TYNDALL EFFECT

The Tyndall effect is the scattering of light as a light beam passes through a colloid. The individual suspension particles scatter and reflect light, making the beam visible.

The amount of scattering depends on the frequency of the light and density of the particles. As with Rayleigh scattering, blue light is scattered more strongly than red light by the Tyndall effect. Another way to look at it is that longer wavelength light is transmitted, while shorter wavelength light is reflected by scattering.

The size of the particles is what distinguishes a colloid from a true solution. For a mixture to be a colloid, the particles must be in the range of 1-1000 nm (nanometers) in diameter.

The Tyndall effect was first described by 19th-century physicist **John Tyndall**.

EXAMPLES OF TYNDALL EFFECT

- Shining a flashlight beam into a glass of milk is an excellent demonstration of the Tyndall effect. You might want to use skim milk or else dilute the milk with a bit of water so you can see the effect of the colloid particles on the light beam.
- An example of how the Tyndall effect scatters blue light may be seen in the blue color of smoke from motorcycles or two-stroke engines.
- The visible beam of headlights in fog is caused by the Tyndall effect. The water droplets scatter the light, making the headlight beams visible.
- The Tyndall effect is used in commercial and lab settings to determine particle size of aerosols.
- Opalescent glass displays the Tyndall effect. The glass appears blue, yet light that shines through it appears orange.
- Blue eye color is from Tyndall scattering through the translucent layer over the eye's iris.

NB: The blue color of the sky results from light scattering, but this is called Rayleigh scattering and not the Tyndall effect because the particles involved are molecules in air, which are smaller than particles in a colloid.

Similarly, light scattering from dust particles is not due to the Tyndall effect because the particle sizes are too large.