Principles of Visual Design LCC 2720
Instructor: Brian Schrank

Color Theory

Color Theory Lecture Topics

1. Phenomenology
2. Intent Behind Color Choices
3. Color Affecting Color
4. Synesthesia
5. Classic Color Theory
6. More Intent Behind Color Choices
7. Color Palettes
8. Color Balancing
9. Accents
10. Science of Color

phenomenology

Phenomenology

(Philosophical Method Invented by Husserl)

1. Perceive the world as phenomena.

2. Strip away preconceived notions such as cultural filters (or even language) that warp perception

3. Describe rather than interpret

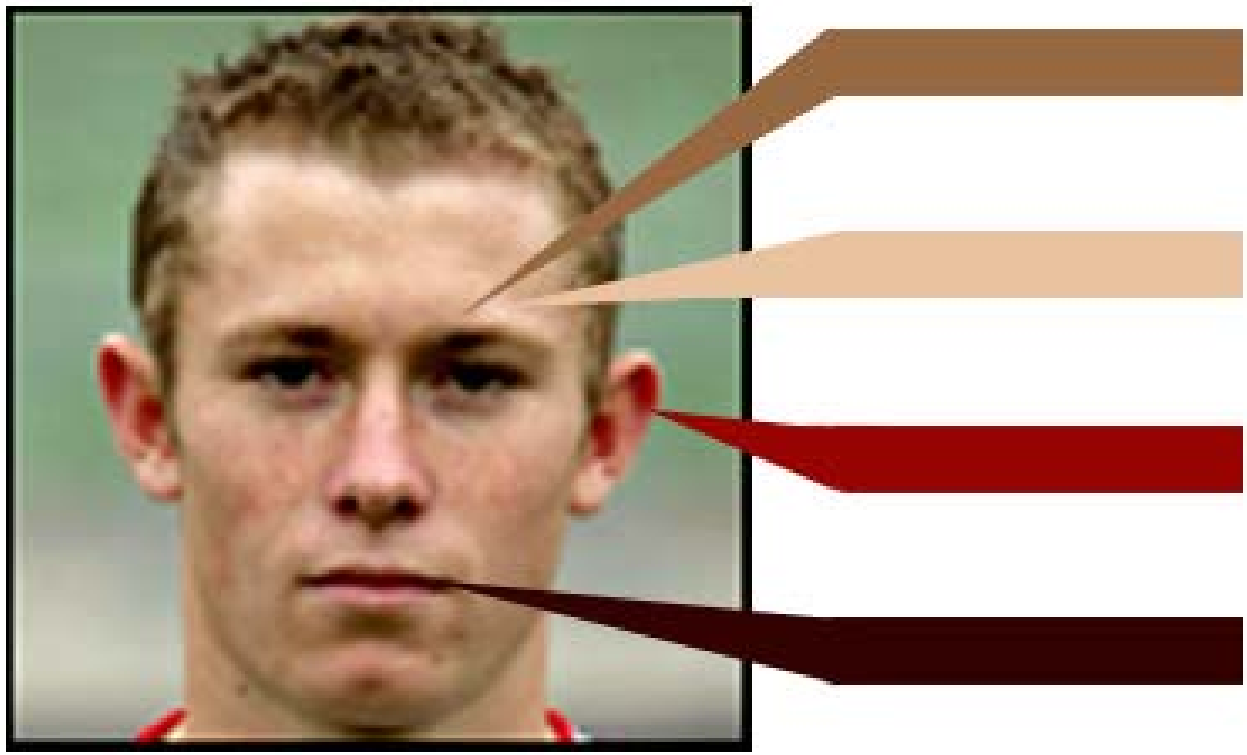
What Color is This Guy?

What Color is This Guy?

well...

he’s not *white.*

What Color is This Guy?



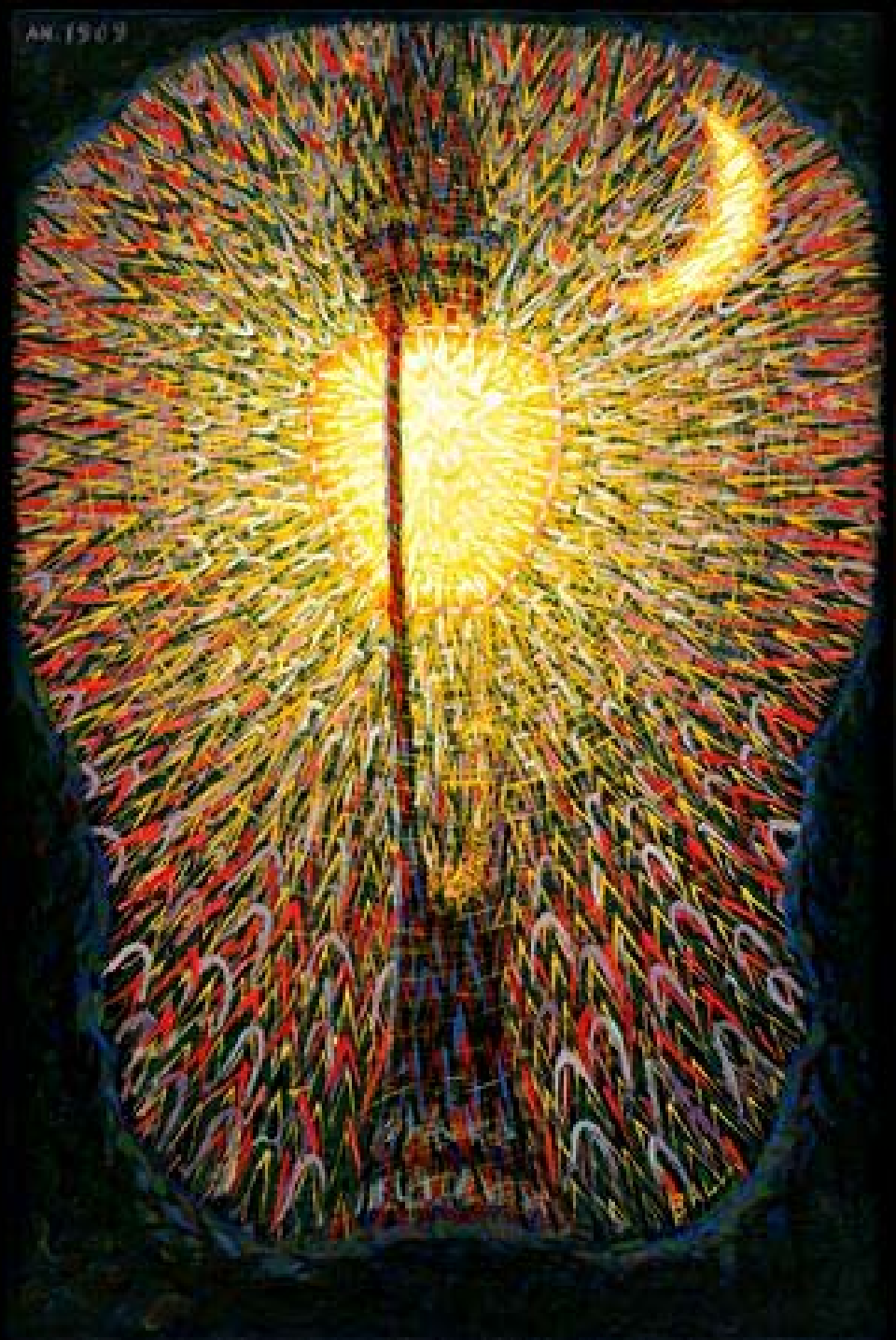
What Color is This Girl?

What Color is This Girl?

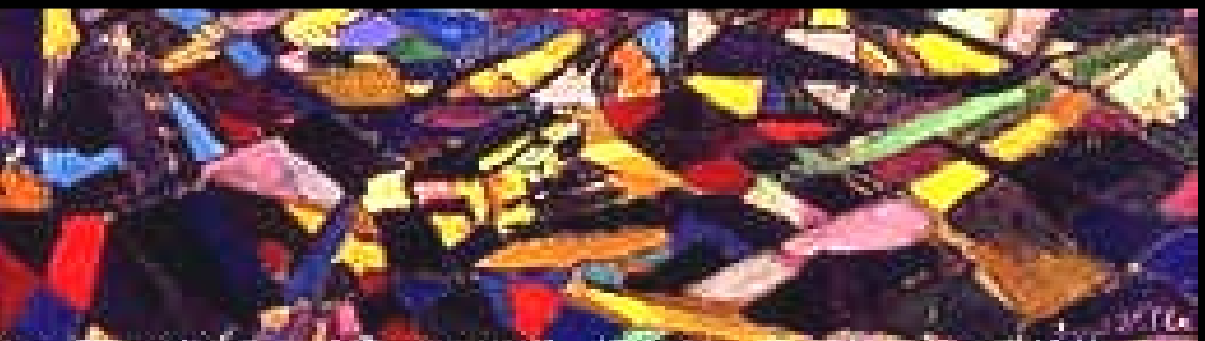
What Color is the Grass?

What Color is the Grass?

What sensations and colors do you really experience when you look into a light?



Thousands of UNAMED colors are filtered into extremely loose word labels such as: WHITE, BLACK, GREEN, BLUE...



It is useful to use phenomenological techniques when analyzing design choices of others.

It is useful to use phenomenological techniques when analyzing the design choices of others.

To do this you explore your unconscious and biological reactions of the design.

Intent Behind Color Choices

Which is the Unaltered Image?

What is the intent behind this color choice?

If this were the color choice what would the intent be?

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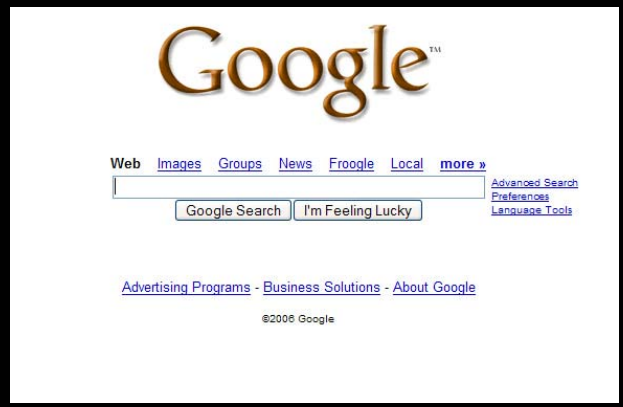
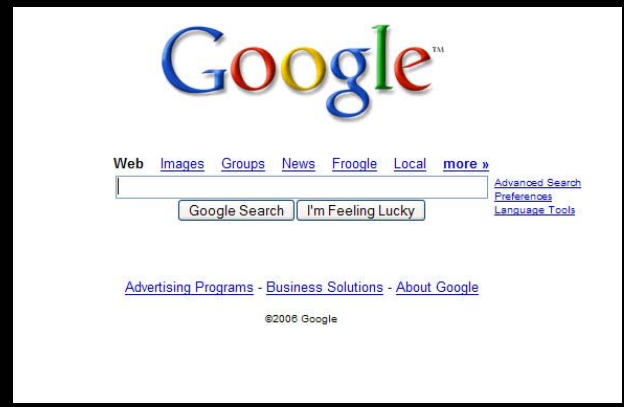
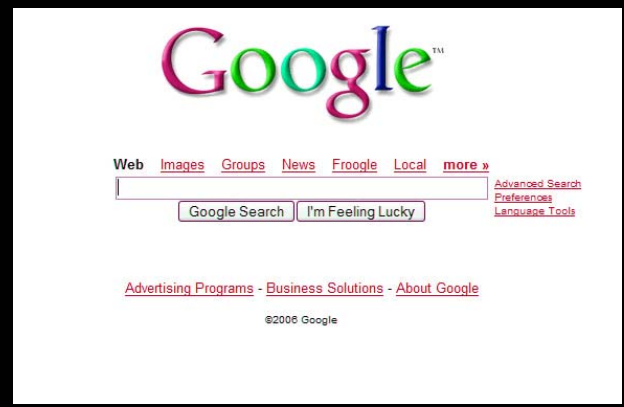
If this were the color choice what would the intent be?

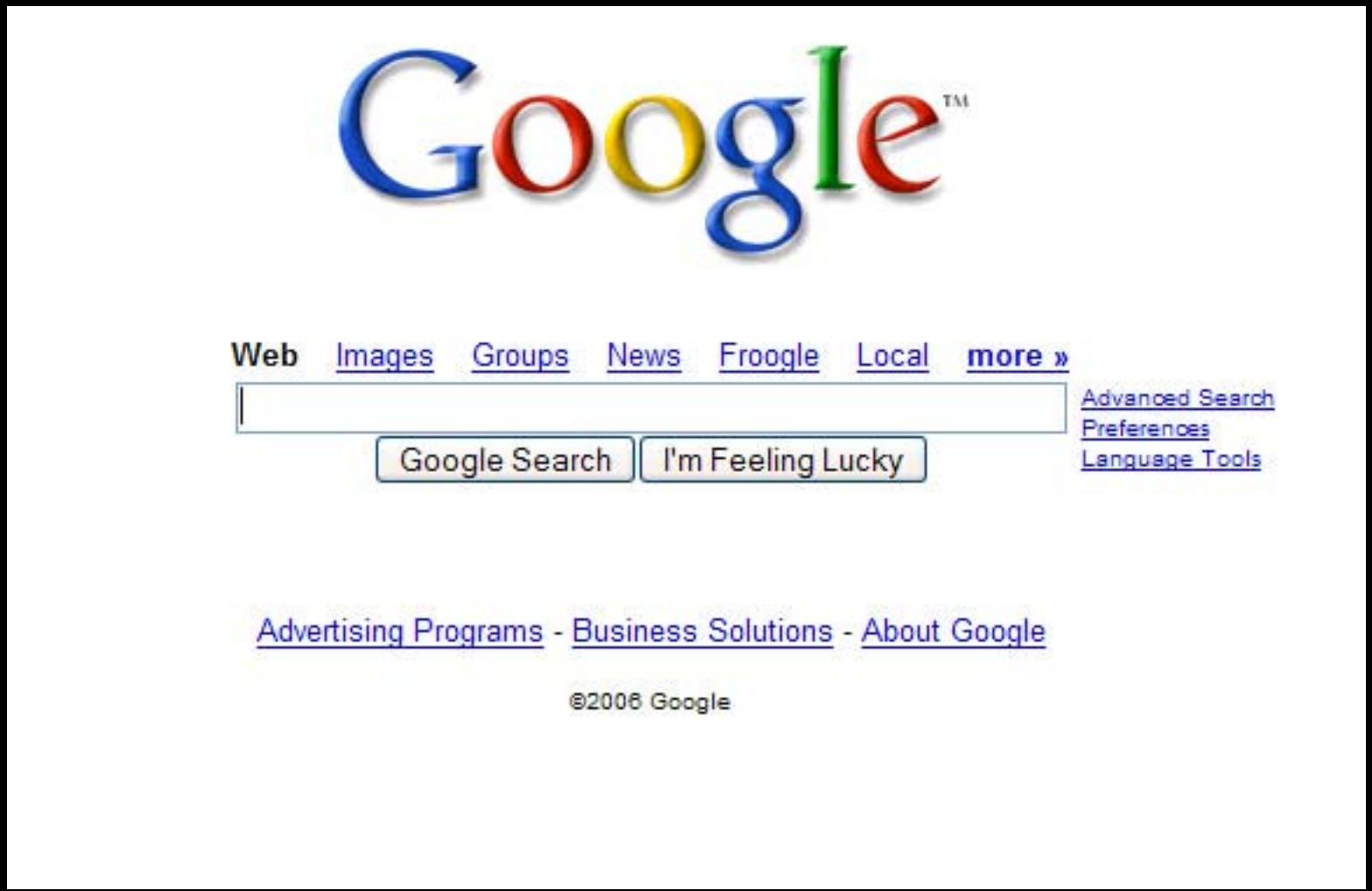
Which is the Unaltered Image?



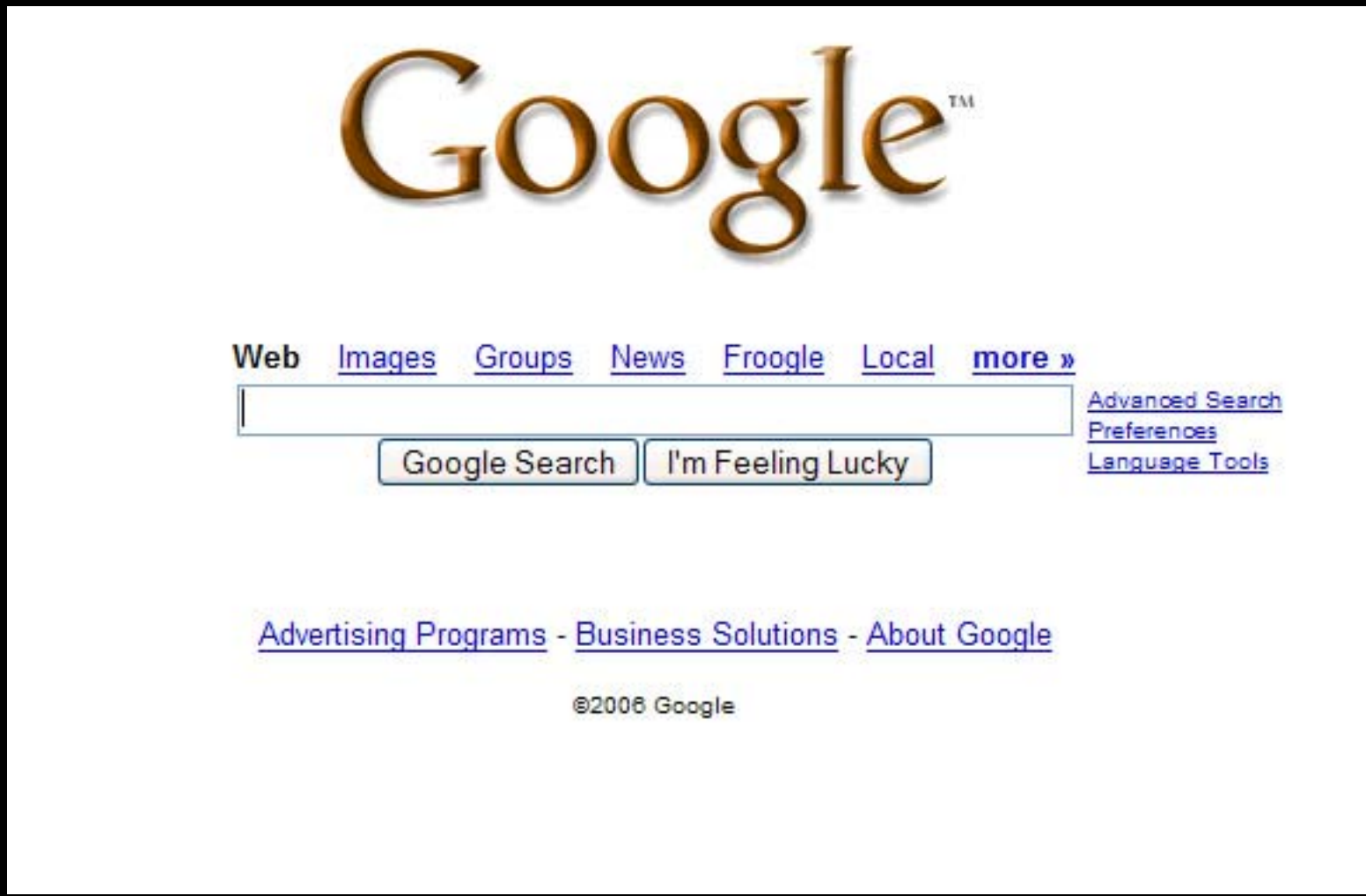




What is the intent behind this color choice?



If this were the color choice what would the intent be?



If this were the color choice what would the intent be?

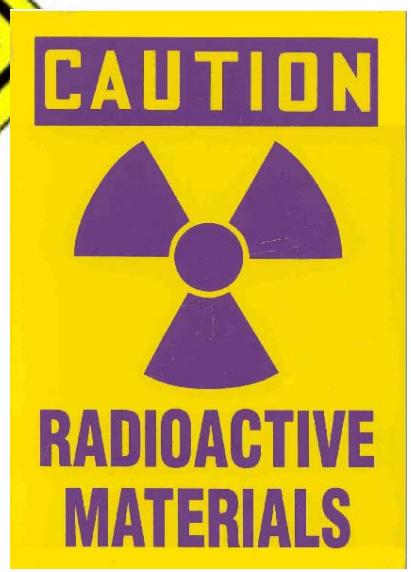
If this were the color choice what would the intent be?

If this were the color choice what would the intent be?

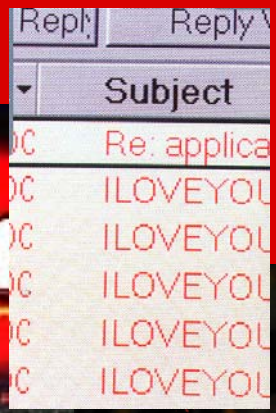
How do these colors shape your “McDonald’s Experience”?

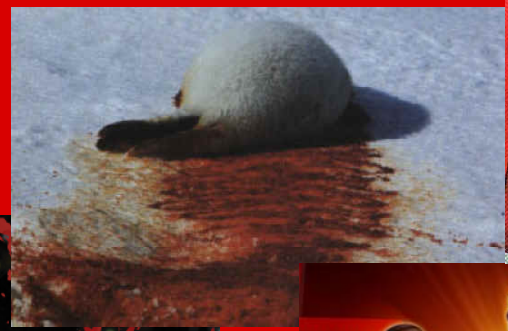
- Eat Fast
- Have a Stimulating Experience

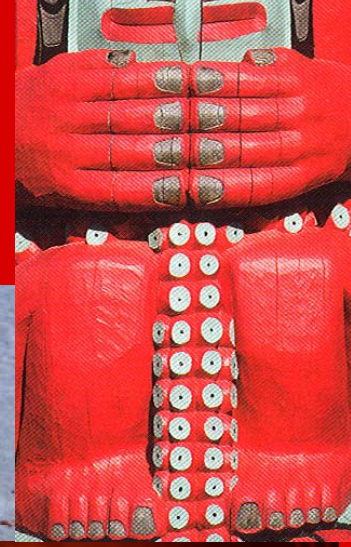
Yellow is also the most popular color to signify **caution**:



Colors are highly contextualized by subject matter







pampers.shop.by

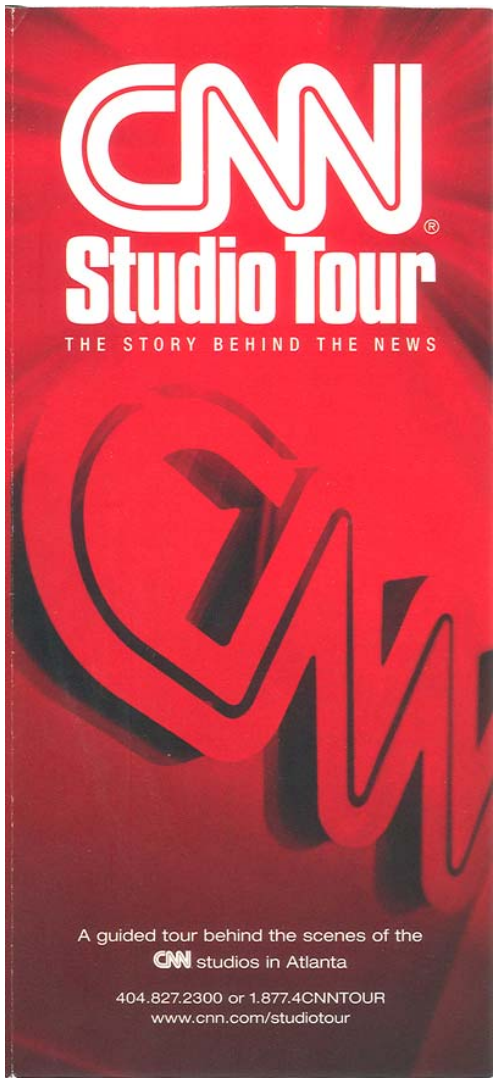
What is the intent behind these color choices?

How do they inform this design?

To Convey:

- **Control over the Period**
- **Containment (red by white)**
- **Retaining Sexual Allure**

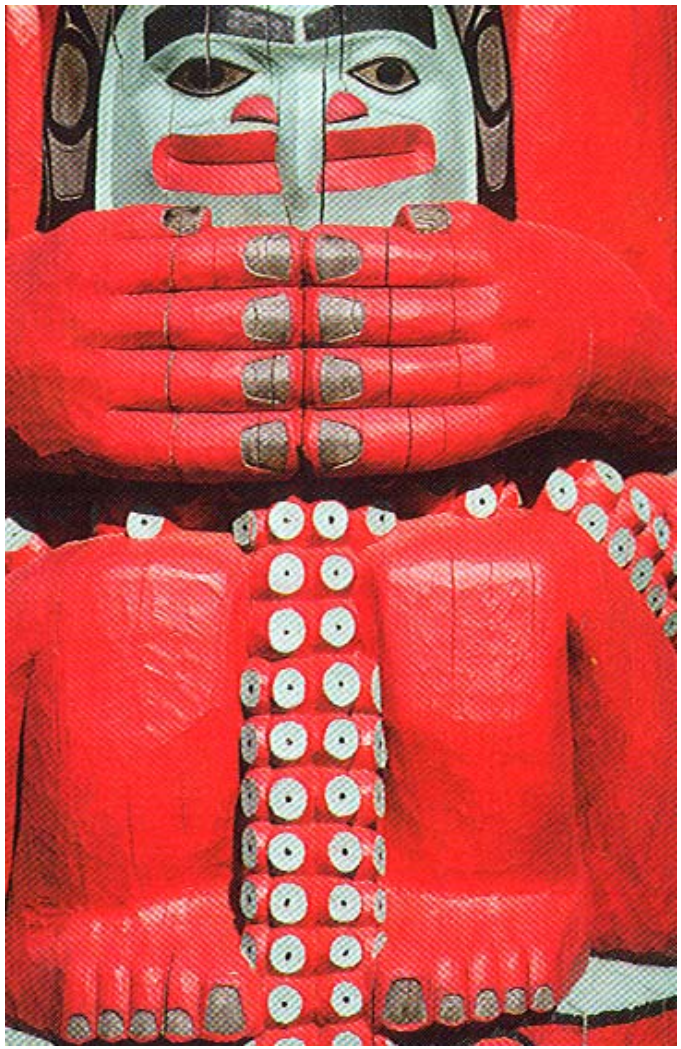
What is the intent behind these color choices?



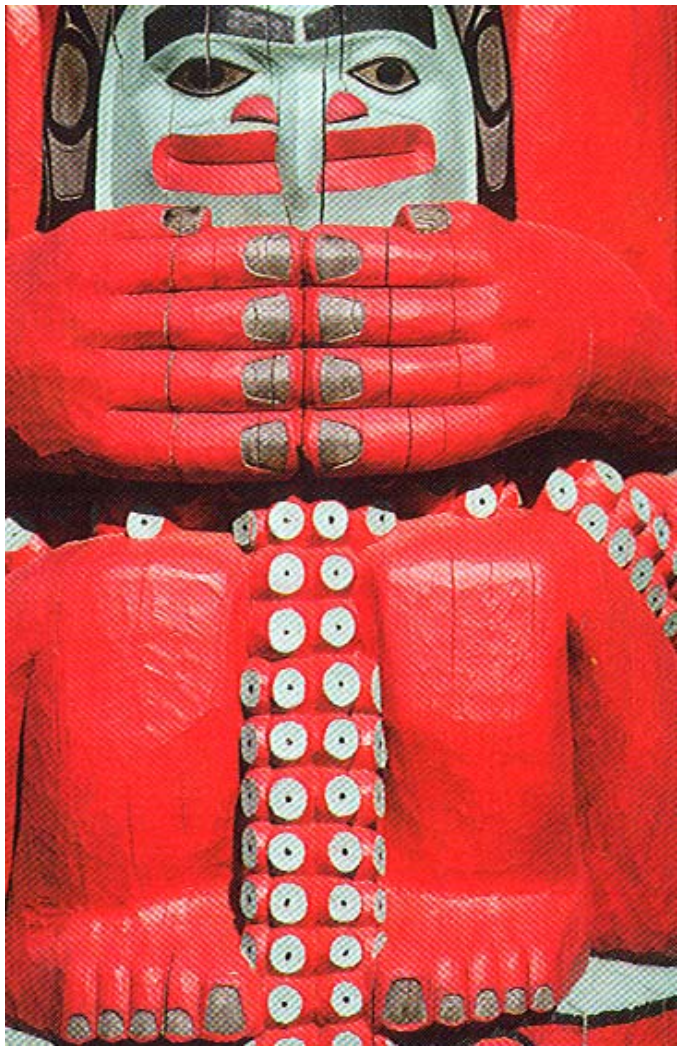
What is the intent behind these color choices?

- **Feeling of being In the Core**
- **Intensity of Action -hotness**
- **Alertness –things are happening**

What is the intent behind these color choices?



What is the intent behind these color choices?



I have no idea, I don’t have the necessary cultural experience.

What is the intent behind these color choices for Egyptian Currency?

I have no idea, I don't have the necessary cultural experience.

What is the intent behind these color choices?

Ahh, now I get at least some of it. These colors connote antiquity and evoke feelings of national identity by referring to ancient cultural structures.

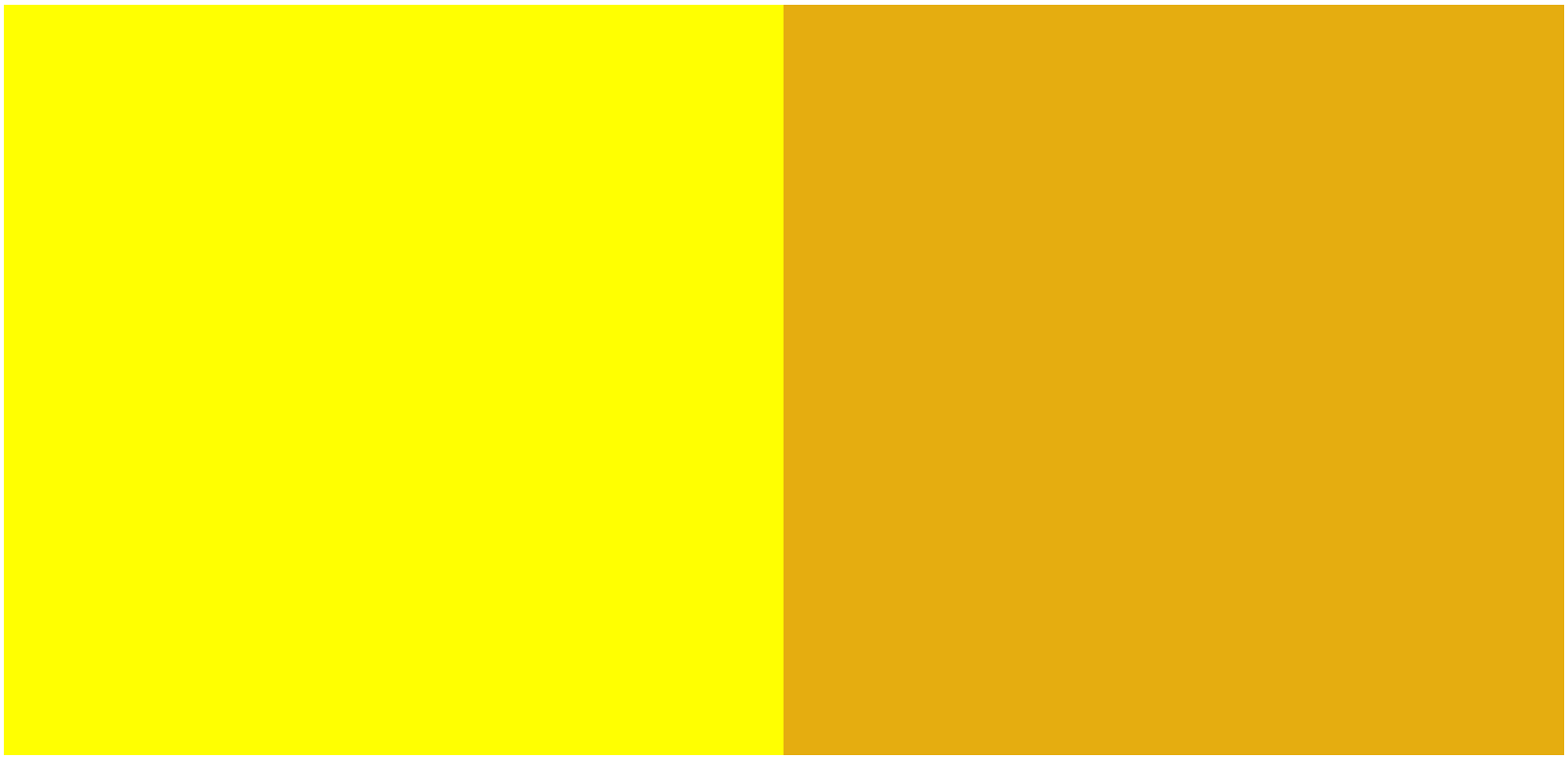
Color Affecting Color

Colors aren’t only contextualized through subject matter. They are also contextualized through other colors.

Juxtaposition changes how color is perceived…

Is this a rich butterscotch mocha…

Juxtaposition changes how color is perceived…



Or a Dirty Yellow?

Temporal sequence changes how color is perceived…

Is this a pure grey…

Temporal sequence changes how color is perceived…

Temporal sequence changes how color is perceived…

Or a cool grey?

Synesthesia

Synesthesia

The faculty to receive stimuli through one sense, sight, for example, and perceive it through another, hearing, for example.

Synesthesia

Wassily Kandinsky heard blaring trumpets when he saw bright yellow.

Synesthesia

Milk = Milk

Synesthesia

452-6220 = 452-6220

Synesthesia

“bzzzzzzzz” =

We are each a ‘synesthese’. It’s a subtle condition for most of us…

Which is Kiki and which is Booba?

Okay, okay, but what is the real applicable use of color theory?

Classic Color Theory

Color Theory Helps Devise Ways to:

LIMIT COLOR PALETTES

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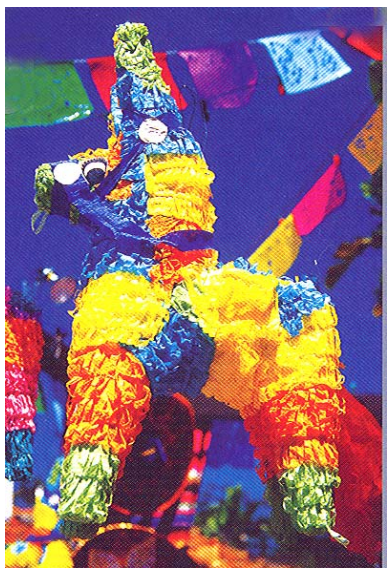
LIMIT COLOR PALETTES



So everything is not a piñata...

Color Theory Helps Devise Ways to:

LIMIT COLOR PALETTES

&

AND COORDINATE THEM.

But first ask:

Why Add Color at all?

Understanding Comics

Black and white images are like a visual shorthand, where we have to fill and color them in with our imagination.

Understanding Comics

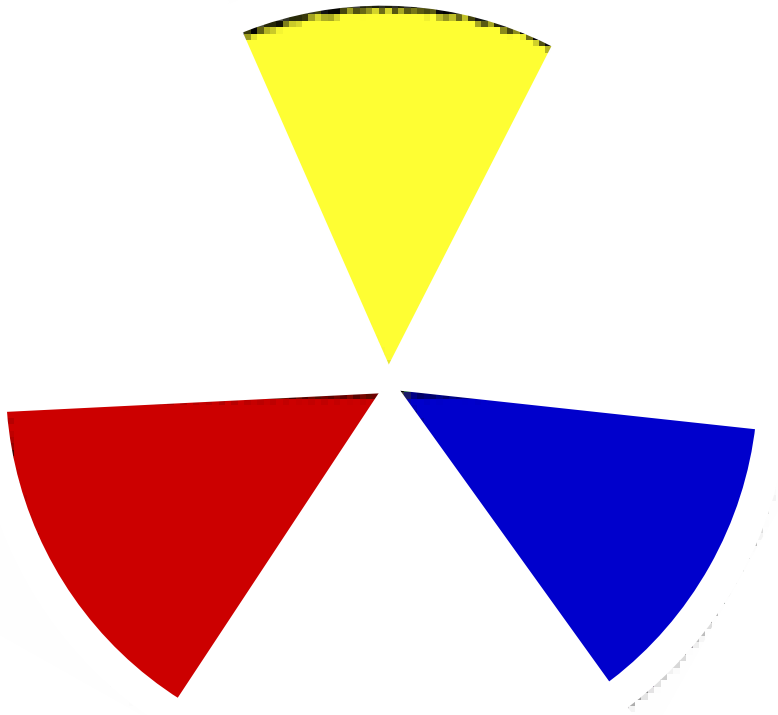
Black and white images are like a visual shorthand, where we have to fill and color them in with our imagination.

