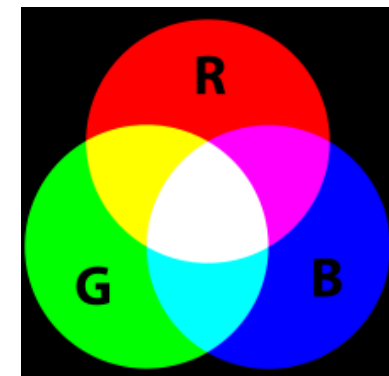
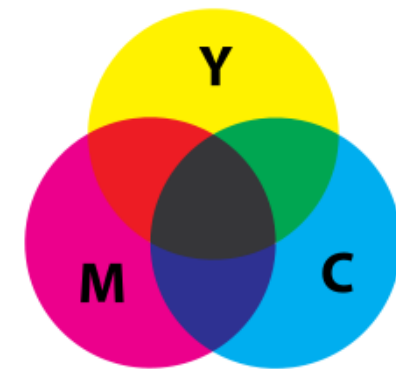
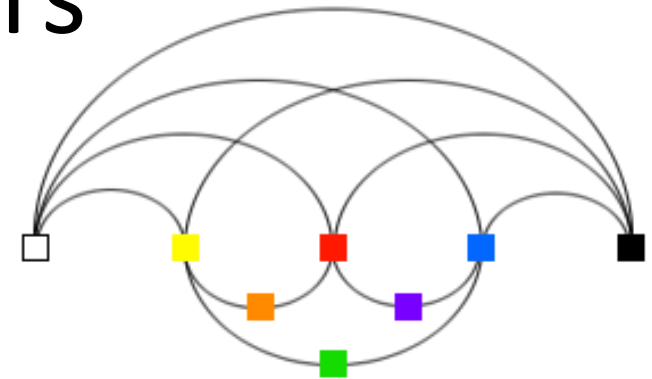
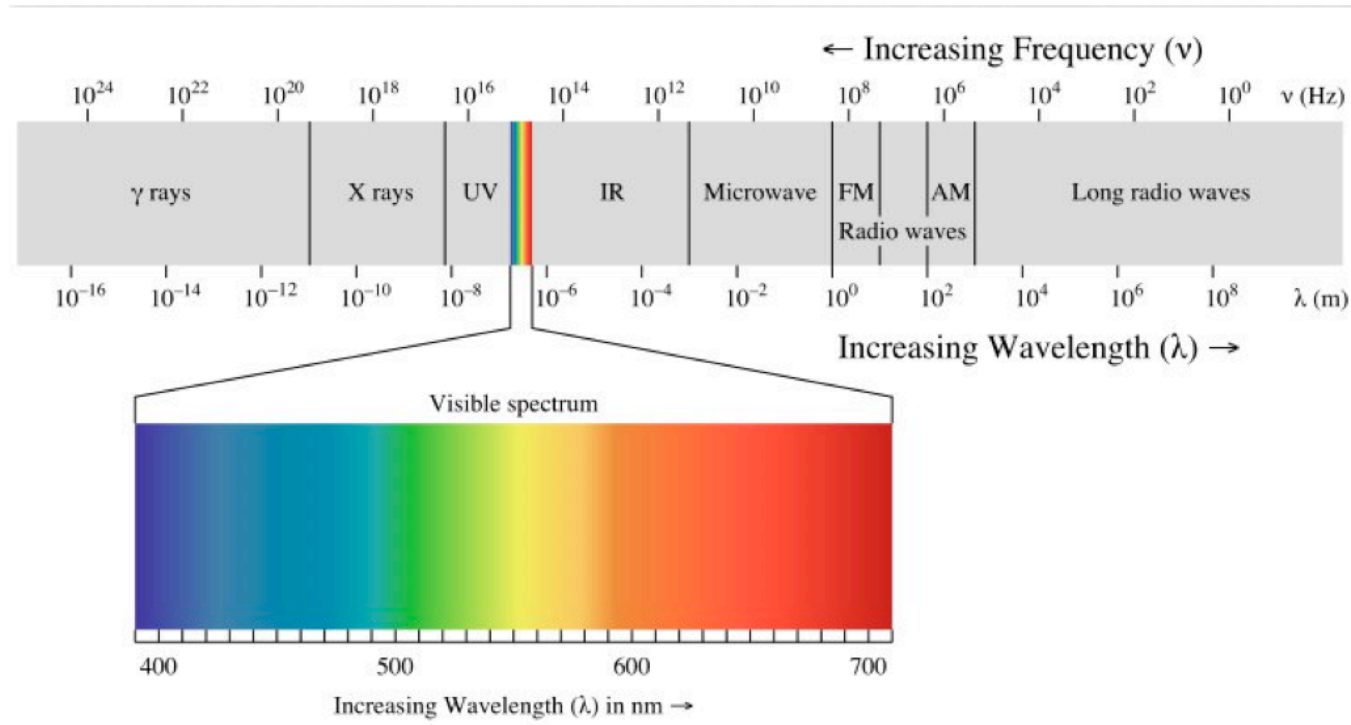


