BLEND MODES

Introduction
Blend modes are common throughout graphic design software but are often thought of as confusing or irrelevant. This is a short guide to the half dozen most common modes in Photoshop and Blender (no relation). For more information, there is an excellent article about blend modes at http://photoblogstop.com/photoshop/photoshop-blend-modes-explained.

Normal and Dissolve blending modes
The easiest way to think about blend modes (sometimes called mixing modes) is to think of them as the ways two or more layers in an image can be mixed together. This isn’t similar to painting, however; the mixing is done mathematically with the numbers representing each color channel in that pixel. Blending is non-destructive; you can change the type of blend or remove it at any time.

In blending’s simplest form one layer hides the layers underneath it - either completely, if it has no transparency, or partially, if it has an alpha channel. This is called the Normal mode. The color value of the pixel in the top layer replaces that in the layers below. Dissolve is the next simplest, removing random pixels in the selected layer to create dithered transparency. All other modes use mathematical mixing.

Every pixel in an image has a numerical representation of each of its channels. For an RGBA image those are four numbers for each pixel - one each for its red, green, blue, and transparency elements. For an 8-bit image the values are between 0 and 255; for a 16-bit image between 0 and 65,535. Blend modes normalize these: in other words, the number representing the pixel’s value in each channel varies between 0 and 1. An 8-bit RGB mid gray of (128, 128, 128) for example, becomes (0.5, 0.5, 0.5). In this way the blended color value always stays within the range zero to one.
**Multiply and Screen**

These are the most useful modes for darkening and lightening. Multiply mode multiplies the number for each pixel of the top layer with the corresponding pixel for the bottom layer. The result is a darker picture. Multiplying any color with black produces black (a black pixel having the color channel values 0, 0, 0 and multiplying anything by zero gives zero). Multiplying any color with white leaves the color unchanged (multiplying by 1 leaves numbers unchanged). When you’re painting with a color other than black or white, however, successive strokes with a painting tool produce progressively darker colors. The effect is similar to drawing on the image with multiple marking pens.

With Screen blend mode the values of the pixels in the two layers are inverted, multiplied, and then inverted again. This produces the opposite effect to multiply, and the result is a brighter picture. Screening with black leaves the color unchanged. Screening with white produces white. The effect is similar to projecting multiple images on top of each other.

**Overlay**

Overlay combines Multiply and Screen blend modes, and is often used to increase contrast. The parts of the top layer where base layer is light become lighter, the parts where the base layer is dark become darker. The base color is not replaced, but mixed with the blend color to reflect the lightness or darkness of the original color.

**Soft Light**

Darkens or lightens the colors, depending on the blend color. The effect is similar to shining a diffused spotlight on the image. If the blend color (light source) is lighter than 50% gray, the image is lightened as if it were dodged. If the blend color is darker than 50% gray, the image is darkened as if it were burned in. Painting with pure black or white produces a distinctly darker or lighter area, but does not result in pure black or white.

**Hard Light**

Multiplies or screens the colors, depending on the blend color. The effect is similar to shining a harsh spotlight on the image. If the blend color (light source) is lighter than 50% gray, the image is lightened, as if it were screened. This is useful for adding highlights to an image. If the blend color is darker than 50% gray, the image is darkened, as if it were multiplied. This is useful for adding shadows to an image. Painting with pure black or white results in pure black or white.

**Blend modes in Blender**

There are several places in Blender where blend modes are available. The first is in the Texture tab, where you have the option to choose how a texture will affect textures below it in the list. This can be found at the foot of the tab in the Influence panel.
Blend modes also appear in the Video Sequence Editor, at the top of the right fly-in in the Edit Strip panel. This list includes application specific types such as Alpha Over as well as the usual Subtract and Multiply.

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