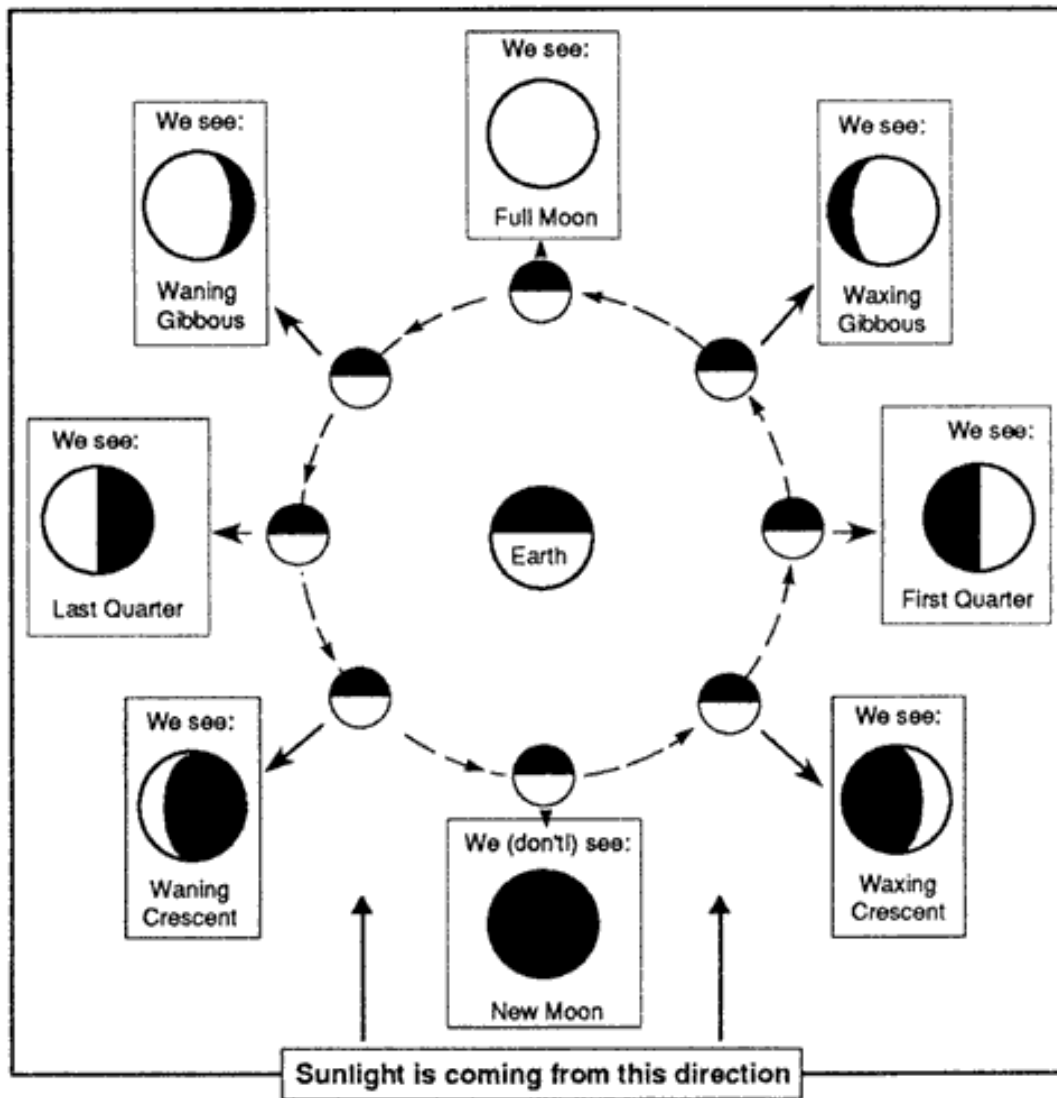


Teaching Moon Phases

Literacy and Hands-On Strategies



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Resources

<http://www.sumanasinc.com/webcontent/animations/content/moonphase.html> an animation of the phases

<http://astro.unl.edu/naap/lps/animations/lps.swf> - Lunar phase simulator

http://www.harcourtschool.com/activity/moon_phases/ - another animation of the phases

<http://www.kidscosmos.org/kid-stuff/phases.html> - moon phase site for kids

http://www.lpi.usra.edu/education/skytellers/moon_phases/activities/phrases_phases.shtml
- a song for moon phases

<http://idioms.thefreedictionary.com/moon> - moon idioms that your language arts teammate could use during your space unit – the site also can be searched for sun or space idioms

If your school subscribes there are also resources on solpass.org, BrainPop, and Edhelper.