Colored images force us to see the subjects' shape and form. Color turns things into objects with weight and substance.

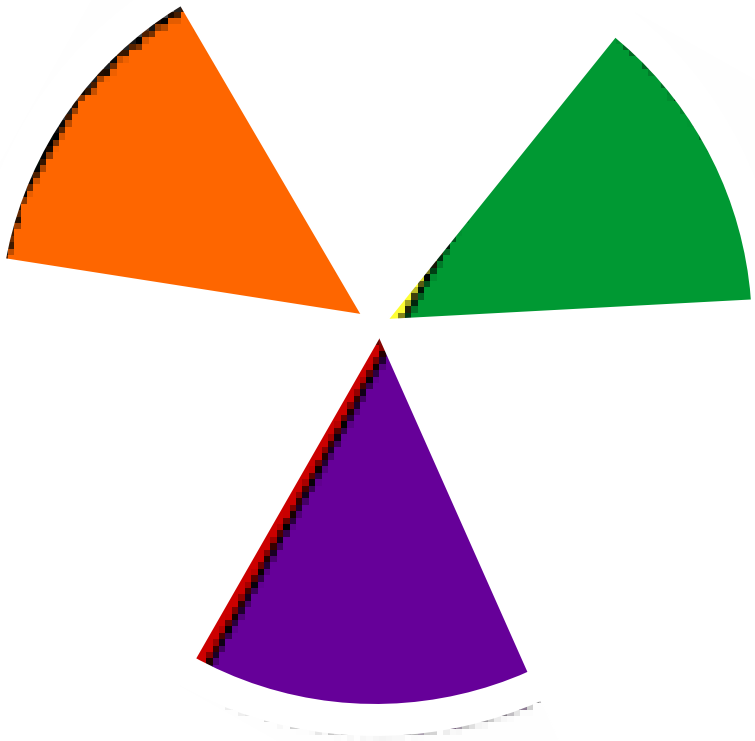
MENU

Color Wheel

Primary Colors

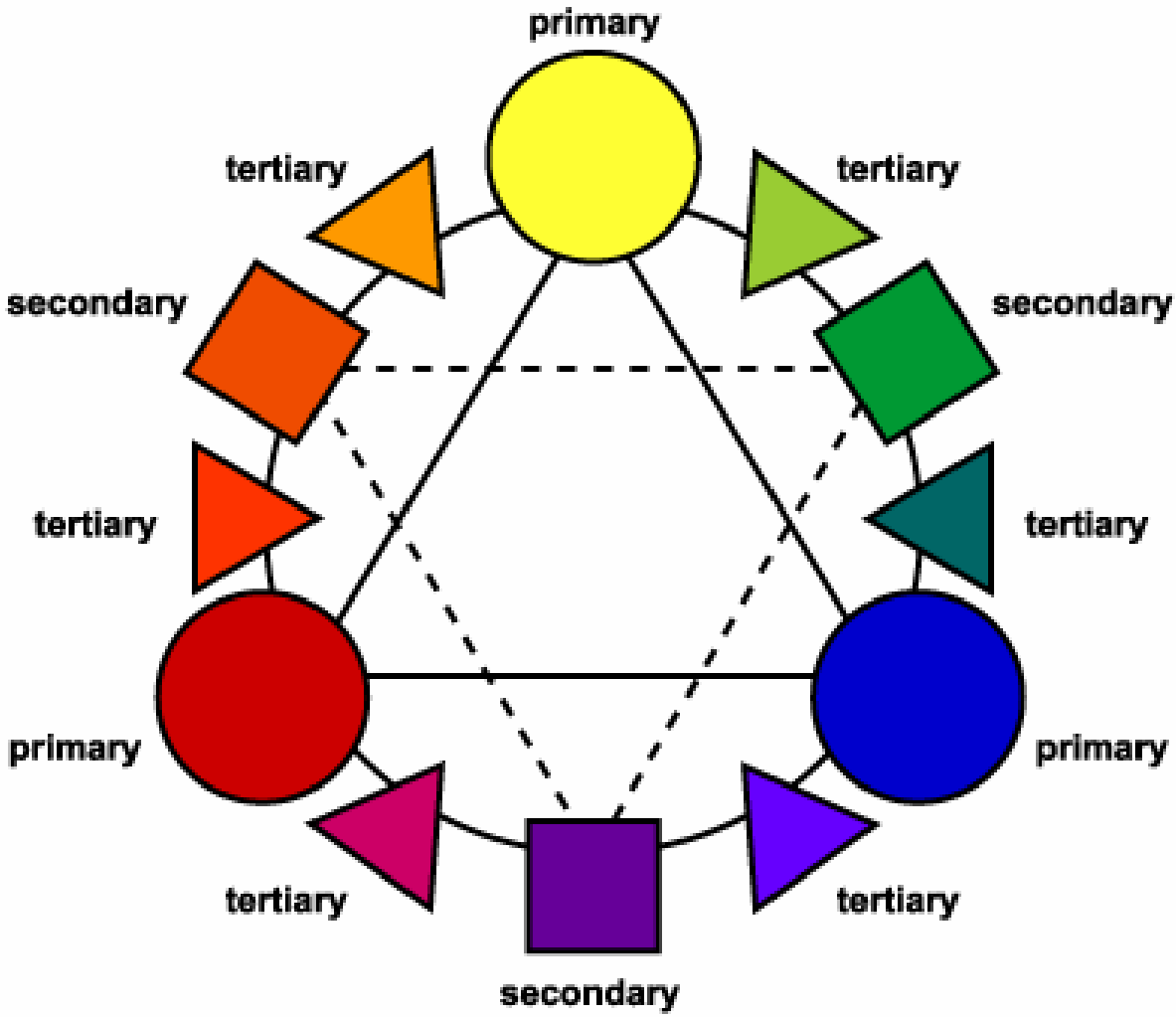


Secondary Colors



Tertiary Colors

Primary, Secondary and Tertiary Colors



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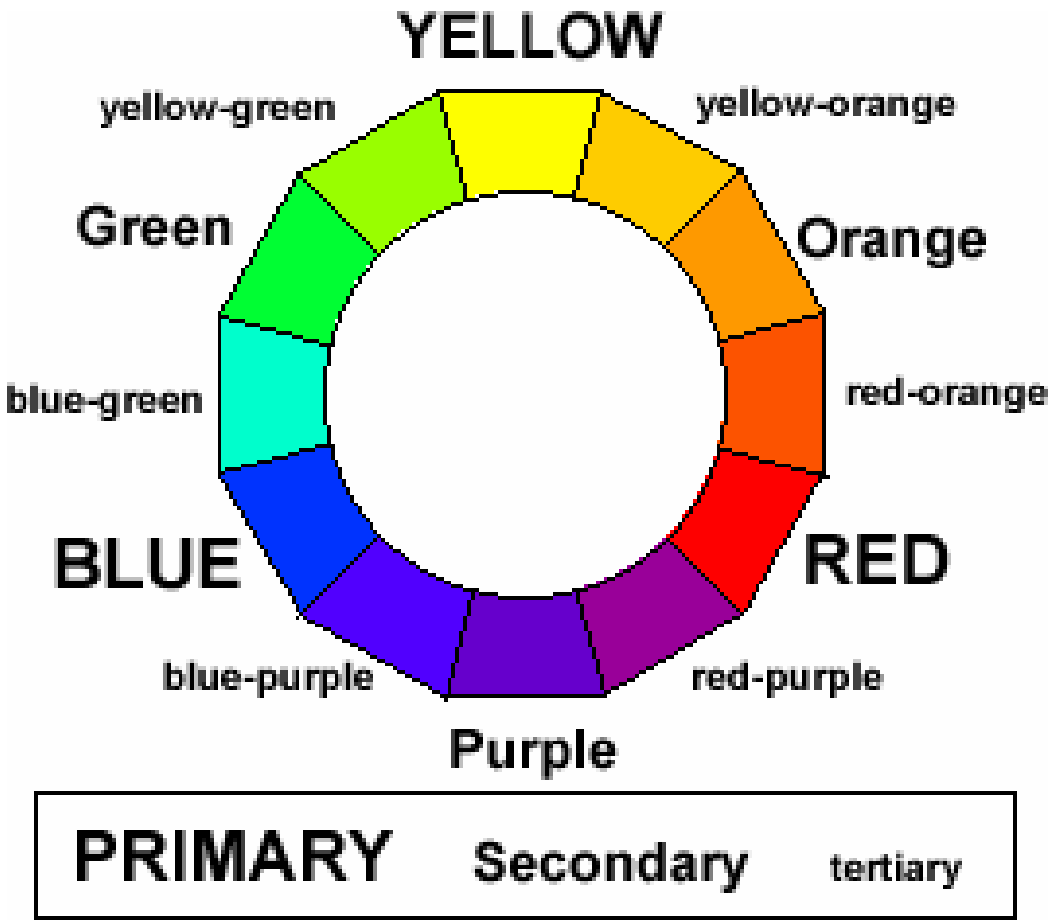
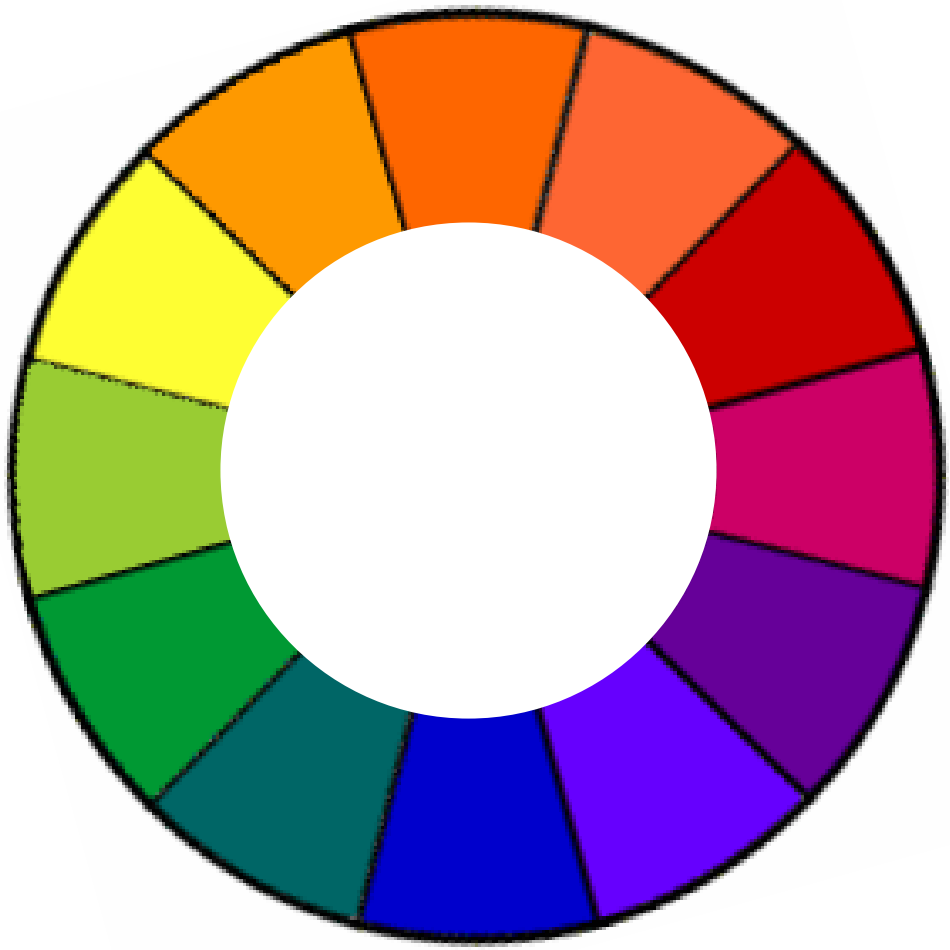
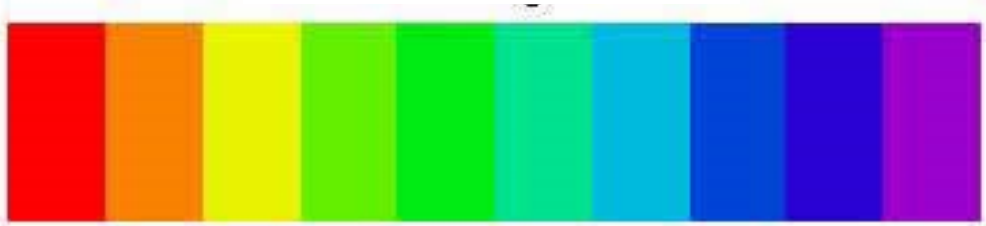


Standard 12-Color Wheel



Three Characteristics of Color

Hue

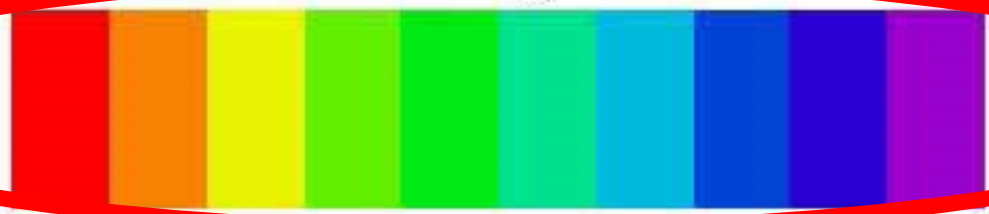


Saturation

Value

Classic Color Theory predominantly concentrates on Hue rather than Saturation and Value.

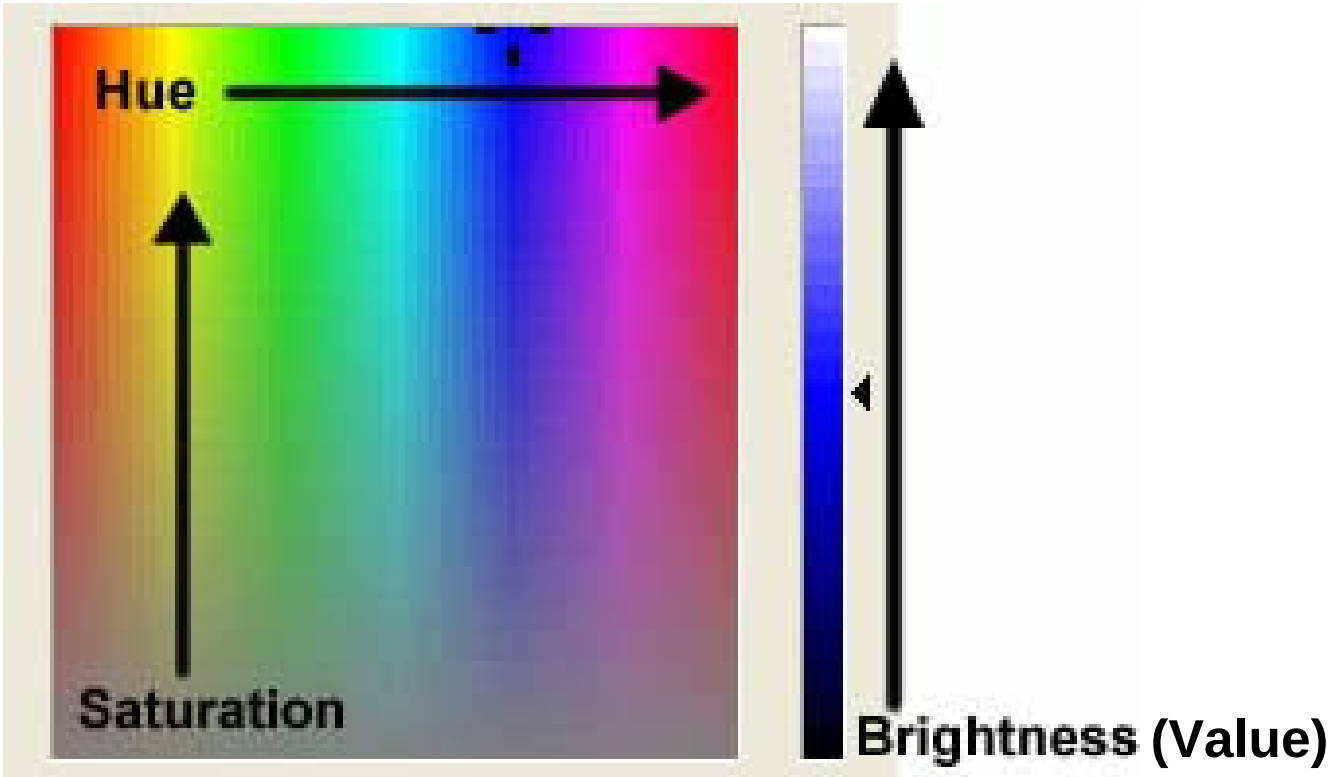
Hue



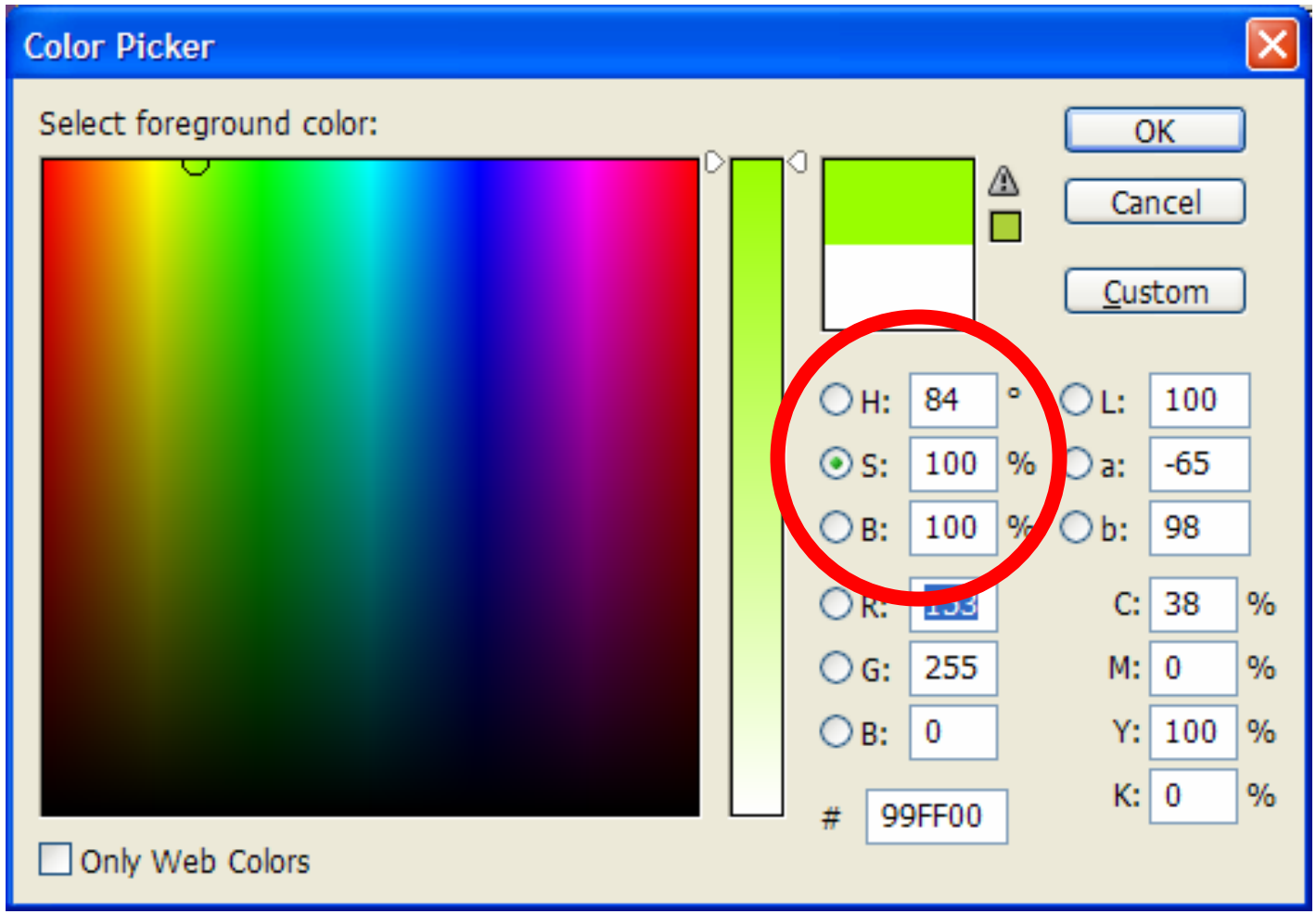
Saturation

Value

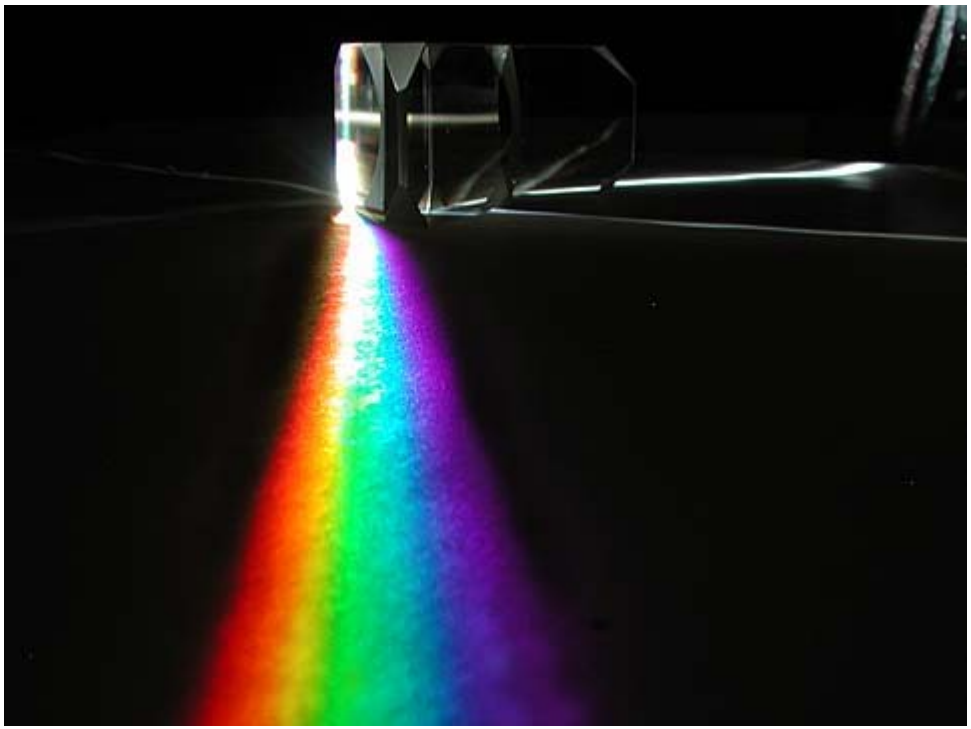
Hue, Saturation and Brightness (Value) in the Photoshop/Illustrator Color Picker

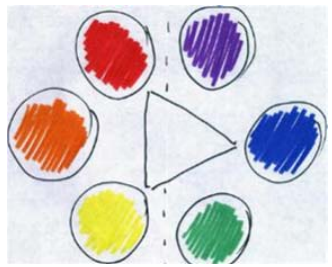


Hue, Saturation and Brightness (Value) in the Photoshop/Illustrator Color Picker



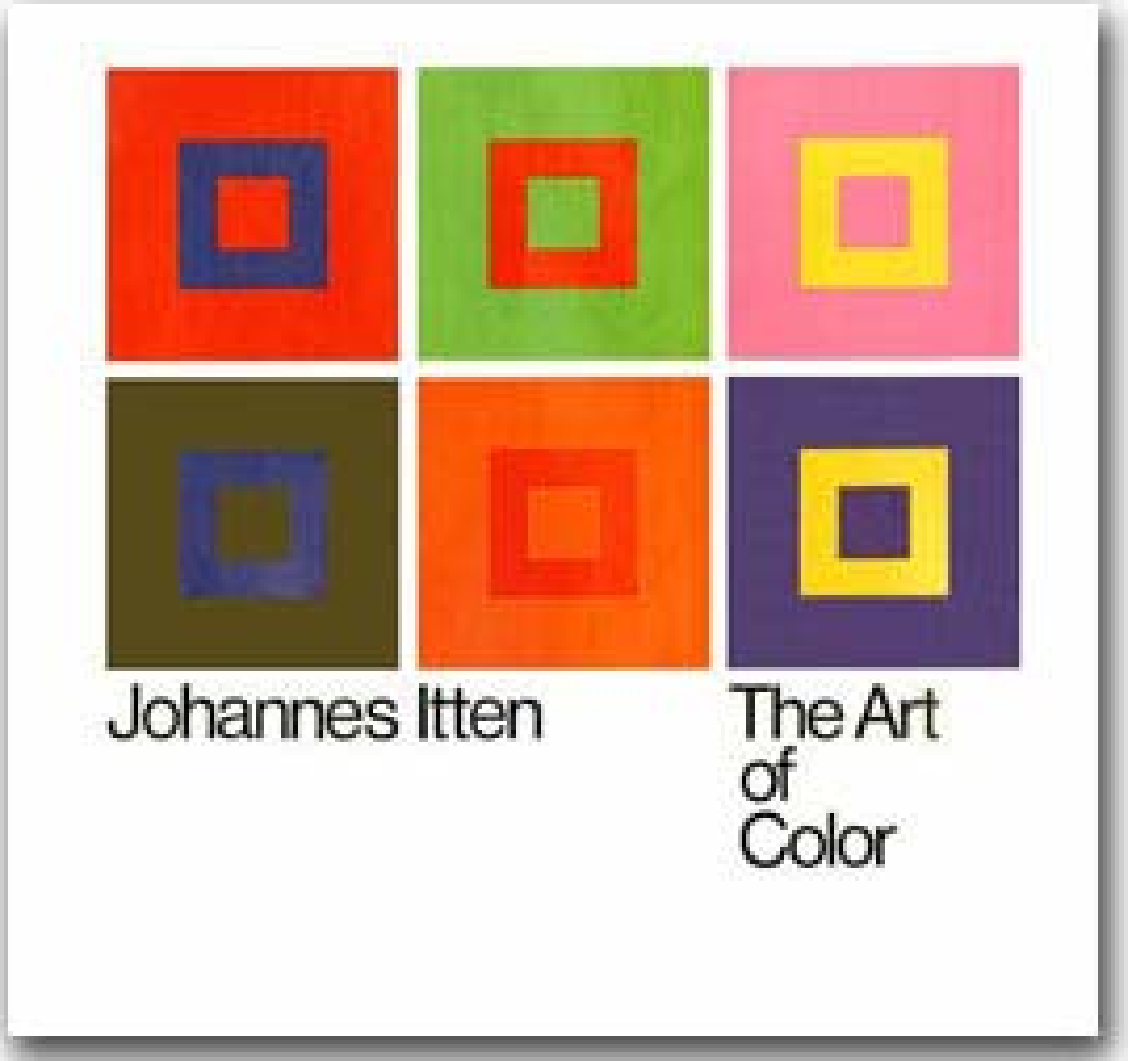
The First Color Wheel





Sir Isaac Newton created the first color wheel resulting from his experiments with refracting light.

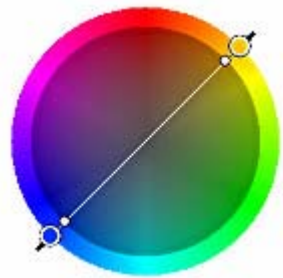
Classic Color Theory



Classic Color Theory Overview

According to color theory, harmonious color combinations use:

Classic Color Theory Overview



According to color theory, harmonious color combinations use:

Any two colors opposite each other on the color wheel.

Classic Color Theory Overview

According to color theory, harmonious color combinations use:

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Any group of colors next to each other on the color wheel.

Classic Color Theory Overview

According to color theory, harmonious color combinations use:

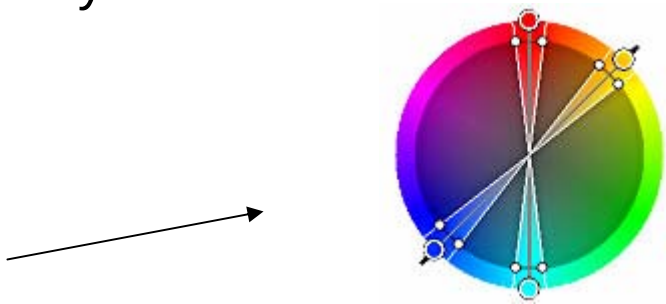
Any two colors opposite each other on the color wheel.

Any group of colors next to each other on the color wheel.

Any three colors equally spaced around the color wheel forming a triangle.

Classic Color Theory Overview

Any four colors forming a rectangle.



Classic Color Theory Overview

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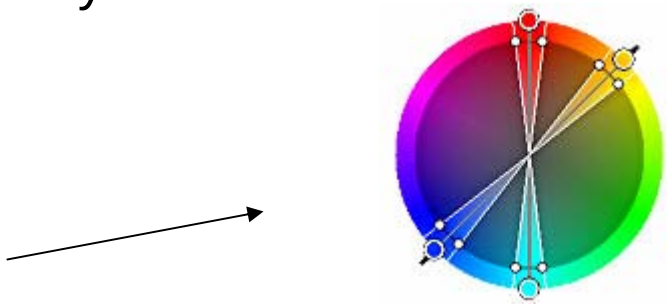
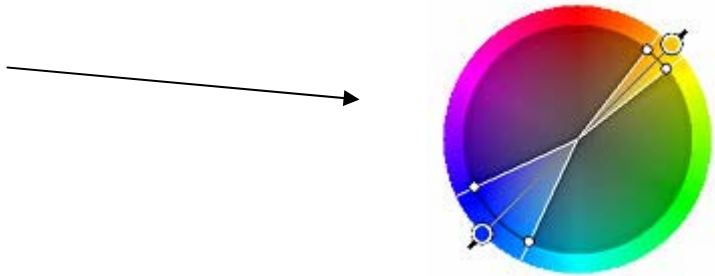


The split of one color’s complement.



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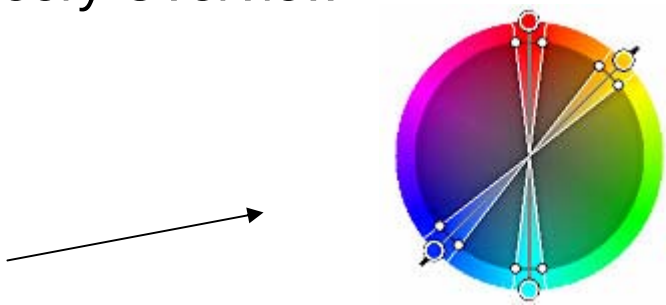

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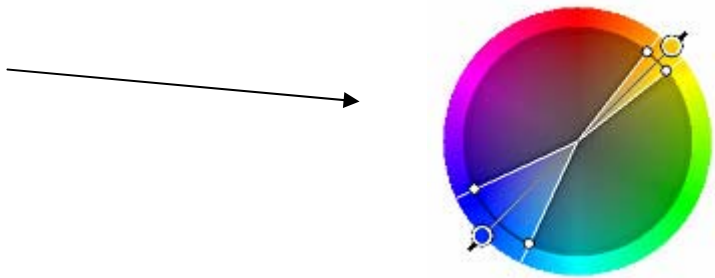
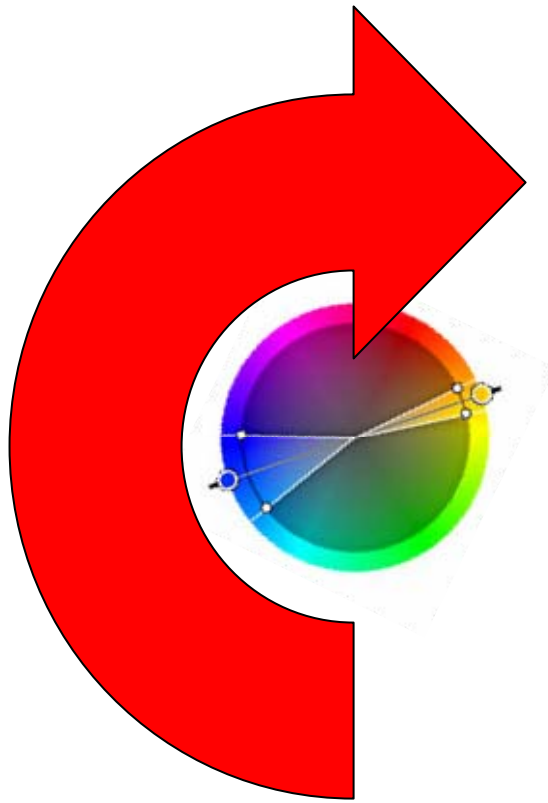


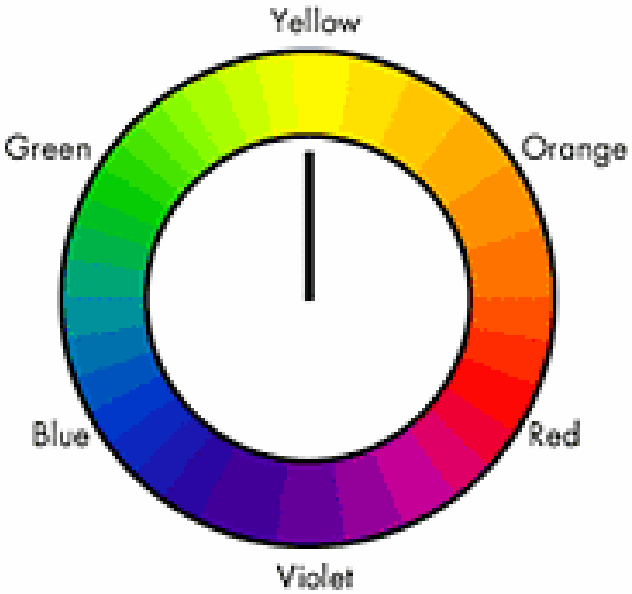
Monochromatic combinations.

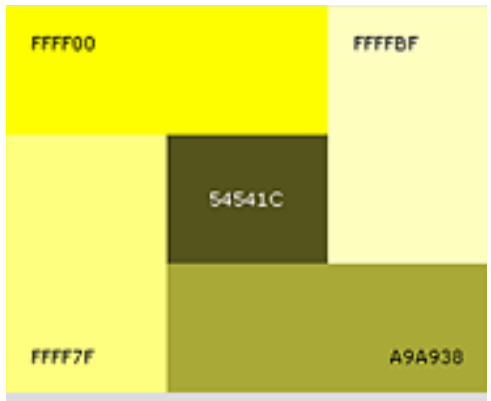
Classic Color Theory Overview

Color schemes remain harmonious regardless of the rotation angle of the configuration.



Monochromatic





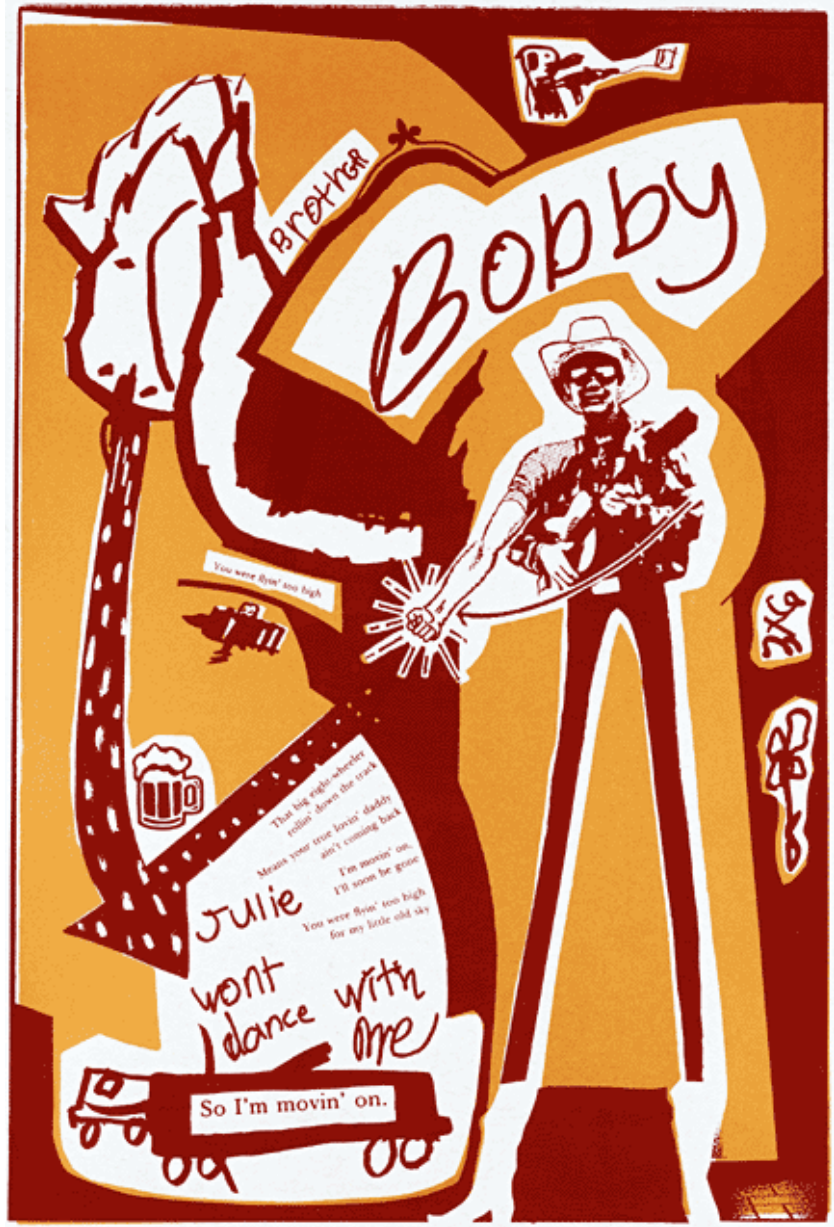
Monochromatic color schemes are guaranteed to be harmonious as they are a single color with variations of value and saturation. They have the highest degree of harmony, but the lowest degree of contrast. Since they grab your attention less than any other color combination they’re usually used for more reserved, corporate, expensive, or nostalgic types of designs.

