In order to use color effectively it is necessary to recognize that color deceives continually.

— Josef Albers
A color has many faces. One color can be made to look like two different colors.
Albers says of this example, “It is almost unbelievable that the upper small and lower small squares are part of the same paper strip and therefore are the same color.”

This is a phenomenon known as color subtraction. Don’t confuse it with “subtractive color.”

What color subtraction means is that surrounding colors cancel out some of the colors of the smaller square.
Here, one color (the gray in the bars) appears as two. It takes on a violet tint on top of the yellow and a yellow tint on top of the violet.

Mario Garcia of the Poynter Institute calls gray the “chameleon” of colors. It takes on characteristics according to the colors surrounding it.
For best results on this test, stare at the border between green and yellow about halfway up. The colors will appear similar even though the horizontal bars show they’re quite different. Another example of the subtraction of color.
Color contrast: Hue
When two colors are placed next to each other, one often will move to the front, creating depth or dimension. This effect is extreme on a computer screen, where colors are more vivid than on the printed page. Here is an example using the primary hues of red and blue.
Color contrast: Warm and cool

The example from the previous page is so striking because it uses the “hot” and “cold” extremes of pure red and pure blue. Cold or cool colors based on blue tend to move to the background. Hot or warm colors based on red tend to move to the foreground.

The Golden Fish
Paul Klee (1925)

Paul Klee was an introverted Swiss painter who spent most of his adult life in Germany until he was expelled by the Nazis in 1933. He was one of the greatest colorists of painting.
Color contrast: Light and dark

Light and dark contrast of **monochromatic** or **achromatic** colors (more on that below) can add dimension to a composition. The gradation progresses from 100 percent black at the top to white at the bottom. The window frame is one shade, a gray of 50 percent black. The vertical bars of the frame appear lighter at the top and darker at the bottom. The top horizontal bar looks lightest, the middle darker and the bottom darkest.
Color contrast: Light and dark

Painters achieve contrast using a limited choice of hues by adding black or white to the hue, creating **tints** and **shades** (see below).

*Self portrait*
Rembrandt Harmenszoon van Rijn (1606-69) sketched his own image when he lacked other models.
Color contrast: Saturation

Color interval, the difference in the amount of color in two samples, can be judged by looking at the border between colors. At left, the red and blue squares become lighter in a counterclockwise direction. The “hardest” border is between the top to squares with the greatest interval. The bottom two squares with the smallest interval have a soft border. The blue and red intervals are similar, as seen by the super-imposed squares.
Color contrast — saturation

By varying saturation, a painter adds depth to a two-dimensional work. Caillebotte used this to portray aerial perspective, in which objects far away appear lighter with a shift in color toward blue, and to give the street a wet look.
**Color contrast — simultaneous contrast and transparency**

When two colors overlap with a third color mixed from various amounts of the other two, striking transparent effects are created. Each example is made up of three shapes: The brown and red rectangles have a third “cutout” shape that shows overlap. On the left, this “cutout” contains brown and red, but more of the brown, making the brown rectangle appear to be on top. In the example on the right, the cutout has more red than brown. The red is dominant and appears to be on top.
Another example. The cutout on the left has more blue than red in its mixture. The cutout on the right has more red than blue.
One more, using red, yellow and orange. The difference between the cutout on the left and cutout on the right is not much, but the effect is dramatic.
Color contrast — simultaneous contrast and transparency
The photorealist artists use simultaneous contrast to create paintings that trick the eye.
Color contrast — proportion

The eye is attracted to small amounts of saturated color on a duller background. The eye is attracted to these small spots of color like iron to a magnet.
Color contrast — proportion

Color is related to hierarchy. Color can be used to make some things stand out. The trick is to stretch the color throughout the composition, creating a path for the eye to follow.

On the Terrace (1881)
Pierre-Auguste Renoir
The Bezold Effect is named after a German who noticed that certain strong colors, when evenly distributed, radically changed the effect of his rug designs. Look at how different the red in the top wall looks compared with the red in the bottom wall. The red with the white looks much lighter than the red with the black.
Definitions for using the color wheel:

**Hue** – a pure color, any color except white or black.

**Tint** – a hue mixed with white. Red (4) is a hue, pink (8) is a tint.

**Shade** – a hue mixed with black. Red (4) is a hue, maroon (1) is a shade.

**Saturation** – the intensity of the hue. Red has a higher saturation than either red or pink.

**Brightness** – describes the lightness of a hue. Pink has a higher value than red; yellow (36) has a higher value than blue (76).
A designer finds discipline in color use by adopting a systematic way of choosing color.

