



Welcome to Unit 6, Lesson 11 of Introduction to HTML & CSS. In this lesson we will be discussing using color in our web pages and designs.

Lesson Objectives 1 - using color!

- Using hexadecimal to define color.
- Using RGB and color.
- How to use a color picker.

In a previous lesson on number systems we learned a little about the hexadecimal system and here we will look at using HEX to define colors in CSS. We no longer use HTML to color. Let's remember HTML is used to define structure and CSS is used to define style. Color is in the style category.

We will look at what RGB (Red, Green, Blue) means and examine how to use various values in our CSS.

We will look at a several online color pickers and color schemes.

Lesson Objectives 1 - using color!

- Understanding RGB and Alpha
- The color wheel and harmonies
- Contrast and brightness
- Shades, tints and tones
- Hue, saturation and opacity

We will gain an understanding of what Alpha transparency is.

How the color wheel can produce pleasing color harmonies for us.

And learn a little about contrast, brightness, shades, tints tones, hue, saturation and opacity. What the heck is all that stuff?

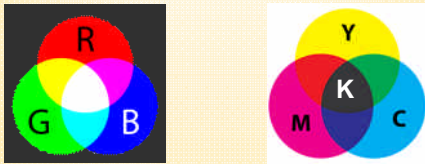
The RGB Color Model

- RGB - combines red, green and blue
- Created for electronic devices
 - ✓LCD's & TV's
 - ✓Cameras & scanners
 - ✓Input & output devices
- An "additive" color model
 - ✓Mixes the RGB primary colors

Colors are displayed on devices showing web pages by combining red, green and blue light sources using a color model called RGB, which stands for red, green, blue. RGB is device-dependent, which means it was developed and intended to work for input and output on electronic devices such as computer LCD's, TV's, cameras and many other devices. RGB is also an "additive color model" which mixes red, green and blue (the RGB primary colors) to produce an amazing variety of colors. There may be some confusion as to the difference between an RGB color wheel and the regular color wheel which has primary colors of Red, Yellow and Blue. We will look closer at that in a minute.

The RGB Color vs. CYM Color

➤ Additive vs. Subtractive



Additive and subtractive color models | lynda.com

For this class we will not be concerned if a RGB, CYMK or RYB color wheel is use for choosing color harmonies and palettes. The important aspect is, are the choices aesthetically pleasing?

Additive means the color comes from a light source. Subtractive means it is reflected light.

Various methods of explaining:

- **Subtractive model:** CYMK- As an example think of finger painting on white paper or food coloring added to water. As you add colors the surface or volume becomes darker until it is black. It is called subtractive because you are subtracting light by adding colors. By the way, the K stands for black, but it is not actually true black since you cannot absorb all the light. Some light (or color) is always reflected.
- **Additive model:** Projected light from a source. We can demonstrate this using your computer screen. You can change the RGB values by using the Google color picker that comes up first when searching for "online color picker."

As an interesting alternative:

Use three flashlights and wrap red, green and blue cellophane over the lamp ends. Use a funnel or other cone shaped item and duct tape the flashlights to the outer edge. This separates the lights but points them to a center. When you point the flashlights towards a white board it should look darker in the center but have defined colors on the outer edges. If you point the flashlights at someone, they should see defined colors on the outer edge and white towards the center. This shows a dramatic representation of reflected (subtractive) vs. projected (additive) colors.




RGB Color Standard

- Values between 0 – 255 for each color
- $256 * 256 * 256 = 16,777,216$ colors
- Web designers available palette
- Specified in CSS (not HTML)

This standard in HTML for RGB color allows for 16,777,216 colors by using 0 to 255 as values for each color source of red, green and blue. This provides front-end web developers and designers with a huge palette to work from when creating beautiful web pages. Although the standards are for HTML5 and CSS3, colors are specified only using CSS.