However, as all rules are there to be broken.

Monochromatic Design

The subtle color scheme of this design makes other elements more prominent. If the colors contrasted each other in their hue we wouldn't notice the strange imagery as much. Being of the same color the imagery seems to share presence.

Monochromatic Design



How does monochromatic design change our perception of it?

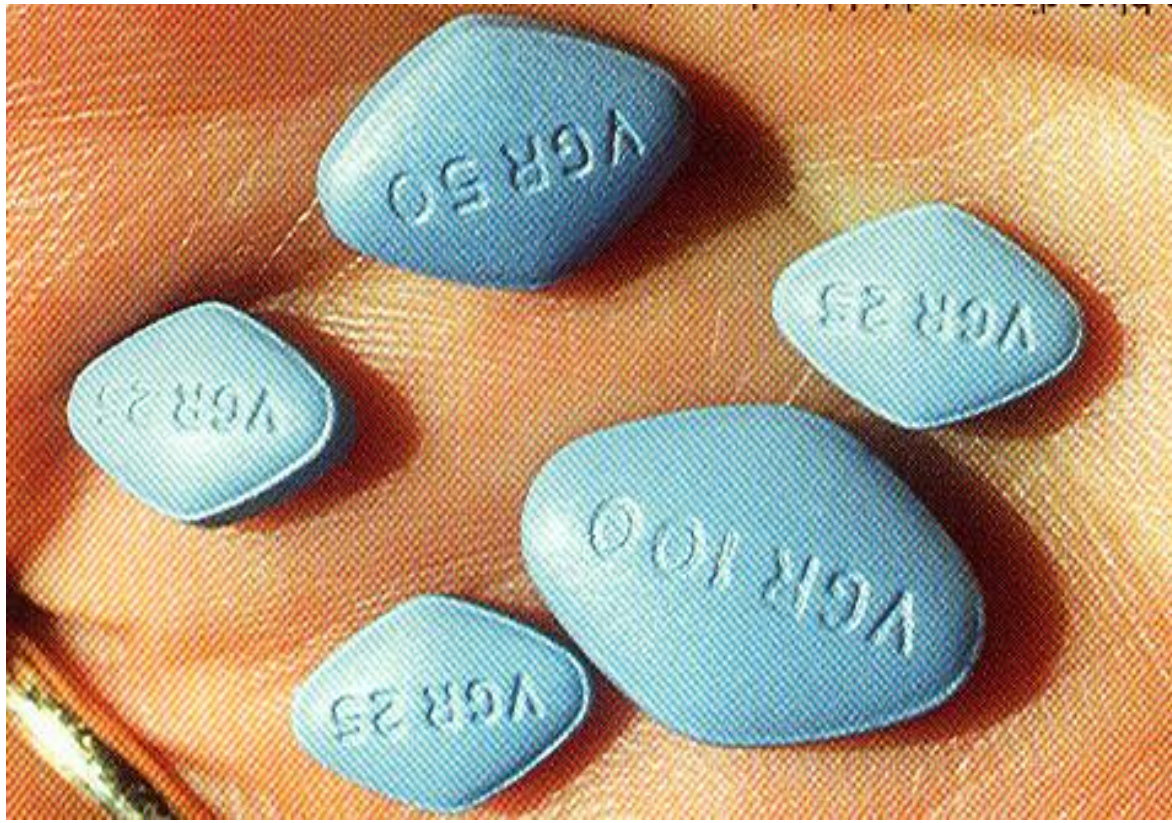
Monochromatic Design

How does monochromatic design change our perception of it?

Monochromatic Design

Red, Black and White is the strongest Monochromatic combination.

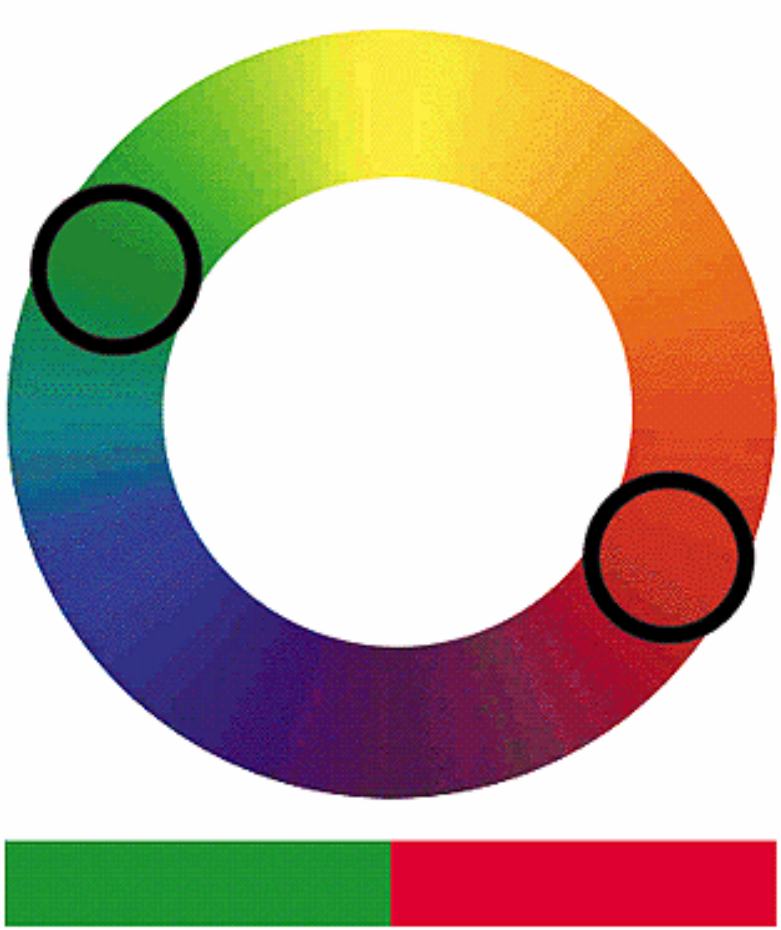
Monochromatic Design



Monochromatic Design

Complementary Colors

Any two colors 180 degrees opposite on the color wheel.



What is the definition of “complement”?

What is the definition of “complement”?

To complete or enhance each other.

What is the definition of “compliment”?

What is the definition of “compliment”?

To praise.

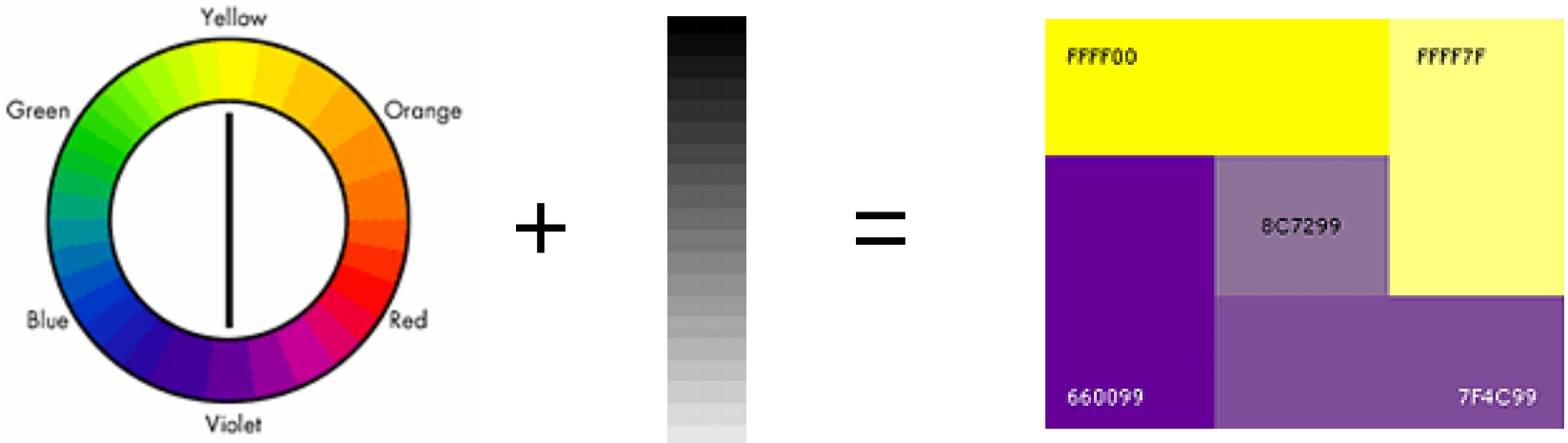
Complementary Colors

Complementary colors have the highest contrast. Because of this they are the boldest combination. Color compositions based on them usually work well, however they can sometimes be tiring to look at due high contrast.

Complementary Colors

Complementary Colors have the highest contrast (in terms of hue, not value).

Complementary Colors



Using Complements as a basis for a color scheme, but allowing variances of value will often help soften a complementary color scheme.

Painters mix Complementaries to Achieve Rich Vibrant Grays, Browns, and Neutral Colors…

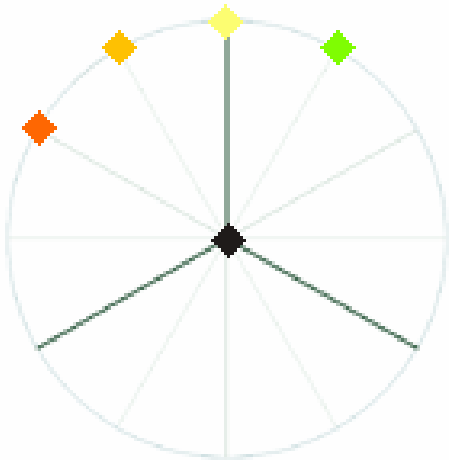
Hideous Complementary Colors

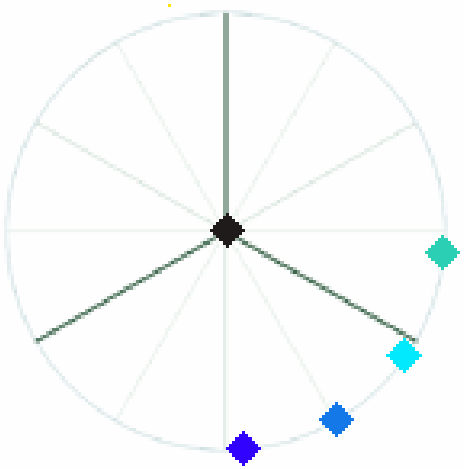
Classic color theory doesn't take color **value** into account. So, according to this theory, these two hideous compositions are technically the same as the complementary colors of magenta and green.

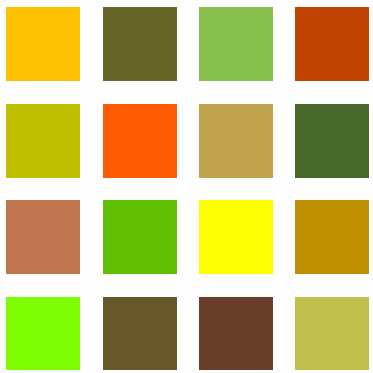
Analogous Colors

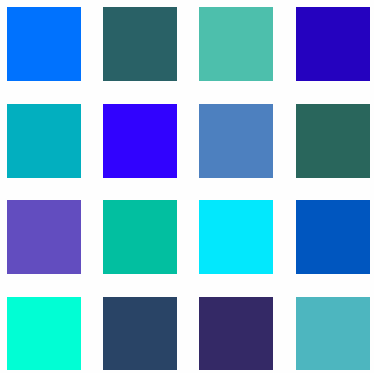
These are any number of colors that are adjacent on the color wheel.

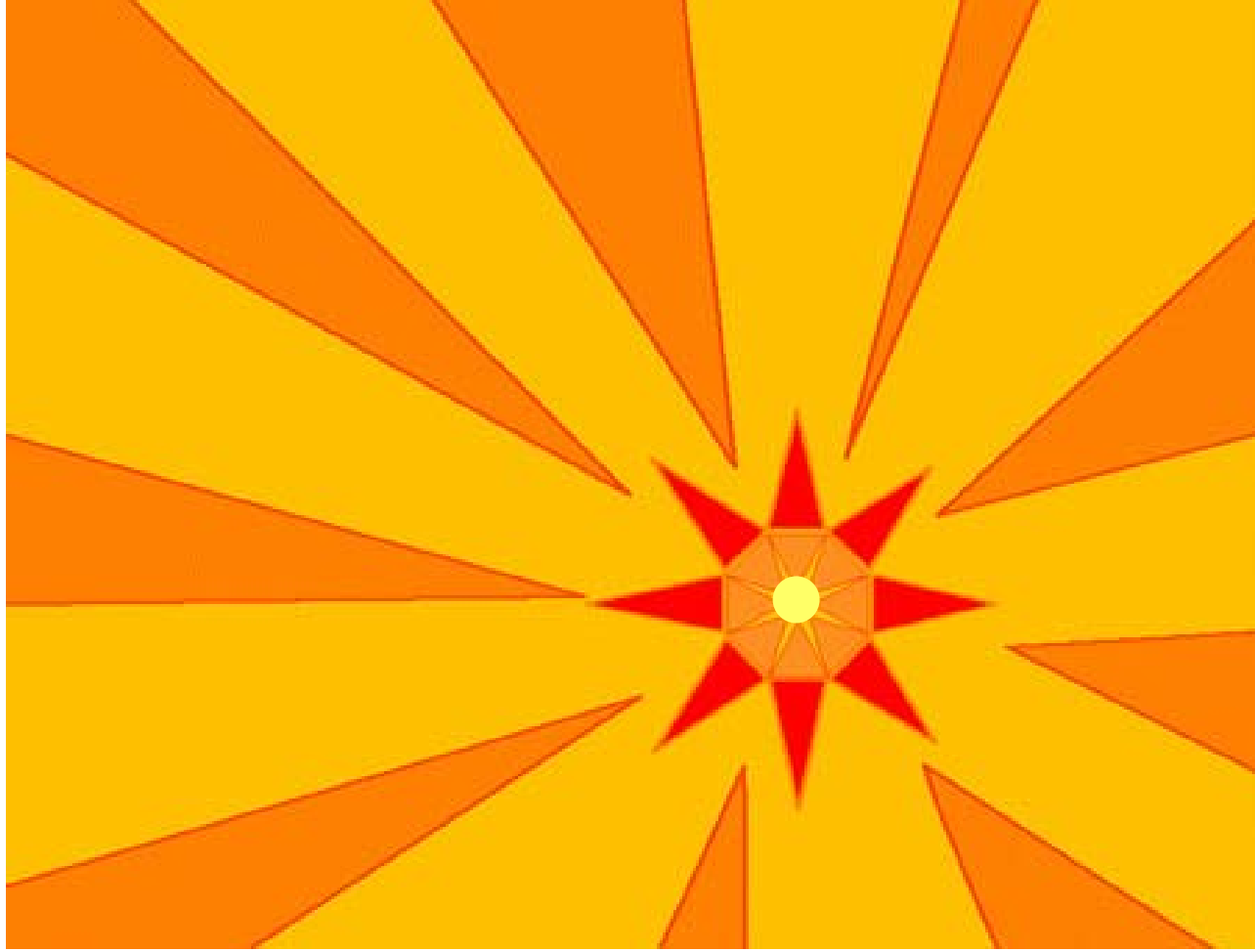
Analogous Colors











Analogous Colors

These combinations have an extremely high degree of harmony but low degree of contrast.

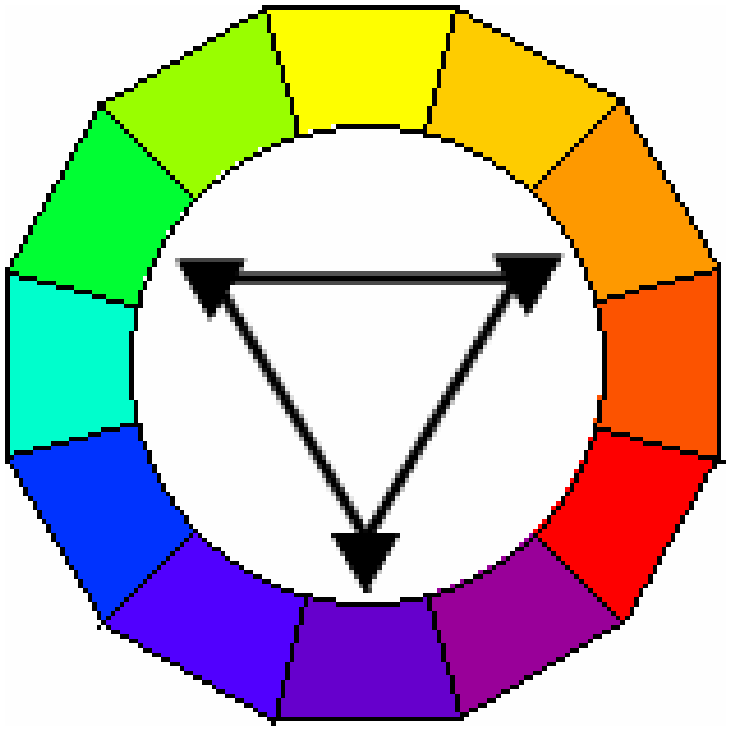
Analogous Colors

These can seem very drab. A complementary color could be added here for an accent that would empower the design

Analogous Colors
(with complementary accent)

These can seem very drab. A complementary color could be added here for an accent that would empower the design

Triadic Colors



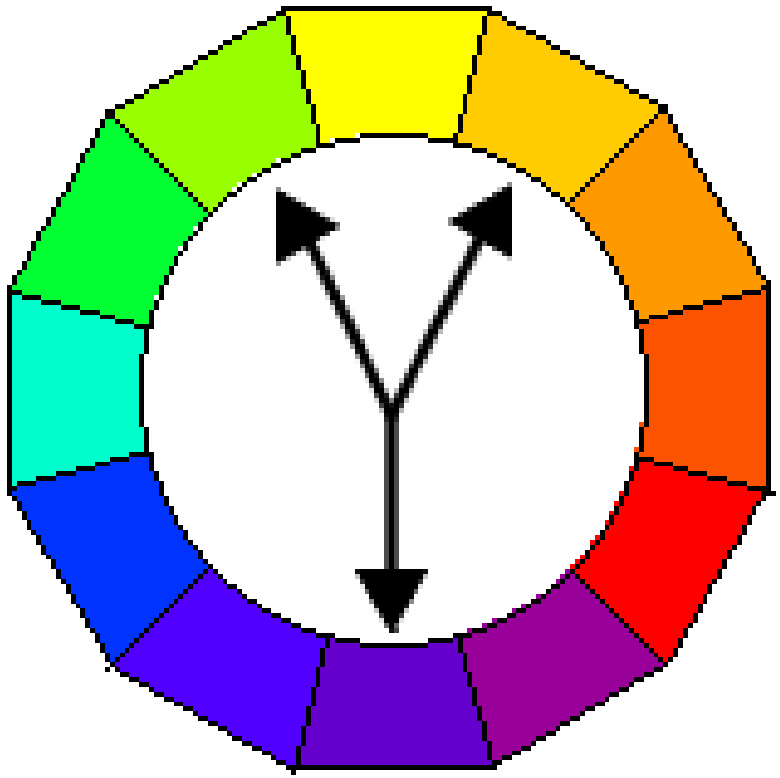
Triadic colors are any colors 120 degrees (one third of a 360 degree circle) apart on the color wheel.

The Triad of the Three Primary Colors are the most energetic and balanced color combination possible.

The Triad of the Three Primary Colors are the most energetic and balanced color combination possible. This combo draws intense interest. This combo is appealing to children and we've learned to associate this Triad with children.

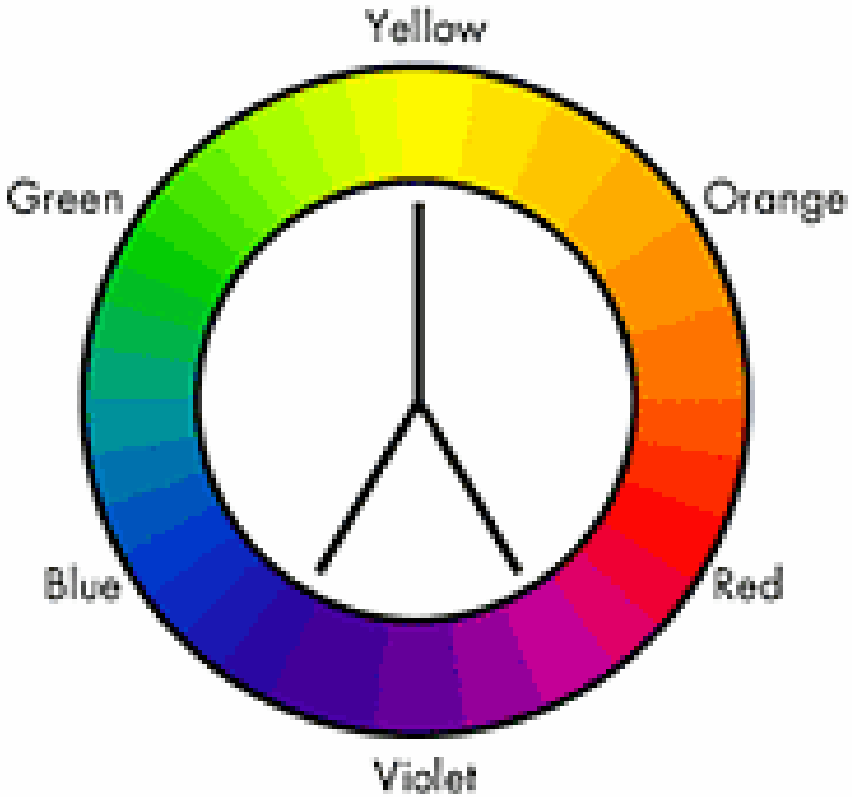
Is this true with the Burger King design as well?

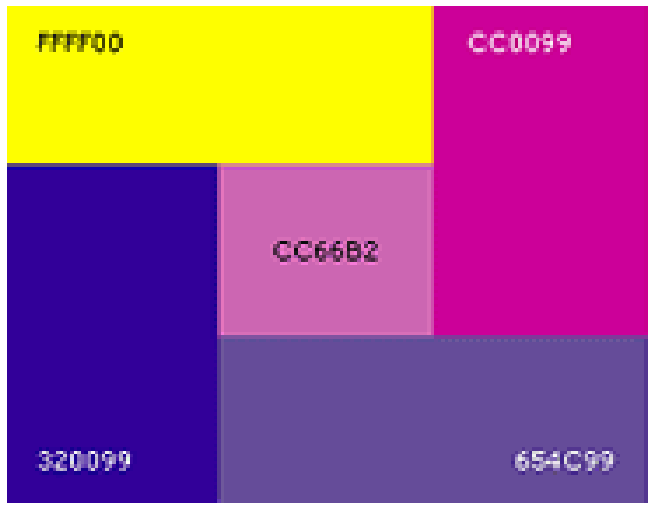
Split Complementary



This is a combination of two colors next to the opposite of the first color.

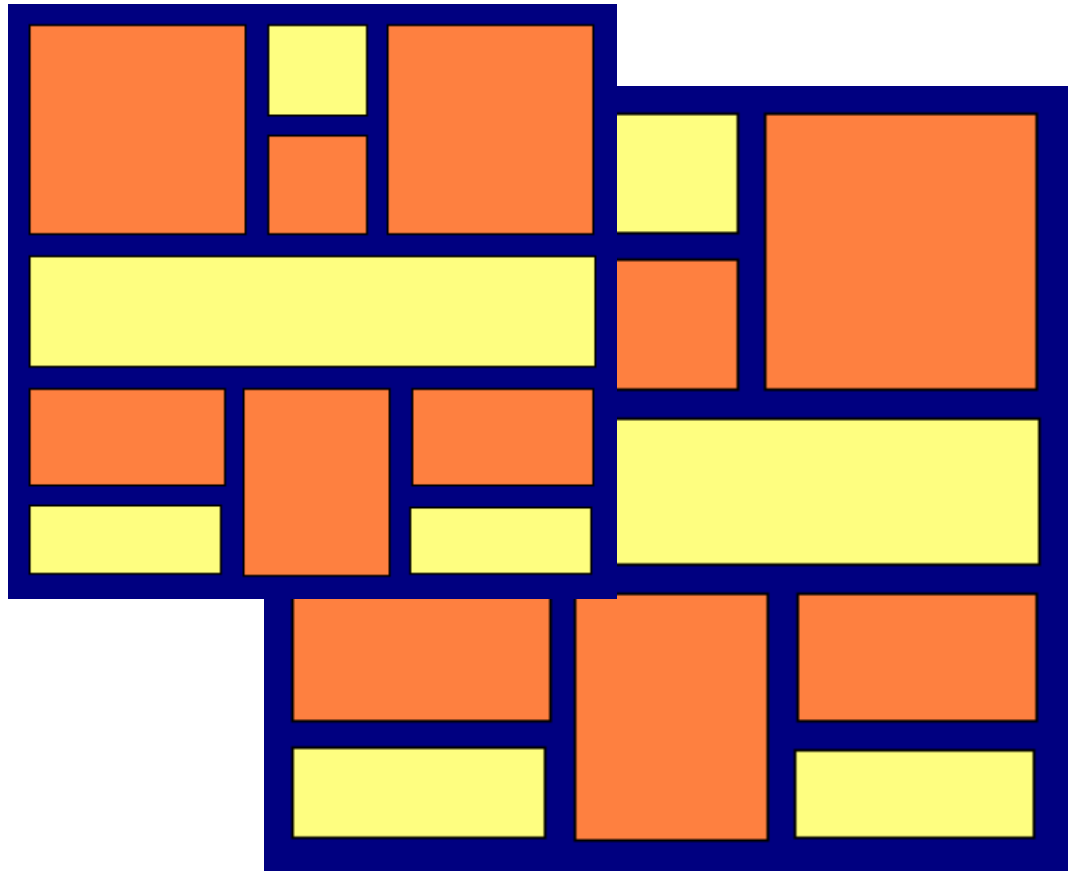
Split Complementary Colors

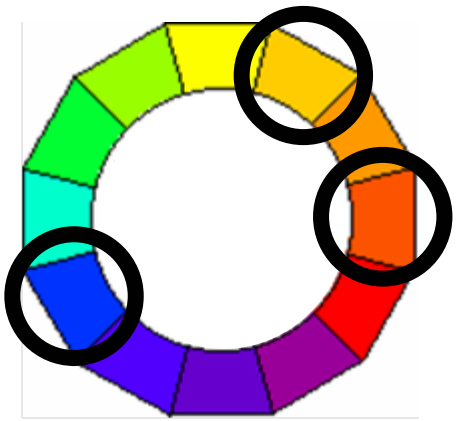




This is structure is dynamic enough to hold interest, but not with an excess of intensity of hue contrast from which the eye tires so easily.

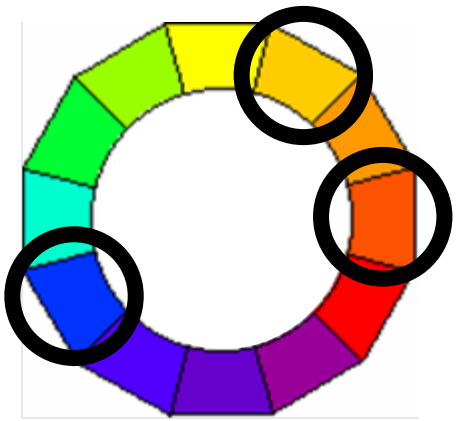
Split Complementary





This combination balances the interests of harmony and contrast, neither dominating the composition

Split Complementary



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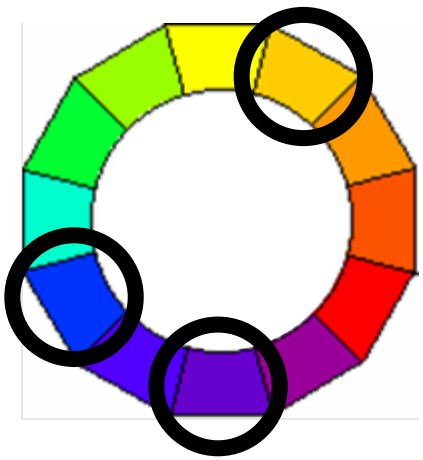
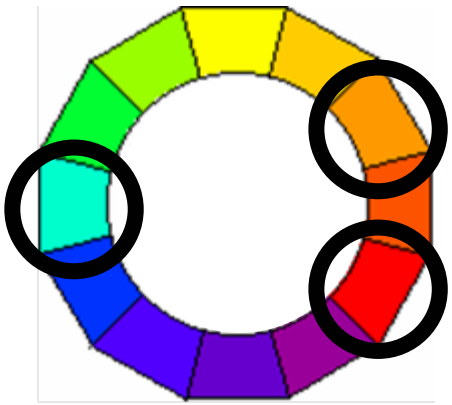
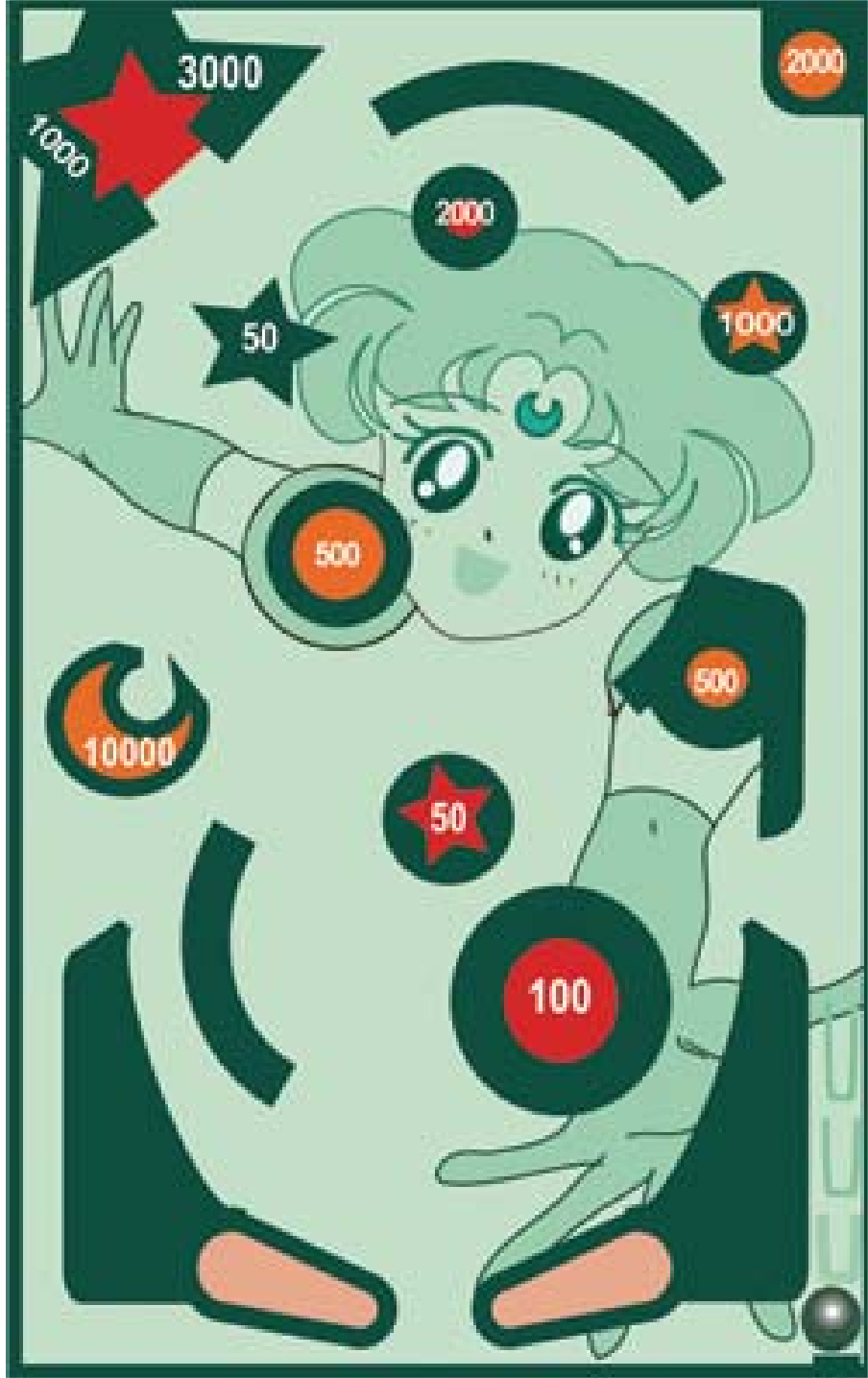
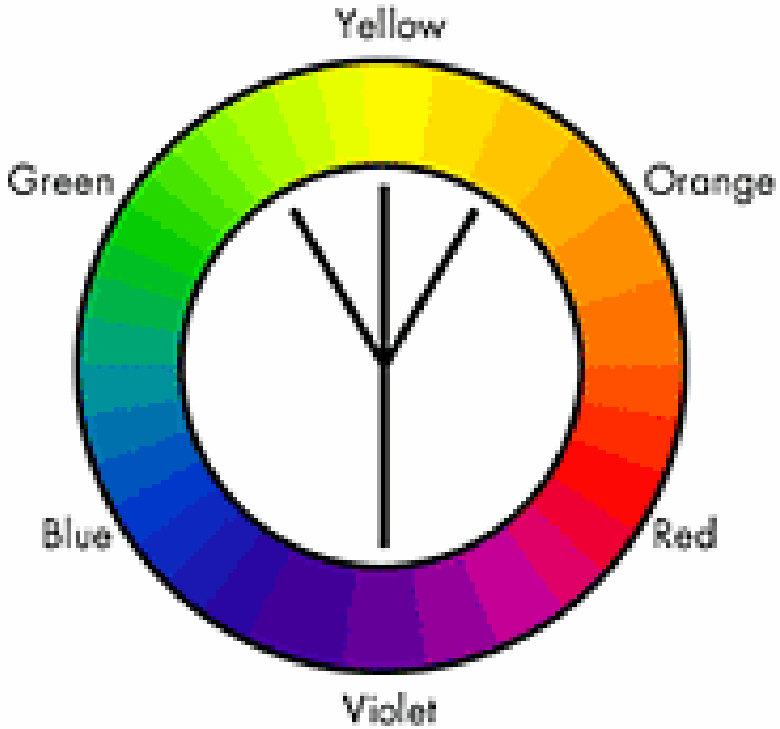


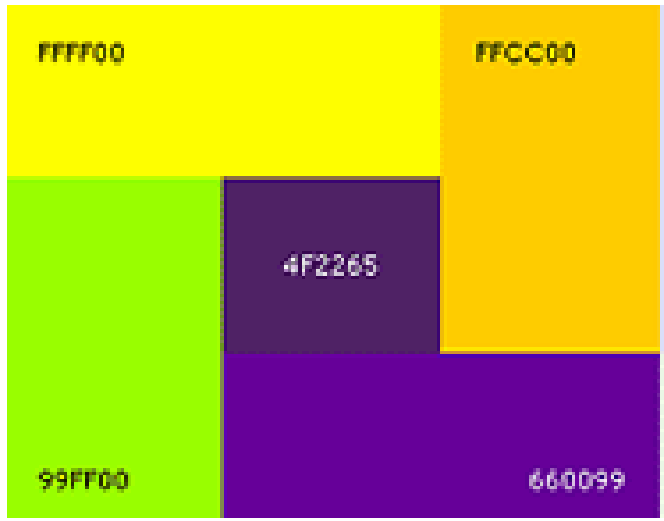
Split Complementary





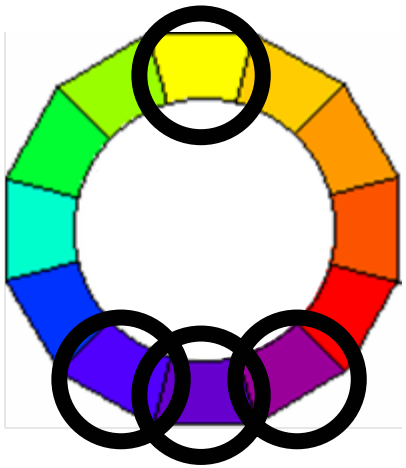
Analogous with a Single Complementary





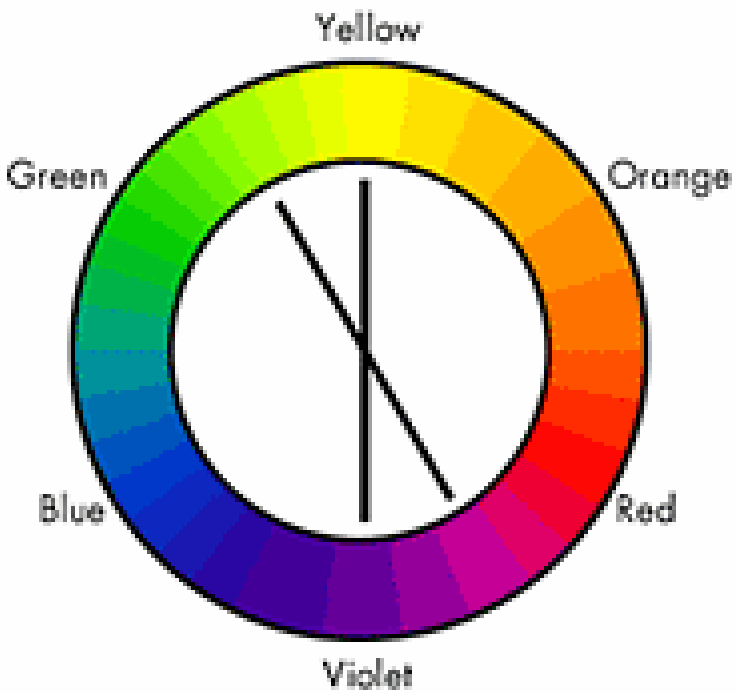
This usually is pretty striking combination as the analogous colors are of the strongest harmony, but the complement of the center color punches the composition with a dramatic accent.

