25 Color and Cylinders

Wednesday, March 17, 2021   9:51 PM

Today:
UPD: Color theory, nomenclature, management
Pantone https://en.wikipedia.org/wiki/Pantone
Additive/subtractive physics
Upright Cylinder sketching

Guest lecture rescheduled: Friday April 19. Required.

Yes, clickers. I want to see what you know about color to know how deep to go into it.

What is a color space
27%   1. A system for defining colors digitally
32%   2. The range of colors a screen or print can show   *GAMUT*
9%   3. A room for performance art filled with a color
32%   4. The way human eyes perceive color

Universal Principles of Design

HSB = Hue, Saturation, Brightness.
A type of color space, a system used to define colors.
RGB and sRGB are more familiar color spaces

Color

Color

Color is used in design to attract attention, group elements, indicate meaning, and enhance aesthetics.

Color can make designs more visually interesting and aesthetic, and can reinforce the organization and meaning of elements in a design. If applied improperly, however, color can seriously harm the form and function of a design. The following guidelines address common issues regarding the use of color.[1]

Number of Colors
Use color conservatively. Limit the palette to what the eye can process at one glance (about five colors depending on the complexity of the design). Do not use color as the only means to impart information since a significant portion of the population has limited color vision.

Color Combinations
Achieve aesthetic color combinations by using adjacent colors on the color wheel (analogous), opposing colors on the color wheel (complementary), colors at the corners of a symmetrical polygon circumscribed in the color wheel (triadic and quadratic), or color combinations found in nature. Use warmer colors for foreground elements, and cooler colors for background elements. Light gray is a safe color to use for grouping elements without competing with other colors.

Saturation
Use saturated colors (pure hues) when attracting attention is the priority. Use desaturated colors when performance and efficiency are the priority. Generally, desaturated, bright colors are perceived as friendly and professional; desaturated, dark colors are perceived as serious and professional; and saturated colors are perceived as more exciting and dynamic. Exercise caution when combining saturated colors, as they can visually interfere with one another and increase eye fatigue.

Symbolism
There is no substantive evidence supporting general effects of color on emotion or mood. Similarly, there is no universal symbolism for different colors—different cultures attach different meanings to colors. Therefore, verify the meaning of colors and color combinations for a particular target audience prior to use.[2]

See also Expectation Effect, Highlighting, Interference Effects, Similarity, and Uniform Connectedness.

[1] A nice treatment of color theory is *Interaction of Color* by Josef Albers, Yale University Press, 1963. For a more applied treatment, see *The Art of Color: The Subjective Experience and Objective Rationale of Color* by Johannes Itten, John Wiley & Sons, 1997; and *Human-Computer Interaction* by Jenny Preece, et al., Addison Wesley, 1994.

[2] It is reasonable to assume that dark colors will make people sleepy, light colors will make people lively, and irritating colors will make people irritated. Otherwise, the only observable influence of color on behavior is its ability to lead people to repaint walls unnecessarily. For those determined to try to calm drunks and win football games through the application of color, see *The Power of Color* by Morton Walker, Avery Publishing, 1991.

According to the Howard Hughes Medical Institute, about 3.7% or 12 million Americans are colorblind (7 percent of males, and 0.4 percent of females).

From <https://www.colorblindguide.com/post/colorblind-people-population-live-counter>

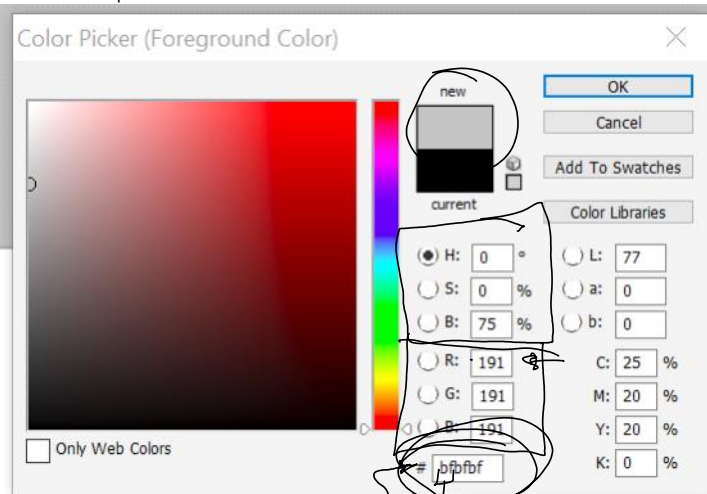Girl-Boy Pink-Blue preferences are from cultural training. Pink used to be boy color before 1930s; from diluted blood (red was male color)

