## H's Cosmic Dance: Earth, Sun, and Moon Adventures!

## Materials You'll Need:

- Large ball (e.g., basketball or beach ball) for the Sun
- Medium ball (e.g., tennis ball or baseball) for the Earth
- Small ball (e.g., golf ball or ping pong ball) for the Moon
- Flashlight
- Dark room or ability to dim lights
- Paper plates (3) one for Sun, Earth, Moon labels/bases
- Markers or crayons
- Construction paper (various colors, especially black or dark blue for space background)
- Optional: String, sticks/skewers, glue, tape for model building
- Notebook or paper for drawing and notes
- Optional: Oreo cookies (8 for Moon phases fun!)

## Let's Get Started! (Introduction ~10 mins)

Hi H! Have you ever wondered why we have day and night? Or why the Moon looks different sometimes? Today, we're going on an amazing journey into space to discover how our Earth dances with the Sun and Moon! It's going to be a cosmic adventure filled with science, a bit of math, and lots of art!

**Quick Question:** What's something that changes every day because of the Sun? What about the Moon?

# Part 1: Earth's Super Spin and Speedy Trip! (Science & Demo ~ 20 mins)

#### **Our Spinning Earth: Day and Night**

Imagine our Earth (the medium ball) is a spinning top. It spins around an invisible line called an axis. This spinning is called **rotation**.

#### Activity - Day and Night Demo:

- 1. Let's make the room a bit darker.
- 2. Let the flashlight be our Sun. It shines brightly!
- 3. You hold the Earth ball. Pick a spot on your Earth ball and mark it (maybe with a tiny sticker or a washable marker dot) that's where you live!
- 4. Now, slowly spin (rotate) the Earth ball. See how your spot moves into the flashlight's light (daytime) and then into the shadow (nighttime)?
- 5. One full spin takes 24 hours that's one whole day and night!

Science fact: The Earth is always spinning, even though we can't feel it!

#### Earth's Big Journey: A Year and Seasons

Not only does Earth spin, but it also travels on a big path around the Sun! This journey is called a **revolution**. It takes about 365 days (one year) for the Earth to go all the way around the Sun.

#### Activity - Orbit Demo:

- 1. Let's use the large ball as the Sun and place it in the center.
- 2. You, holding the Earth ball, slowly walk in a big circle (orbit) around the Sun ball.
- 3. While you're walking (revolving), remember to also keep spinning the Earth ball (rotating)! This shows how we get days and years happening at the same time.

The path Earth takes is like a slightly squashed circle, called an ellipse. The tilt of Earth's axis as it revolves is what gives us different seasons, but today we're focusing on the movement itself!

## Part 2: The Mysterious Moon! (Science & Demo ~ 20 mins)

#### **Our Moon: Earth's Best Friend**

The Moon (our small ball) doesn't make its own light. It shines because it reflects sunlight, like a mirror!

The Moon also does two things: it rotates on its own axis, AND it revolves around the Earth. It takes the Moon about 27-29 days to go around the Earth once. We call this a lunar month!

#### **Moon Phases: A Changing Face**

As the Moon travels around Earth, we see different amounts of its sunlit side. These different looks are called **Moon phases**.

#### Activity - Moon Phase Demo (with balls or Oreos!):

#### **Option 1: Ball Demo**

- 1. The flashlight is still the Sun. You are Earth (you can stand in the middle).
- 2. Hold the Moon ball out in front of you.
- 3. Slowly move the Moon ball in a circle around your head (you are Earth). Watch how the "sunlight" from the flashlight hits the Moon ball.
- 4. When the Moon is between you (Earth) and the Sun (flashlight), the side facing you is dark (New Moon).
- As it moves, you'll see a sliver (Crescent), then half (First Quarter), then more than half (Gibbous), then the whole side lit (Full Moon) when it's on the opposite side of Earth from the Sun. Then it wanes back to New Moon.

