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.

Next Generation Science Standards (NGSS):
• 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.

A. GRADE LEVEL: 4th - 6th Grade
B. SUBJECT: STEM/Mathematics
C. DATE: [Insert Date]
D. DURATION: 45 - 60 minutes
E. LESSON FOCUS: Understanding the phases of the Moon and their cyclic pattern.

F. 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

G. LESSON OBJECTIVES:

1. Identify and describe the eight major phases of the Moon.
2. Explain why the Moon appears to change shape over a month.
3. Model the Moon phases using Oreo cookies to visualize the changing appearance.
4. Record observations and recognize the cyclic nature of the Moon's phases.

H. PROCEDURES:

1. INTRODUCTION:

- Begin with a discussion conducted through a PowerPoint presentation: "Have you ever noticed how the Moon looks different on different nights?"
- Show images of the Moon at various phases and ask students to describe what they see.
- Introduce key vocabulary: waxing, waning, crescent, gibbous, full moon, new moon.
- Explain that the Moon does not actually change shape—it only appears to because of the way sunlight reflects off its surface.

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 of the Moon (new moon, waxing crescent, first quarter, waxing gibbous, full moon, waning gibbous, last quarter, and waning crescent).
- Students will arrange the cookies on a paper plate in the correct sequence and label each phase.

3. OBSERVATION:

- Students will document the phases they create 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 the real-world lunar cycle.

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: Have students observe the Moon over the next week and record their findings.

Note 1: Safety Considerations
Ensure that students handle plastic knives, or popsicle sticks safely while scraping the Oreo cream. Be mindful of food allergies and provide an alternative modeling material if needed. Encourage students to clean up their workspace after the activity.

Note 2: Accommodations for Diverse Learners (ELL, ESE, etc.)
For **ELL students**, provide labeled diagrams with visuals and use gestures when explaining vocabulary. Offer sentence starters for observations (e.g., "Today, the Moon looks..."). For **ESE students**, allow extra time for hands-on activities and provide tactile models for better understanding. Use peer support and small group discussions to reinforce concepts. For **advanced learners**, challenge them to research and present how different cultures interpret Moon phases.