

TITLE: Lunar Phases

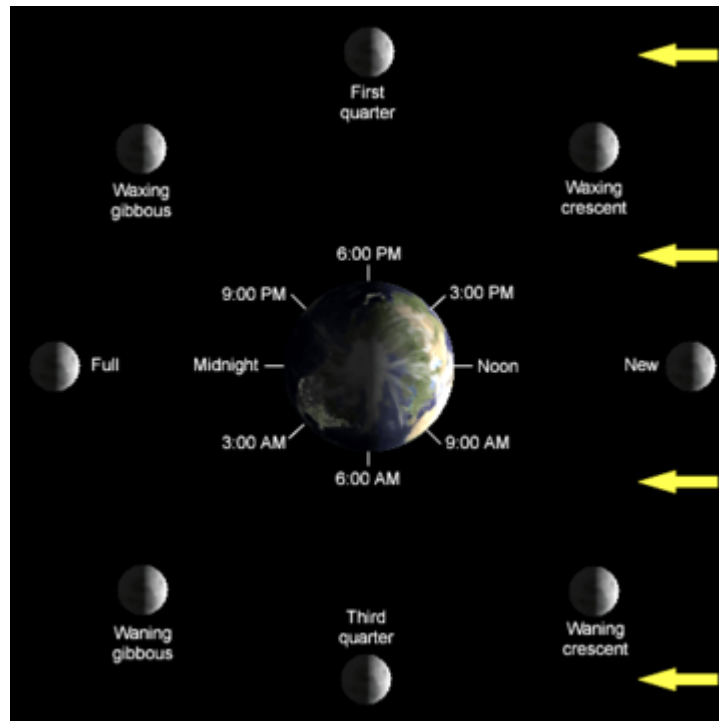
AUTHOR:

TEAM MEMBERS:

DATE LESSON TO BE TAUGHT:

GRADE LEVEL: 5

Concept(s): The phases of the moon are caused by the Moon's revolution around the Earth. Light is not emitted by the Moon itself; rather, the Sun acts as the constant light source. The phases in sequential order are: New Moon, Crescent, First Quarter, Waxing Gibbous, Full Moon, Waning Gibbous, Last Quarter, Crescent, and New Moon. In this lesson, students will investigate the phases of the Moon and understand why this cycle occurs monthly.



OBJECTIVES The student will be able to:	Evaluation Question for each Objective
Recognize the Sun as a light source which allows us to see the Moon	True or False: The moon produces light. <i>False</i>
Identify and illustrate the phases of Moon in sequential order	<p>Which of the following states the correct order of the moon phase?</p> <p>A. New Moon, First Quarter Moon, Waxing Gibbous Moon, Waxing Crescent Moon, Full Moon, Waning Gibbous, Third Quarter Moon, Waning Crescent Moon</p> <p>B. <i>New Moon, Waxing Crescent Moon, First Quarter Moon, Waxing Gibbous Moon, Full Moon, Waning Gibbous Moon, Third Quarter Moon, Waning Crescent Moon</i></p> <p>C. New Moon, Full Moon, First Quarter Moon, Waning Crescent Moon, Waxing Gibbous Moon, Third Quarter Moon, Waning Gibbous Moon, Waxing Crescent Moon</p> <hr/> Illustrate all 8 phases of the Moon and correctly label those phases. Include the Sun and the Earth. (Hint: Think about the notes we took and the activity)
Explain the phases of the moon are a result of the Moon's revolution around the Earth, which occurs about every 27.3 days.	<p>The phases of the Moon occur because:</p> <p>A. Clouds cover part of the Moon B. The Earth's shadow falls upon the Moon C. The Moon revolves around the Earth</p> <hr/> About how long does it take the Moon to revolve around the Earth? A. 31 days B. <i>27days</i> C. 13 days D. 30 days

Resources:

Picture Perfect Science Lessons. By: Karen Rohrich Ansberry and Emily Morgan. NSTA press.

