

Building User Interfaces

Visual Design

Professor Bilge Mutlu

What we will learn today?

- Elements and principles of design
- Color, type, and images

Elements of Design

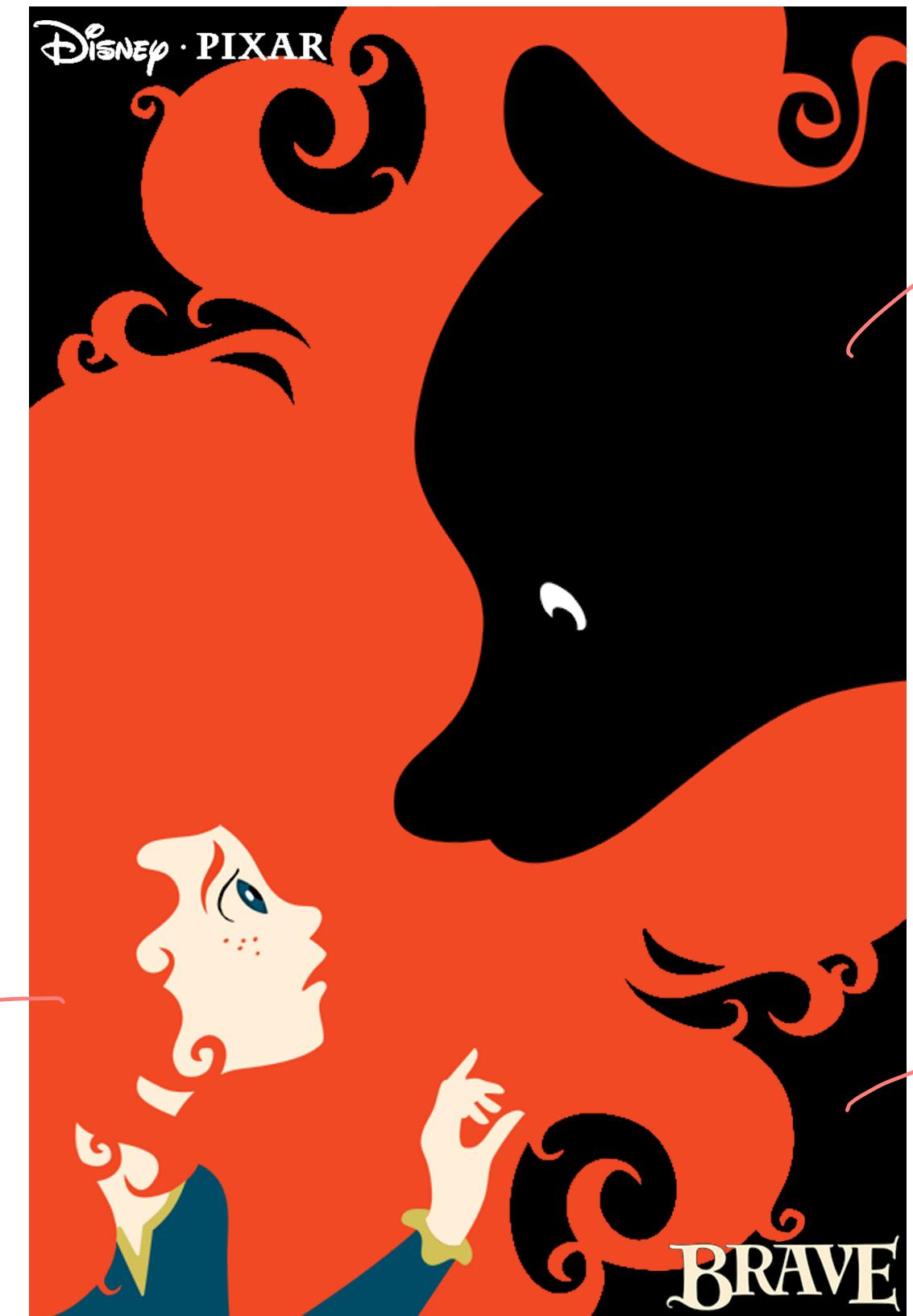
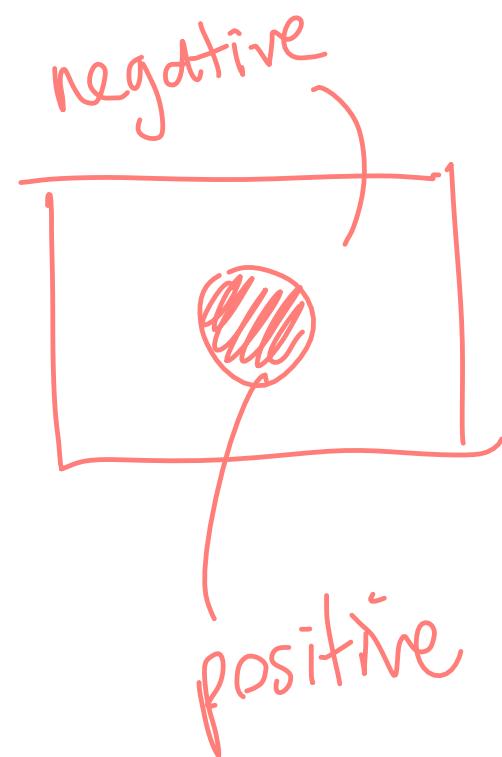
Elements of Design

