

Standards Taught

This activity teaches the following National Education Standards:

Earth and Space Science:

- Earth is third planet from the sun in our solar system
- Most objects in the solar system are in regular and predictable motion

Math:

- Geometry: Use visualization, specify location and describe spatial relationship using coordinating geometry and other representational methods

First Quarter Moon



From a student's perspective, this is how the first quarter moon appears (see step 2 in the image to the left). Image credit: NASA/JPL

Full Moon



In step 3, students have their back to the "sun." They should see a fully illuminated styrofoam ball, or "moon" in this position. Image credit: NASA/JPL



CALENDAR

06.25.11

[Mass versus Weight Workshop](#)

07.23.11

[Workshop: Space Communications/Sounds](#)

07.27.11

[Earth Science Workshop](#)

› [Full Calendar](#)

Moon Phases Demonstration



JPL's Allison

Sengstacken demonstrates steps 1 through 4 to show how a student would turn in relation the to light source, or sun. Image credit: NASA/JPL

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This moon phase activity allows students to "act out" the phases of the moon in about 30 minutes. As you do the activity, remind students that what they are doing in 30 minutes takes the moon about 30 days to do: Complete one full circle around Earth.

In preparation for this activity, discuss moon phases with students. It is very helpful if students can make their own moon observations for one month prior to and after this exercise. (You could break up the viewing by assigning teams to different weeks.) You can also watch a brief [video overview of the moon](#) or watch the July 2007 [What's Up video](#) to learn more about the moon.

Safety warnings:

Remind students to be careful when using the pointed end of their pencil. Also, do not allow students to get close to the light source since it may heat up. Finally, remind students with eye sensitivities to look away from the light source frequently.

Materials needed:

One light-colored sphere and one pencil, per student. Try white styrofoam balls, 5 centimeters (2 inches) or larger

One larger white sphere (for the teacher only) and one pencil

Light source, such as a lamp - shade removed - with a bright, clear, incandescent bulb (100 watts or higher)

Dark room

Prep work:

-- Place the lamp in the middle of the room.

-- Have each student poke a hole into their sphere with their pencil and hold the pencil, with sphere attached, in their left hand. They should be holding what looks like a spherical lollipop.

-- Explain to students that the bulb is the sun, each of their spheres is the moon and each student is Earth.

Directions:

Step 1: New Moon: To begin, students should face the lamp and extend the sphere directly in front of them, raising the sphere enough so they can also see the lamp. This view simulates a new moon. As students look at their moon, they will see that the sunlight is shining on the far side, opposite their view of the moon. From Earth, the new moon is not seen.

Waxing Crescent Moon: Keeping their arms extended in front of their bodies, have students turn their body and extended arm counterclockwise (as viewed from above) about 45 degrees. They should face their balls and observe what they now see. They should see the right-hand edge of the sphere illuminated as a crescent. The crescent starts out very thin and fattens up as the moon moves farther away from the sun (as the student begins to turn in a circle). We say the moon is waxing because we are seeing more of its surface illuminated.

Step 2: First Quarter: Have students continue turning left so their moon and body are now 90 degrees to the left of their original position. The right half of the moon should now be illuminated. This phase is called the first quarter.

Waxing Gibbous Moon: As students continue to turn, they see more and more illuminated surface.

Step 3: Full Moon: When students move their moon so it is directly opposite the sun, as viewed from Earth, the half viewed from Earth is fully illuminated. (Make sure they hold their moon high enough so the "sunlight" is not blocked by their head.)

Waning Gibbous Moon: Now, as students continue to turn, they start to see less and less of the illuminated surface.

Step 4: Third or Last Quarter: Keep students turning, with arms extended, so they are now three-quarters of the way around from their original position. This is the third, or last, quarter. They should observe that the opposite side from the first quarter moon is now illuminated.

Waning Crescent Moon: Now the illuminated surface of the moon is growing smaller and smaller, bringing it back to a new moon.

Step 5: Return to New Moon: The continued counterclockwise movement brings a thinning crescent and finally a return to a new moon.