Primary Colors

- **RYB:** Art Spectrum, RYB noble hues, primaries are **White** and **Black**, composite hues, formerly standard subtractive colors.
- **CMY.** Subtractive (white), start with light, inks subtract
- **RGB.** Additive, start without light (black), light sources combine to form color.



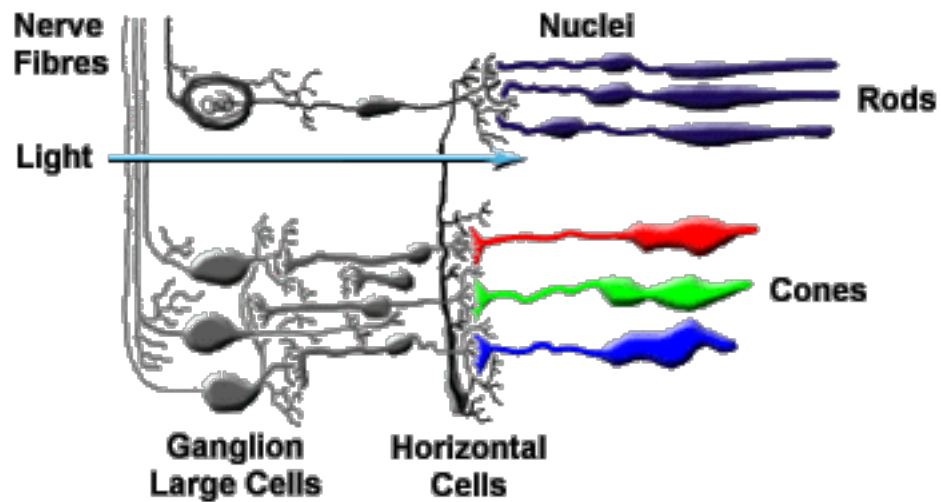
Visible Spectrum



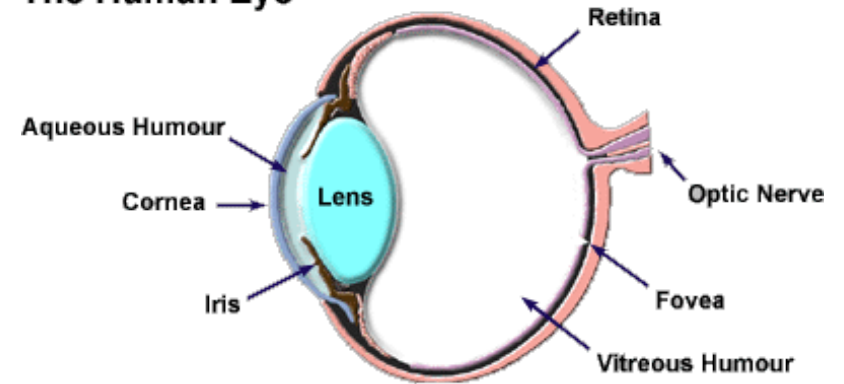
- wavelengths between 400nm and 700 nm (0.4μ - 0.7μ)
- exactly the colors in a rainbow

