Calendaring the Moon

(Taken from Episode 6.1.1 Changing Moon)

Strand 6.1	Standard 6.1.1	Big Idea: The moon appears to change shape over time in a cyclical pattern.

Title	Time	CCCs	Practices
The Changing Moon	**50 minutes**	**Patterns**	**Argue from evidence**

Phenomenon: The moon's appearance changes over time.

Materials:

- Clark Planetarium PowerPoint under Curriculum and Lessons about half way down: Moon Phase Phenomena (PowerPoint)
- Four to six months showing what the moon looks like from Earth day to day
- Journal
- Calculator

Teacher Directions:

Starter:

1. Show the students the PowerPoint found here--https://slco.org/clark-planetarium/education/for-educators/. You will need to find it under "Curriculum and Lessons" about half way down.
2. Have a discussion about the phenomenon.
    a. Get them to where the Moon seems to change from day to day.
    b. Get them to where the Moon seems to begin a new cycle about every 29 days.
3. Tell them that this is our phenomenon to solve to study as to why the moon does this and also from month to month.

Gathering

Obtain Information

1. Give the students the six months of the calendars that show the changes of the shape of the moon we see from Earth each day.
2. Students are to look at the moon changes from calendar one to calendar two, starting with the new moon on calendar one and ending with the new moon on calendar two. Students are to write down information they see happening from day to day during these 29 or 30 days. (The moon seems to be changing its shape each day from new moon to new moon.)
3. After the students write their findings of the changes of the moon from the new moon to the new moon, the students will then record their findings of the patterns they see from month to month. (The moon goes through the same

pattern from new moon to new moon each month, showing the same phases in order.)

4. They are to record their finding in a journal or on the student worksheet.
5. Students should observe either a full moon or a new moon for several days on both sides, preferably starting with the first quarter and ending at the third quarter or vice versa.

Ask Questions

1. During and after observations, give students time to discuss and ask questions about their observations based on the patterns of the changing appearance of the moon.
2. Have students record their questions in their journals, and keep a class record to discuss later.

Reasoning

Analyze and Interpret Data

1. After the students write their findings, the students will analyze the data by looking for patterns they see from new moon to new moon. (The moon seems to get bigger to a point and then begins to get smaller again until it disappears.) They are to record their finding in a journal or on the student worksheet.
2. As the students analyze the data of the moon changing from month to month, they will analyze the pattern they see from new moon to new moon each month. (The pattern seems to repeat itself every 29 or 30 days showing the same moon phases in order.)
3. After writing down their findings, the students will interpret their findings and write down any conclusions what they think are happening that causes this phenomenon to happen. (The moon must orbit the earth. During this orbit, we are able to see light getting bigger on the right side of the moon from new moon to full moon and seeing light getting smaller on the left side of the moon from full moon to new moon. When the new moon is reached, the pattern begins again for the next 29 or 30 days showing the same moon phases.)

Argue From Evidence

1. Using the patterns they have discovered, students will discuss and make predictions for the following 7 days.
2. Students will argue their predictions using the evidence they have collected previously.
3. Students will then argue from evidence what they would expect to see in the next month.
4. Focus on student predictions that occur before and after the full moon or new moon to develop understanding of the phases' cyclical pattern.

Communicating

1. Students will write about their finding with evidence as to the patterns they see with one lunar cycle and multiple lunar cycles. The students will have a written explanation and pictures to support their evidences.
    a. Have the students draw a model of why they think the moon is changing from day to day.
    b. Have the students draw pictures of what the eight reoccurring moon phases are from month to month.
    c. Students should include the rate of change and the cyclical nature of the pattern.
2. Buddy Share
    a. Tell the students to buddy share to discuss what they have come up with to the patterns that they see from day to day and from month to month. Have them discuss what the moon is doing to cause it to change from day to day and from month to month.
    b. Have them share their model of what is happening that is causing the moon to seem to change.
3. Have a discussion as a class to come up with final decisions as to why the moon is changing and why it follows the same pattern month to month.
4. Have the students share their models as a class.

Assessment

Students' writing should demonstrate an understanding that the changing shapes of the moon occur from new moon to new moon. Also, the students should demonstrate an understanding that this pattern starts again with the new moon from month to month.

1. Have the students draw a model of what they think the moon is doing to cause the light to seemingly change from day to day.
2. Have the students draw the moon phase pattern of the eight standard moon phases that are seen each month.
3. Resource 6111oon Phase Chart

Student Sheet Name _____

Calendaring the Moon

Answer these questions.

