

COLOR



Numerical Scale of Luminosity (Goethe)

Y	O	R	G	B	V
9	8	6	6	4	3

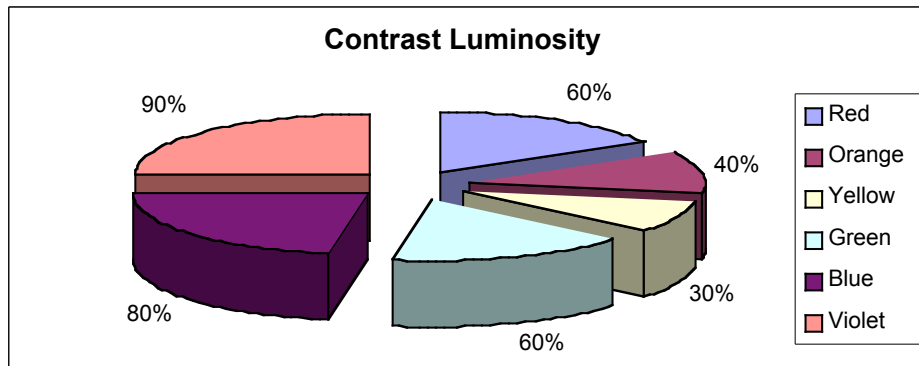
Ratio of Luminosity of principal colors and complements

Y:V	O:B	R:G
9:3	8:4	6:6

Numerical scale of luminosity of fundamental colors translated into quality relationships

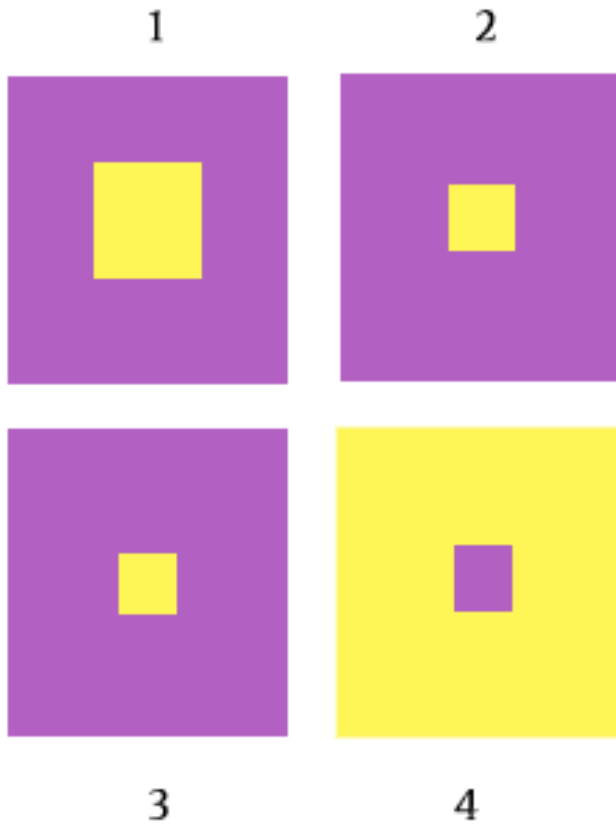
Y	O	R	G	B	V
3	4	6	6	8	9

Contrast Luminosity



Earth Tones:





Inner Squares:

- 2 more intense and slightly darker than 1
- 3 appears larger than 4



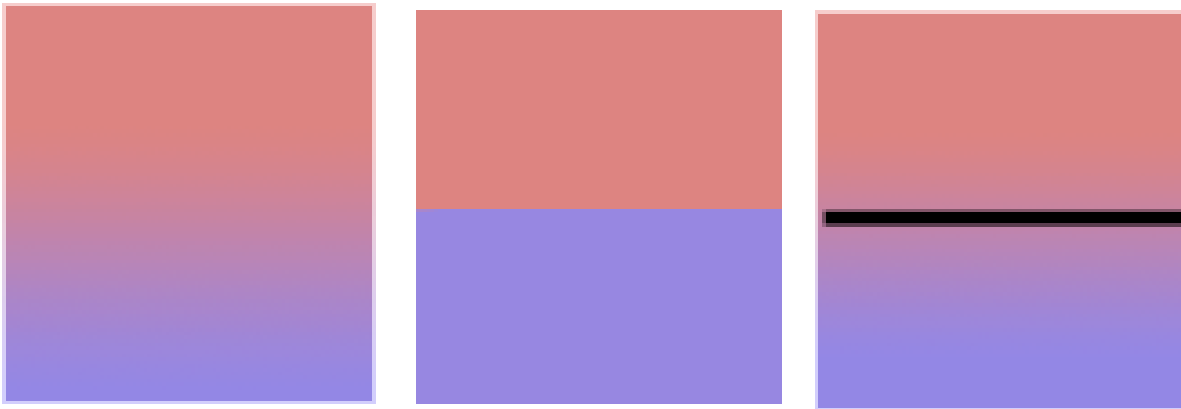
If you stare at the cross, a faint yellow border will appear and if you then look at a white space a yellow cross will appear.

