

Color Theory

A simplified approach

Wikipedia - In the visual arts, color theory is a body of practical guidance to color mixing and the visual effects of a specific color combination. There are also definitions (or categories) of colors based on the color wheel: primary color, secondary color and tertiary color. Although color theory principles first appeared in the writings of Leone Battista Alberti (c.1435) and the notebooks of Leonardo da Vinci (c.1490), a tradition of "color theory" began in the 18th century, initially within a partisan controversy around Isaac Newton's theory of color (*Opticks*, 1704) and the nature of so-called primary colors. From there it developed as an independent artistic tradition with only superficial reference to colorimetry and vision science.

The Basics

There are three main properties of color.

1. **Hue:** Hue refers to the actual pigment of a color. Hues are the pure spectrum colors. All hues can be mixed from the three primary hues of red, yellow, and blue (see the color wheel).
2. **Value:** Value refers to the *lightness* or *darkness* of a color. **Tints** are colors that have been mixed with white. **Shades** are colors that have been mixed with black.
3. **Saturation/Intensity:** Saturation refers to the purity of a color and is also called the **chroma**. It represents the color's relationship to gray.

The Color Wheel



The Color Wheel is a visual representation of the color spectrum and chromatic relationships. The root of the color wheel is the triadic relationship of Red, Yellow, and Blue (the **primary** colors). These colors form an equilateral triangle along the color wheel. The primary colors are also the three fundamental hues from which all other colors are produced.

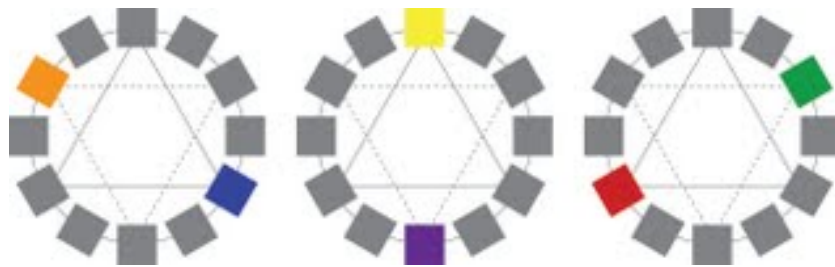
The primary colors combine to create a second triadic relationship of Orange, Violet, and Green. These colors are the **secondary** colors. Each secondary color is the result of the combination of 2 primary colors. A third group of colors can be achieved by combining primary and secondary colors. These colors are called the **tertiary** colors.

Color Schemes/Harmonies

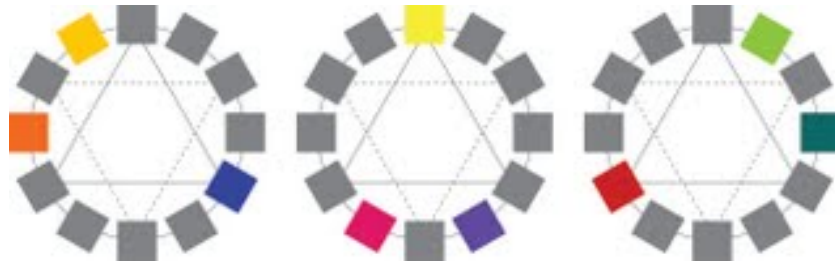
1. **Monochromatic:** Monochromatic color schemes utilize only tint and shade variations of one color or hue.



2. **Complementary:** Complementary color schemes utilize colors or hues that are directly across from each other on the color wheel.



3. **Split Complementary:** Split complementary color schemes utilize one color or hue with two other colors or hues that are equidistant on the color wheel from the first color's complement.



4. **Double Complementary:** Double complementary color schemes utilize two sets of complementary colors. Increasing or decreasing the distance on the color wheel between the color sets will affect the level of contrast in the color scheme.



5. **Analogous:** Analogous color schemes are color schemes which include a set of colors or hues that are adjacent to each other on the color wheel.



6. **Triadic:** Triadic color schemes are color schemes which include three colors that are equidistant from each other along the color wheel.



7. **Warm:** Warm color schemes utilize warm colors or hues (yellow through red-violet) and are often referred to as **active** colors. These colors tend to move forward visually in a composition, although they usually contain less visual weight than cool colors or hues.



