4.Color Psychology:

https://www.behavioraldesign.academy/wp-content/uploads/color_psychology_book_alterspark_25_42347951.pdf

https://color.adobe.com/create/color-wheel

Also, check out the free courses at School of Motion; it has free notes on the basics of color.

💡 **3 Main Challenges of Digital Artists in Using Color Properly:**

1. Unverified scientific principles and rules.
2. Lots of Blogs and material on color.
3. Information changes as per source changes.

Always use color according to the proper scientific theory and well-timed, tested principles, not on gut feeling.

---

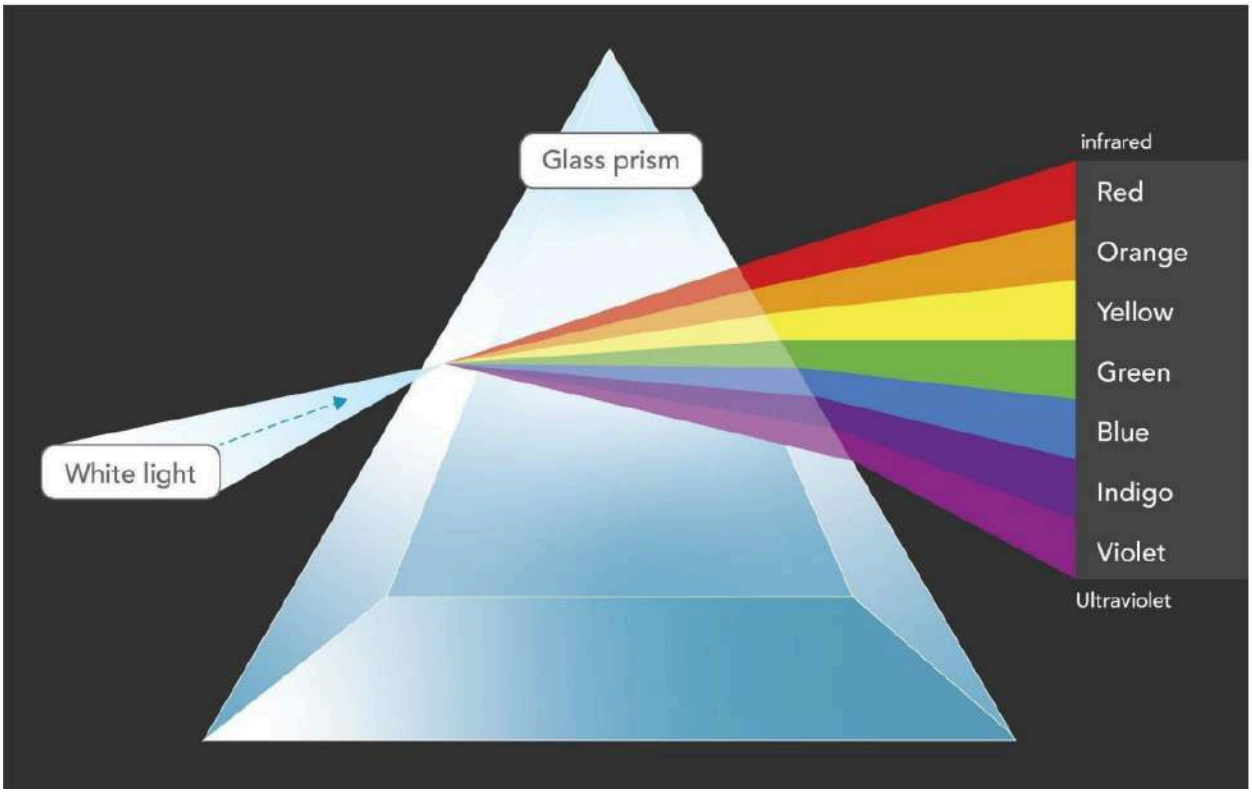
1. The Science of Color:

💡 Two scientific theories are needed to understand color: Physical (how we measure light) and Biological (how our mind perceives light).

A. Physics of Light:

> When sunlight passes through raindrops, the light bends into different wave-length and we get rainbow which has 7 Light (VIBGYOR). Same thing happens when we pass white light through a glass prism.

This process is called refraction, which describes when light passes through a medium such as water and then bends, breaks apart, and slows down.



💡 We as humans can only see the light which is between 400-700 nanometers; beyond this, we can't see. Infrared is just beyond red, and ultraviolet is just below purple.

- **Infrared = Heat → Afternoon Above 700 nm. (strongest when the Sun is hottest).**
- **Ultraviolet = Sunburn → Midday Below 400 nm. Time 10 AM - 4 PM (strongest when the Sun is directly overhead).**

Night vision cameras detect infrared radiation, which helps in the dark.

B. How we perceive Light: (Biology)

> When light hit a particular surface than some of it get absorb by the surface itself and rest of light is reflected back, which we interpret as different colors.

💡 Our eyes have two photosensitive cells that help us to interpret the light as color around us by sending signals to our brain.

1. Our eyes have around 6-7M cones, which interpret 3 different types of wavelength:
They are short-wavelength (which our brain interprets as blue), middle-wavelength (interpreted as green), and long-wavelength (interpreted as red).

That's why at night, we are not able to see any color because our cones do not receive any wavelength.

