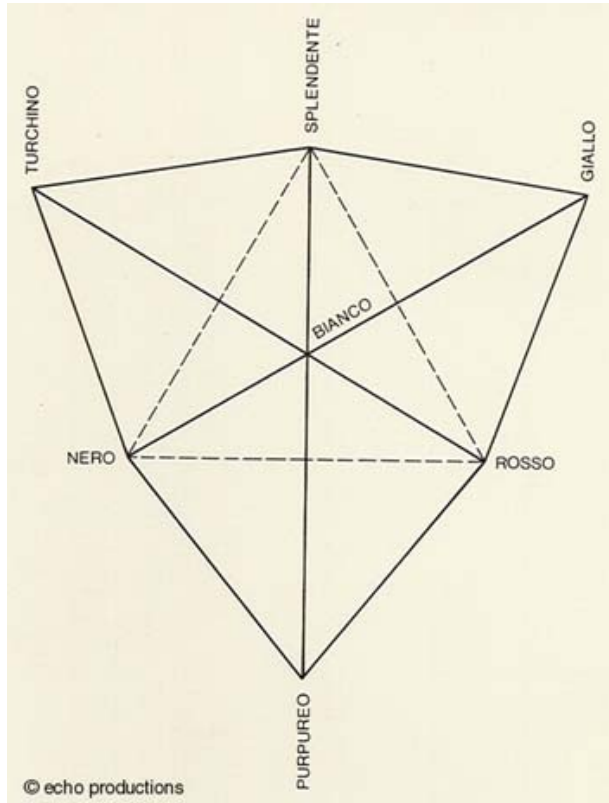


EARLIEST DESCRIPTORS OF COLOR

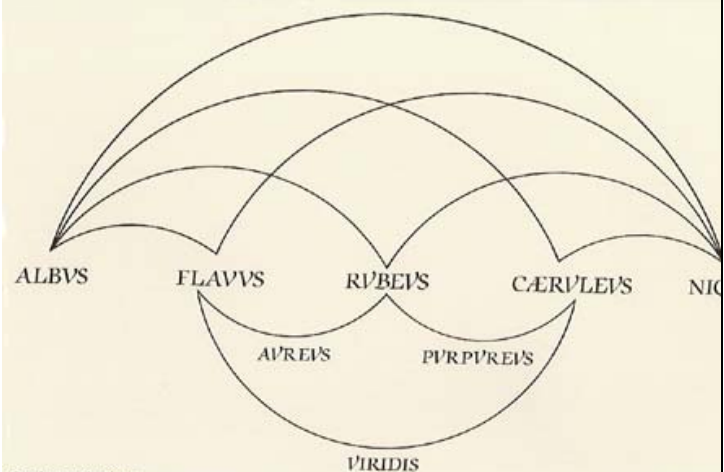


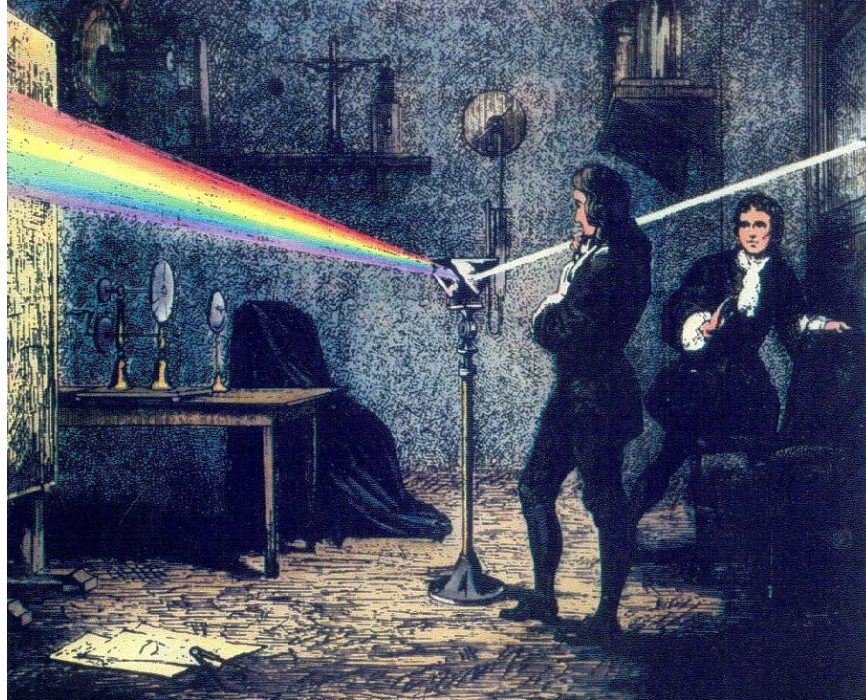
PLATO

TURCHINO = BLUE
 SPLENDEnte = SHINY
 GIALLO = YELLOW
 BIANCO = WHITE
 NERO = BLACK
 ROSSO = RED
 PURPUREO = PURPLE

In 1613, Aquilonius believed in the straight line of color from black to white, but added arcs as a way of mixing colors.

ALBUS = WHITE
 FLAVUS = AUREUS =
 RUBEUS = RED
 VIRIDIS = GREEN
 PURPUREUS = PURPLE
 CAERULEUS = BLUE
 NIGER = BLACK



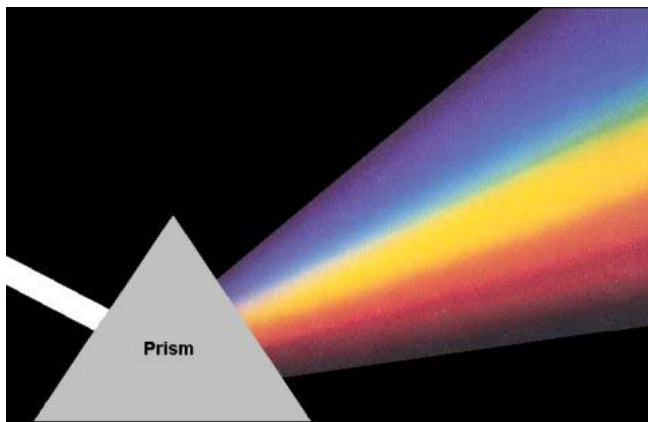


And in order thereto have darkened my Chamber, and made a small hole in my Windowshutts, to let in a convenient quantity of the Sun's light. I placed my prism at his Entrance, that it might so thereby be refracted to the opposite Wall. It was at first a very pleasing Divertisement, to view the Vivid and intense colours produced thereby, but after a while applying myself to consider them, more circumspectly, I became surprized to see them in an oblong form, which according to the received Laws of Refractions, I expected should have been circular

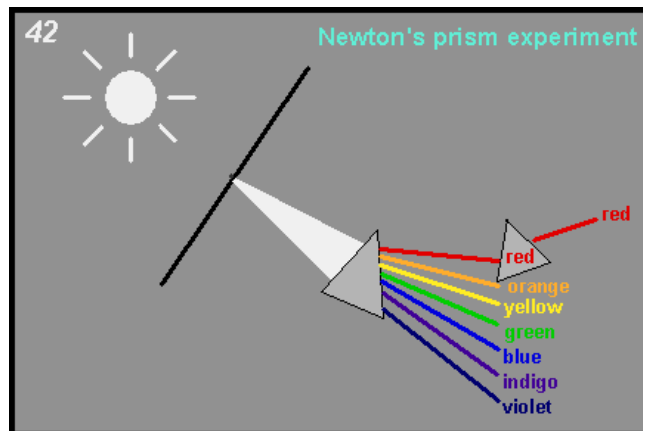
Comparing the length of the spectrum with its breadth. I found It above five times greater, a disproportion so extravagant, that it excited me to a more than ordinary curiosity of examining from wherever it might proceed.

