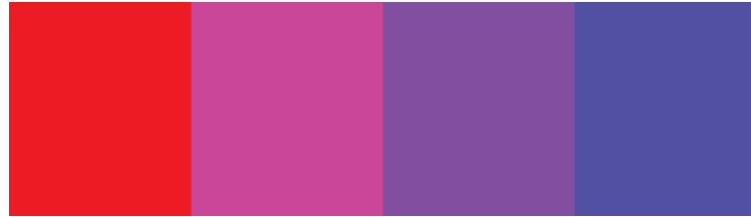


C O L O R



Find your Space in the Spectrum

by Evie Chang Henderson

COLOR IS BOTH ART & SCIENCE

- Our understanding of light and color begins with Isaac Newton (1642-1726). Newton understood the rainbow and refracted white light with a prism, resolving it into its component colors: red, orange, yellow, green, blue and violet.
- Newton's conceptual arrangement of colors in a circle allowed the primaries (red, yellow, blue) to be arranged opposite their complementary colors (e.g. red opposite green) Each complementary would enhance the other's effect through optical contrast.

EXPLORING COLOR IN HISTORY

- This explains, in part, why both da Vinci and Michelangelo were both artists and scientists/chemists.
- Artists had to mix their own colors before the invention of tin as a container element at the beginning of the 1800's.
- Each artist developed his own sacred paint formulas and carefully protected them. It is said that these paints were things such as pigs' bladders.

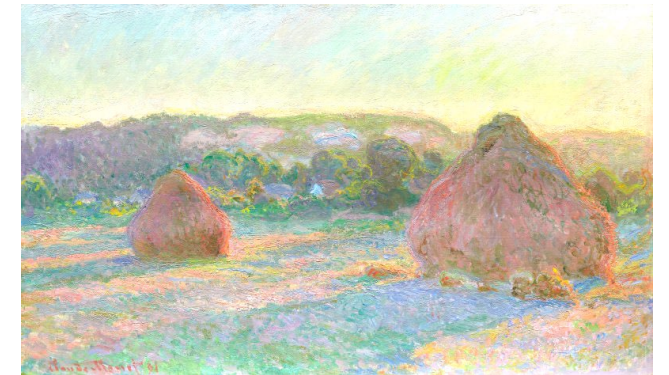
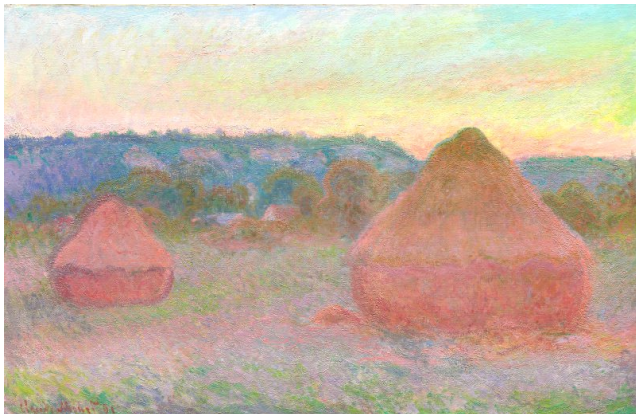
THE INFLUENCE OF IMPRESSIONISM

- At the end of the 19th Century, a group of artists in Paris studied color science and their aim was to depict what they saw truthfully rather than with the chiaroscuro technique of previous periods.
- They explored the optical impression of light and atmosphere by placing dabs of primary and unmixed pigments. The leader of this group was Claude Monet (1840-1926).
- The development of color Photography also began to be explored in mid-19thCent.

Monet studied the Effects of Light on a Subject

The haystacks near his home were only one example of Monet's study of light. Because there is no black in the spectrum, Monet used no black or gray in his paintings, even for shadows.

The results were haystacks bathed in colors ranging from purplish tones, to hot ochre, pink and alizaron.