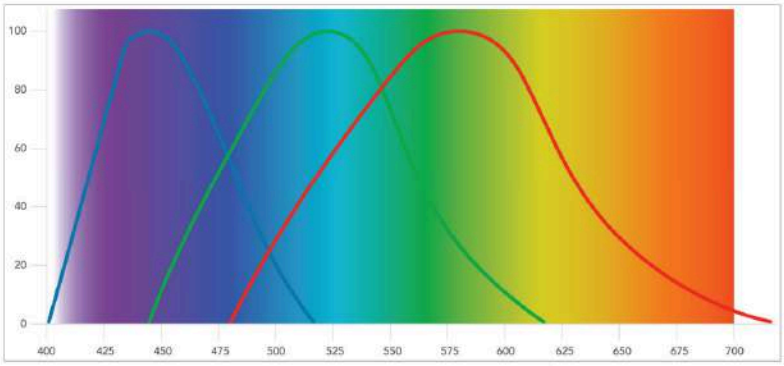
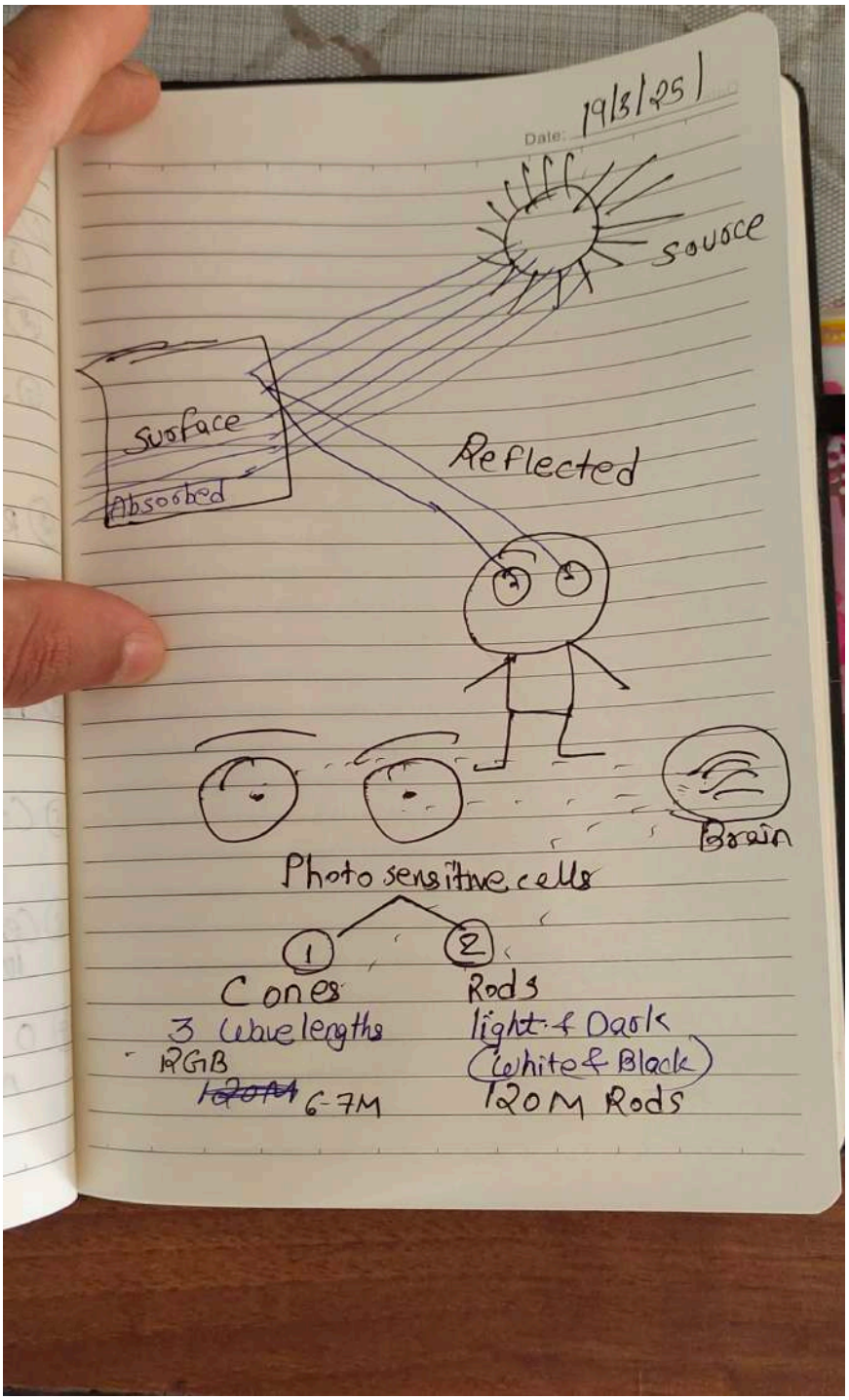


Figure 3. Red, green and blue cones and the perception of visible light


Date: 19/8/25
source
Surface
Absorbed
Reflected
Brain
Photo sensitive cells
1
2
Cones
3 Wavelengths
RGB
~~120M~~ 6-7M
Rods
light & Dark
(White & Black)
120M Rods

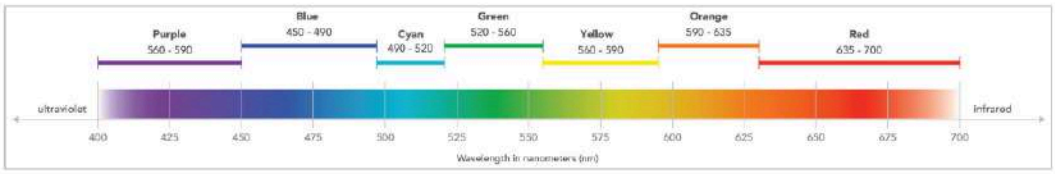


Figure 4. Cultural words for color based on arbitrary wavelength ranges

💡 In short, colors are nothing but the ***different wavelengths of light*** and for simplicity, we as humanity started calling the different wavelengths with different color names, i.e., red, green, or blue, etc.

It is the miracle of God, and we can say that light is an illusion. It changes from species to species because some have more cones and rods than us.

2. The Color Wheel & Basic Terms:

💡 When we connect one end of the spectrum to another, we get what is known as a color wheel. (This means the red and violet ends are bent to create a proper circle.)

