The Phases of the Moon

Florida Benchmark: SC.4.E.5.2 – Describe the changes in the observable shape of the Moon over the course of about a month.
NGSS Standard: MS-ESS1-1 – Develop and use a model of the Earth-Sun-Moon system to describe the cyclic patterns of lunar phases, eclipses of the Sun and Moon, and seasons.

Objective:
- Identify and describe the eight major phases of the Moon.
- Explain why the Moon appears to change shape over a month.
- Model the Moon phases using Oreo cookies.
- Record observations and recognize the cyclic nature of the Moon's phases.

Materials:
- Oreo cookies (one per student or group)
- Plastic knives or popsicle sticks
- Paper plates
- Diagram of the Moon phases
- Student observation journals
- PowerPoint presentation

Safety Precautions:
- Ensure students handle plastic knives or popsicle sticks carefully.
- Be mindful of food allergies—provide an alternative modeling material if needed.
- Encourage students to wash hands before and after handling food items.

Procedures:
1. **Introduction:**
    - Use a PowerPoint presentation to introduce the topic: *"Have you ever noticed how the Moon looks different on different nights?"*
    - Show images of the Moon at different phases and ask students to describe what they see.
    - Introduce key vocabulary: *waxing, waning, crescent, gibbous, full moon, new moon.*
    - Explain that the Moon's shape does not change—it appears different due to sunlight reflection.
2. **Experiment:**
    - Students will use Oreo cookies to model the phases of the Moon.
    - Each student will take apart an Oreo and use the cream filling to represent the illuminated portion of the Moon.
    - Using plastic knives or popsicle sticks, they will scrape off portions of the cream to match the different phases:
        - **New Moon** (no cream)
        - **Waxing Crescent** (small crescent of cream)
        - **First Quarter** (half-moon with cream on one side)
        - **Waxing Gibbous** (mostly covered in cream)
        - **Full Moon** (entire cream visible)
        - **Waning Gibbous** (same as waxing gibbous but on the other side)
        - **Last Quarter** (half-moon, opposite side of the first quarter)

        - **Waning Crescent** (small crescent on the opposite side of waxing crescent)
    - Students will arrange the cookies on a paper plate in the correct sequence and label each phase.
3. **Observation:**
    - Students will document their phases in their journals, drawing and labeling each phase.
    - Discuss how long it takes for the Moon to complete one full cycle (~29.5 days).
    - Relate observations to real-world applications, such as calendars and tides.
4. **Generalization:**
    - Recap key takeaways: The Moon's shape changes in a predictable cycle due to its orbit around Earth.
    - Ask students to predict what the Moon will look like a week from today.
    - Discuss how understanding Moon phases helps with calendars, tides, and cultural traditions.
5. **Assessment:**
    - Students will complete a worksheet matching Moon phase names with images.
    - **Exit ticket question:** *"Why does the Moon appear to change shape?"*
    - **Optional:** Students observe the Moon over the next week and record their findings.

Note: Clean-up

- Ensure all Oreo cookies, plastic knives, and paper plates are properly disposed of.
- Have students wipe down their desks and wash their hands after the activity.