Sunrise

Earth & Space Science | Lesson Guide

1st Grade

Photo Description

This image shows a beautiful sunrise over a flat, open landscape with a straight road leading toward the horizon. The sun is just beginning to rise, painting the sky with bright orange, pink, and yellow colors near the horizon, which fade to gray and blue higher up in the sky. Trees line both sides of the road in the distance.

Scientific Phenomena

Anchoring Phenomenon: Why does the sky change colors at sunrise?

The sun appears to rise in the eastern sky each morning, creating a natural light show. This happens because Earth is constantly rotating on its axis. As your location on Earth rotates toward the sun, the sun comes into view on the horizon. Before the sun appears above the horizon, its light travels through Earth's atmosphere and scatters off dust, water droplets, and air molecules. Blue light scatters easily and spreads throughout the upper sky, while longer wavelengths like red, orange, and yellow light reach us more directly at the horizon, creating the warm colors we see during sunrise. This is a daily, predictable pattern that young students can observe and discuss.

Core Science Concepts

1. Day and Night Cycle: The sun appears to move across the sky each day because Earth rotates. Sunrise marks the beginning of daytime when the sun becomes visible in the eastern sky.

2. Light and Color: Different colors of light behave differently when traveling through the air. The colors we see at sunrise depend on how light scatters through the atmosphere.

3. Patterns in Nature: Sunrises happen at regular times each day and follow a predictable pattern. Students can observe and track these patterns over time.

4. Sky Observation: The appearance of the sky changes throughout the day, showing students that the natural world is dynamic and observable.

Pedagogical Tip:

For First Grade, focus on observation and prediction rather than complex physics. Ask students to simply notice the colors, time of day, and direction (East). Have them predict what they'll see tomorrow morning. Avoid detailed explanations of light wavelengths; instead, use comparisons: "The orange light travels straight to our eyes, but blue light bounces around in the air."

UDL Suggestions:

Multiple Means of Representation: Provide a visual schedule showing sunrise times for the week so students can see the pattern. Use actual photographs from different days/seasons. Offer a simplified diagram showing the sun's position at different times of day.

Multiple Means of Action & Expression: Allow students to express their thinking through drawing, painting, or arranging colored paper strips to show sunrise colors. Some students might act out Earth's rotation and the sun's apparent movement.

Multiple Means of Engagement: Connect to students' personal experiences: "Have you ever seen the sun come up? What colors did you see?" This validates morning observations some families share together.

Zoom In / Zoom Out

Zoom In: Light Scattering at the Molecular Level

When we look at a sunrise, we're actually watching tiny invisible pieces of light (called photons) bouncing around in the air! High above Earth, there are billions and billions of teeny-tiny dust particles, water droplets, and air molecules floating in the atmosphere. When sunlight enters the atmosphere at sunrise, the blue light waves are very small and bounce off these tiny particles easily—like a ball bouncing around a playground. Orange and red light waves are bigger and pass more directly through to our eyes at the horizon. This bouncing around is called "scattering," and it's what makes the sky look different colors during sunrise. Even though we can't see the dust and water droplets themselves, we can see the beautiful result of light bouncing off them!

Zoom Out: Earth's Position in Space and the Solar System

Sunrise is only possible because of Earth's place in our solar system. Our solar system has one star (the sun) at the center, and Earth orbits around it while also spinning like a top. Every 24 hours, Earth completes one full rotation. At the same time, Earth is also traveling around the sun in a big circle, which takes 365 days (one year). The sunrise we see depends on where Earth is in its yearly orbit—this is why sunrise happens at different times in different seasons. In winter, the sun rises later and lower in the sky; in summer, it rises earlier and higher. Understanding sunrise means understanding that Earth is a small planet moving through space in two ways at once: spinning and orbiting. We live on a dynamic, moving world!

Discussion Questions

1. "What colors do you see in the sky during sunrise? Why do you think the sky changes colors?" (Bloom's: Understand | DOK: 1–2)

2. "When does the sun rise in the morning where you live? How could we find out the exact time?" (Bloom's: Remember | DOK: 1)

3. "If the sun rises in the east every morning, what do you think will happen tomorrow morning? Why?" (Bloom's: Predict/ Understand | DOK: 2)

4. "Where is the sun during nighttime? How do we know it's still there even though we can't see it?" (Bloom's: Analyze | DOK: 2–3)

Potential Student Misconceptions

Misconception 1: "The sun moves across the sky because it's traveling toward us and away from us."

Scientific Clarification: The sun doesn't actually move across the sky—Earth does! The sun appears to move because our planet is spinning like a top. As your location on Earth rotates toward the sun in the morning, the sun comes into view on the horizon. It's similar to how when you're sitting in a moving car and looking out the window, the trees seem to move backward—but really, the car (and you) are moving! Help students feel this by having them spin slowly while looking at a fixed object in the room; the object appears to move, but it's actually them spinning.

Misconception 2: "The sun disappears at night because it goes somewhere else, like behind a building."

Scientific Clarification: The sun doesn't go away or hide—it's always shining! At night, your location on Earth has rotated away from the sun. The sun is still shining brightly, but it's shining on the other side of Earth where it's daytime. You can use a globe and flashlight to show this: shine the light on one side (daytime) while the other side is dark (nighttime). The light source (sun/flashlight) doesn't move; Earth spins so different places get light and darkness.

Misconception 3: "Sunrises happen at the same time every single day."

Scientific Clarification: Sunrise times actually change throughout the year! In winter, the sun rises later (sometimes not until 7 or 8 a.m.). In summer, the sun rises earlier (sometimes as early as 5 a.m.). This happens because of the tilt of Earth's axis. As Earth orbits the sun, the tilt causes the sun to rise at different times and different places on the horizon. You can track sunrise times on a calendar to show students this pattern—it's a great way to see how Earth's motion affects our daily experience!

