# Overview of color:

- **Digital color wheel:** A color wheel is a tool that provides a visual representation of the relationships between all possible hues. The digital color wheel consists of:

  - **Primary colors: Red, Green and Blue (RGB) colors** arranged around a circle at equal (120 degree) intervals**.**

  - **Secondary and Complementary colors. Complementary colors** are colors that are opposite (180 degrees) on the color wheel. The complementary colors to **RGB** are **Cyan, Magenta, and Yellow** which are referred to as **Secondary colors**. The color complement of each primary color (red, green and blue) can be obtained by mixing the two other primary colors together. Thus for the primary color of red, the opposite complementary color (Cyan) is a mixture of green and blue. When complimentary colors are used together in a photograph they create contrast.
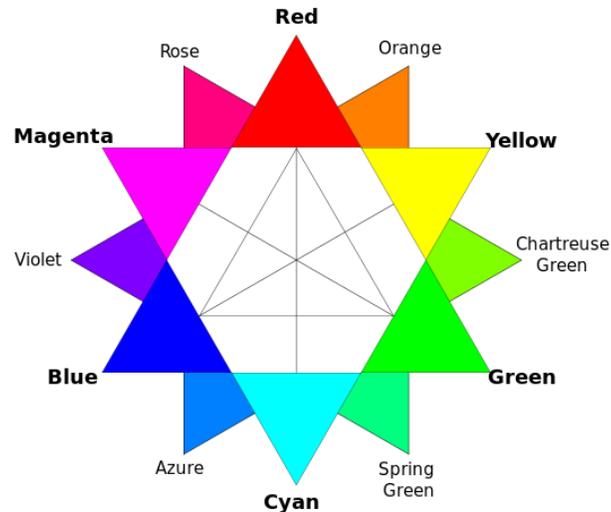

  - **Tertiary Colors:** The Tertiary colors are Orange (Red-Yellow), Chartreuse Green (Yellow-Green), Spring Green (Green-Cyan), Azure (Blue-Cyan), Violet (Blue-Magenta), and Rose (Magenta-Red). These are the colors formed by mixing a primary and a secondary color. That's why the hue is sometimes named with two words, such as blue-magenta, red-yellow, etc.

  - **Harmonious and Complementary colors in a photo:** Harmonious (or Analogous) colors lie close to each other on the color wheel, and are not difficult to look at together, even if all of the colors take up similar amounts of space in the photo. Analogous colors are mesmerizing, keeping you pulled into the photo, never really allowing your eye to stray too much and they give a sense of calm and peace, or harmony. Try to make one of the two analogous colors the focus of your image, and use the second color to enhance the overall image.

    Complementary colors can clash in a very ugly fashion, but they can also produce striking contrasts and vivid, vibrant images. Blue and its complementary color yellow, will give you a striking contrast in your photo (yellow flowers against a blue sky). However, you should make sure the two complementary colors do not take up equal amount of space in the photo otherwise the viewer might be overwhelmed. When complementary colors are equal in intensity and placed next to each other, the line that separates them has vibrance. If your scene contains a very strong, bold color in the foreground, don't include a lot of other bold colors in the surrounding scenery or in the background. Too much color is confusing to the eye and will make for a feeling of chaos throughout the image.

  - **Monochromatic color:** A monochromatic scene consists of varying shades of a single color where the hue remains the same in the entire image; however, the saturation and luminosity of the color changes. The key to a successful monochromatic image is to find scenes with good contrast throughout the image — you want the photo to have a dark version of the color, a light one and a range of tones in between. A monochromatic photo normally conveys emotion because the dominant subject is color and the human response to color is psychologically complex.

- **Traditional color wheel:**
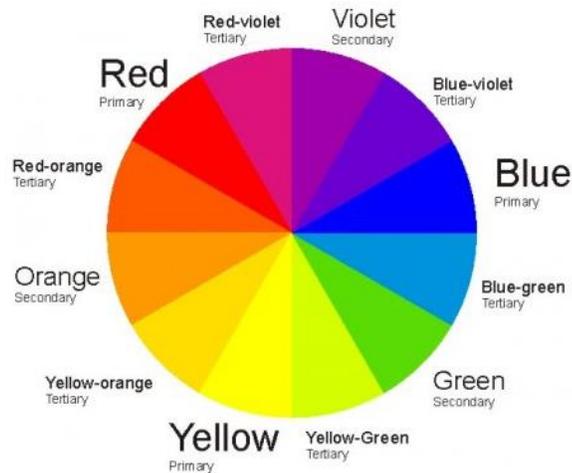
  - The traditional color wheel is the one used in the field of art and uses primary colors of **Yellow**, **Red**, and **Blue**. The secondary colors are **Green**, **Orange** and **Violet** (also called Purple).