General affects of color:

- Complement color will highlight a color
- When there are alternating bands of different color in certain proportions with equalization occurs in which two colors appear more alike than contrasted.
- Two yellows, one slightly green, the other more red, from a distance look the same, close different. Put a third between appears the same.
- Irritation makes colors appear to be different size (white square on black seems bigger than black square on white).
- Varying degrees of brightness of colored surfaces but equal dimensions appear to be different sizes - Warm vs. Cool.
- Surfaces of different color, even if on the same plane appears to be displaced on different planes producing a kinetic effect of movement.
- If on a white background dark colors will appear to be pushed forward or if luminosity of color adjusted
- On white ground colors decline in luminosity but increase in chrome (reinforcing tone) on black appear lighter and in brilliance while the most luminous will predominate over others, affecting their hue.
- If the intention is to obtain simultaneous contrast of contiguous (adjacent) color want of black outlines must be excluded.
- Colors next to each other of semi luminosity produce a strong contrast.
- When warm color occupies a smaller surface the color will be luminous and vice versa.
- Contrast between a pure cold color and an impure warm color inverts and cold comes forward.
- Heavy vs. light - dark green ceilings seems lower than a yellow ceiling.
- Same color of an average saturation appears opaque and little saturated over a background of the same but purer tonality... but appears more saturated and brilliant over background still of the same tonality but saturated with black.
- Black and white borders create strong contrast when there is a wide distance between them.
- Two adjacent colors appear to become more similar if the transition from the one to the other comes about by shading... where their diversity becomes greater if the transition is sudden.

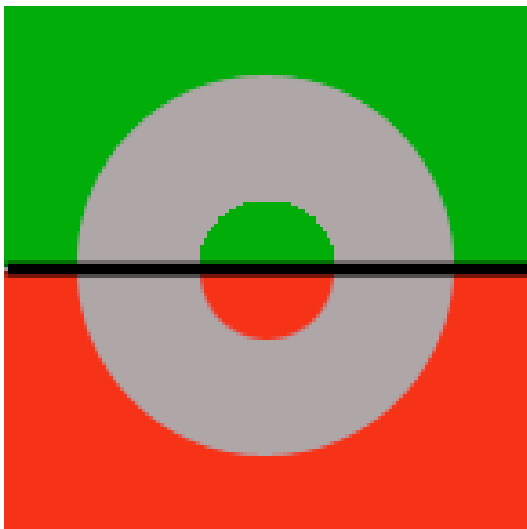
Interaction of two adjacent colors:

- Alike if transition is gradual
- Different is accentuated when transition is sudden
- Black dividing line heightens the contrast even if they don't differ greatly or transition is gradual



Use of black lines accentuates the contrast.

Looking at each piece of the ring color will be influenced, looking at the ring as a whole and it will appear gray.





Luminosity increases in inverse relation to size. Small disk appears most luminous.

As a rule, the smaller the area the greater the contrast, but this depends on relation of complement and luminosity.

Yellow and red promote proximity
Blue and violet sensation of distance

Color creates moods:

- Red causes greatest fatigue, Blue least
- Red exciting, Orange apathetic
- Green respectful
- Blue Cheerful
- Black, Violet, Gray violence
- Pediatric bright R&Y, B&G

Goethe's Harmony

1. Colors that are opposite are harmonious pairs
2. Using intermediate colors (Yellow & red, orange & violet) have character but lack harmony
3. Color combos of adjacent pairs in the color in color circle. Red & violet, blue & green.