(The Royal Society of London, R.B.C. 3, 215, 1671/2)

INTERESTING INTERPRETATIONS



from Purdue



from MIT

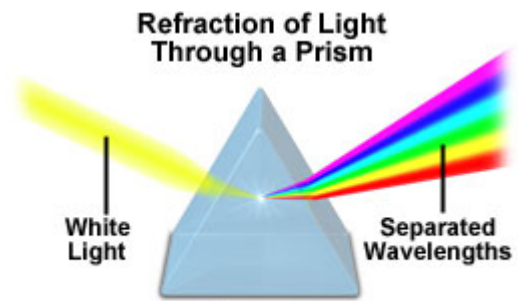
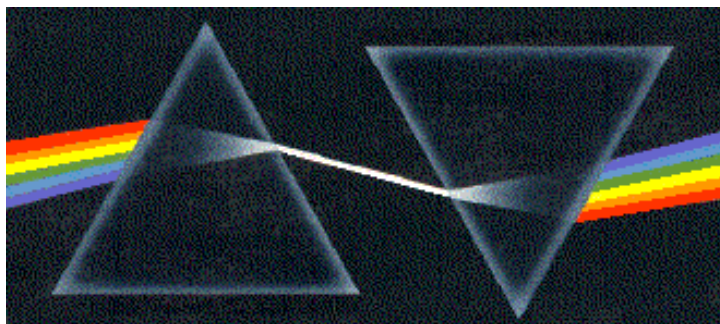
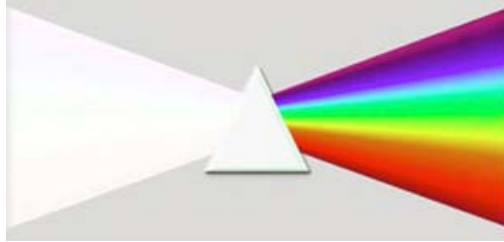


Figure 5

MORE INTERESTING PRISMS



from Epson

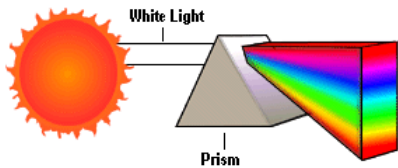
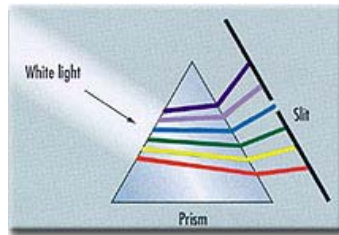
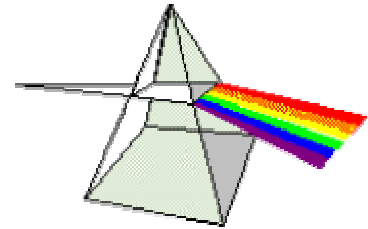


Figure 1

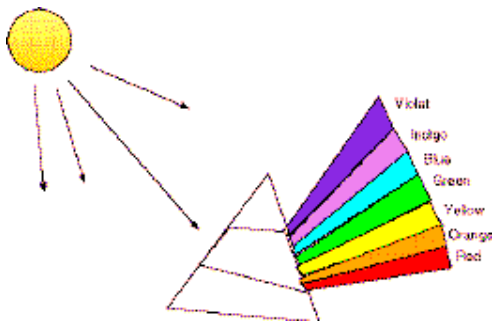
from US Ink



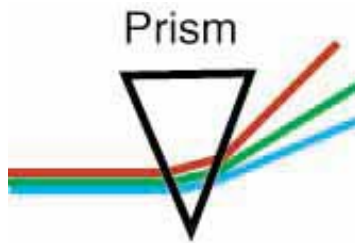
from Sensors Inc.



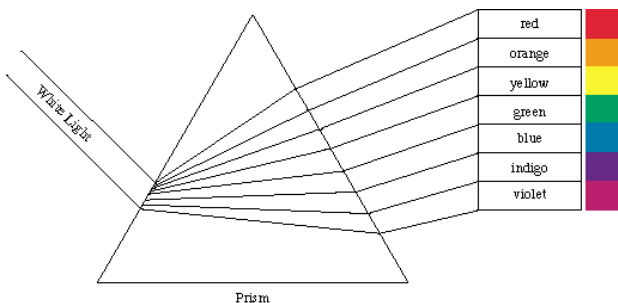
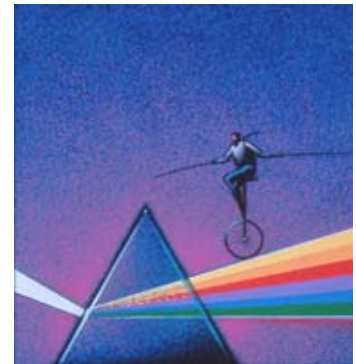
Dream analysis



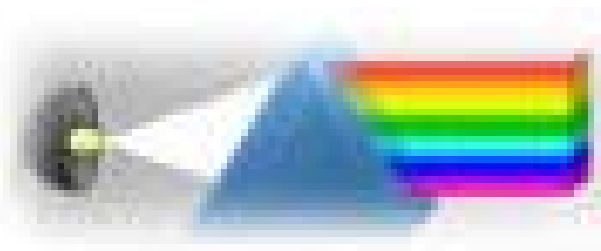
from UCSD



WDM tutorial

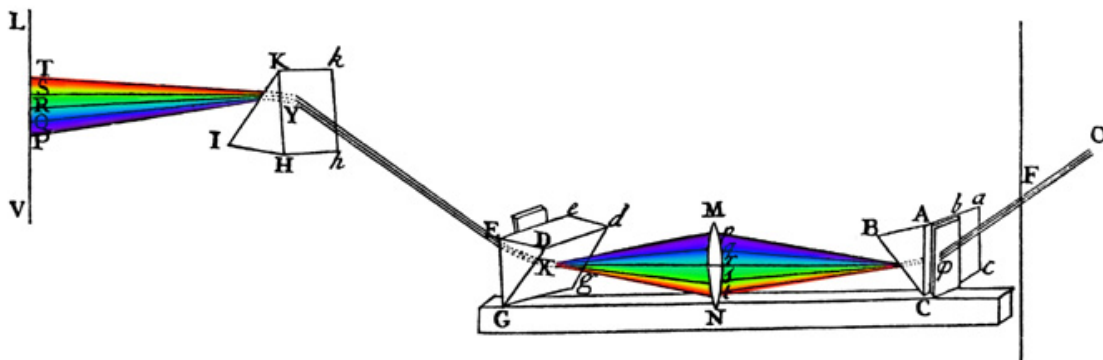
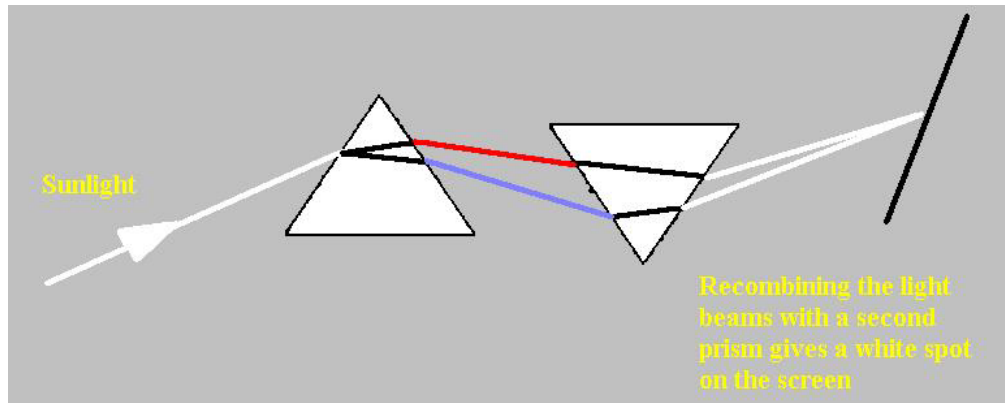


Quilters prism

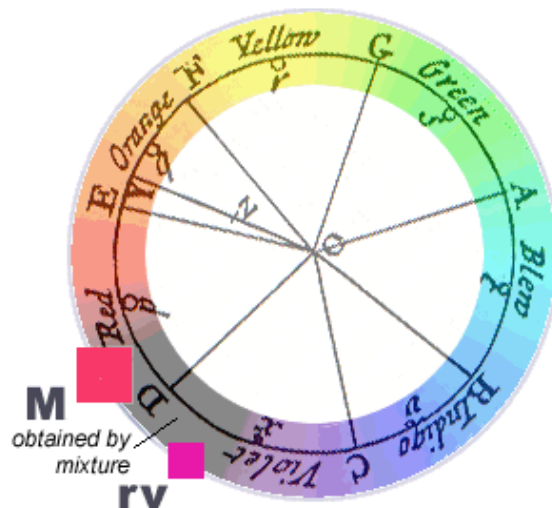
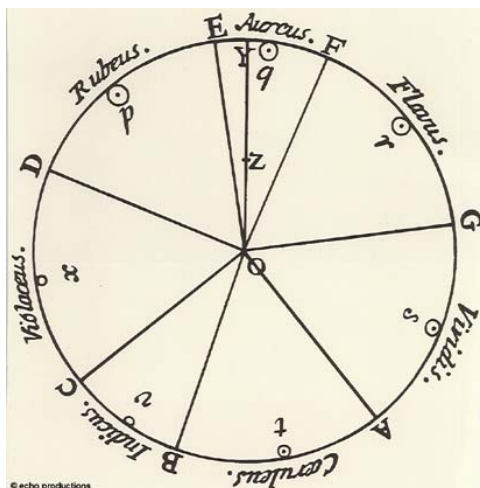


MORE NEWTON

Newton demonstrated that you could disperse a spectrum, then put it back together to reconstruct white light.



