Psychology of Design

WEB AND APP DESIGNERS understand and use psychological theories to engage users with a website or app. To fully engage a user, the following matter: color, font, and layout. It is important to understand what color means and how it makes people feel. Color theory, semiotics (signs and symbols), and the font selection help the user interpret the intent of the website or app. Consider cultural meanings assigned to color when developing and designing products for a global market.

Objective:

☑ Summarize how color theory and visual aesthetics impact web and app designs.

Key Terms:

60-30-10 rule	cool colors	secondary color
additive color mixing	eyestrain	semiotics
aesthetics	font	shade
analogous colors	gradient	subtractive color mixing
CMYK	hue	warm colors
color	monochromatic colors	tertiary color
color palette	opacity	tint
color theory	primary color	triadic colors
color wheel	psychology	value
complementary colors	RGB	
contrast	saturation	

Understanding Web and App Design Psychology

Psychology is the study of human behavior and how the mind works. Web and app developers and designers understand and use psychological theories to make it easier for users to

780008

engage with a website or app. Color theory and **semiotics** (signs and symbols) assist a user in understanding an app without reading. For example, some semiotic signs (e.g., a camera image) tell the user that the function of the app is to take pictures. Other app images are less literal (e.g., a cloud for weather and a musical note for music).

PSYCHOLOGY AND COLOR

Color is light of different wavelengths and frequencies; light is a form of energy that people can see. Each color has its own unique wavelength and frequency. People can measure color in units of cycles or waves per second. Color is a sense, a micro-consciousness. It is similar to the way people respond to taste and smell; color is a brain response to different hues.

Color Theory

Color theory is the way our brain reacts to the data it receives from visual signals. Color theory is a human visual construct (a theory or idea formed in the mind). It is a way to order, apply, and relate colors to human perceptions. Understanding the language of color theory helps a web or app designer to communicate with the visual artists who are part of the web design team. The following terms are applicable across many fields, including web and app design.

Hue

A **hue** is a color. Each hue has a tint and a shade as well as a saturation level and a value.

- A **tint** is any hue with white added. Pink is a tint of red.
- A **shade** is any hue with black added. Maroon is a shade of red.
- **Saturation** is the intensity of a color; it describes how much pigment is in the color. It is the purity of color. Highly saturated colors look rich and full.
- **Value** is the lightness or darkness of a color. Light colors are often referred to as "tints," and dark colors are referred to as "shades."

Blue #3944BC	Slate #757C88	Sky #63C5DA	Navy #0A1172
Indigo #281E5D	Cobalt #1338BE	Teal #48AAAD	Ocean #016064
Peacock #022D36	Azure #1520A6	Cerulean #0492C2	Lapis #2832C2
Spruce #2C3E4C	Stone #59788E	Aegean #1F456E	Berry #241571
Denim #151E3D	Admiral #051094	Sapphire #52B2BF	Arctic #82EEFD

FIGURE 1. A hue is a color. Each color has a name. Each hue has a tint and a shade. Each hue has a saturation level and a value. This blue color palette distinguishes the name of each hue based on tinting, shading, level of saturation, and brightness or darkness (value).

780008

Primary Color

A **primary color** is a hue that cannot be made from a combination of any other colors: yellow, red, and blue (or yellow, magenta, and cyan in printing). They are the colors from which all other colors are mixed. For example, you cannot create yellow by mixing two other colors. (An artist has yellow or does not have yellow.)

Secondary Color

A **secondary color** is a hue created by mixing two primary colors. For instance, mixing the two primary colors blue and yellow creates green. The secondary colors are orange (red + yellow), violet (red + blue), and green (yellow + blue), as mentioned.

Tertiary Color

A **tertiary color** is a hue created by mixing a primary and a secondary color. The six tertiary colors are red-orange, yellow-orange, yellow-green, blue-green, blue-violet, and red-violet.

