

614-0240 (40-180) Color Wheel Light Reflection

Teacher Demonstration

Benchmarks and Standards

This demonstration provides support for the *Benchmarks for Science Literacy* and *National Science Education Standards* shown in the table below.

<i>Benchmarks for Science Literacy</i>			<i>National Science Education Standard</i>		
Physical Setting	4F.2	Something can be "seen" when light waves emitted or reflected by it enter the eye just as something can be "heard" when sound waves from it enter the ear.	Physical Science	Transfer of Energy	Light interacts with matter by transmission, absorption, or scattering.
					To see an object, light from that object - emitted by or scattered from it - must enter the eye.

Applications and Uses for this Demonstration

Use the following demonstration as an introduction to an energy unit, light and optics unit, or human biology unit. This demonstration could be used during a unit assessment by providing students with an opportunity to use vocabulary appropriately and in a meaningful way.

Assembling and Using the Color Wheel

1. Remove all parts from packaging materials.
2. Attach wheel to top of handle with the included screw/nut.
3. Locate the small notch on the spool-like fixture. Slip the end of the rope into the notch.
5. While holding the end of the string in place with your thumb, wind the rope around the spool on the underside of the color wheel. Continue winding up to the handle on the rope.
6. While holding the handle of the color wheel firmly with one hand, pull the handle of the rope smoothly and forcefully. Practice setting the wheel in motion a few times before class begins.

Demonstration Lead-In

While holding the color wheel apparatus so that students can make observations from their seats, ask: ***How would you describe this object?***

Elicit from students a list of colors that they see on the wheel. Ask: ***How are you able to see the colors on this color wheel?***

What must be in the room for you to be able to see these colors or anything else in the room? (Light)

Explain that they are able to see the colors on the wheel, their desks, their hands, and everything else because some light bounces or is reflected off objects.

Tell students that their eyes receive this reflected light.

Further explain that light entering their eyes stimulates specialized cells at the back of their eyes. These cells then send messages

Demonstrate the white light is composed from all the spectral colors.

By rotation of the enclosed color disc, you can demonstrate visually that a succession of light impulses, reaching the eye in different proportions from the rapidly rotating disc, will produce the sensation of seeing either gray or white. This unit is comprised of a special segmented and colored disc which has a diameter of 20 cm. The unit contains a plastic handle and comes with a pull handle to get it spinning.

to the brain where the messages are translated and interpreted. Without reflected light, the cells are not stimulated and no messages are sent.

If students need a little help digesting this concept, review what they know about the phases of the moon. Remind them that like Earth itself, the moon does not give off light; only stars give off light. Ask: **Where does the light from the moon come from?**

Elicit from students that the moon's light is actually sunlight reflected off its surface.

Draw the positions of the sun, moon, and Earth during a new moon.

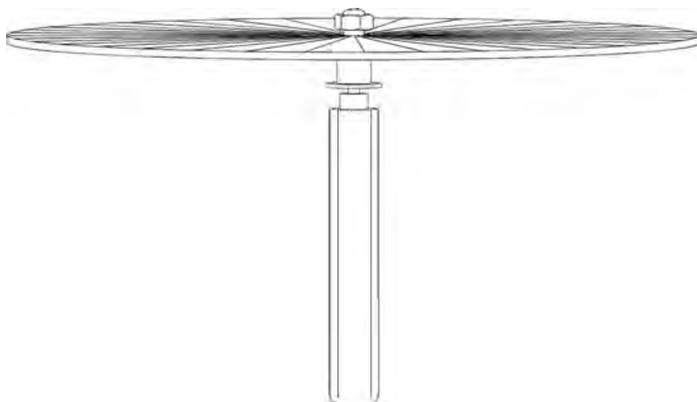
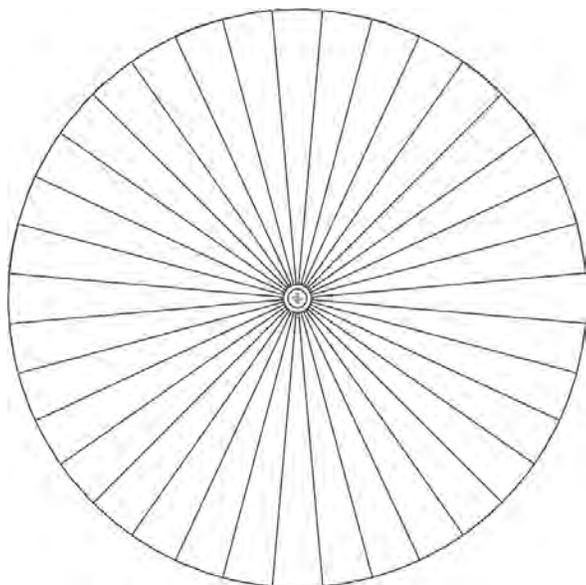
Explain that during a new moon, the moon is between the sun and Earth and that because sunlight is *not* reflected off the side facing Earth, they do not see a moon during the new moon phase.

Demonstration

1. Review the colors that they observe on the wheel when it is not turning. Ask: **What colors will you see when the wheel is spinning?** Record student predictions on the chalkboard or dry board.
2. Wind the rope around the spool. Pull smoothly and forcefully.
3. Discuss student observations. Write 2 to 3 observations on the board next to their predictions. Ask: **What questions could we ask about these observations?** Elicit from students questions about light, reflection, and visual perception.

Demonstration Wrap-Up

Explain that the light entering their eyes is a combination of reflected light. Ask: **When the wheel is not moving, what colors are reflected?**



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