

Color mode or Image mode

The color mode or image mode determines how colors combine based on the number of channels in a color model. Different color modes result in different levels of color detail and file size. For instance, use CMYK color mode for images in a full-color print brochure, and use RGB color mode for images in web or e-mail to reduce file size while maintaining color integrity.

Color modes include grayscale, RGB, and CMYK, among others. Photoshop Elements supports bitmap, grayscale, indexed, and RGB color modes

1. RGB mode (millions of colors)
2. CMYK mode (four-printed colors)
3. Index mode (256 colors)
4. Grayscale mode (256 grays)
5. Bitmap mode (2 colors)

RGB Color mode

Photoshop RGB Color mode uses the RGB model, assigning an intensity value to each pixel. In 8-bits-per-channel images, the intensity values range from 0 (black) to 255 (white) for each of the RGB (red, green, blue) components in a color image. For example, a bright red color has an R value of 246, a G value of 20, and a B value of 50. When the values of all three components are equal, the result is a shade of neutral gray. When the values of all components are 255, the result is pure white; when the values are 0, pure black.

RGB images use three colors, or *channels*, to reproduce colors on screen. In 8-bits-per-channel images, the three channels translate to 24 (8 bits x 3 channels) bits of color information per pixel. With 24-bit images, the three channels can reproduce up to 16.7 million colors per pixel. With 48-bit (16-bits-per-channel) and 96-bit (32-bits-per-channel) images, even more colors can be reproduced per pixel. In addition to being the default mode for new Photoshop images, the RGB model is used by computer monitors to display colors. This means that when working in color modes other than RGB, such as CMYK, Photoshop converts the CMYK image to RGB for display on screen.

Although RGB is a standard color model, the exact range of colors represented can vary, depending on the application or display device. The RGB Color mode in Photoshop varies according to the working space setting that you specify in the **Color Settings** dialog box.

CMYK Color mode

In the CMYK mode, each pixel is assigned a percentage value for each of the process inks. The lightest (highlight) colors are assigned small percentages of process ink colors; the darker (shadow) colors higher percentages. For example, a bright red might contain 2% cyan, 93% magenta, 90% yellow, and 0% black. In CMYK images, pure white is generated when all four components have values of 0%.

Use the CMYK mode when preparing an image to be printed using process colors. Converting an RGB image into CMYK creates a *color separation*. If you start with an RGB image, it's best to edit first in RGB and then convert to CMYK at the end of your editing process. In RGB mode, you can use the **Proof Setup** commands to simulate the effects of a CMYK conversion without changing the actual image data. You can also use CMYK mode to work directly with CMYK images scanned or imported from high-end systems.

Although CMYK is a standard color model, the exact range of colors represented can vary, depending on the press and printing conditions. The CMYK Color mode in Photoshop varies according to the working space setting that you specify in the **Color Settings** dialog box.

Grayscale mode

Grayscale mode uses different shades of gray in an image. In 8-bit images, there can be up to 256 shades of gray. Every pixel of a grayscale image has a brightness value ranging from 0 (black) to 255 (white). In 16- and 32-bit images, the number of shades in an image is much greater than in 8-bit images.

Grayscale values can also be measured as percentages of black ink coverage (0% is equal to white, 100% to black).

Grayscale mode uses the range defined by the working space setting that you specify in the **Color Settings** dialog box.

Bitmap mode

Bitmap mode uses one of two color values (black or white) to represent the pixels in an image. Images in Bitmap mode are called bitmapped 1-bit images because they have a bit depth of 1.

LAB Mode VS RGB Mode

It can be hard to pump up the Colors in a photograph without making it look unnatural. In RGB mode, changing your Colors in Curves will also produce changes in Brightness and Exposure. To fix this, we can easily switch to LAB Mode by selecting it from the Image drop down menu.

LAB stands for Lightness, A Channel, B Channel. If you pull up a Curves Adjustment Layer in LAB, you'll see that your red, green, and blue Channels have been replaced with Lightness, A, and B. Your A and B Channels **ONLY** affect the Colors in your image, so you're free to push them as much as you desire without messing up your Exposure.

Lab Color mode

The **CIELAB color space** (also known as **CIE L*a*b*** or sometimes abbreviated as simply "Lab" color space) is a [color space](#) defined by the [International Commission on Illumination](#) (CIE) in 1976. It expresses color as three numerical values, L^* for the lightness and a^* and b^* for the green–red and blue–yellow color components. CIELAB was designed to be perceptually uniform with respect to

human color vision, meaning that the same amount of numerical change in these values corresponds to about the same amount of visually perceived change.

The CIE L*a*b* color model (Lab) is based on the human perception of color. The numeric values in Lab describe all the colors that a person with normal vision sees. Because Lab describes how a color looks rather than how much of a particular colorant is needed for a device (such as a monitor, desktop printer, or digital camera) to produce colors, Lab is considered to be a *device-independent* color model. Color management systems use Lab as a color reference to predictably transform a color from one color space to another color space.

The Lab Color mode has a lightness component (L) that can range from 0 to 100. In the Adobe Color Picker and Color panel, the *a* component (green-red axis) and the *b* component (blue-yellow axis) can range from +127 to -128.

Lab images can be saved in Photoshop, Photoshop EPS, Large Document Format (PSB), Photoshop PDF, Photoshop Raw, TIFF, Photoshop DCS 1.0, or Photoshop DCS 2.0 formats. You can save 48-bit (16-bits-per-channel) Lab images in Photoshop, Large Document Format (PSB), Photoshop PDF, Photoshop Raw, or TIFF formats.