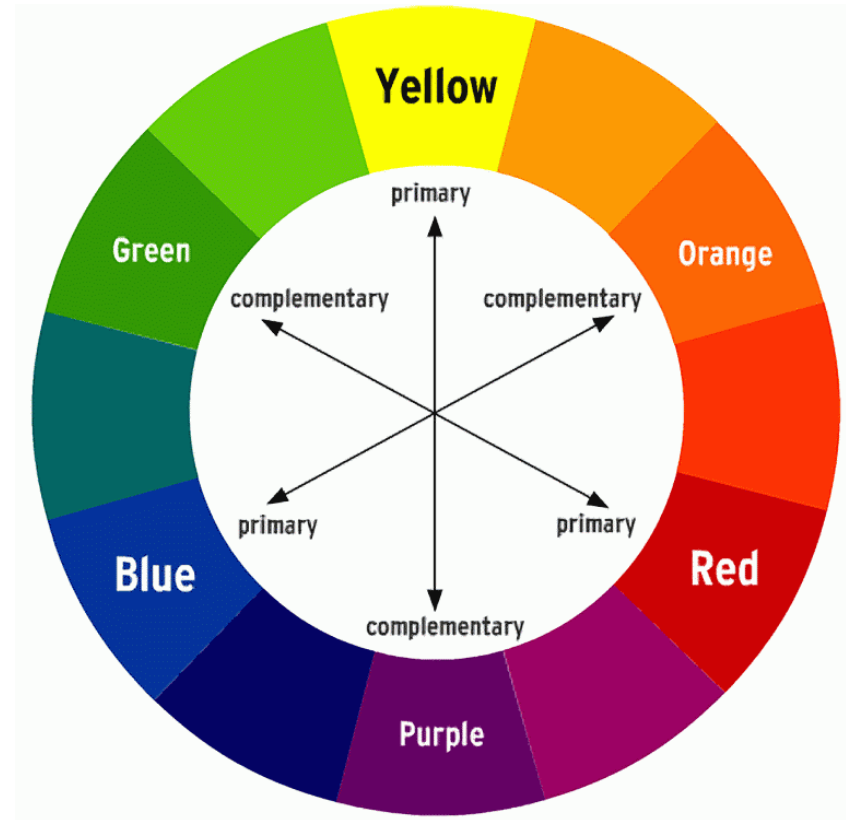
THE EFFECTS OF THE POST- IMPRESSIONISTS

- Artists began to see color as an element or vehicle by which they could heighten the expressiveness of their images.
- Said, Vincent Van Gogh (1853-1890): “Instead of trying to reproduce exactly what I have before my eyes, I use color more arbitrarily so as to express myself forcibly”.



“Color is a magical element that gives feeling and emotion to art and design.” --- Jean Bourges

- Primary Colors are
- Red, Yellow & Blue.
- Secondary Colors are
- Orange, Purple and
- Green.
- Tertiary Colors are
- Yellow Orange, Red
- Orange, Yellow Green, etc.



COLOR THEORIES

- There are many different theories on Color
- A few notable ones:
- **Munsell** (Albert H. Munsell 1858-1918)
- **Itten** (Johannes Itten 1888-1967)
- **Birren** (Faber Birren (1900-1988))

MUNSELL'S COLOR THEORY

- [Munsell Color Theory](#) is based on a three-dimensional model in which each color is comprised of three attributes of hue (color itself), value and lightness.
- The Munsell color-order system has been widely used in many fields of color science has been the subject of many scientific studies.
- Its color wheel and theory may be the most well-know color model in the art field.

ITTEN'S THEORY OF CONTRASTS

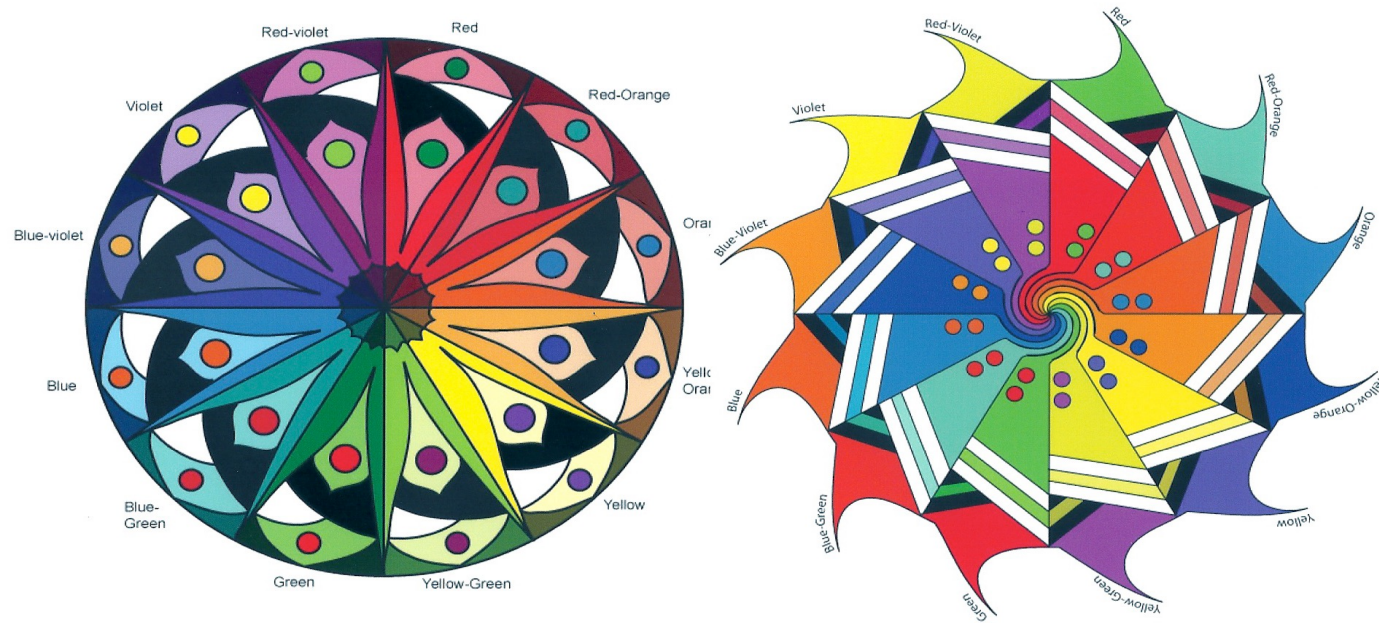
- A member of the Bauhaus faculty in Germany, Johannes Itten devised a theory of color which mapped color use into seven categories:
- **Light & Dark** – contrast of light and dark value incl. monochrome
- **Proportion** – contrast formed by size related to the weight of a color
- **Complements** – use of opposites on the color wheel
- **Simultaneous Contrast** – contrast of vibrating illusions of color
- **Hue** – hues used further apart on a color wheel will give greater contrast
- **Primary** – using primary hues
- **Warm & Cool** – using warm colors against cool colors