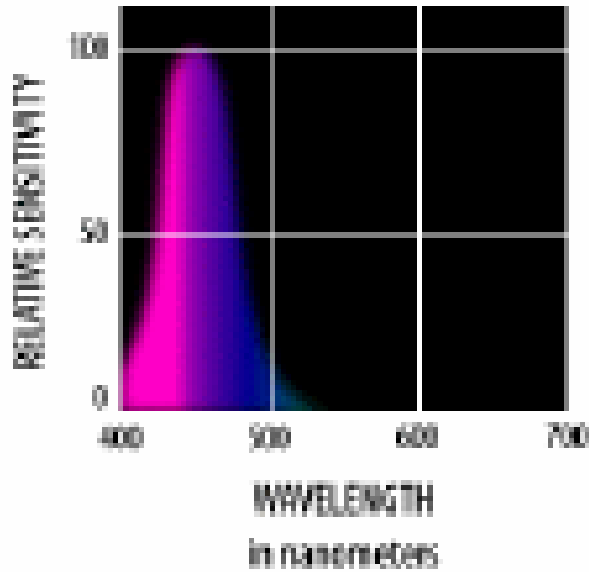
He constructed what is probably the first color circle.



COLOR RECEPTORS IN THE EYE

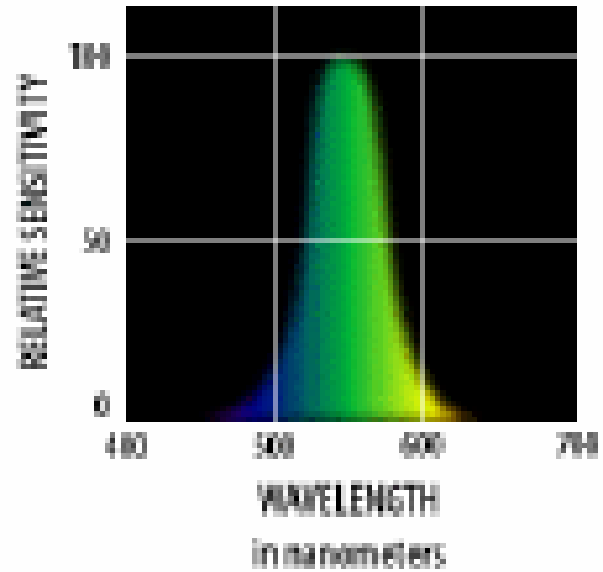
BLUE SENSITIVITY

β CONES



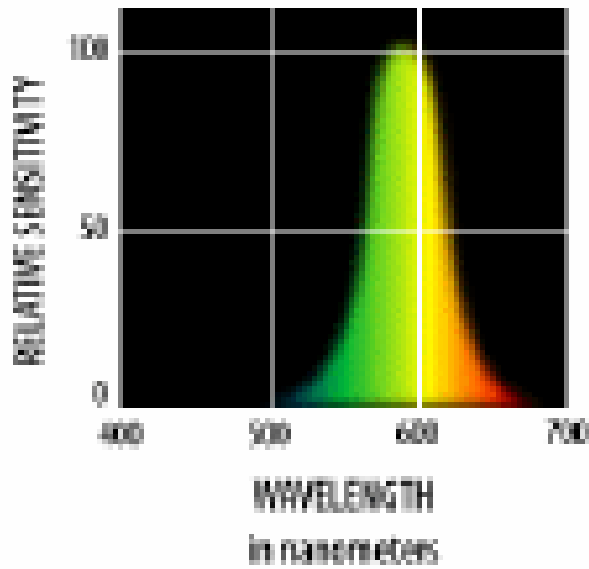
GREEN SENSITIVITY

γ CONES



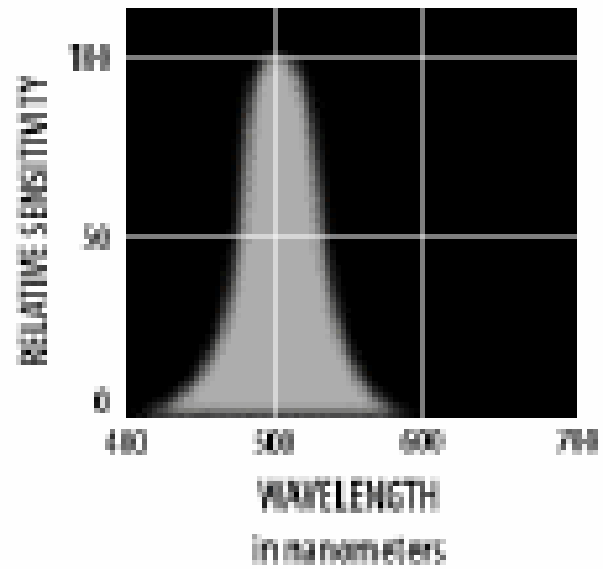
RED SENSITIVITY

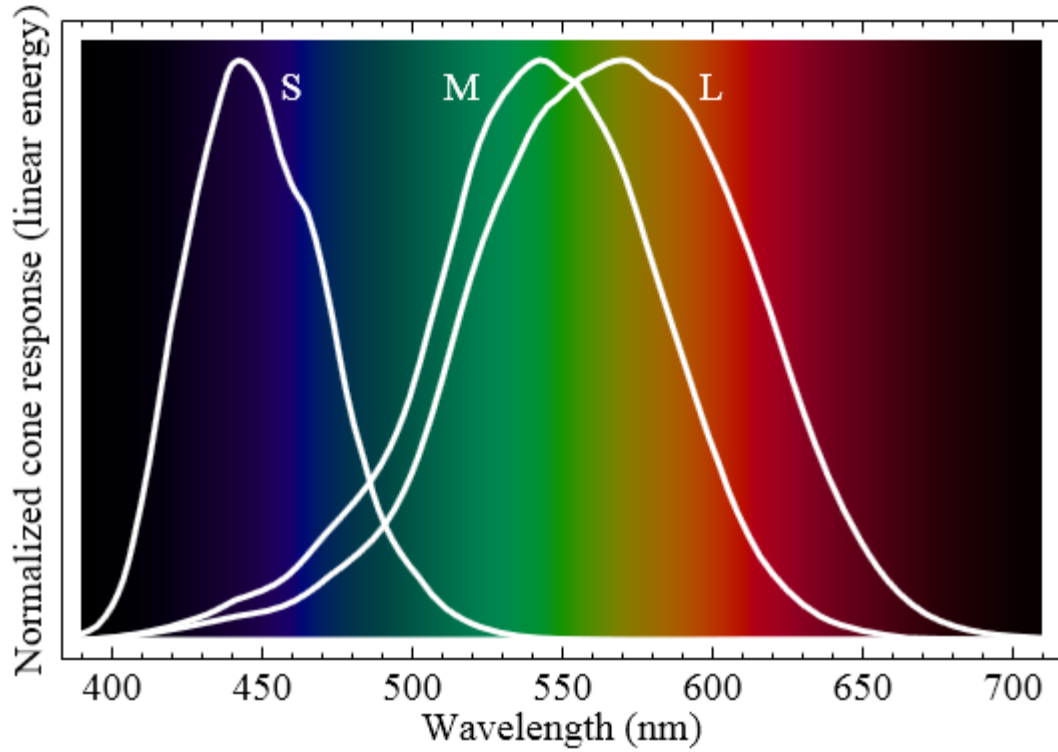
ρ CONES



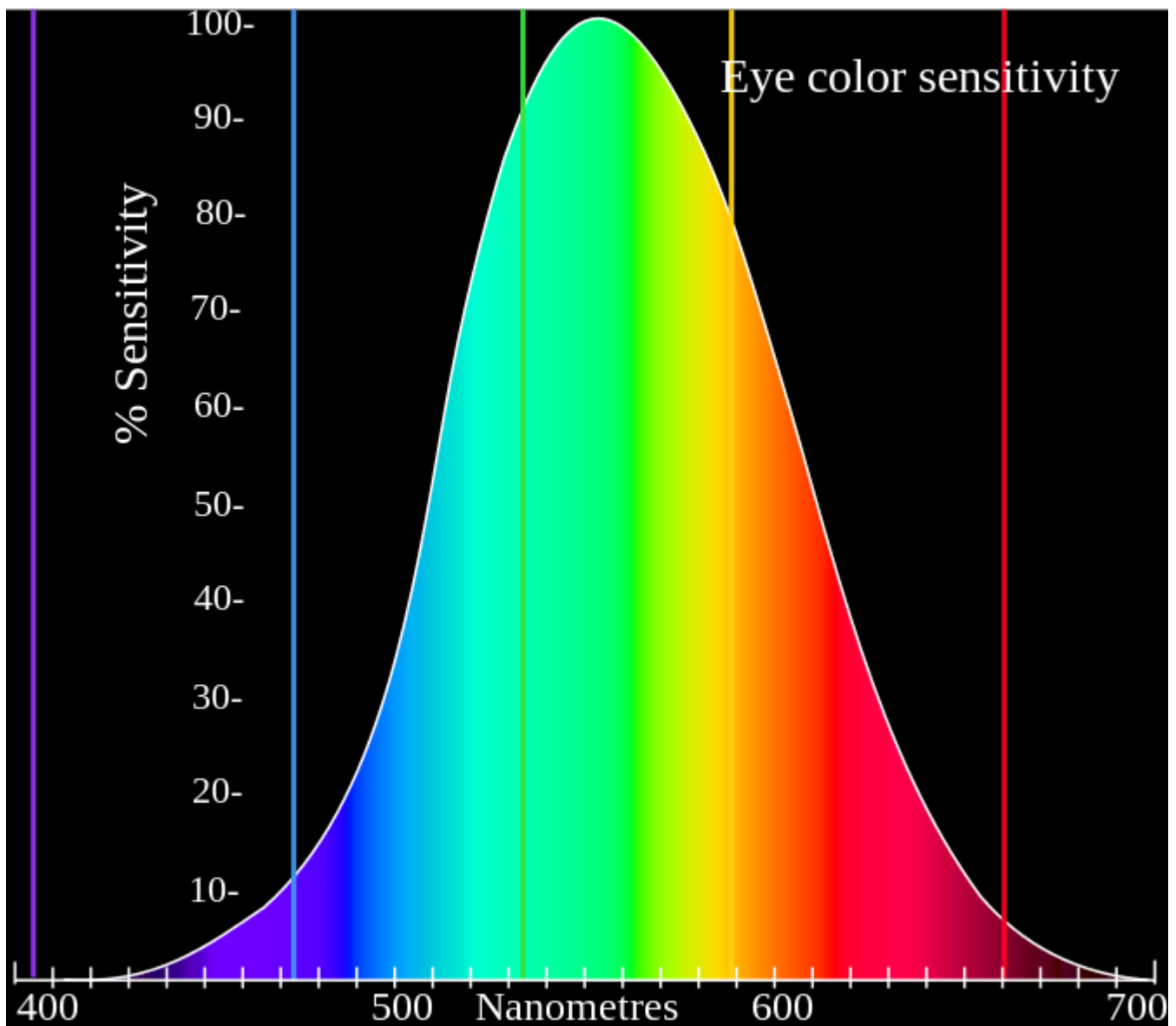
SCOTOPIC VISION