1. Space
2. Line
3. Shape
4. Size
5. Pattern
6. Texture
7. Value

Space¹

Definition: Space is the canvas on which visual elements are placed.

- Space can be *positive* or *negative*
- *Positive*: where the subject is positioned
- *Negative*: the space surrounding the subject
- Negative space can be used as positive



¹Image sources: [this slide](#), next slide: [left](#), [right](#)

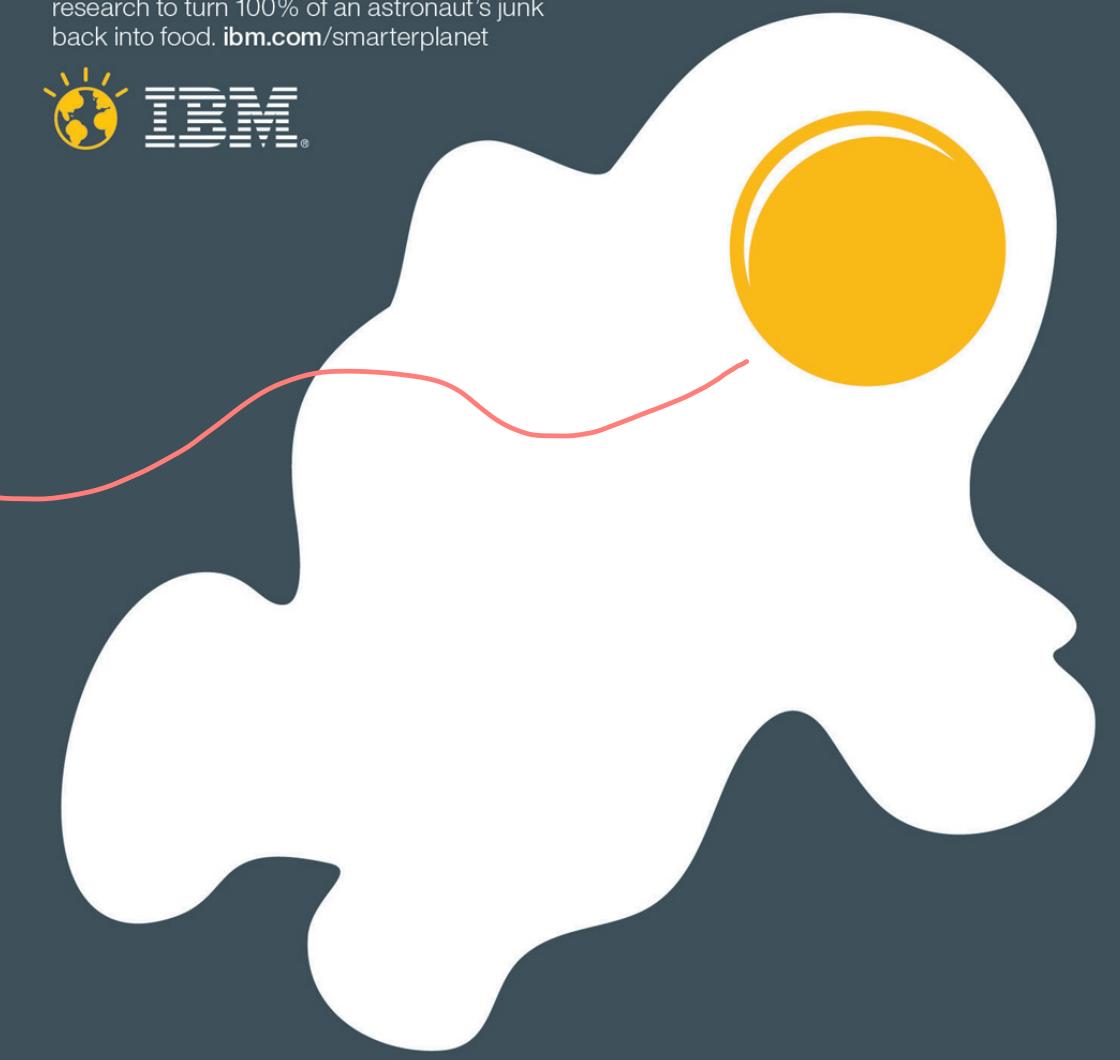
Now data helps pinpoint more oil.