BIRREN'S THEORY OF COLOR

- Faber Birren explored the influence of color in Art, the workplace and human psychology.
- One of Faber Birren's beliefs about color was that we use color every day to express ourselves, to communicate our thoughts and feelings, and to help us with self-identification. Rather than saying that colors have a direct influence on emotions, Birren wrote that it is the human perception of colors that affect our emotions.
- In addition, how color affects our senses – our sense of taste and our sense of smell

COLOR TERMINOLOGY

Define: Hue, Tint, Shade, Complementary, Primary, Secondary, and Tertiary colors



ANALOGOUS COLORS

Analogous

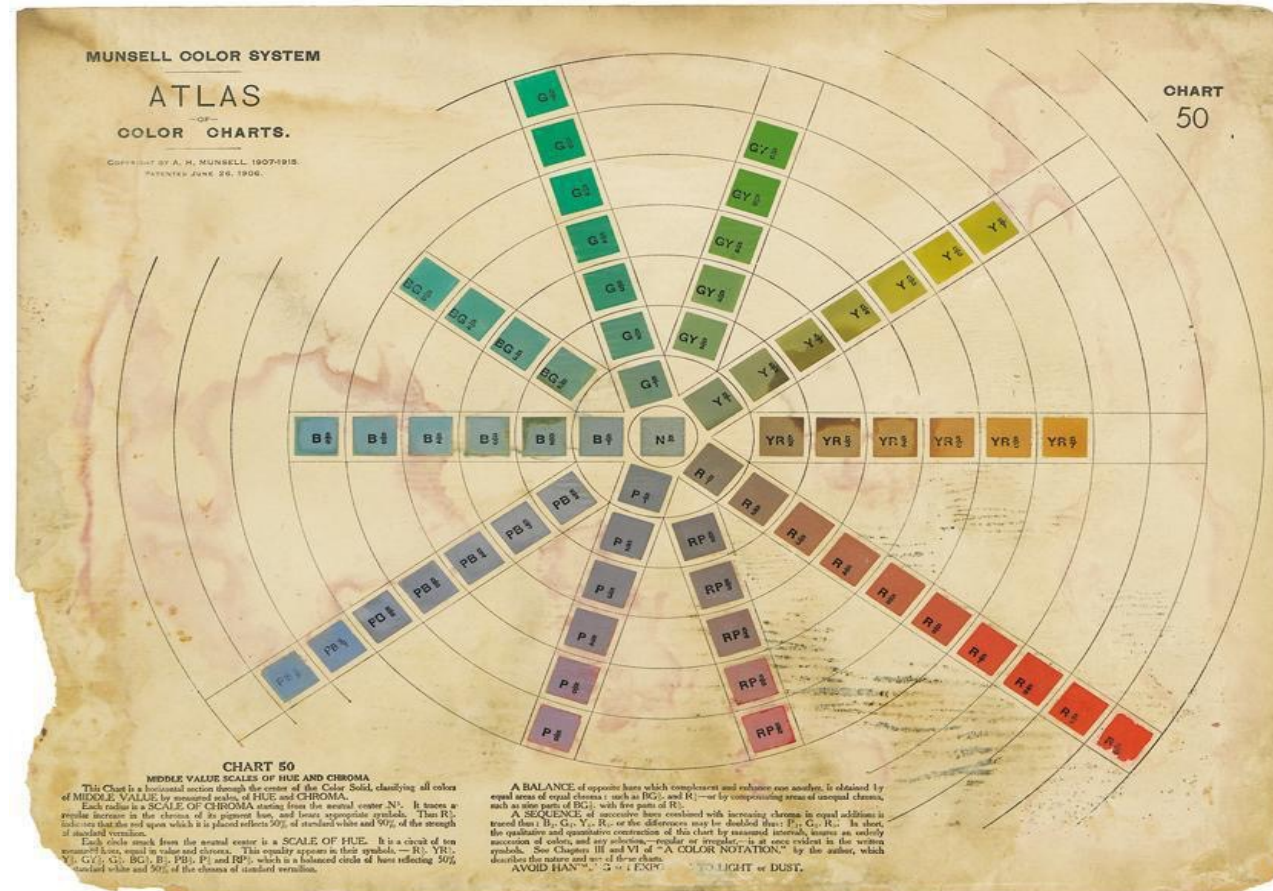
Analogous color schemes use three colors that are next to each other on the color wheel. This color scheme is said to be harmonious and creates a pleasant feeling. It is best used when one color is more dominant.

It is generally best when using colors to have one color be more dominant --- that is, in a larger proportion.



