

Colours of the sky

Objectives

By the end of this lesson the student will:

- have a better understanding of what causes the different colours of the sky.

Background

From the side of the tank the beam looks bluish-white and from the end it looks yellow-orange.

The sun produces white light, which is made up of all colours; red, orange, yellow, green, blue, indigo and violet. Light is a wave and each of these colours has a different frequency and therefore a different wavelength of light.

When light collides with gases in the earth's atmosphere the light is scattered. Blue light has a short wavelength and scatters more than red light. The light reaching our eyes from the sky is blue. At sunrise and sunset, sunlight passes through far more air before reaching us. As the blue light has been lost through scattering, what we see is white light minus the blue; that is, red light.

Fact File

Seen from the side in a darkened room, the light beam from a projector appears blue, because of the smoke and dust in the air scattering the light.

Resources and actions

1. Fill the bottle with water.
2. Illuminate the bottle with the torch or projector.
3. Add milk a small amount at a time, gently stirring the mixture until you just observe from the far end of the container a beam shining through the liquid.
4. Look at the light beam from the end of the container and then from the middle.
5. A card placed in front of the light at the end of the tank may help students see the colour. The room should be darkened.

Print off the student's worksheet and photocopy one for each student:
http://www.bom.gov.au/lam/Students_Teachers/worksheet26.shtml

Ask the students to carry out the activity from the worksheet then go over their results at the end of the class.

Questions and solutions

1. What colour does the light beam appear to be when viewed from the end of the tank?

From the end of the tank, the light beam appears to be yellow-orange.

2. What colour is the light when viewed from the side of the tank?
From the side of the tank, the light looks bluish-white.
3. From your observations, can you suggest why the sky is blue?
When light collides with gases in the earth's atmosphere the light is scattered. Blue light has a short wavelength and scatters more than red light. The light reaching our eyes from the sky is blue.
4. Why is the sky a red-orange colour at sunset and sunrise?
At sunrise and sunset, sunlight passes through far more air before reaching us. As the blue light has been lost through the scattering, what we see is white light minus the blue; that is, red light.

Extension activity

Move your eyes along the container. Do you notice a gradual colour change?

Try the activity using a piece of cardboard with a hole punched in it to produce a sharper light beam.

Investigate the effect of placing a polarising film in the light path.

Find out what happens to ultraviolet light from the sun.

Time

30-45 minutes

Assessment Task

Q 3 & 4