General color comments:

- Small attraction yellow & orange, blue & violet
- Small coarse yellow & green, blue & green
- Active colors (yellow, orange, & red) when combined with black or dark colors gain energy, but when combined with white or light colors loose energy.
- Passive colors (cool) tend to look dark and foreboding when combined with dark colors, but gain cheerfulness from combined with light of white colors.

Chevreul Color Wheel

64 colors from 3 primaries, different types of harmony:

1. Analogous- Related tones of different hues
2. Contrast-Same hue far apart in tone or widely contrasting hues (compositions showing the greatest harmony)
3. When two colors are seen as disharmonious
 - a. Separate by white
 - b. Black is preferable to when the two chromatic colors are luminous
 - c. Inferior – dull

Albert Henry Munsell

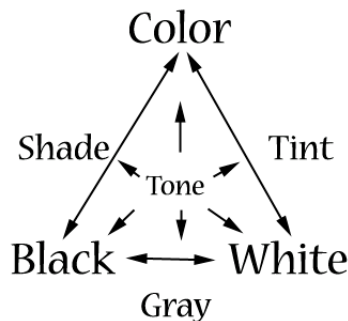
Color theory based on three scales of hue, value and chroma

1. Use as few hues as possible, if more than two are used, select adjacent or opposites
2. Combine colors of high values with the same low value
3. Combine colors of high chroma with colors of low chroma
4. Balanced areas are inversely proportional the product of value and chroma of the color involved
5. Harmonies combined require the application of at least three of the four previous rules

Wilhelm Ostwald - Mathematical rations

Wassily Kandinsky –Inner necessity

Leger-Color rectangles provide a static foil to the rhythmic pattern of thick black lines and the white background



Colors are easier to relate to than form

Contrast of hue –yellow, red, blue – blue, yellow, violet – green, violet, red – violet, green, blue, orange, black – Yellow, red, blue – is extreme contrast of hue, normally three are needed.

Decrease as hues employed leave three primaries, thus yellow, red, blue is stronger than orange, green, violet

White lessens luminosity of adjacent hue; black does the opposite and heightens the hue.

Light dark contrast any color will transfer gray from neutral to complement color. Gray absorbs strength of colors and makes them weak.

Complement contrast used correctly give effect of statically fixed image

Yellow – Violet – complement and light dark contrast

Red, Orange- Blue, Green – Complement and cold & warm contrast

Red – Green – Complement and have some brilliance

Simultaneous contrast- grays, neutrals and colors taking on another colors complement

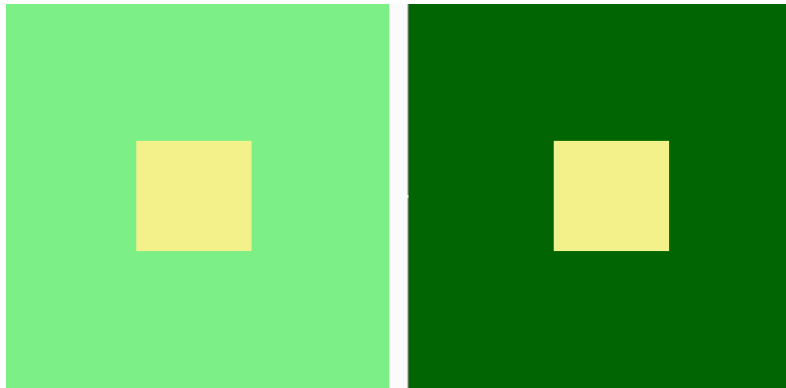
Contrast of saturation – Four different methods

1. Mix with white – somewhat colder
2. Mix with black
3. Mix with Gray
4. Mix with complement color

Contrast of extension – Relative areas of two or more color pitches-brilliance, tone

Tonal varies from light to dark, local→specific

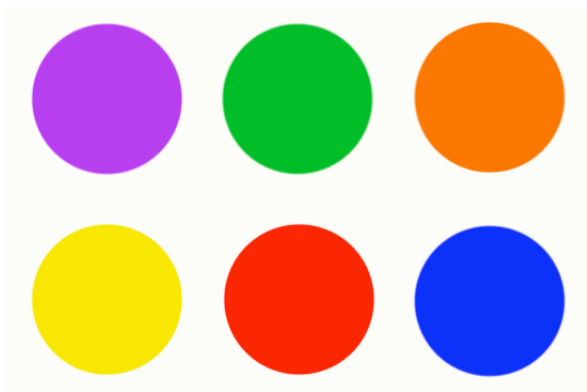
A color darker when around a lighter color and color appears lighter when around darker color.