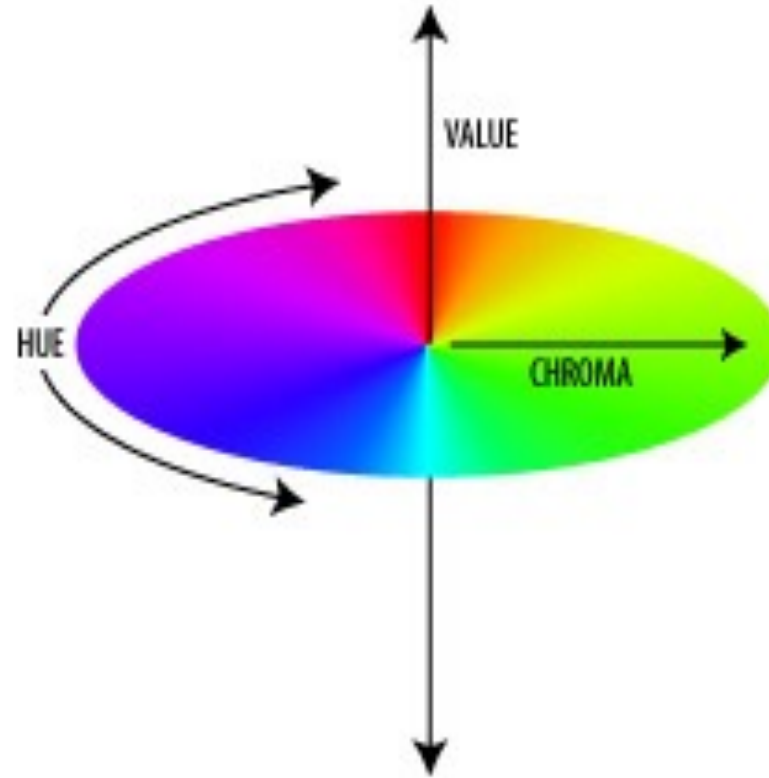
SATURATION OR CHROMA

The mixing of the complementary colors will give you another range of color beyond the tints, tones and shades.



ANOTHER WAY OF LOOKING AT THE SPECTRUM

**A Complementary
Color Scheme uses
two colors opposite
each other on the color
wheel such as red and
green or blue and
orange.**



COLORS ARE LIKE PEOPLE

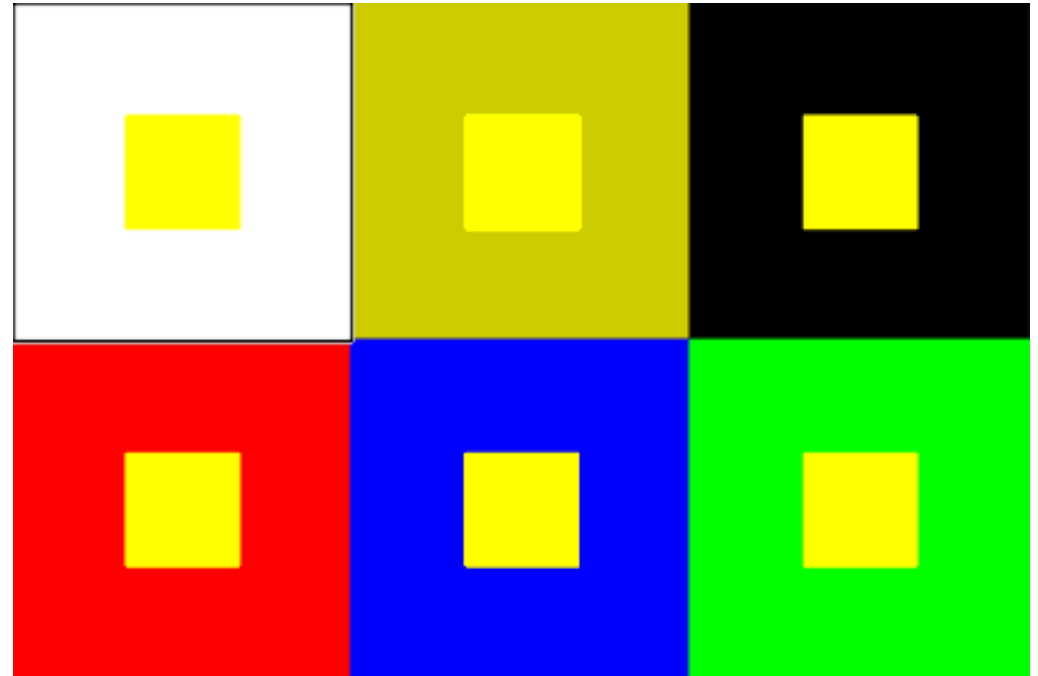
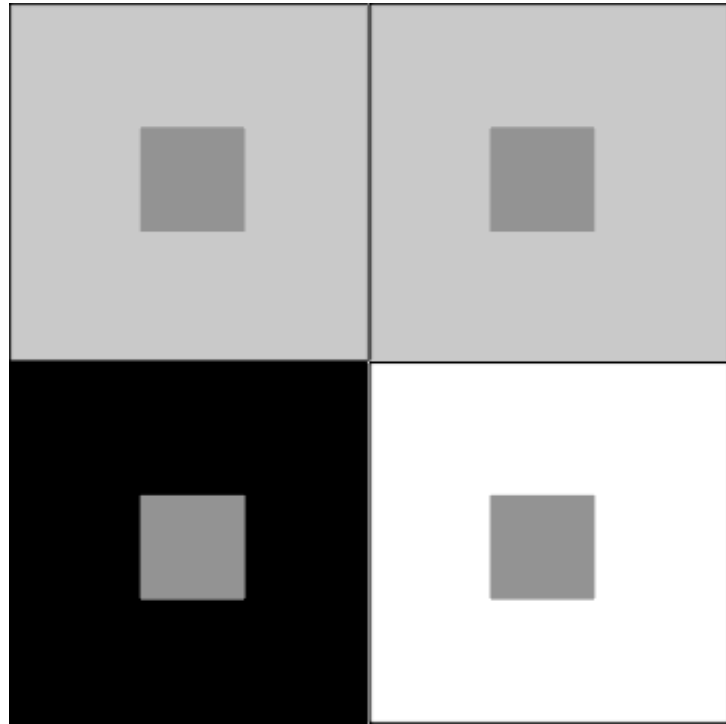
Whether hue, tint, tone or shade
every color is beautiful of its own.