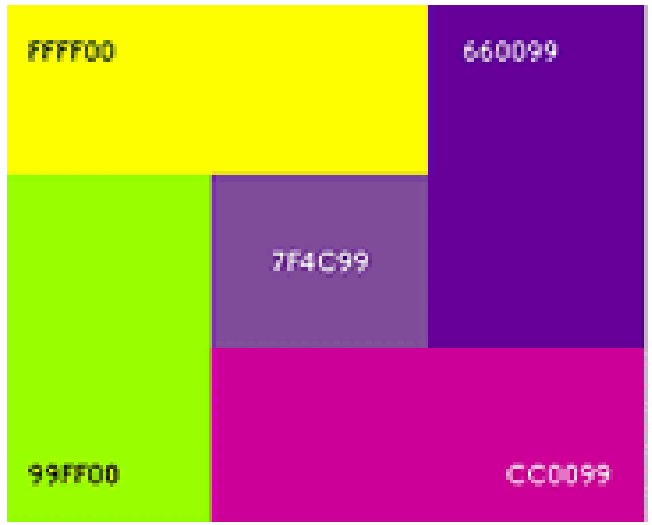
Analogous with a Single Complementary



This usually is pretty striking combination as the analogous colors are of the strongest harmony, but the complement of the center color punches the composition with a dramatic accent.

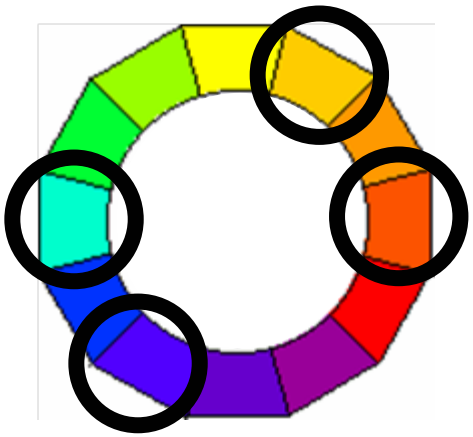
Double Complementary





Double complementary combinations are almost on the verge of breaking down into simply a panoply of color without any structure. However, since we can still intuitively grasp the structure of this combination it will retain a (weakened) harmony.

Double Complementary

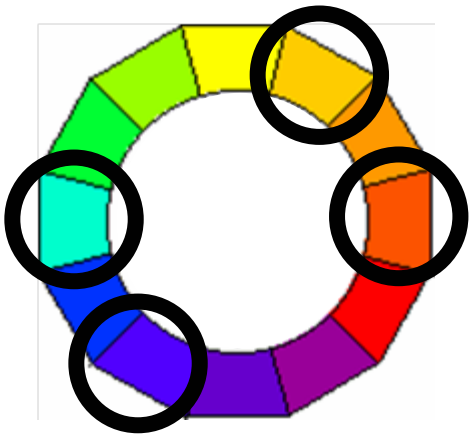


Double Complementary

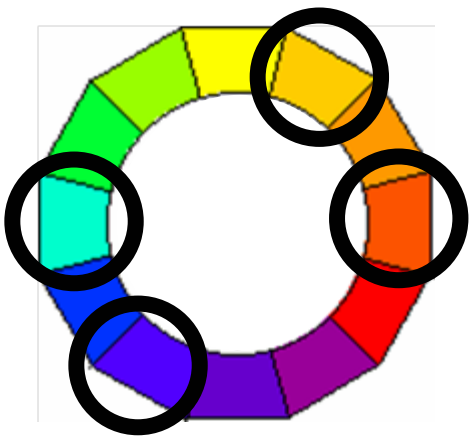
As opposed to seeing:

Cyan, Blue, Orange and Red

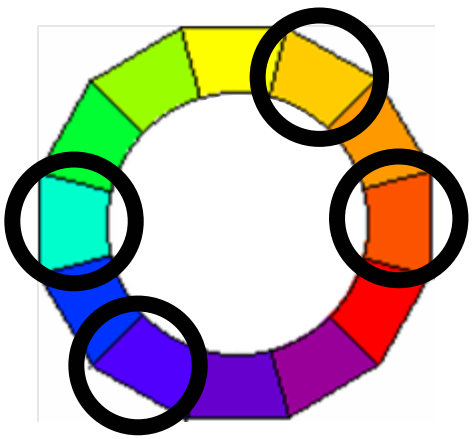
We might basically see: “every color except green and purple.”



Double Complementary

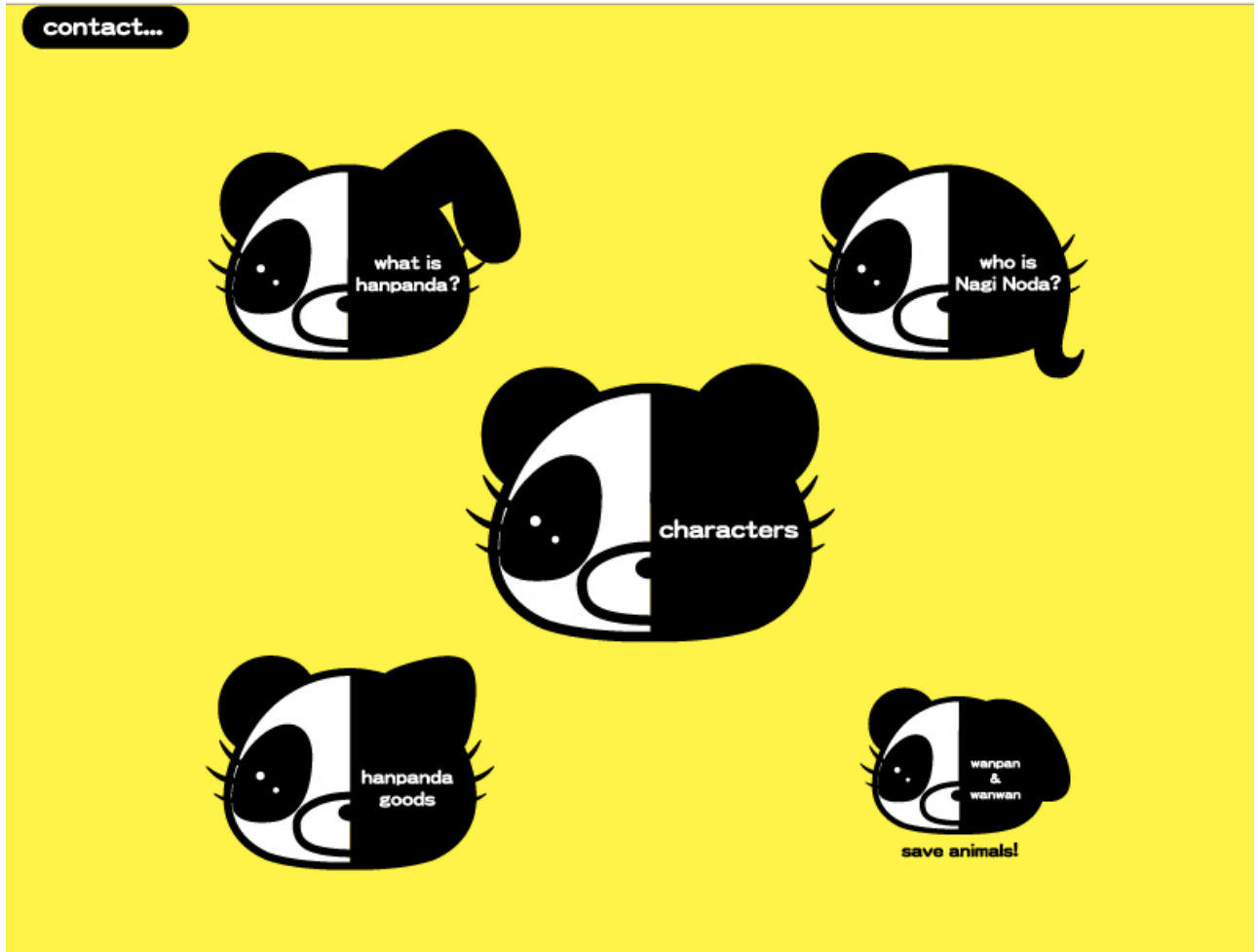


Since there are a wide range of colors in this design the **saturation** levels and **values** are both very light to harmonize it.

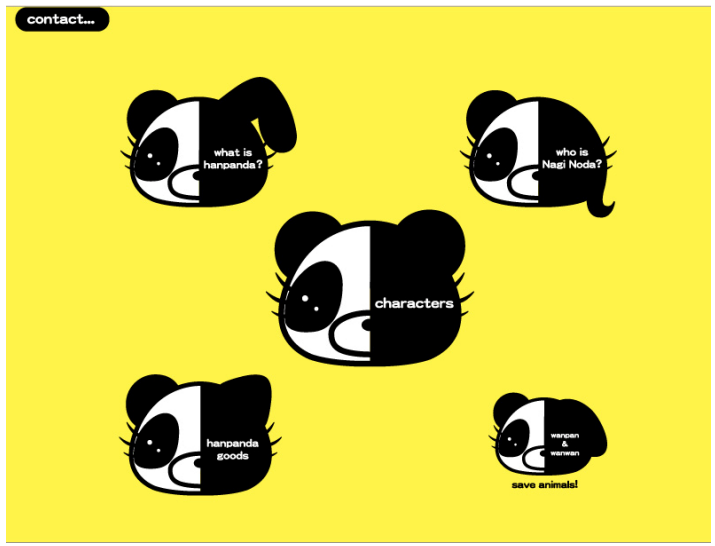


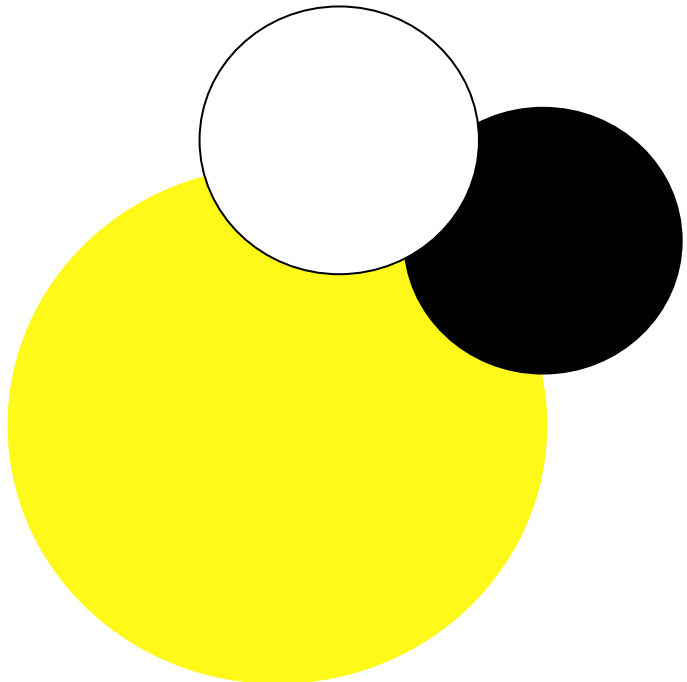
Quick Classic Color Theory Quiz

This is a _____ color combination.



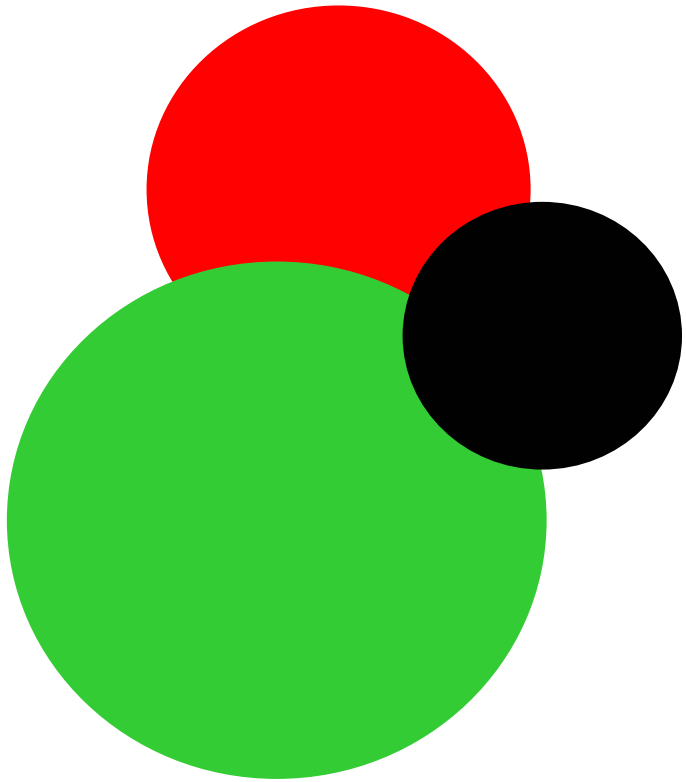
Monochromatic



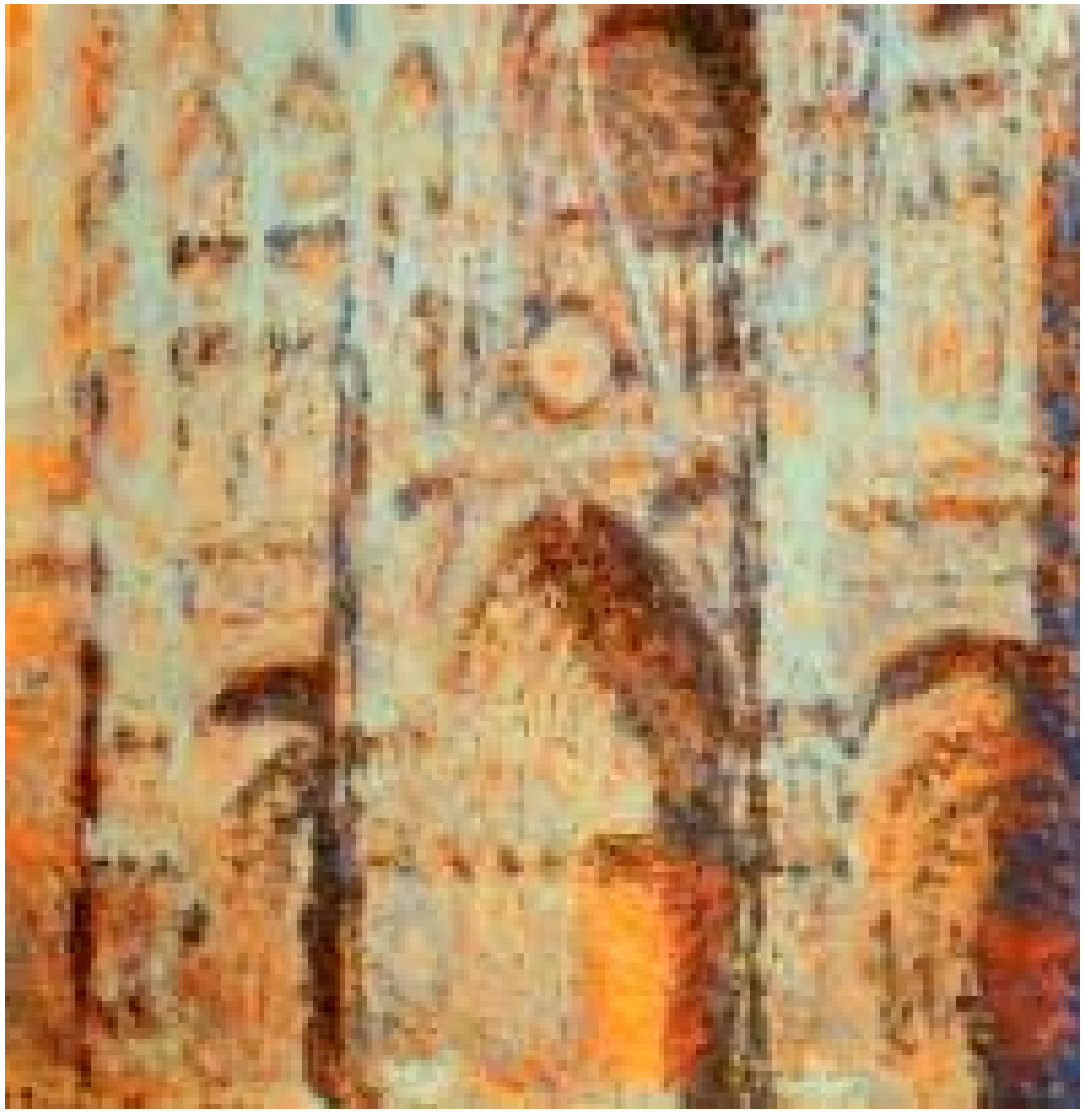


This is a _____ color combination.

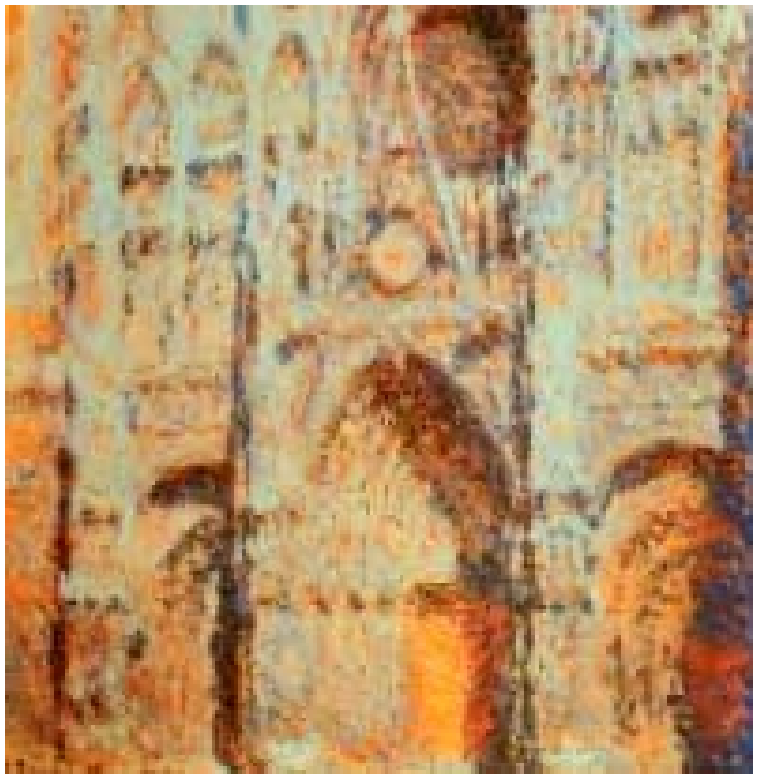
Complementary

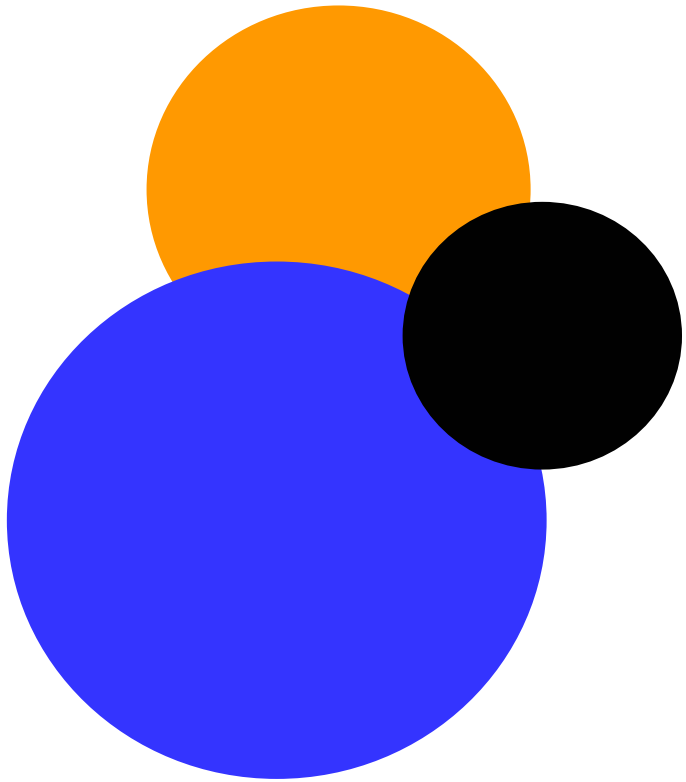


This is a _____ color combination.



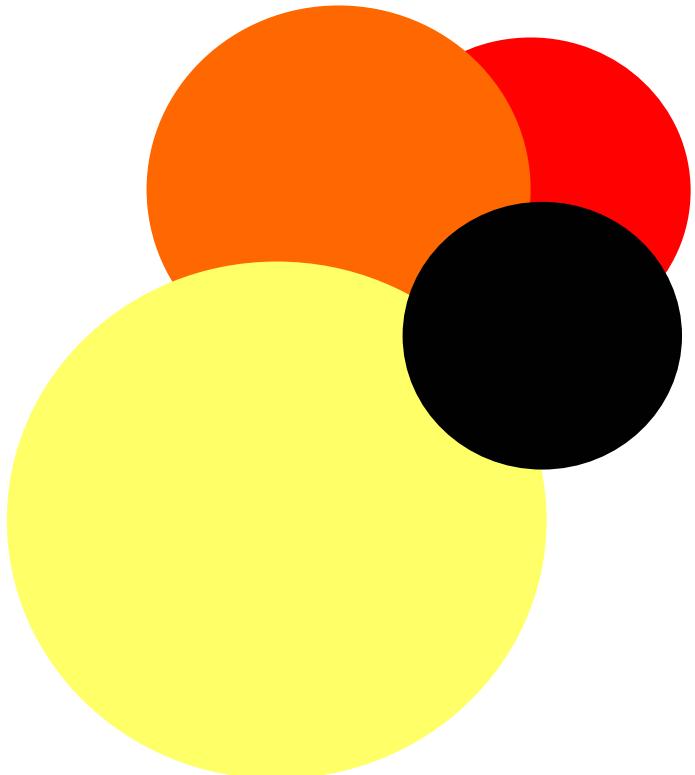
Complementary





This is a _____ color combination.

Analogous



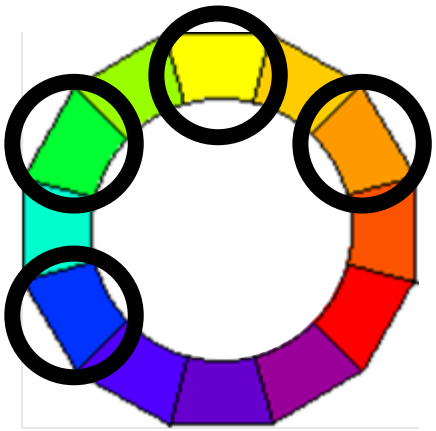
This is a _____ color combination.

Triadic

This is a _____ color combination.

Double Complementary

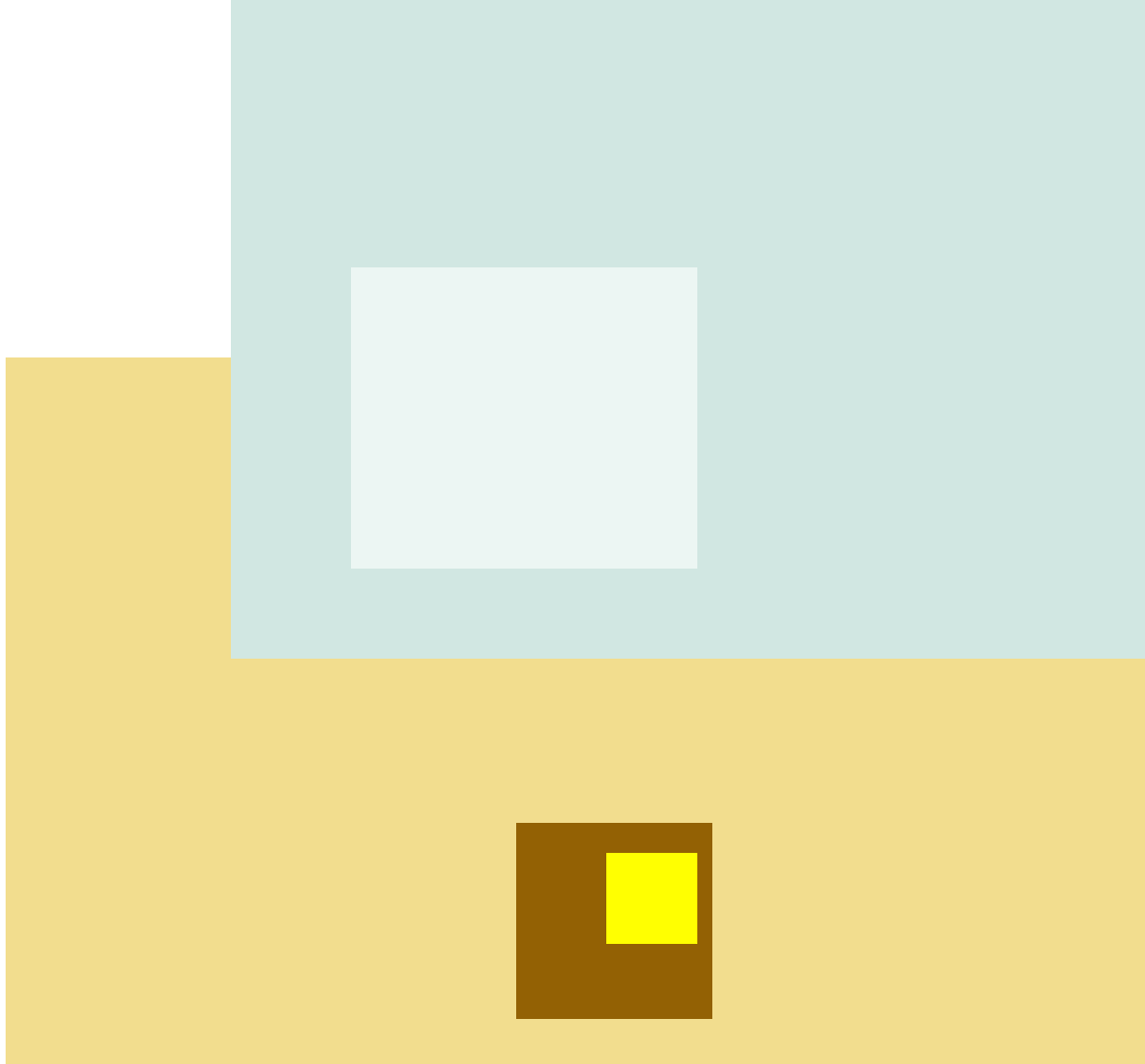
Invent New Color Combination Structures



Of course, you can always invent new combinatory structures. You could call this one ***Alternating Analogous***.

Invent Color Wheels

Invent Color Palettes

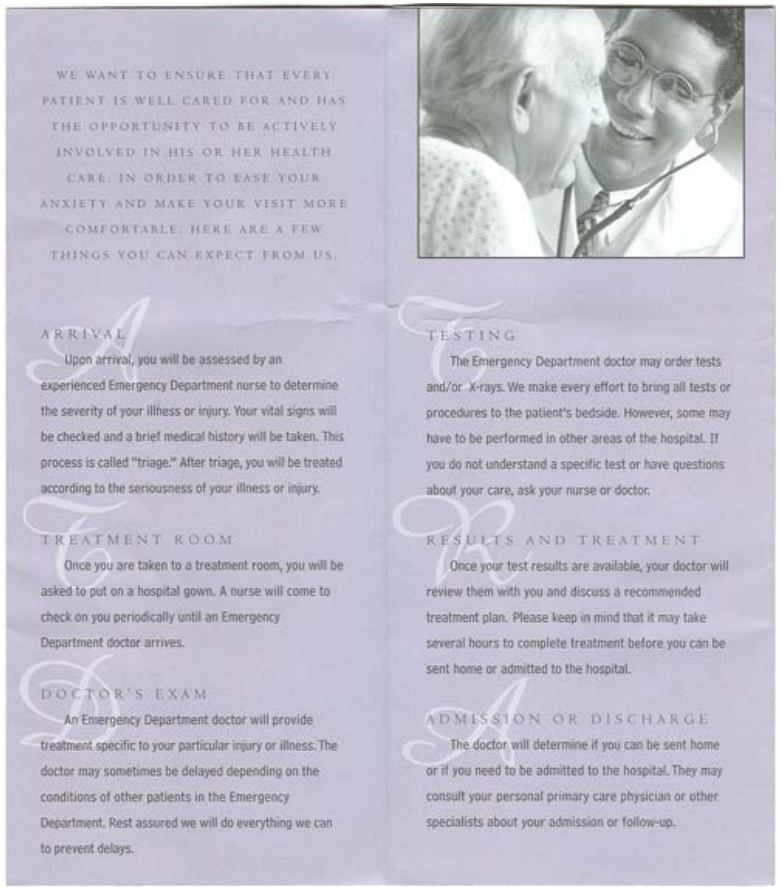


It’s All About **LIMITING YOUR COLORS**

in order to achieve the desired effect...

More Intent Behind Color Choices

What is the connotation of this color palette?



WE WANT TO ENSURE THAT EVERY PATIENT IS WELL CARED FOR AND HAS THE OPPORTUNITY TO BE ACTIVELY INVOLVED IN HIS OR HER HEALTH CARE. IN ORDER TO EASE YOUR ANXIETY AND MAKE YOUR VISIT MORE COMFORTABLE, HERE ARE A FEW THINGS YOU CAN EXPECT FROM US.

ARRIVAL

Upon arrival, you will be assessed by an experienced Emergency Department nurse to determine the severity of your illness or injury. Your vital signs will be checked and a brief medical history will be taken. This process is called "triage." After triage, you will be treated according to the seriousness of your illness or injury.

TREATMENT ROOM

Once you are taken to a treatment room, you will be asked to put on a hospital gown. A nurse will come to check on you periodically until an Emergency Department doctor arrives.

DOCTOR'S EXAM

An Emergency Department doctor will provide treatment specific to your particular injury or illness. The doctor may sometimes be delayed depending on the conditions of other patients in the Emergency Department. Rest assured we will do everything we can to prevent delays.

TESTING

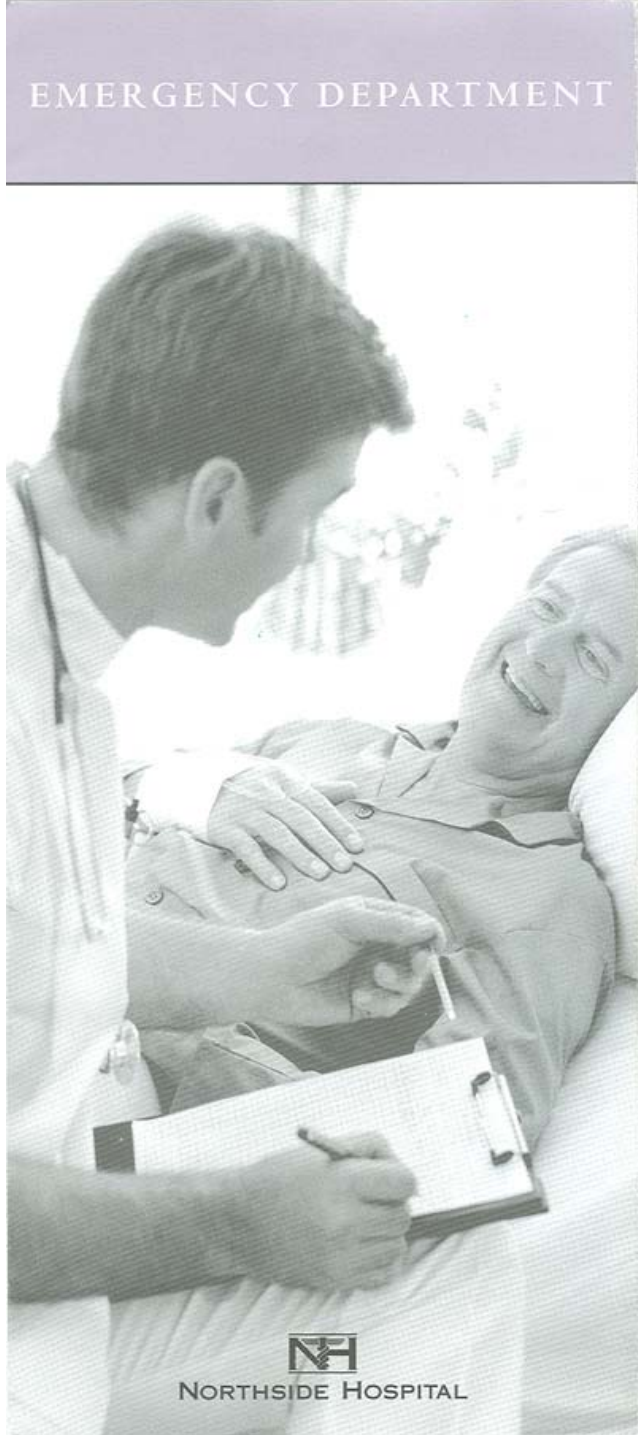
The Emergency Department doctor may order tests and/or X-rays. We make every effort to bring all tests or procedures to the patient's bedside. However, some may have to be performed in other areas of the hospital. If you do not understand a specific test or have questions about your care, ask your nurse or doctor.

RESULTS AND TREATMENT

Once your test results are available, your doctor will review them with you and discuss a recommended treatment plan. Please keep in mind that it may take several hours to complete treatment before you can be sent home or admitted to the hospital.

ADMISSION OR DISCHARGE

The doctor will determine if you can be sent home or if you need to be admitted to the hospital. They may consult your personal primary care physician or other specialists about your admission or follow-up.



What is the connotation of this color palette?

