

Lesson and Activity Excerpted from the Tanenbaum Curriculum *Interreligious Understanding*
Guidebook: Changing Seasons, Changing World

Lunar Cycle

Introduction – Setting the Foundation

Objectives:

- Children will learn about the lunar cycle through a continuing class activity and its relation to the earth and its seasons.

Grades:

2-6

Time Needed:

20 minutes

Materials:

For Teacher demonstration: Lamp (no shade), Globe, Small ball, Information sheet on festivals (included). For class activity, Over-size Wall Calendar (To make the calendar, divide several sheets of posterboard into sections appropriate for a month (30-31)/two weeks (14). Make sure each section is large enough for a piece of paper). Paper, Pencils, “Draw what the moon looks like tonight” sheet, Main Moon phases (turn to overhead).

Related Activities:

What Does the Moon Look Like Tonight?

Students will engage in:

Independent activities, Cooperative learning, Peer tutoring, Visuals, Pairing, Literature, Hands-on, Whole Group Instruction, Technology Integration, Project

PROCEDURE

Anticipatory Set/Hook/Do-Now

- 1) Begin the lesson by reviewing some of the holidays that the students celebrate with their families in November and December, and the holidays that they studied about throughout the world that take place in December. You can have students give you some examples from other lessons (for example, the Tanenbaum Center's "Winter Solstice" lesson) or other books they have read.
- 2) Ask students if they know any holidays that fall on the same date every year. Examples may include New Year (Jan 1), Kwanzaa (Dec 26 - Jan 1), Halloween (Oct 31st), Summer Solstice (June 21), or students' birthdays.
- 3) Now ask students if they know of any holidays that fall on different dates each year. Examples may include Thanksgiving (the fourth Thursday of November in the United States), Eid Al-Fitr (Muslim), Hanukkah (Jewish), Diwali (Hindu), or Chinese New Year (East and South-East Asia).

Review of Previously Learned Material/Connect to Prior Knowledge

- 1) Explain to students that many cultures have their own calendars, which are partly or completely based on the movements of the moon. Some examples include the Islamic calendar, the Jewish calendar, the Hindu calendar, the Chinese calendar etc.
- 2) In addition, the moon plays a central role in some harvest festivals (example - the Green Corn festival in North America, the Harvest Moon Festival in East and South-East Asia.) Information sheets on these festivals follow for your reference.
- 3) Explain that today the children will learn about the relationship between the Earth, the Sun and the Moon.

Mini-lesson

- 1) Have the students form a circle around the lamp, the globe and the small ball placed at the center of the room. Turn out the lights. Turn on the lamp and have a volunteer hold the ball, which will represent the moon. Explain that the lamp represents the sun.
- 2) Place the globe a short distance from the lamp and the ball/moon held by the student a short distance from the earth. Ask the students to observe the shadows.
- 3) Explain how the rotation of the Earth works, and rotate the globe around the static lamp, asking the students to notice what like is light in their part of the world at different times. Explain that the seasons are caused by the Earth's tilt and the Earth's revolution around the sun.

- 4) Ask students: *What does the moon look like?*
- 5) Explain that the moon itself is not actually changing shape, but rather, it is a reflection of its position in relation to the sun and the Earth. Have the moon student revolve around the earth, stopping in different places along the way.
- 6) Each time the student stops, ask the class what the moon looks like at each point. The students should notice a pattern as the moon travels around the earth. Questions can include:

How much of the moon is dark?

How much of the moon is lit?

How does it change shape?

Is there any time the moon is completely lit?

What do you notice as the moon revolves around the Earth?

Guided Practice

- 1) Regroup as a class and show the “Main Moon Phases” overhead. Ask if students recognize the moon looking these ways, and if they saw parallels with the demonstration.
- 2) Explain that as a class, you are going to keep a moon journal, where each day for the next few weeks, a volunteer is going to take home a “Draw the Moon” handout and draw the moon for that night. Then, it will be posted on that day’s class calendar.

Wrap-Up

- 1) Read about some of the festivals that are connected to the moon and to the Lunar cycle. Brief information sheets are included at the end of this lesson.