COLOR WHEEL

A **color wheel** is a visual representation of colors arranged by chromatic relationship. The primary colors are equidistant from each other; the secondary colors are equidistant from each other; and the tertiary colors are directly across the color wheel from each other. Complemen-
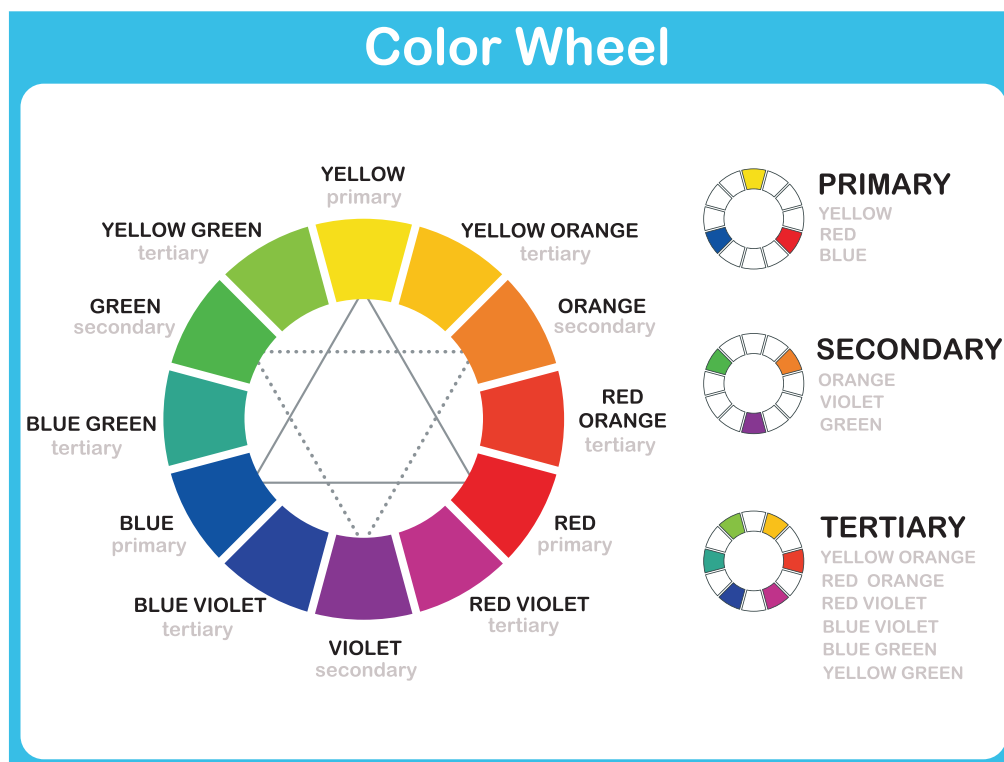

FIGURE 2. A color wheel is a visual representation of colors arranged by chromatic (color) relationship. The primary colors are equidistant from each other; the secondary colors are equidistant from each other; and the tertiary colors are directly across the color wheel from each other.

780008

tary colors are located directly across from each other on the color wheel (e.g., red and green, yellow and purple, and blue and orange). See VM–A. The color wheel can be split in two, creating one warm and one cool side.

Warm Colors

The **warm colors** are yellows, oranges, and reds: active colors. These are the colors of fire and summer.

Cool Colors

The **cool colors** are greens, blues, and purples: passive colors. These are the colors of icebergs and winter.

Color Palettes

Color wheels are often used to create a color palette for a project. A **color palette** is the grouping of colors chosen for a particular project. Many color palettes have common starting places that are popular among artists and have proven interesting to the human eye.

Analogous Colors

Analogous colors are located next to each other (adjacent) on the color wheel, such as yellow, light orange, and orange.

Complementary Colors

Complementary colors are colors located directly opposite from each other on the color wheel and are particularly vibrant (lively, bright, pulsating) when shown together (e.g., red and green, blue and orange, or yellow and purple).

Triadic Colors

Triadic colors are three colors evenly spaced around the color wheel, creating a triangle (e.g., purple, orange, and green).

Monochromatic Colors

Monochromatic colors are colors that are one hue in different shades and tints (e.g., dark green, green, and light green).

Sprouts Pallete

FIGURE 3. Monochromatic colors are one hue in different shades and tints (e.g., dark green, green, and light green).

780008

Color Systems

Subtractive color mixing is beginning with white and ending with black. As you add more color, the color becomes darker. Graphic artists, commercial printers, and most physical materials with color are created with subtractive color. When all subtractive colors are mixed together, they make black. The **CMYK** is cyan (C), magenta (M), yellow (Y), and black (K) and is a color system used for printing and for printer ink cartridges.