The Moon Book by Gail Gibbons

The Moon by Seymour Simon

SIOP LESSON PLAN

Date: 11/21/2008

Grade/Subject: Science 6

Unit/Theme: Space

Standards: SOL 6.8

Content Objective(s):

The student will be able to:

1. Describe changes in the appearance of the moon during a month.
2. Identify the pattern of change (phases) in the moon's appearance.

Language Objective(s):

The student will be able to:

1. Read aloud with a partner.
2. Write an explanation of moon phases.

Key Vocabulary

phases	waxing
waning	crescent
gibbous	new moon
full moon	half moon

Review Vocabulary

rotation
revolution

Supplementary Materials

Large styrofoam ball painted half black on a piece of dowling, Oreos, plastic spoons, paper plates, phase labels, suns, Earths, pennies, quarters, sticky notes

SIOP Features

Preparation

Adaptation of Content
 Links to background
 Links to past learning
 Strategies Incorporated

Scaffolding

Modeling
 Guided Practice
 Independent practice
 Comprehensible Input

Grouping Options

Whole Class
 Small groups
 Partners
 Independent

Integration of Processes

Reading
 Writing
 Speaking
 Listening

Application

Hands-on
 Meaningful
 Linked to objectives
 Promotes engagement

Assessment

Individual
 Group
 Written
 Oral

Lesson Sequence – Lesson actually ended up taking 1 ½ periods to complete. Our block is 75 minutes.

1. Students will individually fill out anticipation guides as the warm up for the day. (3 min)
2. Read the guide together and get a class tally to see if more think the statement is true or false. Ask for any other facts they know about the moon and add to overhead. (3 min)
3. Tell the students this is called an anticipation guide and ask if they have an idea why we did this as our warm up. Try to elicit the idea that we are accessing our background knowledge and starting our thinking about the moon in preparation for today's lesson. As we do the lesson, we will be able to connect what we learn to the anticipation guide. (2 min.)
4. Go over objectives. (2 min.)
5. Review rotation and revolution. Have them stand and rotate. Have students describe rotation to a partner. Have one pair share their description. Review the term axis. (can show visual of Styrofoam ball with a pencil through it). Then have students revolve around their table. Have

- students describe revolution to a partner. Have one pair share their description. Ask the class to compare revolution and rotation with a partner. Have a pair share their comparison. (4 min.)
6. Class will do penny/quarter activity on page 570 to demonstrate that the same side of the moon always faces Earth. Have them predict how many rotations the penny will make before doing the activity.(10 min.)
 7. Discuss the think it over question for penny/quarter activity.
 8. Teacher reads aloud the first two paragraphs and models the procedure for adding visuals to the moon fact sheet for the first two squares. Students also illustrate on their own paper. Teacher takes suggestions from the students for the next two squares. (5 min.) Put sticky note on statement about moon phases.
 9. Have two students model partner reading. (3 min.) To partner read, students put their chairs side by side but facing in opposite directions. They speak in a voice that can only be heard by their partner and alternate paragraphs. After each paragraph the partner who did not read, makes a statement about the paragraph just read before he reads the next paragraph. It can be a summary, a question, a single fact – anything to help the student focus and process the paragraph. This should also signal students if they need to reread a paragraph. Students will partner read pages 570 – 573 and add visuals to the rest of their moon fact sheet (30 min.)
 10. Moon phase demonstration in the room with the large Styrofoam ball. (15 min)
 11. Start by showing them that light from the overhead is reflected from the screen not produced by it.
 12. Have a student represent the sun at the front of the room. Have a group of students represent the Earth in the middle of the room. I do this activity several times because the view of the moon will vary if they are not in the center of the room. This also allows many to participate and they all learn the phases by the repetition of saying them each time.
 13. Show new moon and full moon then spots in between. Have “Earth” students describe what they see. Introduce waxing and waning.
 14. Put up labels in the room as each phase is identified. Keep students involved by having them put the labels up.
 15. Go through once and name the phases.
 16. Go back through a second time and add pictures beside the labels. At this point students can begin to add pictures to their moon phase page.
 17. Once moon phase sheets are completed each table group will use Oreos to make/label a model of the phases of the moon to be checked by the teacher (15 min.)
 18. Using the visual of their model, groups will write a paragraph describing and explaining the phases of the moon. (10 min.)
 19. Class will revisit the anticipation guide for closure. (8 min.)