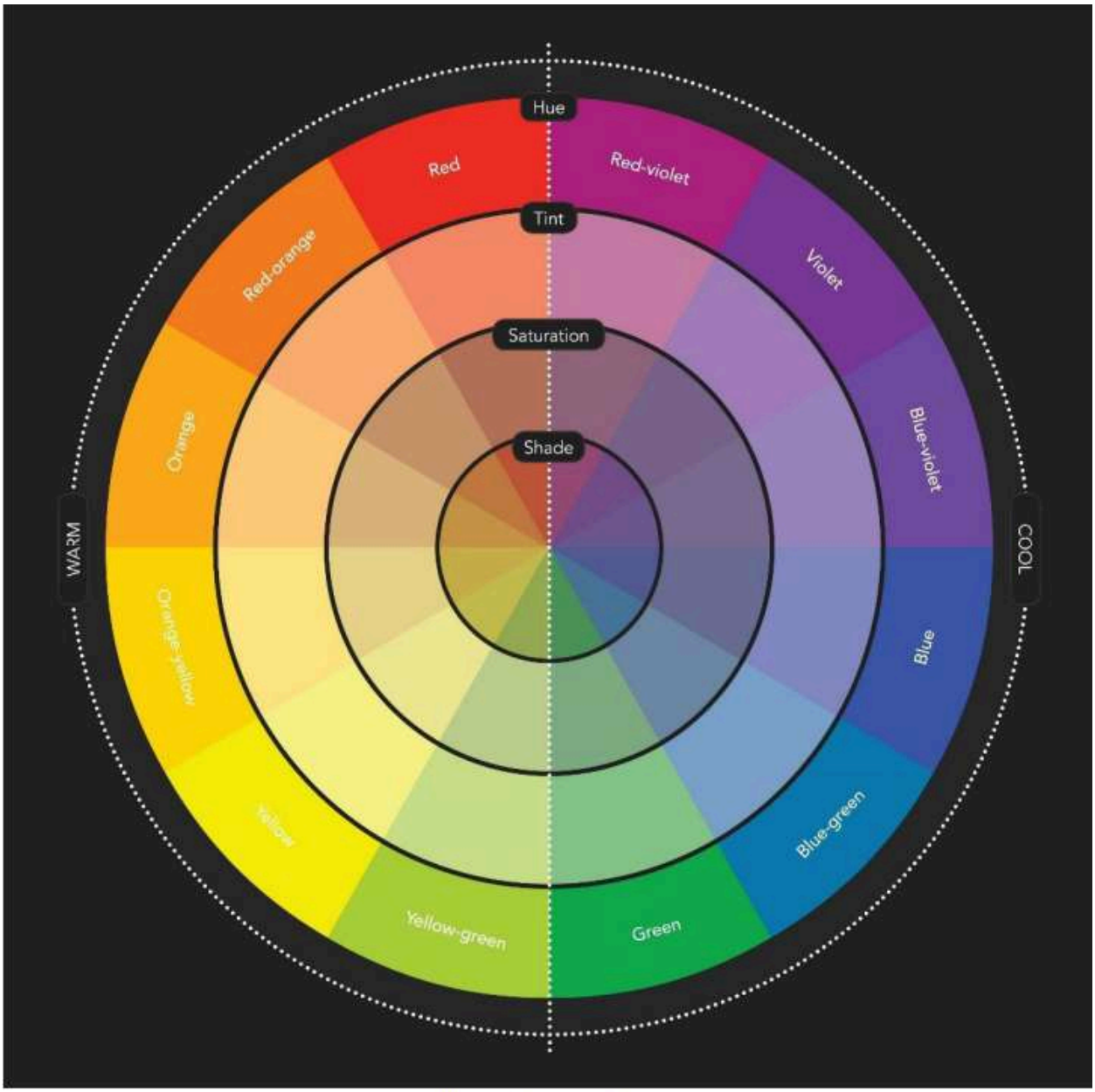


Figure 5. Color wheel

> **There are 3 primary color (RGB) which used to create different colors that we see.**

This is more useful for physical painting to create different colors from 2 or more colors, but in digital, we have all the colors in the software itself.

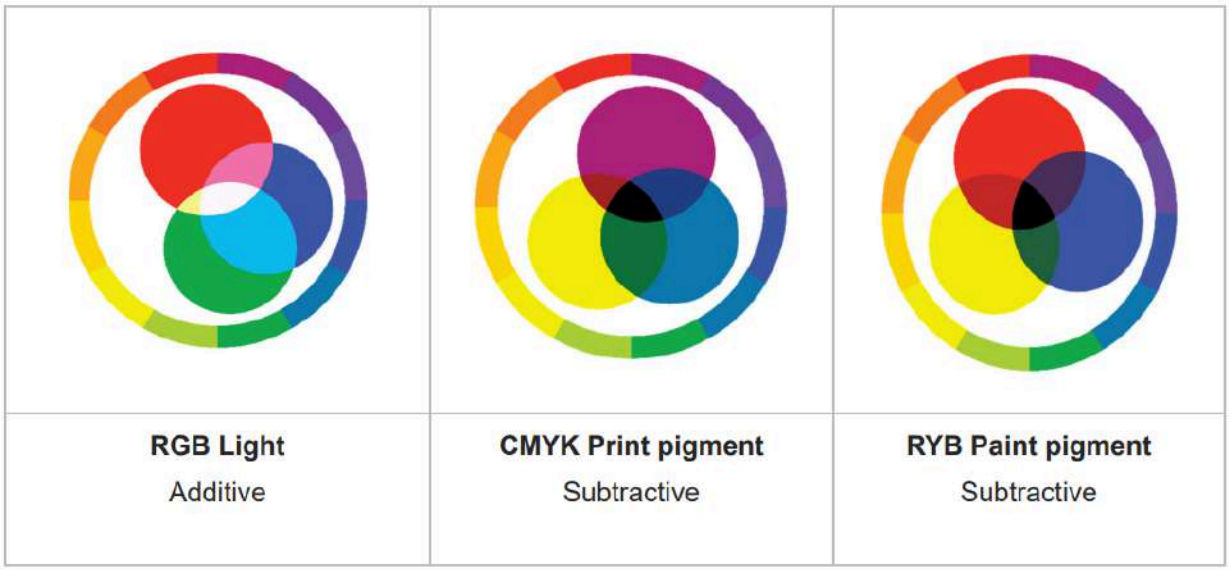


Figure 6. Primary colors from three color models

Key Color Terms:

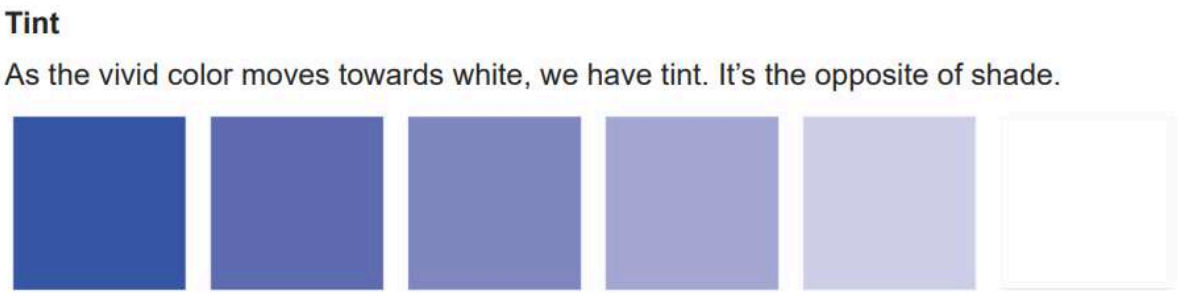
1. **Hue** is the color in its pure or original form, such as Red, Green, or blue.

2. **Brightness (Value):** How much black and white color is mixed with the color hue. Lightness or darkness. It has 3 main terms:

A. **Shade:** A shade means how dark the color is; in other words, how much black is mixed. When we kept adding black, it finally became black and lost its color.

B. Saturation: This means how grayish a particular color is. When we kept adding grey, the color finally became grey.

C. **Tint:** We keep adding white, and lastly, it became white, and all its properties vanished.



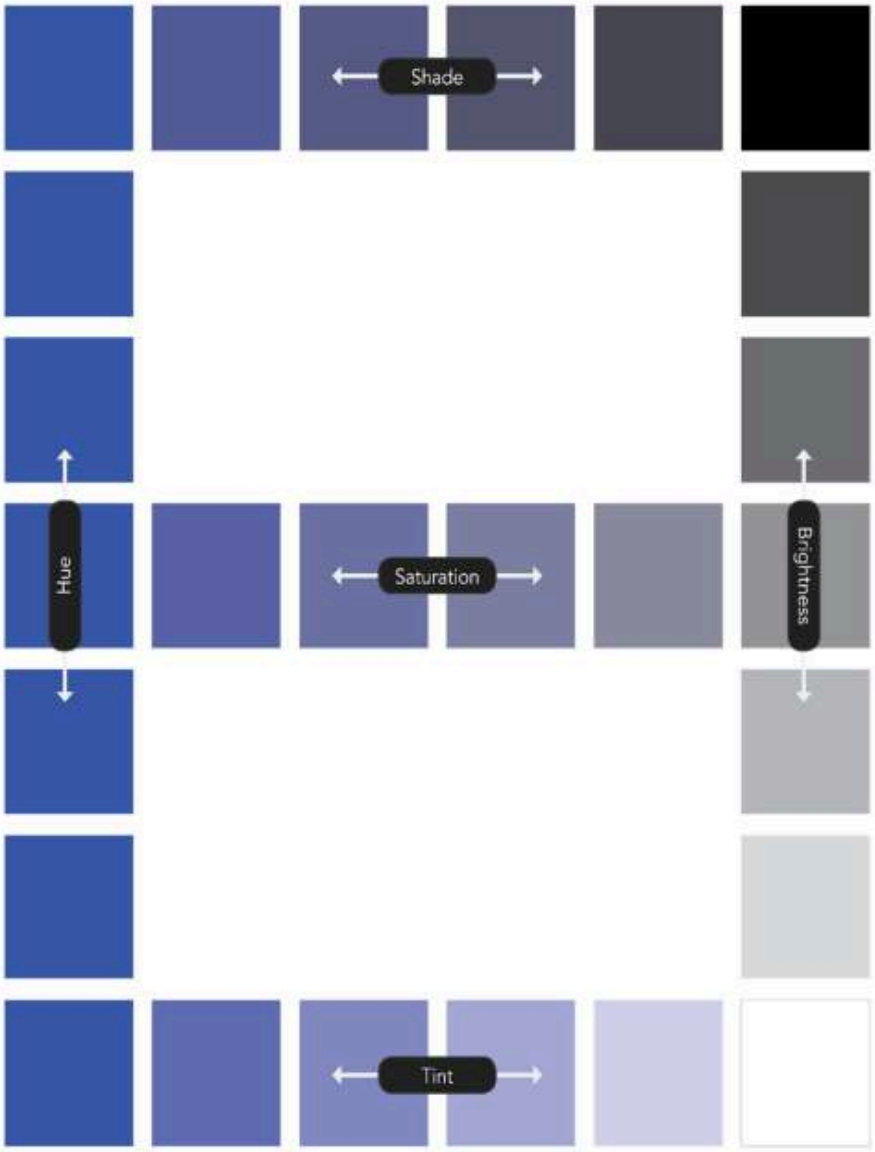


Figure 8. Mega map with hue, shade, saturation, tint and brightness

3. The Color Combinations:

💡 ***There is no point in using only an RGB color combo for our design; we can use different color combinations suitable for our message and the emotion and impact we want to generate from our work.***

We can select colors from websites like Adobe Color, etc.

1. Calm Combinations:

> This are the type of combination which gives cool, clam and aesthetic feeling to us.
>
> The research on aesthetically pleasing colors deals more ***with related colors, such as contrasting colors*** **(contrast principle created by colors which on opposite side of each other)** ***or similar colors.*** So a good starting point for establishing pleasurable color combinations is the color wheel, which is typically used for this exact purpose.