Color standards for the World Wide Web come from the World Wide Web Consortium at <https://www.w3.org>

RGB Values

- Individual colors (red, green, blue)
 - ✓ 0 = **none** of that color
 - ✓ 255 = **all** of that color
- Therefore:
 - ✓ RGB(0, 0, 0) produces 
 - ✓ RGB(255, 255, 255) produces 
 - ✓ RGB(255, 0, 0) produces 

Using this model, 0 is none of an individual color and 255 is all of an individual color. Therefore RGB(0, 0, 0) is black, RGB(255, 255, 255) is white, RGB(255, 0, 0) is red. We will look at the various ways of expressing these values, but remember they are all based on the RGB 0 to 255 color model.

You may be asking where is the hexadecimal? We will get to that. Using this RGB method is another way we will designate color in web development. Both methods and others we will show, all have their place.

Specify Values in CSS

- Supported Color Names
- RGB values
- HEX values
- HSL values (not used in this class)

In CSS RGB colors can be specified using various methods, such as: |

Supported Color Names

RGB values

HEX values

HSL values

RGBA

HSLA

There are some other methods, but for this class **we will concentrate on supported color names, RGB and HEX values**. We will also be using RGB with alpha channel or RGBA. (USE WHITE BOARD) In a very broad sense RGB() and HSL() in CSS are similar to programming “functions”. A function can accept input and return a value. Here the input is the values listed above and the return value is the color on the web page.

Writing Color Values

- Color names and HEX values can be written in upper or lower case.
- Can be used in many CSS attributes:
 - ✓ background-color
 - ✓ border-color
 - ✓ Color
 - ✓ And many more

Both color names and HEX can be written in upper or lower case. Color names, RGB, and HEX values are used in several CSS attributes such as:

- background-color
- border-color
- color
- flood-color
- lighting-color
- outline-color
- scrollbar-color (8 separate scrollbar color attributes)
- stop-color
- text-decoration-color
- text-emphasis-color

Specify Using Named Colors

- Support 140 color names.
- Only alphabetic characters.
- CSS usage: `font{color:dodgerblue;}`
- <https://www.w3.org/TR/2018/REC-css-color-3-20180619/#svg-color>

To specify using Color Names:

- Modern browsers support 140 color names, actually called extended color keywords.
- There are only alphabetic characters in these color names. No spaces, dashes or other characters and always in lowercase.
- CSS usage: `font{color:dodgerblue;}` – this style rule assigns the named color "dodgerblue" to a font. Remember I am representing the CSS rule here as it would appear in the inline usage, which puts the code on one line. When using this in a style sheet always format your code for better readability. Some style sheets remove all formatting for quicker downloading to a browser, but we will always use proper formatting in this course.
- Complete list: <https://www.w3.org/TR/2018/REC-css-color-3-20180619/#svg-color>

Specify Using Hexadecimal

- The values are in triplets
- $FF*FF*FF=1000000_{(16)}$
- Upper or lower case
- Begins with #
- **Not** separated by a comma
- CSS usage: `font{color:#1E90FF;}`

To specify using HEXICECIMAL:

HEX is short for hexadecimal (base 16)

The values are three separate hex numbers called triplets

$FF*FF*FF=1000000$ in HEX or 16,777,216 in decimal.

Can be either uppercase or lowercase (Uppercase more readable – lowercase easy to type)

They begin with the # symbol and not separated by a comma

CSS usage: `font{color:#1E90FF;}` – changes the font color to the HEX value of DodgerBlue.

Usage reminder: this is not a single hex number. It is three separate hex numbers. The 1E is the value for red. The 90 is the value for green. The FF is the value for blue.

Specify Using RGB

- Red, green, blue
- Values between 0 – 255
- Values separated by a comma
- $256*256*256=16,777,216$
- CSS usage: `font{color:RGB(30,144,255);}`

To Specify using RGB:

- RGB stands for red, green, blue.
- Color is specified using a value between 0 and 255 for each color.
- The values are separated by a comma.
- $256*256*256=16,777,216$ color values.
- CSS usage: `font{color:RGB(30,144,255);}` – changes the font color to the RGB value of DodgerBlue.

