around the Earth while it reflects the sun's light.

Standardized Assessment Correlations (State, College and Career)	
No standardized science assessment in 4 th grade at this time.	
Unit Assessments	
Pre-Assessment	Informal Progress Monitoring Checks
Pre-assessment will be aligned (directly matched to post-assessment but with questions that are less in-depth).	<ul style="list-style-type: none"> - participation in class simulations of the movement of the sun, Earth, and moon - cooperative group work on Oreo phases activity - individual results on a sort matching the the pictures and words of phases - informal class and individual discussion about WHY the moon appears as it does and WHY day and night occur
Post-Assessment	
***Note: Pre- and Post-Assessments, as well as a moon phases sort, are attached.	
Scoring Guides and Answer Keys	
***Note: The Post-Assessment answer key is attached. The post assessment is scored as a fraction out of 26. The points are listed beside each question.	

Engaging Learning Experiences	
Learning Activities Using Text or Program	Authentic Performance Tasks
<p>- Intro activities: KWL chart Read a book about the moon to build background.</p> <p>-Students should take notes throughout, including essential questions and unwrapped standards.</p> <p>- Model day and night: Use flashlights (sun), mirrors (moon), and globe (earth) to model → (Talk about day and night, in relation to the rotation of the earth and in relation to the sun. Use a flashlight and a globe to model this. Be sure to point out that the earth's axis is on a tilt, a 23.44-degree tilt, to be exact.)</p> <p>-Model the phases of the moon: Have a few kids come up to the class to model two of the main phases: new moon and full moon. Have one kid hold a yellow piece of construction paper, to stand for the sun. Have a second kid hold a blue piece of construction paper, to represent the earth. Finally, have a third kid hold a white piece of construction paper to represent the moon. See if the "moon" student can determine exactly where to stand in relation to the sun and earth, to represent a new moon. Have other students share which phases follow the new moon on its path to becoming a full moon.</p> <p>- Oreo Phases of the Moon Activity → http://www.leosciencelab.com/educators/lesson-plans/oreo_moon_phases.php</p> <p>- Teach a phases of the moon song or rap to help students remember phases.</p> <p>-Art/Research/Writing Activity: Cut a circle out of wax paper for each student. Students crunch it once to make "craters." Students then use a Sharpie to make their moon look like a phase they have seen. Glue their moons on black construction paper. Each student researches online to find what kind of moon they have created. Write a descriptive paragraph about the phase they chose. Include __ details.</p>	<p>- After acting it out as a class and in small groups, draw diagram showing how day and night occur (include sun and earth, and lines showing direction of light).</p> <p>- After modeling how the moon appears to shine and phases of the moon occur as a class and in a small group, draw diagram showing why the moon appears to shine (include sun, moon, earth, and lines showing direction of light)</p> <p>- Students perform a Phases of the Moon song or rap and explain it.</p> <p>- Students complete a sort of the phases of the moon.</p> <p>- Over the course of a month, students should keep a "moon journal" and draw what the moon looks like each night. Students attempt to label the phases that they see.</p>

Research-Based Effective Teaching Strategies	21st Century Learning Skills
<p><input checked="" type="checkbox"/> Summarizing and Note Taking _ Homework and Practice</p> <p><input checked="" type="checkbox"/> Nonlinguistic Representations _ Cooperative Learning</p> <p><input checked="" type="checkbox"/> Setting Objectives, Providing Feedback _ Interdisciplinary Non-Fiction Writing</p>	<p><input checked="" type="checkbox"/> Teamwork and Collaboration</p> <p><input checked="" type="checkbox"/> Innovation and Creativity</p> <p><input checked="" type="checkbox"/> Critical thinking and Problem Solving _ Accessing and Analyzing Information _ Other</p>

Differentiation Strategies (Additional Supports + Enrichment)	Intervention Strategies (Tiers 1, 2, 3)	Specially Designed Instruction for Special Education Students	Strategies for English Language Learners
<p>-For the phases sort, leave the pictures attached in order as needed.</p> <p>- See "Enrichment/ Extension" below.</p>		<p>- Give students guided notes that follow your instruction.</p> <p>- Have students work with a buddy as needed.</p>	<p>-Develop hand motions to help students with vocabulary.</p> <p>-Have students work with a buddy to develop explanations in words to match diagrams.</p>

