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Theory of Color

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THEORY OF COLOURS

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Reproducing Color

- Three essential elements to seeing color:
  - Light, an illuminated object and an observer
  - At low light levels colors look different
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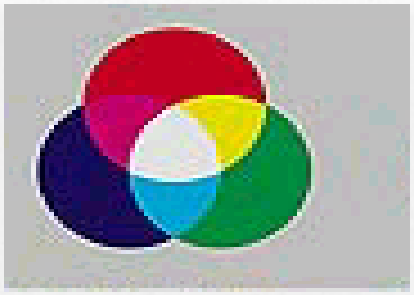
    - why fire trucks are no longer painted red
  - In bright daylight we can see more colors, more contrast and more saturation
  - The color spectrum shows the range of color visible to the human eye.
    - White light is a mixture of all the visible colors
    - It's called **Additive Color**

Additive Color



The visible spectrum

Used in monitors.

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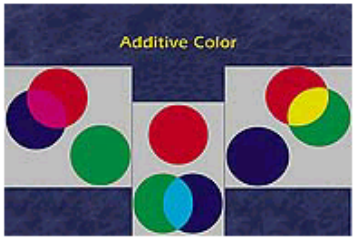
Primary Colors are Red, Blue and Green

When combined it produces ‘white’ light or the combination of all visible colors.

Additive and subtractive color mixing are the two primary methods for reproducing a range of colors.

The additive system combines light to produce a range of colors. Red, green, and blue are the primary additive colors. Equal amounts of all three produce white light.



When two equal amounts of primary additive colors are mixed, complementary colors are created.

Example 1

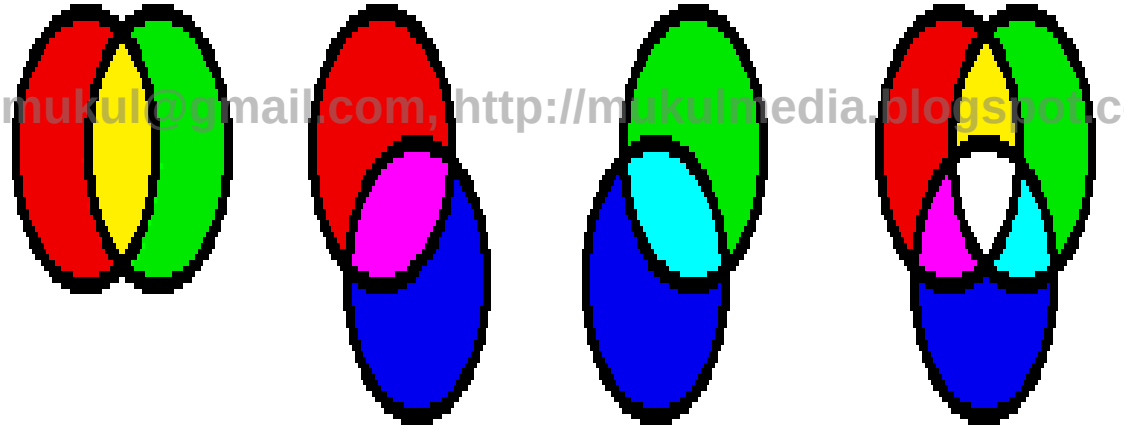
Example 2

Example 3

Additive color

Primary Colors are Red, Blue and Green

When combined it produces **‘white’ light or the presence in equal strengths of all the colors**.



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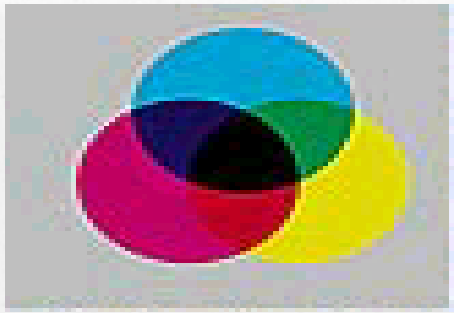
Subtractive color complements additive color

Subtractive Color

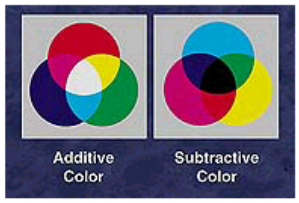


Combines pigments that absorb or filter light.