RODS





Normalized response spectra of human cones



Relative brightness sensitivity of the human visual system as a function of wavelength

WHAT DO WE SEE?

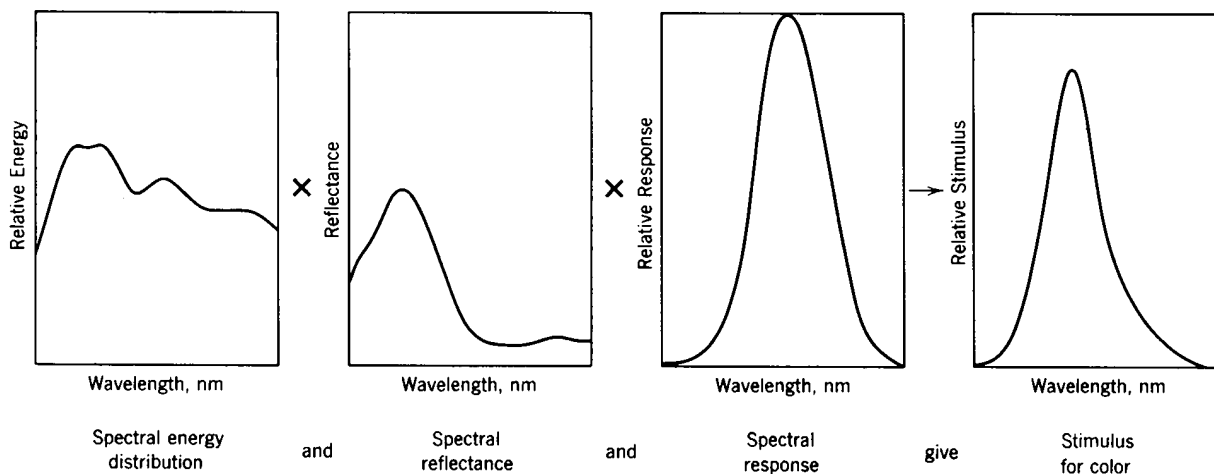
The stimulus presented to the brain is the product of several factors:

Source of light L_λ

Reflection/transmission coefficient $\rho(\lambda)$

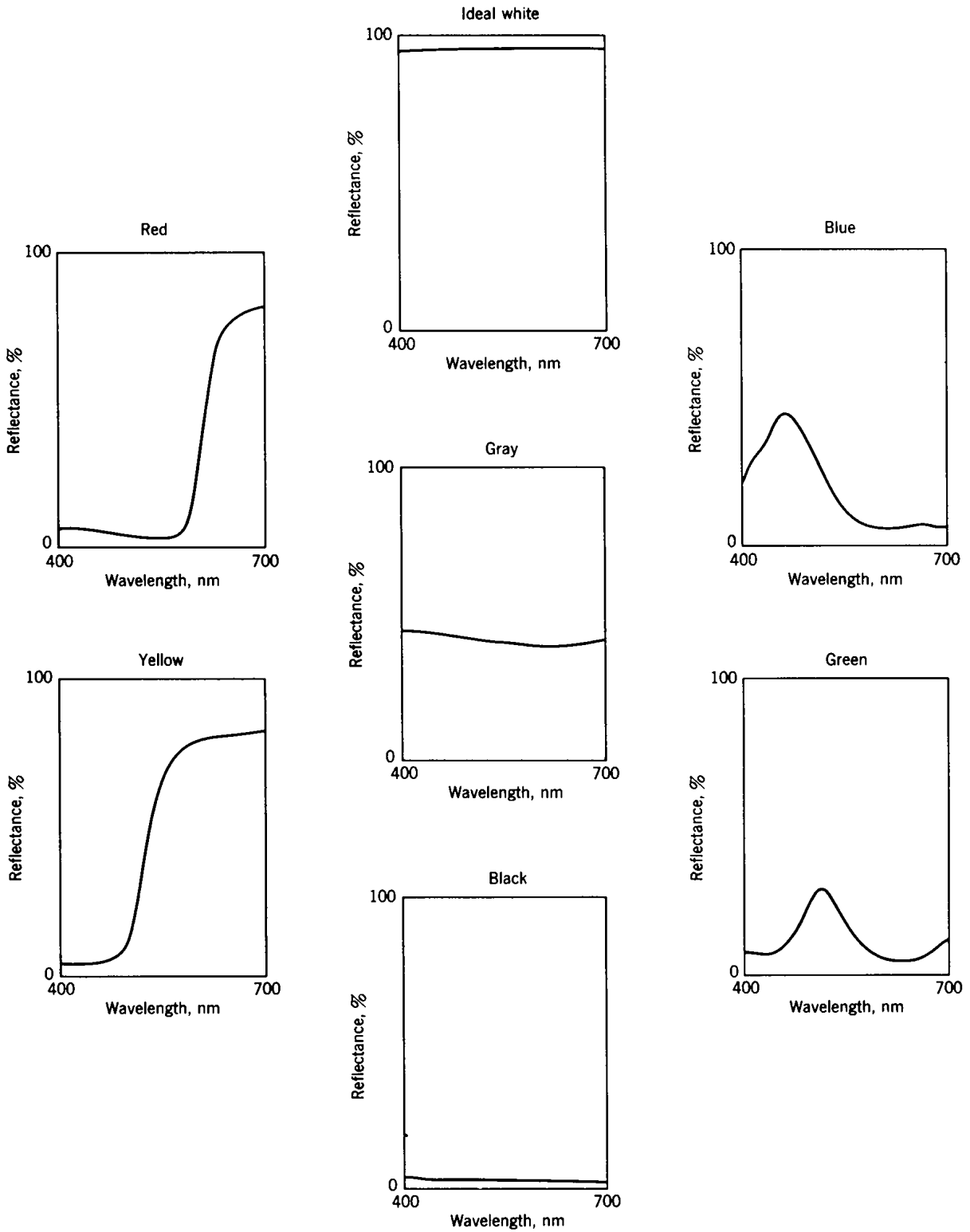
Spectral response of the eye itself $V(\lambda)$

