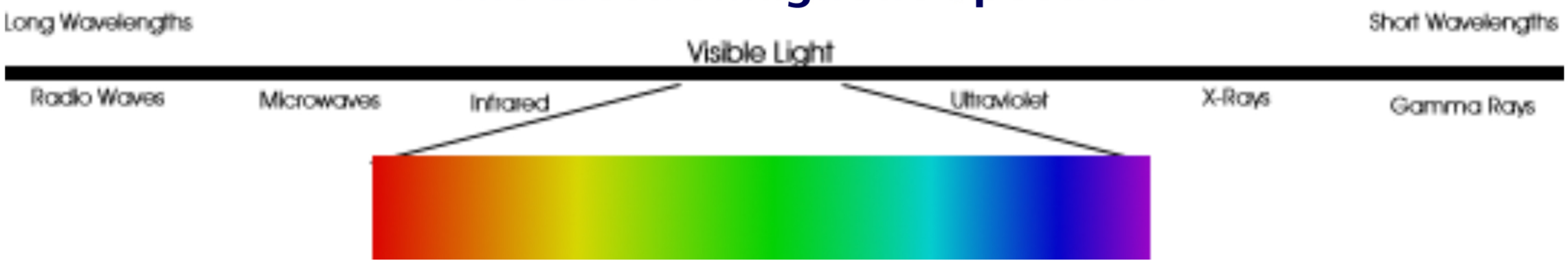
THE COLOR OF LIGHT

Light is the visible portion of the Electromagnetic Spectrum (radiation from the sun). These wavelengths are the colors of the spectrum: red, orange, yellow, green, blue, indigo, and violet. When all the colors are mixed together in relatively equal proportions they make **WHITE LIGHT.**

The Electromagnetic Spectrum



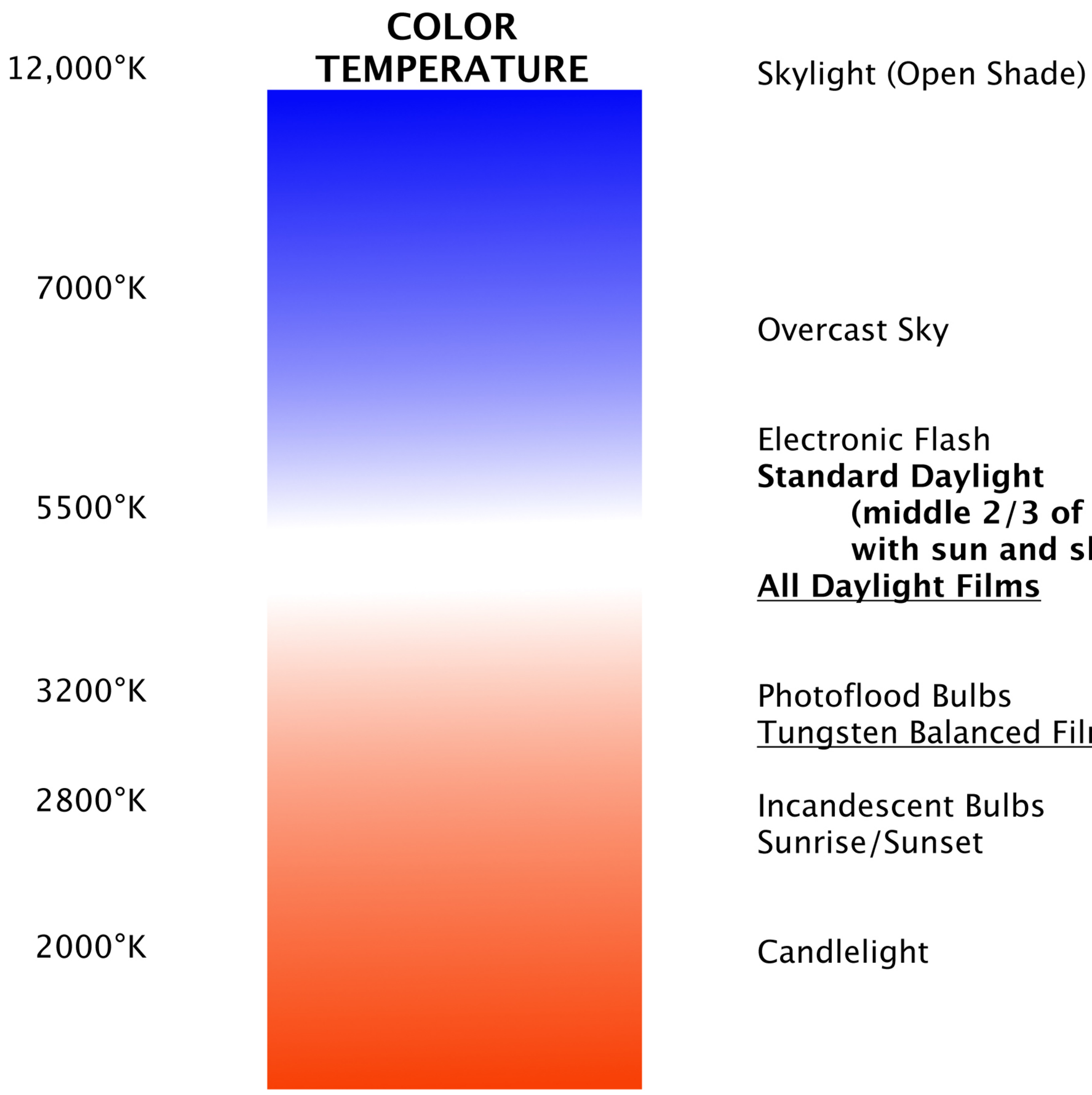
Our eyes see most white light sources like sunlight, electronic flash, and incandescent bulbs as the same neutral color but neither digital sensors or film "see" them that way. With middle of the day sunlight and electronic flash the rendering is neutral. On a cloudy day or in deep shadows the rendering is cool or blue. Early in the morning or late in the day or under incandescent illumination (called Tungsten) the rendering is warm or amber. The system for measuring the relative warmth or coolness of white light sources is called **COLOR TEMPERATURE.**