It depends on which colors are placed together.

Like people, some colors work
well together and other don't.

- Black and White enhance hues and make them look brighter.
- White or Grey looks better with tints but not with Black.
- Grey and black look better with tones
- Saturated colors look better with Black

A Color will vary in lightness or darkness depending on what color is beside or around it.



THINK OF COLORS ALSO AS MUSICAL TONES

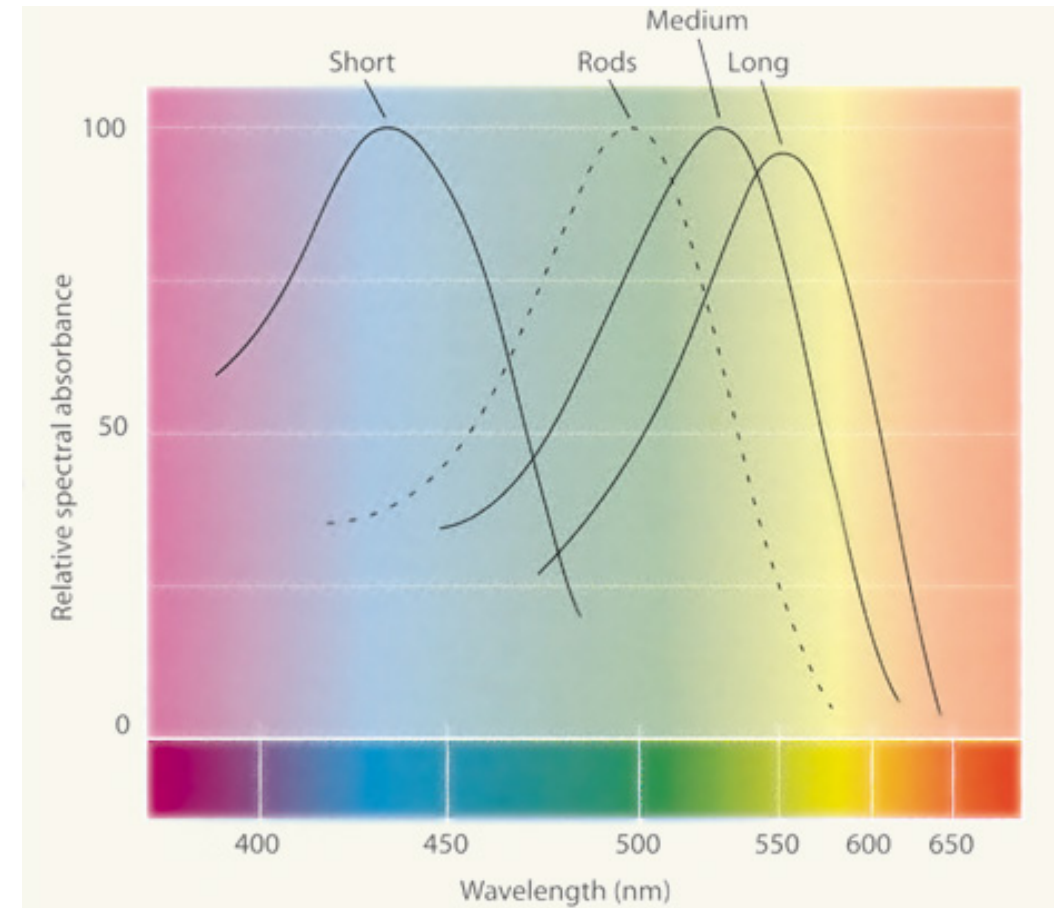
- The Tints are light, high notes.
- The darker the color gets, the lower and more base the sound quality.
- Hues are clear, sharp, resonant notes.
- They call for your attention.

COLOR PERCEPTION

Our visual system works by perceiving light waves made possible by visual receptor cells: **rods & cones**.