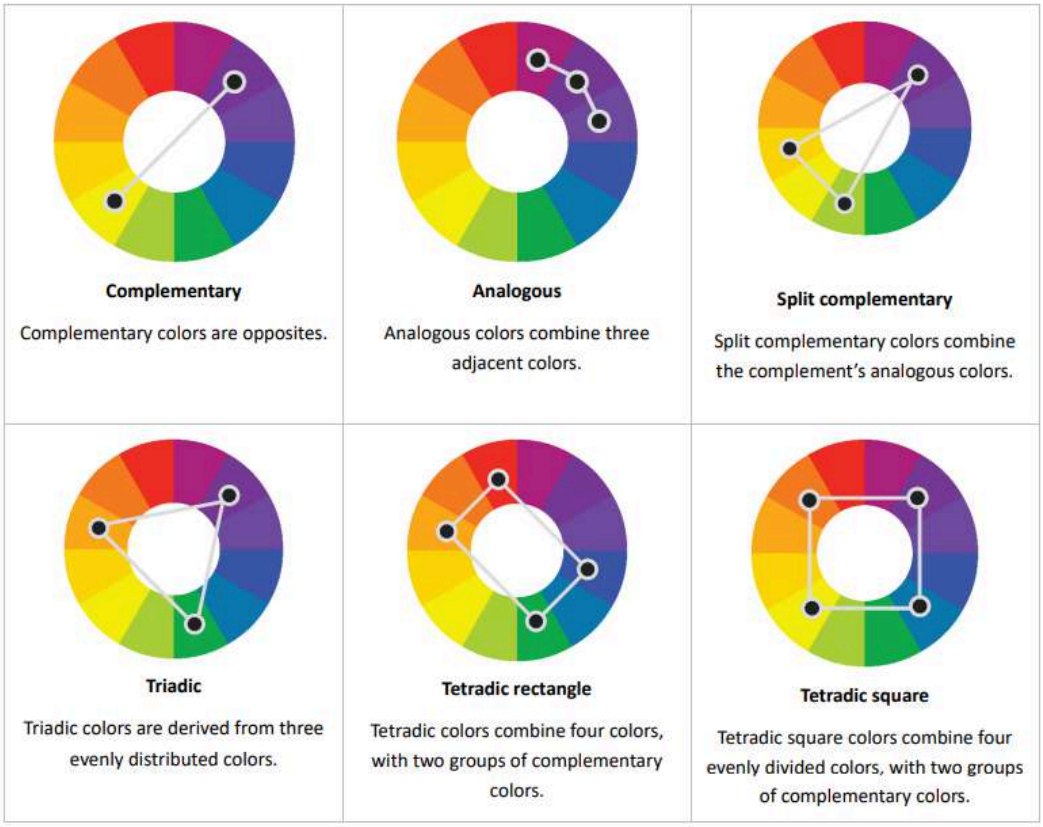


Figure 9. Color combinations

2. Stressed Combinations:

> These are the type of color combinations which we don't liked to watch and give our eyes some kind of stain and pain. This happens due to chromostereopsis.

💡 Chromostereopsis is the effect in which people experience a wobbly optical illusion that people experience when looking at two colors far apart on the color spectrum.

Chromostereopsis emerges when one color reaches the eye slightly faster than the other due to different wavelengths.

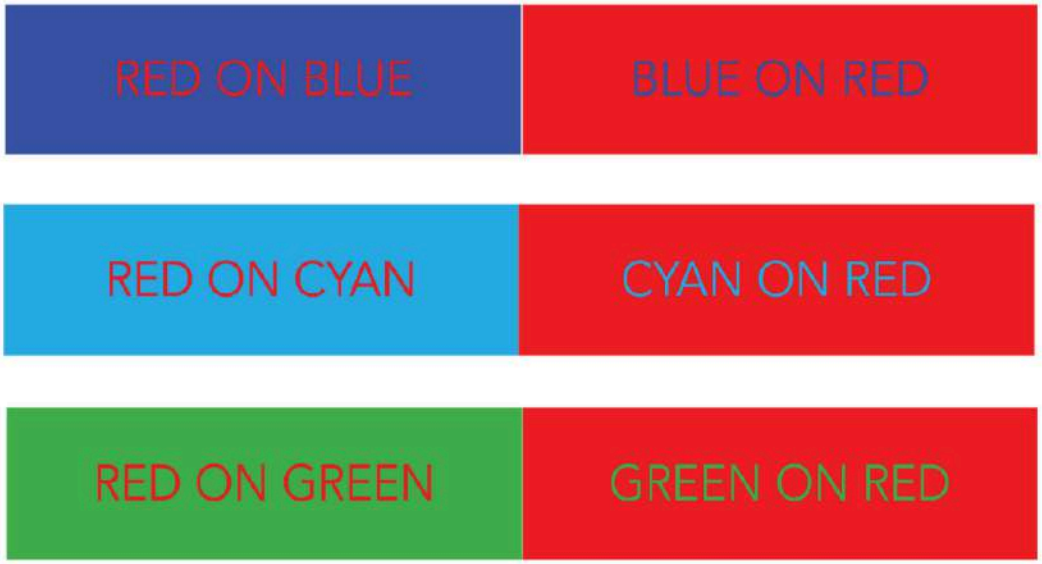


Figure 10. Chromostereopsis

💡 This creates an optical illusion where one color appears closer than the other. However, from tests at Alter Spark, people report seeing **either color closer or further.**
This effect does not create a proper effect on our eyes, but we can use it to ***create depth of illusion in our design*** **(because it creates an effect where the object appears either closer or further),** as this was done by the old painter in their paintings.