The higher the color temperature, the cooler or bluer the color that the film renders and vice versa. The color temperature scale is based around 5500°Kelvin which is called **STANDARD DAYLIGHT** (the average of 2/3 of the middle of the day with sun and sky). Unlike film which are only balanced for syandard daylight (5500° K), or tungsten (3200° K), a Raw file can capture many color temperatures all in the same file. Light Balancing filters which change the color temperature of a source for film are totally unnecessary with digital cameras using the Raw format.

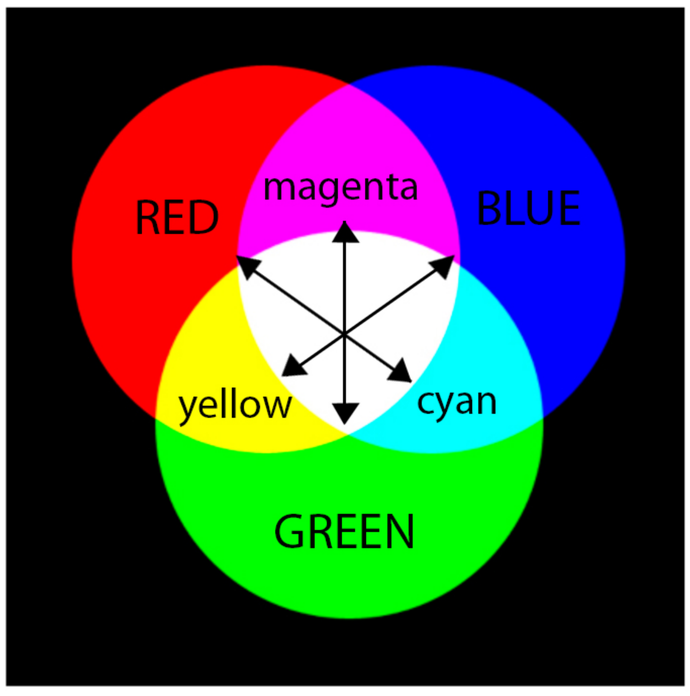
Light sources which lack one or more of the colors of the spectrum are not white light sources but are called **NON-CONTINUOUS SPECTRUM EMITTERS.** Certain wavelengths (colors) are missing and most films record strong color casts. These casts are more or less filtered out in the Raw translator. Fluorescent lights are the most common of these types of light sources and the only ones that can be easily corrected. Other non-continuous emitters include most street lights which are predominately two types, mercury vapor and sodium vapor. The former appears blue-white to our eyes and green to the sensors and film and the latter appear orange to our eyes and all recording media.