[handwritten] USING COLOR in your project?
A yes
B no
C wood
D Haven't thought about it

Color Nomenclature
- Color space = method of defining a specific color.
- Gamut = Range of colors that can be produced by a technology
- Matching across devices, technologies = color management
From Photoshop:

Color Picker (Foreground Color)

new
OK
Cancel
Add To Swatches
current
Color Libraries

H: 0
S: 0 %
B: 75 %
L: 77
a: 0
b: 0
R: 191
G: 191
B: 191
C: 25 %
M: 20 %
Y: 20 %
K: 0 %
bfbfbf
Only Web Colors

[handwritten] 4 color spaces; HSB, RGB, LAB, CMYK

L = black to white
a = red to green
b = blue to yellow

Printing
Cyan
Magenta
Yellow
blacK

RGB in hexadecimal
2 bytes per 4 color spaces
0-9 A...F
10   16
dark 0 – 255 FF
Fully turned on
00
FF
R G B
FFFFFF
White

http://colorizer.org/
Shows conversion between many color spaces. Also shows complementary, triad, square etc. pairings

[handwritten annotations:] hexade... ↳ 0-9 A...F dark X Fully turned on ⌐FFFFFF¹ White
10 16

http://colorizer.org/

Shows conversion between many color spaces. Also shows complementary, triad, square etc. pairings

Another site for choosing palettes, from Olivia: https://coolors.co/

[handwritten:] Adobe Color - similar

Will Harris's list:

Will Harris 1:09 PM
Color tools I've collected over the years: https://coolors.co/
https://color.adobe.com/
http://www.colorhunt.co/
http://javier.xyz/cohesive-colors/
http://colormind.io/
https://colourco.de/
https://www.materialpalette.com/
http://culrs.com/
http://paletton.com/
https://colorizer.org/ (edited)

From <https://app.slack.com/client/T04JM775J8Y/C04HXCRP0M9>

Pantone https://en.wikipedia.org/wiki/Pantone
Another color nomenclature and color management system. Common in design world.
There are competing companies: Behr

Color of the Year

Since 2000,[18] the Pantone Color Institute declares a particular color "Color of the Year". Twice a year the company hosts, in a European capital, a secret meeting of representatives from various nations' color standards groups. After two days of presentations and debate, they choose a color for the following year; for example, the color for summer 2013 was chosen in London in the spring of 2012.[19] The color purportedly connects with the zeitgeist; for example, the press release declaring Honeysuckle the color of 2011 said "In times of stress, we need something to lift our spirits. Honeysuckle is a captivating, stimulating color that gets the adrenaline going – perfect to ward off the blues."[20] The results of the meeting are published in *Pantone View* ($750), which fashion designers, florists, and many other consumer-oriented companies purchase to help guide their designs and planning for future products.

From <https://en.wikipedia.org/wiki/Pantone#Pantone_Goe_System>

Dye manufacturers prepare to sell quantities of the Color of the Year in advance, so products (plastics, textiles) are ready to sell.

Last year:

"Three years deep into a pandemic, facing a war, an unstable economy, social unrest, supply chain breakdowns, and mounting climate change, we need to heal," it adds. "And still, we need to find the motivation to continue. Here, Viva Magenta cloaks us in both power and grace, and sends us out into the world with the verve we've yearned for."

From <>

Accompanying palette
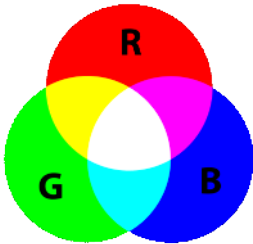

Prior years

In 2013 Subaru started offering a tangerine colored Crosstrek.
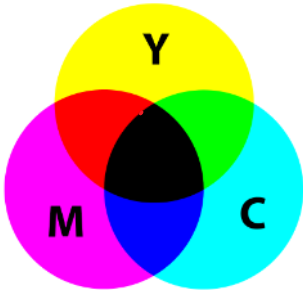No coincidence.

Additive/subtractive color

Additive color = light.

Computer screens, other light emitting sources

your eyes

Subtractive color = surfaces; scattered light. Dyes, pigments, inks. All wavelengths are absorbed except the scattered ones.