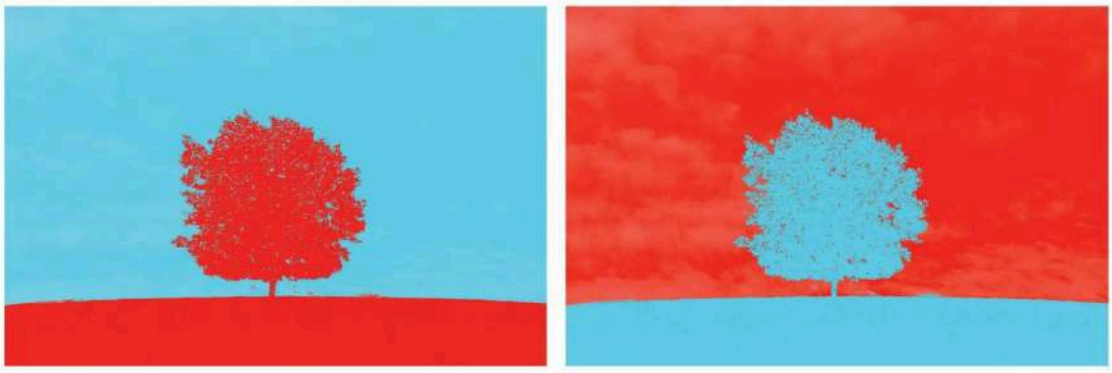


Figure 11. Creating a depth illusion with chromostereopsis

In Figure 11, the same effect is used to make the tree appear in the foreground.

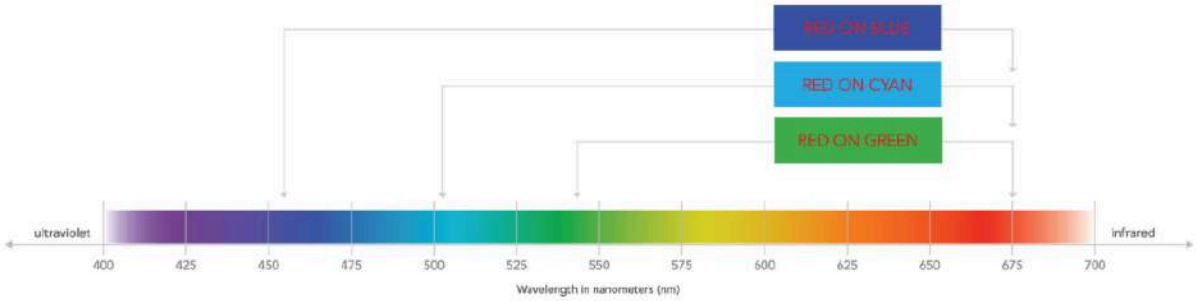
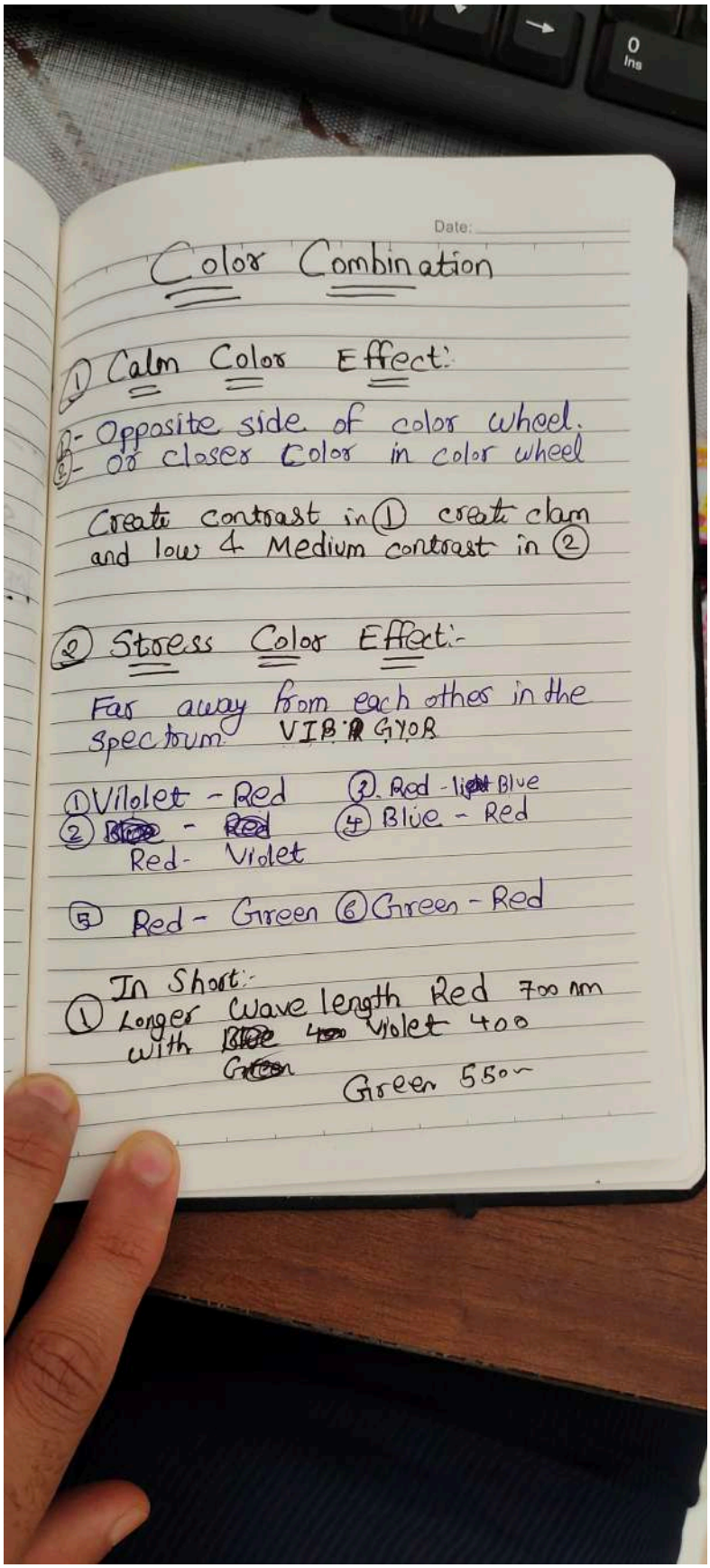