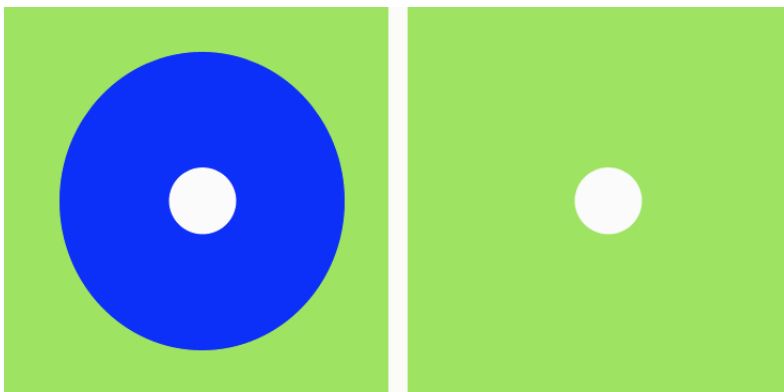
Types of contrast:

- Dark blue next to light blue is tonal contrast
- Red next to blue contrast of color
- Dark blue and light red contrast of color and tone

Juxtaposition of two colors in different tones enhances both colors making the lighter one light and darker on darker.



Color will contrast complement color onto a neighbor color or shade.



Start at center point of one, then to two, white-ish ghost appears.

Fix gaze on color than sensation of seeing same color may persist and then a negative image will appear



Square one: Green turns violet-ish
Square two: Green turns yellowish

Outlines contribute to render the impression of the colors stronger and more agreeable.

White contour narrow strip between two hues in order to help preserve individual quality of each color Delacroix, Cezanne, and Matisse. This caused no accidental optical mixture that can disturb the experience of each shape as such Paul Feeley, Morris Louis, Kenneth Noland and Frank Stella.

Interwoven complement colors form a distance that will appear gray tinged with whichever complement dominates the mixture.

Divisionism is hues distributed evenly throughout the color wheel and painted in mosaic small dashes. An example of this is Seurat who had eleven colors divided evenly and used white for tinting.

Active color – interaction tends to undermine stability in pictorial form, but emphasis is placed on form will promote pictorial stability.

Itten – Chessboard division helps to free the study of color effects from the associations of form. This has the effect of weakening the element of pictorial form and securing correspondingly strong interaction of color across the area of the picture. Also, using chess pattern creates constant movement allowing eye to rest.

Primal colors

- Blue-dark, inactivity, quiescence
- Yellow- White, day incites expectation and preparation for activity
 - Blue and yellow represent heteronymous or involuntary forces, which influence man externally.
- Red-excites physical system to attack and conquest
- Green-retreats in defense and self preservation subordinates colors
 - Red and green influence voluntary forces

Colors Represent

- Red- Strong temperaments, infatuation, bravery, hatred, revenge
 - Bright-extravert activity, ambitious and practical
 - Pink-impulsive, immaturity, young
- Orange-Bright vitality, and physical endurance
- Yellow-Virtues of wisdom and knowledge
 - Yellow/green-Worst general character a color can have
- Green-Regeneration growth and remembrance of youth experience, nature's color
 - Green/blue-honesty, healing
 - Green/yellow-Dubious
- Blue-piety, prayer, and contemplation
 - Pale-Trust, innocence, youth
 - Deep-have a mission, fulfillment
- Violet/indigo-clairvoyance and psychic sensitivity
 - Indigo-Spiritual seeking and self mastery
 - Violet-with intuition and idealism

Harmonic range dominant color accompanied by three other colors of an opposite shade that form a group from which a new color is obtained. Thus...

