

INSTRUCTIONAL GUIDE

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- LED Array
- AC Adaptor
- Instructional Guide

Recommended for Activity:

- [Holographic Diffraction Grating \(33-0985\)](#)



Introduction

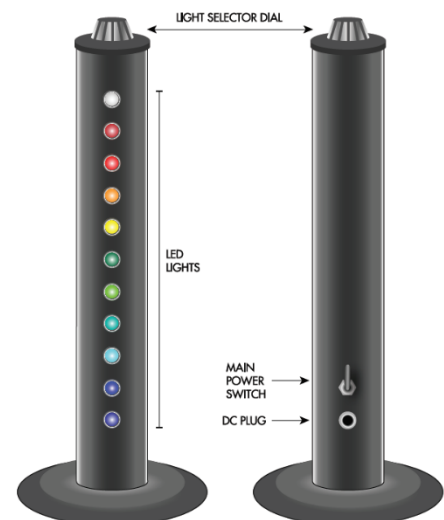
The LED Array is a simple device used to introduce the electromagnetic spectrum and demonstrate the properties of light. As an integral part of students' individual investigation of the properties of light, younger students should focus on color mixing, reflection, absorption, the meaning of wavelength, etc. High school or advanced classrooms should focus more on the mathematical relationships between wavelength, frequency, and speed of light as well as the applications/use of the properties of light in communications technologies (fiber optics) or astronomical methods of observation (spectroscopy).

Background

The LED Array's metal housing hold 11 LEDs arranged from longest (top) to shortest wavelength (bottom) with a white LED at the top. Each LED is labeled with color and wavelength (right).

The light selector dial on top of the device can be rotated to individually select one LED at a time all of the LEDs at the same time. The power switch and location for plugging in the AC adaptor are found on the back of the device (far right).

Color	Wavelength (nm)
White	--
Deep Red	640
Red	626
Orange	604
Yellow	590
Green	570
Bright Green	525
Turquoise	505
Blue	470
Deep Blue	455
Violet	400

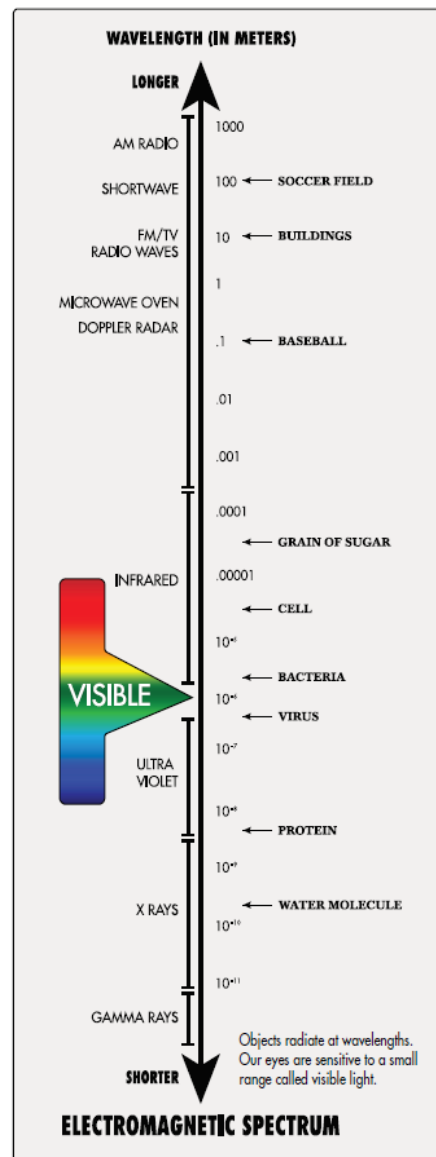


Activity

1. Connect the LED Array to a wall outlet with the included 5V AC adaptor and turn on the power switch on the back of the housing.
2. Make sure that the LEDs are facing a white wall and turn off the classroom lights.
3. Use the Light Selector Dial to switch between different light colors, being sure to announce to students the different colors of light with their respective wavelengths.
4. Use the Light Selector Dial to turn all of the LEDs on at the same time. There should be a section of the wall that appears white due to the combination of all of the colors from the LEDs.
5. With all of the LEDs turned on, place an object between the LED Array and the wall so that some of the colors are blocked. This should produce a variety of colored shadows in the shape of the object that was placed in front of the LED Array. Use black electrician's tape to simplify color combinations by blocking all of the LED lights except for Red, Green, and Blue.
6. Block all the colors except the white light and distribute diffraction gratings to the students. Through the diffraction gratings, there should appear to be multiple images of the light source with each image showing a different color.

Discussion Questions:

- What color appears when all of the light is shined onto the wall and nothing is blocking the light?
- What causes the differently colored shadows when something blocks the light?
- What combinations of light colors make: yellow, magenta, cyan, etc.?
- What combination of lights need to be blocked to make a black shadow?



Related Products

RSpec Explorer (P2-9505) Digitally capture an individual spectrum, and then compare it to a series of known spectra! The included camera and software make this an easy and inexpensive solution to studying quantitative spectral data in the classroom.

Quantitative Spectroscope (P2-7061) Use this durably constructed, economical tool to see and measure different spectra. Brighter and clearer than other spectrosopes. A built-in scale measures light wavelengths from 400nm to 700nm with a precision of +/- 5 nm.

NexGen Spectrum Tube Classroom Bundle (P2-9902) A classic atomic theory demonstration! Energize the gas and view the characteristic atomic spectral lines with any spectroscope. This complete set comes with 8 different gas Spectrum tubes.