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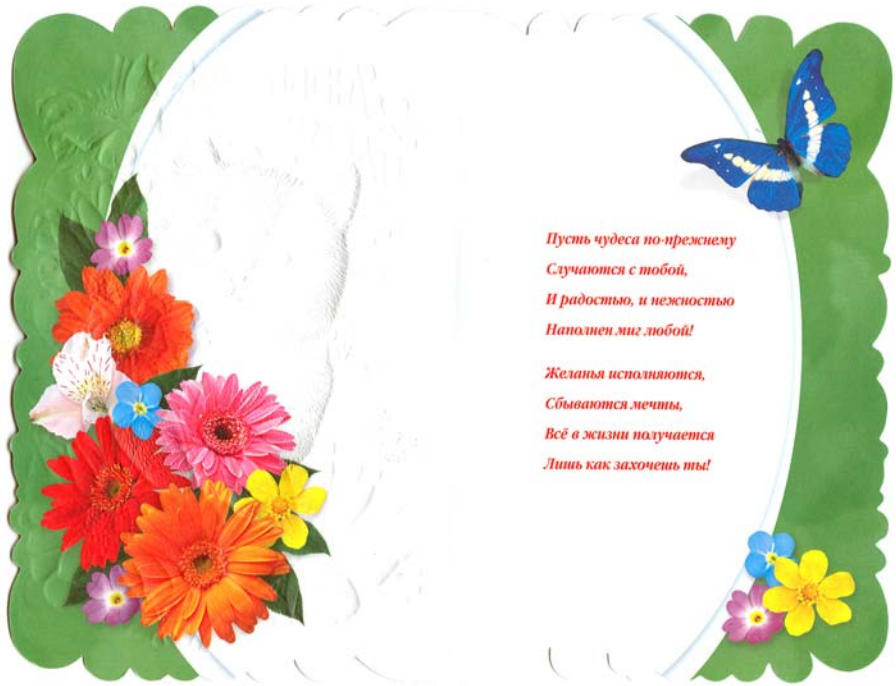

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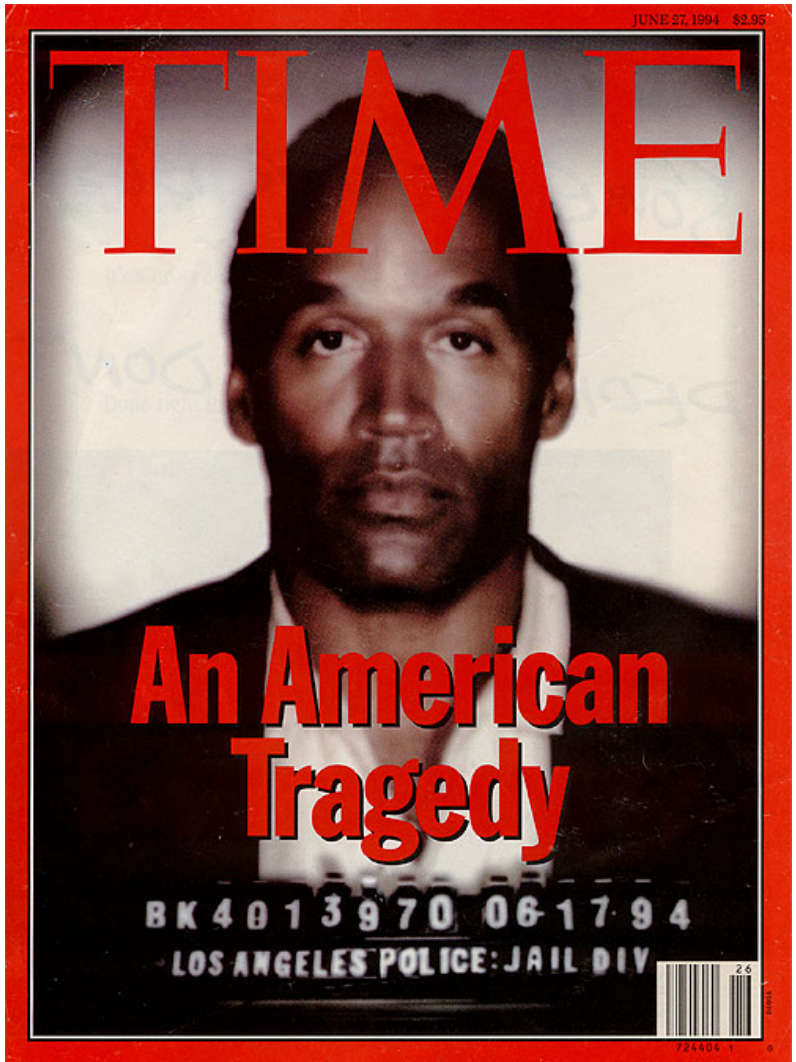

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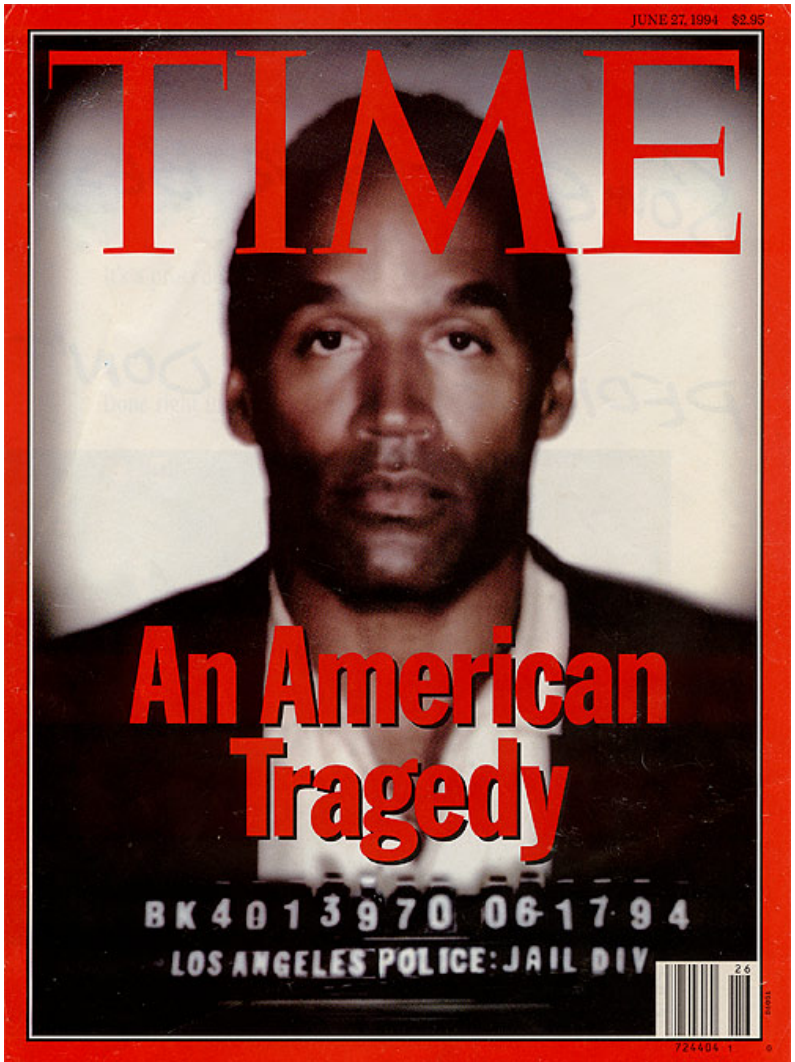

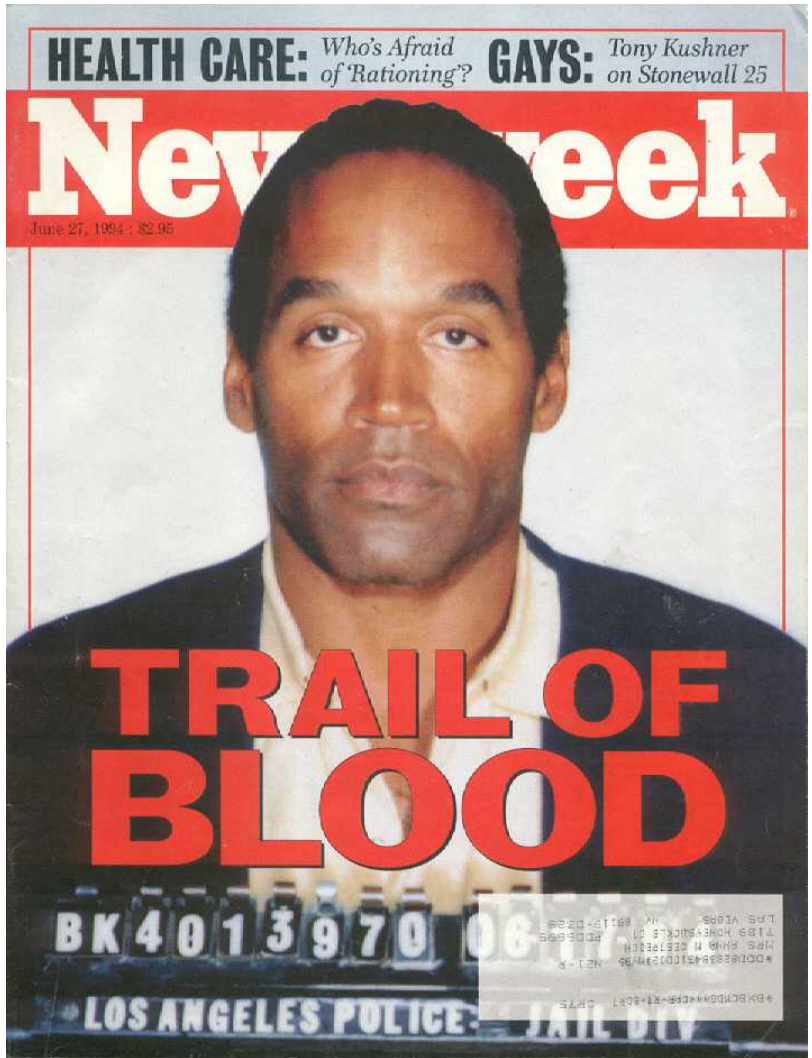

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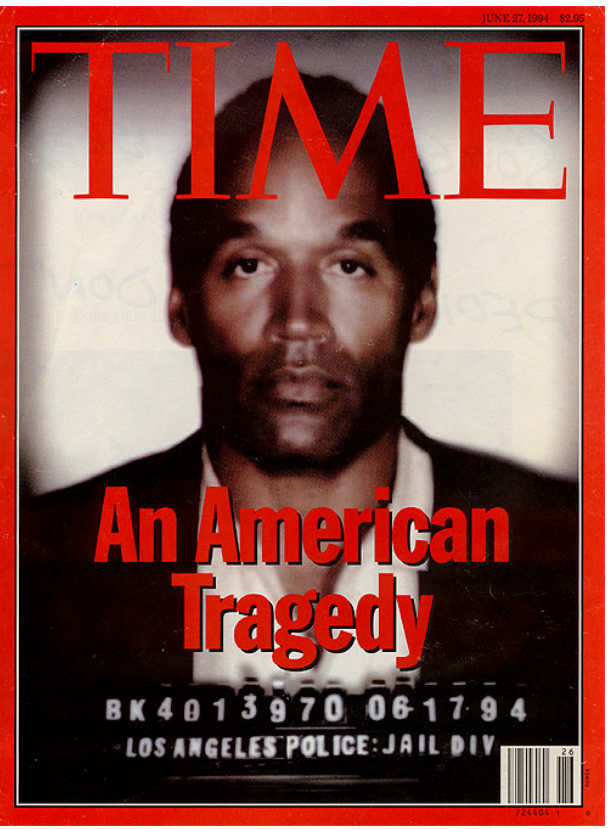
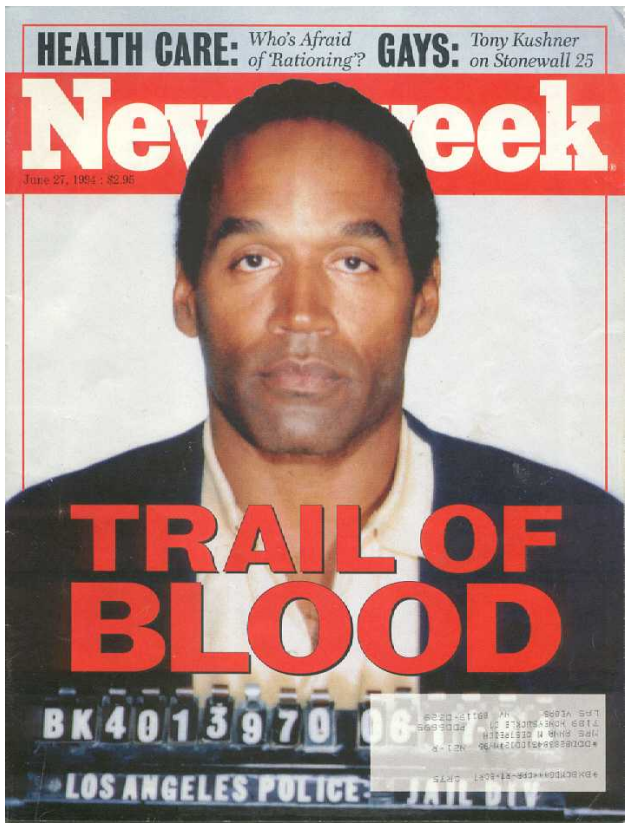
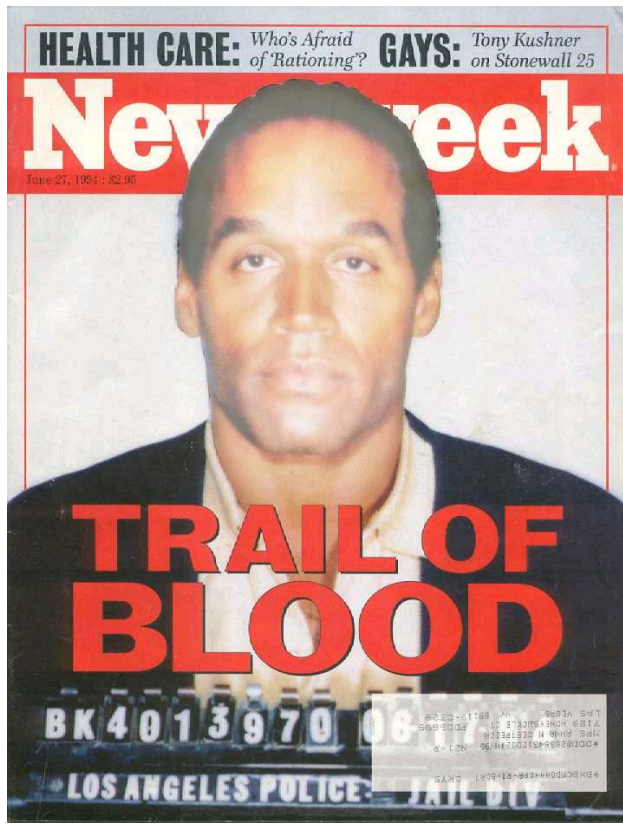
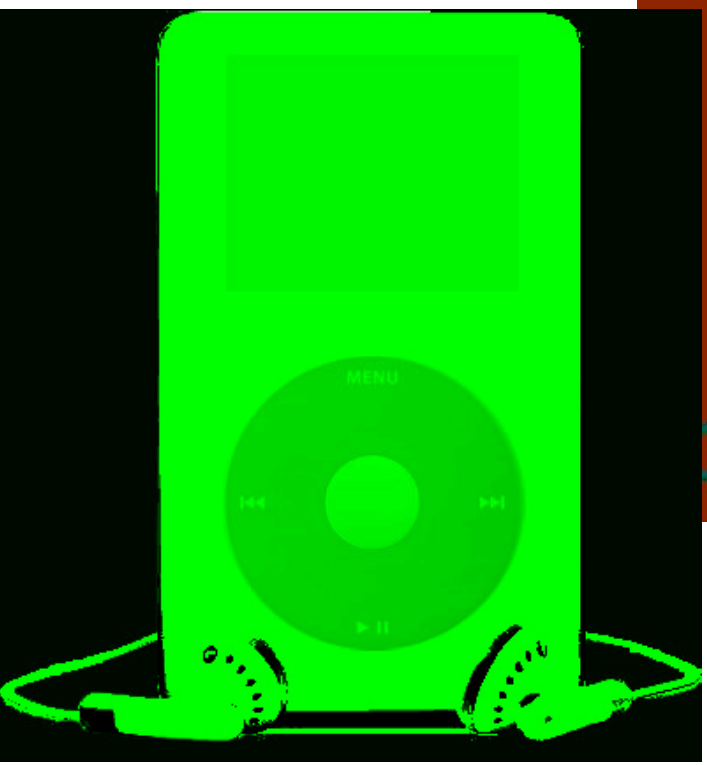






What is the connotation of this color palette?

What are the connotations of these new color palettes for iPod?



What is this Design's Color Palette and Its Connotation?

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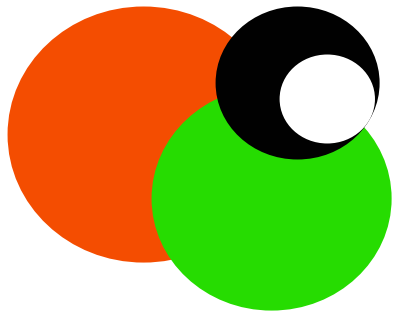
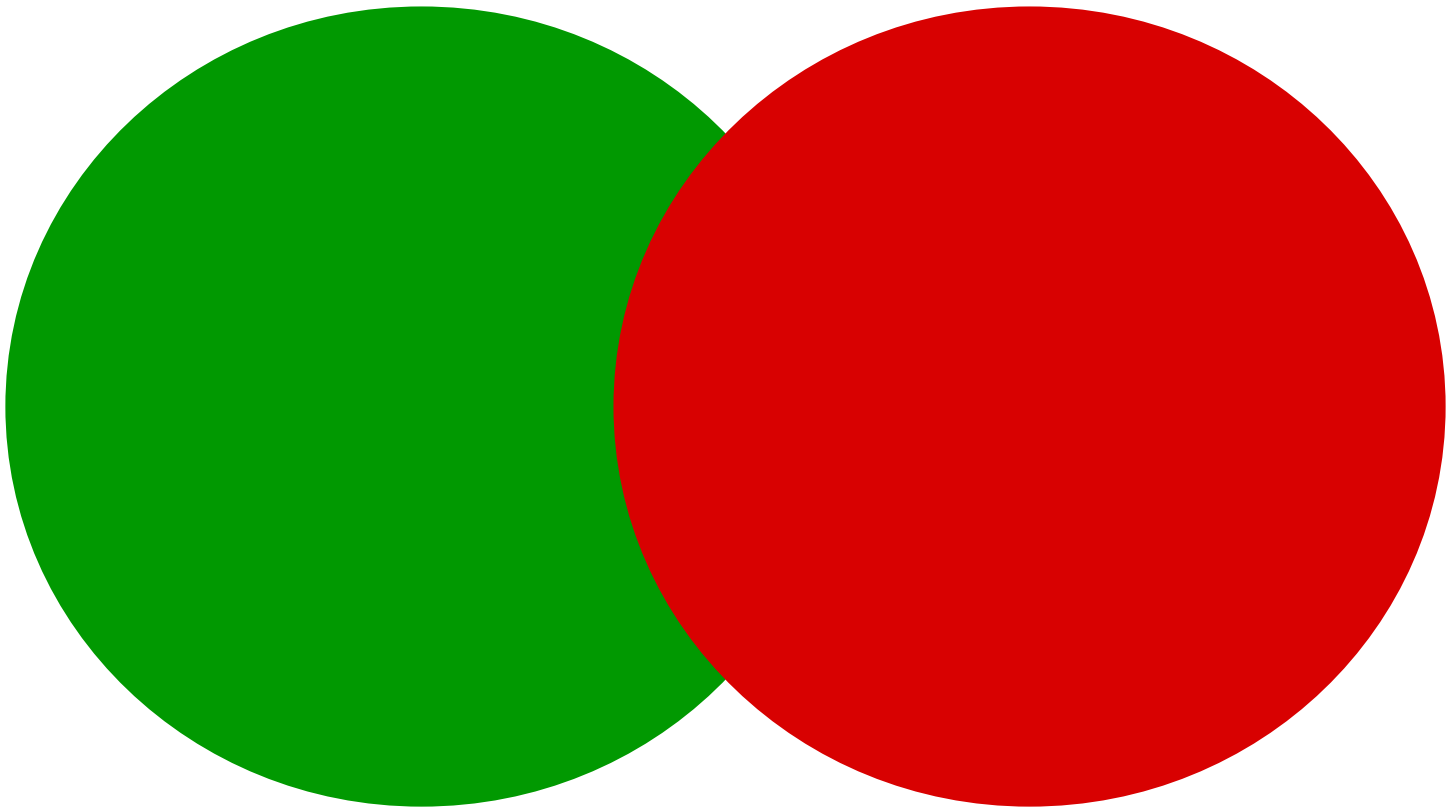
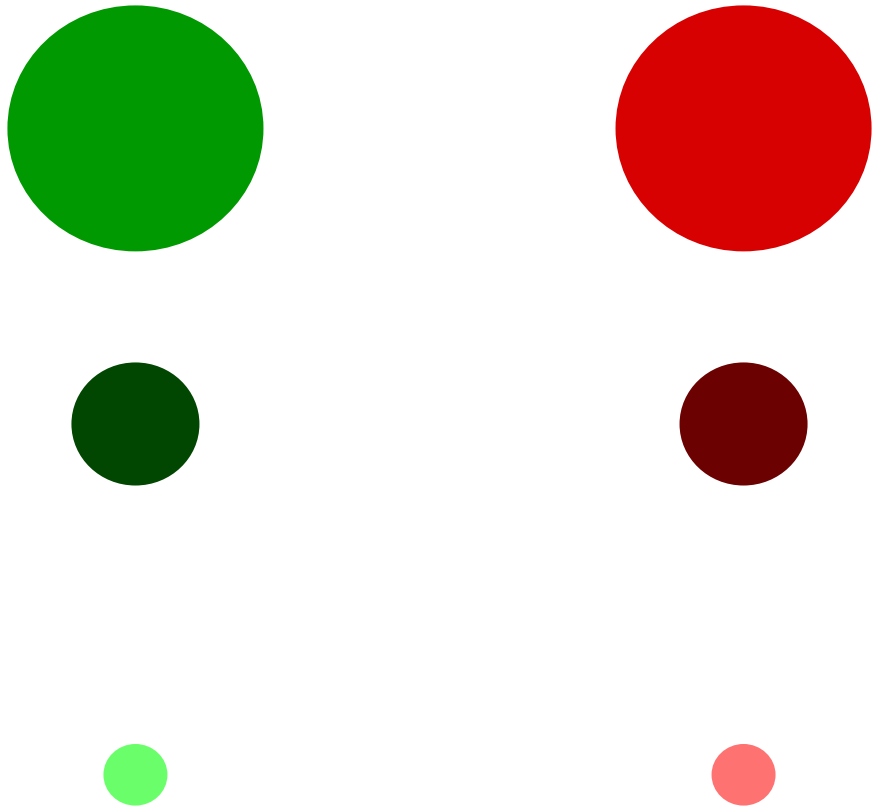


Green (which usually connote *life*) seems like such an ironic color choice that I assume it's intentional. Therefore I associate this complementary (or near complementary) color palette with humor and self-consciousness.

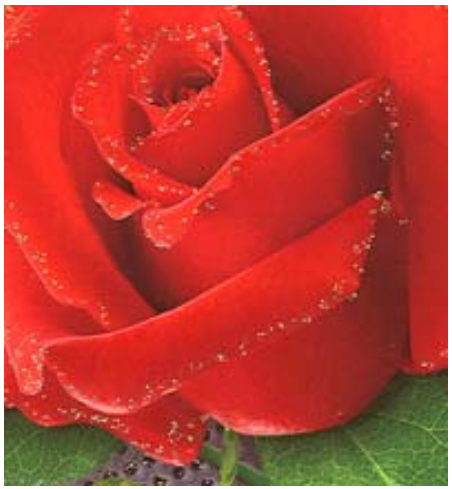
What is the Usual Connotation of Green/Red Complementaries?



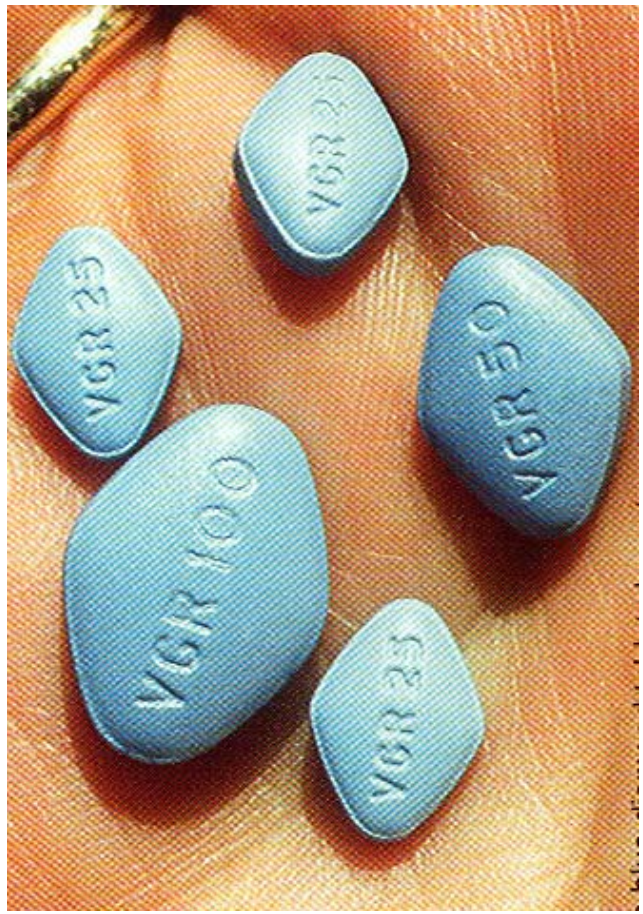
How often is this really the case?



How often is this really the case?



The ‘Branding’ of Color is Exactly What many Companies and Artists Try to Do.

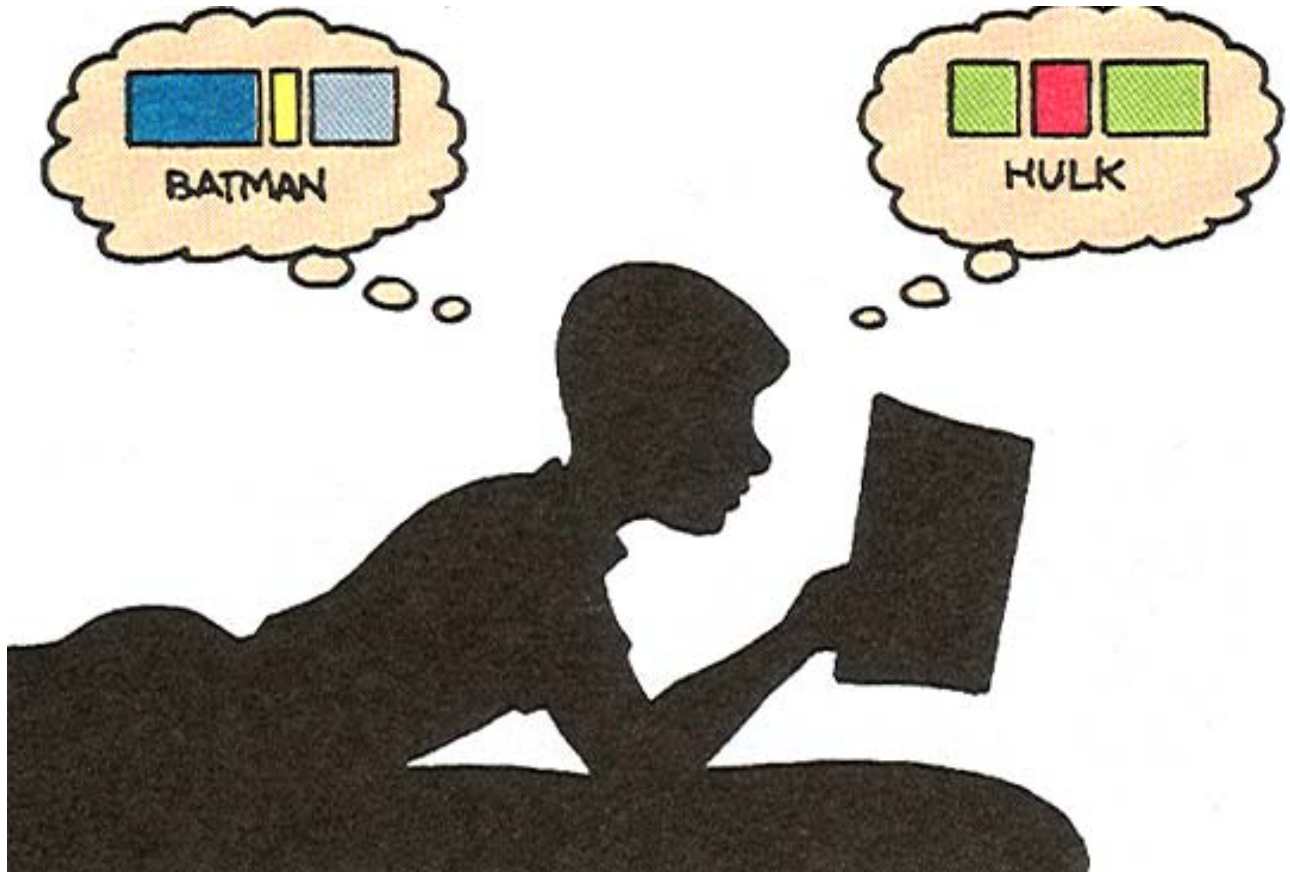


In pharmaceuticals what pill does this type of turquoise signify?

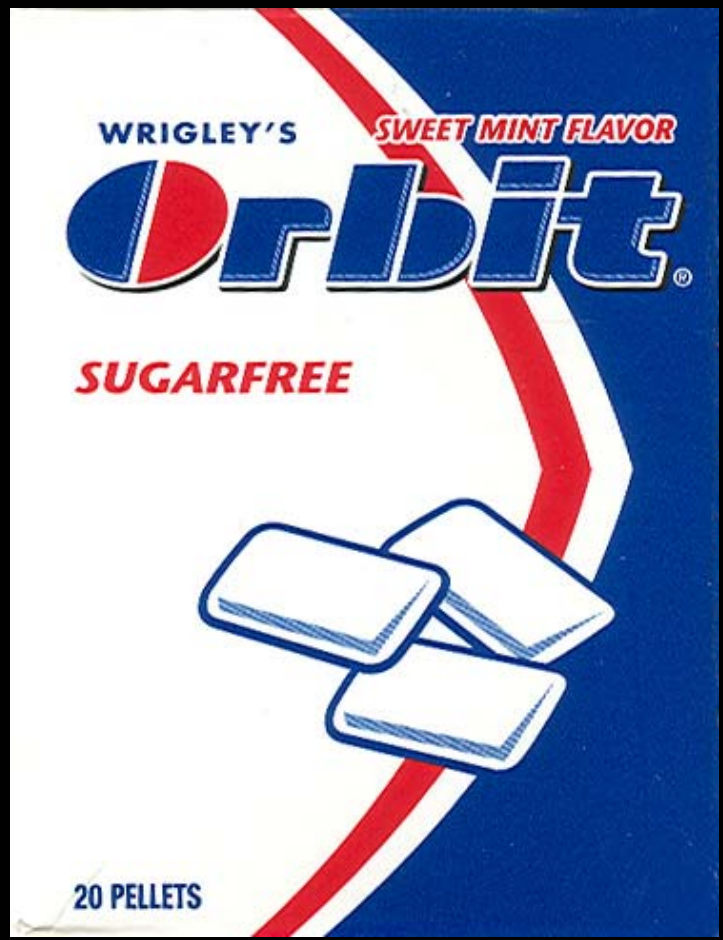
The ‘Branding’ of Color is Exactly What many Companies and Artists Try to Do.

=

The ‘Branding’ of Color is Exactly What many Companies and Artists Try to Do.



The ‘Branding’ of Color is Exactly What many Companies and Artists Try to Do.



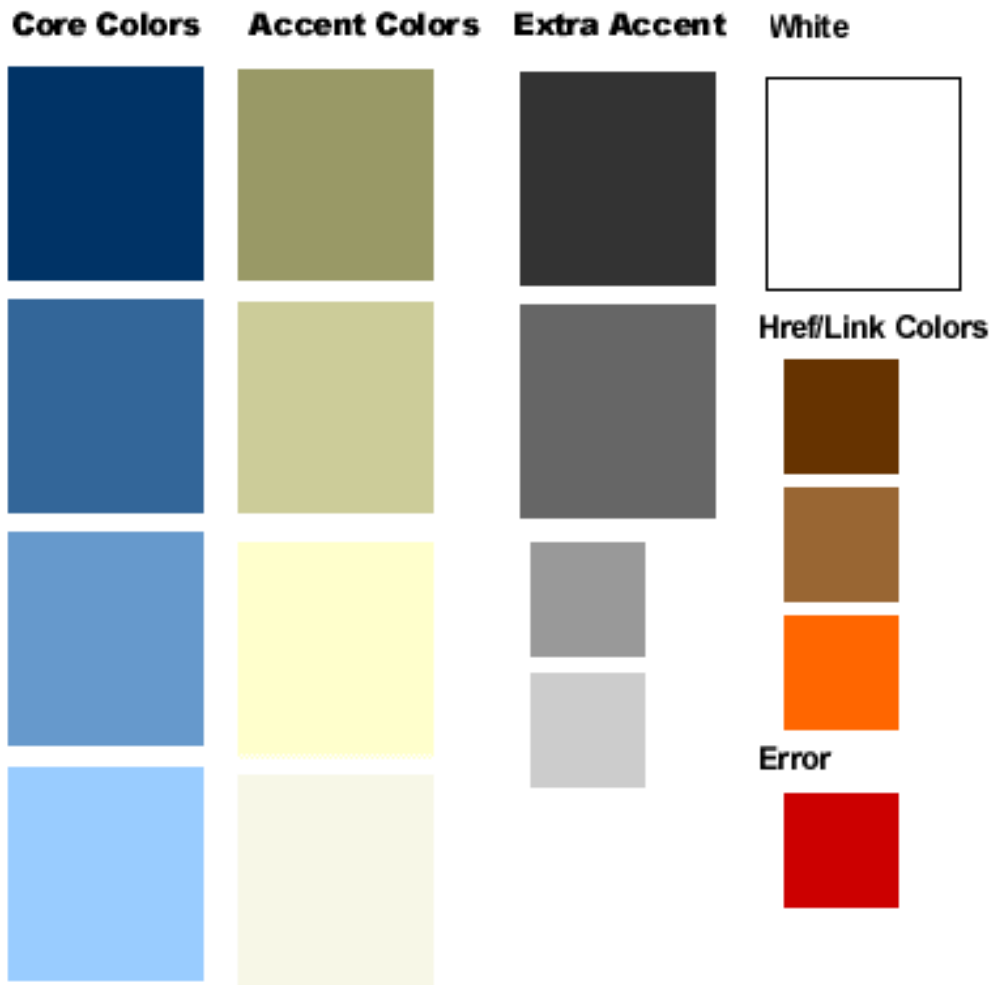
What product brand is this gum package cross-referencing?

Color Palettes

What types of things are Color Palettes made for?

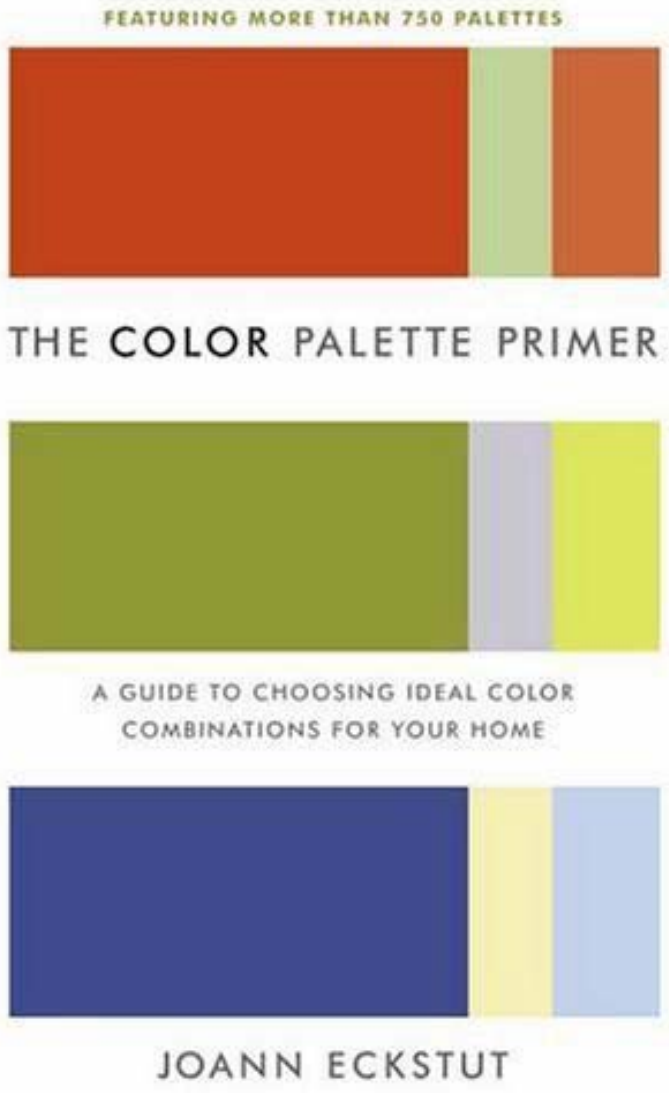
What types of things are Color Palettes made for?