Used in any pigment (ink, colored pencils, crayons) on a substrate

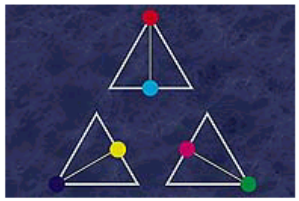
Primary colors are Cyan, Magenta and Yellow

Combined they produce ‘black’ or the absence of color.



Unlike additive color mixing, the subtractive system works by taking color away from white light. When all color has been removed from light, what's left is black. The subtractive system uses colored pigments and dyes that filter light. Its primary colors are cyan, magenta and yellow.

There is a relationship between primary additive and subtractive colors. You can see this by placing the colors in a triangle. Additive primaries are placed a points around the triangle. Subtractive primaries are placed between the two additive primaries that combine to produce them.



Subtractive colors subtract the color across from them, their complement, from white light.

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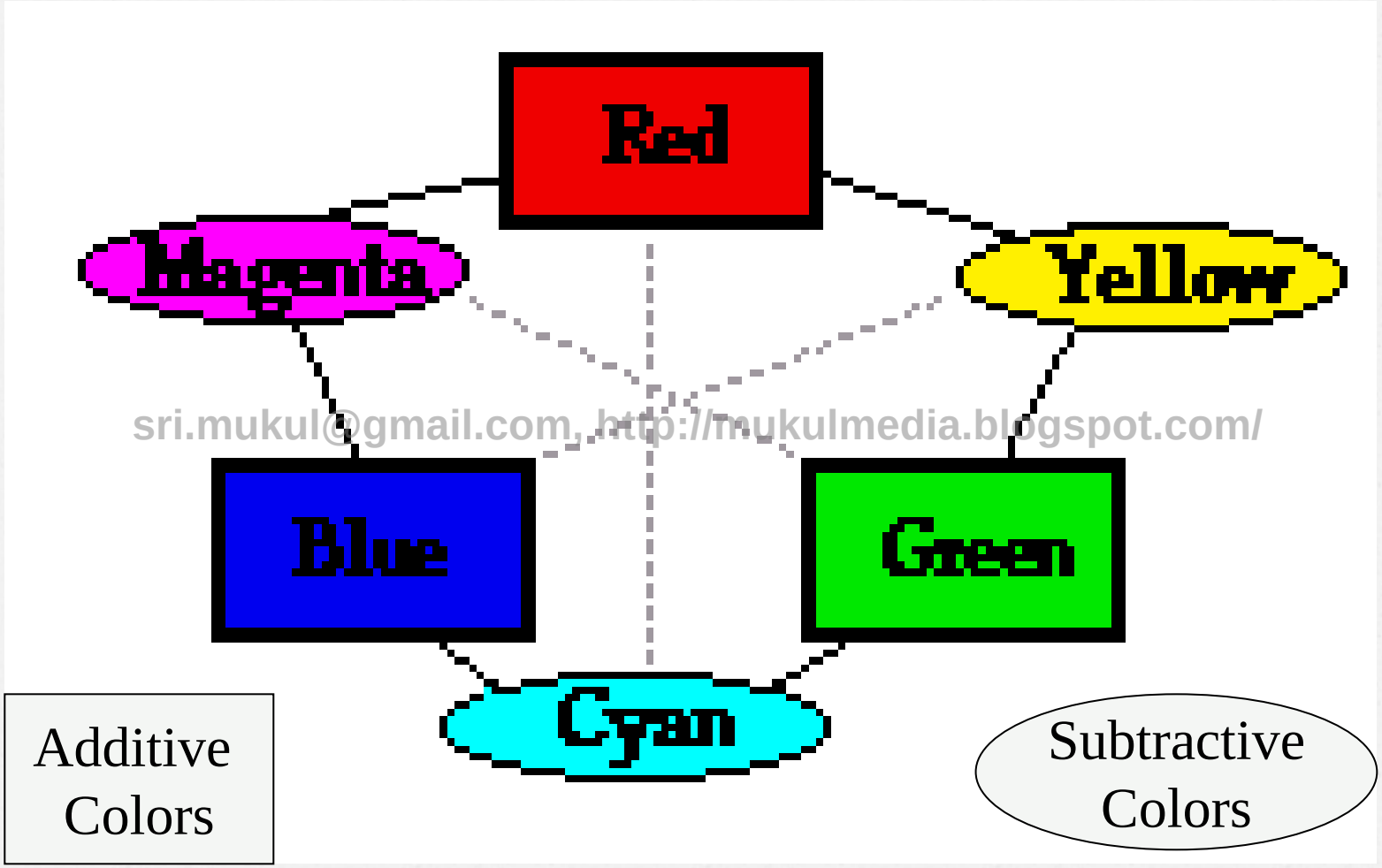
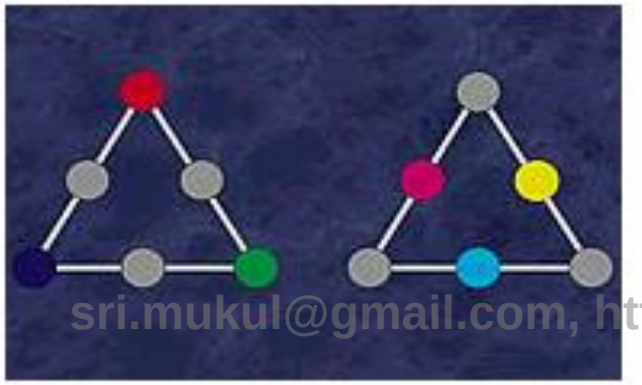