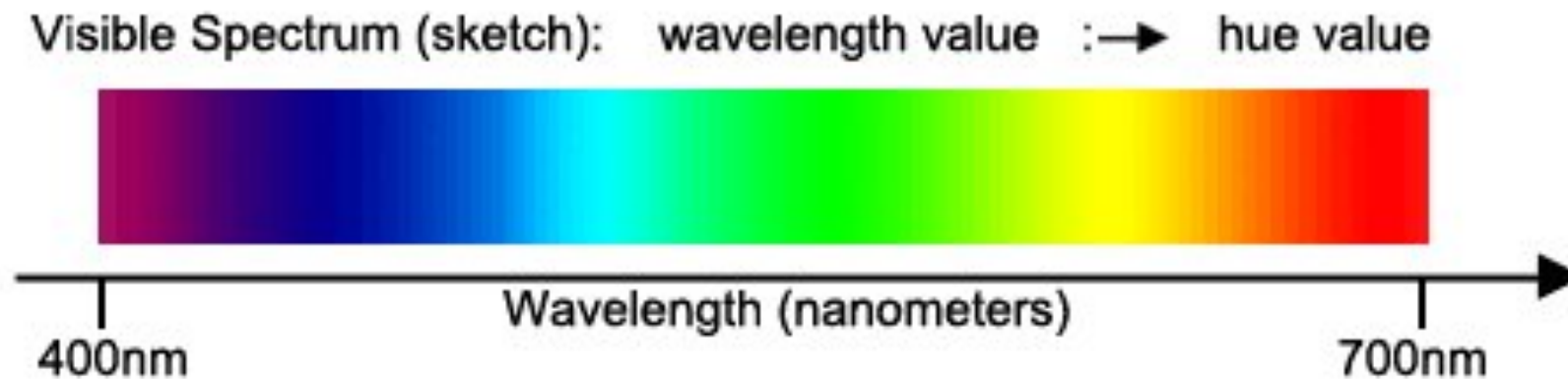
There are about 120 million and about 6.4 million cones in the eye.

Rods are sensitive to short wave lengths. They do not see red. There are 3 types of cones which perceive reds, greens and blues.



WARM COLORS VERSUS COOL COLORS

Because Warm Colors have longer wave lengths, they are perceived to advance while Cool Colors are perceived to recede.



The Psychology of Color or Emotional Response

Warm Colors include red, orange and yellow are said to evoke emotions of warmth, love or danger.

Cool Colors include colors such as blue, purple or green. These colors are said to evoke a mood of calm, peace, sadness or indifference.



COLORS EVOKE A VARIETY OF EMOTIONAL RESPONSES

Warm colors, like yellow, orange and red, create a sense of warmth and happiness. Too much of it, however can make our pictures too active, maybe threatening.

Cool tones, like blues and purples, create calmness and serenity. Or, may create melancholy or sadness.

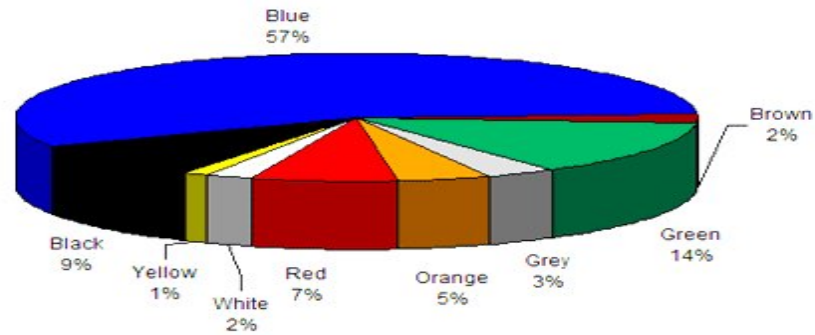
Green can go evoke a sense of growth, a fresh beginning like Spring. Or, it can be indifferent and institutional.

COLOR SYMBOLISM

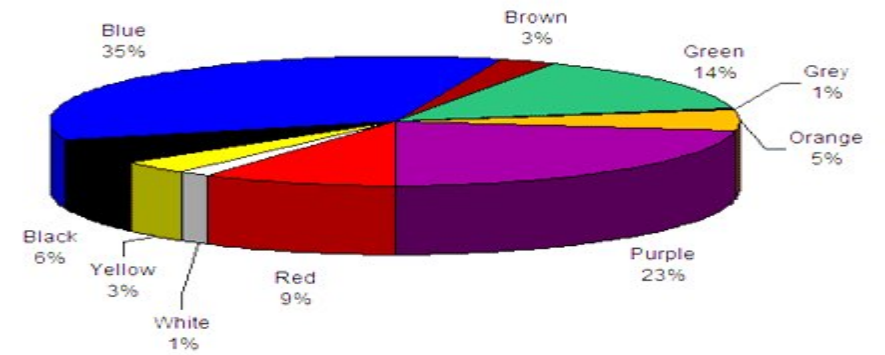
- Cultural symbolisms vary from country to country.
- Our responses to colors are biological, psychological as well as cultural.
- People from countries with strong sunlight tend to prefer warm, bright colors.
- People from countries with less sunlight prefer less saturated colors.
 - Scandinavians showed a preference for blue and green.
 - Mediterranean people prefer red and other warm hues.
 - Unconscious color preferences may sometimes develop.

To use a musical analogy, it may be limiting to play everything on a violin when a whole orchestra is at one's disposal.

