

Modeling Earth's Tilt and the Seasons

Name: _____ Date: _____

LEARNING OBJECTIVE

Students will use a model to demonstrate how Earth's axial tilt, not distance from the Sun, causes the seasons.

MATERIALS NEEDED

- small ball or globe
- pencil or skewer (to represent the tilted axis)
- flashlight or lamp
- protractor
- ruler
- notebook paper
- pencil

HANDS-ON ACTIVITY

1. Push the pencil or skewer through your ball at a 23.5 degree angle (use your protractor to set the angle) to represent Earth's tilted axis. Mark a dot near the top for the Northern Hemisphere.
2. Set a flashlight or lamp on a table to represent the Sun. Holding your tilted ball at a fixed angle (do not change the tilt direction), position it so the Northern Hemisphere dot tilts toward the light.
3. Shine the light directly at the ball and observe/sketch how directly the light hits the Northern Hemisphere dot versus the Southern Hemisphere -- this represents summer in the North.
4. Keeping the tilt angle and direction exactly the same, move the ball to the opposite side of the light (as if Earth had orbited halfway around the Sun) and observe/sketch how the light now hits the Northern Hemisphere -- this represents winter in the North.
5. Record your observations in a simple two-column chart comparing how directly sunlight hits the Northern Hemisphere in each position, and write one sentence connecting this to the reason for seasons.

QUESTIONS

1. **In your model, when the Northern Hemisphere was tilted toward the Sun, was the sunlight more direct or more spread out?**
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2. In the opposite position, what happened to the sunlight hitting the Northern Hemisphere, and what season does this represent?

3. What causes the seasons: Earth's distance from the Sun, or Earth's tilt? Use your model to justify your answer.

4. Why do the Northern and Southern Hemispheres experience opposite seasons at the same time?
