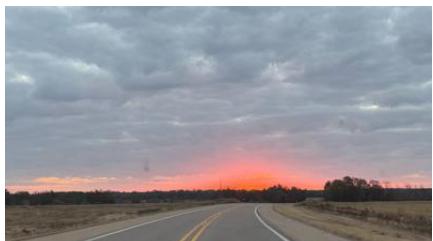


Photo Description



This image shows a beautiful sunrise over a long, straight road stretching toward the horizon. The sky displays a dramatic gradient of colors—deep oranges and reds near the horizon gradually shifting to pink, purple, and gray clouds above. The sun is just beginning to peek over the treeline in the distance, casting warm light across the flat landscape and illuminating the road's yellow center line.

Scientific Phenomena

Anchoring Phenomenon: Why does the sky change colors during sunrise, and why does the sun appear to move across the sky?

Scientific Explanation: The sun doesn't actually move—Earth is rotating on its axis. As our location on Earth turns to face the sun, we experience sunrise. The colorful sky happens because sunlight enters Earth's atmosphere at a low angle during early morning. The shorter blue and violet wavelengths scatter when passing through more atmosphere, while longer red and orange wavelengths pass through more directly, creating the warm colors we see. This is called Rayleigh scattering. The sun appears to move across the sky because of Earth's rotation, not because the sun is moving.

Core Science Concepts

- * **Earth's Rotation:** Earth spins like a top on an imaginary axis. This spinning causes day and night. It takes 24 hours for Earth to complete one full rotation.
- * **The Sun as an Energy Source:** The sun provides light and heat energy that reaches Earth. This energy travels through space in the form of light and warms our planet.
- * **Light and Atmosphere:** Light from the sun travels through Earth's atmosphere (the blanket of air around our planet). Different colors of light behave differently in the atmosphere—some scatter more than others, which is why we see different colors at sunrise and sunset.
- * **Observable Patterns in the Sky:** The sun rises in the east and sets in the west every day. This is a pattern we can observe and predict.

Pedagogical Tip:

Students at this age are concrete thinkers who benefit from direct observation and kinesthetic experiences. Rather than only explaining Earth's rotation verbally, have students physically demonstrate it by standing and slowly spinning. This embodied learning helps them internalize the concept that Earth rotates, not that the sun moves around us.

UDL Suggestions:

To support diverse learners, provide multiple means of representation: (1) Show the image alongside a simple animated diagram of Earth rotating toward the sun; (2) Offer a tactile globe that students can rotate themselves; (3) Use color-coded vocabulary cards (sun = yellow, atmosphere = blue, light = white) to support visual learners and English Language Learners. Additionally, allow students to express their understanding through drawing, movement, or verbal explanation rather than requiring only written responses.

Discussion Questions

1. What do you think causes the sun to appear in different places in the sky throughout the day? (Bloom's: Understand | DOK: 1)
2. Why do you think the sky is red and orange at sunrise instead of blue like it is during the middle of the day? (Bloom's: Analyze | DOK: 2)
3. If Earth is always spinning, why does it feel like we are standing still? (Bloom's: Analyze | DOK: 2)
4. Where do you predict the sun will be in the sky two hours from now, and what evidence helps you make this prediction? (Bloom's: Evaluate | DOK: 3)

Extension Activities

1. Sunrise Observation Journal: Have students observe and sketch the sunrise or a simulated sunrise (using images or video) for several days. Ask them to record the time, colors they see, and where the sun appears on the horizon. This builds observational skills and reinforces the predictable pattern of sunrise. (Supports 3-ESS1-1)
2. Rotating Earth Model: Provide students with a globe, flashlight, and darkened classroom. One student holds the flashlight (representing the sun) while another slowly rotates the globe. Students observe how different parts of Earth experience "day" and "night" as the globe rotates. This kinesthetic activity makes abstract rotation concrete. (Supports understanding of 3-ESS1.A)
3. Color-Mixing Sky Experiment: Using watercolors or colored tissue paper, have students blend colors from orange and red through pink to purple and blue, mimicking the colors they see in the sunrise photo. Discuss why the colors blend and fade, connecting this to light scattering through the atmosphere. Display finished artwork alongside the original photo for comparison. (Supports Patterns through artistic representation of natural phenomena)

NGSS Connections

Relevant Performance Expectation:

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

Disciplinary Core Ideas:

- 3-ESS1.A—The sun, Earth, and moon and the regular and predictable motion of the earth in relation to the sun and moon
- 3-ESS2.D—Weather and climate are influenced by, among other things, the position of Earth relative to the sun

Crosscutting Concepts:

- Patterns—Students identify and describe the predictable pattern of sunrise in the eastern sky
- Cause and Effect—Earth's rotation causes the sun to appear to move across the sky

Science Vocabulary

- * Sunrise: The time of day when the sun first appears above the horizon in the eastern sky, bringing daylight.
- * Atmosphere: The layer of air that surrounds Earth and protects it from the sun's harmful rays.
- * Rotation: The spinning motion of Earth on its axis, which causes day and night.
- * Horizon: The line where the sky appears to meet the land or water in the distance.

- * Light: Energy from the sun that allows us to see and warms Earth.
- * Pattern: Something that happens again and again in the same way, like the sun rising every morning.

External Resources

Children's Books:

- Sun Up, Sun Down by Gail Gibbons (explores Earth's rotation and daily light patterns with clear illustrations)
- The Sun by Dayle Ann Dodds (introduces the sun as a star and its importance to Earth)
- Day Light, Night Light by Franklyn M. Branley (explains how Earth's rotation causes day and night)

YouTube Videos:

- "Earth's Rotation and the Day-Night Cycle" by Crash Course Kids — A clear, animated explanation of how Earth's spinning creates sunrise and sunset. <https://www.youtube.com/watch?v=xJkO2VAjTT0>
- "Why is the Sky Blue? Sunrise and Sunset Colors Explained" by TED-Ed — An engaging animated video explaining Rayleigh scattering and atmospheric optics in accessible language. <https://www.youtube.com/watch?v=Y0jUiVQ1nq8>