

# COLOR IS A PROPERTY OF LIGHT

White light can be divided into its component parts by passing it through a prism. The light is separated by wavelength and a spectrum is formed. Sir Isaac Newton was the first to discover this phenomenon around 1671-72.

The traditional color name of a specific wavelength of light is a hue. All of the colors of the spectrum are hues. Red, Orange, Yellow, Green, Blue and Violet.

Every Hue has three distinct properties: **Value, Temperature and Intensity**. To understand color you must understand how these three properties relate to each other.

## VALUE

Value is concerned with the light and dark properties of color. All colors exhibit these properties. The hues have a natural value where they look the purest. Some colors, like yellow, are naturally light, while others like violet, are darker.

All hues can be made in all values. Adding white pigment will make any pigment lighter. Adding black pigment will make most pigments darker, but will cause yellow pigment to shift in hue to green because black is essentially a very dull blue (Yellow + Blue= Green).

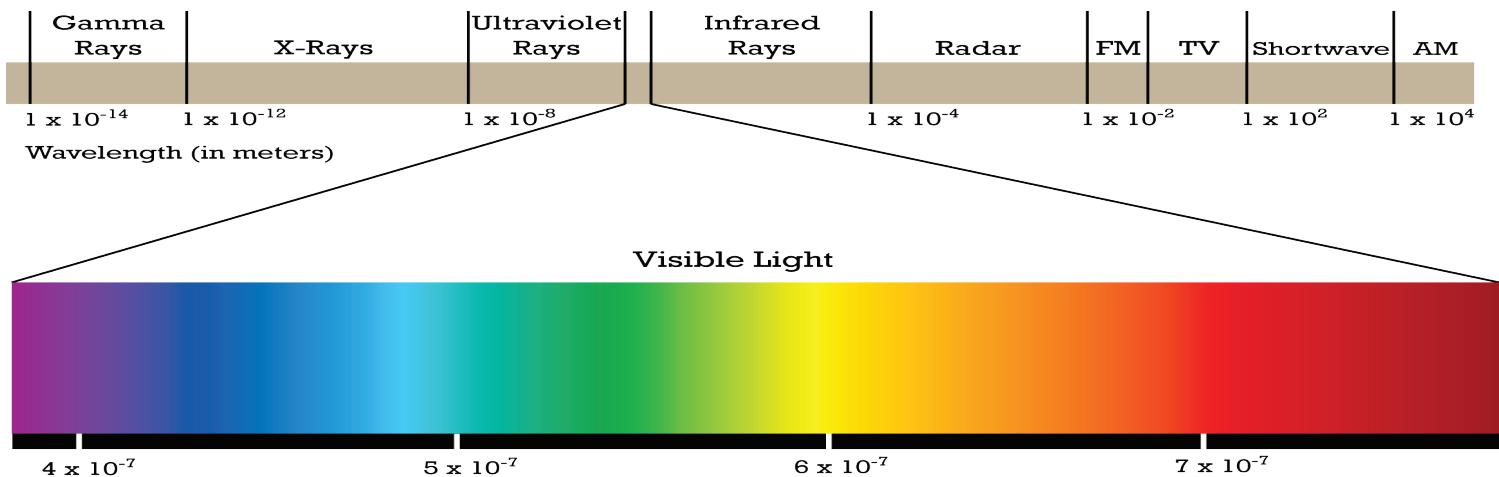
## INTENSITY

Intensity (sometimes referred to as Chroma or in some books and computer programs such as photoshop, Saturation) is concerned with the purity vs. dullness of color.

## TEMPERATURE

The temperature of a color is based on the degree of warmth or coolness measured when one color stands in relationship to another color creating a contrast. This perceived temperature is usually measured relative to something else or relative to the area around it. The colors: Red, Orange and Yellow are considered to be warm because they are associated with warm phenomena (Fire, the Sun etc.)

The colors: Blue, Green and Violet are considered cool because they are associated with the cool phenomena (Ice, Water etc.) However, color temperature relationships are relative. One red can be warmer or cooler than another for instance. Color temperatures effect us both psychologically and perceptually. They help determine how objects appear positioned in space. Warm colors are said to advance -- they appear closer to the observer. Cool colors are said to recede -- they appear farther from the observer, however this can change depending on how the other two properties of color are being used.



The use of color from light starts with black -- the absence of light. When all of the frequencies of visible light are radiated together the result is white (sun) light. The color interaction is diagrammed using a color wheel with red, green and blue as primary colors. Primary here means starting colors. These are the three colors that the cones in the eye sense. This is the RGB color system (Red, Green and Blue) used in Video and Computers.

The primary colors mix to make secondary colors: red and green make yellow, red and blue make magenta and green and blue make cyan. All three together add up to make white light. That is why the theory is called additive.

You can see an example of light theory in action almost every day on a computer monitor or a color television. The same three primary colors are used and mixed by the eye to produce the range of colors you see on the screen. This theory is also used for dramatic lighting effects on stage in a theater.

### COLORS FROM THE USE OF PIGMENTS

Pigments behave almost the opposite of light. In pigments a black surface absorbs most of the light, making it look black. A white surface reflects most of the (white) light making it look white. A colored pigment, green for instance, absorbs most of the frequencies of light that are not green, reflecting only the green light frequency. Because all colors other than the pigment colors are absorbed, this is also called the subtractive color theory.



If most of the green light (and only the green light) is reflected the green will be intense. If only a little is reflected along with some of the other colors the green will be dull. A light color results from lots of white light with only a small amount of color reflected. A dark color is the result of very little light and color reflected.

The primary colors when using pigments are generally some variation of Yellow, Red and Blue, (the specifics vary depending on whether you are using inks, paint, pastels etc.)

It is hard to use color effectively. The ability to use colors is difficult to learn and comes with lots of experience and a trained eye. Color has such strong psychological, and even physiological, effect on us that any formula about its use would be doomed to failure.

The best advice is simple: keep in mind what you are trying to communicate and think of color as a series of relationships. Look carefully and critically at how color works in nature and how other artists have applied it. Learn first by observation.