

Color Theory

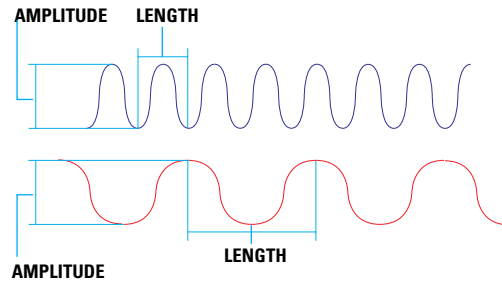
Color is the visible portion of the lightwave spectrum. Whether it comes directly from a light source, such as a yellow flame, or is reflected from an object, such as a red stop sign, our perception of color is subjective. If you asked a group of people to picture something blue, each one would visualize a slightly different color. Yet if you showed the entire group all the colors visualized, they would all probably agree that all the colors they imagined would fall into the category “blue.”

PERCEPTION

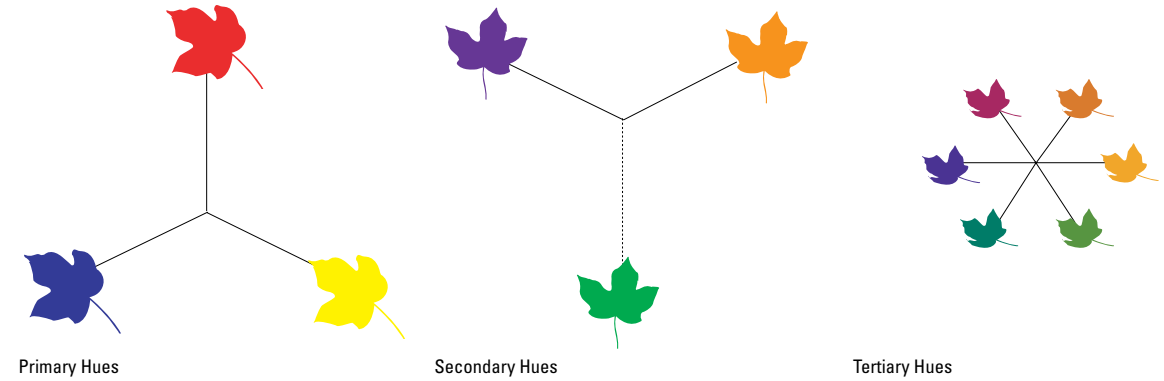
Color perception involves the object, the context, the light source, and the viewer. The object affects perception by the way it absorbs and reflects light. Its context, or proximity to other objects, also has an effect, as does the light source, which may be sun, flame, or electrical (incandescent, fluorescent). Finally, the workings of the eye have an effect. The human eye has three types of cone, and each registers a different color: red, green, or blue. This is known as trichromatic vision. All colors can be matched in the visible spectrum using these colors.

PROPERTIES

Light has three characteristics that can be measured precisely by a spectrophotometer. Length is the most important characteristic as it identifies the hue of the color. The length is determined by the distance of one peak to the next in a light wave. Amplitude identifies the brightness of the color and is determined by the height of the wave from peak to trough. The higher the peaks, the more energy in the wave and the brighter the color. Purity is determined by the number of wavelengths. A pure, or completely saturated color contains light of only one wavelength. As more wavelengths are added, the color becomes less distinct.



Although the perception of color is subjective, we can measure and describe the properties of color with scientific precision. Various color models are used by scientists and artists to describe color in theory, that is, independent of reproduction technologies such as printers. This allows a standardization to exist between different inks, dyes, and other color agents.



COLOR WHEEL

This system is based on the three primary hues of red, blue, and yellow, as shown in the basic color wheel. The secondary hues in this system are orange, green, and violet. The color wheel also shows six tertiary hues, formed by mixing equal amounts of a primary hue and an adjacent secondary hue. A mixture of equal amounts of the three primary hues will form brown. This system is based on mixing color pigments.

HUE

TECHNICALLY, THE HUE IS THE COLOR REFLECTED FROM OR ABSORBED BY AN OBJECT. HUE REFERS TO THE NAME OF THE COLOR, FOR EXAMPLE, BLUE, RED, AND GREEN.