COLOR TEMPERATURE CONTINUED

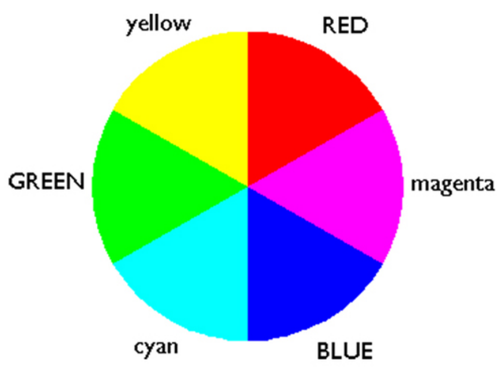
(* You will not be asked to know the specific numbers [temperatures Kelvin] but you need to know where the different white light sources mentioned here fall on the color temperature scale, from warm to neutral to cool)



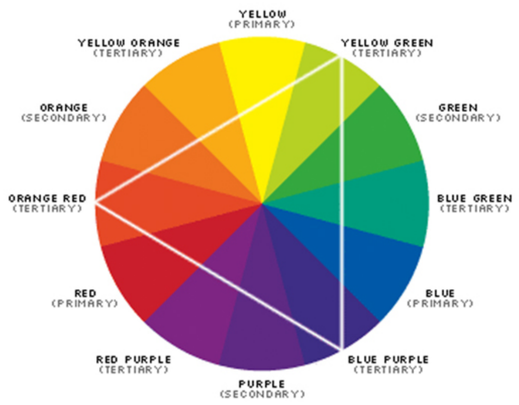
Each color here is pointing at its opposite, or complement.
The circles--RED, GREEN, and BLUE---are the primary colors of light.
The points of intersection show the combinations of two primary colors.
All the colors of light cobined together---as indicated in the center---make WHITE LIGHT.
See more about the color wheel of light on the following page.



PHOTOGRAPHIC COLOR THEORY



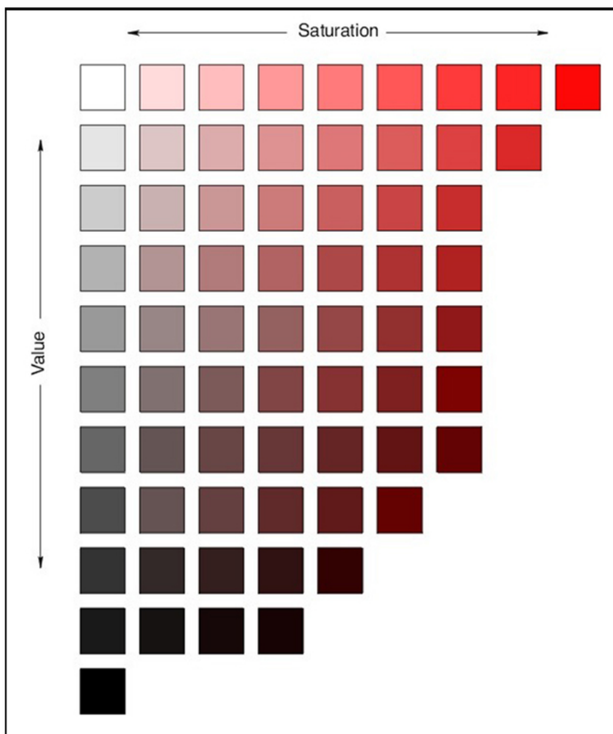
LIGHT



PIGMENT

The color wheel of light differs from the color wheel of pigment. When mixing colors on paper with paint, we deal with the color wheel on the right, which may seem familiar to you from experiences you've had with paints and other pigments. In photography, we deal with the colors of light. It is important to remember that any color you view on this wheel is created by combining the two colors that flank it (exist on either side). So red is made by combining yellow and magenta, and cyan is made by combining blue and green light. It is also important to consider the relationships between colors that are **OPPOSITES or COMPLEMENTS**. These colors exist opposite each other on the wheel (i.e., red is the opposite of cyan,blue is the opposite of yellow, and magenta is the opposite of green.) In order to color correct our digital images in Camera Raw, we add the opposite color of the color "problem" or "sickness." So if an image is too yellow, we make it more blue. If it is too green, we make it more magenta, etc.