$$STIMULUS = \int L_\lambda \cdot \rho(\lambda) \cdot V(\lambda) \cdot d\lambda$$



$$STIMULUS = \sum L_\lambda \cdot \rho(\lambda) \cdot V(\lambda) \cdot \Delta\lambda$$

COLOR VIA REFLECTANCE



WHAT ARE THE PRIMARY COLORS?

Your second grade teacher told you they were:

RED **YELLOW** **BLUE.**

Crayolas



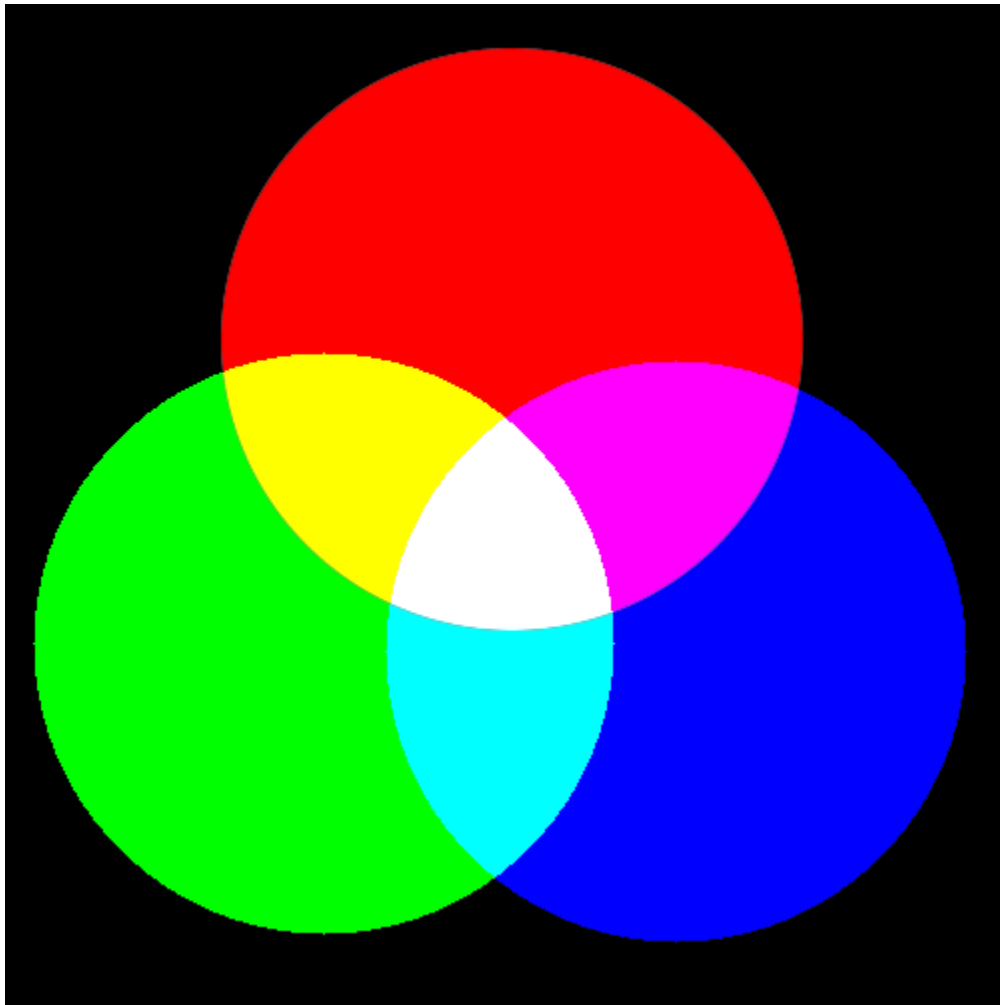
Finger Paints



RGB COLOR MIXING

Your second grade teacher had it wrong. It's RGB.

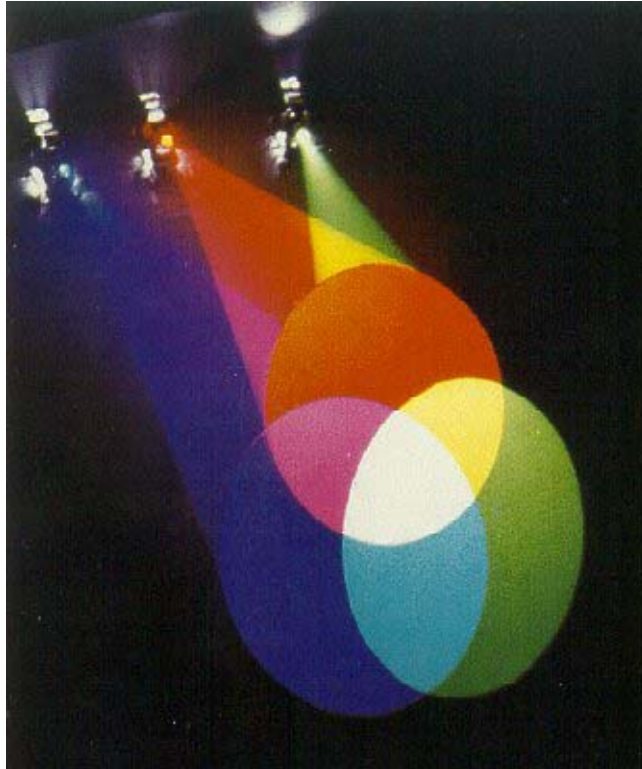
RED **GREEN** **BLUE.**



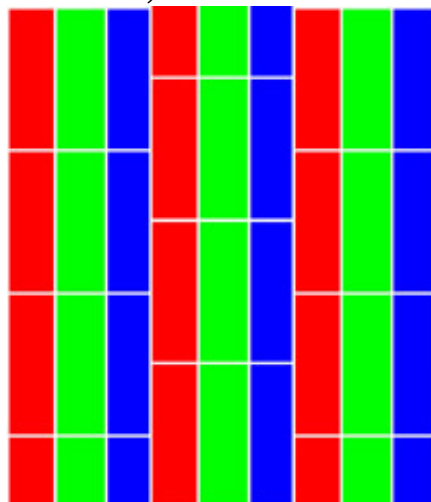
These are the “additive” colors, produced by adding light from different sources. This is the way your computer and television work.