Extension Activities

1. Sunrise Color Mixing: Set up a simple activity where students use watercolors or food coloring mixed with water to recreate sunrise colors on paper. Start with blue at the top, blend to purple, then pink, orange, and yellow near the bottom. Discuss how the colors fade and change, just like in a real sunrise.

2. Sunrise Observation Journal: Over one week, have students (with family help) observe and record one sunrise. They can draw what they see, note the colors, and write or dictate one sentence about it. Create a classroom "Sunrise Gallery" with all their observations to show the patterns.

3. Earth Rotation Demonstration: Use a globe or ball and a flashlight in a darkened area. Show students how as the globe rotates toward the light, different parts experience "sunrise" and "sunset." Let students take turns rotating the globe and watching when light first appears on their location—making the connection concrete and kinesthetic.

Cross-Curricular Ideas

Math Connection: Sunrise Time Patterns
Create a simple data chart showing sunrise times for one week or one month. Students can place stickers or draw pictures on a number line to show sunrise times (e.g., 6:30 a.m., 6:45 a.m., 7:00 a.m.). This builds early graphing skills, number sense, and helps students see that sunrise times follow a mathematical pattern. Ask: "Is sunrise getting earlier or later? By how many minutes does it change each day?"

ELA Connection: Sunrise Color Words and Poetry
Read sunrise-themed picture books together, then have students create their own simple sunrise "color poems" using descriptive words. Provide sentence frames like: "I see _____ (color) in the sky. The sun is _____. The sky looks _____." Students can illustrate their poems with watercolors or colored pencils, creating a classroom poetry and art display. This builds vocabulary around descriptive language while celebrating their own observations.

Social Studies Connection: Our Daily Routine and Community Helpers
Discuss how different people experience sunrise differently based on their jobs. Farmers, bakers, mail carriers, and construction workers often wake up before sunrise. Have students interview a family member about when they wake up and why. Create a classroom chart showing community helpers and their morning routines. This connects sunrise to real life, builds awareness of different jobs, and helps students understand that sunrise is important to many people in their community.

Art Connection: Sunrise Color Blending and Sky Observation
Have students observe the sky during actual sunrise times (with family support at home, or as a class field trip if possible) and paint what they see using a "wet watercolor" technique. Drop colors onto wet paper and let them blend naturally—yellow at the bottom, orange, pink, purple, and blue at the top—mimicking how colors fade in a real sunrise. Display finished paintings alongside photographs of real sunrises, and have students compare: "How are the colors the same? How are they different? What colors did the artist choices work best?"

STEM Career Connection

Meteorologist (Weather Scientist) – Average Salary: $97,000/year

A meteorologist is a scientist who studies the weather and atmosphere. They observe clouds, temperature, and wind patterns—including what the sky looks like during sunrise and sunset! Meteorologists use special tools and cameras to track storms, predict rain and snow, and understand how the sun's heat affects our weather. Some meteorologists work at airports to help pilots know if it's safe to fly. Others work on TV to tell people what the weather will be like tomorrow. By studying sunrises and how light moves through the atmosphere, meteorologists learn important clues about weather patterns. If you love observing the sky and asking questions about why it looks different each day, you might become a meteorologist!

Astronomer (Space Scientist) – Average Salary: $119,000/year

An astronomer is a scientist who studies the sun, moon, stars, and planets. Astronomers are very interested in the sun because it's the biggest, brightest object in our solar system and it gives Earth light and heat. They use telescopes and special equipment to observe the sun safely (never looking directly at it!) and learn about how it works. Some astronomers study how the sun's light travels through space and affects our planet. Others teach people about the solar system and help us understand our place in the universe. If you're curious about the sun, stars, and space, and you enjoy using tools to observe things far away, you might become an astronomer!

Photographer or Cinematographer (Visual Artist/Technician) – Average Salary: $68,000/year

A photographer or cinematographer captures beautiful images and videos of the world around us—including stunning sunrises! These professionals use special cameras, understand light and color, and know exactly when and where to take pictures to show nature's beauty. Many photographers travel to different places to photograph famous sunrises. Some work for nature magazines, websites, or create art to display in galleries. Others make videos for movies and television shows. Cinematographers understand how light changes throughout the day and use that knowledge to create amazing visual stories. If you love taking pictures, observing colors and light, and want to share the beauty of nature with others, you might become a photographer or cinematographer!

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 (patterns in daily weather, including sunrise and sky changes)

Crosscutting Concepts:
- Patterns (Daily patterns of sunrise; repeating color changes)
- Systems and System Models (The sun-Earth system and how rotation creates day/night)

Science Vocabulary

* Sunrise: The time in the morning when the sun first appears above the horizon and the sky becomes bright.

* Horizon: The line where the sky meets the land or water far, far away.

* East: The direction where the sun rises in the morning.

* Atmosphere: The air and gases that surround Earth.

* Pattern: Something that repeats the same way over and over.

* Rotate: To spin or turn, like a spinning top (Earth rotates to create day and night).

External Resources

Children's Books:
- Sun by Mary Hill (simple, concept-focused picture book about the sun and daylight)
- The Sun is Up by Harriet Ziefert (explores what happens during sunrise and morning)
- Sunrise by Richard McGuire (beautiful visual exploration of morning light)

Teacher Note: This lesson works best when connected to real observations. Encourage families to observe sunrises together over a week and share their observations in class. This builds community, validates home science experiences, and provides authentic data for classroom discussions.