- Websites



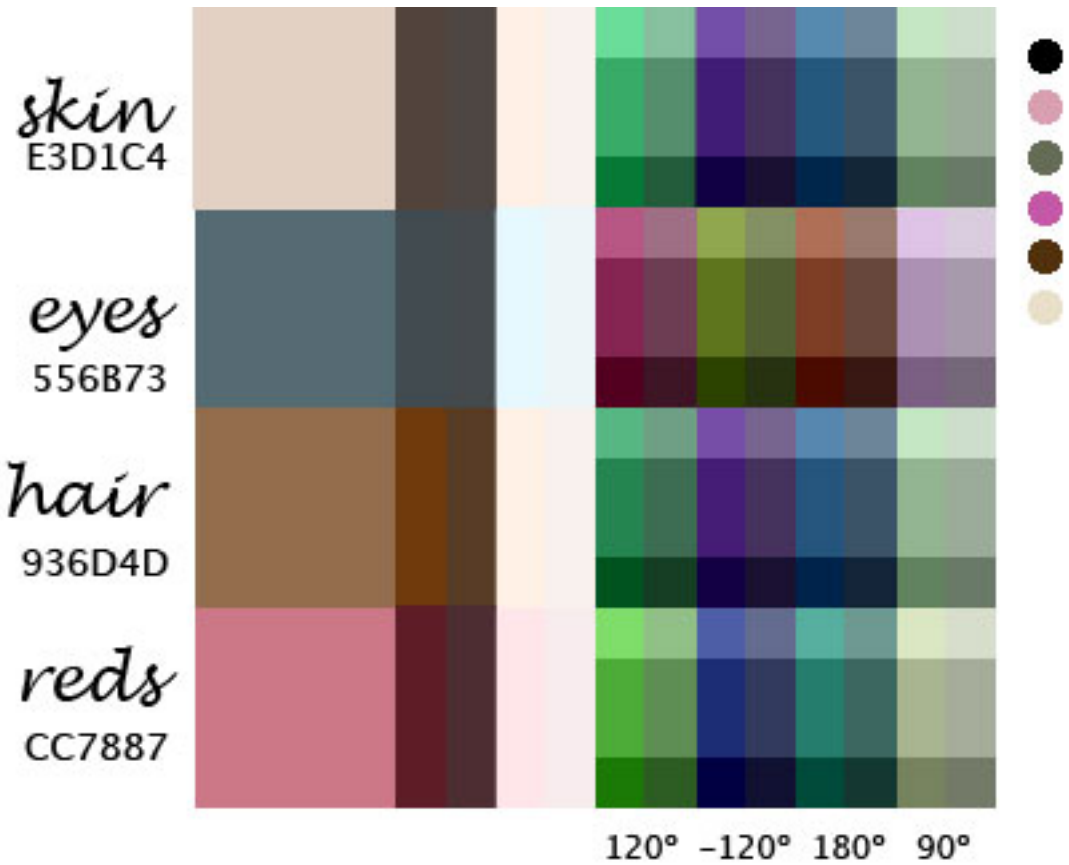
What types of things are Color Palettes made for?

- Websites
- Architecture



What types of things are Color Palettes made for?

- Websites
- Architecture
- Characters

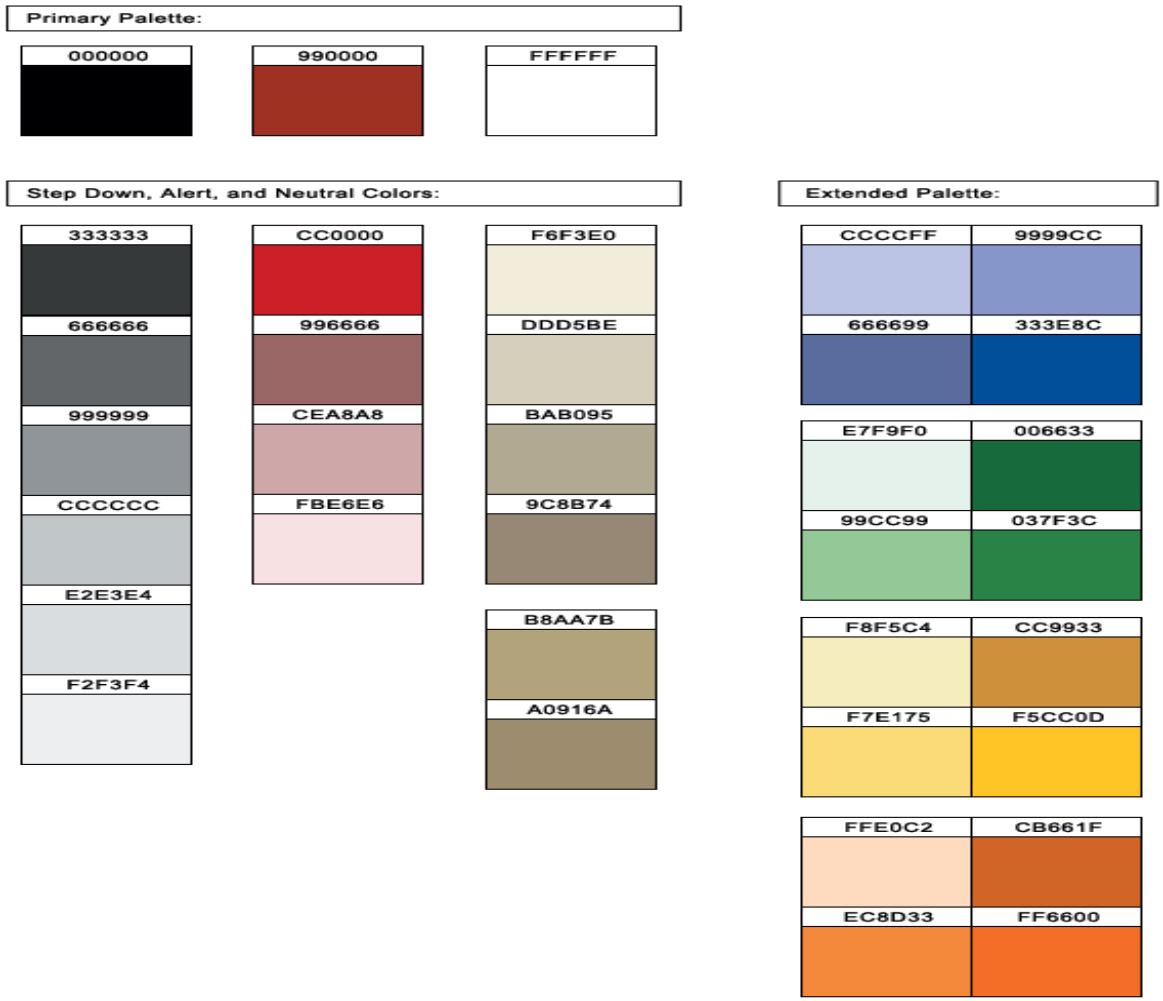


What types of things are Color Palettes made for?

- Websites
- Architecture
- Characters

What types of things are Color Palettes made for?

- Websites
- Architecture
- Characters
- Anything that has a visual component



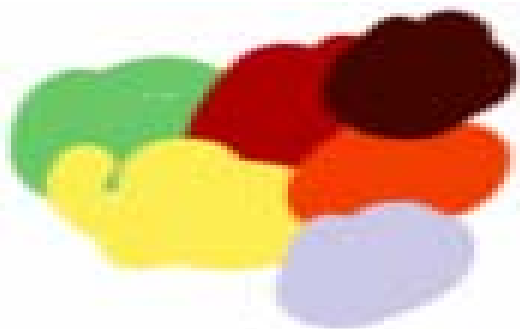
Technique for Building Color Palettes

Technique for Building Color Palettes

1) Select Image of Interest

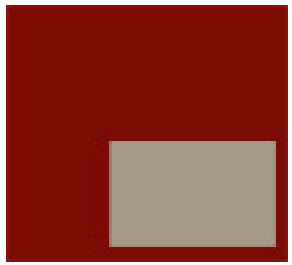
2) Open it in Photoshop and tweak/exaggerate the colors Using Levels, Curves or Hue/Saturation

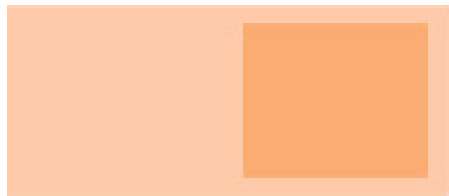
3) Using the eyedropper, swatch some colors off it.



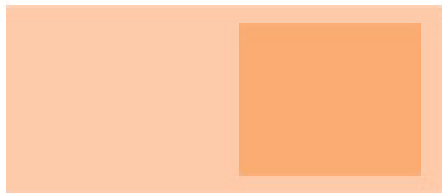
Technique for Building Color Palettes

Technique for Building Color Palettes





Technique for Building Color Palettes



Technique for Building Color Palettes

Accent

Sub-Dominant

Dominant

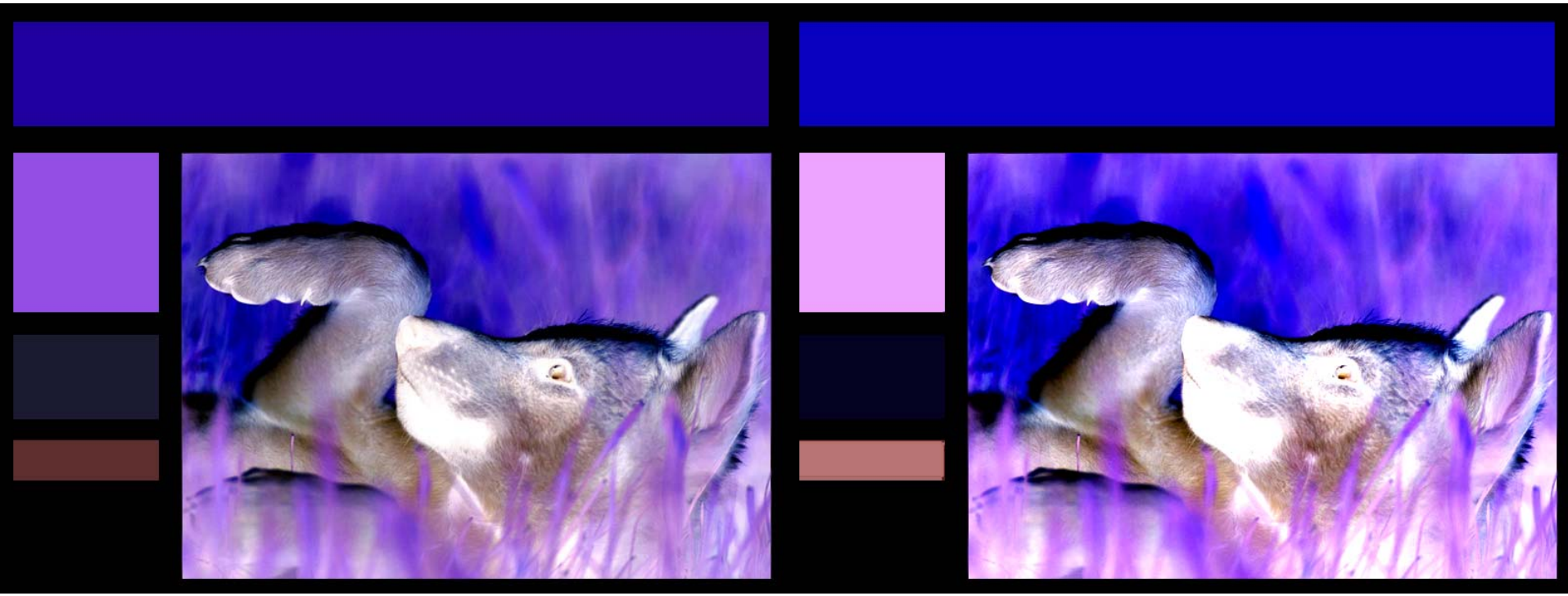
Don’t forget to play with and alternate the dominants, subdominants and accents colors

Technique for Building Color Palettes

Technique for Building Color Palettes

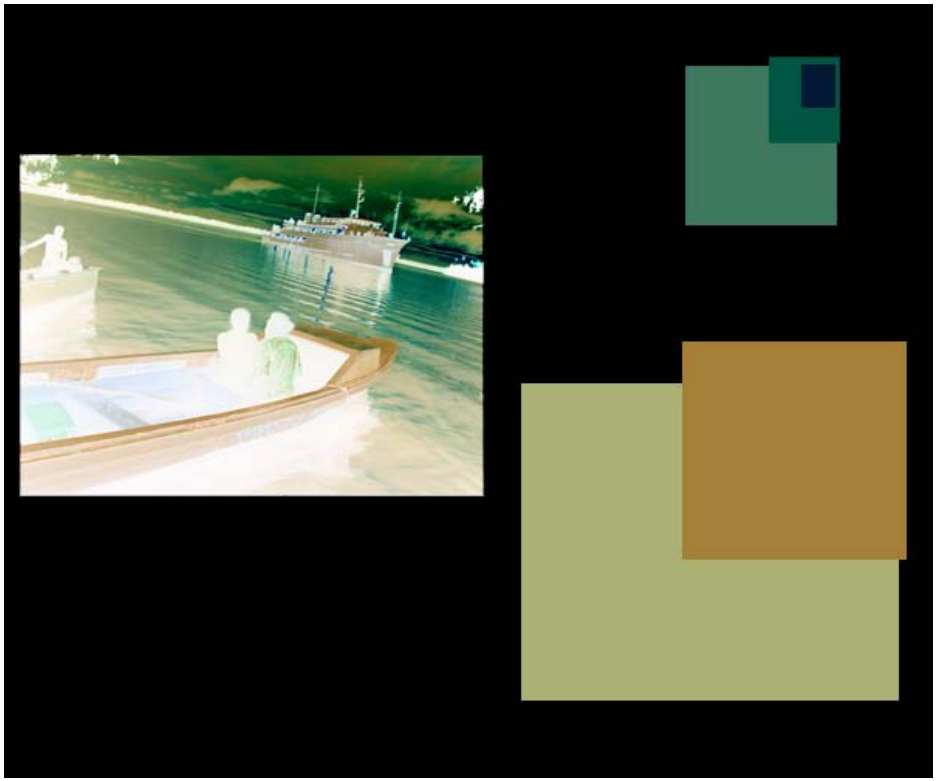
Inverting Images can yield interesting results as well.

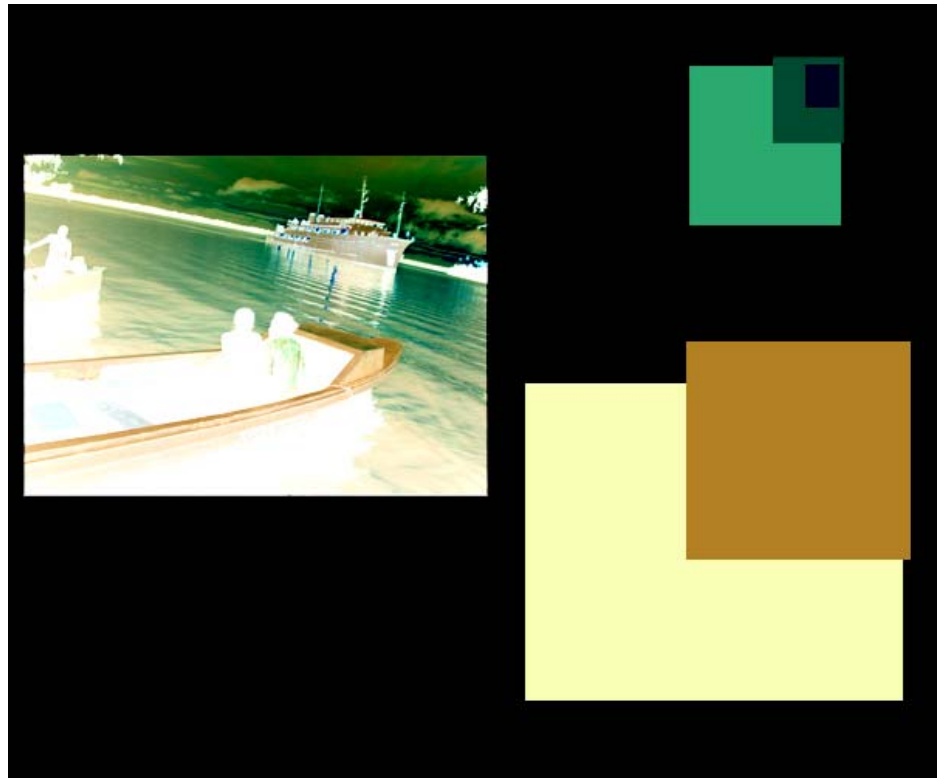
Technique for Building Color Palettes



Tweaking the levels, hue, etc., might be necessary to get the desired effect.

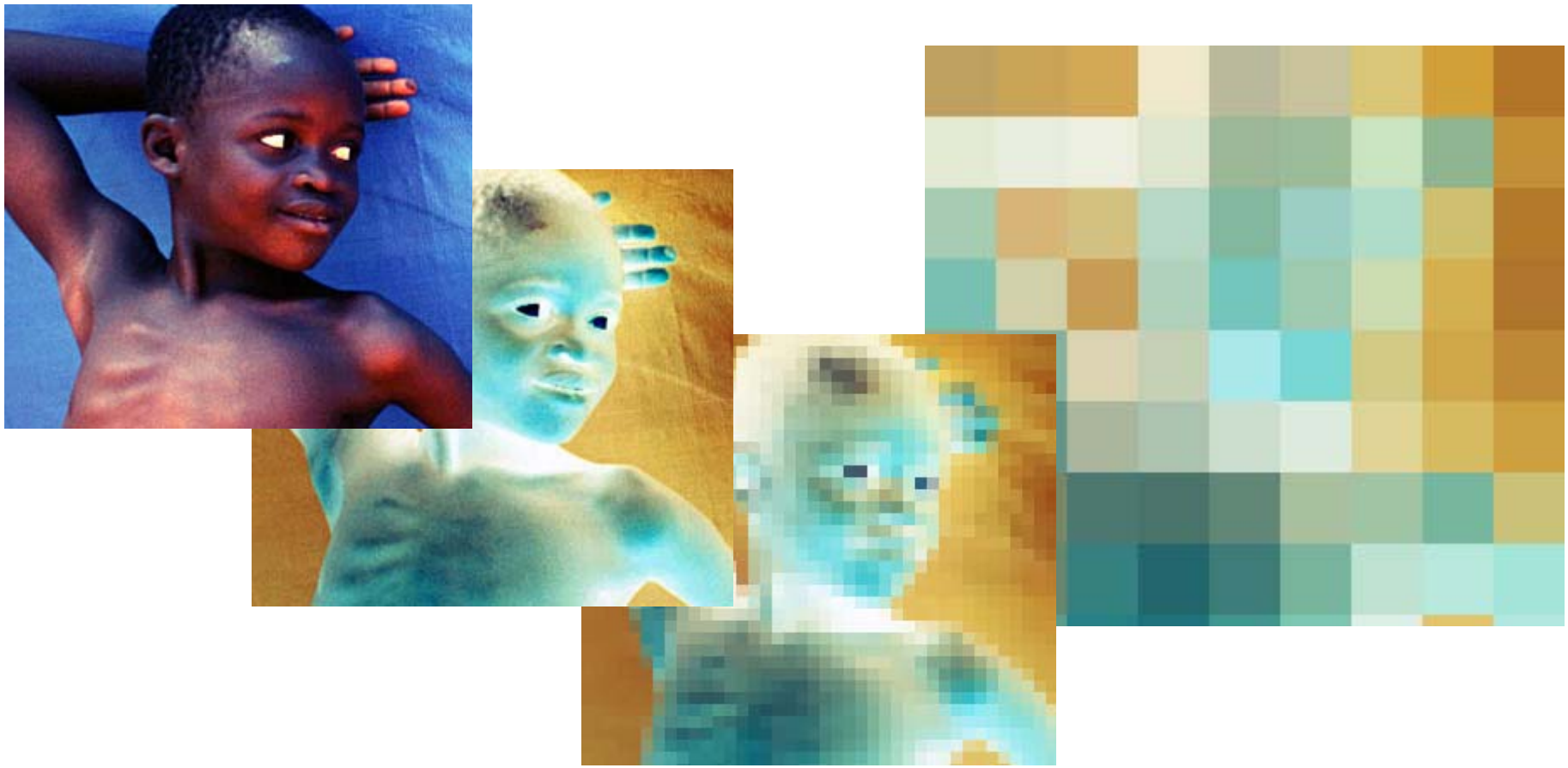
Technique for Building Color Palettes





Tweaking the levels, hue, etc., might be necessary to get the desired effect.

Technique for Building Color Palettes



Technique for Building Color Palettes

http://www.degraeve.com/color-palette/

Color Palette Generator

Enter the URL of an image to get a color palette that matches the image. This is useful for coming up with a website color palette that matches a key image a client wants to work with.

URL of image: http://www.lickapixel.com/images/facelcon.jpg

Color-Palette-ify!

dull	vibrant
#443322	#220000
#aa6644	#bb5522
#bbccff	#ddffff
#bbbbcc	#ddeeff
#bb8866	#ee9955

Number One Technique for Building Color Palettes

RESEARCH!!!

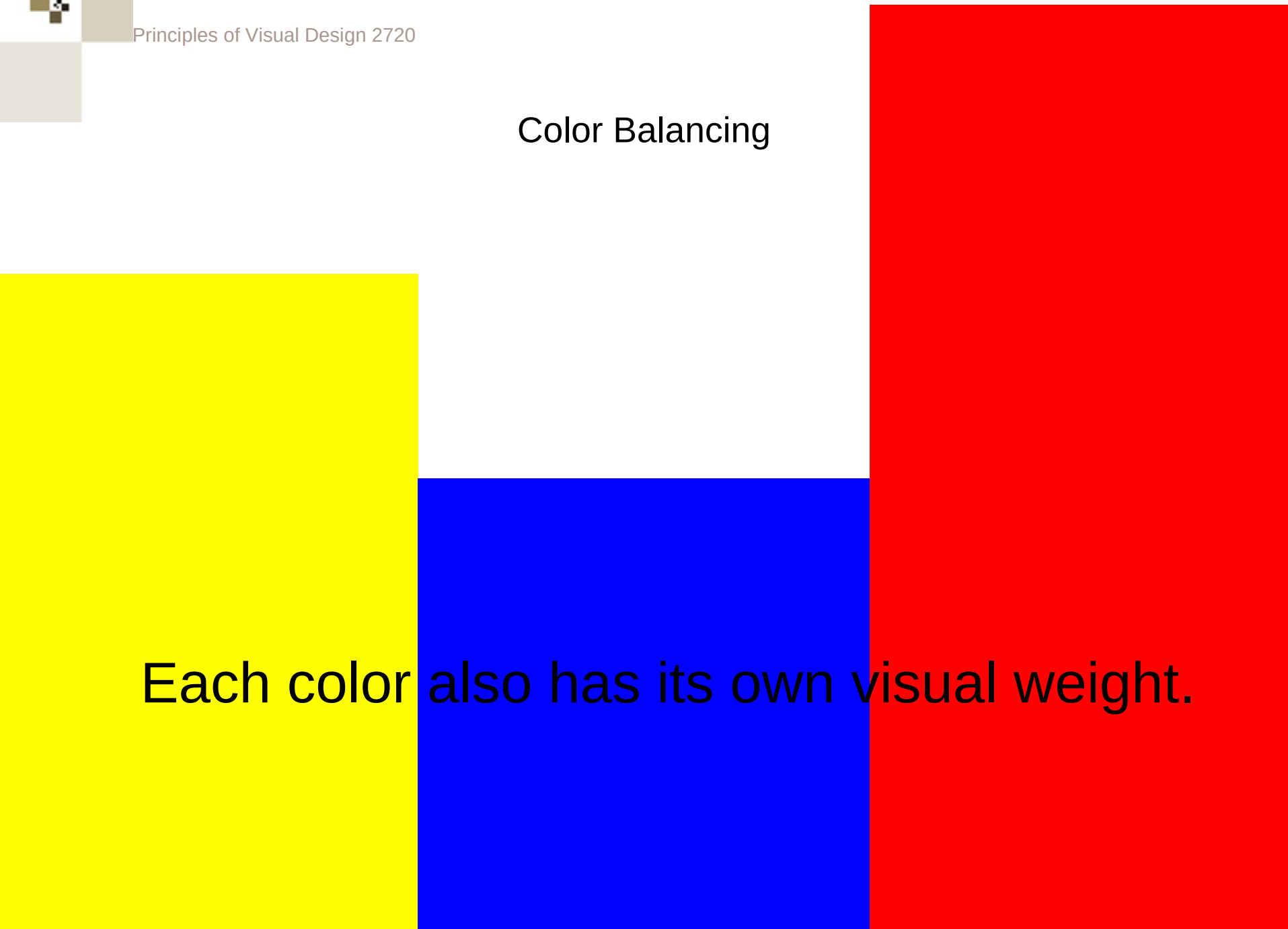
Number One Technique for Building Color Palettes

RESEARCH!!!

Central Bank of Egypt
ONE POUND
Любимой Племяннице!
מדריך קפה
Coffee guide
Дорогому Сыну!

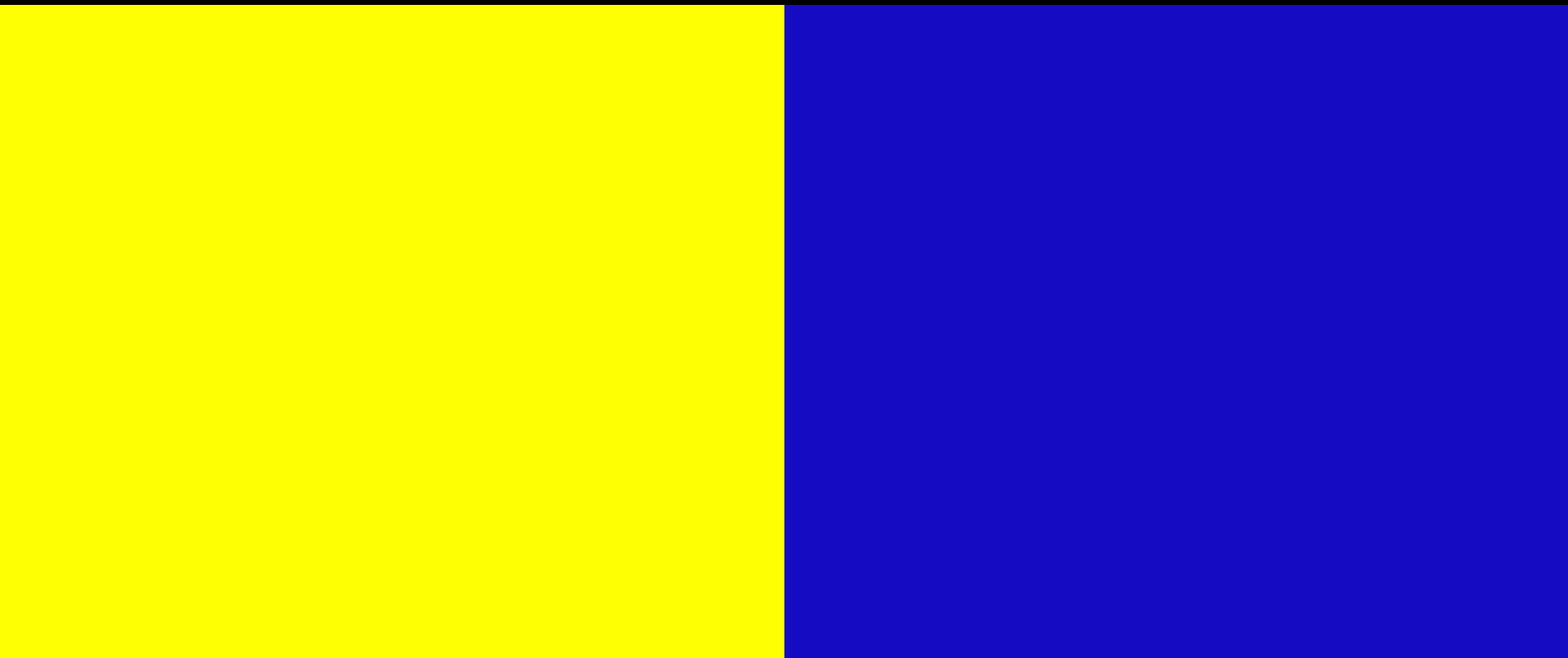
Color Balancing

Color Balancing



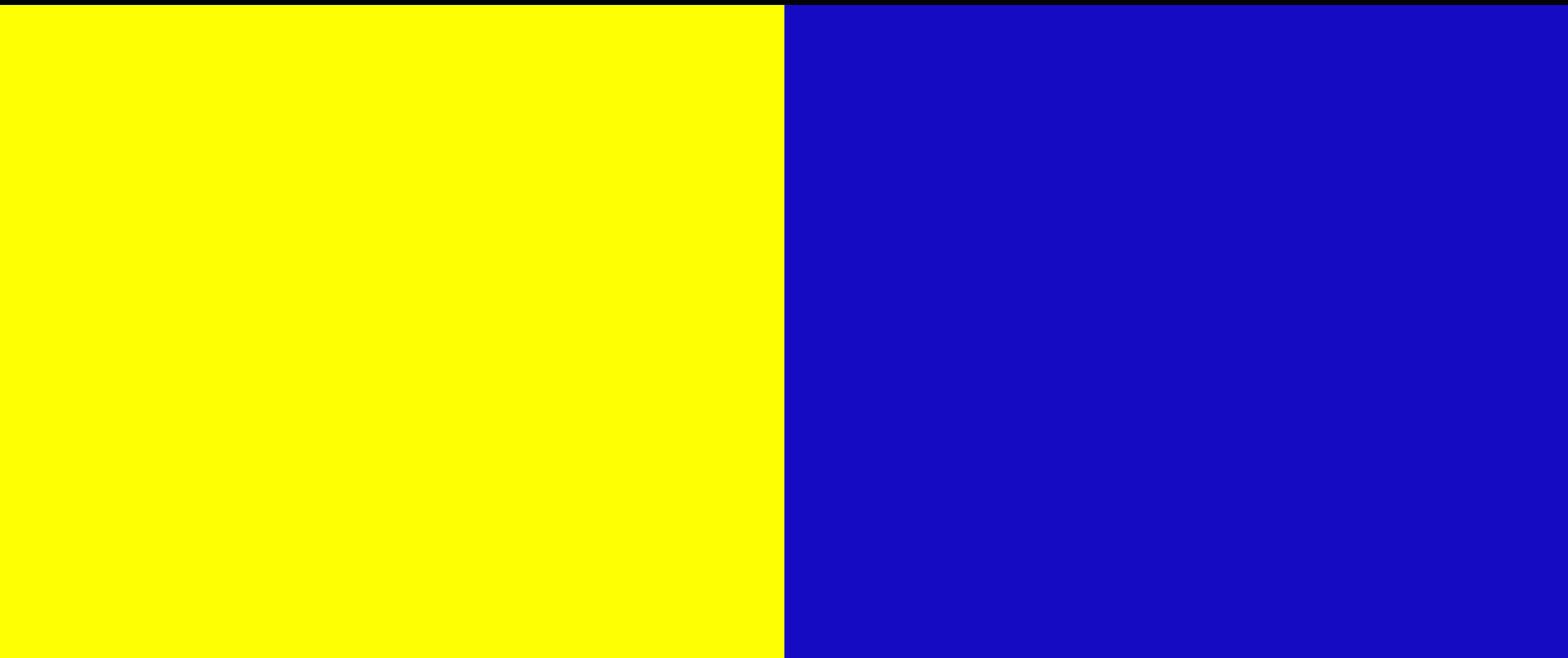
Color Balancing

Different colors have different levels of influence on drawing the eye. For example…



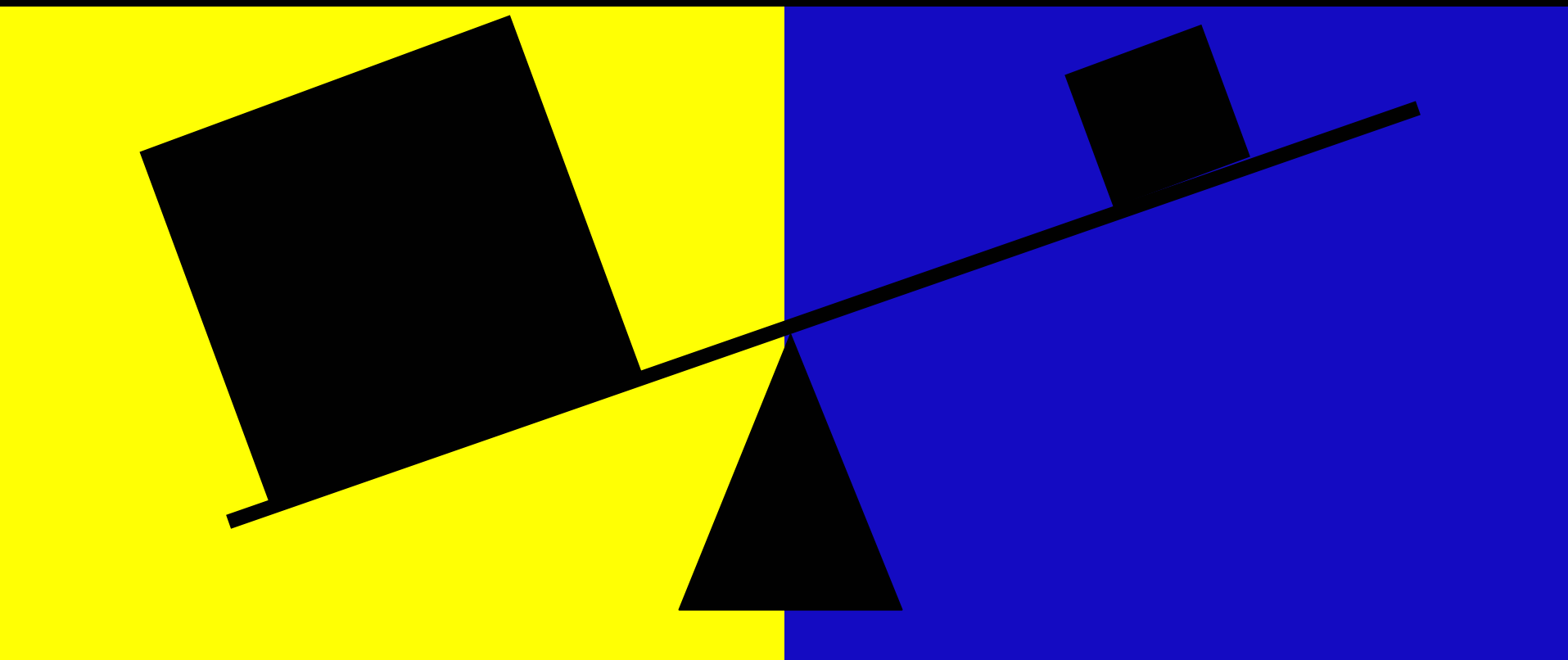
Color Balancing

The yellow is screaming for attention while the blue patiently waits for your eye.