ADDITIVE COLOR MIXING

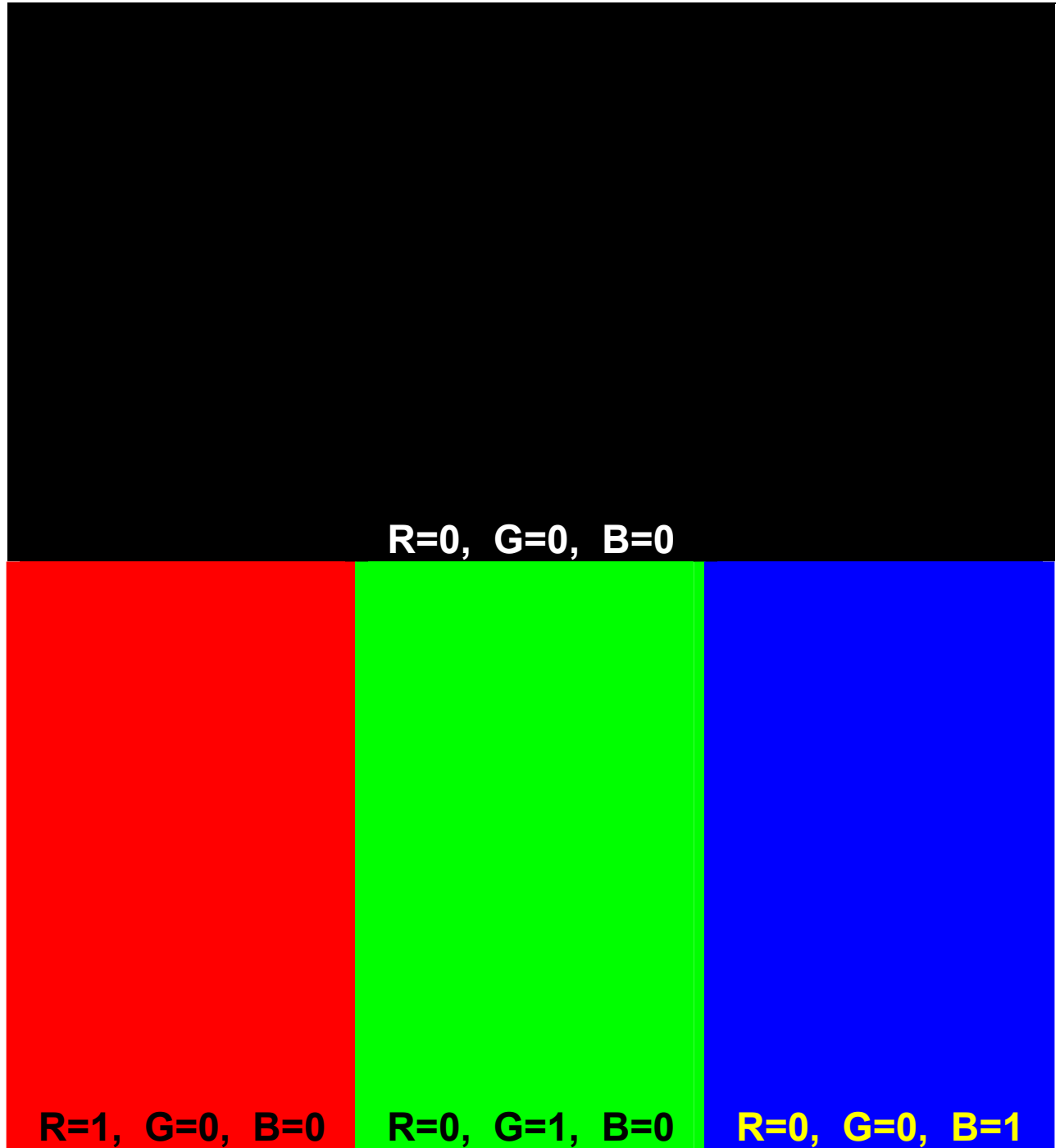
Colored lights



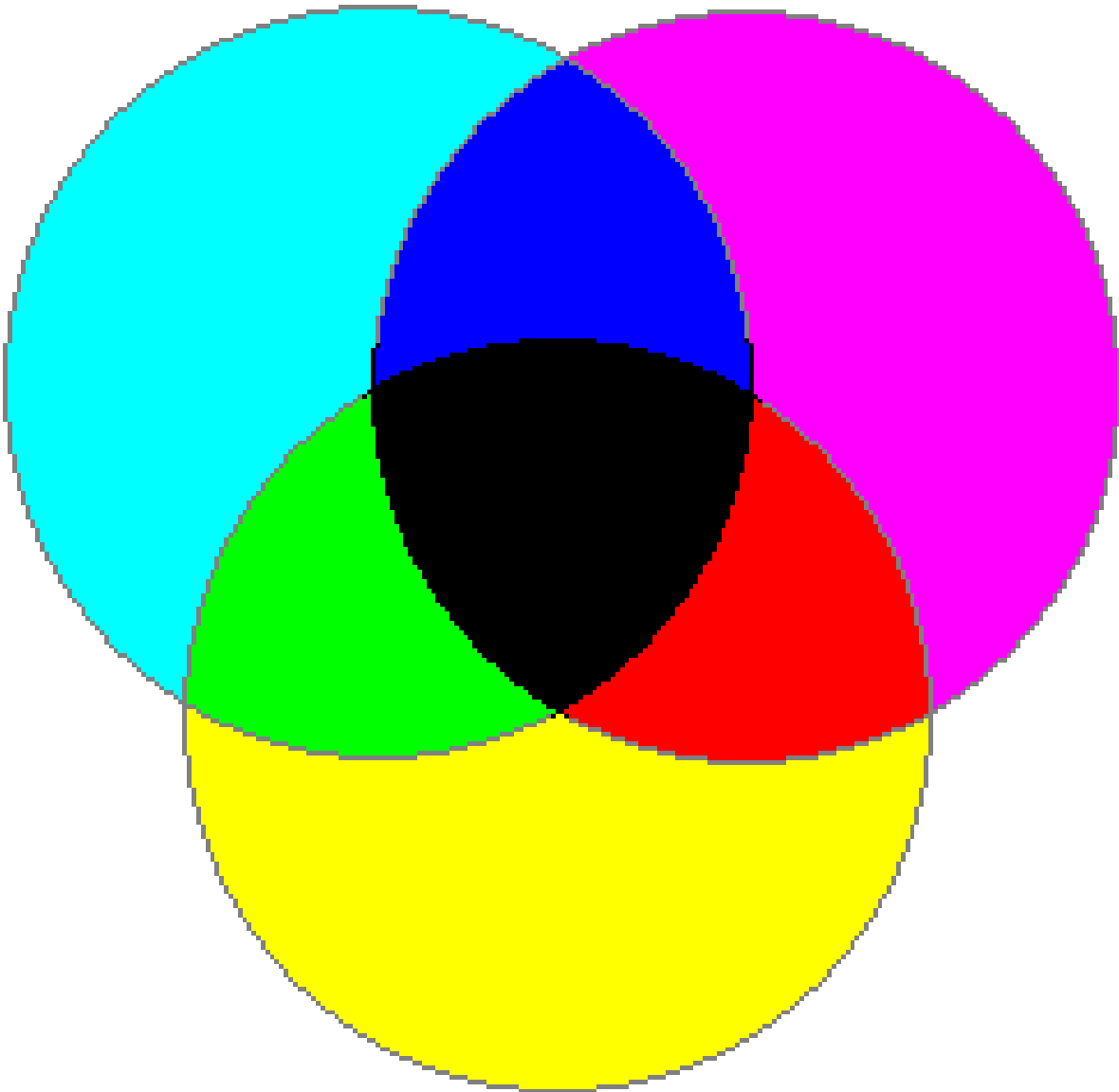
Used in stage and general lighting, television, computer monitors & screens (use a magnifier to see individual pixels). Start with black, add all three to create white.