Vision

The Retina

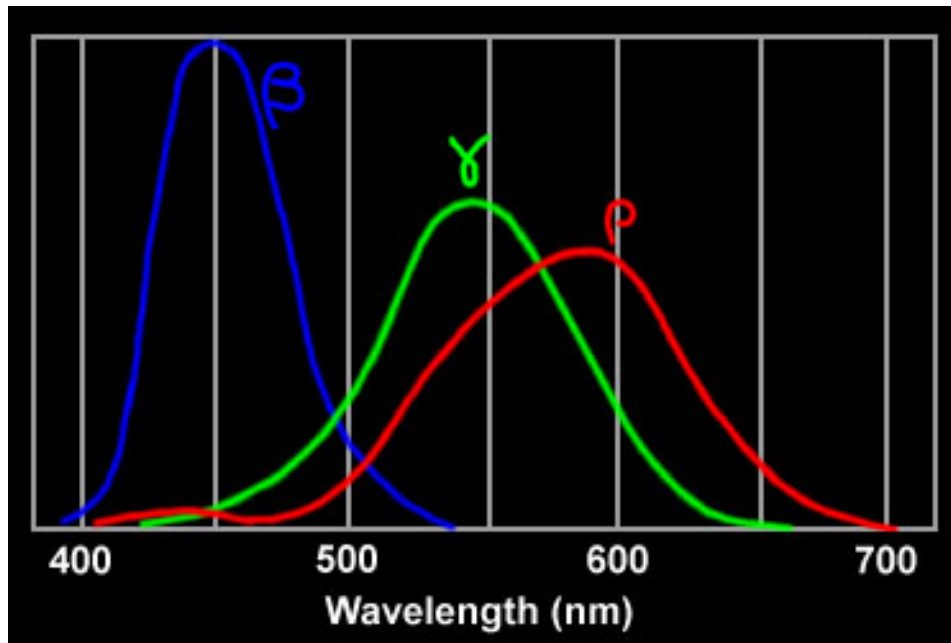


The Human Eye

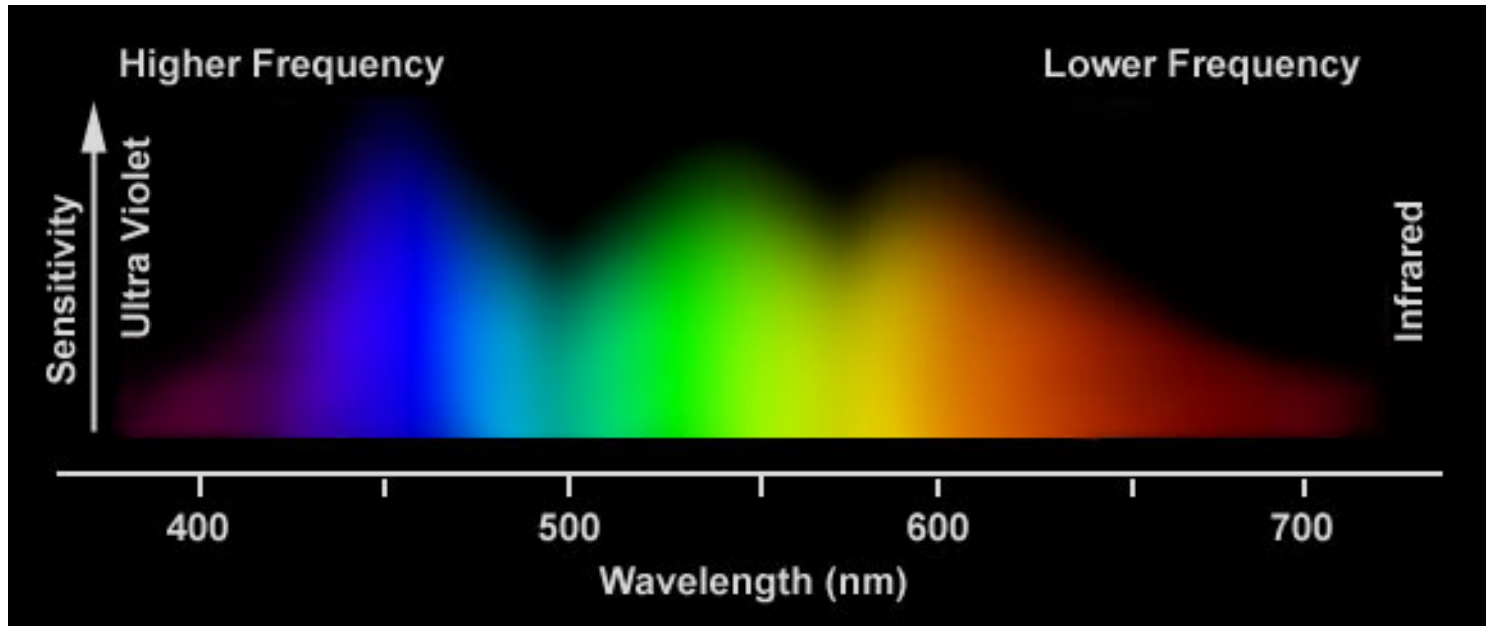


- Vision:
 - Rods: Illumination levels (all around retina)
 - Cones: Color vision (only in fovea)