WHITE LIGHT

BLUE

CMYK

Perception of Color

Classic text: Albers, Josef, and Nicholas Fox Weber. *Interaction of Color: 50th Anniversary Edition*. -50th Anniversary ed. edition. New Haven Connecticut: Yale University Press, 2013. First edition 1963. $12 paperback

Much has been learned about the physiology of vision; active area of research.
Recommended: **Livingstone, Margaret, and David Hubel. *Vision and Art: The Biology of Seeing*. Reprint edition. Abrams, 2008. $20 paperback.**
Topics:
> The eye and color vision
> Luminance and night vision
> Neural processing of color information
> Acuity and spatial resolution
> From 3-D to 2-D: Perspective, Shading and Chiaroscuro, Stereopsis
> Illusions of motion
> Color mixing and color resolution
> Digital color

In the sun's spectrum, each color comes from photons of particular energy and wavelength.
Humans only have sensors for a few colors; R,G,B, black and white. Yellow photons trigger our R and G receptors. Sensors are not narrow-band.
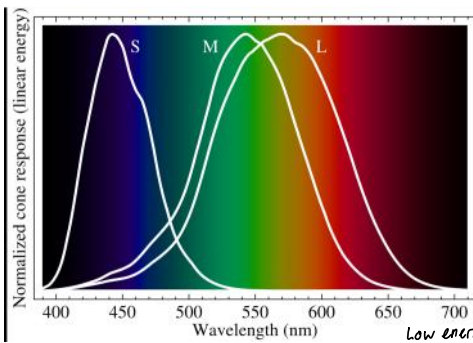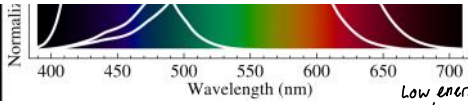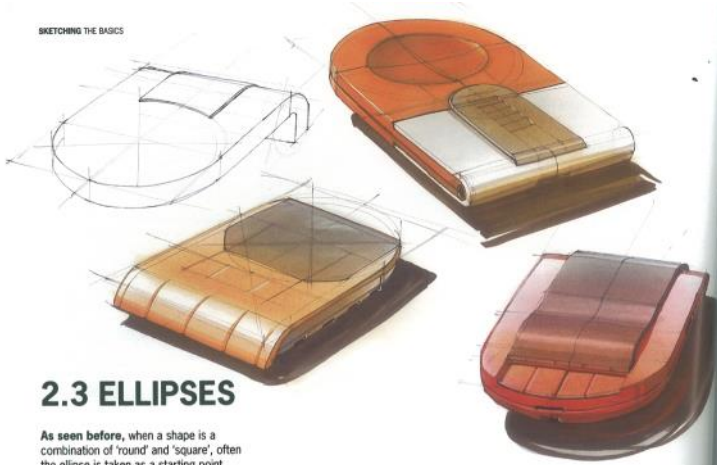
High energy photons

Low energy

High energy Photons

Wavelength (nm)

Low energy, long wavelength

Cones = color

Sketching: Cylinders
Ellipses

SKETCHING THE BASICS

2.3 ELLIPSES

As seen before, when a shape is a combination of 'round' and 'square', often the ellipse is taken as a starting point for the perspective of the block-shaped parts. Here again you see how the same ellipse can provide for add-ons in various directions.

No matter how the circle is orientated, when the ellipse represents a circle on a horizontal surface, the orientation of the ellipse (long axis) will remain horizontal.
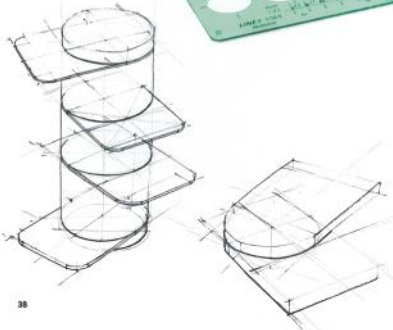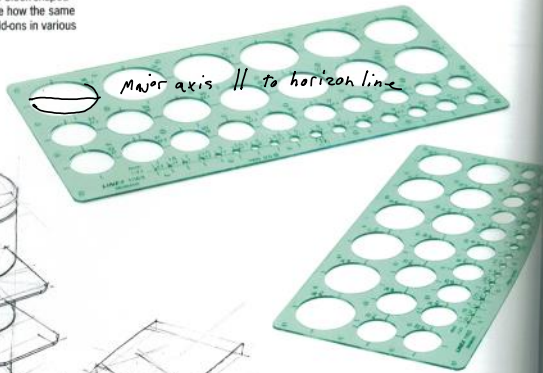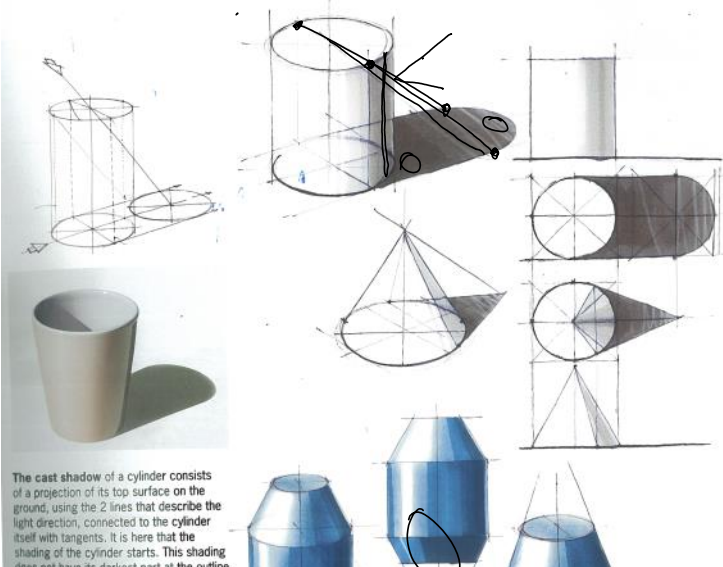
Major axis || to horizon line

