

## Photo Description



This image shows a beautiful sunrise over a flat landscape with a straight road leading toward the horizon. The sky changes colors from orange and red near the horizon to pink, gray, and blue higher up. Trees line both sides of the road, and the sun is just beginning to appear on the horizon, painting the sky with warm, glowing colors.

## Scientific Phenomena

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

**Scientific Explanation:** A sunrise occurs because Earth is constantly rotating on its axis. As your location on Earth rotates toward the sun, the sun appears to rise above the horizon. The colors we see during sunrise happen because sunlight travels through Earth's atmosphere at an angle. When sunlight enters the atmosphere at a low angle (during sunrise or sunset), it scatters off gas molecules and particles in the air. Blue and violet light scatter easily, but red, orange, and yellow light scatter less, so those colors dominate the sky near the horizon. This natural phenomenon is predictable and happens every single day.

## Core Science Concepts

- \* **Earth's Rotation:** Earth spins like a top, and this spinning causes the sun to appear to move across the sky each day. Kindergarteners observe that the sun rises in the east and sets in the west because of this rotation.
- \* **Light and Color:** Sunlight contains all colors mixed together. When sunlight passes through the air during sunrise, it breaks into different colors. The air acts like a filter that shows us reds, oranges, and yellows during sunrise.
- \* **Patterns in Nature:** Sunrise happens in the same way every single day. Kindergarteners can observe this repeating pattern and predict that the sun will rise again tomorrow.
- \* **Weather and Sky Observation:** Clouds, weather, and atmospheric conditions affect how colorful and bright a sunrise looks. Some sunrises are more spectacular than others depending on dust, water droplets, and pollution in the air.

### Pedagogical Tip:

For Kindergarten learners, avoid abstract explanations of rotation and light refraction. Instead, anchor learning in observable experiences: "Every morning, the sun comes up. We see different colors. The colors happen because light travels through air." Use hand motions (spinning for rotation, waving for light traveling) and repeated daily observations to build understanding gradually. Kindergarteners learn through repeated, sensory-rich experiences, not explanations.

### UDL Suggestions:

**Representation:** Provide both visual (pictures of sunrises) and tactile (colored tissue paper overlays) ways to explore how light creates colors. **Action & Expression:** Allow students to show understanding through movement (acting out Earth's spin), drawing, and singing songs about sunrise rather than written responses. **Engagement:** Connect the lesson to students' personal experience by asking them to share when they've seen a sunrise. Use real, high-quality photographs and videos rather than cartoons to maintain scientific accuracy.

## Zoom In / Zoom Out

### Zoom In: Tiny Light Particles in the Air

When we zoom in very close—so close we'd need special tools to see—we discover that the air around Earth is filled with teeny, tiny invisible particles of dust, water droplets, and gases. When sunlight enters the atmosphere during sunrise, these invisible particles act like a mirror, bouncing light in different directions. The smaller blue and violet light waves bounce around a lot, but the bigger red and orange light waves pass through more easily. This is why we see warm colors near the horizon! Kindergarteners can't see these particles, but we can observe their effect: colorful sunrises.

### Zoom Out: Earth's Place in Space

If we zoom way out into space, we see that Earth is one small planet spinning around the sun. The sun is a giant ball of hot gas that shines light in all directions. Earth is always rotating, like a spinning top, as it travels around the sun in a big circle (an orbit). The sunrise we see in this photo is happening because one side of Earth is slowly turning to face the sun's light. Meanwhile, on the other side of Earth, it's nighttime—people there are sleeping while their part of Earth spins away from the sun. Every 24 hours, Earth completes one full spin, and sunrise happens again in the same place.

## Discussion Questions

1. What colors do you see in the sunrise? (Bloom's: Remember | DOK: 1)
2. Why do you think the sky is a different color at sunrise than it is in the middle of the day? (Bloom's: Analyze | DOK: 2)
3. What do you think will happen to the sky colors as the sun gets higher in the sky? (Bloom's: Predict | DOK: 2)
4. Do you think the sun rises at the same time every single day, or does it change? (Bloom's: Understand | DOK: 1)

## Potential Student Misconceptions

Misconception 1: "The sun moves across the sky; Earth stays still."

Kindergarten Clarification: It looks like the sun is moving, but actually, we are moving! Earth is spinning like a top, and as it spins, different parts face toward the sun. The sun stays in the same place in space. We see the sun rise because our part of Earth is spinning toward it. (Use the Earth Spin Dance activity to reinforce this kinesthetic understanding.)

Misconception 2: "The sun disappears at night and comes back in the morning."

Kindergarten Clarification: The sun doesn't disappear! It's always there, shining. At night, your part of Earth is turned away from the sun, so you can't see it. It's shining on the other side of Earth where people are awake during the daytime. When your part of Earth spins back around, the sun appears again—but it was always there.

