

Because the light that causes glare is in most cases horizontally polarized, it can be filtered out by a polarizing substance whose transmission axis is oriented vertically. This is the case with polarizing sunglasses. As shown in **Figure 25**, the angle between the polarized reflected light and the transmission axis of the polarizer is 90° . Thus, none of the polarized light passes through.

In addition to reflection and absorption, scattering can also polarize light. Scattering, or the absorption and reradiation of light by particles in the atmosphere, causes sunlight to be polarized, as shown in **Figure 26**. When an unpolarized beam of sunlight strikes air molecules, the electrons in the molecules begin vibrating with the electric field of the incoming wave. A horizontally polarized wave is emitted by the electrons as a result of their horizontal motion, and a vertically polarized wave is emitted parallel to Earth as a result of their vertical motion. Thus, an observer with his or her back to the sun will see polarized light when looking up toward the sky.

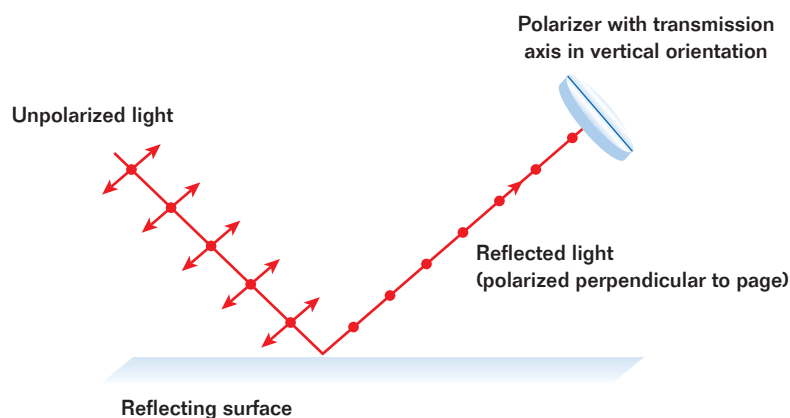


Figure 25
At a particular angle, reflected light is polarized horizontally. This light can be blocked by aligning the transmission axes of the sunglasses vertically.

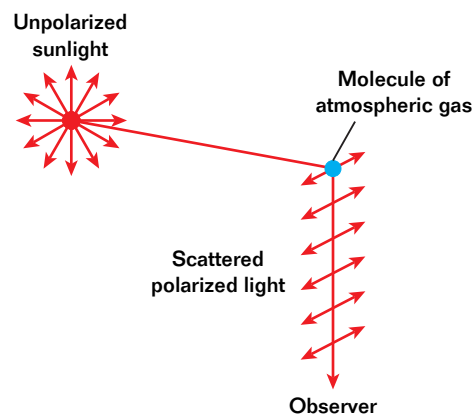


Figure 26
The sunlight scattered by air molecules is polarized for an observer on Earth's surface.

SECTION REVIEW

1. A lens for a spotlight is coated so that it does not transmit yellow light. If the light source is white, what color is the spotlight?
2. A house is painted with pigments that reflect red and blue light but absorb all other colors. What color does the house appear to be when it is illuminated by white light? What color does it appear to be under red light?
3. What primary pigments would an artist need to mix to obtain a pale yellow green color? What primary additive colors would a theater-lighting designer need to mix in order to produce the same color with light?
4. **Critical Thinking** The light reflected from the surface of a pool of water is observed through a polarizer. How can you tell if the reflected light is polarized?