Color

Color theory is a topic that seems very familiar on the surface, but it is much more in-depth as the subject is explored.

Teachers tell us the three primary colors — red, blue and yellow — at a young age.

Those teachers were not completely accurate. There are two other primary color schemes they do not mention.

Primary colors are color that cannot be produce by mixing two other colors.

When dealing with color that is reflected off of an object and into the eye, the primary colors are cyan, magenta and yellow — subtractive color. In this scheme, mixing the primary colors together produce black.

The subtractive color scheme is used with inks, paints, dyes and pigments. The object reflects different amounts of the primaries to produce the color we perceive.

When dealing with color that is produced by light that goes directly into the eye, the primary colors are red, blue and green — additive colors. In this color scheme, mixing the primaries together produce white.

The additive color scheme is used with televisions, projectors and stage lighting.

Regardless of the source of the color, each color has three characteristics: hue, value and saturation.

Hue is the color itself. Sometimes hue refers to the wavelength that specific color produces. It is the named color, such as garnet.

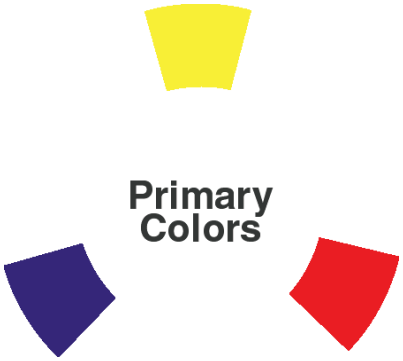
Value refers to a color's brightness. Value is adjusted by adding black or white to the color.

Saturation, or chroma, is how "pure" a color is. Full saturation is the color without black, white or any amount of another color. To desaturate a color, the color's opposite, or complement, is added. If equal amounts of a color and its complement are mixed, a gray color is produced.

Color Wheel

The primary colors learned in school produce what is called the color wheel. The color wheel helps designers determine relationships among colors.

Red, blue and yellow are the primary colors. Mixing two primary colors together produce secondary colors. Red and yellow make orange; blue and yel-



Color Wheel

Complementary Colors

low make green; and blue and red make violet — not "purple." Purple may be more fun to say, but visual communicators refer to the color as violet.

Mixing a primary and a secondary color together produce a tertiary color. Tertiary colors are named by placing the primary color's name first, followed by the secondary color, such as red-orange. The tertiary colors are yellow-orange, red-orange, red-violet, blue-violet, blue-green and yellow-green. With the primaries and the secondaries, these colors produce a 12-segment color wheel.

Relationships

As mentioned above, the color opposite a specific color on the color wheel is known as the color's complement. For example, the complement for blue is orange. Complementary colors contrast each other as well as work well together in a color scheme.

A split complement refers to the two colors next to the complementary color on the color wheel. With blue, the complement is orange, so the split complement to blue is yellow-orange and red-orange.

A triad has three colors that are of equal distance away from each other on the color wheel in its scheme. The primaries and the secondaries both form triads. Once again, these colors contrast as well as work well together.

When you need colors to harmonize, spectral neighbors — analogous colors — work well. Spectral neighbors are three colors next to each other on the color wheel. The spectral neighbors to blue are blue-green and blue-violet.

Each color can also have a variety of tints and shades. Tints are created by adding a certain percentage of white to the color. Shades are produced by adding a certain percentage of black to the color. Pink is a tint of red. Brown is a shade of orange.

Colors can be said to have a temperature. Warm colors are the red, yellow and orange colors. Cool colors are the blue, green and violet colors.

Because of the colors' wavelengths, warm colors appear to be closer and cool colors appear to be farther away. Warm colors advance, cool colors recede. A warm color on top of a cool color can give a 3-D look to a design.

Names

Colors are hard to refer to by name. What may be

called "turquoise" in a pack of crayons may look nothing like the turquoise on a paint chip from the hardware store.