Misconception 3: "The colors in the sunrise come from the sun being a different color."

Kindergarten Clarification: The sun is always white and bright. The colors—red, orange, pink, and yellow—come from sunlight traveling through the air. The air is like a special filter that shows us these beautiful colors during sunrise and sunset. When the sun is high in the sky at noon, the light travels through less air, so we see white light instead of colorful light.

## Extension Activities

1. Sunrise Color Mixing Station: Provide red, orange, and yellow watercolors or markers. Invite students to paint their own sunrise, blending colors to show how the sky changes. Discuss why they chose those colors and what they observed in the photograph.

2. Daily Sky Observation Chart: Create a simple pictorial chart where students draw or place stickers showing what the sky looks like each morning for one week. Discuss patterns: "Does the sun come up in the same place? Do we see colors every day?" This builds understanding of predictable patterns.

3. Earth Spin Dance: Play music and have students spin slowly like Earth rotating. Point to one side as "sunrise" and the other as "sunset." This kinesthetic activity helps Kindergarteners internalize why the sun appears to move across the sky.

### Cross-Curricular Ideas

#### Math: Sunrise Time Patterns & Graphing

Create a simple graph showing what time sunrise occurs over one week or month. Use pictures of clocks or color-coded blocks to represent early morning times. Ask: "Does the sun come up at the same time every day? Is it earlier or later than yesterday?" This builds understanding of time, patterns, and basic data representation while connecting to the predictability of sunrise.

#### ELA: Sunrise Poetry & Descriptive Language

Read sunrise-themed poems or picture books aloud, then invite students to use sensory words to describe what they see, hear, and feel during sunrise. Create a class poem together using repeated phrases like "The sun is rising, the sky is... [orange, pink, bright, warm]." This builds descriptive vocabulary and oral language while celebrating the beauty of the phenomenon shown in the photo.

#### Social Studies: Daily Routines & Community Helpers

Discuss how sunrise affects people's daily routines. Who wakes up to see the sunrise? (farmers, fishermen, construction workers, parents, doctors). Create a simple chart showing community helpers who work during sunrise hours. Invite students to share their own morning routines. This connects the natural phenomenon to real human experiences and introduces careers tied to daytime work.

#### Art: Sunrise Mixed Media & Color Exploration

Beyond watercolor painting, provide multiple materials for sunrise art: tissue paper collage, oil pastels, water droplets on paper with food coloring, and natural materials like straw or grass arranged as a landscape. Ask students to experiment with how colors blend and change. Display artworks with the original photograph so students see how artists try to capture the beauty of what scientists observe in nature.

### STEM Career Connection

#### Weather Reporter / Meteorologist

Weather reporters are scientists who watch the sky, clouds, and weather patterns. They observe things like sunrise colors, cloud shapes, and temperature to tell people what the weather will be like. Some weather reporters work very early in the morning, waking up before sunrise to report on the day's weather! They use tools like thermometers and rain gauges to measure weather.

Average Annual Salary: \$40,000–\$65,000 USD

#### Astronomer

Astronomers are scientists who study the sun, stars, planets, and space. They use special telescopes to look at the sun safely and learn why it rises and sets. Astronomers help us understand how Earth moves around the sun and why we have day and night. Some astronomers work at planetariums, where they teach people about space and show beautiful pictures of sunrises on other planets!

Average Annual Salary: \$65,000–\$120,000 USD

### Photographer / Nature Photographer

Photographers take pictures of beautiful things in nature, like sunrises and sunsets. They know the best times of day and the best places to stand to capture amazing photos. Nature photographers travel to different places to photograph sunrises in mountains, deserts, and by the ocean. Their beautiful photos help people see and appreciate the natural world.

Average Annual Salary: \$35,000–\$70,000 USD

### 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)
- K-PS4.B (Electromagnetic radiation—light)

#### Crosscutting Concepts:

- Patterns (Students observe the repeating pattern of daily sunrises)
- Energy and Matter (Light energy travels from the sun through the atmosphere)

### Science Vocabulary

- \* Sunrise: The moment when the sun first appears above the horizon in the morning, and the sky begins to get light.
- \* Horizon: The line where the sky meets the ground or water in the distance.
- \* Sky: The space above Earth where clouds, the sun, and stars live.
- \* Atmosphere: The air all around Earth that we breathe; it is made of invisible gases.
- \* Pattern: Something that happens the same way over and over again.
- \* Color: The way light looks—like red, orange, yellow, blue, or purple.

### External Resources

#### Children's Books:

- The Sun by Elisha Cooper (simple, observational picture book perfect for Kindergarten)
- Hello, Sun! by Tim Hopgood (colorful exploration of sunrise and the sun throughout the day)
- A House for Little Red by Bonnie Christensen (beautiful illustrations including sunrise scenes)