  - Use this color chart wheel to determine your complementary colors so that elements of your photo will really jump out to the viewer. Examples would be an orange balloon against a blue sky, red flowers in a green field, or yellow autumn leaf floating on a purplish (violet) body of water. These combinations would make your photos more dramatic and draw the viewer's eye to them.

  - **Recommended Complementary Ratios:** The recommended ratios between primary and secondary colors in a photo are:

    - **Red and Green** can be roughly equal (1:1 ratio) in their effect on each other.

    - **Orange and Blue** needs about a 3:1 ratio for balance.

    - **Yellow and Violet** needs about 5:1 ratio for balance.
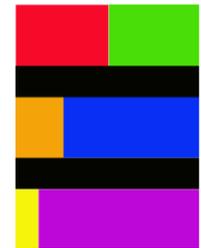
- **Color Models important to Photographers:**

  - **RGB:** The RGB color model is an additive color model. Red, green and blue light are added together in various combinations to reproduce a wide spectrum of colors. The primary purpose of the RGB color model is for the display of images in electronic systems, such as on television screens and computer monitors and it's also used in digital photography.   In the RGB color model, colors are represented by varying intensities of red, green and blue light. The intensity of each of the red, green and blue components are represented on a scale from 0 to 255 (256 levels for each color) with 0 being the least intensity (no light emitted) to 255 (maximum intensity). For example, Magenta color would be R=255 G=0 B=255 (see the RGB figure to the right), Black would be R=0 G=0 B=0 (a total absence of light) and White would be R=255 G=255 B=255.
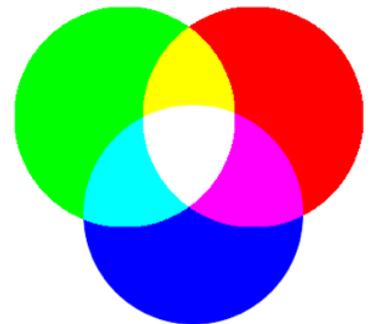
    To adjust RGB colors in Lightroom, use the Tone Curve and select one of the individual RGB colors and adjust the curve. For the Blue channel, moving the curve up will increase blue and moving the curve down will add yellow (complementary color of blue).

  - **Lab:** The Lab color model is designed to approximate human vision. Unlike RGB, LAB is not device-dependent. In this three-dimensional model, the '**L**' stands for the lightness or Luminance of the color, ranging from black to white. The '**a**' channel is for the colors ranging from green to magenta, and the "**b**" channel is for the color ranging from blue to yellow.

    This color model is used when you adjust your White Balance — Temperature (blue to yellow) and Tint (green to magenta). In Photoshop, to make your colors vibrant you would convert your image into the LAB

color space. Once you are finished working in LAB, if you want to actually do anything with your photo, you need to convert it back to RGB.

- **HSL:** In order to describe a specific color, you need to break it down into its three elements.

    - **Hue:** Hue is another word for color. What hue we see is dependent on the wavelength of light being reflected or produced and we all perceive color differently. The hue you see may not be the same hue I see.

    - **Saturation (or Chroma):** Saturation is the intensity or richness of a color. High saturation colors are bright and colorful while low saturation colors are less colorful and appear dull. Saturation is something that you can tweak in post-processing; however, avoid oversaturating.

    - **Luminance:** Luminosity is the lightness or the darkness of a color. In post-processing you can make a color lighter or darker by adding black or white to a color (using the HSL luminance slider in Adobe Camera Raw).

- **Memory colors:** The first step in adjusting colors is to remember the colors you shot and adjust the White Balance (Temperature and Tint sliders) to obtain an overall color you recall. To help you fine toon your adjustments, click in the numeric value box and use the up/down arrow keys (temperature will change by 50 units [200 units if hold down the Shift key] and tint by 1 unit [10 units if hold down the Shift key]).

    A standard color checking test chart (PDITarget) is available for download (http://www.inkjetcarts.us/support/assets/PDI_Target-DCPHiRes.jpg) that can be used as a standard test target for colour printing and monitor profile evaluation.

- **Black & White:** Some images will look better in black and white. Sometimes colors can be terribly distracting in some images taking focus away from your subject. Black & White photos should have a good range of tones between the bright highlights and strong blacks. Generally you want the main subject to appear in a significantly different shade of grey to the background. If your composition includes lots of well-defined shapes, lines, and textures then you should consider trying black and white. Patterns can be more compelling in black and white because color can distract the eye from the pattern. You can quickly view and evaluate a photo as a black & white image by clicking on the **Black & White** treatment in Lightroom (located at very top of the Develop module).