*When you have students model the partner reading, it works best if you do not choose your “model” students. Generally students will read loudly as if they are reading aloud to the entire class. You can point out that it would be too noisy if everyone read like that. Once a class is used to doing this, they can be in position and ready to read in 10 seconds. It is important to have a signal to actually begin reading. Also be sure to circulate the room and listen as each pair reads.

Anticipation Guides

Purpose: to stimulate student interest in a topic and activate background knowledge before a lesson; to clarify main ideas and bring closure when used again at the end of a lesson

Method:

1. Give each student a copy of the guide and have them mark whether they agree or disagree with each statement. This can be done individually, with partners, or in small groups.
2. Discuss the anticipation guide responses as a whole class allowing students to defend their choices.
3. Read the text or conduct the lesson.
4. Have students mark and discuss statements again at the end of the lesson.

**Students will often mention the guide in the course of the lesson as information comes up that proves or disproves each statement.*

Adapted from 50 Literacy Strategies by Gail Tompkins, 2009



Anticipation Guide
The Moon

Name _____
Date _____ Pd. _____

- | | | |
|-------|--|-------|
| _____ | The moon changes shape. | _____ |
| _____ | The moon produces light. | _____ |
| _____ | We always see the same side of the moon. | _____ |
| _____ | A moon "day" and a moon "year" take the same amount of time. | _____ |
| _____ | The moon revolves around Earth once a year. | _____ |
| _____ | Waxing means getting smaller. | _____ |
| _____ | Waning means getting larger | _____ |

Coin Activity

Purpose: to demonstrate visually the rotation and revolution of the moon and show that the same side of the moon always faces Earth

Background: The moon rotates once on its axis every 27.3 days which is the same amount of time it takes to revolve around Earth. Because of this, the same side of the moon is always facing Earth. A “day” (rotation) and “year” (revolution) are the same length on the moon. It does not look to us like the moon is rotating since we always see the same side.

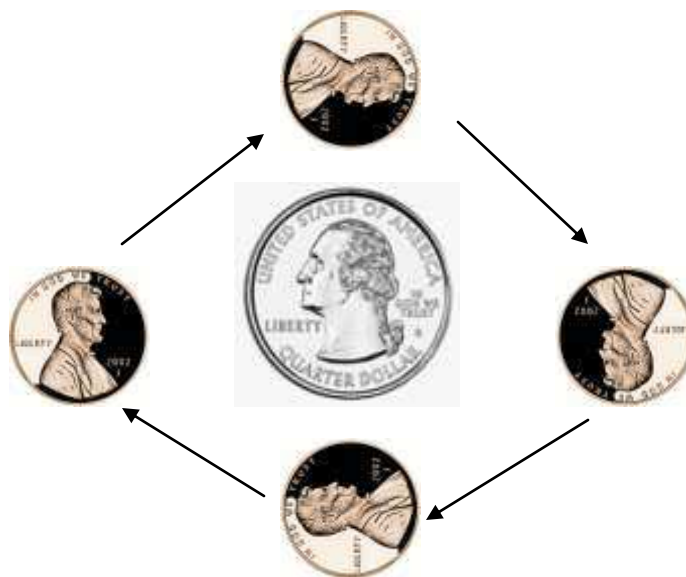
Materials needed: one quarter and one penny per student or pair of students

Procedure:

1. Ask students to predict how many times the penny will rotate during its revolution around the quarter.
2. Have students place the quarter flat on the table to represent Earth.
3. Explain that the same side of the moon always faces Earth. Our penny will represent the moon. Since the same side of the moon always faces Earth, we are going to have Lincoln always looking at the quarter while the penny revolves around it.
4. Have the students rotate and revolve the penny making sure Lincoln continually faces the quarter. They should count how many times Lincoln rotates during one revolution. (It should be once)
5. Ask students what they can infer based on this information. (see background information above)

*It helps to briefly review revolution and rotation with the coins to make sure students remember the difference before talking about them in terms of the moon and Earth.

**Usually some students catch on very quickly, but others have great difficulty with this. I try to circulate around the room making sure at least one person per table has the correct idea and appointing them “expert” to help their tablemates. This works for most of them, and I can go back to individuals who still do not understand. It is also possible to have students physically stand and act it out by walking around the human “earth” while continually facing the person.