Men's Favorite

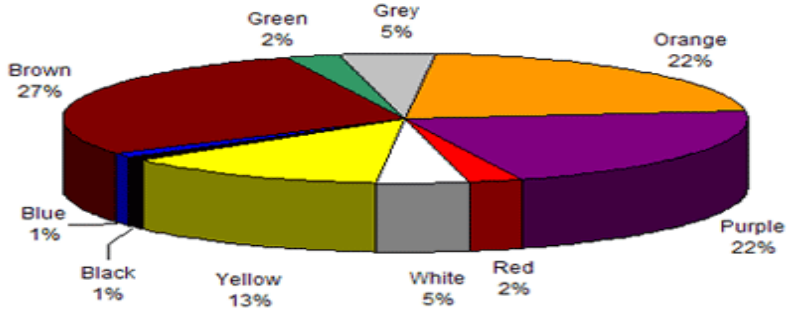


Women's Favorite

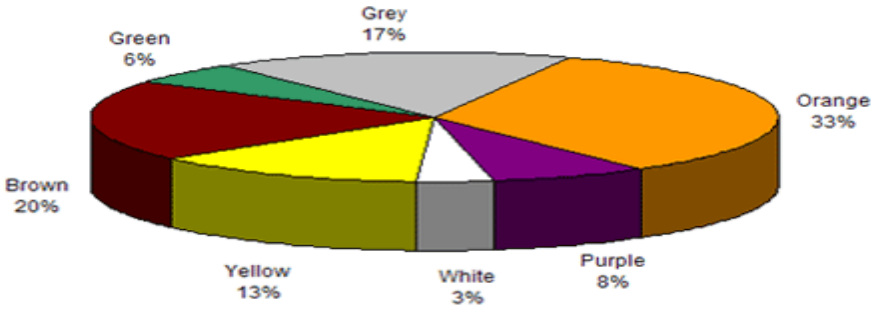


<http://www.joehallock.com/edu/COM498/credits.html>

Men's Least Favorite



Women's Least Favorite



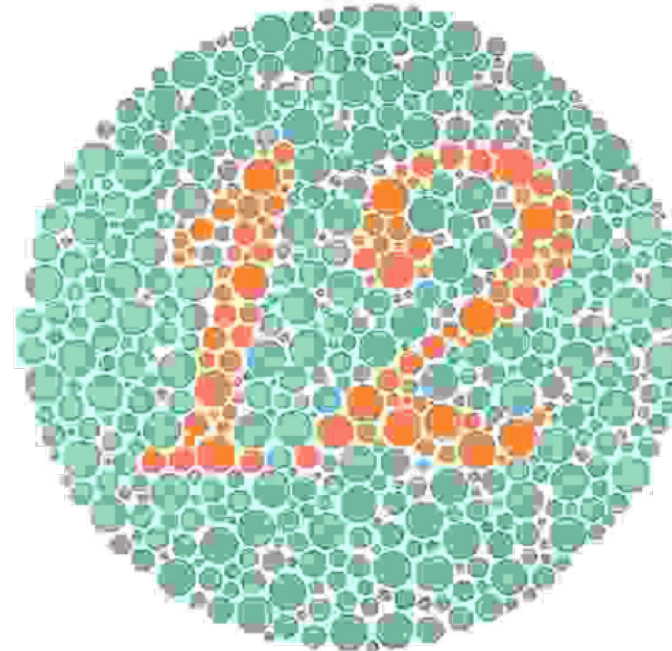
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COLOR DEFICIENCY

- Almost 10% of human males experience color vision deficiency (compared with 0.4% of females). The most common form of these abnormalities is characterized by an inability to distinguish between red and green hues.

Test for Color-Deficiency by Shinobu Ishihara M.D. is the accepted standardized color blindness test.

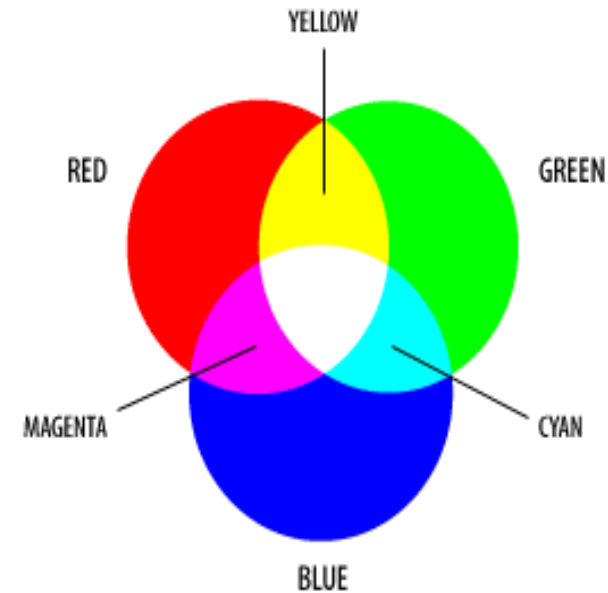
It is the most well known tool to test for red-green color blindness. Published in 1917 and is used since then to check the two different kinds of red-green color vision deficiencies.