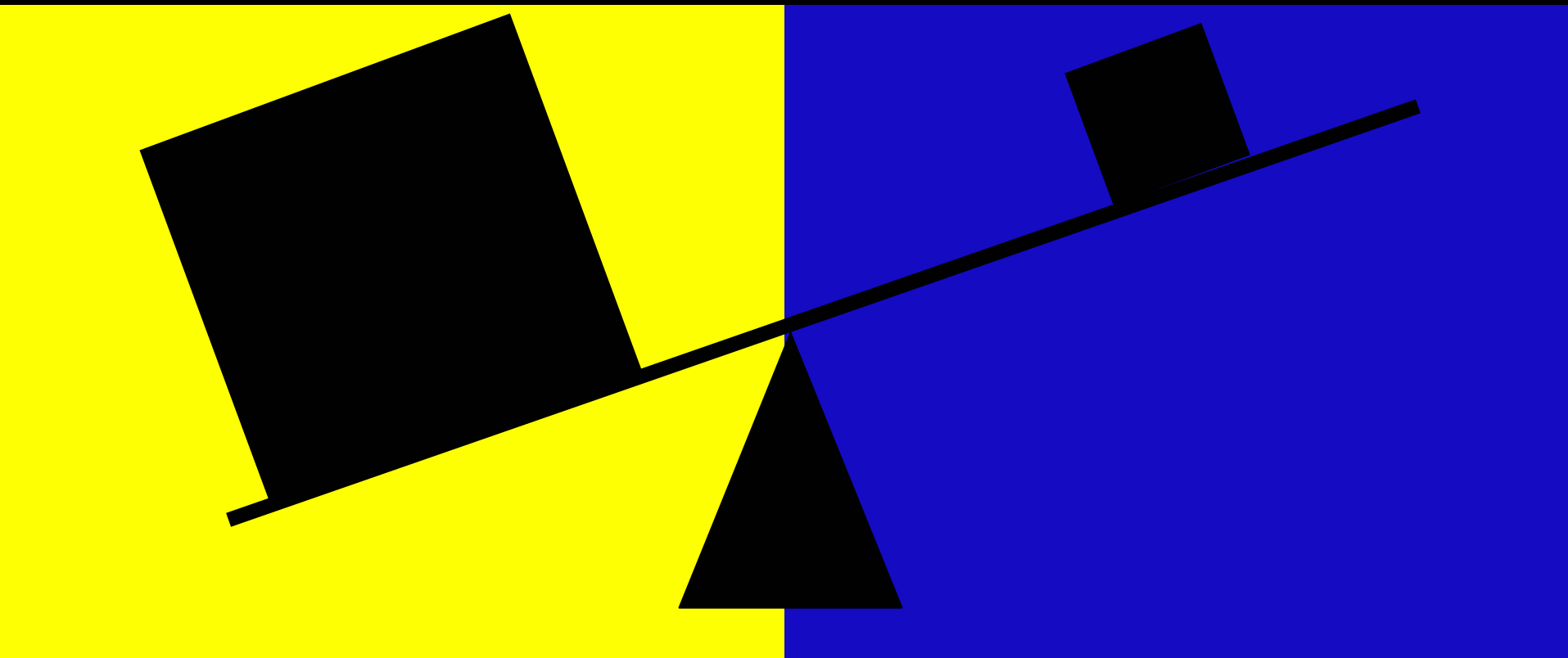
Color Balancing

So this is an unbalanced color composition.



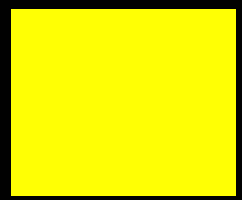
Color Balancing

So how can we balance this composition out?



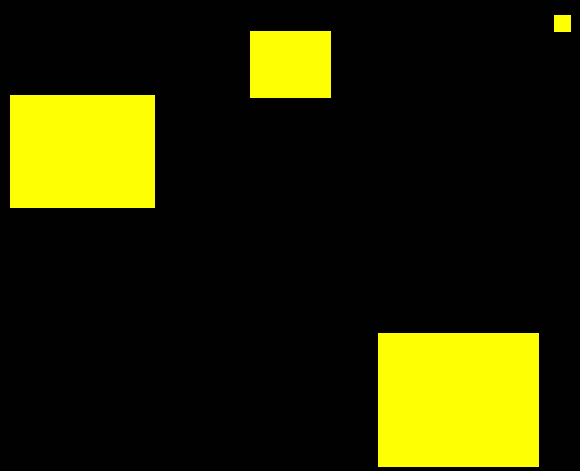
Color Balancing

We could try this.



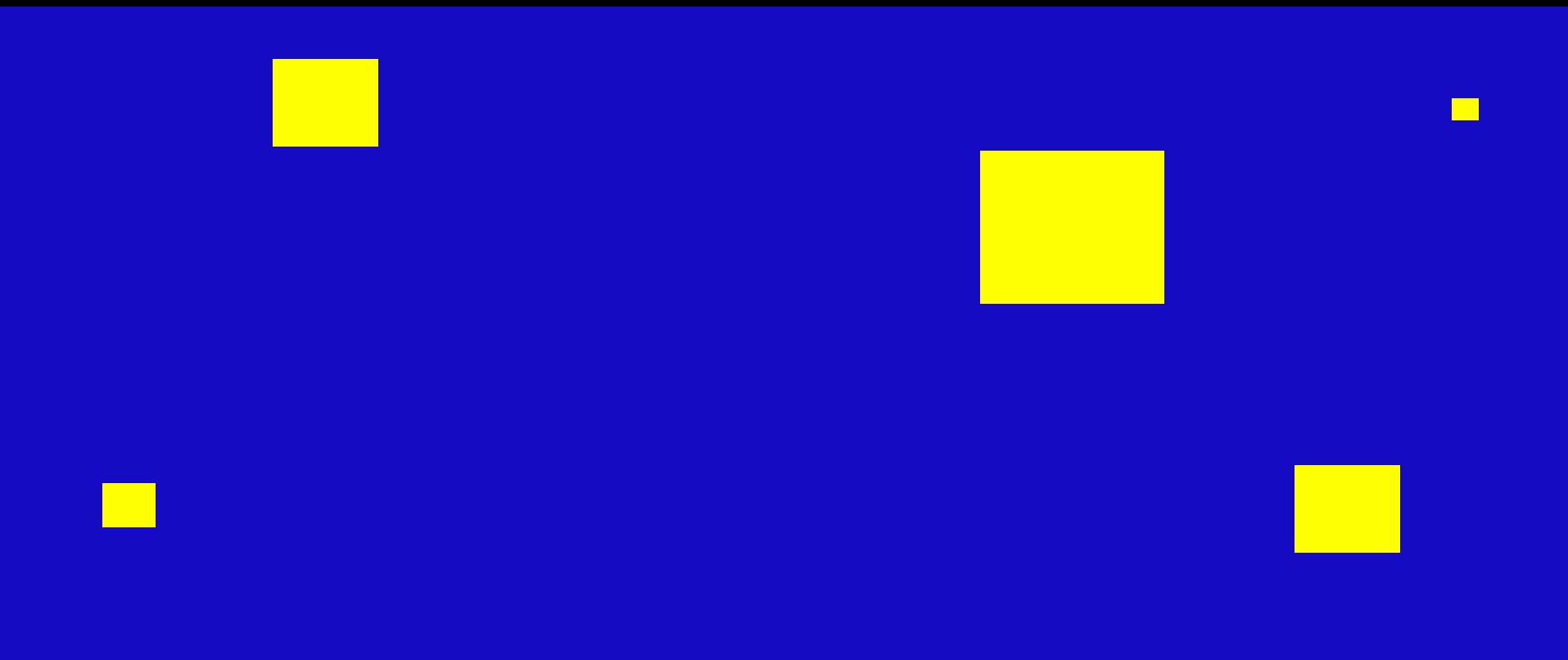
Color Balancing

Or this.



Color Balancing

Or this.



Accents

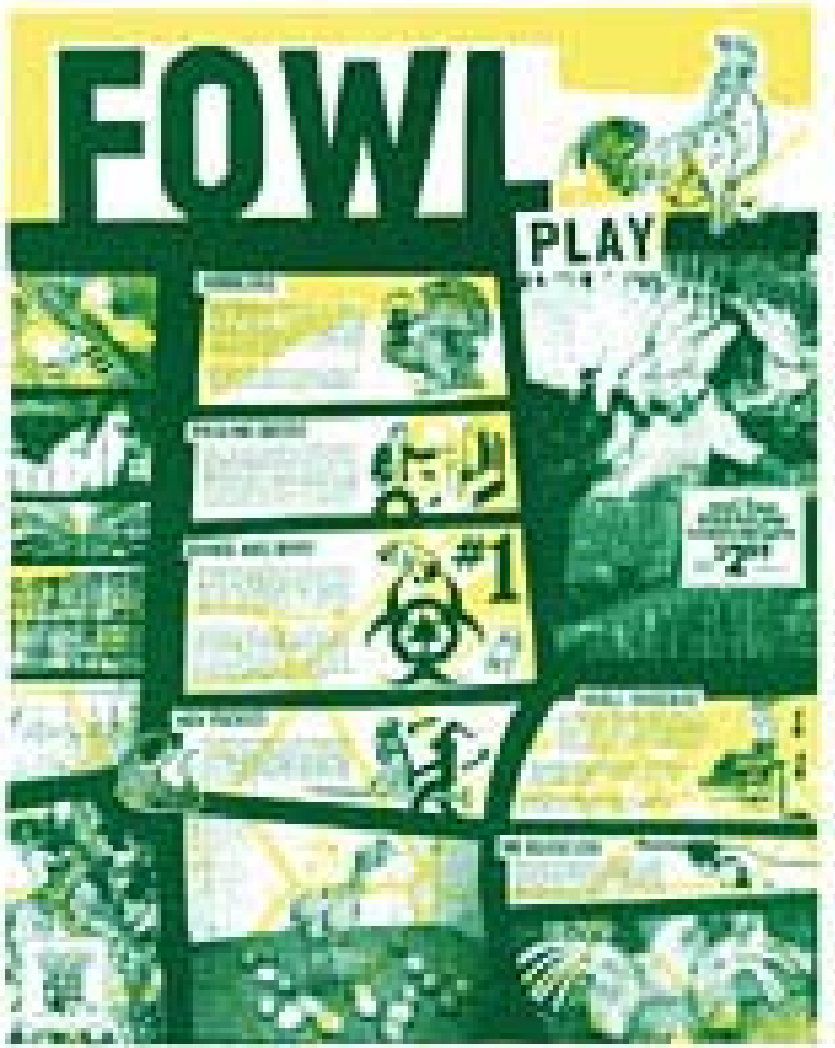
Accent Colors

Accent colors define a composition by drawing attention due to their anomaly in the design. Most effective designs have carefully calculated combination of accent and dominant colors.

Accent Colors

Accent colors define a composition by drawing attention due to their anomaly in the design. Most effective designs have carefully calculated combination of accent and dominant colors.

Accent Colors



Accent colors define a composition by drawing attention due to their anomaly in the design. Most effective designs have carefully calculated combination of accent and dominant colors.

Accent Colors

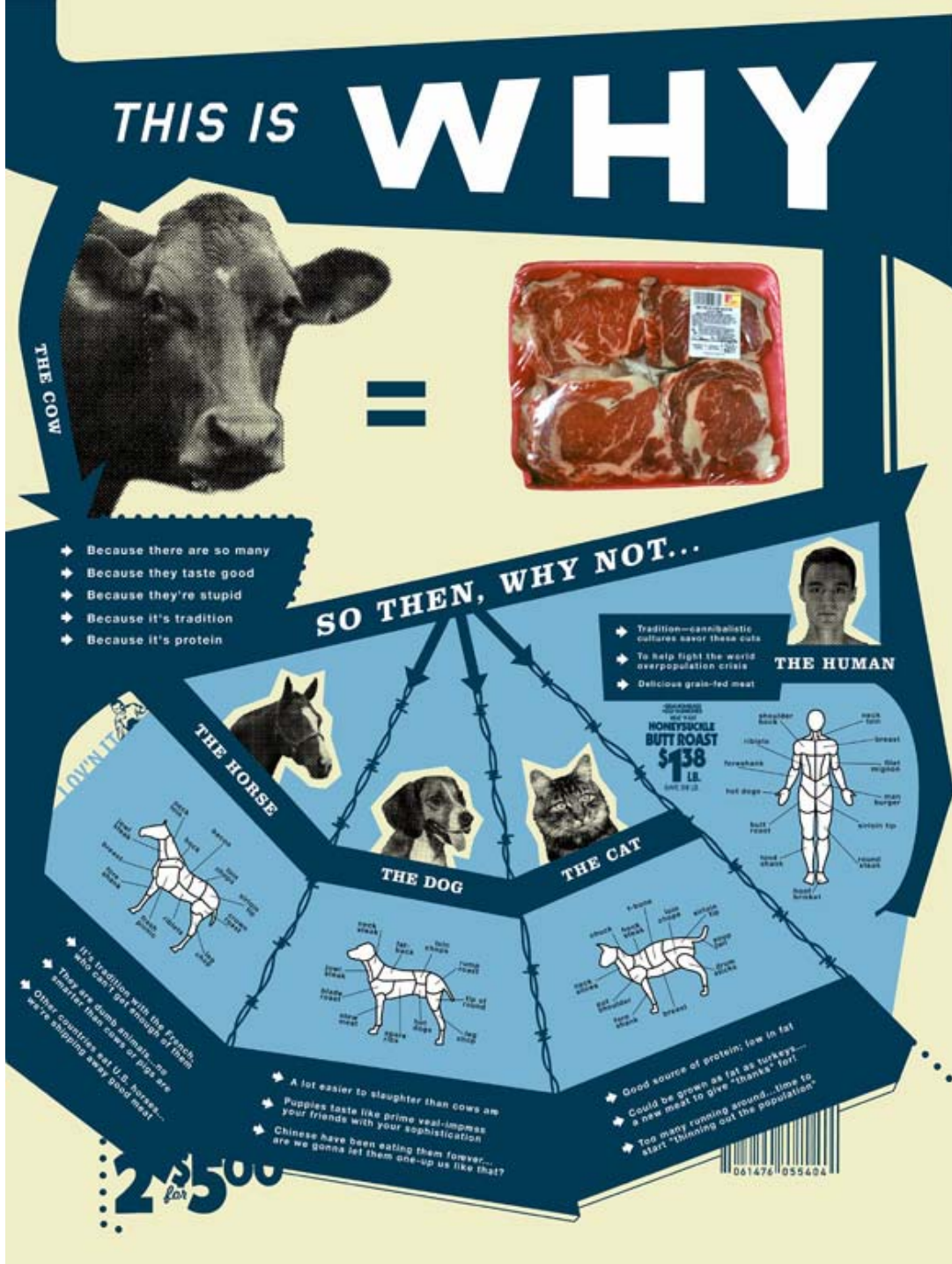
Brian Schrank
ブライアン・シュランク
PhD Student
Georgia Institute of Technology

Videogame
Researcher & Designer

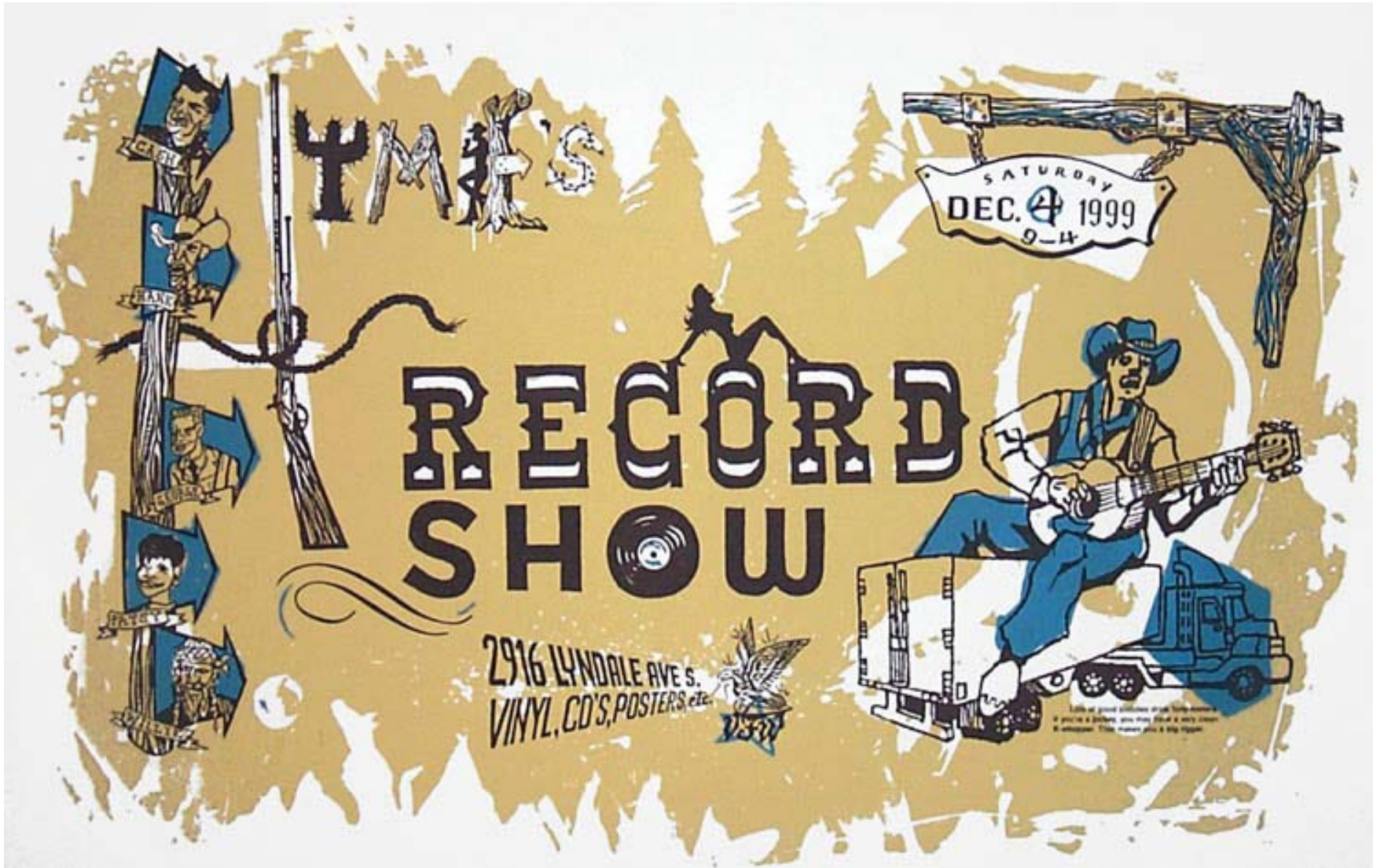
Lickapixel.com
bschrank@gmail.com
412-841-6209

Accent Colors

Accent Colors



Accent Colors

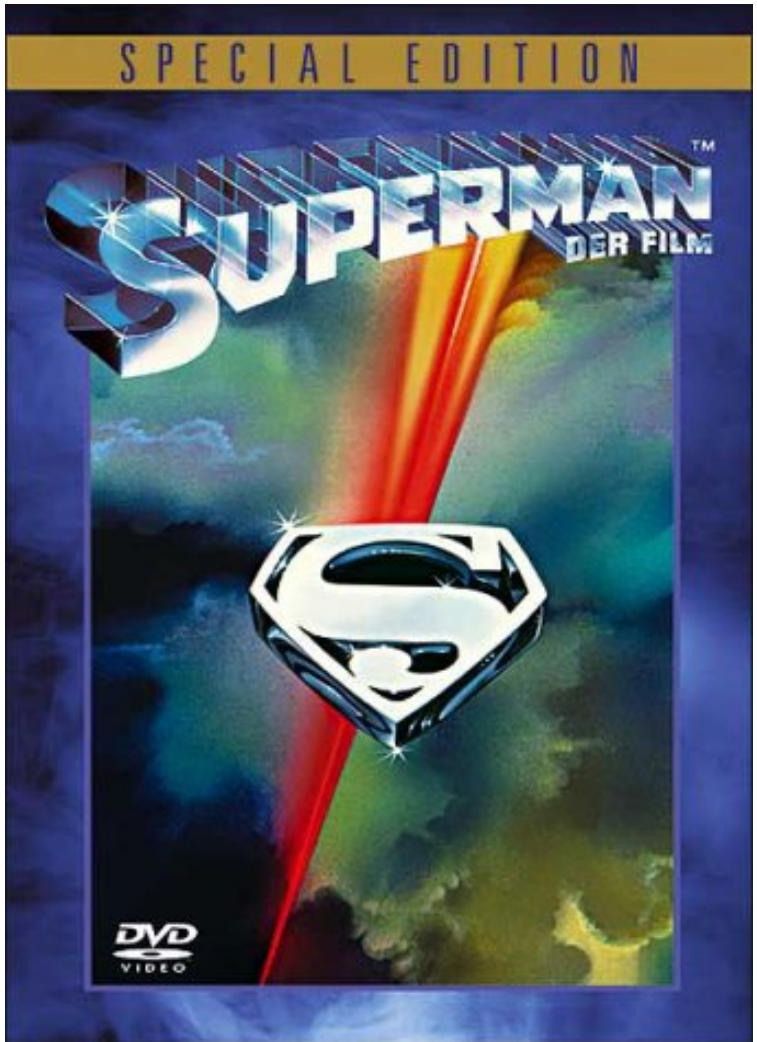


Selective emphasis on VALUE or SATURATION can also serve as an accent. For example...

In videogames characters often have stronger **VALUE** contrast ratios than their environment

Or artists will sometimes outline videogame characters in black to separate them from the background.

By De-emphasizing Color (by lowering Saturation or raising or lowering value) **Other Aspects** Become Accented

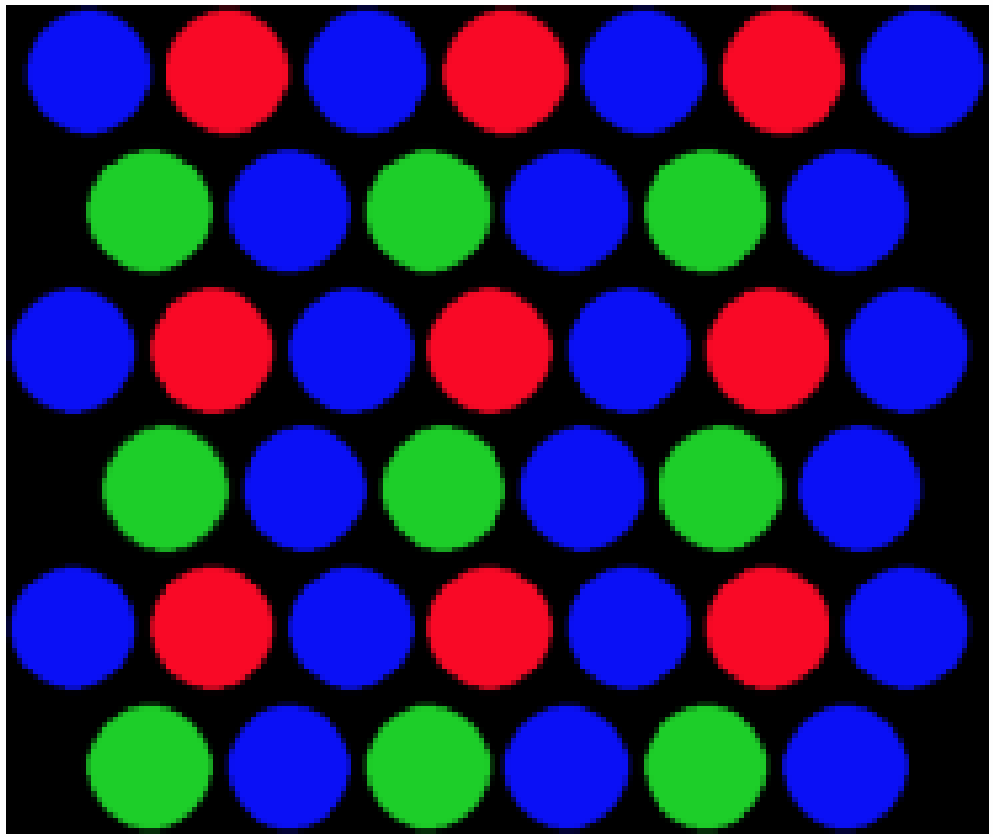


By De-emphasizing Color (by lowering Saturation or raising or lowering value) **Other Aspects** Become Accented

By De-emphasizing Detail, Color Can Become Emphasized.

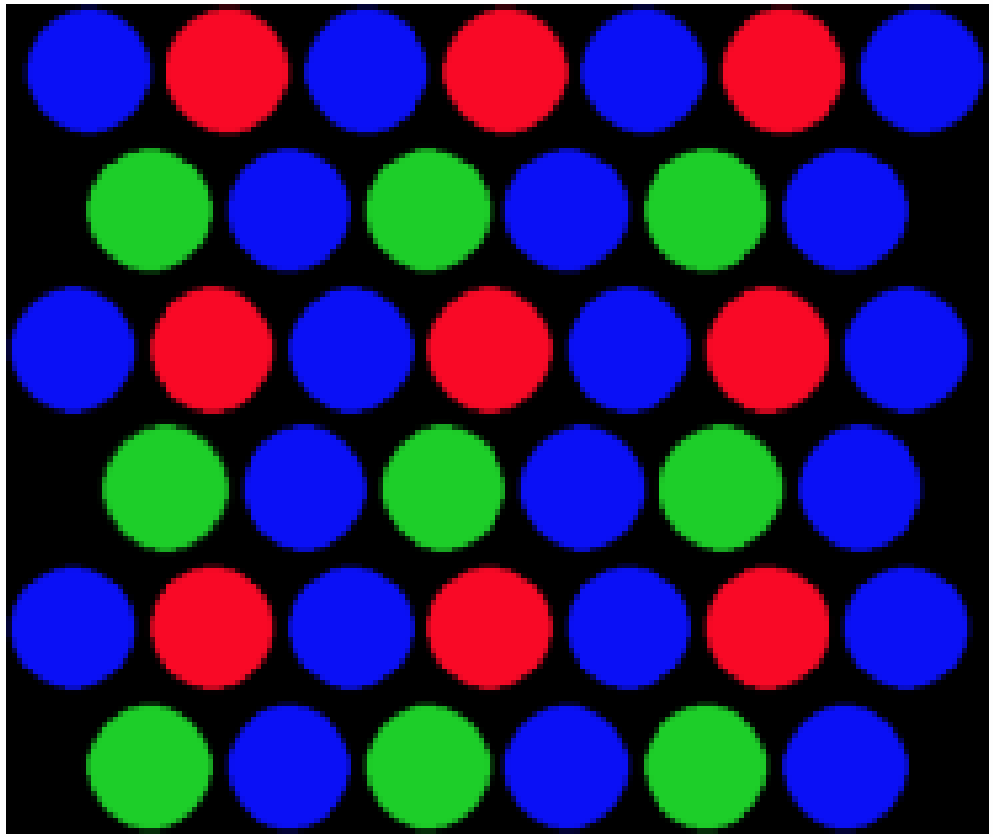
Science of Color

RBG



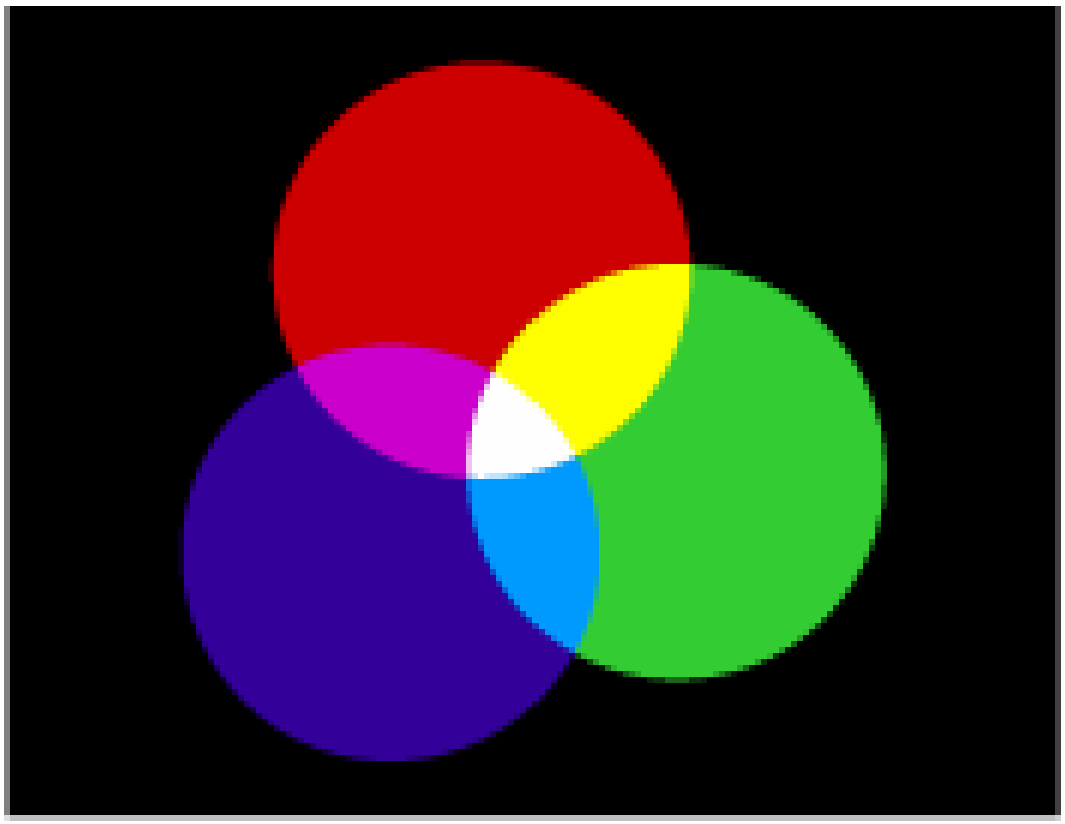
Red Green and Blue

RBG
(additive color process)



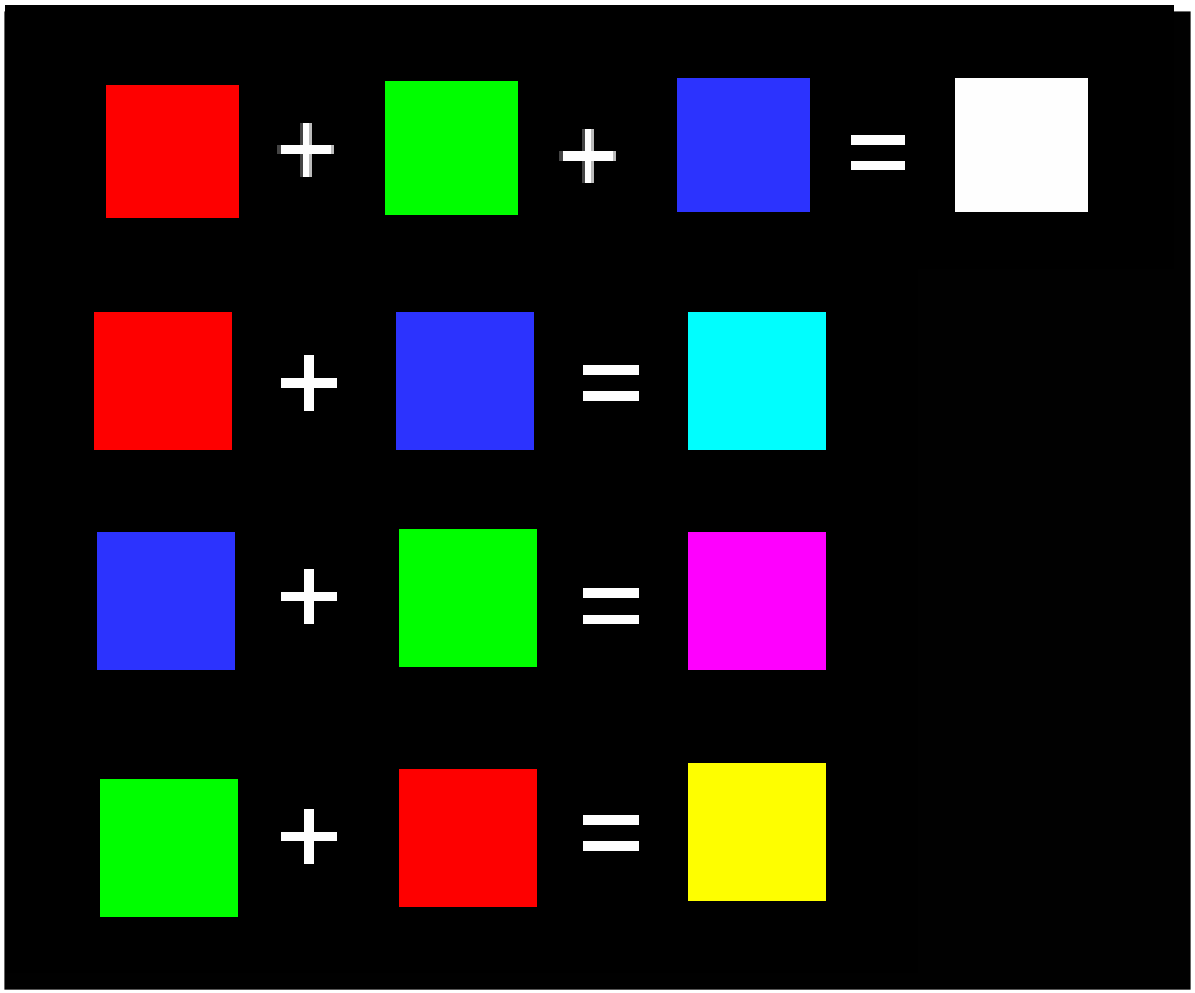
On RGB monitors small phosphoric dots combine to form color.

RBG
(additive color process)

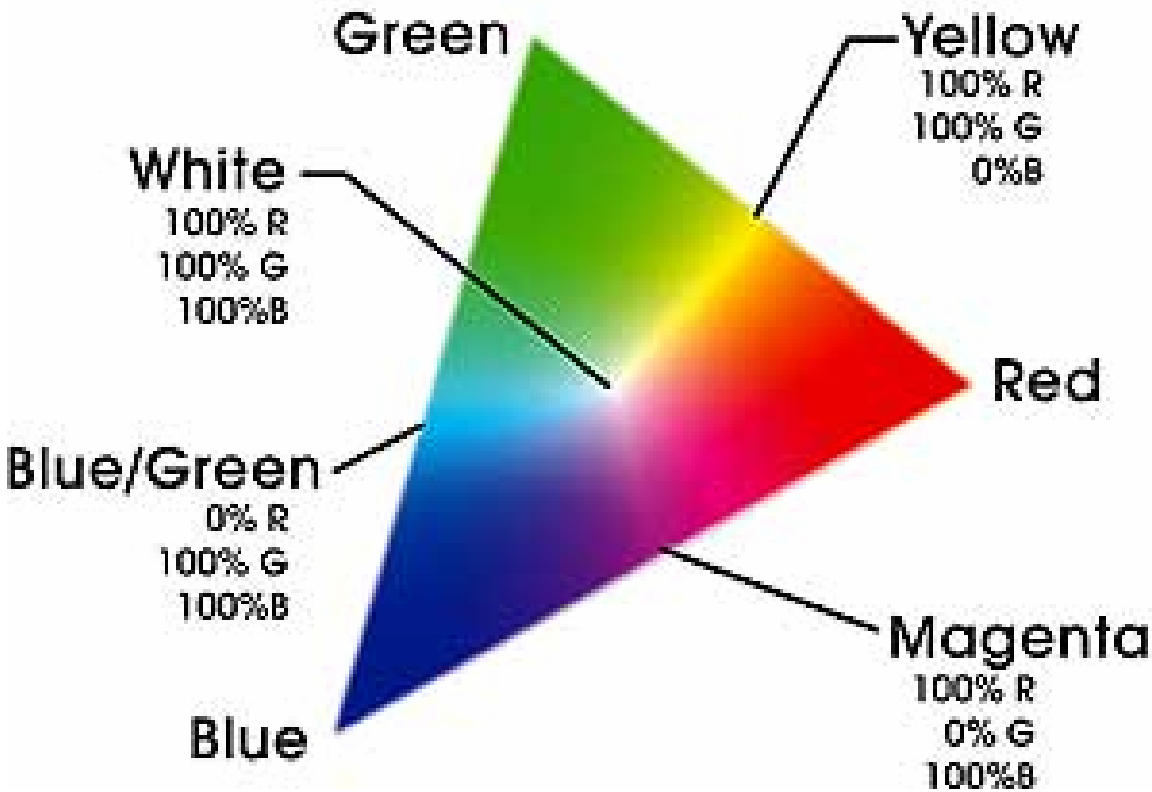


Red, Blue and Green light combines to form White.

