

Photo Description



This picture shows tall buildings in a city during the day. The sun is shining bright between the buildings. There are trees and grass in front of the city buildings.

Scientific Phenomena

The Anchoring Phenomenon is the daily movement of the sun across the sky, creating shadows and bright sunlight at different times of day. This happens because Earth rotates (spins) on its axis once every 24 hours. As Earth spins, different parts of our planet face toward or away from the sun, creating day and night. The bright sunlight visible between the buildings shows how the sun's position changes throughout the day as Earth continues its rotation.

Core Science Concepts

1. Earth's Rotation: Our planet spins like a top, making one complete turn every 24 hours, which creates day and night cycles.
2. Sun's Apparent Movement: The sun appears to move across the sky from east to west, but it's really Earth that is moving.
3. Light and Shadows: When sunlight hits objects like buildings, it creates shadows that change size and direction as Earth rotates.
4. Daily Patterns: We can observe predictable patterns in how sunlight changes throughout each day.

Pedagogical Tip:

Have students track the sun's position by observing shadows on the playground at different times during the school day. This concrete observation helps them understand abstract concepts about Earth's rotation.

UDL Suggestions:

Provide multiple ways for students to represent their understanding: drawing pictures of shadows, acting out Earth's rotation with their bodies, or creating simple diagrams with moveable sun and Earth models.

Zoom In / Zoom Out

1. Zoom In: Light travels in straight lines from the sun to Earth. When these light rays hit solid objects like buildings, they cannot pass through, creating dark areas called shadows on the opposite side.
2. Zoom Out: Earth is part of our solar system, where it orbits around the sun while also spinning on its axis. This movement affects not just our city, but creates day and night patterns for people all around the world.

Discussion Questions

1. What do you notice about where the sun is in this picture? (Bloom's: Observe | DOK: 1)
2. How do you think the shadows from these buildings might look different in the morning compared to the afternoon? (Bloom's: Predict | DOK: 2)
3. Why do you think we see the sun in different parts of the sky throughout the day? (Bloom's: Analyze | DOK: 3)
4. What patterns do you notice about sunlight and shadows every day? (Bloom's: Analyze | DOK: 2)

Potential Student Misconceptions

1. Misconception: The sun moves around Earth during the day.
Clarification: Earth spins while the sun stays in the same place, making it look like the sun is moving across our sky.
2. Misconception: Shadows are always the same size and direction.
Clarification: Shadows change throughout the day as Earth rotates and the sun appears in different positions in the sky.

Cross-Curricular Ideas

1. Math + Science: Have students measure shadows at different times of day using string or rulers. They can record the measurements on a simple chart and compare which shadows are longest and shortest. This connects measurement skills to understanding how the sun's position changes.
2. ELA + Science: Students can write or draw a simple story titled "Where Does the Sun Go at Night?" where they illustrate and explain the day-night cycle in their own words. This helps reinforce their understanding while practicing narrative writing.
3. Art + Science: Create shadow art by tracing shadows of objects (toys, hands, buildings) at different times of day. Students can compare their tracings and discuss why the shadows look different, then paint or color their favorite shadow shapes.
4. Social Studies + Science: Discuss how people in different parts of the world experience day and night at the same time. Use a globe to show that while it's daytime in Houston (where this photo is taken), it's nighttime on the other side of Earth.

STEM Career Connection

1. Astronomer: An astronomer is a scientist who studies the sun, moon, stars, and planets. They use special telescopes to look at space and learn how Earth moves around the sun. Astronomers help us understand why we have day and night. Average Annual Salary: \$110,000
2. Urban Planner: An urban planner designs cities and decides where buildings should go. They think about how sunlight hits buildings at different times of day to make sure cities are bright and safe. They use their knowledge of the sun's movement to create good city designs. Average Annual Salary: \$75,000
3. Weather Meteorologist: A meteorologist studies the weather and atmosphere. They track how the sun's heat affects our weather patterns and creates wind, rain, and temperature changes throughout the day. Understanding the sun helps them predict what the weather will be like tomorrow. Average Annual Salary: \$97,000

NGSS Connections

- Performance Expectation: 1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted.

- Disciplinary Core Ideas: 1-ESS1.A and 1-ESS1.B
- Crosscutting Concepts: Patterns and Cause and Effect

Science Vocabulary

- * Rotation: When something spins around like a top
- * Shadow: A dark area made when something blocks light
- * Pattern: Something that happens the same way over and over
- * Axis: An imaginary line through the middle of Earth that it spins around
- * Solar system: The sun and all the planets that go around it

External Resources

Children's Books:

- The Magic School Bus Lost in the Solar System by Joanna Cole
- Sun Up, Sun Down by Gail Gibbons
- Shadows and Reflections by Tana Hoban