Buffalo Trace Education Box
Lesson 25

Astronomy in Indiana

Purpose: Students will learn the eight phases of the moon by name and shapes. Students will learn how early cultures made use of astronomy as they engineered the earthwork mounds in Indiana.

Standards:

- **4.ESS.1** Investigate how the moon appears to move through the sky and it changes day to day, emphasizing the importance of how the moon impacts the Earth, the rising and setting times, and solar and lunar eclipses.
- **4.H.1** Identify and compare the major early cultures (Paleo-Indians such as the Hopewell and the Mississippian cultures) that lived in the region of Indiana before the arrival of the Europeans and before Indiana became a state.

Materials Needed for Moon Phases: chocolate creme-filled sandwich cookies (8 for each student), popsicle sticks, paper plates, markers. For a visual of the activity, visit the link. (**https://www.lpi.usra.edu/education/space_days/activities/moon/documents/Moon_Oreo_Phases.pdf**)

Steps:

1. Discuss the movement of the earth and moon. Why does the moon look different throughout the month? Discuss the light and shadow.
2. Remember: crescent is the lighted curved sickle shape; gibbous is light greater than a semicircle, less than a circle. Waxing is increasing in the lighted side; waning is decreasing in the lighted side.
3. Introduce the eight phases: new moon (dark shadow), waxing crescent (a little light upon the right, shadow on the left), first quarter (right half is light, left side shadow), waxing gibbous (light on the right, a little shadow on the left), full moon (full light), waning gibbous (little shadow on the right, light on the left), third quarter (half shadow on the right, half light on the right), waning crescent (shadow on the right, little light on the left).
4. Twist open the cookies. Spread the cream with the popsicle stick to resemble the phases.
5. Around the paper plate, arrange the phases in order: new moon, waxing crescent, first quarter, waxing gibbous, full moon, waving gibbous, third quarter, waning crescent.

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Materials Needed for Connecting Culture and Sky: YouTube from DNR about Mounds State Park in Anderson (**https://www.youtube.com/watch?v=rVDmHMVAANY**), vocabulary study of equinox and solstice, calendar. This link provides information about Hopewell and Woodland period: **https://www.in.gov/dnr/state-parks/files/sp-Mounds_State_Park_IMP_2011.pdf**)

Steps:

1. Discuss the changing seasons and astronomy as the study of stars, moons and planets, and changing positions in the sky.
2. Explain equinox (meaning equal amounts of daylight and darkness) and solstice (longest and shortest days of the year). Read over this article for background information: https://www.weather.gov/cle/seasons.
3. Point out the dates of equinox: spring is March 19-21; fall is September 21-24; the dates of solstice: summer is June 20-22; winter is December 20-23.
4. Read background information about the early cultures of Adena and Hopewell as mound builders.
5. Play the DNR video about Mounds State Park.
6. How do you think the early people were able to “tell time” without paper calendars?