BLACK and COLORS (RGB)



SUBTRACTIVE COLOR MIXING

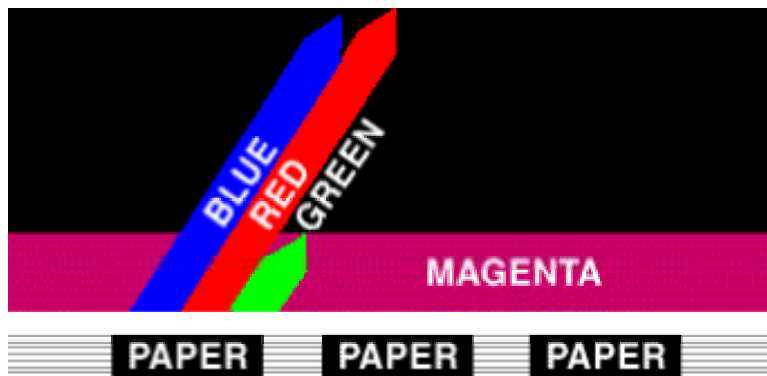
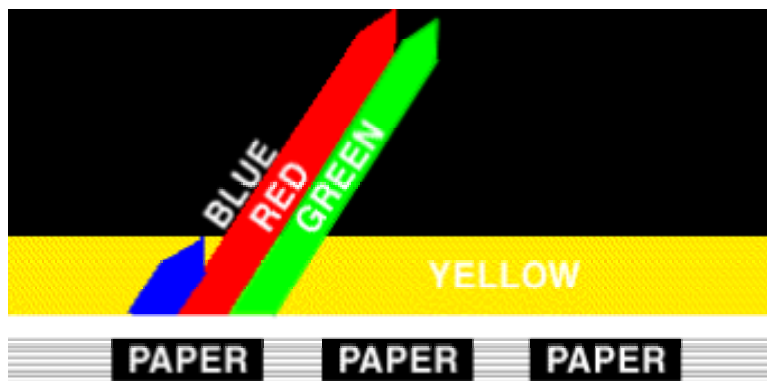
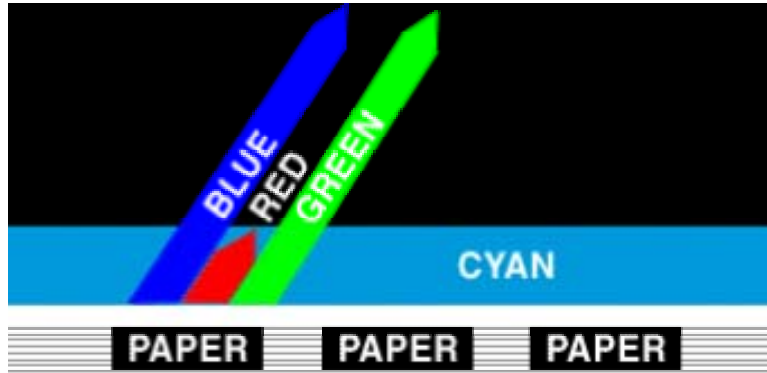


Primary colors are cyan, yellow and magenta. Start with white; remove colors. Used in photography, textiles, printing, dyes, paints and crayons. Subtraction of all three from white yields black.

WHITE and COLORS (CYM)



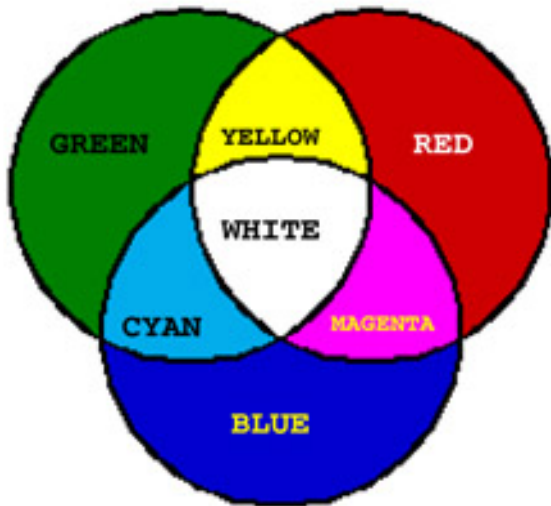
COLORANTS ON PAPER



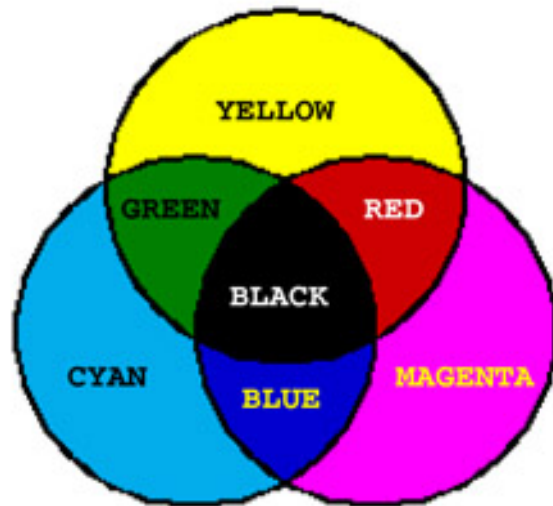
So your teacher was sorta correct, she just didn't know the right names for the subtractive primaries.

COMPLEMENTARY COLORS

Notice that these choices for additive and subtractive primaries are complementary

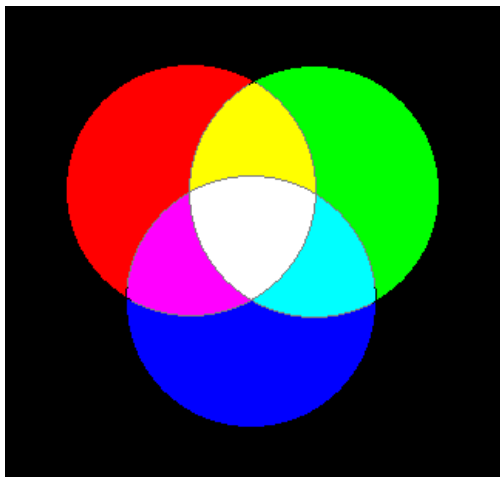


**Additive Colors
(Lights)**

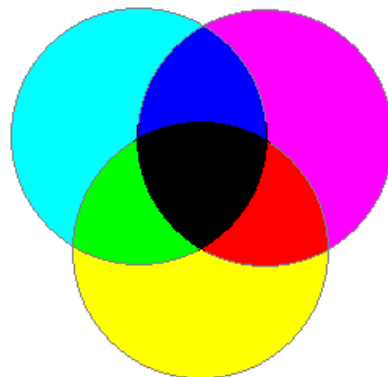


**Subtractive Colors
(Pigments)**

ADDITIVE



SUBTRACTIVE



HOW MANY COLORS ARE OUT THERE?



WHITE ONYX



PLATINUM



ZIRCON



TOPAZ



SEAFROST



QUARTZ



RADIANCE



PACIFIC



BRITISH RACING GREEN

COLOR FOR THE INTERNET

Full color is represented by three 8-bit words, one each for red, green and blue. There are $256^3 = 16,777,216$ possible combinations from 000000 black to FFFFFFFF white.


Our browsers can't handle that much information at a high speed, and most colors are formed by dithering, mixing two colors at the finest pixel level possible.


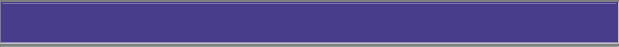
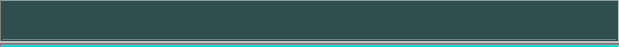




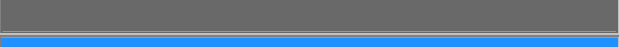






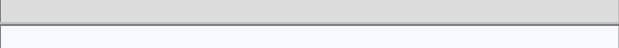
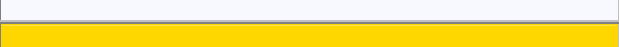


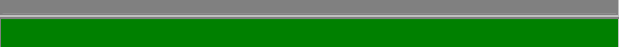





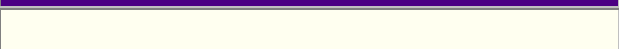
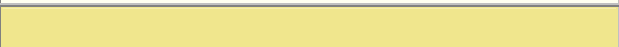




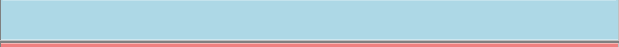




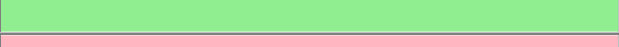


To keep the number of available colors to a minimum, both Windows and MAC operating systems use 216 colors to make up their palettes of colors. The color list comes from a mathematical formula using the shades 00, 33, 66, 99, CC, and FF from hex codes. Using just those 6 hex combinations of red, blue, and green hues, gives us a total of 216 colors that will render perfectly on your screen. The first two hex digits are red, the middle pair is green and the last pair is blue. These are considered "browser-safe" colors.