Bitmap (BMP)

Bitmap (BMP) is an image file format that can be used to create and store computer graphics. A bitmap file displays a small dots in a pattern that, when viewed from afar, creates an overall image. A bitmap image is a grid made of rows and columns where a specific cell is given a value that fills it in or leaves it blank, thus creating an image out of the data.

To create a bitmap, an image is broken into the smallest possible units (pixels) and then the color information of each pixel (color depth) is stored in bits that are mapped out in rows and columns. The complexity of a bitmap image can be increased by varying the color intensity of each dot or by increasing the number of rows and columns used to create the image. However, when a user magnifies a bitmap image enough, it eventually becomes pixilated as the dots resolve into tiny squares of color on a grid.

- **Hue:** Shifts all the colors clockwise (drag right) or counterclockwise (drag left) around the color wheel.
- **Saturation:** Increases (drag right) or decreases (drag left) the richness of the colors. Note that dragging all the way to the left gives the photo the appearance of a grayscale image.
- **Lightness:** Increases the brightness values by adding white (drag right) or decreases the brightness values by adding black (drag left).

The **Hue/Saturation** command adjusts the hue (color), saturation (purity), and lightness of the entire image or of individual color components in an image.

Use the Hue slider to add special effects, to color a black and white image (like a sepia effect), or to change the range of colors in a portion of an image.



A

B

C

Changing colors in an image using the Hue/Saturation command

A. Original **B.** Entire image changed to sepia using the Colorize option **C.** Magenta colors targeted in the Edit menu and changed using the Hue slider

Use the Saturation slider to make colors more vivid or more muted. For example, you could add a color punch to a landscape by saturating the colors in it. Or, tone down a distracting color, like a vivid red sweater in a portrait.



Before and after adjusting color saturation

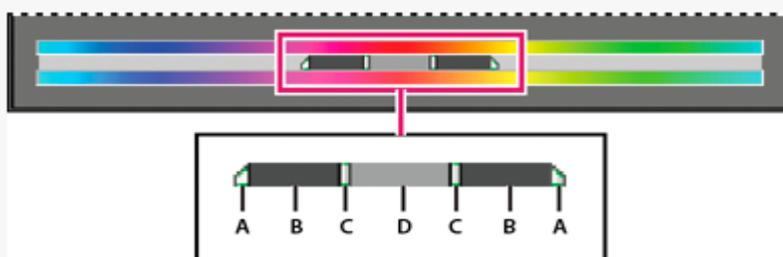
Use the Lightness slider with the other adjustments to lighten or darken a portion of an image. Take care not to use it on an entire image—this adjustment reduces the overall tonal range.

Change color saturation or hue

- 1 Do one of the following:
 - Choose Enhance > Adjust Color > Adjust Hue/Saturation.
 - Choose Layer > New Adjustment Layer > Hue/Saturation, or open an existing Hue/Saturation adjustment layer.
 - The two color bars in the dialog box represent the colors in their order on the color wheel. The upper bar shows the color before the adjustment; the lower bar shows how the adjustment affects all hues at full saturation.
- 2 In the Edit drop-down menu, choose which colors to adjust:
 - Choose Master to adjust all colors at once.
 - Choose one of the other preset color ranges listed for the color you want to adjust. An adjustment slider appears between the color bars, which you can use to edit any range of hues.
- 3 For Hue, enter a value or drag the slider until the colors appear as you want. The values displayed in the text box reflect the number of degrees of rotation around the color wheel from the pixel's original color. A positive value indicates clockwise rotation, and a negative value counterclockwise rotation. Values range from -180 to +180.
- 4 For Saturation, enter a value or drag the slider to the right to increase the saturation or to the left to decrease it. Values range from -100 to +100.
- 5 For Lightness, enter a value or drag the slider to the right to increase the lightness or to the left to decrease it. Values range from -100 to +100. Be careful when using this slider on an entire image. It will reduce the tonal range of the overall image.
- 6 Click OK. Or, to cancel your changes and start over, hold down Alt (Option in Mac OS), and click Reset.

Modify the range of Hue/Saturation sliders

- 1 Do one of the following:
 - Choose Enhance > Adjust Color > Adjust Hue/Saturation.
 - Choose Layer > New Adjustment Layer > Hue/Saturation, or open an existing Hue/Saturation adjustment layer.
- 2 Choose an individual color from the Edit menu.
- 3 Do any of the following to the adjustment slider:
 - Drag one of the triangles to adjust the amount of color fall-off without affecting the range.
 - Drag one of the gray bars to adjust the range without affecting the amount of color fall-off.
 - Drag the gray center part to move the entire adjustment slider, selecting a different color area.
- Drag one of the vertical white bars next to the dark gray center part to adjust the range of the color component. Increasing the range decreases the color fall-off, and vice versa.
- To move the color bar and the adjustment slider bar together, Ctrl-drag (Command-drag in Mac OS) the color bar.



Adjustment slider

- A.** Adjusts color fall-off without affecting range **B.** Adjusts range without affecting color fall-off **C.** Adjusts the range of color component **D.** Moves entire slider

- If you modify the adjustment slider so that it falls into a different color range, the name changes to reflect this. For example, if you choose Yellow and alter its range so that it falls in the red part of the color bar, the name changes to Red 2. You can convert up to six of the individual color ranges to varieties of the same color range (for example, Red 1 through Red 6).

Note:



By default, the color range selected when you choose a color component is 30° wide, with 30° color fall-off on either side. Setting the fall-off too low can produce banding in the image.

- 4 To edit the range by choosing colors from the image, select the color picker, and click the image. Use the color picker + tool to add to the range; use the color picker – tool to subtract from the range.

While the color picker tool is selected, you can also press Shift to add to the range or press Alt (Option in Mac OS) to subtract from it.