

Modeling Moon Phases and Eclipses

Materials needed:

- Lamp with a bare bulb
- Pencils
- Small polystyrene or Styrofoam balls

Getting Ready

1. Find a room that can be darkened completely.
2. Plug in the lamp and place it in the middle of the room at about eye level.
3. *Optional* - Have polystyrene or Styrofoam balls painted with white opaque paint.
4. Try out different bulbs to see which one works best

Darken the room so that the lamp in the center is the main source of light

5. Arrange students in a circle around lamp.
6. Hand out moon balls. Have students push balls onto pencil points as "handles."
7. Explain that the students' heads represent earth, the lamp is the sun, and the white balls are the moon.

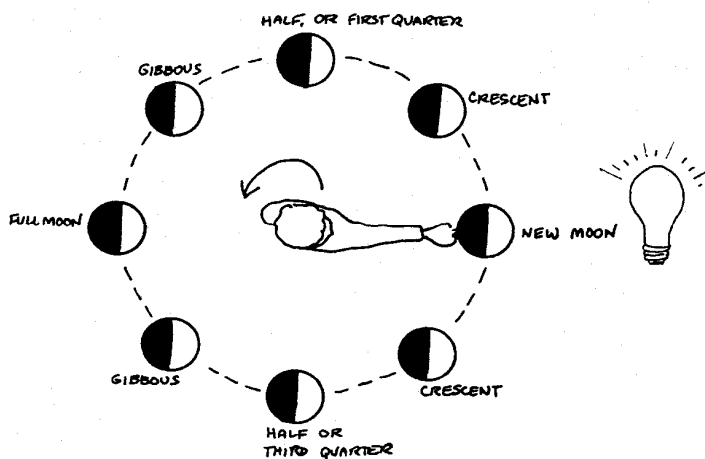


Part I. Observing Moon Phases

1. Ask students to hold their ball at arm's length, directly in front of sun.
2. Tell students to move their ball to the left until they see a thin crescent.
3. Look around the room and help as needed.
4. Ask if the bright side of moon is facing toward or away from sun.
5. Continue moving moon to the left until half is lit. Ask: "For the moon to be more full, does it have to move towards or away from sun?"
6. Continue moving moon until fully lit. Move above the shadow of heads.
7. Keep moving moon in circle until half full again. Ask: "As the moon moves towards the sun, does it get fuller or thinner?"
8. Continue moving moon in same direction until a thin crescent (new moon).
9. Move moon in circle several times to learn pattern of phases.

Part II. Observing Eclipses

1. When the students fully understand phases, ask them to move their moons directly in front of the sun to create an eclipse of the sun.
2. While your students observe an eclipse of the sun, tell them: "Hold your moon ball exactly where it is, and glance around the room. Do you see the shadows over everyone's eyes? Remember that your head is the Earth. The people who live where your eyes are see an eclipse of the sun. But how about the people who live on your chin? Or your ear? [Only the people who live on your eyes can see an eclipse of the sun—the people on your ear or chin can still see the sun!]"



3. Instruct your students to move their moon balls around in a circle, as before, until they reach the full phase. This time, tell them to move their moons into the shadow of their heads.

4. While the moons are in the shadow of your students' heads, explain: "This is an eclipse of the moon. Can you see the shape of your hair when the moon moves into eclipse? When there is an eclipse of the real moon, you

can see that the shape of the Earth is round, because it always has a curved shadow."

5. While the students continue to observe the eclipse of the moon, point out that everyone who lives on the side of the Earth facing the moon can see the moon in eclipse. But during an eclipse of the sun, only the people inside the shadow see the sun being eclipsed.
6. Instruct your students to continue moving their New moon / moons around their heads until they again see an eclipse of the sun. Ask: "What phase is the moon in just before or just after an eclipse of the sun?" [Thin crescent or new phase.] Tell them to continue moving their moons in a circle until they see another eclipse of the moon. Ask: "What phase is the moon in just before or just after an eclipse of the moon?" [Full.]

7. Remind the students that it takes one whole month (29.53 days) for the moon to go around the Earth. During the month there is one time when there might be an eclipse of the moon (at full phase) and one time when there might be an eclipse of the sun (at new moon). An eclipse of the moon will occur when the moon passes into the shadow of the Earth where it glows a coppery-red for a few hours. Anyone who lives on the night side of the Earth during an eclipse of the moon can see it. An eclipse of the sun occurs when the moon passes directly between our location on the Earth and the sun, and lasts only a few minutes! Only the people directly under the shadow can see it. That is why eclipses of the moon are seen more frequently than eclipses of the sun.