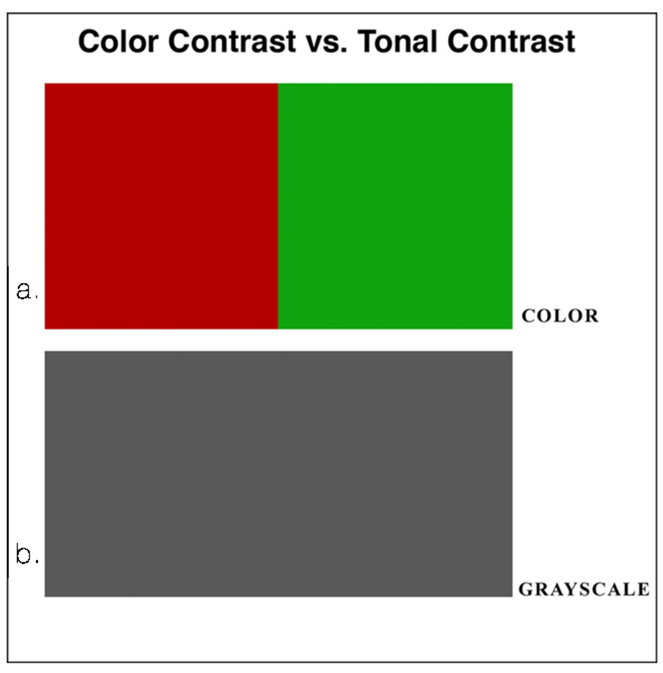
When we talk about color, we deal with three main quailites. The **Hue** of a color is simply its name, or what the color is. **Saturation** is how pure a color is, from a scale of no color at all (black&white, or zero saturation) to the purest ("punchiest") version of that color. **Luminance** (also called value) is the lightness or darkness of a color. The tones in black&white images have Value (lightness or darkness--think of the zone system) but no hue or saturation, as they lack color altogether. In Camera Raw, the **HSL** tab allows us to deal with the hue, saturation and value/luminance of individual colors within the image. Using the sliders or the targeted tool, we can change the hue (color), saturation (purity), and luminance (lightnes or darkness) of a single color within the image. So we can individually adjust everything within the image that is considered purple, yellow, red, etc. The targeted tool affords us further control by allowing us to select a cluster of pixels and change it, even if it is a combination of colors (the way most caucasian skin is a combination of red and orange in most color images from typical lighting situations).



HUE
The name of the color

SATURATION
The purity of the color
(NO stauration = B&W)

LUMINANCE (Value)
The lightness or darkness of the color, on a scale from black to white
(Think **Z**ONE SYSTEM, but in color)



Consider the difference between color contrast and tonal contrast. You encountered this when you did your Motion assignment, and you found that images worked in color but became flat when they were converted to black&white in Camera Raw by bringing down the saturation.

With color imagery, you deal with **color contrast** (particularly with contrasting colors, as with figure a above). When reduced to Black&White (as in Figure b), the colors become the same tone, lose their contrast, and look muddy by blending together.

When shooting in color, consider using color contrast to create tension and make your images more dynamic.

PSYCHOLOGICAL IMPLICATIONS OF COLOR:
(Euro-American Societies)

HUE	POSITIVE	NEGATIVE
	*BLOOD, passion, energy, eroticism	*BLOOD, anger, aggression
	*HUMAN FLESH, warmth, (Hearth fire), accessibility	*HUMAN FLESH, weakness, lack of discrimination
	SUNSHINE, energy, happiness	Overwhelming energy
	Life, nature, restfulness (Foliage, green forests)	Toxicity, Artificiality decay (fungus, mold)
	"Coolness" (elegance) spirituality, sky	"Coolness" (distance) sadness, depression ("blues")
	Fantasy, playfulness, dream states (also royalty)	Madness, Nightmares

All photography, when created deliberately, has the potential to move its viewers. Color, in photography and other visual media, carries with it additional associations and potential to affect our viewers on an emotional level.]Much of the information on this chart is intuitive, but it bears mentioning that these associations have a Western slant.
Consider the emotional impact that results from focusing on certain colors in your imagery when you compose your shots and choose your palette.