Light & Shadows – Blue Skies

Hello is a salutation and good-bye is a valediction. A traditional valediction with some first nations is 'blue skies' but why is the sky blue?

Materials:

- Glass juice bottle or large glass
- 1 L container
- Milk
- Water
- Dark room
- Measuring spoon
- Flashlight (powerful but not blueish LED flashlight)

Procedure: (Remember to have your parent's permission and have them watch and help you.)

- Fill the container 4/5 full with water.
- Add 5-10 ml of the milk to the water.
- Pour 1 to 2 cm of liquid into the bottom of the bottle or glass.
- Turn off the lights
- Carefully place the bottle on the edge of a table so that part of it hangs over the edge.
- Shine the flashlight up through the overhanging edge.
- Look at the light coming straight through the bottle and the light coming out of the side. What happens to the colour?
- Add some more solution and look through it again (repeat).
- If nothing is happening to the colour, you'll need to add more milk to the jug and repeat the process. If light doesn't pass through the bottle solution, you'll need to add more water to the jug to dilute it.

What's Happening:

The more milk particles in the water the redder the light will look. No milk and the light looks white, then yellow, orange and if you are lucky red. If you look at the side it will look bluish near the bottom and turns white, yellow, orange and perhaps red as it the light travels up the bottle. Milk is actually a suspension of droplets of fat in water. The Yellow/white light of the flashlight is made up of all colours. As the light travels through the solution, some hit the tiny fat particles called globules, and bounces off in random directions. The blue end of the colour spectrum is scattered more than the red end. This is called the Tyndall effect.

The air molecules and dust in the atmosphere act in the same way as the fat globules in the milk, scattering more of the blue wave lengths of light than the red. At sunrise and sunset the light travels through more air so we see red. This is why we say "Red sky at night sailor's delight" since the redder the sunset the more dust in the air which means there is likely a wind (which is important for sail boats) stirring up dust.

Extension:

See if you can find out why blue light scatters more than red light? Would it be possible to see a red or green sky on another planet?

This activity is based on our Light & Shadows kit. The source for this lab is http://www.thenakedscientists.com/HTML/content/kitchenscience/exp/why-is-the-sky-blue/. Our teaching kits (described on our website) are loaned out FREE to provide classroom teachers and parents of home schooled children an opportunity to explore Science in interesting ways. Please consider volunteering as a classroom guest speaker or offer your business as a field trip location.

Lorne Cooper, Regional Executive Director

PRAXIS, "Making Science Fun". Contact Praxis at praxis@praxismh.ca, www.praxismh.ca, Tweet or follow us @PraxisMedHat, or friend us on Facebook. Address: c/o 200 7th Street S.W., Medicine Hat, AB, T1A 4K1 Phone: 403-527-5365, Fax: 403-527-6570.