Sunrise

Earth & Space Science | Lesson Guide

Kindergarten

Photo Description

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

Scientific Phenomena

This image represents the Anchoring Phenomenon of how the sun provides light and heat to Earth during daytime. The bright sunlight visible between the buildings demonstrates solar radiation reaching Earth's surface. This occurs because the sun is a massive star that produces energy through nuclear fusion, sending light and heat across space to illuminate our planet during the day when our location faces the sun due to Earth's rotation.

Core Science Concepts

1. Day and Night Cycle: The sun appears to move across the sky, but Earth is actually spinning, creating day and night
2. Solar Energy: The sun provides light and heat energy that we can see and feel
3. Natural vs. Human-made Objects: The sun and trees are natural, while buildings are made by people
4. Shadows and Light: When sunlight hits objects like buildings, it creates shadows and bright spots

> **Pedagogical Tip:**
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> Use concrete, hands-on experiences like shadow tracing throughout the day to help kindergarteners understand the sun's apparent movement. Young children learn best through direct observation and physical activities.

> **UDL Suggestions:**
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> Provide multiple ways to represent the day/night cycle: use a flashlight and globe demonstration, act out Earth spinning, and create picture schedules showing daytime and nighttime activities to support diverse learning needs.

Zoom In / Zoom Out

1. Zoom In: Inside the sun, tiny particles are constantly crashing together to make the light and heat that travels to Earth (nuclear fusion at the atomic level)
2. Zoom Out: Earth spins like a top in space, and as it turns, different parts face the sun, creating day and night cycles across our entire planet

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 of these buildings might change during the day? (Bloom's: Predict | DOK: 2)

3. Why do you think some parts of the buildings look brighter than others? (Bloom's: Analyze | DOK: 2)
4. What would this same place look like at nighttime? (Bloom's: Apply | DOK: 2)

Potential Student Misconceptions

1. Misconception: The sun moves around Earth during the day
   Reality: Earth spins, making it look like the sun moves across the sky

2. Misconception: The sun goes away at night
   Reality: The sun is always shining, but Earth's spinning means our side faces away from it at night

3. Misconception: Buildings can block out the sun completely
   Reality: Buildings create shadows but the sun's light spreads around and reflects off many surfaces

Cross-Curricular Ideas

1. Math - Patterns and Shapes: Have students identify and sort the different shapes of buildings (rectangles, squares, triangles). Count how many buildings they can see in the photo. Create a pattern with building blocks using the same shapes from the skyline.

2. ELA - Storytelling and Descriptive Language: Ask students to dictate or draw a story about what happens in the city during the day versus nighttime. Read books about city life and have students use new vocabulary words like "skyline," "tall," "sunny," and "shadow" in simple sentences.

3. Social Studies - Communities and City Workers: Discuss that cities are communities where many people live and work. Talk about the workers in tall buildings (teachers, doctors, helpers) and how the sun helps them do their jobs. Take a neighborhood walk to observe buildings and workers in your own community.

4. Art - Light and Shadow Painting: Have students create cityscape paintings using light and dark colors to show how sunlight makes some buildings bright and creates shadows. Use white paint or chalk on dark paper to show bright sunlight, mimicking the photo's lighting.

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 safely and learn why it gives us light and heat. They help us understand how Earth moves around the sun. Average Annual Salary: $120,000

2. Architect: An architect is a person who designs buildings like the tall ones in this photo. They think about how the sun will shine on buildings during the day and where shadows will fall. They make sure buildings are safe and beautiful for people to live and work in. Average Annual Salary: $88,000

3. Solar Energy Engineer: A solar energy engineer designs special panels that catch sunlight and turn it into power for buildings and homes. They use the sun's energy to help people have electricity. This job helps keep our Earth clean and healthy. Average Annual Salary: $105,000

NGSS Connections

- Performance Expectation: K-ESS2-1: Use and share observations of local weather conditions to describe patterns over time

- Disciplinary Core Ideas: K-ESS2.D Weather and Climate - Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time
- Crosscutting Concepts: Patterns - Patterns in the natural world can be observed and used as evidence

Science Vocabulary

* Sun: The bright star that gives Earth light and heat during the day
* Shadow: A dark area made when something blocks the sun's light
* Daytime: When our part of Earth faces the sun and it is bright outside
* Energy: The power that makes things work, like light and heat from the sun
* Natural: Things that are made by nature, not by people
* Human-made: Things that people build or create

External Resources

Children's Books:
- The Sun Is My Favorite Star by Frank Asch
- What Makes Day and Night by Franklyn M. Branley
- Sunshine Makes the Seasons by Franklyn M. Branley