COLOR DISPLAY

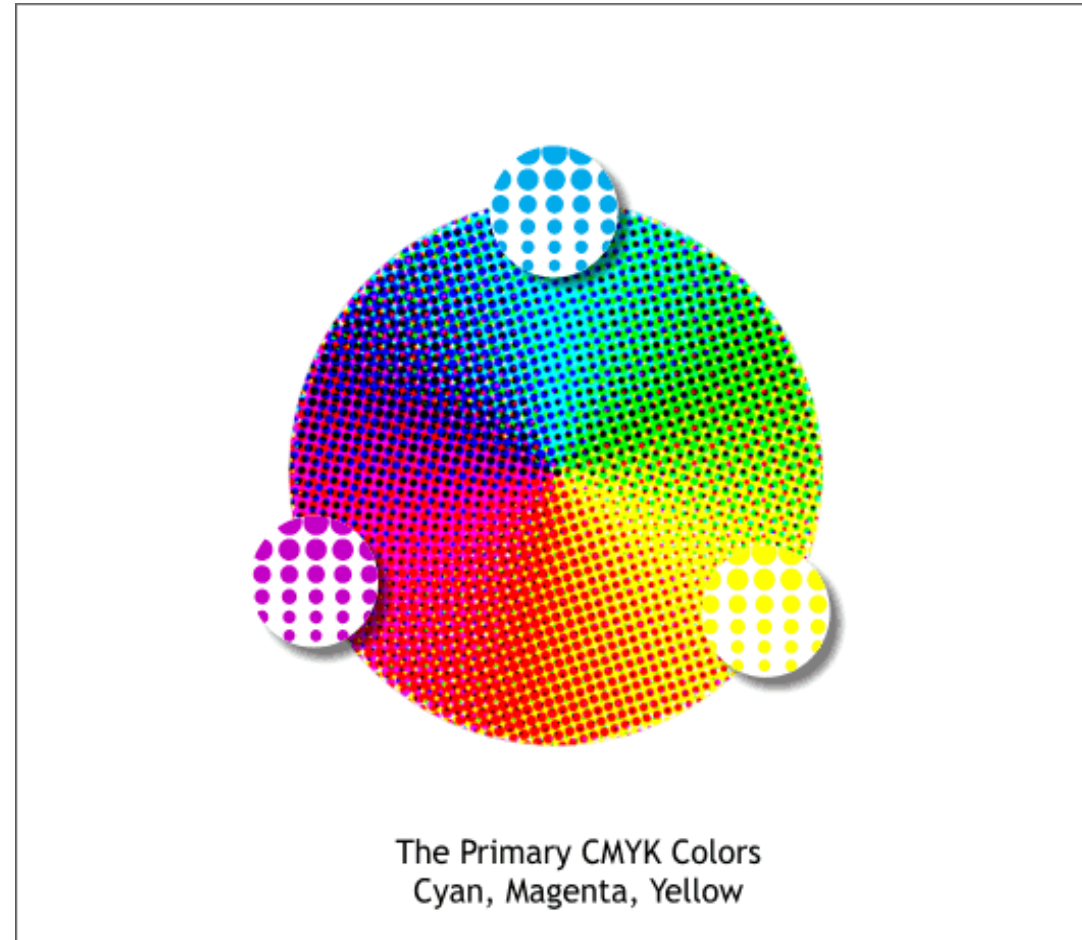
The RGB color model is used with electronic systems such as computers.

- Typical color depths are 8 bit (256 colors) 16 bit (about 65 thousand) 24 bit (about 16 million) and 32 bit (over 4 billion different colors)



COLOR IN THE PRINTING INDUSTRY

- C – Cyan (blue)
- M - Magenta
- Y - Yellow
- K – Black
- CMYK refers to the inks used by printers in typical four color process printing: Cyan, Magenta, Yellow and Black. It is best to convert your RGB files to CMYK if you wish to use your photos in a brochure, etc.



COLOR IN NATURE

Personal work

Photo: Tulip circa 2008
Is this a
Complementary Color
Scheme?



Complementary Color Scheme?



How about this?



Would you describe this as Analogous?



How would you describe this?



And this?



LIGHT IS YOUR PAINT BRUSH



Some birds wear color well
(Remember, hues go better with black or white)



EXPERIMENT

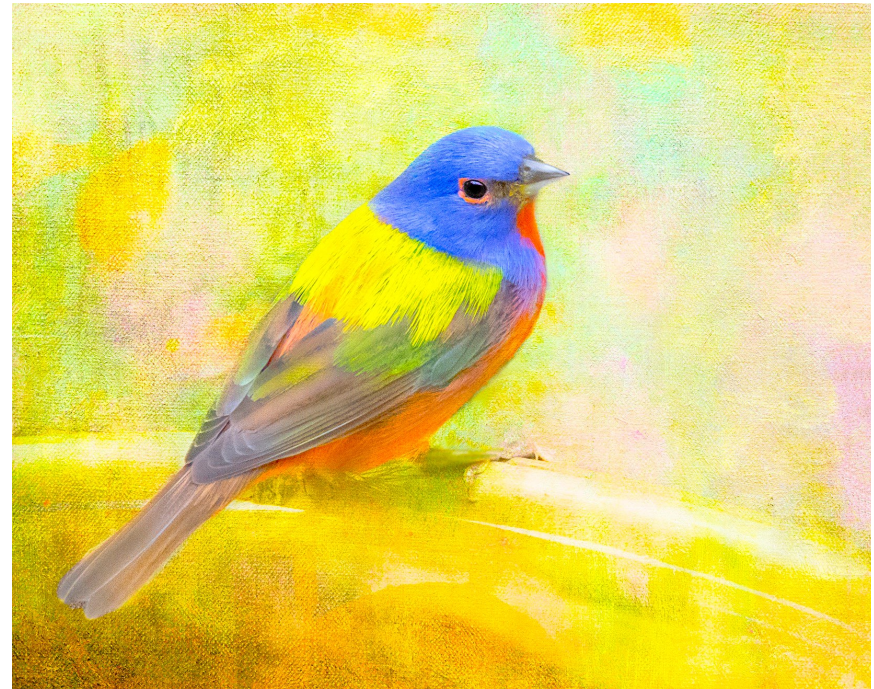
Use a filter or a preset



ENHANCE



USE A TEXTURE



Some birds prefer subdued colors



Yet even the dullest birds can be colorful.



Questions?