(also the primary printing colors)

Additive & Subtractive Relationship
It's Complementary!



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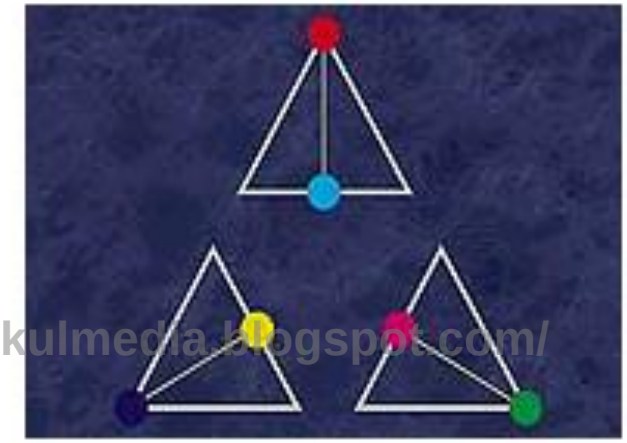
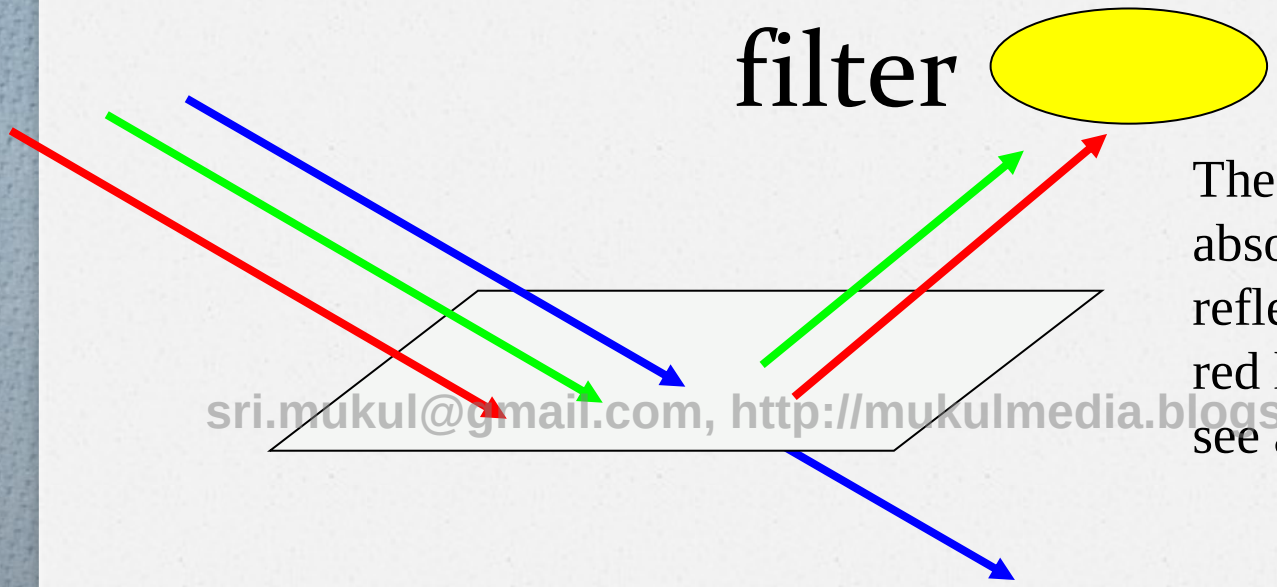


