Mode

- Color mode determines what color method is used to display and print the image. Photoshop bases its color modes on the color models that are useful for images used in publishing.
- Color Mode Sets…
  - The number of colors,
  - The number of channels,
  - Which tools and file formats are available.

Lab Color

- **Lab** color is the intermediate color model Photoshop uses when converting from one color mode to another.
- Three components:
  - Lightness
  - a-axis from green-red
  - b-axis from blue-yellow

Color Channel

- One of the building blocks of a particular color model, like red in RGB.

Color Balance

- The correct relative amounts of red green and blue in an RGB digital image.
- "Perfect" light color for photography?
  - Color of sunlight on a sunny day at noon.
  - 5500^{O} Kelvin
    - Lower values = *redder* (incandescent light bulb)
    - Higher values = *bluer* (built-in flash, overcast day)

Sources of "Bad" Color

1. ***Lighting*** that is not characterized at 5500 deg Kelvin color temperature.
   • Tungsten lights lower, reddish.

   Change white balance on your camera.

   • Fluorescent lights are deficient in certain bands of red.

   Can use white balance.

   Best to use a lens filter made for fluorescent.

   (Digital cameras historically don't compensate as well with their fluorescent white balance.)

Sources of "Bad" Color

2. ***Mixed light sources***. Avoid. Use one source and a reflector. Use a big flash.
3. ***White balance adjustment being set wrong.*** "Auto" means if it is bright it is daylight, if it is dim it is tungsten. Would that work in here?
4. ***The camera (It used to be the film!)***

Color Balance Tool

Sliders for
- cyan-red
- magenta-green
- yellow-blue

Note: check box for "Preserve Luminosity" keeps the overall tonal balance the same.

Variations Tool

Like Color Balance with a what you see is what you get interface.

Why "Show Clipping"?

You can send values to 255. If you keep pushing, more pixels get the 255 and the differences between pixels is lost, or "clipped off."

Even if you reverse the adjustment, all the clipped pixels stay a single color.

Best Color Balance Tools?

- *Eyedropper* tools found in *Levels* and *Curves*.
- Require something in the image that you can identify as actually black, white or gray.
  - Black = 0 Red, 0 Green, 0 Blue.
  - White = 255 Red, 255 Green, 255 Blue. (100% ea)
  - Gray = *equal values* for Red Green Blue.

No Black, White, or Gray Hints?

1. Open the Info or Histogram palette in RGB "Expanded View." Look for two with a similar shape.
2. Keep your eye on the histogram while you adjust the Color Balance sliders, or Levels for one of the channels.
3. Aligning the shapes in the RGB channels sometimes improves color balance.

Auto Color Tools

Auto Contrast

Adjusts all channels *identically*. This preserves the overall color relationship while making highlights appear lighter and shadows appear darker.

Auto Levels

Maximizes the tonal range (maximizes contrast!) in each channel *separately* to produce a more dramatic correction.

This may change the color.

Auto Color

Adjusts both contrast and color balance. Creates a neutral average in the mid tones.

Sometimes seems to do way too much.

Note you can get to an Auto Color Correction Options dialog box. Click Options button in the Levels or Curves dialog box.

Useful with save-able settings.

Demo?

Image >Adjustments >Match Color

Takes color palette from an image or a selected part of an image, and applies it to another image or selected part of an image. Select an area in both images if you wish.

Great for making a set of images match, like they were taken at the same time.

Before making color and tonal adjustments, consider…

•Work with a monitor that's calibrated and profiled.

- Monitors are not perfect. Also, ambient room lighting affects how images appear.

- PS or OS can utilize a published "color profile" for your monitor. This compensates for a neutral balance.

- Software such as Adobe's Gamma correction can help you adjust your monitor color balance.

- Hardware systems are available to automatically adjust. Typically done in image-related businesses.

Before making color and tonal adjustments, consider…

•Work with 16-bits per channel rather than 8-bits per channel. Examples: RAW or DNG.

8-bits = 16.7 million colors, 16-bits = 16.7 million^2 colors

Any loss of image information from processing is more critical in an 8-bit image than a 16-bit image.

Before making color and tonal adjustments…

• Use *adjustment layers* rather than applying an adjustment directly to the image layer itself.

Adjustment layers let you go back and make successive tonal adjustments without discarding data from the image layer.

Hue/Saturation/Brightness

Hue shifts colors. Could turn crabgrass into bluegrass.

Saturation might help an image taken on a gray day look more colorful.

Brightness is sometimes necessary to make up for tonal change after Hue and Saturation.

Shadow/Highlight

Like a separate contrast for shadows and highlights.

Shadow expands the shadow range up in brightness, effectively creating contrast and brightness.

Highlight expands the highlight range downward, creating more contrast.