Additive color mixing is a process beginning with black and ending with white. As you add more color, the color becomes lighter. The colors you see on a computer screen, iPad, or mobile phone are created with light using the additive color method. The **RGB** is red (R), green (G), and blue (B), which is a color system created with light and includes the primary hues for additive colors. Percentages of RGB are used to create colors on a computer or similar screen.

additive colour synthesis   subtractive colour synthesis

🔵 cyan   🟣 magenta   🟡 yellow   ⚫ black   ⚪ white   🔴 red   🟢 green   🔵 blue
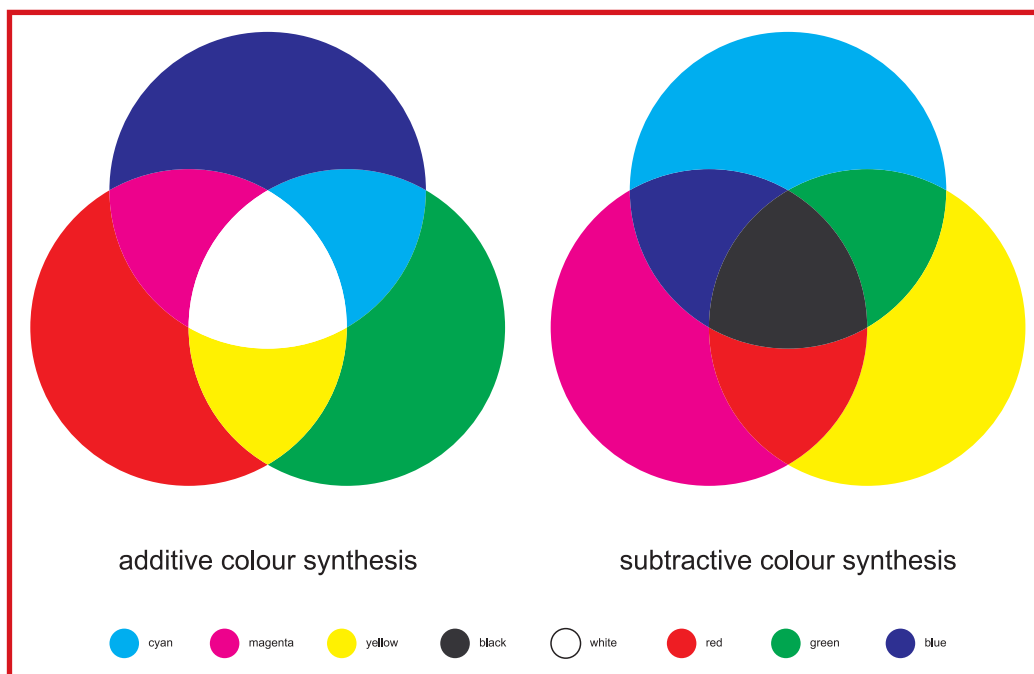
FIGURE 4. This example shows additive and subtractive color mixing systems side-by-side. Each illustrates color mixing with three primary colors, three secondary colors, and one tertiary color made from all three primary colors.

HOW COLOR AFFECTS WEB AND APP USERS

Color is an important factor that influences web and app users.

Psychology of Color

Color has long been a marketing tool. People are susceptible to color persuasion in many ways. Certain colors affect people physiologically (physically and chemically), and other

780008

E-unit

responses are influenced by culture and upbringing. Following is a list of basic colors and the feelings to which they correlate in western culture.

Red

Red increases a person's pulse, breathing rate, and blood pressure. Fire engines, stop signs, and traffic lights use red. Emotions related to the color red include life, passion, vitality, danger, blood, anger, boldness, and excitement.

Orange

Orange is a cheerful color that stimulates the brain and produces oxygen. It tends to increases a person's mental activity. Emotions related to the color orange include creativity, assertiveness, adventure, cheerfulness, and friendliness. In many cultures, monk's robes are orange.

FIGURE 5. Certain colors affect people physiologically (physically and chemically), and other responses are influenced by culture and upbringing. The color associations depicted here are for western culture.

Yellow

Yellow is bright, light, and warm. It is usually viewed as an optimistic color. It attracts attention. Taxicabs, traffic lights, and warning signs on highways use the color yellow. Emotions related to the color yellow include optimism, joy, hope, happiness, and wisdom. However, yellow has been shown to increase rates of crying in infants and shaking in some people. It can have a mild stressing affect on the body when associated with cowardice, fear, and decay.

Green

Green has a calming effect as well as a sense of stability. It is nature, harmony, balance, and growth. Emotions related to the color green include peace, environment, money, health, and freshness. Green can create feelings of envy or jealousy (e.g., "green-eyed monster").