Place additive primaries at the points of the triangle. Subtractive primaries are placed between the two additives that combine to create them.

A subtractive color filters out the primary color across from it (the complement) from white light.

Subtractive Colors act as a filter



The ink on the paper absorbs blue, reflecting green and red light which you see as yellow.

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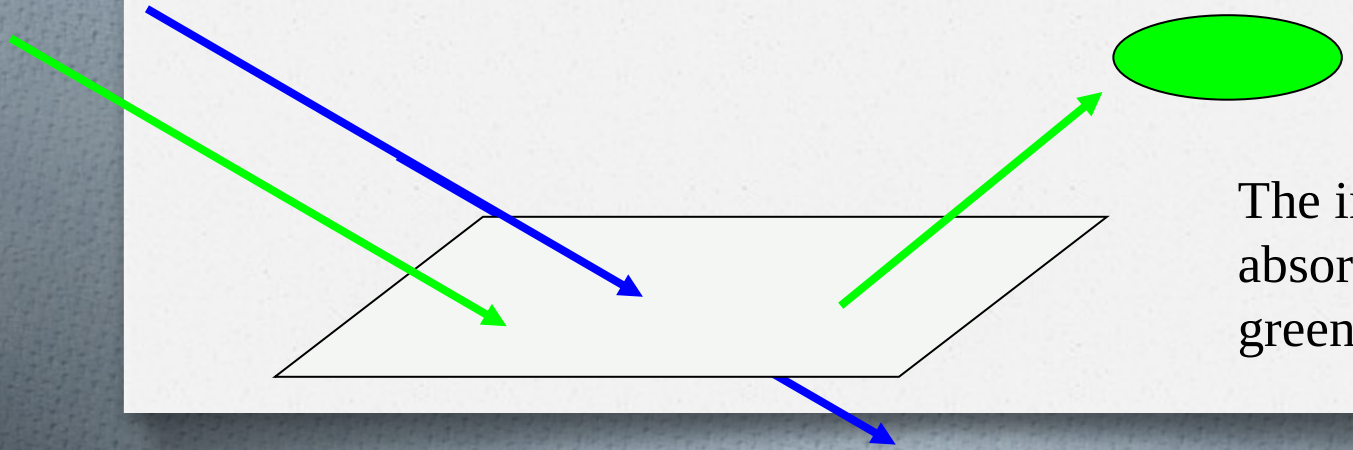

The ink on the paper absorbs blue, reflecting green see as green.

Hue, Value and Saturation

- **Hue is** identified as **the color family** or color name (such as red, green, purple). Hue is directly linked to the color's wavelength.
- **Saturation**, also called "chroma," **is a measure of the purity of a color** or how sharp or dull the color appears.
- Brightness, also called "luminance" or **"value," is the shade (darkness) or tint (lightness)** of a color.
  - Areas of an evenly colored object in direct light have higher brightness than areas in shadow.

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Hue, Value and Saturation

Below: Colors of similar hue, value and saturation will harmonise just as will musical notes one octave apart. The colors must for they are the equivalent!

Below: Colors of similar value and hue (but different saturation) will harmonise. Any of these 'harmonies' can be utilised in a painting as either major or minor accents (chords).

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Below: Colors of similar value (but different hue and saturation) will harmonise. This would describe a painting of colors with no value difference. No forms would be discernible just hues. We define a high key painting as one with the 'majority' of the painting surface painted with high value colors. Some years ago a particular paint manufacturer produced (modular) colors labled with their value so artists could more easily harmonise their color schemes!

Below: Colors of similar hue (but different value and saturation) will harmonise. This would be equivalent to a painting done in sepia tones.

Thank You

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