Spectral Sensitivity of our Eyes

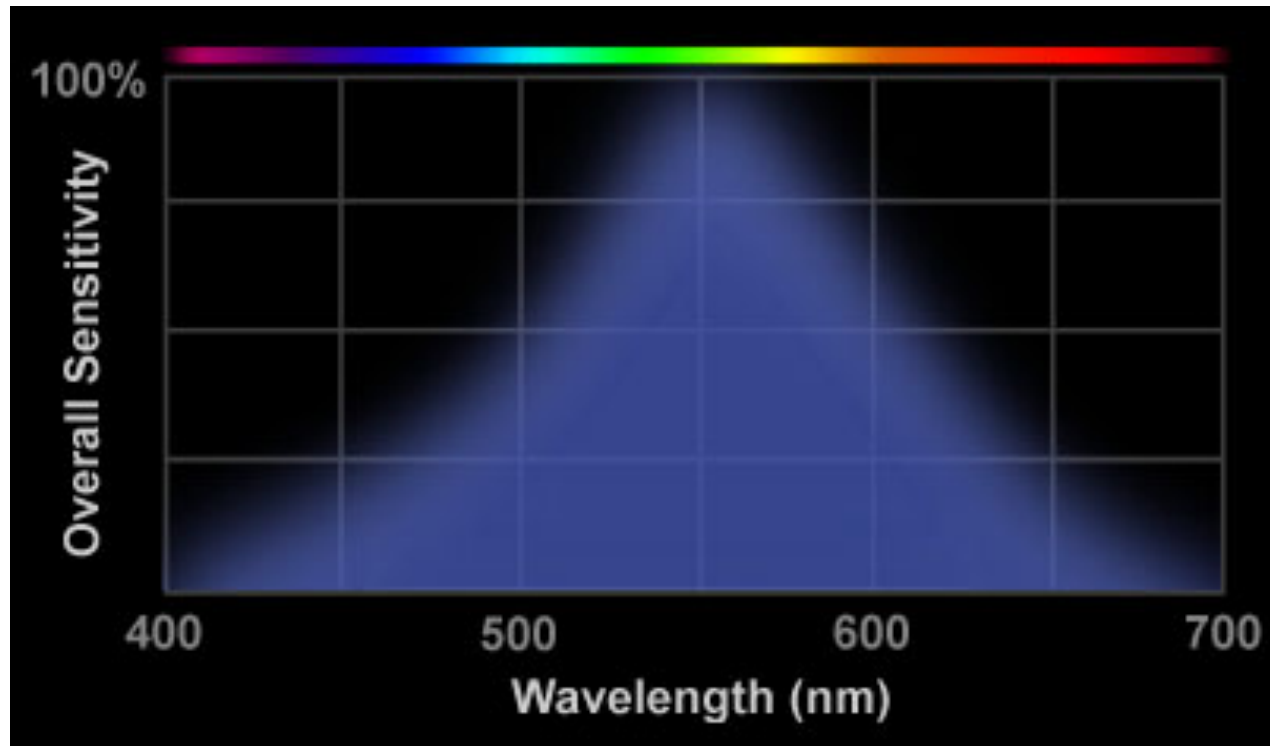


- The sensitivity curves of the Rho, Gamma and Beta sensors in our eyes determine the intensity of the colors we perceive for each of wavelengths in the visual spectrum.



- Selective sensing of different light wavelengths allows the visual system to create the perception of color.

