

Make a Rainbow

Investigate how to separate white light into different colors!



Image: Generation Genius.

Materials Needed:

Clear cup, water, white paper, flashlight, dark room.

Instructions:

Step 1: Fill a clear cup half full of water. Set it by the edge of a sheet of white paper.

Hint: This activity works best with a smooth-sided clear cup.

Step 2: Darken the room and turn on the flashlight. Shine it through the glass of water and onto the paper at an angle. Try different angles and distances until you see a rainbow. It will take some trial and error!

Step 3: Look carefully at the rainbow on the paper. What colors do you see? Are some colors brighter than others?

Step 4: Experiment with different angles, distances or kinds of cups. Which combination works best? Can you make a bigger or smaller rainbow?

Try placing your glass of water and paper next to a window on a sunny day! What can you see?



Watch a video demonstrating this experiment:

www.youtube.com/watch?v=Cm9ZkYTnCNE

Sunlight, Color, and Rainbows

Stars like our Sun make light through chemical reactions between helium and hydrogen atoms. The Sun gives off light in waves that take 8 minutes to travel from the Sun to the Earth. Although the sun emits different sizes of waves, or wavelengths, our eyes can only see certain wavelengths. This is the *visible light spectrum*.

Sunlight contains a range of colors: red, orange, yellow, green, blue, indigo and violet. Longer wavelengths appear red, and shorter wavelengths appear violet. When all these colors are combined, they are seen as white light.

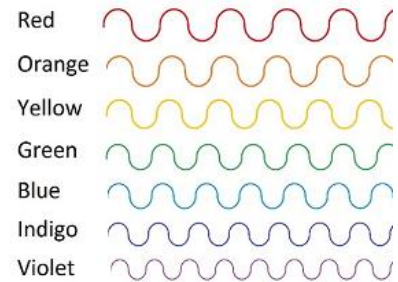


Image: Wikimedia Commons.

The atmosphere and objects on Earth scatter and separate sunlight, revealing different colors. When shining a light in a glass of water, the white light passes from the air and into the water, causing the different wavelengths to bend, or *refract*. Some wavelengths bend more than others, separating the light into its different wavelengths and showing rainbow colors. You can also create this effect with a prism!

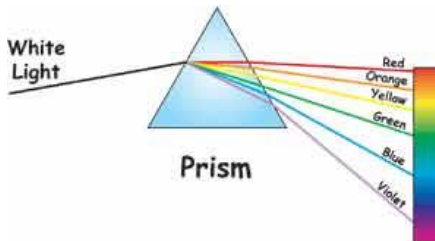


Image: NASA SpacePlace



Image: Needpix.com

We can see rainbows outside when there is a lot of sunlight and water droplets in the air, like after a rainstorm. Light refracts as it hits each water droplet, separating into different wavelengths and forming a rainbow.

Did You Know? Sunlight also makes light that the human eye can't see, such as ultraviolet and infrared light. Some insects, birds, and fish can see in these wavelengths. Objects look very different with ultraviolet or infrared colors!

Discover more about sunlight and the electromagnetic spectrum:

spaceplace.nasa.gov/magic-windows/