1. Name at least two pattern changes you see that happen within a 30-day period starting with the new moon.

_____

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2. After analyzing the pattern changes you see that happen within a 30-day period, what is your interpretation/conclusion of why the light on the moon seems to be changing?

_____

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3. Draw a picture/model below of what you think the moon is doing to cause the light to seemingly change from day to day. Be as specific as possible.

4. What is the pattern that you see happening to the moon looking from month to month?

_____

_____

_____

5. Draw below the pattern of the eight phases of the moon you see from month to month.

Student Sheet Key Name _____

Calendaring the Moon

Answer these questions.

1. Name at least two pattern changes you see that happen within a 30-day period starting with the new moon.

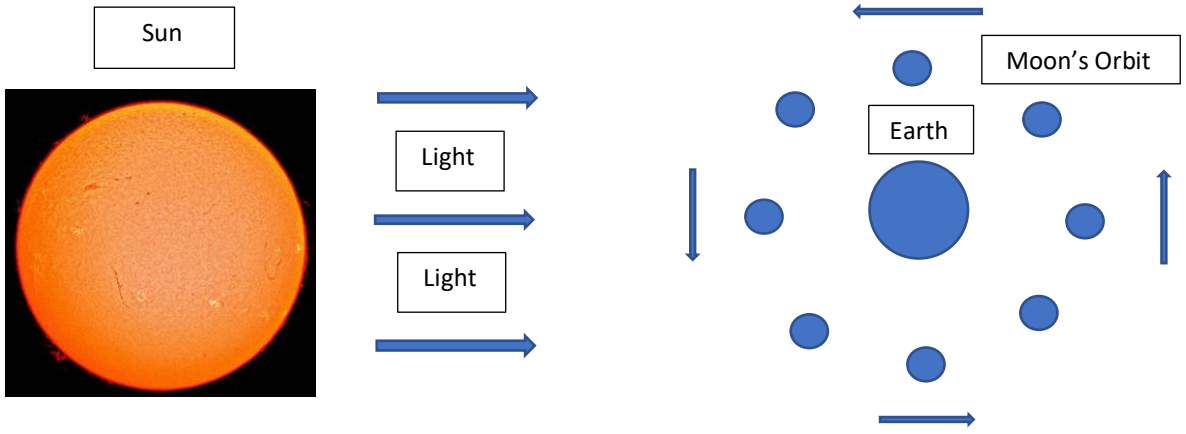
   Beginning with the new moon, the light on the moon seems to get larger and larger until it reaches the full moon when the whole moon is lit up.
   Beginning with the full moon, the light on the moon seems to get smaller and smaller until it reaches the new moon when we see no light on the moon.

2. After analyzing the pattern changes you see that happen within a 30-day period, what is your interpretation/conclusion of why the light on the moon seems to be changing?

   The moon must be circling or orbiting the Earth. As it does that we see the light increase on the moon from the new moon where there is no light to the full moon where the whole moon is lit up.

   As we see the light decrease on the moon from the full moon where we see the whole moon is lit up to the new moon where we no light on the moon at all.

3. Draw a picture/model below of what you think the moon is doing to cause the light to seemingly change from day to day. Be as specific as possible.



4. What is the pattern that you see happening to the moon looking from month to month?

We can see the same moon phases from the new moon to the full moon and the full moon to the new moon from month to month. They repeat themselves each month.

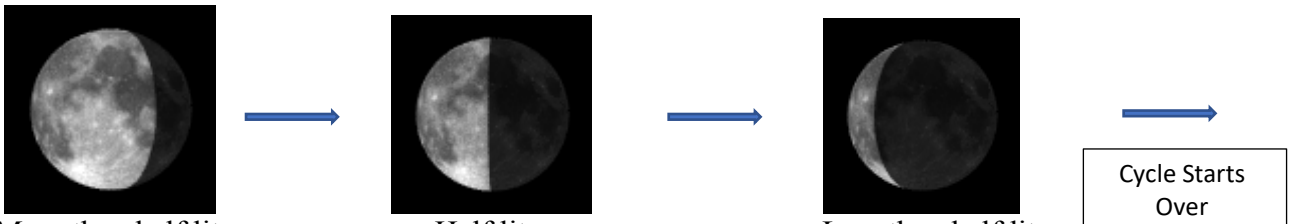
5. Draw below the pattern of the eight phases of the moon you see from month to month.

No light seen on the moon

Less than half lit — Half lit — More than half lit

Light on the right side increases day by day

The whole moon lit up



More than half lit — Half lit — Less than half lit

Light on the left side decreases day by day