1. Choose a dominant color according to subject
2. Four colors away from the dominant color (moving left to right in a color wheel of 12 colors) are three colors in the opposite shade
3. Last color in the trio is the complimentary of the chosen dominant color



Two complement colors that are equal in tone are completely in compatible in harmonization. Harmony is possible in so far as they provide contrast not only in color but also in tone

Harmonic range of grays through the mixture of complementary colors is composed of pairs of complement colors mixed in unequal proportions and grayed with white

With direct complement no hue shift the after image contrast will heighten the intensity of the hues after image of red will make green appear more saturated while the after image of green will enhance the red.

Two colors juxtaposed the after image will shift colors toward complementary.

Simultaneous contrast are great at a mix and must be notable when two colors are similar in value (light of dark) will dramatically influence i.e. red & green, orange & green, blue & violet
Whereas colors of a different value, yellow & violet, after image influence will be less

Bright contrast seems to inhibit hue contrast

Grays next to a hue, values must be close or after image is negligible

Under bright light colors tend to shift yellow, dark light shift violets

The size of juxtaposed is large in size like checkerboard strong difference if in lines diffused by the eye.

Varies Harmonies

Harmony of analogy

- Harmony of scale-close related values of a single value are exhibited
- Harmony of hue-Analogous colors of similar value
- Harmony of a dominant colored light-assortment of different hues and values is pervaded as if by a dominant tinted light.

Harmony of contrast

- Harmony of contrast of scale-different values of a single hue are combined
- Harmony of contrast of hues-related colors are exhibited in different degrees of purity or chroma

Contrast of value

- Contrast of Value-most notable light and dark colors
- Contrast of hue-most notable when colors are fairly uniform in value

Harmony of colors

- Harmony of contrast in colors-colors belong to scales, very far apart are featured (complement), split complement triad combos and others with similar relationships

Colors look best when

1. Closely related
2. Analogous
3. Complements
4. Strong contrast

Different combos

1. Adjacent (analogous)
2. Opposites (Complements)
3. Split complements (red with yellow/green & blue/green)
4. Triads (red, yellow, blue & orange, green, violet)
5. Dominant tint – transparent wash over

Achromatic-white, gray, black or neutrals

Intensity or chroma

Tertiary color – mixing complement or any combo of three primaries

Color tetrad-a primary complement and a pair of intermediate complements



Opponents of color theory fundamentals believe color wheel consists of red, green, yellow, blue, white and black.

Strong red, yellow, and green set off from a brownish background.

Color fields space spreads outward

If less oily color is placed on top of a color into which a fat oil has been mixed the paint on top may dry first, when paint underneath dries it contracts causing cracks and fissures.

Fat over lean (Best under painting colors)

Colors of low absorption

- MG white
- Venetian red
- Flake white
- Chremnitz white
- Chrome oxide green
- Zinc yellow (lemon)

Medium oil absorption (not to be used over any of the following two categories)

- Yellow ochre
- Cadmium yellow light
- Cadmium red light
- Thalo yellow green
- Ultramarine blue
- Titan white
- Cadmium green

High oil absorption (over painting) Cadmium orange

- Winsor orange
- Alzerian crimson
- Ivory black
- Raw umber

- Cerulean blue
- Raw sienna
- Mars black
- Brunt sienna
- Brunt umber

Very high absorption (best over painting)

- Cobalt blue
- Cobalt violet
- Lamp black
- Viridian Green

Any color used in medium, high or very high categories must be mixed with at least 50% of color in low absorption category. If the paint is used as under painting it needs to be superimposed with color in equal or higher absorption.

Glazing mixture

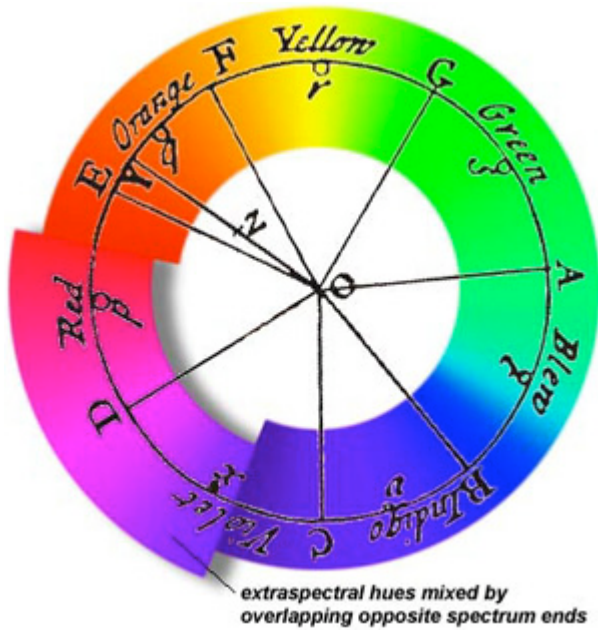
- 5 parts dammar
- 5 parts rectified turpentine
- 3 parts stand oil
- 2 part Venice turpentine