Sensitivity of Rods

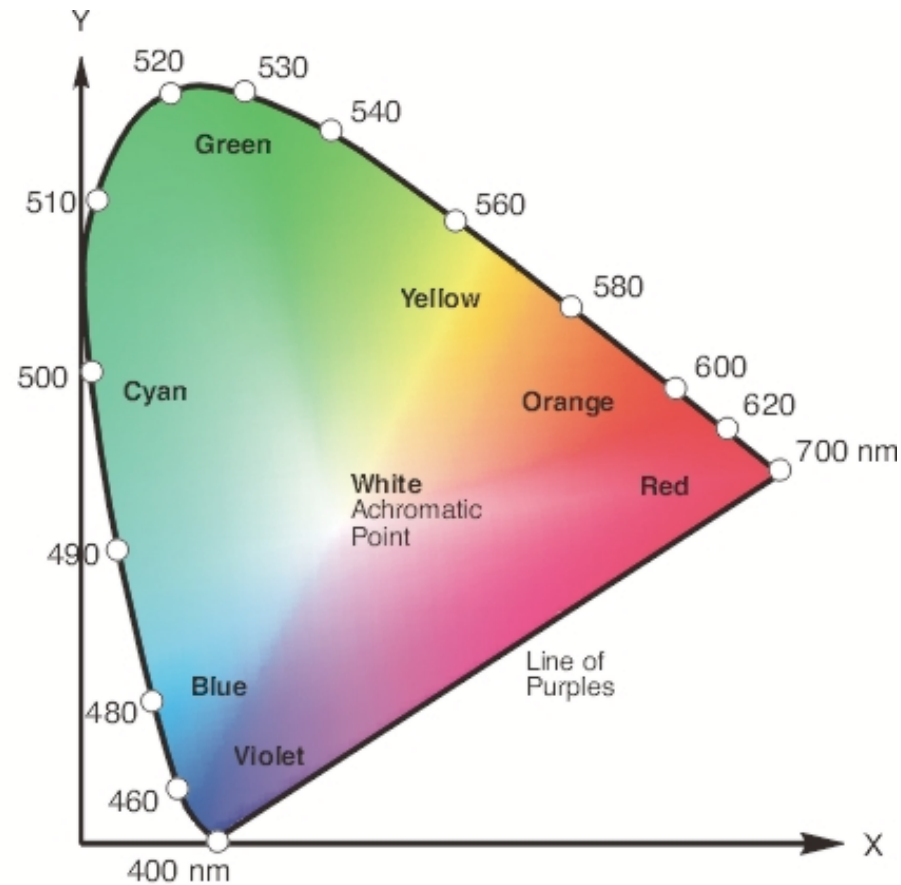
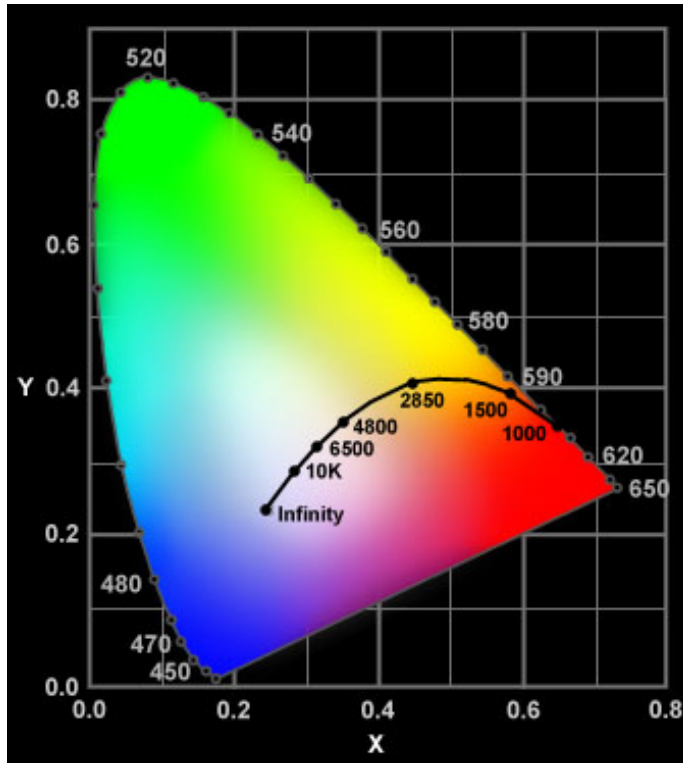


- Cones don't contribute in low light conditions, rods are more sensitive to yellow/green
- Also explains why at moon light we perceive a monochromatic scene.

