

The Moon
Lesson Plan Three

Understanding Why We Don't See
All the Light on the Moon All the Time

Standard II: Students will understand that the appearance of the moon changes in a predictable cycle as it orbits Earth and as Earth rotates on its axis.

Objective 1: Explain patterns of changes in the appearance of the moon as it orbits Earth.

Indicator a: Describe changes in the appearance of the moon during a month.

Indicator b: Identify the pattern of change in the moon's appearance.

Indicator c: Use observable evidence to explain the movement of the moon around Earth in relationship of Earth turning on its axis and the position of the moon changing in the sky.

Objective 2:

Indicator c: Model the movement and relative positions of Earth, the moon, and the sun.

Supplies: -The Lunar Cycle Chart

Directions:

Give the students the Lunar Cycle Chart. Show the website above as you do this activity.

1. Look at the circle of the moon's orbit around the earth. Explain that the circle that cuts into the moon is the only light part of the moon that we see.
2. What do you notice about each of the moon's position around the earth? (Half the moon is light and the other side is dark.)
3. Tell the students that with this chart, we will discover why we see more and more of the lighted part of the moon as the moon moves from the 0-degree position to the 180-degree position. And we will discover why we see less and less of the lighted part of the moon as the moon moves from the 180-degree position to the 360-degree position.
4. Look at the new moon position on the chart. Why can't we see any light on the moon when it is a new moon? (The moon is between the earth and the sun, so we can't see any light. The whole side of the dark side of the moon is facing us.)
5. What part of the light on the moon can we see at the waxing crescent? (We see less than half of the light that is shining on the right side of moon.)

6. What part of the light on the moon can we see at the first quarter moon? (We see half of the light that is shining on the right side of the moon.)
7. What part of the light on the moon can we see at the waxing gibbous moon? (We see more than half of the light that is shining on the right side of the moon.)
8. What part of the moon can we see at the full moon? (We see all of the light that is shining on the moon. The whole lighted side of the moon is facing us)
9. What do we see as it pertains to the light of the moon as the moon orbits from the new moon position to the full moon position? (We see more light of the moon.)
10. Tell why this happens. (As the angle of the moon increases to the full moon, more of the light is exposed as the moon orbits the earth.)
11. What part of the light on the moon can we see at the waning gibbous moon? (We see more than half of the light that is shining on the left side of the moon.)
12. What part of the light on the moon can we see at the third quarter moon? (We see half of the light that is shining on left side of the moon.)
13. What part of the light on the moon can we see at the waning crescent? (We see less than half of the light that is shining on the left side of moon.)
14. What happens to the light of the moon when it is in the new moon phase? (We don't see the light of the moon anymore.)
15. What do we see as it pertains to the light of the moon as the moon orbits from the full moon position to the new moon position? (We see less light of the moon.)
16. Tell why this happens. (As the angle of the moon increases to the full moon, more of the light is exposed as the moon orbits the earth.)

**Discovering Why The Light on the Moon
Seems to Change**

1. Where and what part of the light of the moon can we see at the new moon?

2. Why can't we see any light of the moon at the new moon phase?

3. Where and what part of the light on the moon can we see at the waxing crescent?

4. Where and what part of the light on the moon can we see at the first quarter moon?

5. Where and what part of the light on the moon can we see at the waxing gibbous moon?

6. Where and what part of the moon can we see at the full moon?

7. What do we see as it pertains to the light of the moon as the moon orbits from the new moon position to the full moon position?

8. Tell why this happens.

9. Where and what part of the light on the moon can we see at the waning gibbous moon?

10. Where and what part of the light on the moon can we see at the third quarter moon?

11. Where and what part of the light on the moon can we see at the waning crescent?

12. What do we see as it pertains to the light of the moon as the moon orbits from the full moon position to the new moon position?

13. Tell why this happens.

Discovering Why The Light on the Moon Seems to Change

1. Where and what part of the light of the moon can we see at the new moon?

We can't see any light of the new moon.

2. Why can't we see any light of the moon at the new moon phase?

First: since the moon at this phase is between the sun and the earth, the light shining on the moon is facing away from us toward the sun. We can only see the dark side. Second: the sun is so bright that it washes out the moon completely so we can't see any part of the moon.

3. Where and what part of the light on the moon can we see at the waxing crescent?

The light is on the right side covering less than half the moon in a crescent shape on the side of the moon that is facing us. The light seems to gradually get bigger on the side that is facing us as it moves toward the first quarter moon phase.

4. Where and what part of the light on the moon can we see at the first quarter moon?

The light is on the right side covering half of the moon on the side of the moon that is facing us.

5. Where and what part of the light on the moon can we see at the waxing gibbous moon?

The light is on the right side covering more than half the moon on the side of the moon that is facing us. The light seems to gradually get bigger on the side that is facing us as it moves toward the full moon phase.

6. Where and what part of the moon can we see at the full moon?

The light is covering the whole moon on the side of the moon that is facing us. We can see no dark part of the moon.

7. What do we see as it pertains to the light of the moon as the moon orbits from the new moon position to the full moon position?

The light seems to grow on the right side until the whole moon is lit up as the moon goes from the new moon phase to the full moon phase.

8. Tell why this happens.

As the moon orbits around the earth from the new moon phase to the full moon phase, the angle of the moon from the sun to the earth to the moon gets larger where we can see more of the light that is shining on the moon. When it gets to the full moon, we can see all the light that is shining on the moon.

9. Where and what part of the light on the moon can we see at the waning gibbous moon?

The light is on the left side covering more than half the moon on the side of the moon that is facing us. The light seems to gradually get smaller on the side that is facing us as it moves toward the third quarter moon phase.

10. Where and what part of the light on the moon can we see at the third quarter moon?

The light is on the left side covering half of the moon on the side of the moon that is facing us.

11. Where and what part of the light on the moon can we see at the waning crescent?

The light is on the left side covering less than half the moon in a crescent shape on the side of the moon that is facing us. The light seems to gradually get smaller on the side that is facing us as it moves toward the new moon phase.

12. What do we see as it pertains to the light of the moon as the moon orbits from the full moon position to the new moon position?

The light seems to get smaller on the left side until there is no light at all as the moon goes from the full moon phase to the new moon phase.

13. Tell why this happens.

As the moon orbits around the earth from the full moon phase to the new moon phase, the angle of the moon from the sun to the earth to the moon gets smaller where we can see less of the light that is shining on the moon. When it gets to the new moon, we can see no light that is shining on the moon.