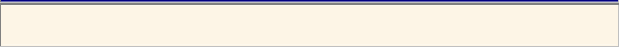
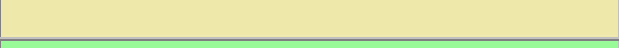
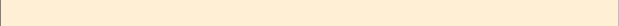
FFFFFF	FFFFCC	FFFF99	FFFF66	FFFF33
FFFF00	CCFFFF	CCFFCC	CCFF99	CCFF66
CCFF33	CCFF00	99FFFF	99FFCC	99FF99
66FFFF	99FF66	99FF33	66FFCC	FFCCFF
99FF00	33FFFF	FFCCFF	33FFCC	00FFFF
66FF99	FFCC99	66FF66	66FF33	00FFCC
66FF00	33FF99	FFCC66	FFCC33	CCCCFF
33FF66	33FF33	00FF99	FFCC00	33FF00
00FF66	00FF33	00FF00	CCCCCC	CCCC99
99CCFF	CCCC66	CCCC00	CCCC33	99CCCC

FF99FF	99CC99	66CCFF	FF99CC	99CC66
66CCCC	99CC33	00CCFF	33CCFF	99CC00
FF9999	66CC99	FF9966	66CC66	33CCCC
CC99FF	00CCCC	FF9933	FF9900	66CC33
66CC00	33CC99	00CC99	CC99CC	33CC66
00CC66	CC9999	FF66FF	33CC33	33CC00
CC9966	00CC33	9999FF	00CC00	CC9933
CC9900	FF66CC	9999CC	FF6699	999999
6699FF	FF6666	CC66FF	999966	6699CC
999933	FFCC33	FF6600	FF33FF	3399FF
999900	669999	CC66CC	0099FF	FF33CC
3399CC	CC6699	669966	FF00FF	339999
669933	669900	FF3399	0099CC	9966FF
CC6666	009999	CC6633	CC6600	339966
FF00CC	FF3366	009966	CC33FF	FF3333
339933	009933	9966CC	FF3300	FF0099
339900	009900	6666FF	CC33CC	FF0066
996699	FF0033	FF0000	CC00FF	CC3399
996666	6666CC	996633	996600	3366FF
CC3366	CC00CC	9933FF	0066FF	666699
CC3333	CC3300	3366CC	CC0099	9933CC
666666	666633	0066CC	9900FF	666600
CC0066	336699	993399	CC0033	6633FF
336666	006699	CC0000	993366	9900CC
336633	006666	336600	6633CC	3333FF
006633	993333	993300	6600FF	990099
006600	0033FF	663399	009966	3333CC
663366	6600CC	990033	0033CC	990000
3300FF	663333	663300	660099	0000FF
333399	3300CC	003399	333300	660066
333333	003366	0000CC	660033	333300
660000	330099	003333	003300	000099
330066	330033	000066	330000	000033
000000				

COMMON NAMED COLORS FOR THE INTERNET

Color Name	Color HEX	Color
AliceBlue	#F0F8FF	
AntiqueWhite	#FAEBD7	
Aqua	#00FFFF	
Aquamarine	#7FFFD4	
Azure	#F0FFFF	
Beige	#F5F5DC	
Bisque	#FFE4C4	
Black	#000000	
BlanchedAlmond	#FFEBCD	
Blue	#0000FF	
BlueViolet	#8A2BE2	
Brown	#A52A2A	
BurlyWood	#DEB887	
CadetBlue	#5F9EA0	
Chartreuse	#7FFF00	
Chocolate	#D2691E	
Coral	#FF7F50	
CornflowerBlue	#6495ED	
Cornsilk	#FFF8DC	
Crimson	#DC143C	
Cyan	#00FFFF	
DarkBlue	#00008B	
DarkCyan	#008B8B	
DarkGoldenRod	#B8860B	
DarkGray	#A9A9A9	
DarkGreen	#006400	
DarkKhaki	#BDB76B	
DarkMagenta	#8B008B	
DarkOliveGreen	#556B2F	
Darkorange	#FF8C00	
DarkOrchid	#9932CC	
DarkRed	#8B0000	
DarkSalmon	#E9967A	

DarkSeaGreen	#8FBC8F	
DarkSlateBlue	#483D8B	
DarkSlateGray	#2F4F4F	
DarkTurquoise	#00CED1	
DarkViolet	#9400D3	
DeepPink	#FF1493	
DeepSkyBlue	#00BFFF	
DimGray	#696969	
DodgerBlue	#1E90FF	
Feldspar	#D19275	
FireBrick	#B22222	
FloralWhite	#FFFAF0	
ForestGreen	#228B22	
Fuchsia	#FF00FF	
Gainsboro	#DCDCDC	
GhostWhite	#F8F8FF	
Gold	#FFD700	
GoldenRod	#DAA520	
Gray	#808080	
Green	#008000	
GreenYellow	#ADFF2F	
HoneyDew	#F0FFF0	
HotPink	#FF69B4	
IndianRed	#CD5C5C	
Indigo	#4B0082	
Ivory	#FFFFFF	
Khaki	#F0E68C	
Lavender	#E6E6FA	
LavenderBlush	#FFF0F5	
LawnGreen	#7CFC00	
LemonChiffon	#FFFACD	
LightBlue	#ADD8E6	
LightCoral	#F08080	
LightCyan	#E0FFFF	
LightGoldenRodYellow	#FAFAD2	
LightGrey	#D3D3D3	
LightGreen	#90EE90	
LightPink	#FFB6C1	

LightSalmon	#FFA07A	
LightSeaGreen	#20B2AA	
LightSkyBlue	#87CEFA	
LightSlateBlue	#8470FF	
LightSlateGray	#778899	
LightSteelBlue	#B0C4DE	
LightYellow	#FFFFE0	
Lime	#00FF00	
LimeGreen	#32CD32	
Linen	#FAF0E6	
Magenta	#FF00FF	
Maroon	#800000	
MediumAquaMarine	#66CDA4	
MediumBlue	#0000CD	
MediumOrchid	#BA55D3	
MediumPurple	#9370D8	
MediumSeaGreen	#3CB371	
MediumSlateBlue	#7B68EE	
MediumSpringGreen	#00FA9A	
MediumTurquoise	#48D1CC	
MediumVioletRed	#C71585	
MidnightBlue	#191970	
MintCream	#F5FFFA	
MistyRose	#FFE4E1	
Moccasin	#FFE4B5	
NavajoWhite	#FFDEAD	
Navy	#000080	
OldLace	#FDF5E6	
Olive	#808000	
OliveDrab	#6B8E23	
Orange	#FFA500	
OrangeRed	#FF4500	
Orchid	#DA70D6	
PaleGoldenRod	#EEE8AA	
PaleGreen	#98FB98	
PaleTurquoise	#AFEEEE	
PaleVioletRed	#D87093	
PapayaWhip	#FFEFD5	

<u>PeachPuff</u>	<u>#FFDAB9</u>	
<u>Peru</u>	<u>#CD853F</u>	
<u>Pink</u>	<u>#FFC0CB</u>	
<u>Plum</u>	<u>#DDA0DD</u>	
<u>PowderBlue</u>	<u>#B0E0E6</u>	
<u>Purple</u>	<u>#800080</u>	
<u>Red</u>	<u>#FF0000</u>	
<u>RosyBrown</u>	<u>#BC8F8F</u>	
<u>RoyalBlue</u>	<u>#4169E1</u>	
<u>SaddleBrown</u>	<u>#8B4513</u>	
<u>Salmon</u>	<u>#FA8072</u>	
<u>SandyBrown</u>	<u>#F4A460</u>	
<u>SeaGreen</u>	<u>#2E8B57</u>	
<u>SeaShell</u>	<u>#FFF5EE</u>	
<u>Sienna</u>	<u>#A0522D</u>	
<u>Silver</u>	<u>#C0C0C0</u>	
<u>SkyBlue</u>	<u>#87CEEB</u>	
<u>SlateBlue</u>	<u>#6A5ACD</u>	
<u>SlateGray</u>	<u>#708090</u>	
<u>Snow</u>	<u>#FFFAFA</u>	
<u>SpringGreen</u>	<u>#00FF7F</u>	
<u>SteelBlue</u>	<u>#4682B4</u>	
<u>Tan</u>	<u>#D2B48C</u>	
<u>Teal</u>	<u>#008080</u>	
<u>Thistle</u>	<u>#D8BFD8</u>	
<u>Tomato</u>	<u>#FF6347</u>	
<u>Turquoise</u>	<u>#40E0D0</u>	
<u>Violet</u>	<u>#EE82EE</u>	
<u>VioletRed</u>	<u>#D02090</u>	
<u>Wheat</u>	<u>#F5DEB3</u>	
<u>White</u>	<u>#FFFFFF</u>	
<u>WhiteSmoke</u>	<u>#F5F5F5</u>	
<u>Yellow</u>	<u>#FFFF00</u>	
<u>YellowGreen</u>	<u>#9ACD32</u>	