Human Vision: Color Quiz

- http://www.xrite.com/custom_page.aspx?PageID=77&Lang=en

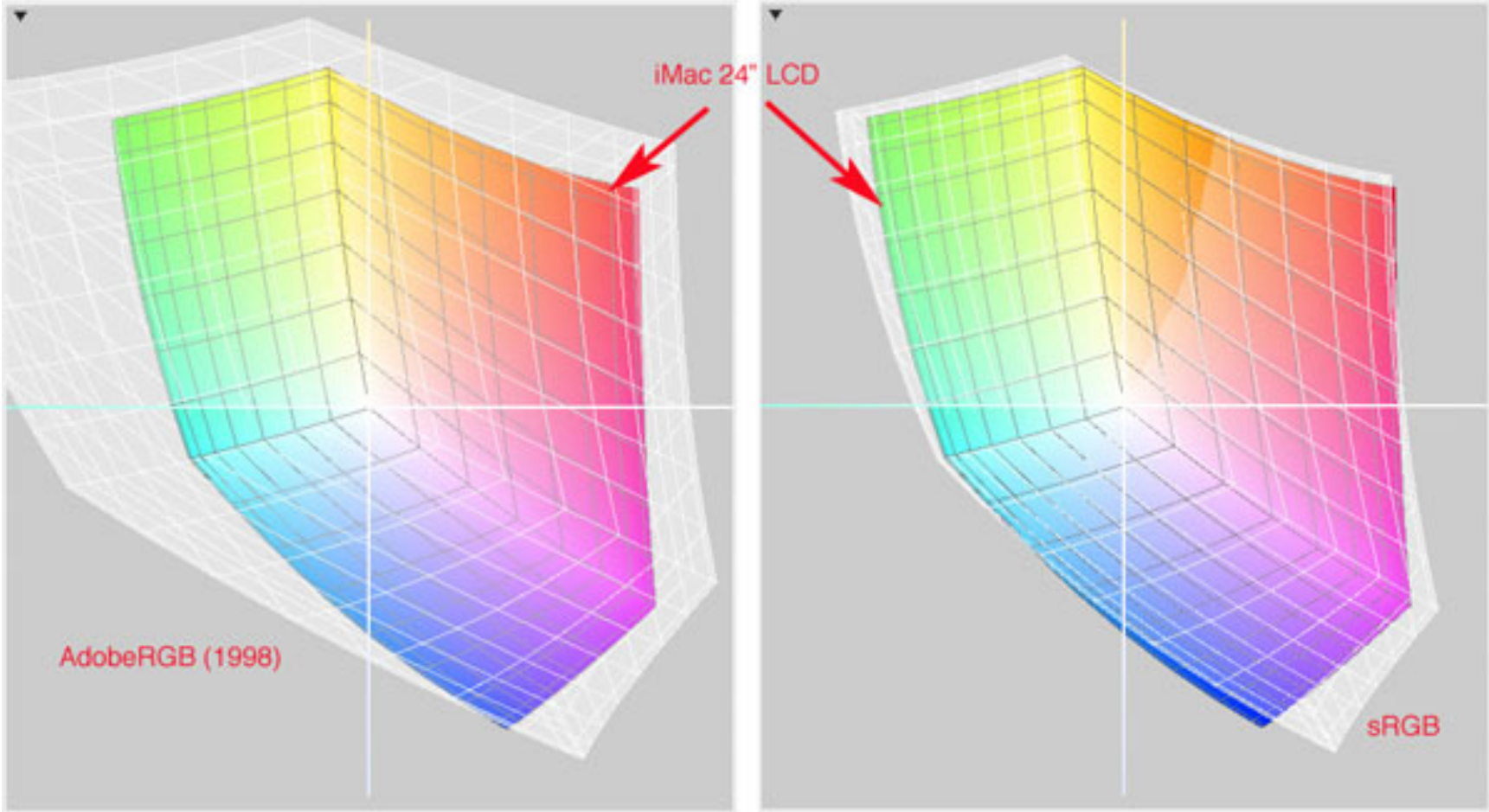
Color Charts



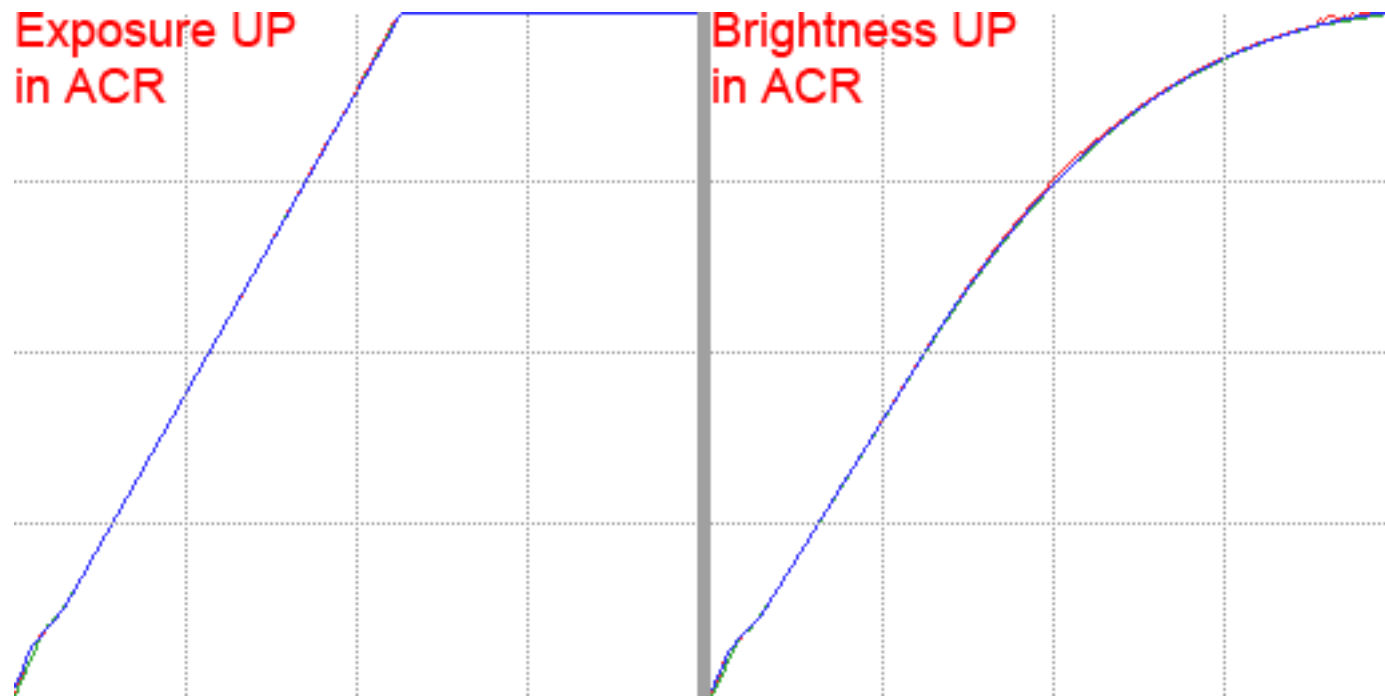
- CIE: Hue and saturation on a two dimensional chart (actually a 3D model projected onto one plane (XY plane))