In Venezuela, IBM deep computing processes seismic data, helping Tricon Geophysics pinpoint new oil and gas using 40% less energy. ibm.com/smarterplanet

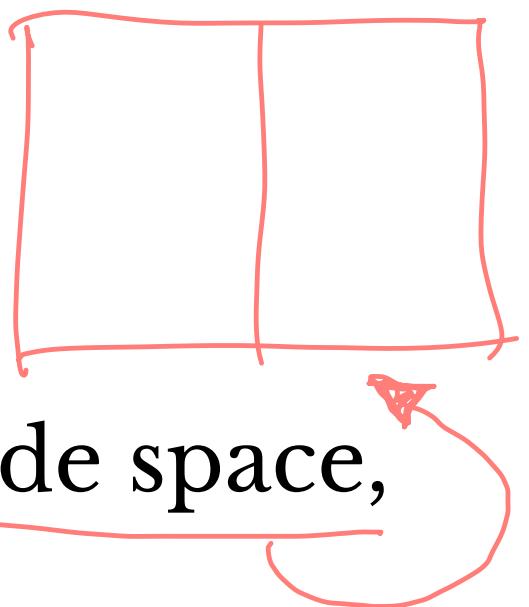
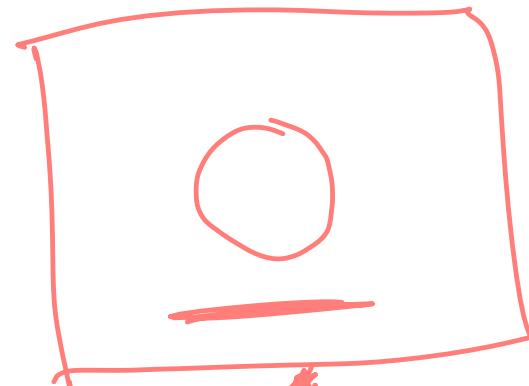


Food is now prepared for space.

The European Space Agency is using smarter research to turn 100% of an astronaut's junk back into food. ibm.com/smarterplanet



Line²



Definition: The most primal design element that can divide space, call attention to, organize, and make up other elements.

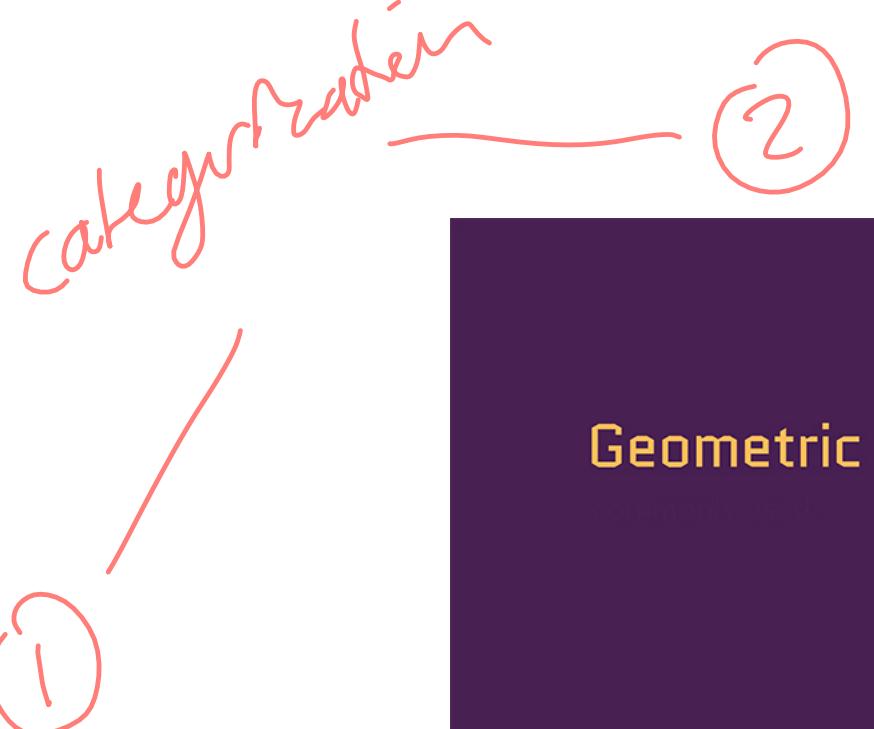
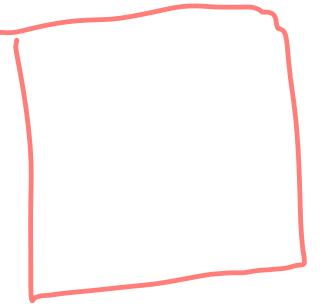


²Image source

Shape³

Definition: Space outlined by a contour.