My Adjusted Wheel to Account for Earth Tones, Black and White:



Newton's Color Wheel: from *Optics* by Sir Isaac Newton, 1706. The names of the colors are in Latin.

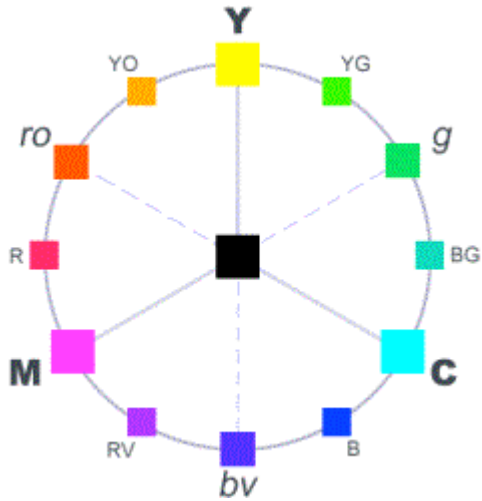
In refracted light the primary colors are red, green, & blue-violet; the secondary colors are magenta, yellow & turquoise



Newton based on the newly developed optical spectrum. A prism, he found, split light into a rainbow. Newton wrapped the rainbow around into a circle and labeled the colors.



A better model is the color triangle, as shown in Fig. 3. It conveys all of the information of the original color wheel, but it also communicates extra information such as the relationship of primary colors to secondary colors and vice versa.



In refracted light the primary colors are red, green, & blue-violet; the secondary are magenta, yellow & turquoise



In Hoener's color wheel the primary colors are orange, green and violet can be juxtaposed to create the secondary yellow, blue and red.



In Munsell's Color Wheel the five principal colors are red, yellow, green, blue, and purple; hues that can be mixed from adjoining principle colors are named for both: purple-blue, red-purple, yellow-red, green-yellow, blue-green.



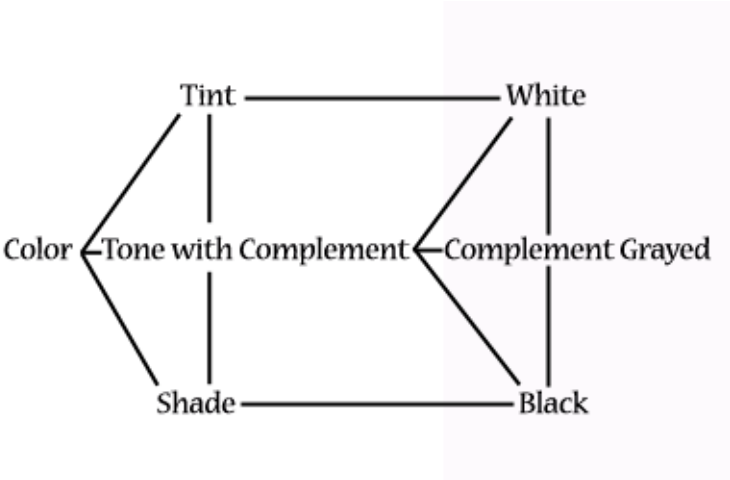
In Ostwald's color wheel the primary colors are red, yellow, sea green, and blue. The secondary colors are orange, purple, turquoise, and leaf-green.

Eyes cant focus on two colors of widely separated wavelengths at the same time thus warm comes forward and blue recedes.

Grey, black and white are not colors but accents and clarify adjacent color areas

A complex composition will demand simple color while complex color is best expressed in a simple framework.