- CIE now uses a LAB model

http://www.ncsu.edu/scivis/lessons/colormodels/color_models2.html

Editing Space

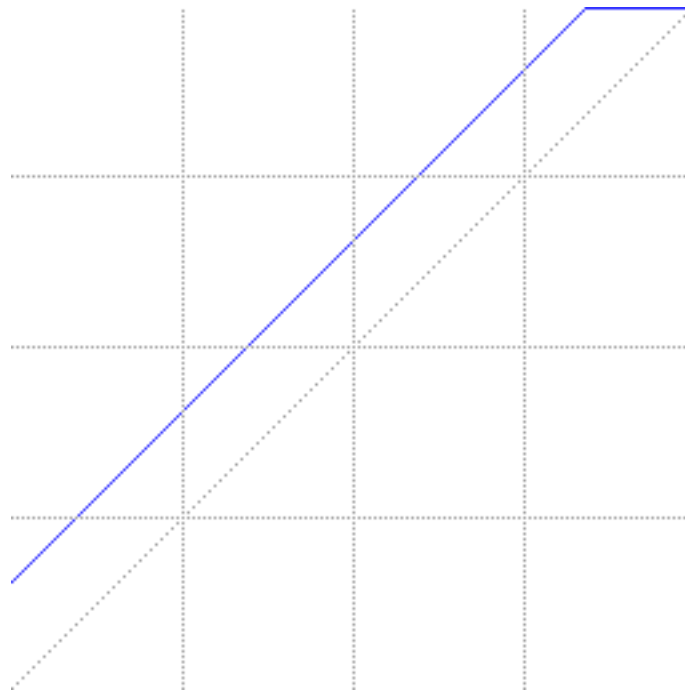


Brightness/Exposure



- Both: Linear scaling shadows
- Brightness preserving the highlights.