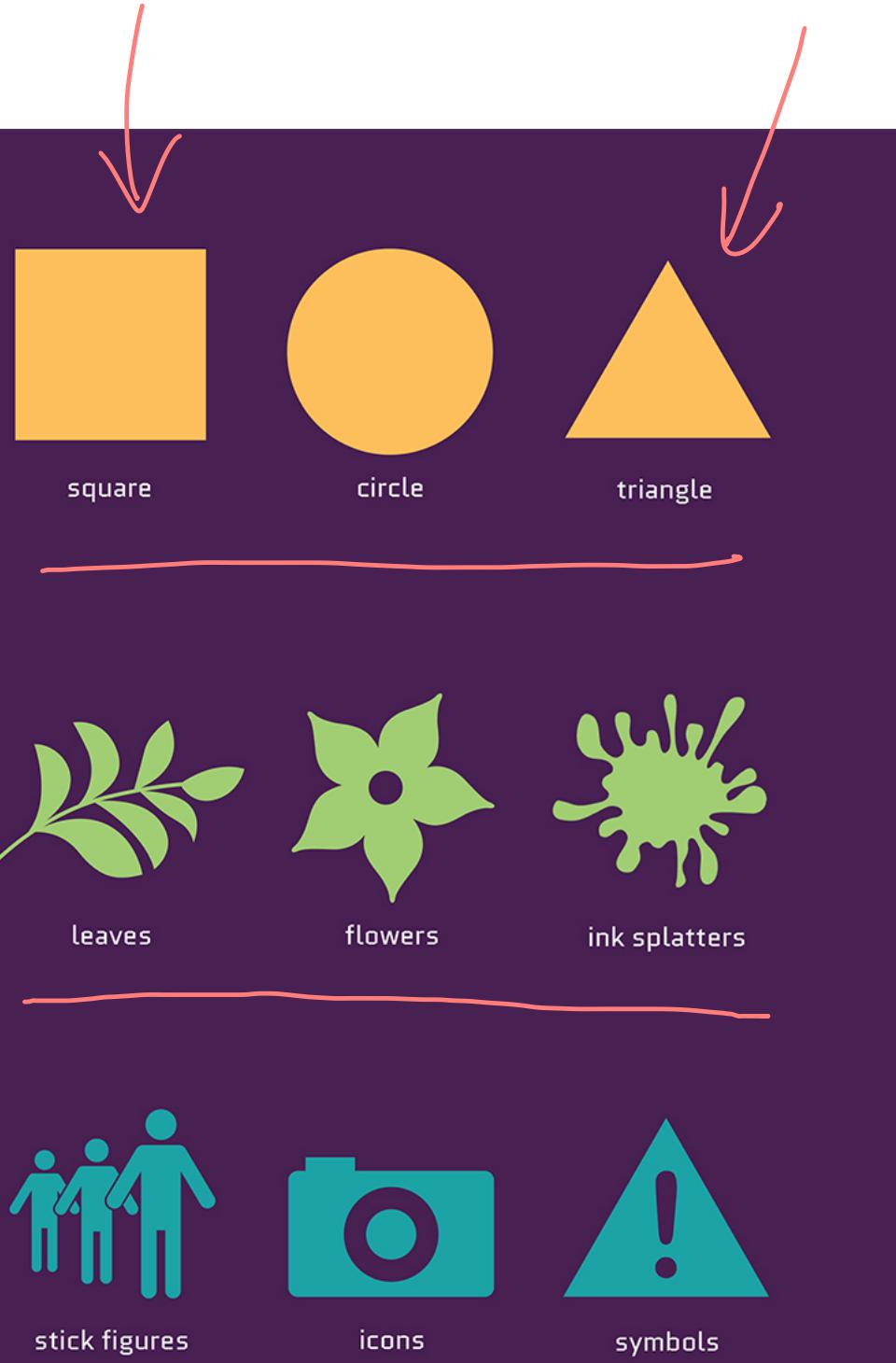
- *Organic* vs. *inorganic* shapes



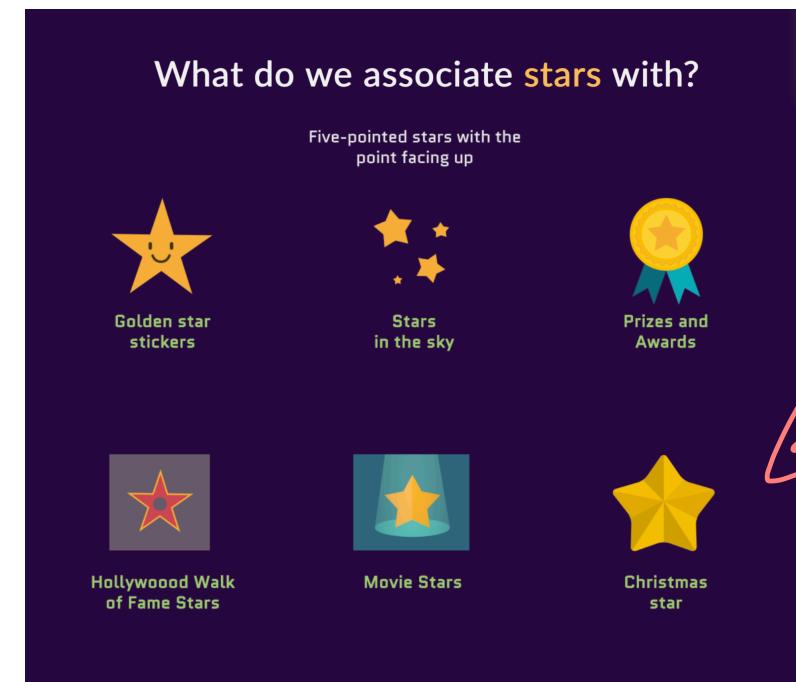