#### Option 2: Oreo Moon Phases (Yummy Science!)

- 1. Take 8 Oreo cookies. Carefully twist them open so frosting is on one side.
- 2. Use a spoon or knife (with help if needed) to scrape away parts of the white frosting to show different Moon phases:
  - **New Moon:** All frosting removed (or use the plain cookie side).
  - Waxing Crescent: A small sliver of frosting.
  - First Quarter: Half frosting.
  - Waxing Gibbous: More than half frosting.
  - **Full Moon:** Full circle of frosting.
  - Waning Gibbous: More than half, but on the other side.
  - **Last Quarter:** Half frosting, other side.
  - Waning Crescent: Small sliver, other side.
- 3. Arrange them in order!

## Part 3: Cosmic Math! (Mathematics ~ 10 mins)

All these movements are related to math and how we measure time!

- 1 Rotation of Earth = 1 Day = 24 Hours
- **1 Revolution of Earth around Sun** = 1 Year = approx. 365 Days
- 1 Revolution of Moon around Earth = 1 Lunar Month = approx. 29.5 Days (this is where our idea of a 'month' comes from!)

Can you see the pattern? Space is full of cycles!

The paths the Earth and Moon take are orbits. These orbits are not perfect circles, but are slightly oval-shaped, called ellipses. For today, we can think of them as big circles!

## Part 4: Create Your Cosmic Masterpiece! (Art ~ 30-40 mins)

Now it's time to use your artistic skills to show what we've learned!

#### Activity: Sun-Earth-Moon Mobile or Diorama

Let's build a model of the Sun, Earth, and Moon system!

- 1. Prepare your celestial bodies:
  - $\circ\,$  You can use the balls we used earlier, or make new ones!
  - $\circ\,$  Cover paper plates with colored paper (yellow for Sun, blue/green for Earth, gray/white for Moon) or color them.
  - $\circ\,$  Or, cut out circles from construction paper. Make the Sun largest, Earth medium, and Moon smallest.
- 2. **Title your bases:** Label your paper plates or construction paper cutouts "Sun," "Earth," and "Moon."
- 3. Assemble your model:
  - Option A (Mobile): Use string and sticks/skewers (or a coat hanger) to hang your Sun, Earth, and Moon. Hang the Moon from the Earth, and then hang the Earth (with its Moon) from the Sun. This shows what orbits what!
  - Option B (Diorama/Tabletop Model): Use a large piece of black or dark blue construction paper as your "space" background. Place your Sun in the middle. You can draw Earth's orbit around the Sun. Then place Earth on its orbit, and draw the Moon's orbit around Earth. Place the Moon on its orbit. You can use small stands (like bottle caps or small cups) to give them some height.
  - **Option C (Simple Diagram):** On a large sheet of paper, draw the Sun. Then draw a large circle around it for Earth's orbit and place your Earth cutout on it. Then draw a smaller circle around Earth for the Moon's orbit and place your Moon cutout there.
- 4. Add Details: You can draw stars on your background, label the orbits, or even add facts you learned!

#### **Alternative Art: Moon Phases Drawing**

If you prefer, you can draw the different phases of the Moon. Use a dark paper and white or yellow crayon/pencil. Try to draw the New Moon, Crescent Moon, Half Moon (First Quarter), Gibbous Moon, and Full Moon. You can label them too!

### Wrap-up & Chat (5-10 mins)

Wow, H, you've been an amazing cosmic explorer today!

- What was the coolest thing you learned about how the Earth, Sun, and Moon move?
- Can you tell me in your own words why we have day and night?
- What makes the Moon appear to change shape?
- Show me your awesome art project! Explain what it shows.

Remember, the universe is full of wonders, and by understanding these movements, we understand our own world a little better. Keep looking up at the sky!

## **Extension Ideas (Optional):**

- Research a specific planet and how it moves.
- Learn about solar and lunar eclipses (when the Sun, Earth, and Moon line up perfectly!).
- Keep a Moon journal for a month, drawing the phase you see each night.