

Light Primary Colors

Our eyes have three types of cones
 – sensitive to red, green, or blue

Light → red, green and blue (RGB)
 Light is additive, more color, more light

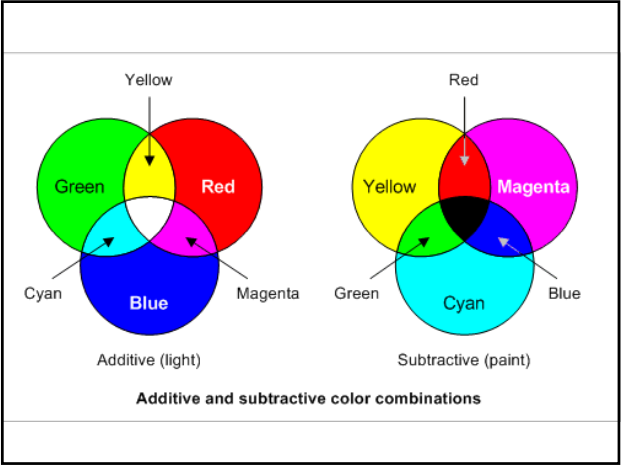
All colors = white No colors = black

Pigment Primary Colors

The pigment primaries are secondary colors of the light color wheel (Opposite is true)

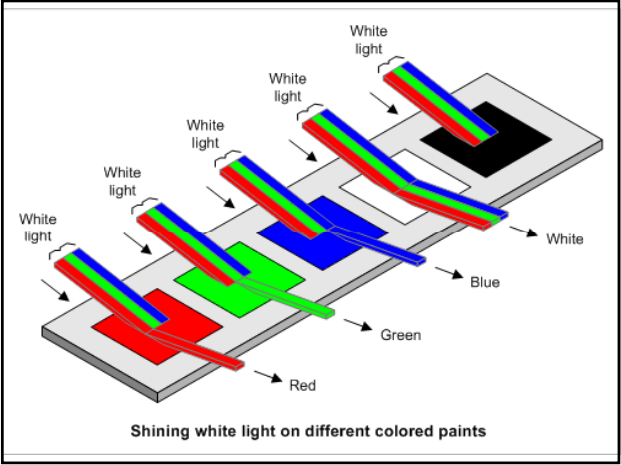
Pigment → cyan, magenta, yellow (CMY)
 Pigment is subtractive, more color, less light

All colors = black No colors = white



Solving Color Problems

- Start with RGB rays (White Light)
- Identify what rays are present
 – (Ex. yellow light is made from red and green)
- Determine what is reflected/absorbed by object
 – Matching colors are reflected
 – Different colors are absorbed
- Determine the color seen by reflected colors



During the day a blue car is seen

It appears blue

At night a yellow street light shines (Yellow = RG)

It appears black

What about a magenta car? (Magenta = RB)

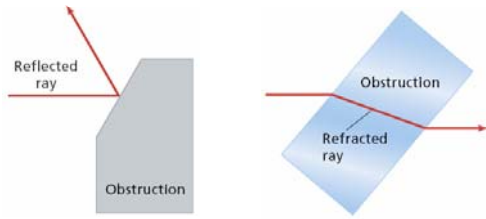
It appears red

Ray Model of Light

Rays travel in straight lines



The direction of a ray can be changed only by an obstruction. The ray can be either reflected or refracted



Types of Obstructions

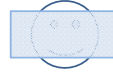
Opaque – Does not transmit light (can't see through)



Transparent – Transmits light



Translucent – Transmits light but does not allow objects to be seen clearly through them (some light is scattered)



Wave Model of Light

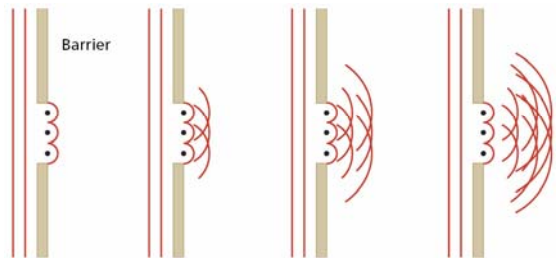
In 1665 Francesco Grimaldi observed the edges of shadows are not sharp. He observed that light bends around a barrier.

Diffraction – The bending of light around a barrier.

In 1678 Christiaan Huygens developed a big idea...

Huygens Principle – all points in a wave front can be thought of as new sources of smaller waves. These wavelets will expand in every direction

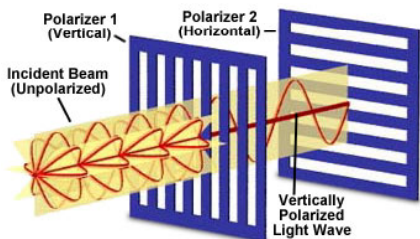
Huygens Principle



Polarization of Light

Polarization – the production of light in a single plane of oscillation.

Light Passing Through Crossed Polarizers



Polarization of Light

Light can be polarized by:

- Filtering using many parallel slits
- Reflection along a plane can partially polarize light (glare from a window)

Having a second polarizer ...

- If the slits are parallel will allow light to pass.
- If the slits are perpendicular, will block light.

