

Teaching Activity: Red Sky, Blue Sky

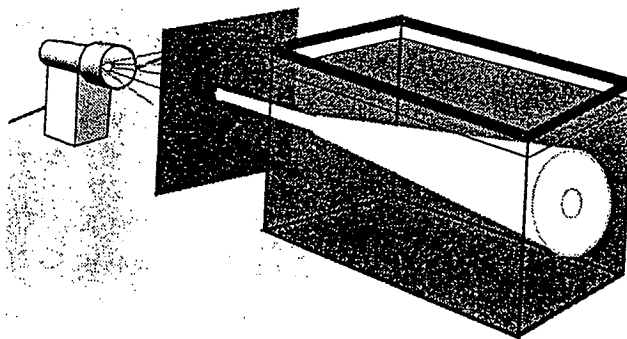
Introduction: One of the standard questions that children of any age are apt to ask is : "Why is the sky blue" ? Sunlight has all of the rainbow colors; red, orange, yellow, green, blue, violet. Earth's atmosphere contains molecules of gases that scatter the blue colors out of the direct path of sunlight and leave the other colors to travel straight through. This makes the Sun look yell, while the rest of the sky look blue. This effect is accentuated when the Sun is low in the sky. At sunrise and sunset, sunlight has to penetrate a much greater thickness of the atmosphere than it does when it is overhead. The molecules and the dust particles scatter almost all of the light at sunrise and sunset- blue, green , yellow and orange- with only the red coming directly through to your eyes; so the Sun In this demonstration, the suspended particles of milk scatter the light like the molecules in the Earth's atmosphere. When the flashlight beam is viewed directly through the water, the blue wavelengths of light are scattered away from the beam of light, leaving it yellowish. Increasing the amount of milk stimulates smog and the Sun will look red. Viewing from the side reveals a very subtle gray-blue hue.

Objective: To illustrate how the gases in the atmosphere scatter some wavelengths of visible light more than other.

Materials: Aquarium, stirrer, flashlight, opaque card with hole, water, milk, eye dropper, dark room;

Procedure:

1. Fill the aquarium with water and set up the demo as shown.



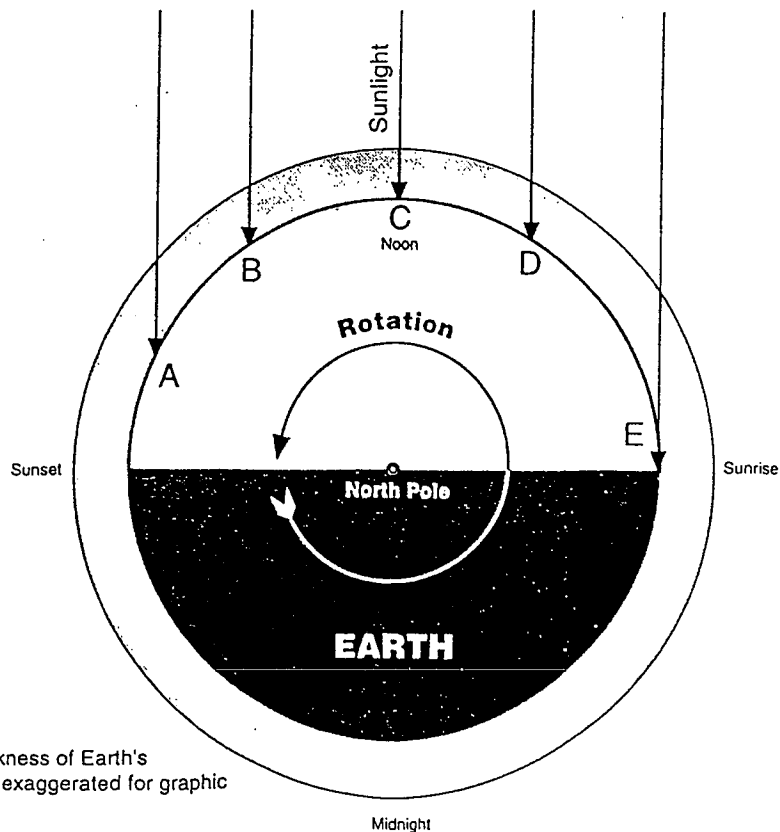
2. Add a few drops of milk to the water and stir the water to mix.
- 3) Darken the room and turn on the flashlight.
- 4) Observe the color of the light coming from the flashlight. Record your observations below.

5) Observe the color of the light as it comes through the aquarium. Record your observations.

6) Observe the color of the liquid from the sides of the aquarium. Record your observations.

For Further Research: When energized by sunlight, oxygen and nitrogen atoms in the atmosphere re-emit (scatter) light in all directions, causing the entire atmosphere to be lighted by sunlight. Violet light is scattered the most (1/10th as much). Because our eyes are very sensitive to violet blue.

-- Draw a diagram on the chalkboard or on an overhead transparency like the one shown below. Measure the difference in the atmospheric thickness the Sun's rays must penetrate to reach each location on the Earth's surface in the diagram. Which ray has the greatest distance to travel through the atmosphere to reach the Earth's surface?



Note: The thickness of Earth's atmosphere is exaggerated for graphic purposes.