Brightness

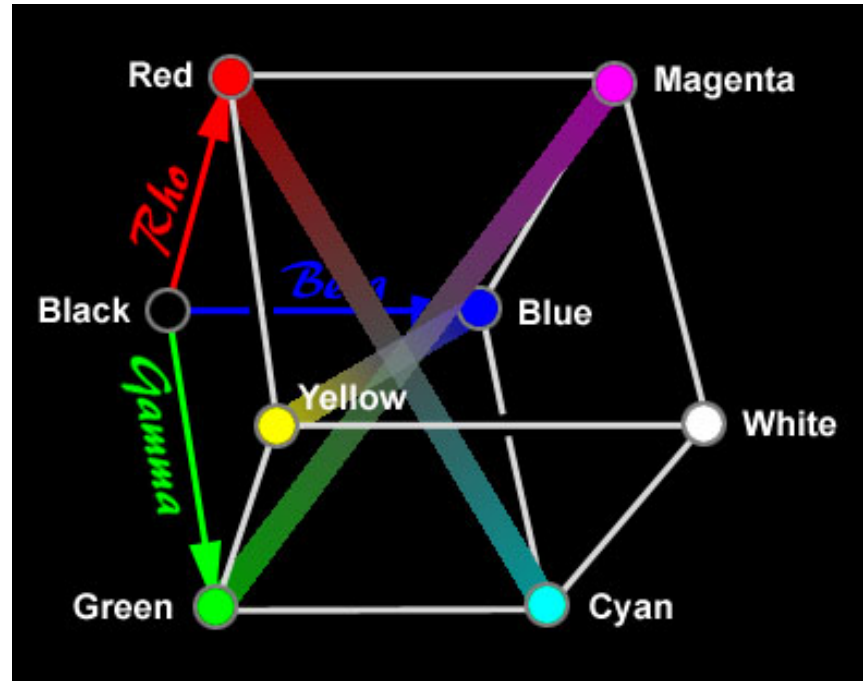
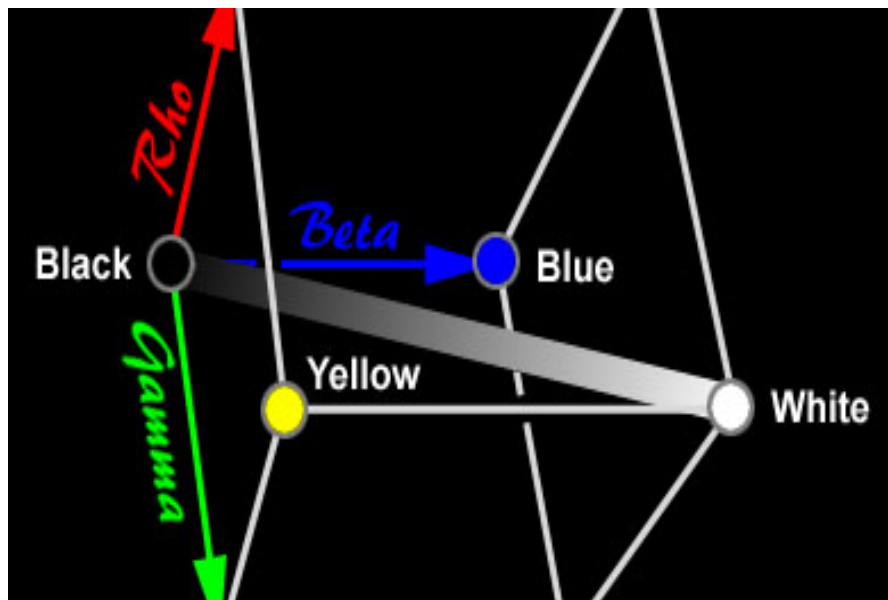


- Brightness means shifting all levels in the image by the same amount of levels, and this is exactly what Photoshop's Brightness do:

Increase Contrast

- Steepen the curve

Sliders: Based on the Opponent Theory (Vision more complicated)



- Responses to one color of an opponent channel are antagonistic to those to the other color.

Other Great Resources

- http://www.ncsu.edu/scivis/lessons/colormodels/color_models2.html