How are colors made?

We have seen RGB (additive) and CMY (subtractive), but we can also think of a color as hue (pure base color around the color wheel), saturation (how “thick” the color should be), and then the “brightness” of the color.

This representation can be a useful if you want to be able to say something such as “make it a little brighter” but isn’t really how most people think about color.

Note: This can be made into RGB or CMY values using mathematical formulas.
Hue: Early Color Wheel (1908)

From *The Colorist* by J. Arthur H. Hatt

Hue: Modern Color Wheel

Christopher S. Baird
### Some colors as Hue, Saturation, Brightness

<table>
<thead>
<tr>
<th>Hexadecimal</th>
<th>Hue</th>
<th>Saturation</th>
<th>Brightness</th>
</tr>
</thead>
<tbody>
<tr>
<td>FF0000</td>
<td>0°</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>00FFFF</td>
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<td>100%</td>
<td>100%</td>
</tr>
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<td>100%</td>
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<tr>
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<td>100%</td>
</tr>
<tr>
<td>7F00FF</td>
<td>270°</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Can gray support different creativity?

Even after color photography was possible and practical, some photographers continued to work in “black and white” (and some still do). Why?

- The real world is in color, artistic photography isn’t?
- Color photography limits the changes one can make before the image feels fake?
- Grays allow the viewer’s focus to be on light, form, and texture?
Desaturation

We have seen that one can “boost” a color by increasing its saturation level in an image.

Many will convert a color image to grayscale via a simple desaturation of all the colors...

Adobe® Photoshop®
Image-Adjustments-Desaturate
Color to Grayscale

In fact, there are many different approaches to the desaturation of an image that make use of the color information during the desaturation process…

Duplicate Layer, “Erase” Lower Layer, Change Upper Blending to Luminosity
Image – Mode – Grayscale

“Secret” RGB Mix

Go to Channels and Select Red
Image – Mode – Grayscale

Reds Only
Go to Channels and Select Green Image – Mode – Grayscale

Go to Channels and Select Blue Image – Mode – Grayscale
Try it yourself…

Choose an image that you feel might look better in “black and white” rather than color.

– Try each of the previous techniques for transforming the image to grayscale.

Is there one that you prefer over the others?

– Do you think you will always prefer that technique regardless of the starting image?
Can we “fix” this Moon?

Curves

When working with a “black and white” image, the contrasts and tone of the image can become more crucial to the overall feel of it. An “S-Curve” is a common starting point.

Go to Layers – New Adjustment Layer – Curves and add two adjustment points to the line:

- Input: 63, Output: 31
- Input: 191, Output: 223
More contrast, but too much color…

Desaturation!
On the layer with the image of the moon, try out the different desaturation techniques until you find one that gives a pleasing result…

You can also make use of other tools in our image editing tool, such as adjusting the overall brightness or the overall contrast, etc.
Blue Channel, Brightness +50, Auto Contrast

Resources

• The Colorist https://books.google.com/books?id=qFa_qP780RQC
• Why are red, yellow, and blue the primary colors in painting but computer screens use red, green, and blue? http://wtamu.edu/~cbaird/sq/mobile/2015/01/22/why-are-red-yellow-and-blue-the-primary-colors-in-painting-but-computer-screens-use-red-green-and-blue/