

AN ALLEN PRESS SEMINAR

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BEST PRACTICES & INNOVATIVE SOLUTIONS

Selecting the Right Color Palette: Understanding RGB and CMYK Color

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What will be covered

- Introduction to Color
- RGB - Additive System
- CMYK - Subtractive System
- Describing Color
- Color Gamut
- Color Profiles
- Color Viewing Conditions

Introduction to Color

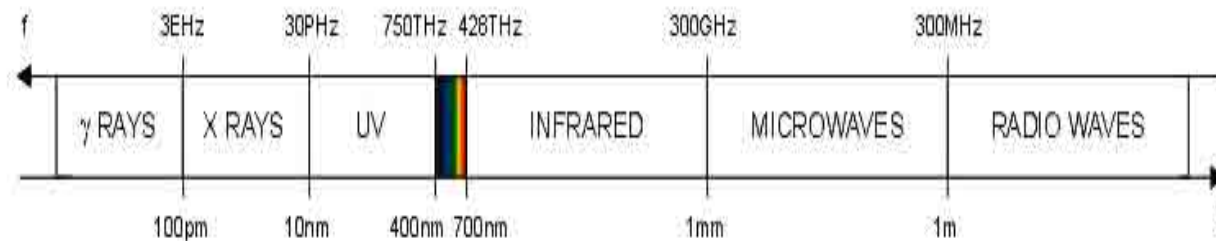
- **Rods** - a nerve in the eye sensitive to low levels of light - night vision.
- **Cones** - a nerve in the eye that can distinguish between the components of light.

Introduction to Color

- All color is in light - without light there is no color
- The absence of light is black

Introduction to Color

- Visible light is a narrow range of electromagnetic energy
- The human eye is sensitive to only a small portion of this range
- It's called a visible spectrum



Introduction to Color

- How many colors can we see?
- Nature.....10 -11 Million
- Slides.....12,000 - 14,000
- Color Proofs...7,000
- Press.....5,000

RGB - Additive System

- The additive color system starts with a black background
- White light is added in different proportions to reproduce a color spectrum
- RGB devices include TV screens, monitors, video projectors, stage lighting, scanners, digital cameras

CMYK - Subtractive System

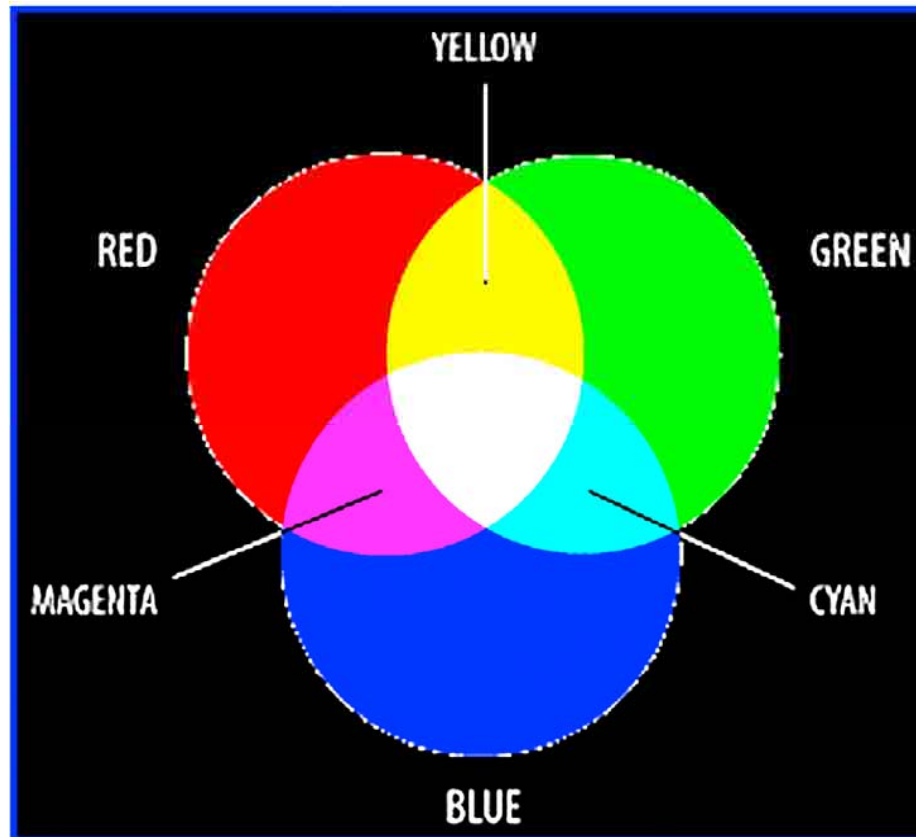
- The subtractive color system starts with a white background
- The paper is white because it reflects the full spectrum of light (RGB)
- Subtractive color is the process of removing color from the white surround
- The whiter the substrate is, the more colors we can reproduce

CMYK - Subtractive System

- When we combine two primary colors (RGB), the result is called a secondary color
- Green + Blue = Cyan
- Red + Blue = Magenta
- Red + Green = Yellow

CMYK - Subtractive System

From RGB to CMYK



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CMYK - Subtractive System

- The printing inks serve as filters on the surround
- They absorb light, subtract some of it and reflect the rest

Color Gamut

- Color gamut (color space) is the range of colors a device is capable of recording or reproducing
- Different devices have different color spaces, and when changing one to another some color information might be lost because it cannot be represented in the new space

Color Gamut

- **RGB** - bigger gamut
- **CMYK** - smaller gamut

Describing Color

- Color is a visual sensation therefore it is as subjective as other sensations (taste, smell, hearing, touch)
- It is difficult to describe color over the phone
- We cannot tell what we want unless we see it

Describing Color

- Some vague terms to describe color:
 - -Flat
 - -Needs more snap
 - -Muddy
 - -Too warm
 - -Too cold
 - -Make it jump off the page

Describing Color

- Warm Colors:
 - Magenta
 - Red
 - Yellow
- Cold Colors:
 - Cyan
 - Blue
 - Green

Describing Color

- Although color perception is subjective, color reflection can be measured and communicated
- **Spectrophotometers** measure reflectance throughout the visible spectrum

ICC Profiles

- ICC (International Color Consortium) Profile describes the property of a color space
- Every device that captures, displays or prints color has its own profile
- ICC Profiles can be created or purchased (some downloads are free)

ICC Profiles

- Adobe RGB (1998)
- U.S. Web Coated (SWOP)v2
- SWOP (Specification for Web Offset Publication)

Color Viewing Conditions

- Color proofing needs to be consistent and repeatable
- American National Standard Institute (ANSI) viewing conditions: **5000 Kelvin** (contains an even mix of red, green, and blue light)
- Viewing booth, 5000K light bulbs

Color Viewing Conditions

- Monitors
- Monitor calibration, profiling
- Soft proofing - Photoshop allows you to preview the effect of printing by loading a color space profile of an output device (printer, press)

Questions?



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