Find out how some wavelengths of light are scattered more than others producing blue skies and red sunsets.

Directions
1. Darken the room by closing shades and turning off the lights. Have student groups shine a flashlight at the top of the tall glass of water.
2. Ask students to describe in their journals the color of the light coming from the flashlight, the color of light as it travels through the glass, and the color of the liquid at the bottom of the glass. (If might be necessary to put a sheet of white paper on the far side to avoid seeing colors through the glass.)
3. Turn on the lights and instruct student groups to fill their straw with about an inch of milk, add it to the glass of water, and mix. (If you are using a soda bottle, you will need to use more milk.)
4. Turn off the lights and again instruct student groups to shine a flashlight at the top of the glass of water.
5. Ask students to describe in their journals the color of the light coming from the flashlight, the color of light as it travels through the glass, and the color of the liquid from the far side of the glass.
6. If your students can’t see any change in color, instruct them to add a couple drops of milk to the mixture and try again.

Background Information
Sunlight, or visible light, is composed of the rainbow colors: red, orange, yellow, green, blue, and violet. Visible light is a part of the electromagnetic spectrum and carries energy in waves. Colors towards the red end of the spectrum have longer wavelengths and colors near the violet end of the spectrum have shorter wavelengths. Light waves can transfer energy when they interact with matter. Each type of matter is able to gain or lose a particular amount of energy and wavelengths.

The molecules and other particles in Earth’s atmosphere scatter (re-emit) some wavelengths of light more easily than others. The shorter wavelengths, such as violet and blue are the most likely to be scattered. The sky is blue because our eyes are not very sensitive to violet light.

When the Sun is low in the sky sunlight travels through a much greater thickness of atmosphere than it does when it is overhead. Over this greater distance, more wavelengths of light are scattered including longer wavelengths like green, yellow and orange. Only the red light comes through to your eyes; so, the setting sun often looks red.

In this activity, the suspended particles of milk scatter light like molecules and other particles in Earth’s atmosphere. Where the light has only traveled through the top layer of water, it appears light blue. Where it has traveled through most of the water, it appears yellow, orange, or red. If you add too much milk to the water, the glass will have a yellowish hue just like the atmosphere on a smoggy day.