MUSEUM OF THE ROCKIES
MONTANA STATE UNIVERSITY

Lesson: Phases of the Moon

Grade level: 2+
Activity duration: 30 - 45 minutes

Objectives:

1. Students will identify various lunar phases.
2. Students will be able to explain various lunar phases by describing the position of the Moon in relation to the Sun and the Earth.

Materials:

- Book: *The Moon Seems to Change*
- Worksheet: Phases of the Moon
- Phases of the Moon light box and flashlight
- Phases of the Moon "mini moons"
- Moon Globe
- Large flashlight
- Dark room with desks pushed to walls to create large open space

Context:

These visuals and hands-on demonstrations illustrate the phases of the moon as described in *The Moon Seems to Change.*

Lesson Procedures:

1. Read *The Moon Seems to Change* to introduce topic.
2. Tell students they will now get to be a part of a live demonstration similar to the one described in the book. Explain that you will first do a big demonstration and then everyone will get their own mini moons to make observations with.
3. Choose a student to be Earth and direct him/her to the center of the room.
4. Choose a student to be the Sun and direct him/her to one side of the room, about 10 feet away from the "Earth".
5. Choose a student to be the Moon and ask the rest of the class where they think the Moon should stand. *If your students are struggling to grasp this concept, have the "Moon"*

stand on the opposite side of the "Earth" from the "Sun," about 5 feet away from the "Earth."

6. Hand the Moon student the Moon globe, directing him/her to hold the globe slightly higher than the Earth's head. With the "dark side" facing away from Earth. Explain what is meant by the "dark side." The dark side of the Moon is really the far side of the Moon. Because the Moon only completes one rotation each time it orbits Earth, we only ever see one half of it. To illustrate this, have the Moon continue to face the Earth and complete a counter-clockwise orbit. Point out that even though the Moon keeps facing Earth, his/her body is facing a different direction in relation to the rest of the classroom at each point during its orbit.
7. Direct the Earth student to look at the Moon, regardless of positioning on the circle; this means the Earth will rotate on its axis in the center. This demonstration does not involve the Earth orbiting around the Sun, but you can remind students that this happens in space.
8. Give the Sun the large flashlight with instructions to carefully hold it in line with the Moon Globe.
9. Turn off the lights and direct the Moon to begin its counter-clockwise orbit of Earth. Earth may spin counter-clockwise on its axis as well, but in the interest of keeping Earth's shadow constant, staying stationary often works best for this demonstration.
10. Point out the shadow that is cast on the Moon. Pause the orbit to introduce vocabulary such as: new moon, full moon, first quarter, last quarter, waxing, and waning.
11. Turn lights on and pass out mini moons to students. *A quicker option for this second demonstration it to have the students observe the different phases by simply rotating the mini moon, pretending like the black is the shadow cast on the moon. Have the students hold the mini moon between thumb and forefinger and rotate counter-clockwise to experience the correct order of lunar phases.*
12. Point out there is a dark side to their mini moons too. Tell students hold their moons at arms-length , in-line with their eyes. Ask students what their heads represent. Earth! Have students re-situate their mini moons if the dark side was facing them.
13. Explain that you will be the Sun now and they can experiment with the position of the Moon in relation to Earth and the Sun. Tell them to remember their observations so they can share their findings when the lights come back on.
14. Turn the lights off and stand in one place with the flashlight pointing out. Let the students experiment. Keep students on track with guiding questions.
15. Turn the lights on and have students complete the Worksheet: Phases of the Moon based on their observations.