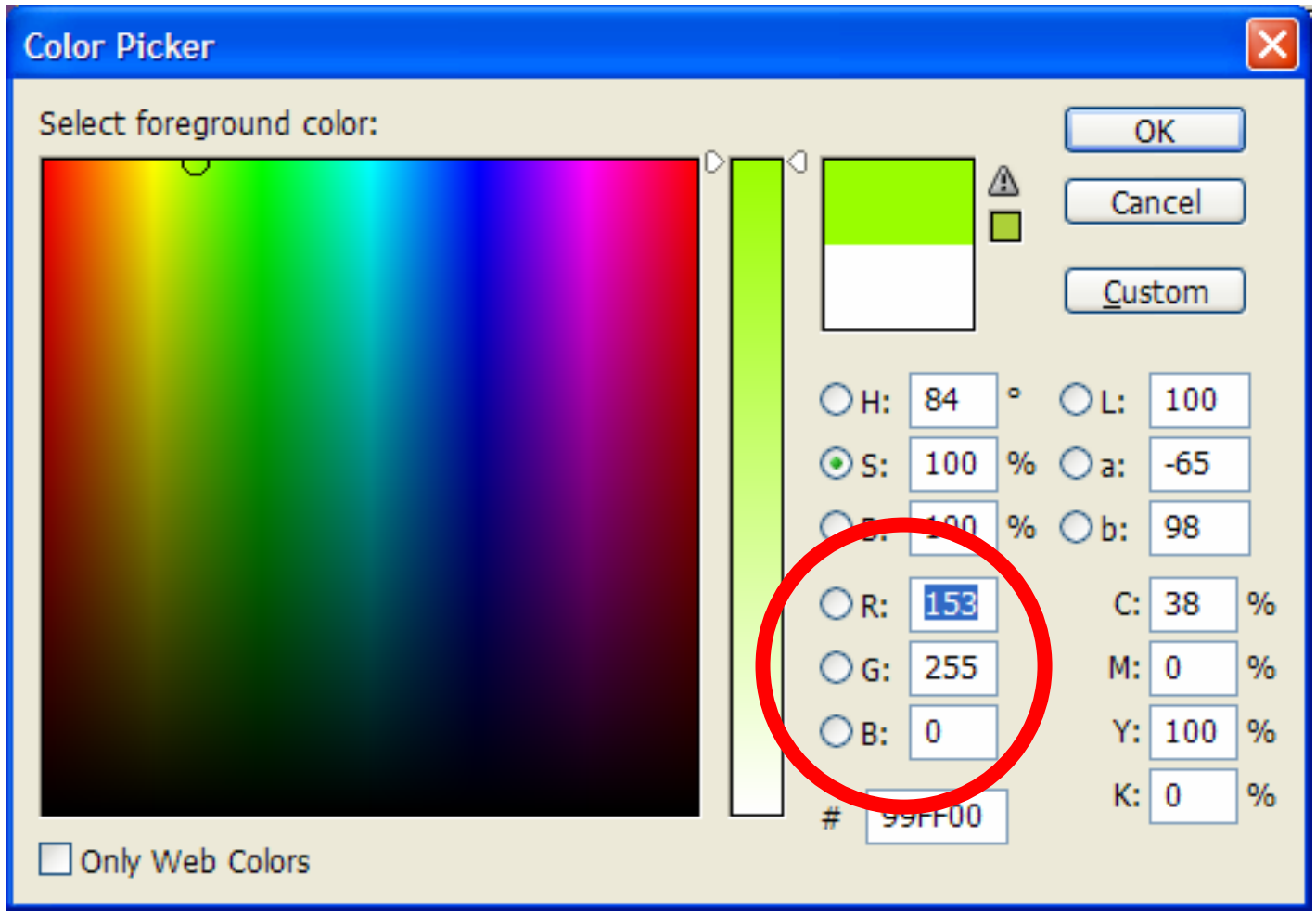
RBG
(additive color process)



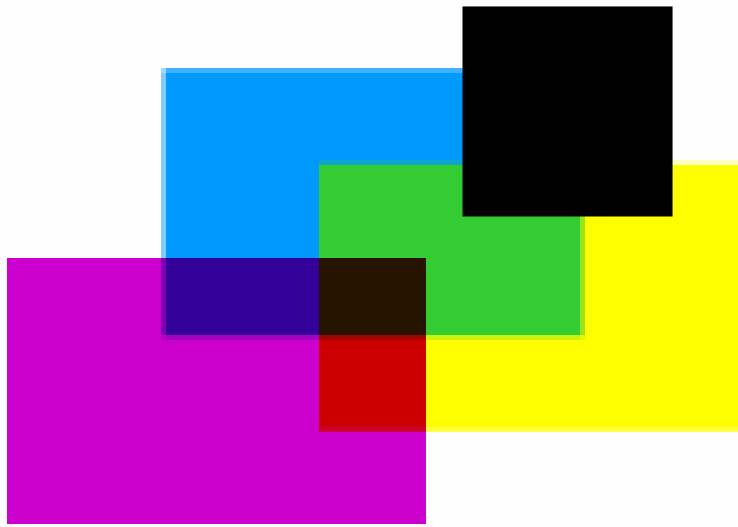
RBG
(additive color process)



RGB in the Photoshop/Illustrator Color Picker



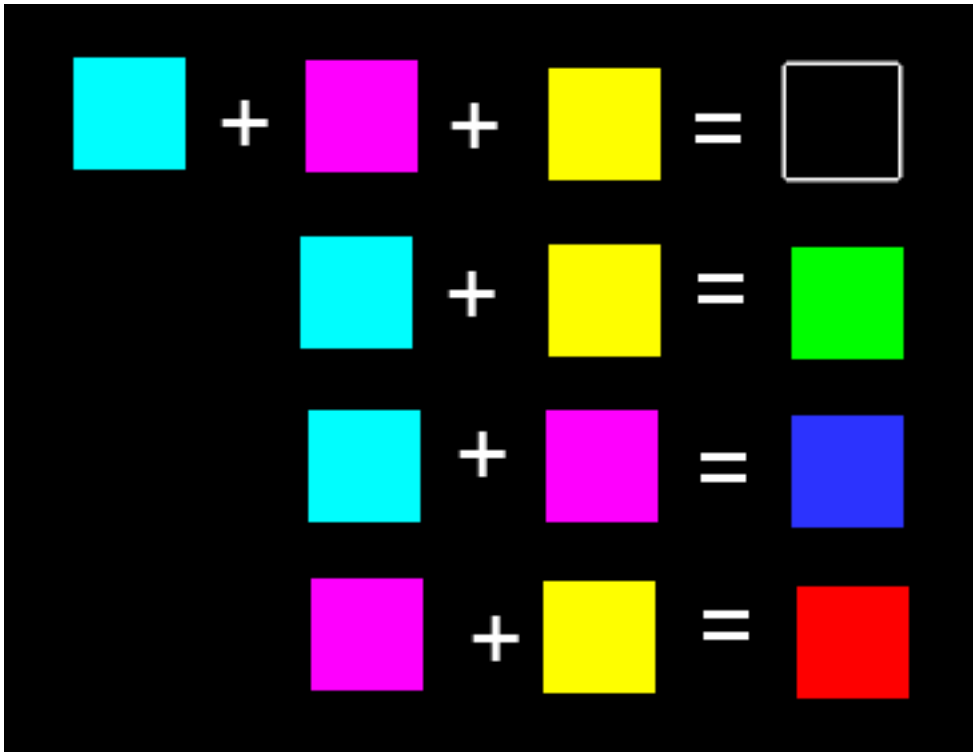
CMYK



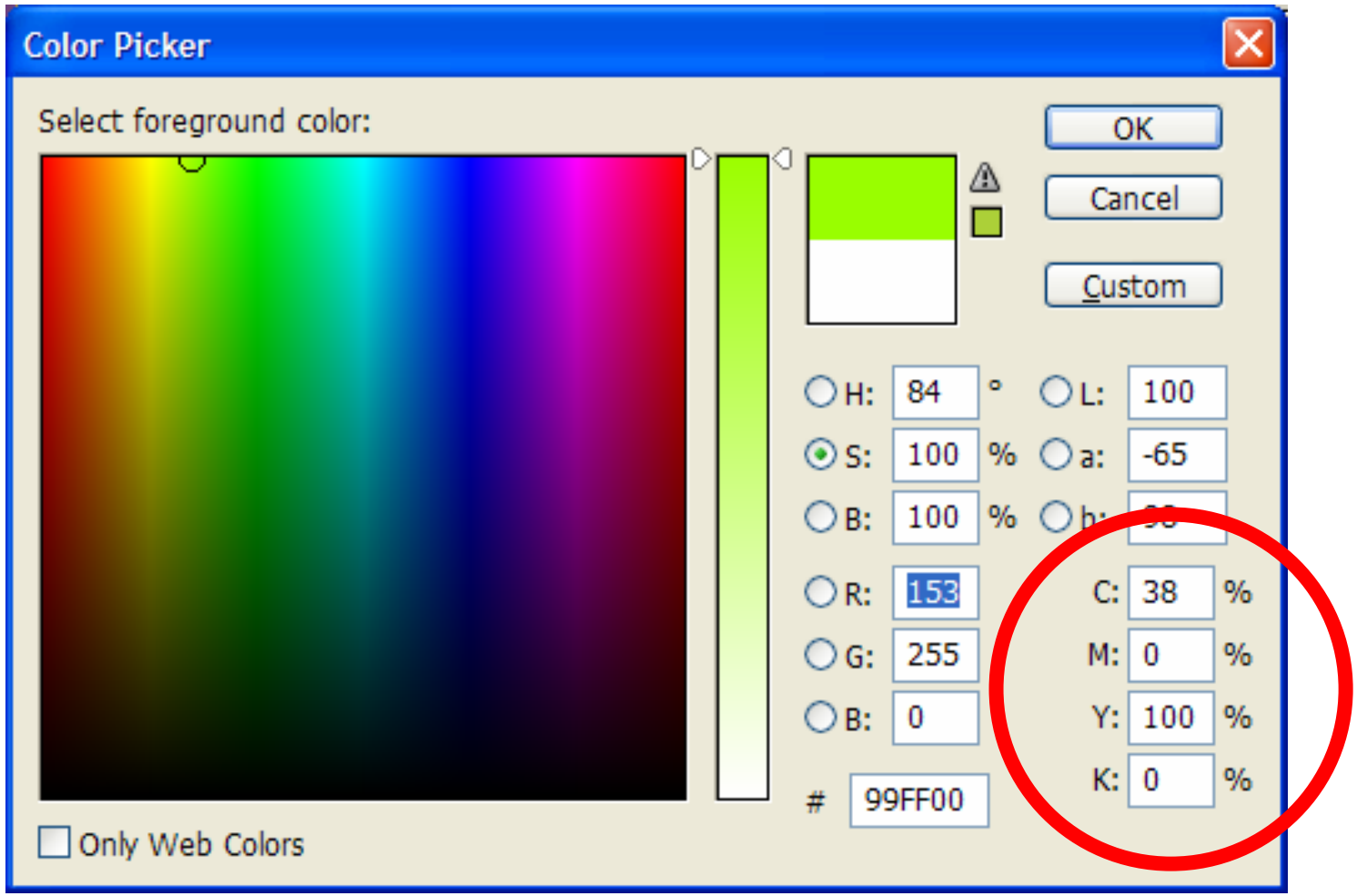
Used in the printing process:

Cyan, Magenta, Yellow and Black

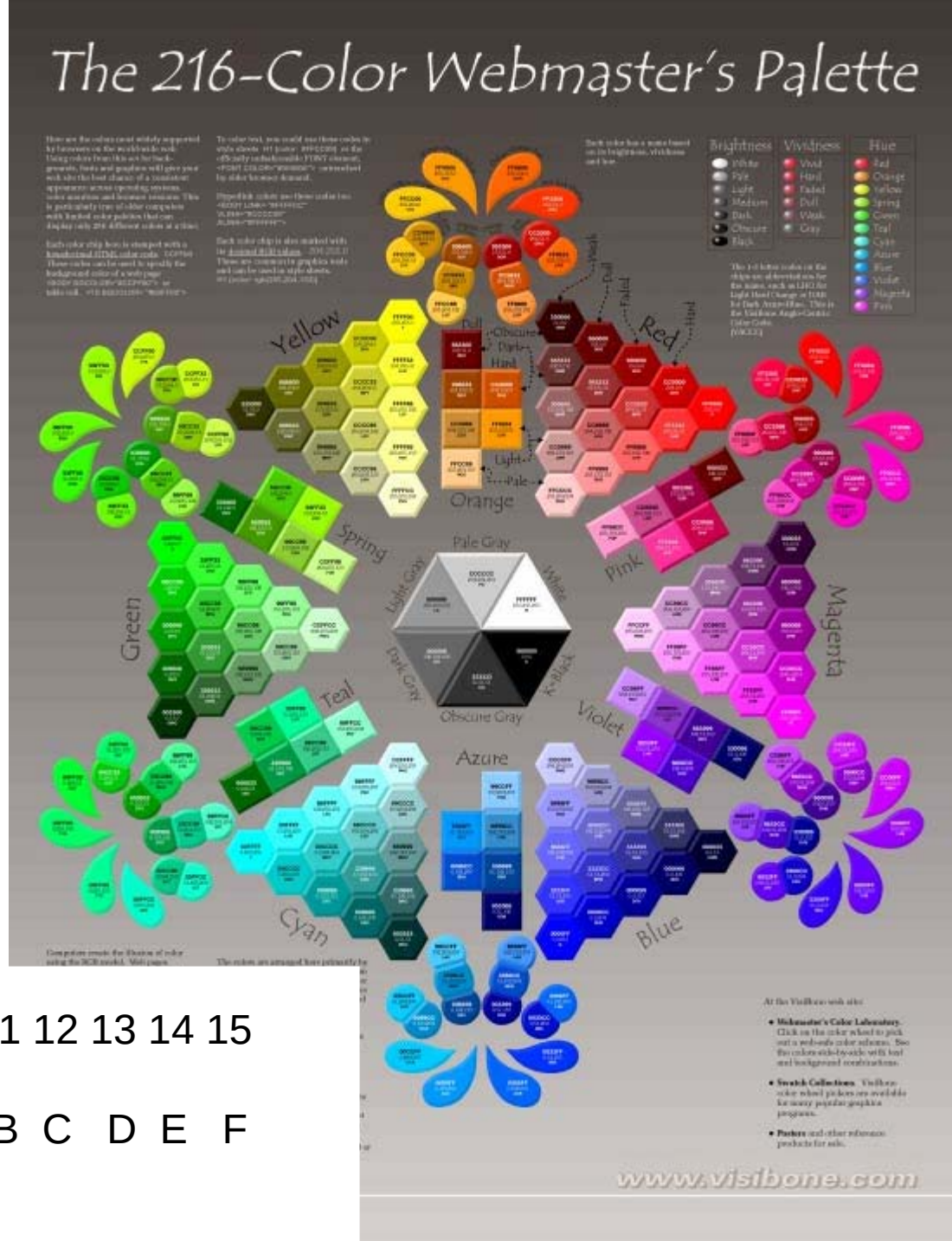
CMYK
(subtractive color process)



CMYK in the Photoshop/Illustrator Color Picker



The Web Uses a “Hexidecimal” Numerical System for Colors



Decimal	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hex	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

Some Hex Colors

Red	
1	660000
2	993333
3	CC3333
4	CC6666
5	FF0000
6	FF3333
7	FF6666
8	FF9999
9	FFCCCC

Yellow	
1	666600
2	999900
3	CCCC00
4	CCCC99
5	FFFF00
6	FFFF33
7	FFFF66
8	FFFF99
9	FFFFCC

Blue	
1	000099
2	333399
3	3333CC
4	6666CC
5	0000FF
6	3333FF
7	6666FF
8	9999FF
9	CCCCFF

Red-Orange	
1	993300
2	CC3300
3	CC6600
4	FF3300
5	FF6600
6	FF6633

Yellow-Green	
1	336600
2	339933
3	66CC00
4	33FF00
5	99FF00
6	99FF66
7	CCFF00
8	CCFF66
9	CCFF99

Blue-Violet	
1	660099
2	9933CC
3	9966CC
4	CC33FF
5	CC00FF
6	CC66FF
7	CC99FF

Yellow-Orange	
1	CC9966
2	CC9933
3	CC9900
4	FFCC00
5	FFCC33
6	FFCC66
7	FFCC99

Blue-Green	
1	006600
2	339999
3	00CC99
4	66CCCC
5	00FFCC
6	33FFCC
7	66FFCC
8	99FFCC
9	CCFFFF

Red-Violet	
1	660033
2	993366
3	CC3399
4	CC6699
5	FF0099
6	FF00CC
7	FF6699
8	FF66CC
9	FF99CC

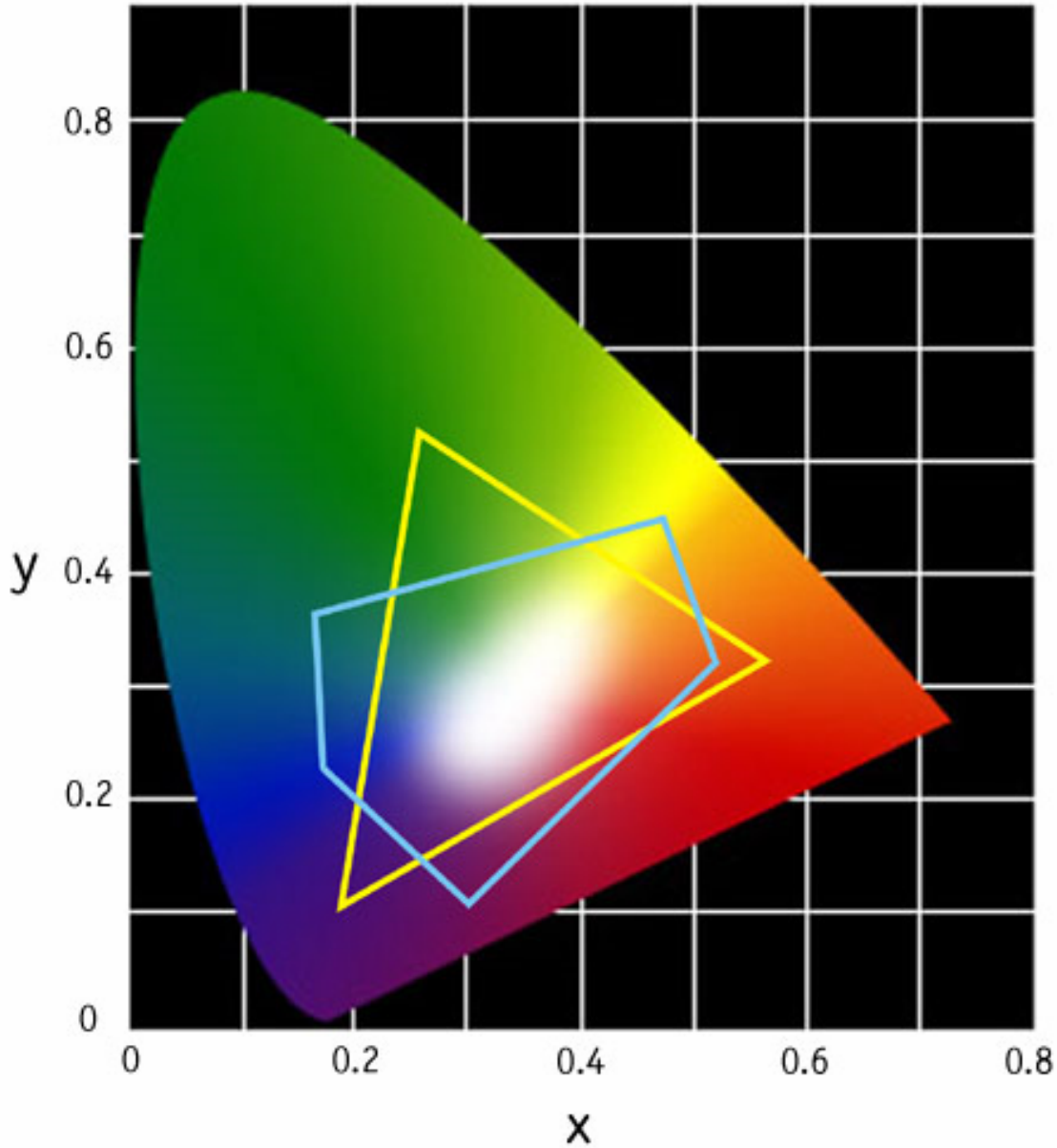
Black	
1	000000
2	333333
3	666666
4	999999
5	CCCCCC
6	FFFFFF

Orange	
1	996633
2	CC6633
3	FF9900
4	FF9933
5	FF9966

Green	
1	006600
2	009900
3	00CC00
4	99CC99
5	00FF00
6	33FF33
7	66FF66
8	99FF99
9	CCFFCC

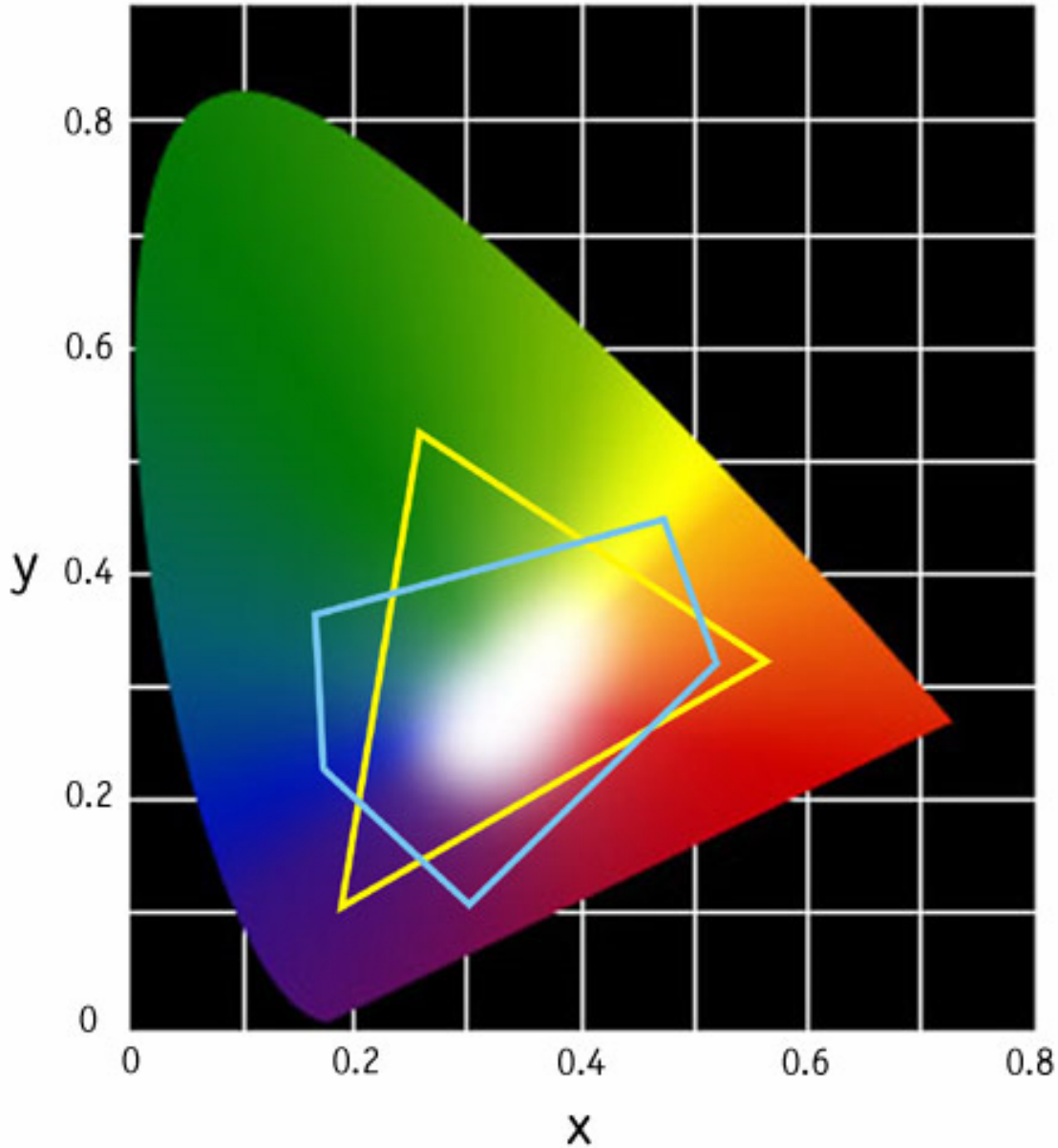
Violet	
1	663366
2	993399
3	996699
4	CC33CC
5	FF00FF
6	FF33FF
7	FF66FF
8	FF99FF
9	FFCCFF

Color Gamut



Is the full range of colors that can be recorded or output by a particular medium. In other words, its “Color Space”.

Color Gamut

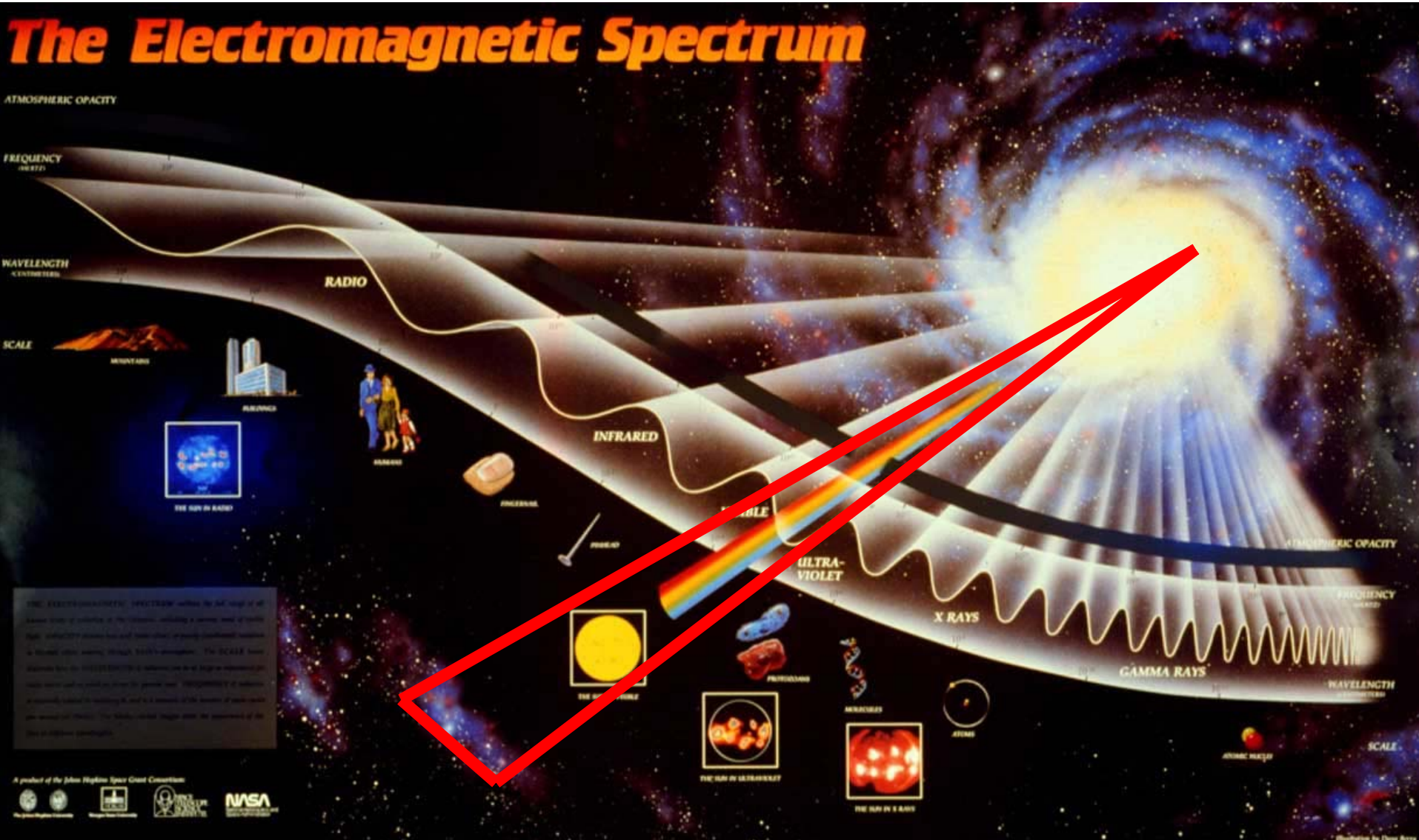


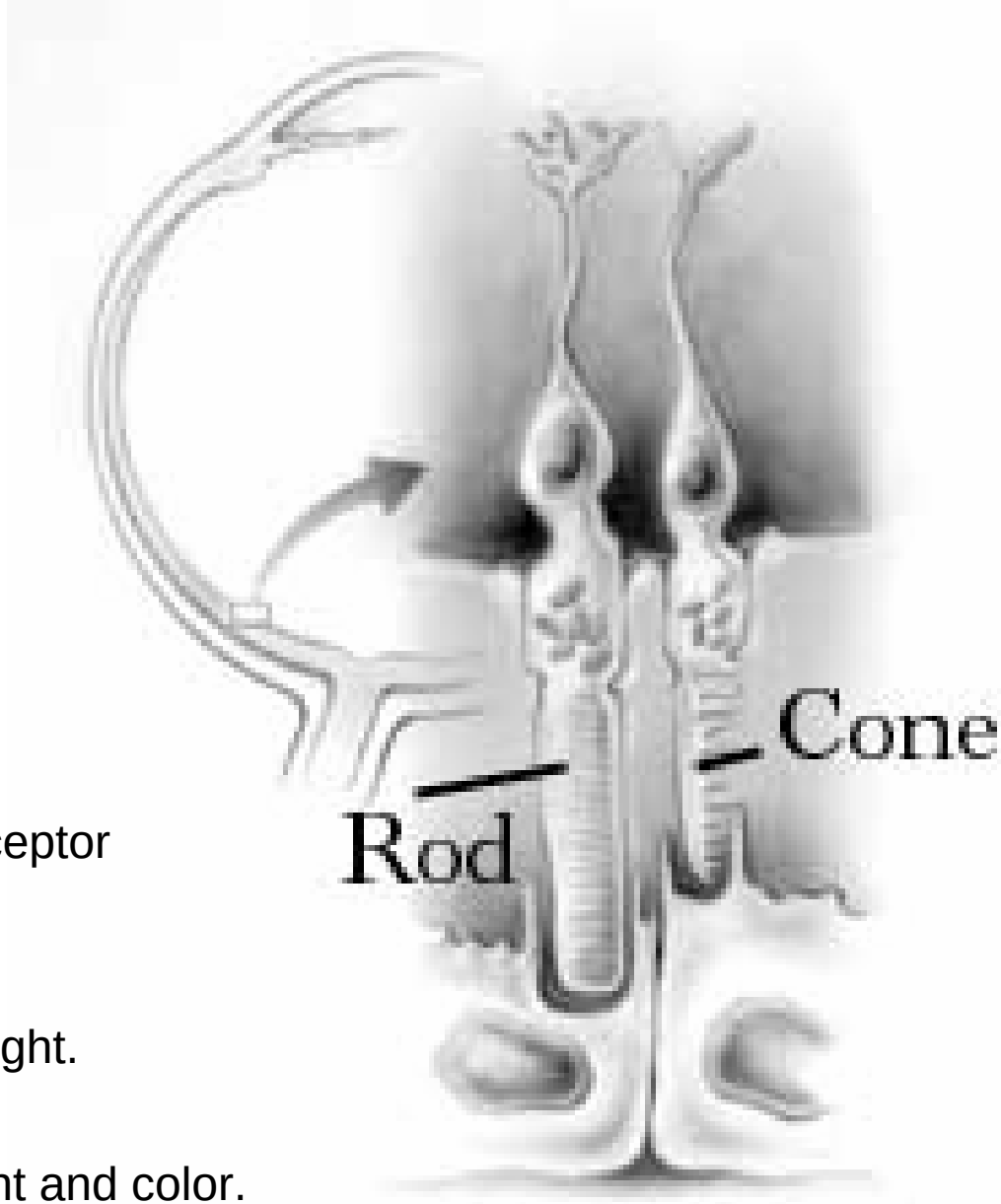
The yellow line = the color gamut for an average RGB monitor.

The cyan line = the color gamut for average CMYK printing.

Human Color (Visible Light) Gamut

Human Color Gamut



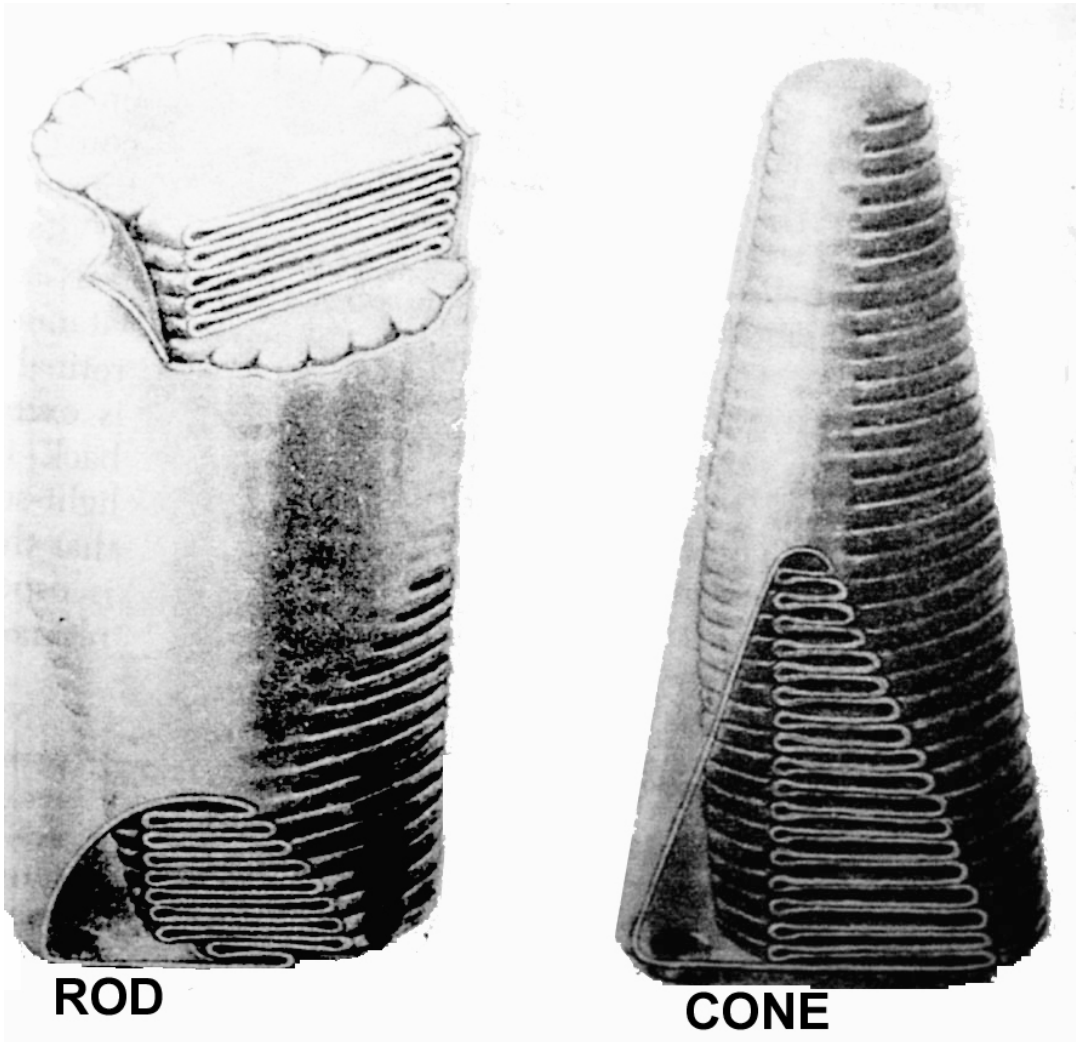


We have two types of Photoreceptor cells inside our eye:

Rods: Which responds to dim light.

Cones: Which responds daylight and color.

Their names were given for a clear reason…

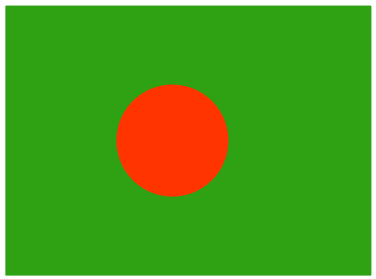


Animals such as dogs have more Rods than we do but less Cones. What does this mean?

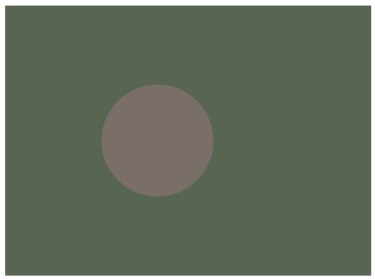
1) They have better night vision.

2) In darkness they have greater sensitivity to differences in color Value, but not Hue.

This is why they have trouble seeing a red ball in green grass. They aren't color blind, but are color impaired compared to humans.



Red ball in the grass to you…



and to your dog.

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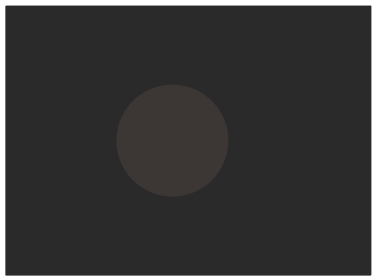
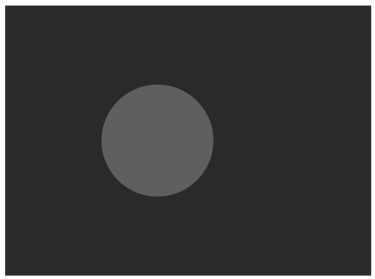


Red ball in the grass at night to you…



and to your dog.