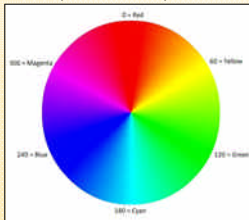
Specify Using HSL

- Hue, saturation & lightness
- Hue: a degree on the color wheel
- Saturation: percentage value of gray
- Lightness: percentage value of white
- Usage: `font{color:HSL(210, 100%, 56%);}`

To Specify Using HSL:

HSL stands for hue, saturation, and lightness. Hue is a degree on the color wheel from 0 to 360. 0 is red. (See the color wheel below.) Saturation is a percentage value; 0% means a shade of gray and 100% is the full color. Lightness is also a percentage; 0% is black, 100% is white. CSS usage: `font{color:HSL(210, 100%, 56%);}` – changes the font color to the HSL value of DodgerBlue.

The HSL (also RGB) Color Wheel



Using HSL uses the color wheel a little differently by employing degrees of color and percentages of white and gray.

Alpha Transparency

- Stands for alpha channel.
- Adds opacity to the color value.
- A percentage between 0% and 100%.
- Not used with supported color names.

Stands for alpha channel.

Adds opacity (transparency) to the color value.

Represents a percentage between 0% and 100%.

Cannot be used with supported color names.

Alpha Values

- HEX: 00 (fully transparent), FF (fully opaque).
 - ✓ HEX number becomes an octet
- RGBA and HSLA values between 0.0 (fully transparent) and 1.0 (fully opaque).

HEX values between 00 (fully transparent) and FF (fully opaque).

HEX adding an alpha value changes HEX number from a triplet to an octet (four separate numbers)

RGBA and HSLA values between 0.0 (fully transparent) and 1.0 (fully opaque).

CSS usage with color names: none.

CSS Usage with Alpha

- HEX - `font{color:#1E90FF80;}`
- RGBA: `font{color:RGBA(30,144,255,0.5);}`
 - ✓ Preferred usage
- HSLA: `font{color:HSLA(210, 100%, 56%, 0.5);}`
 - ✓ Will not be used in this class

Here are three methods of adding transparency to the color dodgerblue. Of course we are not using the named color dodgerblue, but instead we can use the HEX, RGB or HSLA value for dodgerblue to incorporate transparency.

CSS usage for HEX - `font{color:#1E90FF80;}` - sets the font color to the HEX value of DodgerBlue with 50% transparency. **(this is not the preferred usage.)**

CSS usage for RGBA: `font{color:RGBA(30,144,255,0.5);}` - sets the font color to the RGB value of DodgerBlue with 50% transparency. **(preferred usage!)**

CSS usage for HSLA: `font{color:HSLA(210, 100%, 56%, 0.5);}` - sets the font color to the HSL value of DodgerBlue with 50% transparency.

Web Design vs. Web Coding

- This class teaches HTML & CSS
- Can't teach aesthetic, artistic design.
- Can't teach how to create an visually appealing and beautiful website.

There is a difference between coding or building a website, and the artistic aspect of designing the website. I am not an art teacher, so I can't teach you what is artistically appealing. That being said, I know what I like. Although I may not know exactly or from an art and color theory standpoint, what art is, I do know what I like and what I find appealing. There are a few simple rules for design which we will take a closer look at, but we will not have the time in this class to go deeper into design.

Construction vs. Design

You can construct a house like this:



Or, you can construct a house like this:



The fact is you can use the HTML and CSS you learn in this class to construct either type of web page.

Bad Example

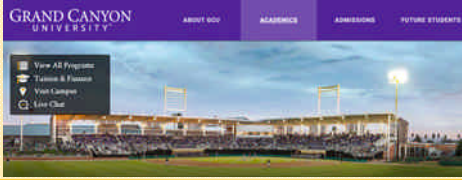
You can construct a website like this:



Here is a bad example of an actual website located at theworldsworstwebsiteever.com

Good Example

Or you can construct a website like this:



Here is just one example I consider to be a well designed website.