8. **Cool:** Cool color schemes utilize cool colors or hues (yellow-green through violet) and are often referred to as **passive** colors. These colors tend to fall back visually in a composition, although they usually contain more visual weight than warm colors or hues.



Color Contrasts & Johannes Itten

Johannes Itten is historically one of the most important names in the development of modern color theory. He developed seven different theories of color contrast that he felt could elicit specific responses and reactions from the viewer. His seven color contrasts are listed below.

- 1. The Contrast of Hue:** This contrast is defined simply as the contrast of different hues. Contrast will be greatest when hues are further apart on the color wheel. The primary colors of red, yellow and blue, for instance, are examples of the most extreme hue contrasts.

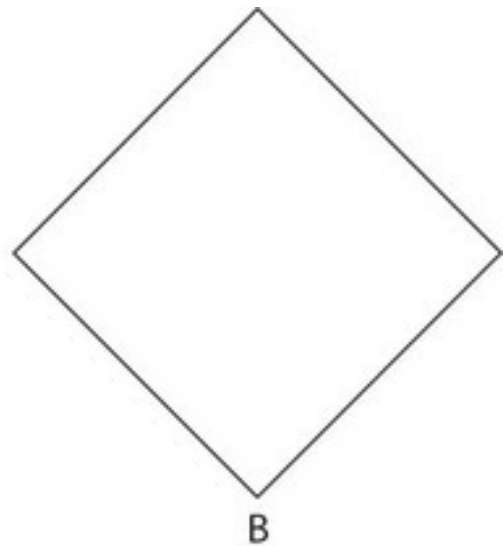
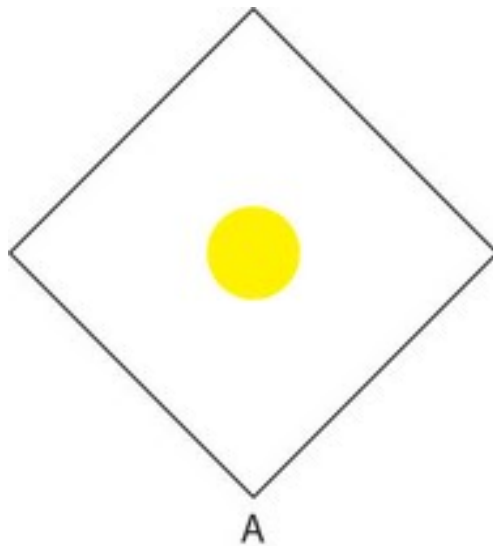


- 2. The Contrast of Value:** This contrast is created by the combination of colors of light and dark values. Each color or hue has a value that corresponds with a value of gray. Gray is a neutral achromatic color that has the capacity to absorb the strength of neighboring colors.



3.

- 1. The Contrast of Complements:** Every color or hue has an opposite. A color and its opposite are referred to as a complementary pair. Complementary pairs visually balance one another. If a color's complement is absent, the human eye will attempt to create it. Stare at the yellow dot inside square "A" below for 30 seconds. Then stare at the empty square "B." Do you see the violet dot?



4. **The Contrast of Extension:** This contrast occurs by assigning compositional space to colors according and in relation to their visual weight. The ratios of visual weight for complementary color pairs is as follows:

1. Red : Green = 6 : 6 (red and green should ideally occupy the same amount of visual space)
2. Blue : Orange = 4 : 8 (blue should occupy twice as much visual space as orange)
3. Yellow : Violet = 9 : 3 (violet should occupy three times the visual space that yellow does)



5. **Simultaneous Contrast:** Perhaps the most visually entertaining of Itten's 7 contrasts is Simultaneous Contrast. This contrast is formed when complementary colors of *equal value* are placed next to one another. The resulting boundary between the 2 colors should begin to vibrate and move. Many optical illusions in the Op Art movement have been produced using this contrast.



6. **The Contrast of Saturation:** This color contrast is realized by placing next to each other colors which differ in their relative saturation. Colors or hues that differ only slightly in their level of saturation will create minimal contrast. However, colors which differ greatly in their saturation will create substantial contrast. This effect can be easily coupled to great effect with the contrast of value.



7. **The Contrast of Warm and Cool:** This contrast is achieved through the juxtaposition of colors of different relative temperatures. However, depending on nearby colors or hues, certain colors may appear warm *or* cool. The illustration below is an example of just that.