My version of the color triangle



General notes:

- Most preferred colors are blue, red, and green. Color schemes that are dominant in this will nearly always satisfy
- Pure colors are most pleasing
- All pure colors visually harmonize with white and black
- Tints harmonize with white
- Shades harmonize with black

- Tones harmonize with gray
- Analogs and complements are more attractive than intermediate hues
- Triads are three colors
- Tetrads are four colors

Purer and warmer colors are best confined to feature parts of a drawing or design, cool hues in the background

Dominate harmonies, one hue is glorified as feature color and influence all others. To do this:

- Utilize transparent layer
- Add a portion of the one pigment to all others

Illumination allows one to have knowledge of areas of:

- Dark lustrous
- Grayish iridescent
- Tinted chromatic light

Eye wants simple color, cut color forms and sequences

Vague uncertain in-between colors will be distracting and unattractive

Warm and cool variations of a dominant hue will vibrate

In abstract art colors have greatest potency because they are not confined to a recognizable shape or thing in space, but are free from form.

Color field with evenly stained canvases and abstract expressionist text show underplay of the center and the constraints of boundary and format and they replace the hierarchy with coordination (Monet's late work)

Hue=specific color

Value=Lightness or darkness of a hue

Chroma=intensity of a hue

Alternate color perspective

- Salient
 - Color that contrasts in temp w/ background
 - Saturation in the color
 - Opaque color and objects that appear solid and tangible
- Recessive
 - Color that is similar in temperature to background
 - Grayed color, shades and tones
 - Transparent color shades and tones
 - Transparent color and areas that are atmospheric.

Chevrue 1830s

Harmonies of analogous colors

1. Harmony of scale – simultaneous view of different tones of single scores
2. Harmony of hues – same brightness
3. Harmony of dominate colored light – low contrast but one stronger

Harmonies of contrast

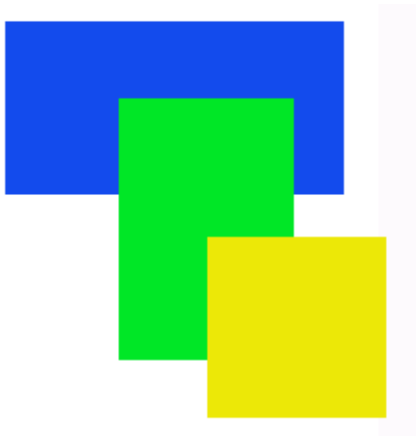
1. Harmony of contrast of scale – two tones of same scale, distant from each other.
2. Harmony of contrast of hues – different brightness.
3. Harmony of contrast of colors – very different brightness

If a weak neutral light in an environment and a strong hued light is directed and object'

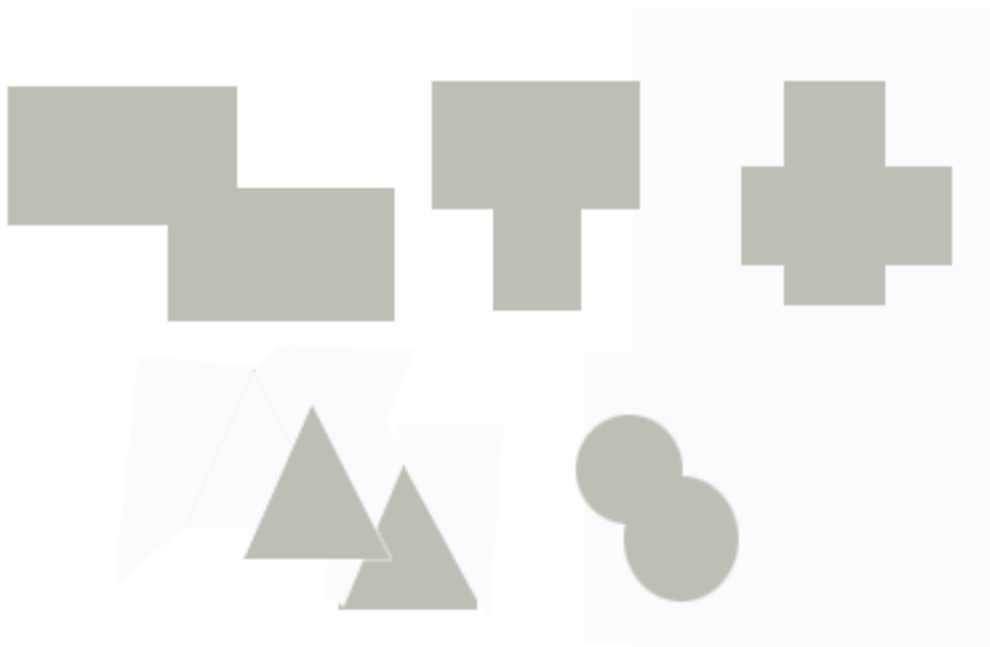
How to see if one color is lighter or drier put color sheets on top of each other and focus on coverage corner (C). Remove (B) if area (C) is lighter than (A) then the upper paper is the darker and vice versa then repeat in reverse order.