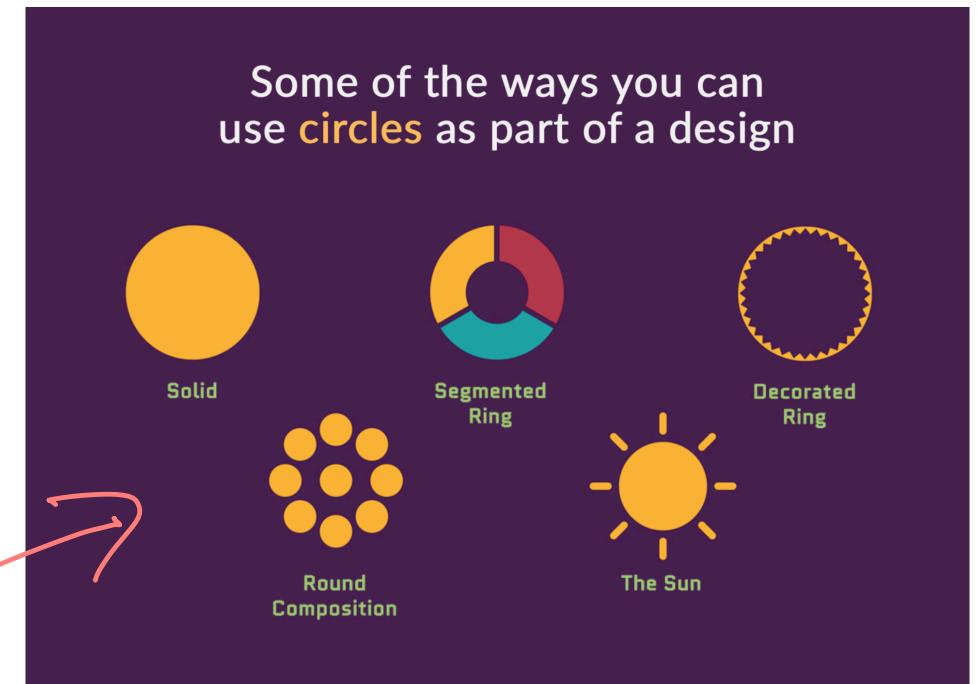
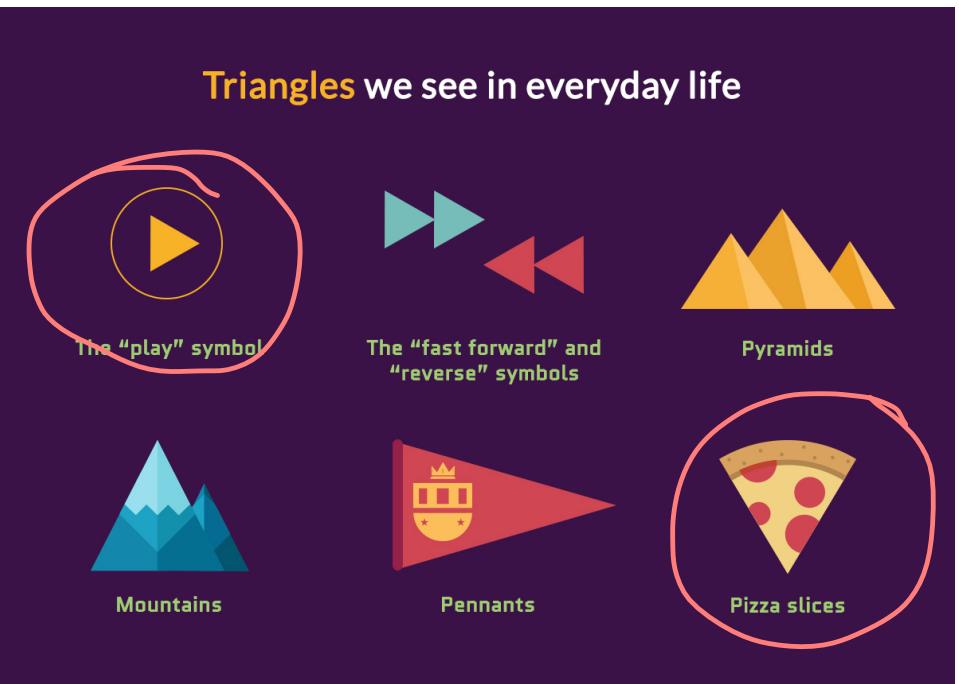
Inorganic

