Sunset in a Jar

Apparatus

large glass beaker with water and a few drops of milk, overhead projector, cardboard mask

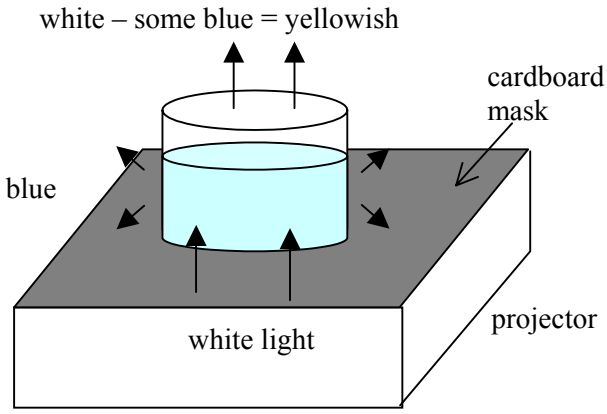
The cardboard mask is a piece of heavy, ideally black, card, with a circular hole cut in it of the same diameter as the beaker, or slightly smaller. The card sits on the overhead projector, with the beaker on top, lined up over the hole.

Action

The students observe the colour of the light coming out the sides of the beaker, scattered by the milk and water. The light coming out the top should be projected onto a white wall or screen, so that the colour of this transmitted light can be seen. They should be able to explain why the sky on Earth is blue.

The Physics

The milky water scatters the blue light more than other colours, so you should be able to see a faint blue tinge to the light coming from the sides of the beaker. This is like a very small but condensed version of the atmosphere scattering the light from the sun. The sky on Earth is blue because we are seeing light scattered by the atmosphere. If you looked directly at the sun (which you should never do!) it would look yellow, like the light coming out the top of the beaker. At sunset, the sky around the horizon where the sun is setting often looks reddish or orange. This is because the light is traveling through a greater thickness of atmosphere, so the amount of blue lost from the beam is greater and it appears more red, like the light from the top of the beaker



Accompanying sheet

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Look at the light transmitted through the top of the beaker.
What do you notice about its colour?

What do you notice about the light coming out the sides of the beaker?
Explain the difference in these colours.

Explain why the sky on Earth is blue.
Why is it different at sunset?