Blue

Blue is the color of the sky and the water. It is viewed as transmitting feelings of trust and wisdom. For example, superheroes and superheroines wear blue. Emotions related to the color blue include integrity, honesty, calmness, peacefulness, coolness, and dependability. Use of the color blue has been shown to increase worker productivity. However, it is also associated with feelings of the "blues" (e.g., melancholy and depression).

780008

Purple

Purple is royalty, wealth, and dignified. Emotions related to the color purple include wealth, creativity, wisdom, restfulness, and imagination. Purple is the color of the military honor: the Purple Heart. However, purple can cause eyestrain and can be associated with sadness (funerals) and gloomy days.

White

White is purity, neutrality, sterility, and winter. Emotions associated with the "color" white include cleanliness, freshness, safety, youth, being angelic, and perfection. Too much white can cause a clinical feeling (as in a hospital) or fear (as in ghosts and fog).

Black

Black sends a message of formality and sophistication (e.g., tuxedo and little black dress). It can send evil, bad, or morbid messages, depending on the context. Emotions associated with the "color" black include mystery, magic, dignity, and negative feelings (e.g., death and grief).

Culture and Color

Globally, blue is the safest color choice. It has the most positive associations among all cultures. For example, in Germany, yellow represents envy. In western culture, white represents purity and is worn at weddings. In China, Korea, and other Asian countries, white is associated with death, mourning, and bad luck.

Cultures, other than western, have various emotions associated with a specific color. This is important to consider if a website or app is being developed for a worldwide audience. For example, in western culture, red means excitement and anger. In eastern culture, it is a bridal color. In Africa, red is associated with death. Consider the audience when choosing a color palette. When it is impossible to consider all cultures, focus on aesthetically pleasing design and color choices.

VISUAL AESTHETICS

Aesthetics is the philosophy and a perception and appreciation of art as it relates to visual beauty. An individual's mind and emotions affect whether or not something is pleasing to the eye.

Number of Colors in a Design

There is no hard-and-fast rule for the number of colors in a web or app design. A rule of thumb is fewer rather than many colors. The use of three colors is common. Three colors create variation and visual interest. The triadic colors (those colors equally spaced around the color wheel) are a good starting point.

780008

The **60-30-10 rule** is a guideline that recommends using different amounts of each of the three triadic colors. Specifically, 60 percent of the color in a design is from the dominant color in the project's color palette; 30 percent is from a less important color; and 10 percent serves as an accent color. This rule simplifies color choices and keeps a design from being overly colorful. Having too many colors in a design can look childish, like a carnival.

Eyestrain

Eyestrain is fatigue due to low contrast or small text on a screen. Many online design choices boil down to functionality. Eyestrain is a problem when it comes to reading text on a computer screen, especially websites and apps with a great deal of informational text. Designing for ease of reading is a must,
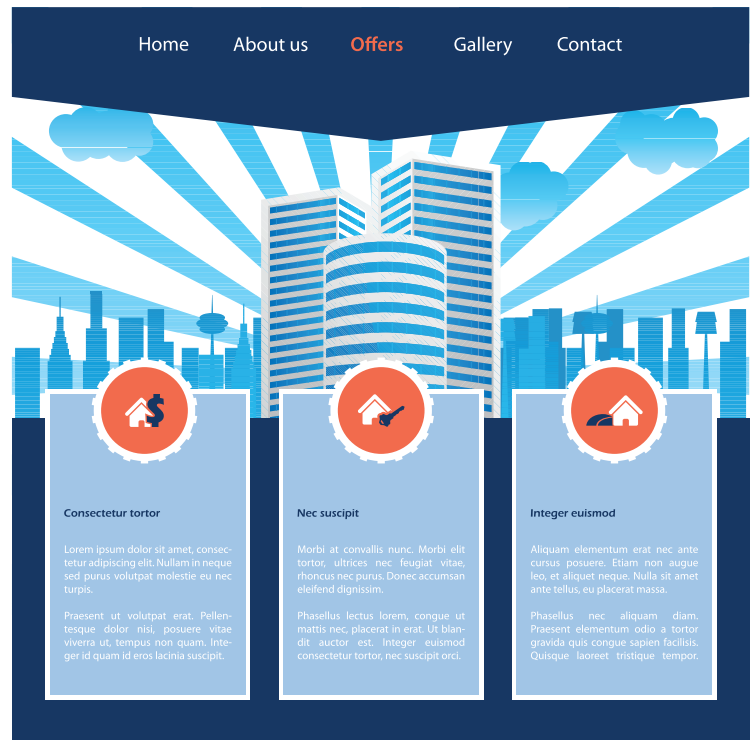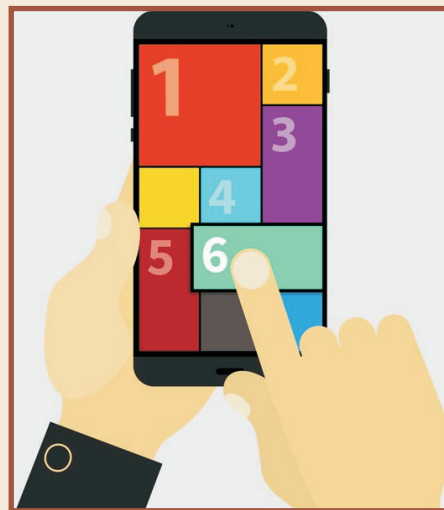