Organic

Abstract



³ Image sources: [this](#) & [next](#) slides



Size⁴

Definition: Size, or *scale*, is the relative extent of the design elements such as shapes and lines.



⁴Image source

Pattern⁵

Definition: Pattern, or *repetition*, systematic duplication of other design elements such as shapes and lines.

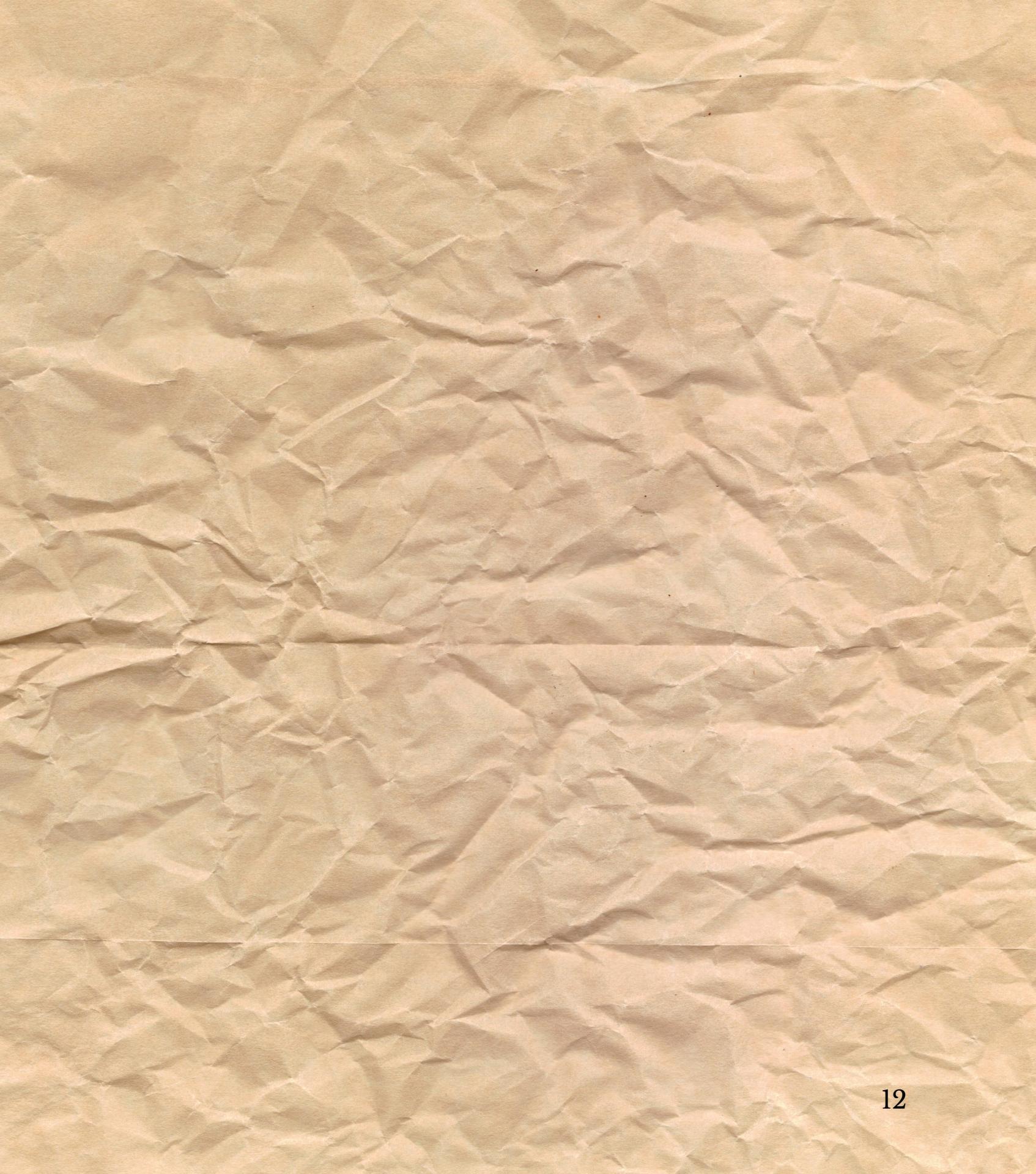


⁵Image source

abstract flower shape is duplicated in a pattern

Texture⁶

Definition: Tactile and visual quality of a shape or space made up of different colors, materials, and different structures.



⁶Image source

Value⁷

lowest value

Definition: The intensity in which a design elements is expressed.



⁷ Image source

highest value

Questions about *Design Elements*?

Principles of Design

Principles of Design

1. Focal Point
2. Contrast
3. Balance
4. Movement
5. Rhythm
6. Perspective
7. Unity

Focal Point⁸

#2

Definition: Focal point, or the area of visual interest, is where the design directs the attention of the viewer first.