Figure 12. Chromostereopsis one the color spectrum


Date:
Color Combination
① Calm Color Effect:
① - Opposite side of color wheel.
② - Or closer Color in color wheel
Create contrast in ① create clam and low & Medium contrast in ②
② Stress Color Effect:-
Far away from each other in the spectrum VIBGYOR
① Vilolet - Red
② - Red - Violet
③ Red - Blue
④ Blue - Red
⑤ Red - Green
⑥ Green - Red
In Short:
① Longer Wave length Red 700 nm
with Violet 400
Green 550~

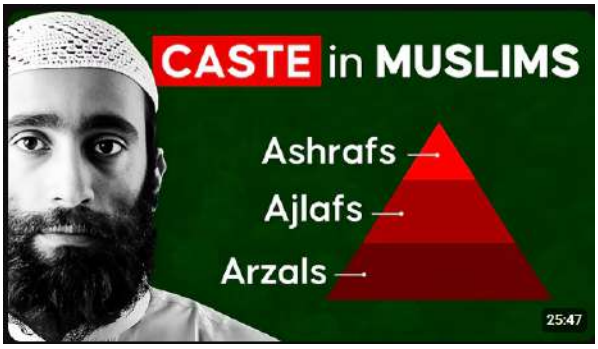
4. The Emotion & Color:

💡 **People worldwide have different emotions attached to different colors, based on their interpretation, faith, experience, culture, etc.**
For some people, green means peace (Muslim), but for Hindus, it might mean violence due to terrorist attacks around the world, done by Muslims.

Language also plays a key role. Western people call 700 wavelengths Red, while the Gujarati call them red (Lal). Orange and red have the English word vermilion, which we call Rato in Guajarati.

General Guideline:

1. When we want to convey something to a particular audience or community, our content must have a color palette that resonates and relates easily with them.



2. If we want people to ***remember our message***, then communicate it with the ***cultural color they resonate with***, and if we want our ***message to be forgotten*** over time, then just tell them in a ***color that they do not resonate with.***

2. When we are confused about which color to use, then ***use market research*** by survey to identify what they like or hate.
3. If some colors are associated with ***reward and punishment,*** then we have to use them carefully while communicating our message to the audience.
4. If we want o***ur company to be perceived as premium,*** bold, vintage, classy, and for rich people, then we can ***use colors like black and white*** because over the past 100 years big brands like Apple and other have created a perception for premium people by creating logo with black and white color, with clean design and high price which symbolized status among people.
5. When communicating something basic and universal, we can use the color red for traffic-related things, green to start, orange to get ready, and also blue for other signs.

5. Visual Hierarchy:

> 💡 **One of the critical applications of color in behavioral design is using it to control where people look.**
>
> **We can achieve visual hierarchy by revealing elements frame by frame, changing the color, shape, or size of the composition, and other visual elements.**

The visual hierarchy of any color palette is easily manipulated by modifying the saturation, shade, and tint of each hue, so we can structure any combination of

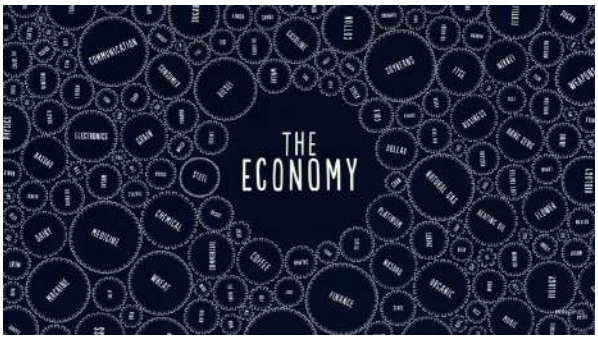
hues with any visual hierarchy.

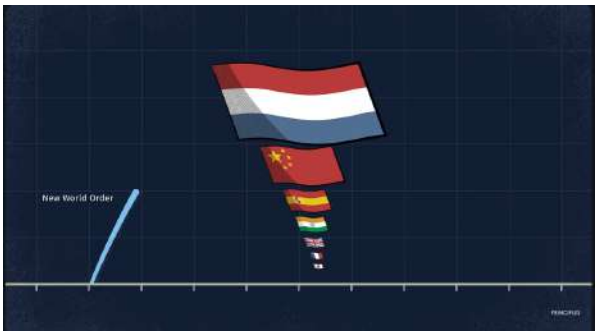
6. My observations and Practical Examples:

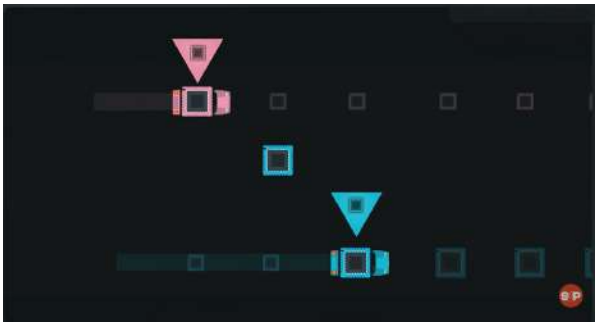
> 💡 **This section features some of my observations and 7 categories in which I have classified colors for my motion design and animation, because I struggle a lot with colors and font selection.**

