

The Moon Seems to Change Each Day

Standard I: Students will understand that the shape of the Earth and the moon are spherical and that Earth rotates on its axis to produce the appearance of the sun and moon moving through the sky.

Objective 1: Describe the appearance of Earth and the moon.

Indicator c: List the differences in the physical appearance of Earth and moon as viewed from space.

Supplies: -Moon phase cards
-Playground ball for the earth
-Big paper sun about two feet in diameter

Directions:

Preparation

1. Show the students the different phases of the moon and tell them their names. Line them on the chalk tray below the white board.
2. Tell the students that a lunar cycle is 29 ½ days, the number of days it takes for the moon to go around the sun.
3. Pass out the paper that has the 28 phases of the moon on it. (Remind them that there are really 29 ½ but most charts will just show 28.) Explain that we see the light more each day on the right side from the new moon to the full moon and less light on the left side each day from the full moon to the new moon.
4. Pass out a current copy of a calendar with the moon phases on it of about two or three months. Find where the new moon is and count the days to the next new moon. There will either be 29 or 30. As it averages out, it will be 29 ½ days.
5. Count the days between the 4-day moon phases (new moon, first quarter, full moon, third quarter). There will either be three 6-day phases and one 7-day phase or two 6-day phases and two 7-day phases.
6. Put the paper sun on the front wall.
7. Put the playground ball in the center of the room telling that this is the earth.
8. Pick out eight students to help with this exercise.
9. Give each student a moon phase card.
10. Put the students in a circle around the where they belong as it comes to the card they have.
11. Have the waning and gibbous students stand behind one of the four one-day phase students: waxing crescent moon behind the new moon; waxing gibbous moon behind the first quarter moon; waning gibbous moon behind the full moon; waning crescent moon behind the third quarter moon.

12. Explain that the moon orbits the earth in a counter clockwise motion. Sometimes the moon will be between the earth and sun, sometimes to the side of the earth, and sometimes behind the earth with the sun in front.
13. Tell the students we are going to learn why the light on the moon changes from day to day.
14. As this activity is done, have the students notice the position on the earth, moon and sun for each position. You will be using acute, right, obtuse, and straight angles.

Demonstration

1. Tell the students that we are going to see what the moon does in the sky each day for the moonlight to change of what we see.
2. Tell them that there are four one-day phases of the moon: the new moon, the first quarter, the full moon, and the third quarter).
3. Tell them that the moon revolves around the earth in about 29 ½ days.
4. Since there are four spaces between each of the 4-day phases, that means that each of the spaces will have 6 or 7 days between each one that will add up to 29 or 30 days.

New Moon

1. Start with the new moon and explain why we call it a new moon.
 - a. We see no light on the moon.
2. Ask the students why we don't see any light of the moon.
 - a. Since the moon is directly between the earth and the sun the light is shining toward the sun where we can't see it.
 - b. Also, since the moon is directly in front of the sun, we can't see the moon since the sun is so bright.

New Moon to First Quarter

1. Have the student with the waxing crescent moon take six equal steps toward but not to the first quarter, each step being a day.
2. Have them notice that the angle (acute) gets larger and larger. Notice that the moon stays a waxing crescent moon until it reaches the first quarter.
3. Tell them that this demonstration doesn't show the light of the waxing crescent moon increasing, but if they look at their papers of the moon phases going from the new moon toward the 1st quarter moon the light is increasing on the right side.
4. Ask them why the light is increasing.
 - a. It is because the acute angle is getting bigger that causes the light that we see on the moon seems to increase each day.

First Quarter Moon

1. Have the student with the waxing crescent moon student step behind the 1st quarter moon for the seventh step.

2. When the moon gets to the right angle, it is a 1st quarter moon because it has reached a quarter of the way. We see half the light on the right side of the moon.
3. Ask them how many days have passed by so far including the new moon.
 - a. It would be at least 8 (but no more than 9) days including the new moon and first quarter moon phases.

First Quarter to Full Moon

1. Have the student with the waxing gibbous moon take six equal steps toward the full moon, each step being a day.
2. Have them notice that the angle (obtuse) again gets larger and larger. Notice that the moon stays at an obtuse angle until it reaches the full moon.
3. Tell them that that this demonstration doesn't show the light of the waxing gibbous moon increasing, but if they look at their papers of the moons going from the 1st quarter moon toward the full moon the light is increasing.
4. Ask them why the light is increasing.
 - a. It is because the obtuse angle is getting bigger that causes the light that we see on the moon seems to increase each day.

Full Moon

1. Have the student with the waxing gibbous moon student step behind the full moon for the seventh step.
2. When the moon gets to a straight angle we see a full moon. We see the whole moon lit up. But the other side is not lit up.
3. Ask them how many days have passed by so far including the new moon, first quarter, and full moon.
 - a. It would be at least 15 (but not more than 17) days including the new moon, first quarter, and full moon phases.

Full Moon to Third Quarter

1. Have the student with the waning gibbous moon take six equal steps toward the third quarter moon, each step being a day.
2. Have them notice that the angle (obtuse) gets smaller and smaller. Notice that the moon stays at an obtuse angle until it reaches the 3rd quarter moon. Tell them that this demonstration doesn't show the light of the waning gibbous moon getting smaller, but if they look at their papers of the moons going from the full moon to the third quarter moon the light is decreasing. Ask them why the light is decreasing.
 - a. It is because the obtuse angle is getting smaller that causes the light on the moon seems to decrease each day.

Third Quarter

1. Have the student waning gibbous moon student step behind the 3rd quarter moon for the seventh step.

2. When the moon gets to a right angle again, we see half of a light on the moon again. However, the light is on the left side now.
3. Ask them how many days have passed by so far including the new moon, first quarter, full moon, and last quarter.
 - a. It would be at least 22 (but not more than 24) days including the new moon, first quarter, full, and third quarter moon phases.

Third Quarter to New Moon

1. Have the student with the waning crescent moon take six equal steps toward the new moon, each step being a day.
2. Have them notice that the angle (acute) gets smaller and smaller. Notice that the moon stays at an acute angle until it reaches the new moon. Tell them that again that this demonstration doesn't show the light of the crescent moon getting smaller, but if they look at their papers of the moons going from the 3rd quarter moon to the new moon, the light is decreasing. Ask them why the light is getting decreasing.
 - a. It is because the acute angle is getting smaller that causes the light on the moon seems to get smaller each day.
3. Ask them how many days have passed by so far including the new moon.
 - a. It would be at least 28 (but no more than 30) days including the new moon, first quarter, full, and third quarter moon phases.
1. However, tell them that it is usually 29 or 30 days, so there are one or two more crescent or gibbous moon phases when the moon is going around the earth.
4. The months seem to alternate between 29 and 30 every other month.

Back to the New Moon

2. Have the student with the crescent moon student step behind the new moon for the seventh step.
3. When the moon gets to a zero angle again, we see no light.
4. This is called the lunar cycle when the moon goes from a new moon to a new moon in 29 or 30 days.