Instructional Resources and Materials	
Physical	Technology-Based
<p>- Oreo Phases of the Moon Activity → http://www.leosciencelab.com/educators/lesson-plans/oreo_moon_phases.php</p> <p>- <i>The Moon Book</i> by Gail Gibbons</p> <p>- <i>Phases of the Moon</i> by Gillia M. Olson</p> <p>- Over the course of a month, students should keep a "moon journal" and draw what the moon looks like each night.</p>	<p>- http://cmse.olemiss.edu/files/2011/11/Just_a_Phase.pdf → background info on moon phases and an activity possibility</p> <p>- http://www.solarsystemscope.com/ → You can see the Earth's rotation and relationship with the sun and moon.</p> <p>http://www.berghuis.co.nz/abiator/patana/5t/science/eab_b.html → shows the rotation of earth on its axis and how day and night are caused</p> <p>http://www.berghuis.co.nz/abiator/patana/5t/science/eab_d.html → this shows the moon rotating around the earth and the earth rotating around the sun</p> <p>http://www.berghuis.co.nz/abiator/patana/5t/science/eab_f.html → this shows and explains the phases of the moon</p> <p>http://www.berghuis.co.nz/abiator/patana/5t/science/astron3.html → this has a fill-in quiz about the moon and more info about phases</p> <p>http://www.wonderville.ca/asset/phases-of-the-moon → video on moon phases</p> <p>http://www.harcourtschool.com/activity/moon_phases/ → shows moon phases; can be paused</p> <p>http://www.moonconnection.com/moon_phases_calendar.phtml → see a calendar of the phases of the moon.</p>

Unit Vocabulary Terms		Enrichment / Extension	Interdisciplinary Connections
<p>“Unwrapped” Priority Standards Concepts</p>	<p>Supporting Standards Concepts and Other Unit- Specific Terms</p>	<p>- W.4.3→ Write narratives to develop imagined experiences or events using effective technique, descriptive details, and clear event sequences → Write a pourquoi tale explaining why the moon changes shape OR why it looks like it does at a certain time.</p>	<p>- Math (patterns) → Operations and Algebraic Thinking 4.OA.5 (Generate and analyze a shape pattern)</p>
<p>- rotation - reflection - axis - orbit - waxing - waning</p>			

Score: /26

Name: _____

Date: _____

Moon Assessment

1.) Label the correct moon phases. Be sure to label if the moon is waxing or waning on the single line below each row. (10 points)





2.) Write at least one sentence to describe how the moon appears to shine at night. (2 points)

3.) Below, draw a diagram and label it to explain how the moon appears to shine. (3 points)

**Use the back of the paper if you need more space.*

4.) What causes day and night? Describe this phenomenon (occurrence) in at least one sentence. (2 points)

5.) Below, draw a diagram and label it to explain how day and night are caused. (3 points) **Use the back of the paper if you need more space.*

Fill in the blanks with the words from the word bank. (1 point each)

WORD BANK:					
orbit	rotation	axis	waxing	waning	reflect

6.) The invisible line that runs through the earth, from the North to South Pole, is called its _____.

7.) As the moon phases move from the new moon to the full moon, the moon is considered to be _____, or “getting bigger.”

8.) The _____ is the path that the moon takes as it moves around the earth.

9.) As the moon phases move from the full moon to the new moon, the moon is considered to be _____, or “getting smaller.”

10.) Another word for a circular movement around an object is a _____.

11.) The _____ of the light of the sun on the moon helps cause the phases of the moon.

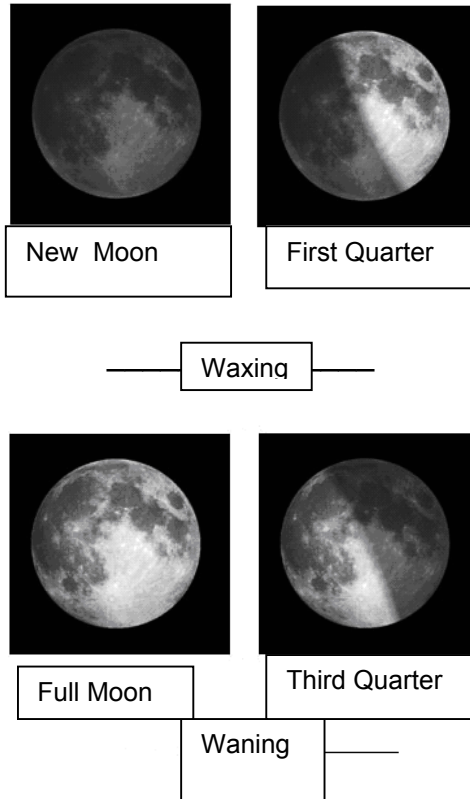
Score: /26

Name: _____

Date: _____

Moon Assessment Answer Key

1.) Label the correct moon phases. Be sure to label if the moon is waxing or waning on the single line below each row. (10 points)



2.) Write at least one sentence to describe how the moon appears to shine at night. (2 points)

The sun shines on the moon. The light reflects off it toward earth so that we can see it.

3.) Below, draw a diagram and label it to explain how the moon appears to shine. (3 points) **Use the back of the paper if you need more space.*

4.) What causes day and night? Describe this phenomenon (occurrence) in at least one sentence. (2 points)

The sun shines onto one half of the Earth. On that side, it is day. As the Earth rotates on its axis, the sun shines on different parts of the Earth. When the sun is not shining, it is night.

5.) Below, draw a diagram and label it to explain how day and night are caused. (3 points) **Use the back of the paper if you need more space.*

Fill in the blanks with the words from the word bank. (1 point each)

WORD BANK:					
orbit	rotation	axis	waxing	waning	reflection

6.) The invisible line that runs through the earth, from the North to South Pole, is called its .

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