Earth's Movements and Their Effects on Day/Night and Seasons

Florida Benchmark:

- SC.5.E.7.1: Explain the role of Earth's tilt and orbit in causing seasons.
- SC.5.E.5.3: Distinguish Earth's rotation (causing day/night) from its revolution (causing seasons).

Next Generation Science Standards (NGSS):

- 5-ESS1-2: Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

A. GRADE LEVEL: 5th Grade
B. SUBJECT: STEM / Science
C. DATE: (Insert Date)
D. DURATION: 60 minutes
E. LESSON FOCUS: Students will explore how Earth's **rotation** causes day and night and how Earth's **revolution and tilt** cause the seasons.

F. MATERIALS:

- PowerPoint presentation
- Globe
- Flashlight (to represent the Sun)
- Small foam balls with skewers (for student Earth models)
- Chart paper and markers

G. LESSON OBJECTIVES: By the end of the lesson, students will be able to:

1. Differentiate between **Earth's rotation** (causing day/night) and **Earth's revolution** (causing seasons).
2. Explain how **Earth's tilt** affects seasonal changes in sunlight and temperature.
3. Demonstrate **rotation, revolution, and tilt** using models in a hands-on experiment.

H. PROCEDURES:

1. INTRODUCTION (in PowerPoint Presentation): (10 minutes)

- Display an image of Earth from space and ask: **"Why do we have day and night? Why do we have different seasons?"**
- Explain that Earth moves in two ways: **rotation (spinning) and revolution (orbiting around the Sun)**.
- Show an animation of **Earth's rotation and revolution** and discuss:
  - One full rotation = **24 hours (causes day/night)**.
  - One full revolution = **365 days (causes seasons, along with Earth's tilt)**.
- Highlight **Earth's tilt (23.5 degrees)** and explain how it affects the amount of sunlight received during different seasons.

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2. EXPERIMENT: (20 minutes)

Activity 1: Earth's Rotation (Day/Night Cycle)

- Place a **globe** in the center of the room.
- Shine a **flashlight** on one side of the globe to represent the Sun.
- Slowly rotate the globe and ask students to identify which areas are experiencing **day and night**.

Activity 2: Earth's Revolution and Tilt (Seasons)

- Keep the flashlight (Sun) in place.
- Move the globe **around the flashlight** to represent Earth's revolution.
- Demonstrate how Earth's **tilt** affects sunlight exposure by tilting a Styrofoam ball and moving it in orbit.
- Ask students: **"Which hemisphere is tilted toward the Sun? What season is it experiencing?"**

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3. OBSERVATION: (10 minutes)

- Students will discuss and record their observations:
  - How does Earth's rotation create day and night?
  - How does Earth's tilt affect how much sunlight different regions receive?
  - How does revolution around the Sun change the seasons?

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4. GENERALIZATION: (15 minutes)

- Summarize key takeaways:
  - **Rotation = Day/Night** (24 hours).
  - **Revolution + Tilt = Seasons** (365 days).
  - The hemisphere **tilted toward the Sun** experiences **summer**, while the opposite hemisphere experiences **winter**.
- Students will create a **diagram** showing Earth's rotation and revolution.

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5. ASSESSMENT: (5 minutes)

✔ Exit Ticket Questions:

1. What causes day and night?
2. What causes the seasons?
3. Why is Earth's tilt important?

✔ Alternative Assessment:

- Students **act out** Earth's rotation and revolution in small groups.

Note 1: Safety Considerations

During the experiment, ensure that students **handle the flashlight and models carefully** to prevent accidents. Be mindful of **bright lights** to avoid eye strain, and ensure students **do not shine flashlights directly into each other's eyes**. Also, clear the workspace to avoid tripping hazards while students move around representing Earth's orbit.

Note 2: Accommodations for ELL, ESE, and Other Learners

For **ELL students**, provide **visual aids**, labeled diagrams, and **key vocabulary with images** (e.g., rotation, revolution, tilt, orbit). Pair them with bilingual peers if needed. For **ESE students**, offer

step-by-step guidance and hands-on support. Use **simplified language and gestures** to explain key concepts. For **advanced learners**, challenge them to **compare Earth's seasons to those on another planet**.