FIGURE 6. Did the homepage of this website use the 60-30-10 rule? If so, which color is represented by 60, by 30, and by 10? If not, how could the design have been altered to create 60-30-10?

including adjusting color-temperature in the design. For example, blue light is short-wavelength visible light and is associated with more eyestrain than longer wavelengths (e.g., red and orange). To create less eyestrain as related to text, consider the following insights.

Background Pattern

Avoid adding pattern to a background if it is behind text. The pattern adds extra symbols for the brain to decode and makes it hard to read. A pattern behind text leads to increased eyestrain.

Contrast

Ensure the font size is large enough for mature eyes to read. Plenty of contrast should exist between the text and font color and the background. **Contrast** is the difference between two elements or items. In color theory, contrast is often achieved by placing a light color against a dark color. Contrast can be achieved by the use of element size to indicate importance or to call attention to an element.

White Space

Plenty of white space should exist in the layout to reduce eyestrain and make reading easier. Pay attention to blocks of text. Few people wish to read a lengthy dense block of text, especially when reading online. To encourage a user to read text, designers split large amounts of text into smaller sections, adding plenty of white space and pictures.

780008

DIGGING DEEPER...

UNCOVERING ADDITIONAL FACTS: Layout Grids

Designing layouts is an area of study in itself. Take some time now to explore designing on a grid and all that entails. Analyze your most recent design. Does a grid naturally appear? Grids can help with alignment and make the overall design more appealing to the viewer/user. Grids have the added benefit of ensuring there is adequate white space. New designers often cram too many objects into one page, making the visual space cluttered and unappealing to the eye. Look at your favorite website or app. Chances are, you will be able to see a grid structure being used. Learn more about layout grids at "Ultimate Guide to Grid-Based Web Design: Techniques and Tools" at http://www.noupe.com/design/ultimate-guide-to-grid-based-web-design.html *and "The Designer's Guide to Grid Theory"* at http://www.creativebloq.com/web-design/grid-theory-41411345.

Grids create a structure for device screens. Grids make the device more aesthetically pleasing. What grid pattern does your smartphone use?

Design Considerations

Design involves thinking about the layout, demographics, online tools, design guidelines, strategies, and more.

Layout

Layout design principles are too vast to list here. However, a person can generalize that it is important to place navigational tools in places where users expect them and can easily find them. Typically, the navigation bar runs horizontally along the top of a web page or an app. Sometimes menu items are along the side.

Demographics

Knowing the product, website, and/or app audience demographics is imperative to creating a user-friendly design. Consider how differently a website selling baby clothes would look from a professional football site. Age, gender, and culture are extremely important considerations. For example:

♦ A younger target audience will appreciate and expect a different aesthetic than older people.

♦ Women as the target prefer different colors and fonts than men.

- U.S. teenage boys will expect a different look than older men from a different part of the world.

Online Tools

Web and app designers have a wealth of online tools from which to select. A designer does not need to be an expert in color psychology to create a "good" design. A search for "color palette generator" will return many results and options.

Design Guidelines

The rules to follow when designing for a specific vendor or platform are important. The three major players in app development each have websites dedicated to their specific design guidelines. For the most part, these are suggestions centered on usability. However, there are often rules to follow for different inputs and devices.

- Android's developer website is called "Up." It provides guidelines for materials and design.
- Windows Development Center has a page called "Design & UI" that contains several design suggestions.
- Apple's pages for developers is "Designing for iOS."