<http://www.wonderville.ca/v1/activities/phases/phases.html>

Texas Essential Knowledge and Skills (TEKS):

The student is expected to:

5.6 The student knows that some change occurs in cycles.

A. Identify events that occur on a regular basis such as in daily, weekly, lunar and seasonal cycles

- 5.3 The student uses critical thinking and scientific problem solving to make informed decisions
 C. Represent the natural world using models and identify their limitations

MATERIALS LIST and ADVANCED PREPARATIONS:

For the class:

- (1) Lamp
- (2) Extension Cord

For each pair of students:

- (1) Foam ball with a dowel rod pushed through the N-S axis
- (2) Flashlight

SAFETY: Do not touch the light bulb or use the foam ball with dowel rod as a sword or as any other toy.

ENGAGEMENT		
What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Students Will Do
Ask all the students to come to the front of the room for story time. Read a book that has to do with the moon. Suggestions include: Eric Carle’s <i>Papa, Papa Get the Moon For Me</i> , Margaret Wise Brown’s <i>Goodnight Moon</i> , Frank Asch’s <i>Happy Birthday Moon</i> , etc. Ask questions about the moon while reading. You may want to customize the questions to fit the book that is being read. Affirm that the moon does have phases and that is why it appears different to us at certain times.	What is the moon? Where does the light from the moon come from? Does the moon always look the same? How long does it take for the moon to look the same again?	Students will gather for story time. Students will answer questions.
Ask all the students to go back to their seats.		Students will return to their seats.

TRANSITION
Tell students that today we will be learning more about the mysterious nature of the moon by creating a model of the Sun, Earth, and Moon.

EXPLORATION		
What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Students Will Do
Begin by asking students what a model is.	<p>What is a model? What are some limitations of a model? Benefits? How will a model help us explore how the phases of the moon occur?</p>	Students will answer questions.
Now divide the class into pairs. Assign each student in the pair either as 1 or 2. This will correspond to their role in the activity. Pass out one foam ball and one flashlight to each pair.		Students will divide into pairs.
<p>Ask all students whose number is 1 to be the one that holds the flashlight, which will act as the Sun. All 2 students will be acting as the Earth while they will be holding the foam ball right in front of them and a little above their head. The foam ball which will be the Moon. Students will first hold the Moon in front of them. This will be the first phase (New Moon). Students will then move clockwise until they are facing away from the light. They will note that the Moon appears to be changing shape. The light appears to increase from right to left on the side of the model facing you. This means the Moon is waxing. Students will continue to rotate to the left, noting that the light appears to decrease from right to left on the side of the model facing the student; this means the moon is waning. One complete rotation is done. Students should continue this one more time with the teacher guiding them</p>	<p>Where is the light being emitted from? How much of the moon is lit up by the Sun?</p> <p>What phase is this? (Repeat for each position)</p>	<p>Students will observe the different phases.</p> <p>Students will answer questions to guide them through the phases.</p> <p>Students will act as both the Sun and the Earth.</p>

through the names. A little bit of light on the right side of the model is the Waxing Crescent Moon, light on the right half of the side of the model is the First Quarter Moon, light on most of the whole face is the Waxing Gibbous Moon. Students will switch places and repeat the activity.		
In order to make sure that students are learning the names of the phases, you may wish to write the phase names on the board.		

TRANSITION
Let's observe all the phases now.

EXPLANATION		
What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Students Will Do
Ask all the students to get into a circle. Have 8 students hold foam balls into the 8 positions around the Sun. Have other students hold the names of the phases. As you rotate around the sun, ask students what the names of the phase is. Ask the student holding that label to hold that label above that foam ball. Students will be able to now see the entire cycle. You may want to run through this cycle a few times to make sure students understand and are getting familiar with the terms.	What phase is this? How do you know? Which side of the Moon is lit up? What causes the phases?	Students will do the activity and further their understanding of the phases.
Now that you have observed why the phases occur and learned the names of the	What phase is this? How do you know this? Where is the light being	Students will take notes on the phases of the Moon and illustrate the Moon.