Extension Ideas

Because the moon is an important part of festivals such as the Harvest Moon Festival (Trung Thu) in Chinese culture, after observing the moon phases, the children can make and eat Chinese Moon Cakes (Recipe from *Autumn Equinox*, by Ellen Jackson)

Ingredients:

Prepackaged or homemade cookie dough

Jam

Sesame seeds

Round cookie cutters

Rolling pins

Cookie sheets

Instructions

- 1) Roll out the dough with the rolling pin and cut with cookie cutters.
- 2) Bake at 375 degrees for 8-12 minutes. Cool.
- 3) Spread with jam and sprinkle with sesame seeds.

Teacher Information Sheet on the Moon

Day/Night

- Caused by Earth's rotation on its axis ("spin").
- One Earth rotation takes 24 hours, therefore we have 24 hour days: roughly 12 hours of darkness when we are facing away from the sun and 12 hours of light when we are facing the sun directly.
- Earth spins counterclockwise, thus the sun appears to rise in the East and set in the West.

Observing the Same Face of the Moon from Earth

- We always see the same face of the Moon when looking from Earth.
- On any given night/day, every place on the Earth sees the same face of the Moon.
- This occurs because the Moon spins on its axis once for every time it revolves around the Earth (28.5 days).

Phases of the Moon

- Every 28 days we see a complete cycle of Moon phases:
New moon, waxing crescent, first quarter, waxing gibbous, full, waning gibbous, third quarter, waning crescent
- Thus, the Moon changes in appearance gradually each night.
- Phases are caused by the relative position of the Moon with respect to the Earth and Sun.
- The Moon's relative position changes as it revolves around the Earth.
- Waxing means increasing in size. A waxing phase appears to be lit on the right side.
- Waning means decreasing in size. A waning phase appears to be lit on the left side.
- One half of the Moon is always facing the sun and therefore one half is always lit.
- Because the Moon's position relative to the Earth is the same on any given day regardless of where one might be on Earth, the same phase of the Moon is visible from everywhere on Earth for any given night/day.
- Because the Moon revolves around the Earth in a counterclockwise direction, the Moon rises later each day (approximately 1 hour).
- The Moon rises in the east and sets in the west because the Earth rotates in a counterclockwise direction.
- The Moon is in the sky for roughly 12 hours in a 24-hour period. Therefore, if the full moon rises at 6 PM, it will set at 6 AM.
- The Full Moon rises at sunset and the new moon rises at sunrise. Based on the position of the Moon in its orbit around the Earth, it is possible to determine the approximate rise time of each phase.

Eclipses

Solar eclipses:

- The sun is blocked (eclipsed) by the Moon, thus the Moon is between the Earth and Sun.
- In this position, the Moon is in a new phase.
- Totality lasts only a few minutes.
- The shadow that is cast on Earth covers a relatively small area, and so can be seen from only a few places on Earth.
- Can occur twice per (Earth) year — when the Moon, Earth, and Sun are aligned and in the same plane.

Lunar eclipses:

- The Earth is between the Sun and the Moon and casts a shadow on the Moon, thus causing it to appear grey, black, or red.
- In this position, the Moon is in a full phase.
- Totality lasts a few hours.
- Lunar eclipses can be seen from any place on the Earth that is experiencing night at the time of eclipse.
- Can occur twice per (Earth) year — when the Moon, Earth, and Sun are in the same plane.

Seasons

- Seasons are caused by the tilt of the Earth (23.5°) and the Earth's revolution around the Sun. Even though the Earth's orbit around the Sun is slightly elliptical, the distance of the Earth from the Sun IS NOT the cause of the seasons. (In fact, the Earth is closest to the Sun while the Northern Hemisphere is experiencing winter.)
- In the Northern Hemisphere, the Sun appears lower in the sky during the winter (is at its lowest noontime angular height on December 21), and higher in the sky during the summer (is at its highest noontime angular height on June 21).
- In winter, the Sun appears to rise in the Southeast and set in the southwest, and the day length is at its shortest. In summer, the Sun appears to rise in the northeast and set in the northwest, and the day length is at its longest.
- In winter, the Sun's rays are less direct.
- In summer, the Sun's rays are more direct.
- Seasons are reversed in the Northern and Southern Hemispheres.
- The Sun is never directly overhead (at a 90° angular height) at any latitude further north than the Tropic of Cancer (23.5°N), or further South than the Tropic of Capricorn (23.5°S). Within the tropics (23.5°S - 23.5°N) the sun is directly overhead two times each year.

**Excerpted
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full moon



new moon



waning gibbous



new crescent



last quarter



first quarter



old crescent



waxing gibbous



Name:

Date:



What does the moon look like tonight?
Draw a picture of the moon!