Beyond the Basics

Some advanced design strategies exist beyond basic layouts and color schemes. These options may make a design feel more modern and sophisticated.

- A **gradient** is a color shift from one hue to another within one shape. It is a great idea for backgrounds and buttons. A gradient provides a feeling of depth without being overwhelming or garish.
- **Opacity** is the level of translucency (transparency) of an object. At 100 percent opacity, an object is completely solid. Nothing can be seen through it. At 10 percent opacity, an object will be almost translucent. Dropping the opacity of a photo or box of color can add layers of depth and make other areas, such as text, easier to see.
- **Font** is a graphic representation of text that includes typeface (the type design), point size, weight, and
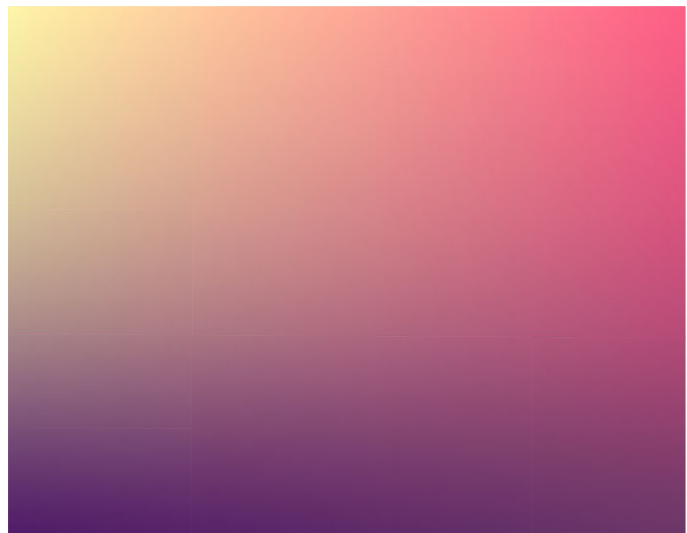
FIGURE 7. A gradient is a color shift from one hue to another within one shape. This is a great idea for backgrounds and buttons. Gradients provide a feeling of depth without being overwhelming or garish. This image is a purple to pink gradient.

780008

color. For example, a font may be **Verdana 12 point bold** or *Times New Roman 10 point italic*. [NOTE: In these two examples, Verdana and Times New Roman are the typeface family, not the font.] In short, a font is a specific typeface of a specific size (point) and style (bold, italic, etc.). Adding color adds depth and a color theory message to the font. Font choice may seem like a small thing, but it is a significant design decision. If a web developer is working without a professional artistic designer, font selection can be tricky. When possible, leaving the font decision to a professional typographer or visual artist is the best option. Font considerations include:

- Err on the side of caution, and choose a simple font that is not ornate. It is hard to read ornamental script on a screen.
- Avoid a font that is too thin or too thick. (In fact, a thick-and-thin font helps reduce eyestrain.)
- Ask the target audience and/or several people of different ages to read and evaluate your text on screen. It is important that the font selected works for most people.
- Avoid cartoonish or goofy fonts.

Summary:

Psychology is the study of human behavior and how the mind works. Web and app developers and designers understand and use psychological theories to make it easier for users to engage with an online product, website, and app.

Color theory is the way our brain reacts to the data it receives from visual signals. Color choice is a serious consideration. Also, key demographics should impact color choices. The tone of a project should be kept in mind. For example, a grocery store website would want colors that communicate freshness (e.g., bright greens and white) and a design tailored to the target audience. Remember that the psychology of color does not translate equally across the globe. When marketing to another culture, it pays to do a little extra research.

Checking Your Knowledge:

1. Explain the differences between primary, secondary, and tertiary colors.
2. How do warm colors affect the user experience? How do cool colors affect the user experience?
3. Describe the CMYK color system.
4. What makes the selection of a color palette important? How is the color palette associated with the target audience?
5. What is the difference between a font, a point, a weight, and a typeface?

780008

Expanding Your Knowledge:

Use the knowledge gained in this unit to critique a website or app that you personally find particularly ugly. Analyze the color choices, font, layout, etc. Can you decipher what it is about the site or app that goes against good design principles?

Web Links:

Website Layout Examples
https://designshack.net/articles/layouts/10-rock-solid-website-layout-examples/

Color Theory Basics
https://www.thinkful.com/learn/color-theory-basics/

Color Matters
http://www.colormatters.com/color-symbolism

780008