<p>phases, we are going to take notes. Ask students to take out a sheet of paper to take notes on. Ask students to draw the Sun in the center and to draw Earth's orbit (make sure it is mostly circular to emphasize that Earth's distance from the Sun is mostly constant; note that the orbit is elliptical) Place the transparency 'Phases of the Moon' onto the overhead. Guide students through each phase and instruct students to draw what the Moon will look like. Label each phase accordingly. You may wish to do the same thing on the overhead or board after students are explaining the answers.</p>	<p>emitted from? What causes the Moon to look different? What does Waxing mean? What does Waning mean?</p>	
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TRANSITION		
Let's further our understanding of the phases with this activity. Put away your notes, please.		

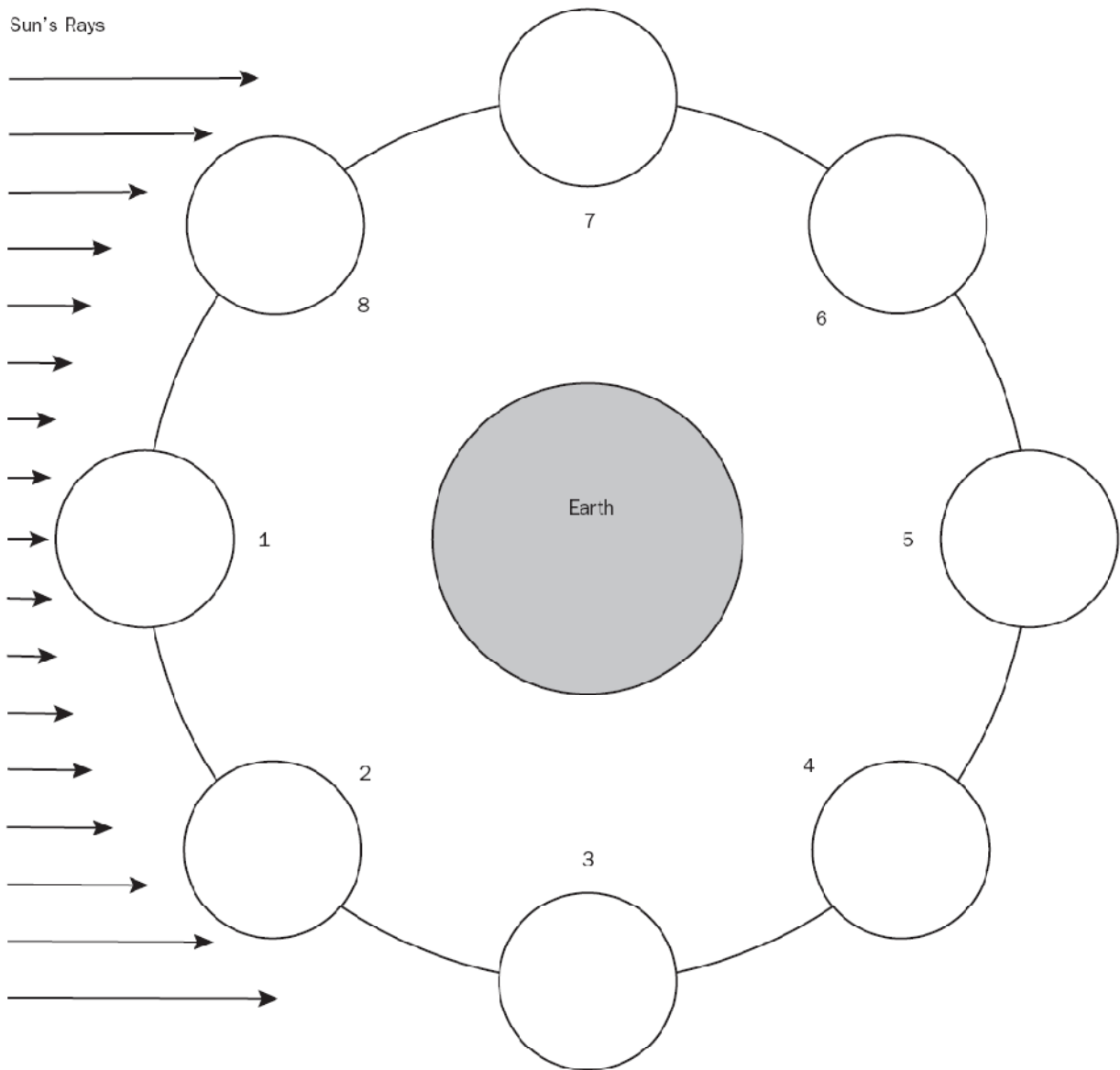
ELABORATION		
What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Students Will Do
<p>Pass out the card sort activity to each student. Ask students to label each phase with the correct name. Make sure that students are doing the activity themselves. This is not a group activity. Remind students that if they are getting confused, to think back to the activity.</p>	<p>What phase is this?</p>	<p>Student will do the card sort activity.</p>
<p>After students complete the activity, call on volunteers to review the answers.</p>		<p>Students will review answers.</p>

