Sunrise

Earth & Space Science | Lesson Guide

1st Grade

Photo Description

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

Scientific Phenomena

The anchoring phenomenon in this image is the apparent position of the sun in the sky and how it creates light and shadows. The sun appears to move across the sky during the day due to Earth's rotation on its axis. As our planet spins, different parts of Earth face the sun, creating the cycle of day and night. The bright sunlight visible between the buildings demonstrates how the sun provides light and energy to Earth.

Core Science Concepts

1. The Sun provides light and heat - The bright sun in the image shows how our star gives us the light we need to see during the day.

2. Day and night patterns - The sun appears to move across the sky as Earth rotates, creating predictable patterns of light and darkness.

3. Shadows are created when objects block light - The buildings in the image cast shadows because they block some of the sun's light.

4. The sun helps plants grow - The trees and grass visible in the foreground need sunlight to make their own food through photosynthesis.

Pedagogical Tip:

Use a flashlight and classroom objects to demonstrate how shadows form when light is blocked. This hands-on experience helps first graders understand the relationship between light sources and shadows.

UDL Suggestions:

Provide multiple ways for students to observe sun patterns: drawing pictures, using body movements to show Earth spinning, and creating shadow puppets to engage different learning styles and abilities.

Zoom In / Zoom Out

1. Zoom In: At the microscopic level, sunlight is made up of tiny particles called photons that travel from the sun to Earth. These light particles help plants make food in their leaves through a process called photosynthesis.

2. Zoom Out: This city is part of Earth's larger system where the sun's energy drives weather patterns, seasons, and supports all life on our planet. The sun's position affects temperatures and daylight hours 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: Apply | DOK: 2)

3. Why do you think the trees and grass need the sunlight we see in this picture? (Bloom's: Analyze | DOK: 2)

4. If you were standing in this spot tomorrow at the same time, where do you predict the sun would be? (Bloom's: Evaluate | DOK: 3)

Potential Student Misconceptions

1. Misconception: The sun moves around Earth during the day.
   Clarification: Earth spins like a top, which makes the sun appear to move across our sky.

2. Misconception: The sun goes away at night.
   Clarification: The sun is always shining, but Earth's spinning makes our part face away from the sun during nighttime.

3. Misconception: Shadows are always the same size and shape.
   Clarification: Shadows change size and direction as the sun's position changes throughout the day.

Cross-Curricular Ideas

1. Math - Measuring Shadows: Have students go outside at different times of day and measure the shadows cast by objects using string or rulers. Students can compare shadow lengths and create simple bar graphs to show how shadows change throughout the day. This connects measurement skills with the science of how sunlight position affects shadow size.

2. ELA - Sun and Shadow Stories: Students can write or dictate simple stories about a character's day, describing what happens when the sun rises, when it's high in the sky, and when it sets. Encourage them to use descriptive words like "bright," "warm," and "dark" to build vocabulary while reinforcing understanding of daily sun patterns.

3. Art - Shadow Puppet Theater: Students create shadow puppets using construction paper cutouts and a light source (flashlight or lamp). They can perform simple shadow puppet shows while learning how light and objects work together to create shapes and silhouettes on a wall or screen.

4. Social Studies - Community Buildings: Use this city skyline photo to discuss the buildings and structures in communities. Students can learn that cities are built by people who work together, and that many workers (architects, construction workers, engineers) help create the buildings we see in our neighborhoods.

STEM Career Connection

1. Astronomer: An astronomer is a scientist who studies the sun, stars, and space. They use special telescopes to look at the sun and learn about how it affects Earth. Astronomers help us understand why the sun is important for life on our planet. Average Annual Salary: $120,000 USD

2. Architect: An architect is a person who designs buildings like the tall ones in this photo. They think about where the sun shines during the day and how to position windows and doors so buildings get the right amount of sunlight. Average Annual Salary: $88,000 USD

3. Urban Planner: An urban planner helps design cities and decides where to put buildings, parks, and trees. They think about how sunlight reaches streets and parks so people have bright, healthy places to spend time outdoors. Average Annual Salary: $77,000 USD

NGSS Connections

- Performance Expectation: 1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted.
- Disciplinary Core Idea: 1-ESS1.A - The sun is a star that appears larger and brighter than other stars because it is closer.
- Crosscutting Concept: Patterns - Objects in the sky have patterns of movement that can be observed and described.

Science Vocabulary

* Sun: The bright star that gives Earth light and heat during the day.
* Shadow: A dark area that forms when something blocks light.
* Pattern: Something that happens the same way over and over again.
* Rotate: To spin around like a top.
* Daylight: The time when the sun lights up our part of Earth.

External Resources

Children's Books:
- The Sun is My Favorite Star by Frank Asch
- Day Light, Night Light by Franklyn M. Branley
- Shadows and Reflections by Tana Hoban