

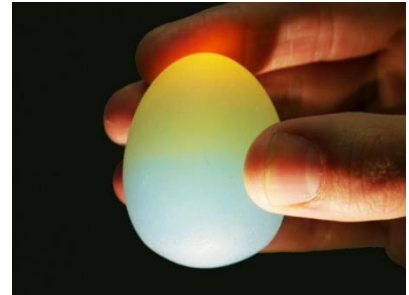
INSTRUCTIONAL GUIDE

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Recommended for Activity:

- Cooking oil
- Flashlight



Introduction

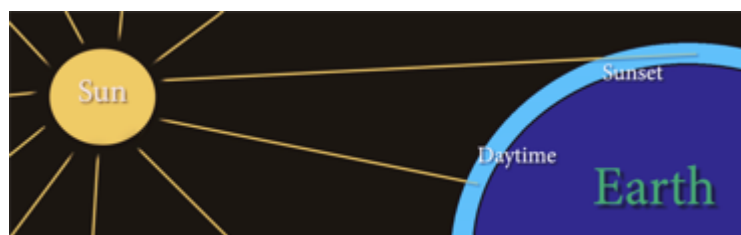
The Sunset Egg is a fun and effective demonstration on the science of light. The egg is made of opalescent glass, although it contains no opal. This refers to the egg's property of looking different colors at different viewing angles.

The Sunset Egg responds to light differently based on its wavelength. The sky does the same thing. This process is called scattering of light (Rayleigh Scattering) and in scattering, shorter wavelengths are scattered more often. When light passes through the egg, the blue light gets scattered away and the remaining light is yellow and red. Looking through the long end of the egg or using multiple eggs can also increase the effect.

Background

The sunset effect of a red sky or yellow sun is seen for the same reason in the sky as in the egg. During sunset, the light has to pass through a lot of sky and that journey causes the blue light to get scattered out sideways leaving red light behind. In the case of the sky, the light is being scattered on air molecules, mostly oxygen and nitrogen, but also dust and other particulates. In the case of the egg, the light is being scattered on fine dye particles inside of the egg. The egg is like a little piece of the sky, and it looks like one for the right reason. When the light passes through a small bit of it, the egg or sky looks blue, but when light passes through a lot of it, the egg or sky looks yellow.

A similar effect can be achieved by using an aquarium full of water with a little coffee creamer. When light passes through the aquarium it gets scattered by the coffee creamer particles. But blue light gets scattered more frequently, making the aquarium look blue over all. However, the light that passes through has less blue in it and so it looks orange. This causes a sunset effect.



Activity

When you receive the egg, it is ready to go, but might have a sheen of white dust. This can be washed off somewhat, but it is helpful to dribble oil over it and then wipe it off. This will give the egg a smooth surface and improve the demonstration that follows. The reason the cooking oil smooths out the glass egg is because oil and glass have nearly the same index of refraction; they bend light the same amount.

To use the egg hold it in one hand and close your hand around it. The egg will appear quite blue. Now hold it up to a source of white light, such as overhead lights. The egg will appear quite yellow. What's going on?

Take the egg in hand and hold it up to light. How many different colors can you get it to make? It might be helpful to use a cell phone flashlight.

Describe the all colors you see and write instructions on how to get these various colors.

Color: _____ How to get this color:

Color: _____ How to get this color:

Color: _____ How to get this color:

Drawing Conclusions:

Explain how this egg can serve as a model for the blue sky. What are your conclusions regarding how well this egg imitates the daytime and sunset sky?

Related Products

Laser Viewing Tank (P2-7690) Teacher-designed for student exploration of light beams! This versatile system allows students to see and control light beams.

Giant Prism (33-0230) This is the biggest solid prism you'll find anywhere! 3" equilateral prism, 4" long.

Refraction Cup with Printed Angles (P2-1225) Fill these semicircular cells with different liquids to observe their refractive properties. Great for showing total internal reflection! Measure angles with the printed protractor.