

Why does the sun look yellow?

A laboratory experiment from the
Little Shop of Physics at
Colorado State University



Overview

Children's drawings often contain a lively scene topped by a bright yellow sun. To those of us here on Earth, the sun does appear yellow, but it's really white! Why then, do we see it as yellow?

Theory

The simple answer: The sun is yellow because it's not blue...

The filters that you have, cyan, magenta and yellow, are each "complementary" or "secondary" colors. The cyan filter absorbs red light and lets the other colors pass; the magenta absorbs green, and the yellow filter absorbs blue.

Blue light is strongly scattered by the atmosphere, and when you take white light and take away the blue, what you get is... yellow! So the sun is yellow because the white light from the sun has lost its blue, leaving yellow!

Necessary materials:

- Rainbow glasses
- Gel filters in cyan, magenta, and yellow
- A long filament light bulb
- A light bulb base

The rainbow glasses we use are called diffraction or fireworks glasses. We purchase them from companies such as American Paper Optics or Rainbow Symphony.

www.americanpaperoptics.com/

www.rainbowsymphony.com

The gel filters were purchased from www.stageshop.com



Additive primary color mixing shows secondary colors of light.

Doing the Experiment

The rainbow glasses are great for looking at many things, but they are particularly nice for showing absorption—which this experiment is about.

- Have your students put on their Rainbow Glasses and look at the light given off by the long filament light bulb, noting what colors they see.
- Now have them put the cyan filter in front of their rainbow glasses and look at the light. What color do they notice is absent from the visible spectrum? (Red) This means that red is being absorbed by the cyan filter!

- Now have them just try the magenta filter in front of their rainbow glasses. The green is absent and is absorbed by the magenta filter.
- Continue the same procedure with the yellow filter. The blue is absent this time, and thus is being absorbed by the yellow filter. From their exploration, have them discuss what they discovered that helps them answer the question: Why does the sun look yellow?
- Now have students stack all their filters together and have them put them in front of the rainbow glasses. Do they see any colors that haven't been absorbed?

Summing Up

There are many other things you can do with these filters, as we will see...

For More Information

CMMAP, the Center for Multi-Scale Modeling of Atmospheric Processes: <http://cmmmap.colostate.edu>

Little Shop of Physics: <http://littleshop.physics.colostate.edu>