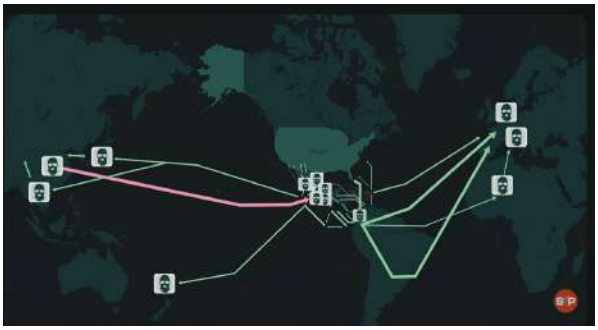
1. **Dark Theme (Ray Dalio and Search Party)**
2. **Light Theme (Think School)**
3. **Gradient Colors (Breakdown, Varun Mayya)**
4. **PASTEL Colors (Aevy TV)**
5. **Monochromatic Color: Different shades and tones of a single color.**
6. **Brand color for brand explainer**
7. **Futuristic and Bright (What I call bright and Popi) Cleo Abram & Full Disclosure**

1. Dark Theme:

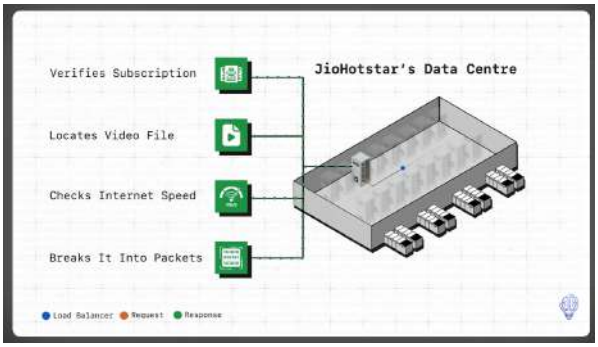




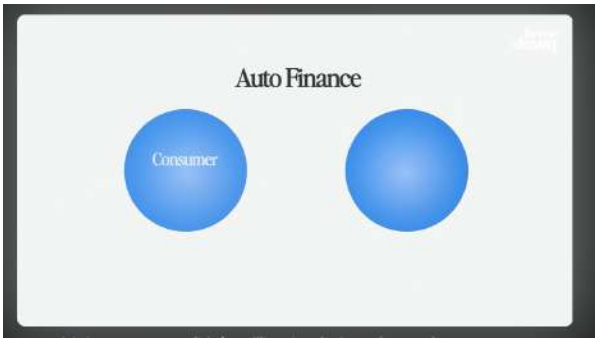


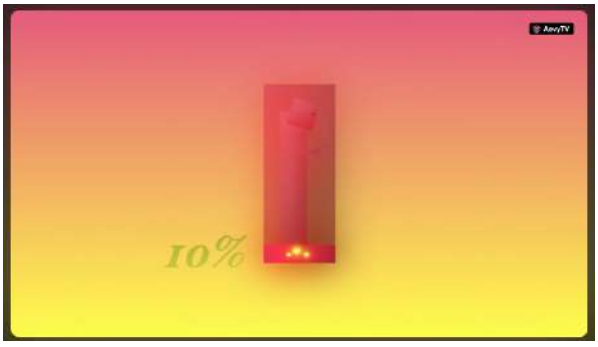


2. Light Theme:

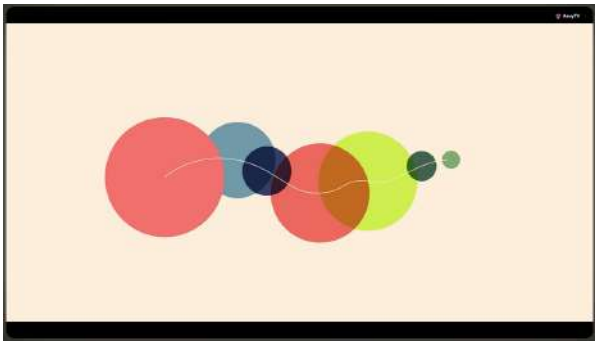


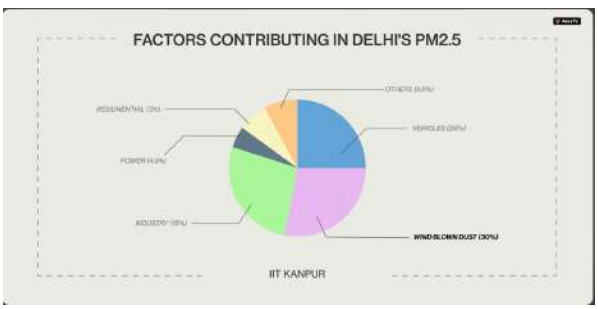
3. Gradient Color:

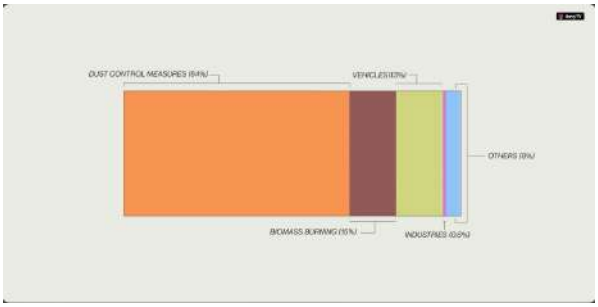




4. PASTEL COLORS:



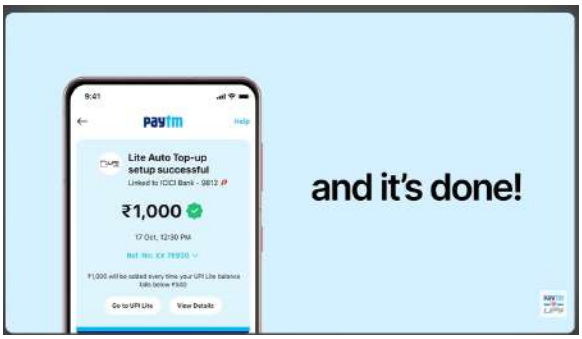




5. Monochromatic Color: Not able to find a concrete example for this.

But look at this Think School video on Ethanol, where they used the same green color in different shades and tones.

6. Brand color for brand explainer:



7. Futuristic and Bright: Neon/Luminescent and High Saturation.