



MAIN IDEAS

How do just 3 colors of light (red, green and blue) make up ALL the colors you see on a screen?

MATERIALS

- Micro-Phone Lens
- Phone camera
- Computer Screen
- Light Blox

Tiny
Micro-Phone Lens



Pixels and Additive Color

Set Up

1. Stick the micro-phone lens to the lens of your cell phone camera (5+ MP)
2. Go to www.laserclassroom.com

The Activity

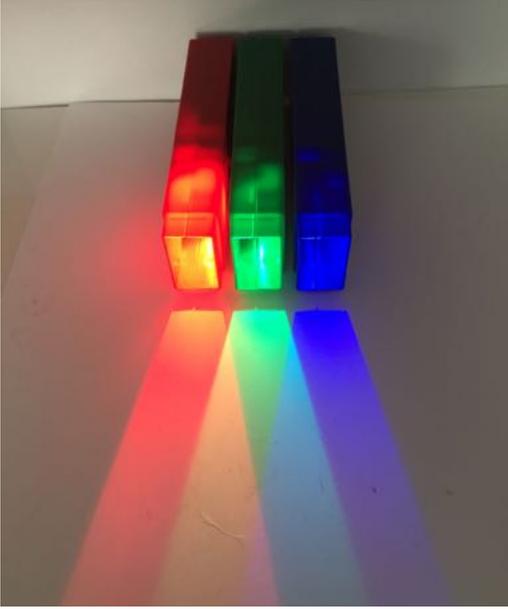
1. Hold the phone's camera with the micro-phone lens attached up very close to an area of the computer screen that is white. Adjust until you can see the little red, green and blue lights on the screen and the white disappears! Where's the white? Snap a photo.
2. Now move the phone so you can see an image that is not white, but a color... what do you see? Snap a photo and look closely.
3. Next, open a video and watch as the colors change in real time with your microphone lens.

What's Happening?

Humans have receptors for detecting red, green and blue light. We can "make" all the colors we actually see, by combining red, blue and green light in varying intensities. Computer screens create colors by doing exactly that... by using teeny, tiny "sub-pixels" of red, green and blue light, they trick our eyes and brains into seeing various colors.



Additive Color Mixing



When you mix red, green and blue paint, you get mud... but when you mix red, green and blue light, you get white. That's why when you look at your white computer screen up very close with a micro-phone lens, you see three sub-pixels: a red, a green and a blue. When the red, green and blue light from the sub-pixels "mix" due to the way your eyes perceive very small light sources, you see white.

Look at the Light Blox in the picture to the left. Each light represents a sub-pixel and you can see that where all three colors come together, you have white light!

You see colors of "things" based on what color or wavelength of light reflects off of them into your eyes. The white light all around contains all of the colors you need to see all of the colors you see. Red paint absorbs all colors or wavelengths except red - which allows red light to reflect into your eyes. Blue paint absorbs all colors or wavelengths except blue - which allows blue light to reflect into your eyes. When you mix red and blue paint, it absorbs more colors or wavelengths and subtracts from the amount of light that reflects back to your eyes - so mixing more than one color always gets darker and darker because more and more colors are absorbed until finally you get dark brown or black.

When you mix light, however, you add wavelengths of light so the colors get lighter and lighter until you finally get white!