To deal with this problem, designers use a guide when naming colors. The most common guide to colors is the Pantone Matching System. The PMS system is a lot like a book of color chips from the hardware store, which each color being given a number. For example, if a designer asks for text to be printed in PMS 153, a printer will know the text should be in that particular shade of burnt orange.

Designers also refer to colors using their percentages of CMYK — cyan, magenta, yellow and black — with subtractive colors or amounts of RGB — red, green and blue — with additive colors. The same burnt orange above would be 0 percent cyan, 46 percent magenta, 100 yellow and 18 percent black. It would also be 178 parts red, 110 green and 56 parts blue if coming from a light source.

Meaning

Visual communicators should only use colors for a specific design reason. Color for color's sake is usually a bad idea. Color can covey a world of meaning if used properly.

For example, think of an apple. Was it red? Apples are not always red, but people associate apples with red. Red can also be associated with blood, fire and stop signs. Knowing this, a visual communicator will use red appropriately.

Red says violence and aggression. It also says love and passion. Use red wisely.

Orange can also be associated certain fruits — oranges and pumpkins — that are not always orange. Orange is a warm and cheerful color, and can be quite festive.

Yellow is a very weak color alone. A headline printed in yellow will disappear when seen from a distance. Yellow with black, on the other hand, is very clear. These colors together are warning colors in nature. Studies have shown that students learn "better" in a yellow room. Because of this, yellow is seen as the color of knowledge. With the sun being yellow, the expression "bright as the sun" has a new twist.

Green is the color of nature. "Being green" means being concerned with the environment. Green is also associated with envy and immaturity.

Blue is the favorite color

Split Complement

Triad

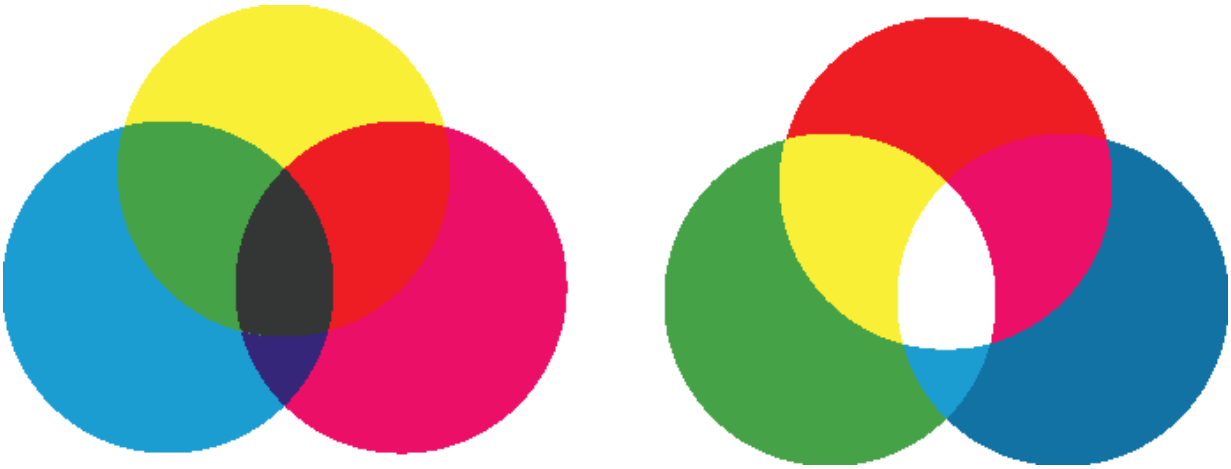
Spectral Neighbors
Analogous Color

of adults. It is a passive color, being associated with the sky, water and ice.

Violet or purple can be very mysterious. Violet used to be a difficult color to create, so the color began to be associated with royalty and the rich.

White can have many different meanings from purity and innocence to surrender and hope.

Black, on the other hand, brings thoughts of death, mourning and evil. But black is also very elegant and stylish.



Sources of Color

Subtractive Colors
paint, ink, pigments, dyes

Additive Colors
television, projectors, stage lighting