

This handout contains some basic information for understanding digital photography. Additional course handouts (PDF) and practice images are found at the following URL:

<http://www.cascadiagraphics.com/geek.html>

Or follow the “Geek Translation” link from the home page (<http://www.cascadiagraphics.com>).

## 1. Digital color

1.1. Digital devices can only detect a portion of the full spectrum of visible color. If you were to observe a brilliant sunset and then take a picture with a film camera and another picture with your digital camera and then print your digital image on a desktop inkjet printer you would notice a gradual deterioration in the brilliance of the color you remember with each successive step. A slide made from from your film exposure does an acceptable job of capturing color. Chances are, your digital camera does too but it's not quite as good at picking up the brighter, near-fluorescent tones. However, when you print the digital image the results are often disappointing.

## 2. RGB Color

2.1. Your digital camera, scanner, and monitor “see” RGB color. You can think of RGB (or red, green and blue) as the primary colors from which all other colors in your image are made. The way they combine requires light. Color is **transmitted** through the image to your eye (or picked up by sensors). There are 255 levels of each of the primary colors.



## 3. CMYK Color

3.1. However, once you place ink on paper the color is **reflected**. The inks in your printer closely resemble the primary colors used in painting. The primary printing ink colors are cyan, magenta, yellow, and black or CMYK (K = black). Each of the primary colors is expressed as a percentage.



3.2. In most cases, if your monitor is “calibrated”, there will be little difference in color between what you see on the monitor and a photo quality print from your printer. There are colors that are very difficult to print using the standard 4-color “process” colors (CMKY).

3.2.1. For an on-screen simulation of how these color modes can change, **File > Open...** [rgbtocmyk1.jpg](#) or [rgbtocmyk2.jpg](#).

3.2.2. To view the color model that these images use: **Image > Mode** and note there is a check next to RGB Color.

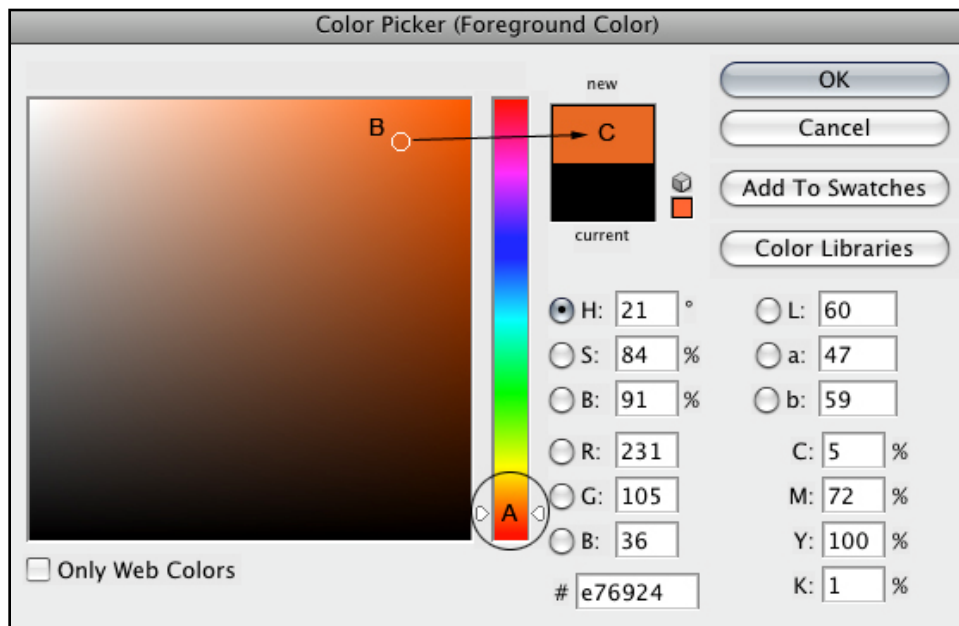
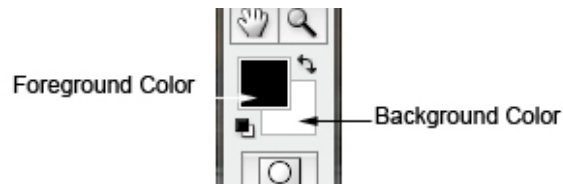
3.2.3. As you watch the image. change the color mode to CMYK Color. The colors are dulled. You can see the image before and after with **Edit > Undo**.

4. The other commonly used color modes in Photoshop:

- 4.1. **Bitmap** – all of the pixels in the image are either black or white. This mode is commonly used for very high resolution line art.
- 4.2. **Grayscale** – consist of 255 shades of gray (including black and white)
- 4.3. **Duotone** – also monotone, tritone, quadtone which are limited to 1 to 4 combinations of any colors. Most commonly used to simulate sepia-tones in early photography.
- 4.4. **Indexed Color** – also limited a palette of color which consist of just the colors that are in the currently viewed image or from a subset of the RGB palette. This mode is most commonly used for images that have limited color and where transparency is needed. GIF images on the internet use this color mode.

5. Selecting Colors in Photoshop

- 5.1. When you want to select a **Foreground Color** (paint color) or **Background Color** (eraser color) click on the color square at the bottom of the toolbar to launch the **Color Picker**.

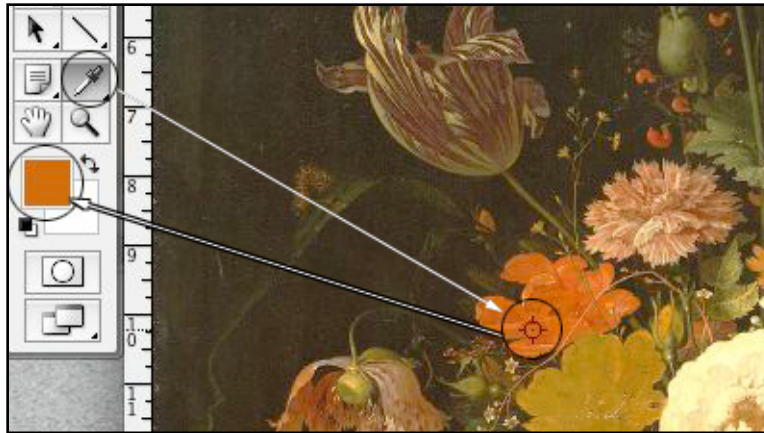


- 5.1.1. Normally you would select the **Hue** in the rainbow bar (A), then the correct **Saturation** by clicking in the large box on the left (B). Your selected color is indicated in the top half of the divided square to the right of the rainbow bar (C). You can adjust the Hue or make another selection in the Saturation box to refine your color selection. When it is correct, click **OK**.

- 5.1.2. Your selection now appears at the bottom of the toolbar.

5.2. The color picker is a very versatile tool. If you choose, you can select a color “by the numbers”. In the example above, the color that was picked has an RGB specification of R=231, G=105, B=36. The same color can also be specified in the CMYK color mode as 5% C, 72% M, 100% Y, 1% K. If you want, you can insert the Hexidecimal value in HTML code to match (or nearly so) this color in your website.

5.3. A third method of selecting color is to match a color that is in your image using the **Eyedropper Tool**.



5.3.1. Using the Eyedropper Tool, move over the image and click on the color that you would like to sample. It will appear in the Foreground Color square at the bottom of the toolbar.

5.3.2. This method is useful if you want to exactly match a color for touching up a photo or to use in another element, such as type or a border.