

Rainbow Refraction

Recommended Ages: 4-12

When you see a rainbow in the sky after it rains, do you ever wonder how it got there? If you look up to the sun, you may think the light coming from it is yellow, but the light from the sun is actually all sorts of colors. What we see is the light that reaches the Earth through our atmosphere and after it is scattered. So, if sunlight isn't just one color, what other colors can come from it? See if you can make your own prism and create rainbows on demand with this experiment!

Materials:

- 1 White Paper
- 1 Piece of Cardboard
- Scissors
- Glass of Water
- Flashlight or Phone Light



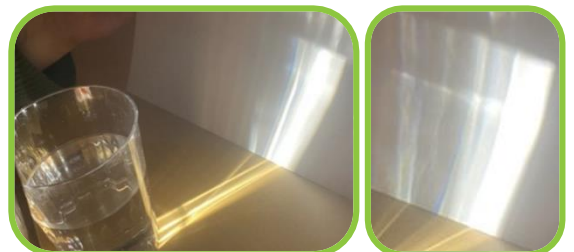
Procedure:

1. Cut a slit in the center of the piece of cardboard wide enough to see through. In the example, the slit is moveable so you can experiment with the amount of light getting through to the "prism".
2. Fill a glass of water about two-thirds of the way full.
3. Tape or hold the cardboard up to the side of the glass, so that the slit is at the waterline, and place the sheet of paper on the ground in front of the glass.
4. Turn off the lights, and shine the flashlight through the slit in the cardboard and through the water.
5. Adjust the cardboard and flashlight until you see a small rainbow on the paper in front of you.



Wow!

Bonus Tip: On a very sunny day, you can also create a rainbow outside, using sunlight instead of the flashlight.



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What happened when the light went through the water? The visible light we see, white light, is actually made up of many colors and each has a different **wavelength**. A *wavelength* is the amount of energy a particular beam of light has. When light passes through a **prism**, it separates into different color wavelengths. This happens because *prisms* slow down the light passing through them. This splits and bends, or **refracts**, the wavelengths slightly allowing the colors to spread out. Water vapor in the air does the same thing, causing the rainbows you see in the sky after it rains.

There are many uses of prisms. Ophthalmologists, a doctor who specializes in eye and vision care, use prisms to diagnose some vision problems. People who have double vision use prisms in their glasses to help their eyes work together. NASA and oceanographers are using prisms to study the health of coral reefs from space.



DID YOU KNOW?

An **optical scientist** is someone who studies light. They study everything about light, including how it moves and what it looks like. If you liked exploring this light activity, maybe optical science is for you!