Name: _____

Class: _____ Date: _____

Student Sheet 5.1 Investigating the Moon's Reflected Light

Directions How much of the Moon is illuminated by the Sun at each position as the Moon orbits Earth? Color each circle as you complete Inquiry 5.1. Remember to look down at the Moon from all angles as if you were out in space.

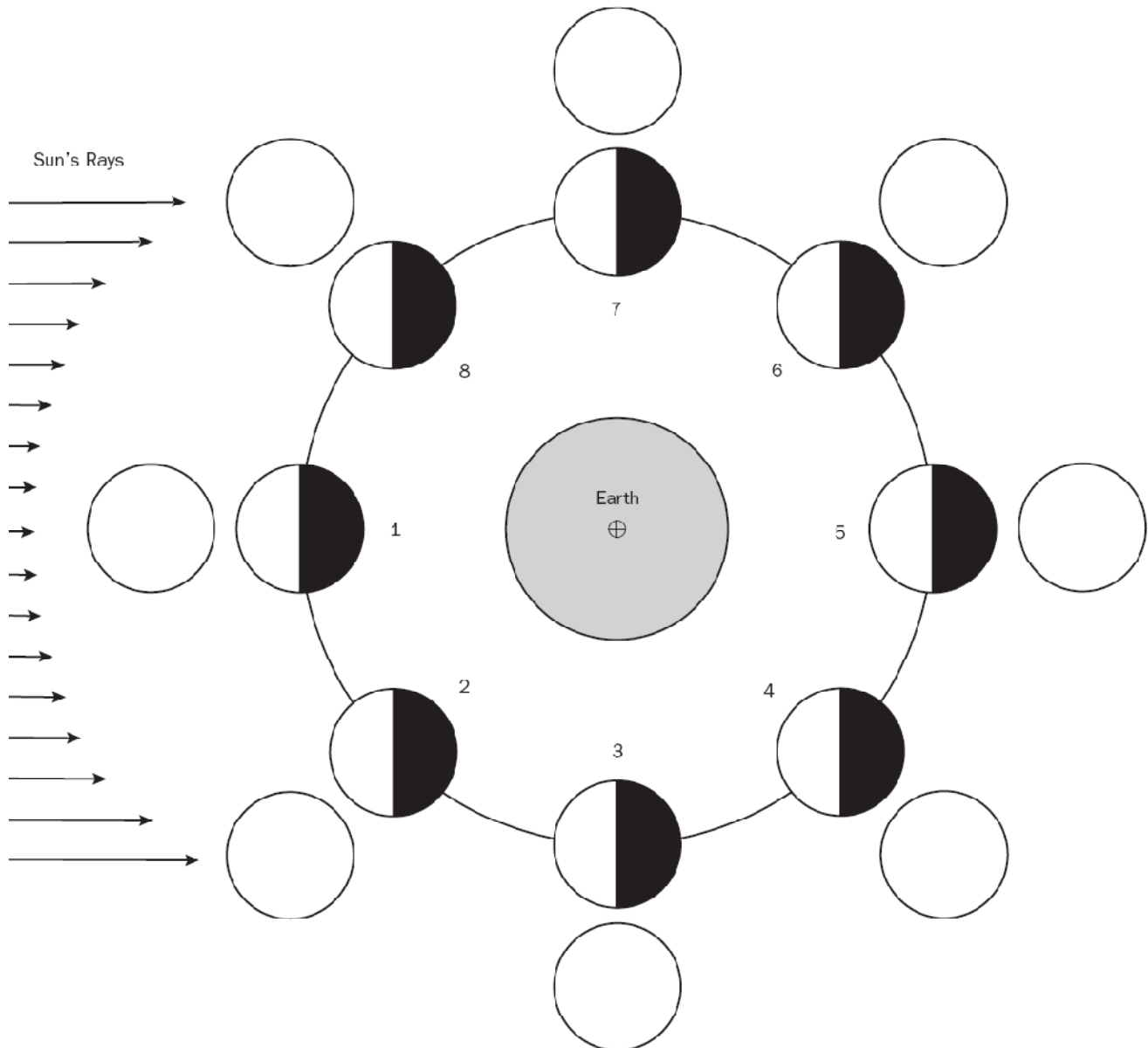


Name: _____

Class: _____ Date: _____

Student Sheet 5.2 Modeling Phases of the Moon