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The cast shadow of a cylinder consists of a projection of its top surface on the ground, using the 2 lines that describe the light direction, connected to the cylinder itself with tangents. It is here that the shading of the cylinder starts. This shading does not have its darkest part at the outline

The cast shadow of a cylinder consists of a projection of its top surface on the ground, using the 2 lines that describe the light direction, connected to the cylinder itself with tangents. It is here that the shading of the cylinder starts. This shading does not have its darkest part at the outline of the shape, but a little 'inside' it. This is caused by ambient light and reflection. It is this effect that gives a shape its round appearance.
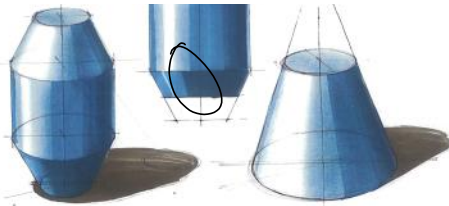
Watch out for errors like shading parallel to the outline of the cone, shading without difference between reversed cone shapes or wrongly connecting shadings of cones and cylinder.

Tip
A conical shape pointed upwards or downwards will have a very different shading from that of a cylinder. When these shapes are simply combined, without a smooth rounding transition, the shading of that object will have drastic 'jumps'.
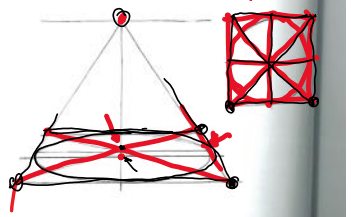
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2.4 UPRIGHT CYLINDERS

A circle drawn in perspective is represented by an ellipse, a mathematical shape. Useful rules are related to their axes. The major axis is the longest line possible, while the minor axis divides the major axis into two equal parts. The crossing of those two lines is exactly 90 degrees at the middle. Drawn in perspective, the perspective centre of the circle is of course not through this point, but, depending on the amount of convergence, somewhat behind this point, as shown in the example. If you cut a grapefruit in two equal halves you can see this difference.
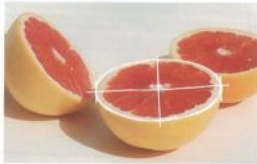
To draw a cylinder you need a centre line, two ellipses and two vertical tangents on the outside. The base ellipse will be rounder because of perspective. You may compare it to a block shape but you do not need to draw a block and construct a cylinder within this block.

3:1   1

3:2

Plan View
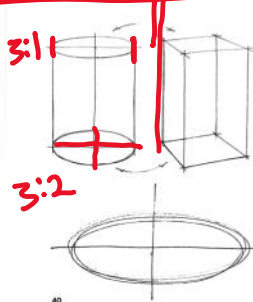
Ellipses are drawn by repeating the shape several times. This will not result in a perfect symmetrical shape, but it emphasises the other main character of ellipses: the fluency of the shape.

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A tangent to the ellipse determines the perspective of other shapes combined with this cylinder.

A **tangent to** the ellipse determines the perspective of other shapes combined with this cylinder.

If you want to attach something like a handle or grip to a cylindrical shape, you will want to know its position and perspective in relation to the cylinder. Therefore you can use tangents.

The first line is a centre line through the perspective centre (and not through the crossing of the major and minor axes). If you then draw two tangents, step by step, you will get a square around the ellipse. The two directions drawn 90 degrees in perspective to each other is the result.

Tip
We drew in 2-point perspective. If you draw in 3-point perspective, it may become unclear whether you are drawing a cylinder or a cone.

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Plan View = straight down

Geometric center
= circle center

geometric center

closer

ǁ to horizon line

Converge @ horizon

ellipse major axis

tangent

ellipse center