The color wheel is composed of six basic hues: three primaries, three secondaries and six tertiaries.

**Primary colors** – Red (4), blue (68) and yellow (36) cannot be made by mixing other colors.

**Secondary colors** – orange (20), green (52) and purple (84) are made by mixing two primary colors.
Tertiary colors – red-orange (12), yellow-orange (28), yellow-green (44), blue-green (60), blue-violet (76) and red-violet (92) are made by mixing a primary color with a secondary color.

Complementary colors – Two colors opposite each other are complementary. When mixed, two complementary colors will form a neutral.
Pure high-chroma hues appear in the wider center ring: 4, 12, 20, 28, 36, 44, 52, 60, 68, 76, 84 and 92.

Colors on the inner four rings are tints made by adding white to the pure hue.

Colors on the four outer rings are shades, made by adding black to the pure hues.
Cold colors
Think of ice, with its blue, blue-green and green. These colors have the effect slowing the metabolism, making people feel cooler. Cold colors can be austere or refreshing.
Hot colors

Fully saturated red is the essence of fire. Red has been proved to stimulate the body. Red also is associated with passion. It’s the color that is retained on the retina the longest, and it instantly attracts the eye. Learn how to use red and the rest of the colors are easy. Painters such as Renoir knew that using small spots of red created movement in otherwise static pictures.
Light colors

With only the faintest hint of a hue, these colors on the inner-most ring of the color wheel reflect light and make a room, photograph or painting seem to glow. Light colors open up space.
Dark colors

These strong, somber colors constrict space rather than expand it. Dark colors often are used in interior design for contrast. They can convey moods ranging from dignified and traditional to melancholy.
Warm colors
These colors are based on red but with yellow added to soften the fire. These colors are inviting, much like the comfort of a fireplace. Warm colors show up in interior design.
Cool colors

Just as warm colors are based on red, cool colors are based on blue but blended with red or yellow, producing a range of colors from light blue-green to violet. Cool colors are considered peaceful and meditative, calming.
Pale colors

Pale colors are tints — hues softened with a substantial amount of white. These pastels evoke softness, youth and innocence. These colors on the inner ring of the color wheel are considered feminine and often are used in cosmetic packaging.
Bright colors

Distinctive highly saturated colors — with little or no white or black — are so intense they can seem to vibrate. Bright colors were a trademark of Pop Art in the ’60s and are favored today in many advertisements.
How to combine colors

Basic color schemes have a mathematical perfection in them, but they still rely on objective judgment in how appropriate they are for a given use. Complementary colors always are opposite each other and will always intensify each other. Here are the basic schemes:

**Complementary** — This scheme uses direct opposites on the color wheel: red/green, blue/orange and yellow/purple. These colors enhance each other and almost seem to vibrate when side by side.

**Achromatic** — It means “without color.” This scheme uses black and white and a range of grays.

**Analogous** — Any three hues next to each other on the wheel, including their tints and shades, are Analogous. They have a harmonious, pleasing effect on the eye.

**Clash** — Clash color schemes have a brash surprising effect. To create these, combine a hue with the color found on either side of its complement, such as blue with red-orange or orange-yellow.

**Complementary** — This scheme uses direct opposites on the color wheel: red/green, blue/orange and yellow/purple. These colors enhance each other and almost seem to vibrate when side by side.
Color schemes

Monochromatic — This restrained, peaceful color scheme, made famous by Regis Philbin’s clothing, is a single slice of the color wheel pie: one hue with its tints and shades.

Neutral — Colors so soft that it blends in to the point of being invisible. These are hues neutralized by adding their complements, further expanded by adding white or black.

Primary — The most basic color scheme: red, yellow and blue. The elementary nature of this scheme make it a favorite for children’s toys and books. The purity of this scheme made it the favorite of artists such as Piet Mondrian and Roy Lichtenstein.

Secondary — It combines the secondary hues of green, purple and orange. It has a fresh, uplifting quality and can be made subtle by using tints and shades.
Color schemes

**Split complementary** — This scheme often is found more pleasing than true complementary colors. Choose a hue; the hues on either side of its complement create the split complementary scheme.

**Tertiary triads** — The color wheel has two tertiary triads, each consisting of tertiary colors that are equal distance apart: red-violet, yellow-orange and blue-green, and red-orange, yellow-green and blue-violet.