Color mixture in paper illusion of transparency

Take a blue and yellow color and imagine what kind of green would result from a mixture...



- In addition to illusion of mixture, another deception will be recognized-illusionary mixture in paper on seems to show through the other.
- For more intensive experience, keep the area of the mixture larger than those of the two mixing ones.



Two types of physical mixtures

1. Direct mixture of projected light – color light – direct color
2. Indirect mixture of reflected light – paint

Under normal conditions a subtractive mixture is not as light as the lighter of the color parents nor as dark as the darker one. Also a mixture is reciprocally neither higher nor lower in color intensity than the color parents.

Spatial organization of color:

- Softer boundaries disclose nearness implying connection
- Harder boundaries indicate distance separation
- Colors in front or behind, here, there, or in space
- Middle mixtures sometimes appear as if meeting with in 2-d plane or sometimes interchangeably as higher or lower than the mixture, thus middle mixture all boundaries equally soft or hard. So middle mixture appears frontal, as a color by itself this is comparable to the reading of any symmetrical order and the middle mixture will behave un-spatially, unless it own shape or surrounding shapes decides differently
 - Example: Cézanne first to develop color areas which produce both distinct and indistinct endings – areas connected and unconnected – areas with and with our boundaries as means of plastic organization. In order to prevent evenly painted areas from looking flat and frontal, he used emphasized borders sparingly, mainly where he needed a spatial separation from adjacent color areas
- Optical effect of the eye mixing blue dot and yellow dot to form green



As you pull the dark away staring at the mid tone, it becomes lighter at the right edge

Goethes Color circle: Yellow→Green 3:4:6:9:8:6

Increase in amount of color, not merely in size of canvas visually reduces distinct (giving intimacy and respect)

Transparent fluids present volume color

- I.E. water- several layers on top of each other darkness, weight and intensity of color
- Can be used with glass works with increased exposure to certain rays the translucent opalescent white within the glass increase resulting in darkening of the whites with light passing through but in whiter white in reflected light

Formless color

- Combines colors exclusively in stripes, stretched, narrow rectangles, same length, vary in width and touching each other in full length, then consider almost shapeless, usually vertical more practical than horizontal in left right and sideward contact color interaction usually easily comprehensible than with in an up down connection. By this, reading, connecting, grouping, and separating of color stripes is easier.
- Don't let any one color dominate to avoid individual attitude toward color

Chevreul emphasized the importance of gray for setting colors.

Chevreul's flaw:

On a sheet of paper make a grade scale

Lay uniform tint 1-10, when dry lay a second tint 2-10, then a third 3-10 and so on.

Weber and Fechner Law:

In first two steps measure one and two units then step three twice as much as 2, so 4, 8, 16,32 and so on.

Two polarities in color

- Light and dark, light and heavy

- Temp contrast, warm vs. cool

Five “parent” colors and the secondary color in classical Japanese paintings

Cardinal principal o Japanese color harmony

1. Primary of parent color should never, in a painting, be placed so that it is contiguous (contact, touching and adjacent) to any secondary colors of which it is a component – both colors would lose by such juxtaposition.
 - a. I.E. the parent color, white, should not be place next to sky blue since white is one for the components of sky blue

Blue + Yellow = Green	Midari
Blue + Black = Dark Blue	Al Nezumi
Blue + White=Sky Blue	Saro Liro
Blue + Red=Purple	Murasaki
Yellow + Black=Dark Green	Unguisu Cha
Yellow + Red=Orange	Kaba
Black + Red=Brown	Tobihiro
Black + White = Grey	Zezumiro