Directions How much of the illuminated side of the Moon can you see from Earth as it completes its orbit? Draw your results in each circle.

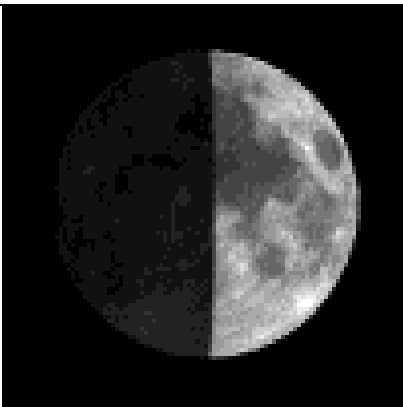




New
Moon



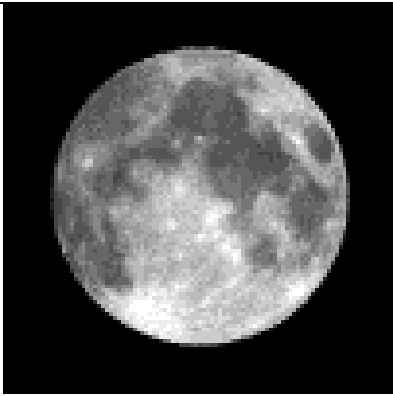
Waxing Crescent



First Quarter



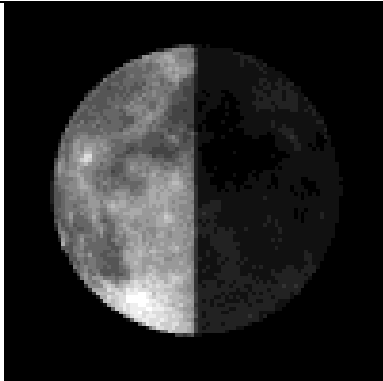
Waxing Gibbous



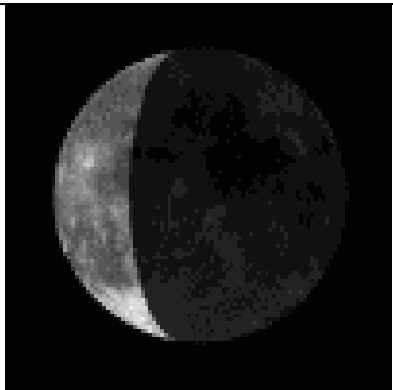
Full
Moon



Waning Gibbous



Last Quarter



Waning Crescent