My Top Four Tips

4. Use no more than three fonts.
✓Main font very "readable."
3. Use no more than 3 or 4 theme colors.
✓Use the color wheel and other color tools.
2. Plan ahead.
1. Look at other designers work!

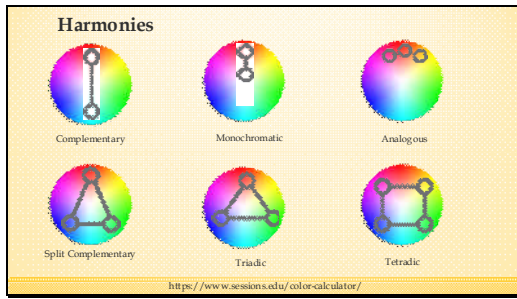
I have included for this class several Infographics for visually appealing web design. Use them!
Here are four simple design ideas to keep in mind.

The color wheel!

- Harmonies or chords
- Attractive combinations
- Uses two or more colors

Using a color wheel and color chords can allow us to come up with some good website color schemes.

The major harmonies using the RGB color wheel.



Shades, tints and tones!

➤Shades: adding black to a color



➤Tints: adding white to a color



➤Tones: adding gray to a color



Assignment

➤Reading:

❖<http://www.tutorial9.net/articles/design/simple-practical-color-theory/#2>

❖<https://www.sessions.edu/color-calculator/>

❖<http://htmlcolorcodes.com/color-picker/>

Reading assignment for this lesson.

Assignment

Task:

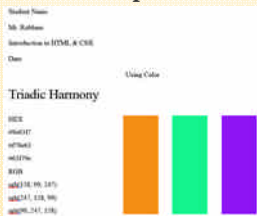
- ❖ After reading the assignment, use the Color Calculator at www.sessions.edu to design what you think would be an appealing color scheme for a webpage or website.
- ❖ Document the scheme in MS Word using the following slide as an example.
- ❖ For your colors use Word Shapes. Go to Shape Fill > More Fill Colors and input your RGB values.

You can use any of the color schemers I have supplied, but the easiest is probably htmlcolorcodes.com.

(USE THE OVERHEAD TO DEMO THE ASSIGNMENT)

1. Go to <http://htmlcolorcodes.com/color-picker/>
2. Run the slider up and down the color bar to choose your main color
3. Use the dropdown menu to choose a color harmony. **Play with the main colors and the various harmonies before choosing your scheme.
4. Click Export Colors and from the popup window, highlight and copy only the HEX and RGB values
5. Paste this into your MLA formatted Word document for this assignment.
6. Use Word Shapes to create rectangles to represent you colors.
7. For each rectangle click Shape Outline and choose No Outline.
8. For each rectangle click Shape Fill and choose More Fill Colors.
9. Type in the RGB values for your colors.

Assignment Example



Your assignment should look something like this. You will use this color scheme in our next assignment.

Add to your Favorites

Online color pickers

- ❖ https://www.w3schools.com/colors/colors_picker.asp
- ❖ https://developer.mozilla.org/en-US/docs/Web/CSS/CSS_Colors/Color_picker_tool
- ❖ <http://htmlcolorcodes.com/color-picker/>

Online color schemes

- ❖ <http://paletteo.com/#id=1000a0k3llaFw0j0qf0w0af>
- ❖ <https://www.sessions.edu/color-calculator/>

Color tutorials

- ❖ <http://www.tutoria9.net/articles/design/simple-practical-color-theory/#2>
- ❖ <https://www.w3schools.com/colors/default.asp>
- ❖ <https://webdesign.tutsplus.com/articles/an-introduction-to-color-theory-for-web-designers--webdesign-1437>

Online resources.