Partner Reading

Purpose: To increase student comprehension of nonfiction reading materials

Setting the Stage:

1. Decide beforehand how partners will be chosen (closest person is quickest) and what to do if you have an odd number of students (group of 3, teacher reads with a student). Consider ELL students and students with special needs.
2. Decide beforehand on an amount of time allotted to get ready to read (most groups can do it in about 10 seconds). I count down.
3. Decide beforehand on a signal to begin reading after partners are in place - unless everyone is settled, they will be reading too loudly. Requiring them to move silently is the easiest way.
4. Explain the strategy and purpose.
5. Model the strategy for the whole group using student volunteers.
6. Discuss the modeling (how quickly did they set up, were their voices too loud, etc.)
7. Have them practice moving and reading one or two paragraphs. Discuss how they did. Did they notice any problems or anything to work on?
8. Every time we do this I have them explain the process to me. It only takes a few seconds to focus them and remind them what to do.



Method:

1. Students sit with their chairs side by side but facing in opposite directions. (ear to ear)
2. Students alternate reading aloud by paragraphs. You can individualize this for students with reading or language challenges if time becomes an element. Most students want to read as long as they are paired with a kind classmate.
3. The student who does not read must comment, make a connection, or ask a question about the paragraph read by his partner before beginning his reading.
4. Have a task for them to complete related to the reading when they finish reading aloud. This allows for the difference in time that different partners will need to finish the reading.
****It is very important to move around the room and interact with them as they work****

Sample Task: (see example on back)

1. Choose key facts from the reading and create a worksheet with spaces for the students to illustrate the facts.
2. I project it on the overhead, read the first key fact, and think aloud about my illustration.
3. I read the next key fact and ask for suggestions for illustrations - usually much better than mine!
4. The students complete the rest of the illustrations as the activity after reading.
5. Sometimes we discuss the illustrations, or I share ideas aloud from their papers as I move around the classroom while they are working.

<p>The moon is Earth's closest neighbor. It is 384,400 miles from Earth.</p>	<p>Traveling 100 kilometers per hour, it would take 5 months to get to the moon.</p>
<p>The moon revolves around Earth. Earth revolves around the sun.</p>	<p>It takes the moon 27.3 days to revolve around the sun. It takes the moon 27.3 days to rotate on its axis. That means a moon day and a moon year are the same length.</p>
<p>The moon does not produce light. It reflects light from the sun.</p>	<p>The different shapes of the moon that you see in the night sky are called phases.</p>
<p>Phases are caused by changes in the position of the sun, moon, and Earth.</p>	<p>The phase of the moon depends on how much of the sunlit side of the moon faces Earth.</p>

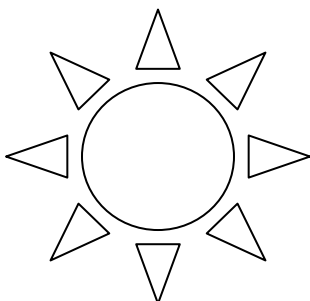
Moon on a Stick

***This is a demonstration that shows the appearance of each phase of the moon. It also shows that the phase that we see depends on the location of the sun, moon, and Earth to each other. To keep the demonstration simple, we do not have the Earth rotate or revolve or have the moon rotate. This can be discussed with students as well as the scale of the sun, moon, and Earth.**

Materials needed: Large Styrofoam ball painted half black on a stick, large sun and Earth, labels for the moon phases, pictures of the moon phases

Procedure:

- Review with students that the moon does not produce light; it reflects light from the sun. (The overhead or projector and screen make a good visual demonstration - they can see that the screen does not produce light, but that when the overhead or projector produces light the screen reflects it)
- Have a student hold the sun and stand at the front of the classroom.
- Have a group of students hold the Earth and stand at the center of the classroom.
- Hand out pictures of the phases and labels for the phases to various other students who will be labeling the model.
- Remind students that if they are in a different position than Earth, they may not see the phase that would be seen from Earth. (I put tape on the floor ahead of time, so that I know where to stand for each phase, so that it looks right from Earth)
- Stand between the sun and Earth with the white side of the moon facing the sun. As you progress through the phases, you will always keep the white side of the Styrofoam ball facing the sun (in other words do not rotate the moon)
- I start with the new moon and full moon. Tell students that the moon is usually a little above or below the Earth. Ask them what happens when the moon and sun and earth are lined up exactly (lunar and solar eclipses - this is a great way to demonstrate those too)
- Then I go through all the phases. Students label the room and put up pictures as we progress.
- We also talk about waxing and waning as we do this. A student last year told me he remembers waxing because when you wax a car or boat, your circular hand movements get larger. This seemed to make sense to the rest of my students.
- Students can trade places and go through the phases again. Students love to be the one with the moon on the stick AKA the moon pop.



Waxing crescent	New moon	First quarter
Waxing gibbous	Full moon	Third quarter
Waning gibbous	Waning crescent	

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