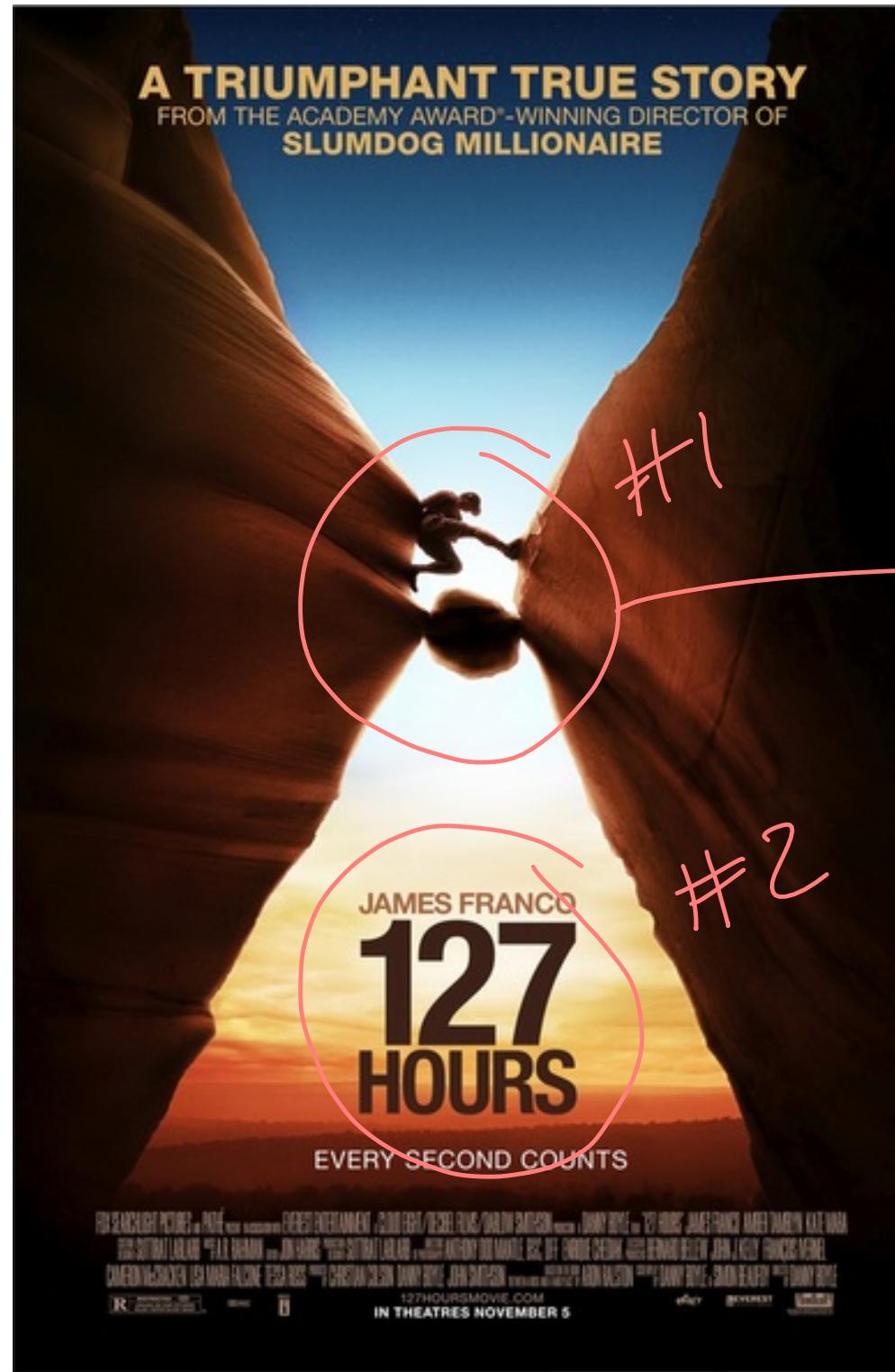
#3

#1

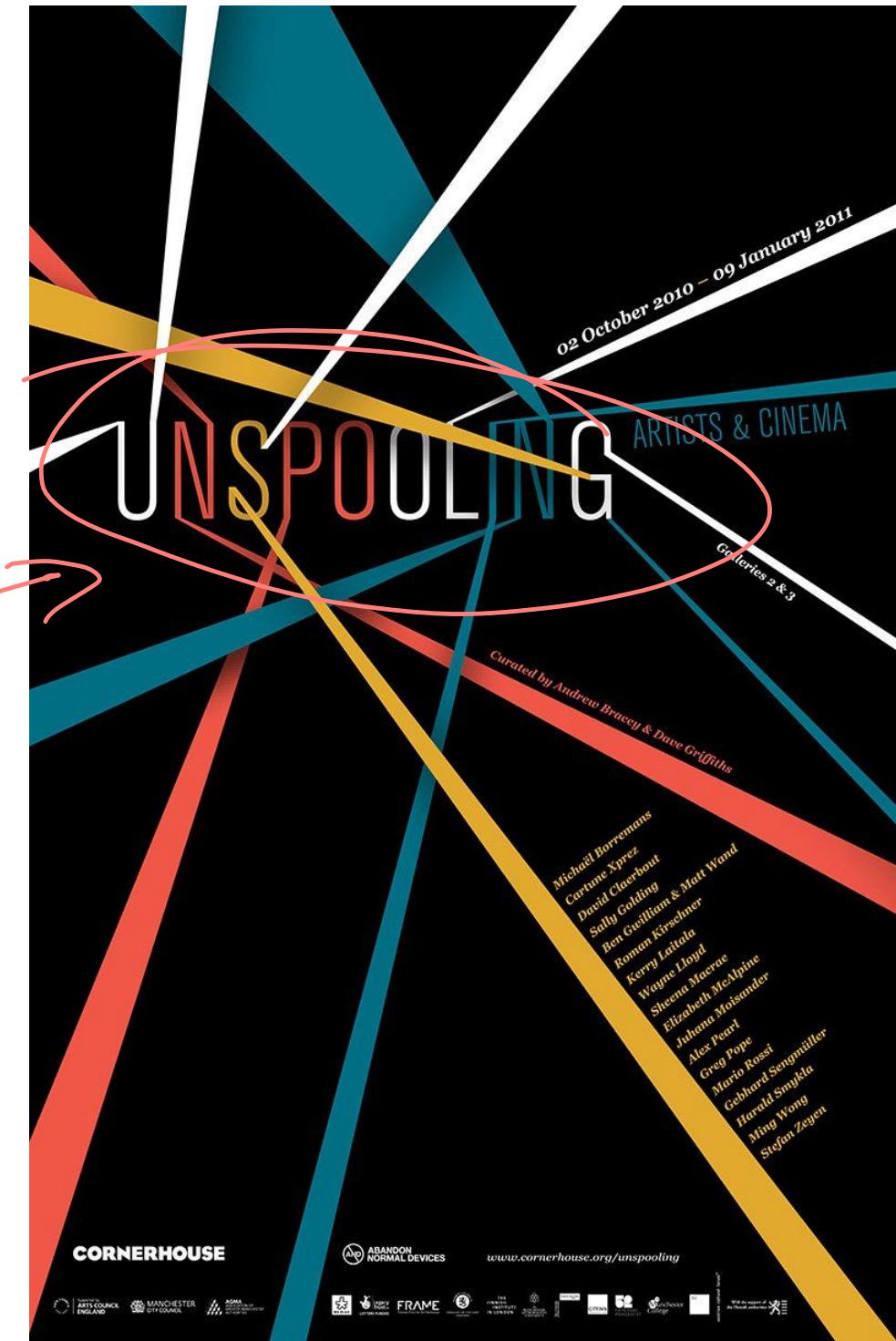
#4



⁸Images sources: [this slide](#), next slide: [left](#), [right](#)



focal points



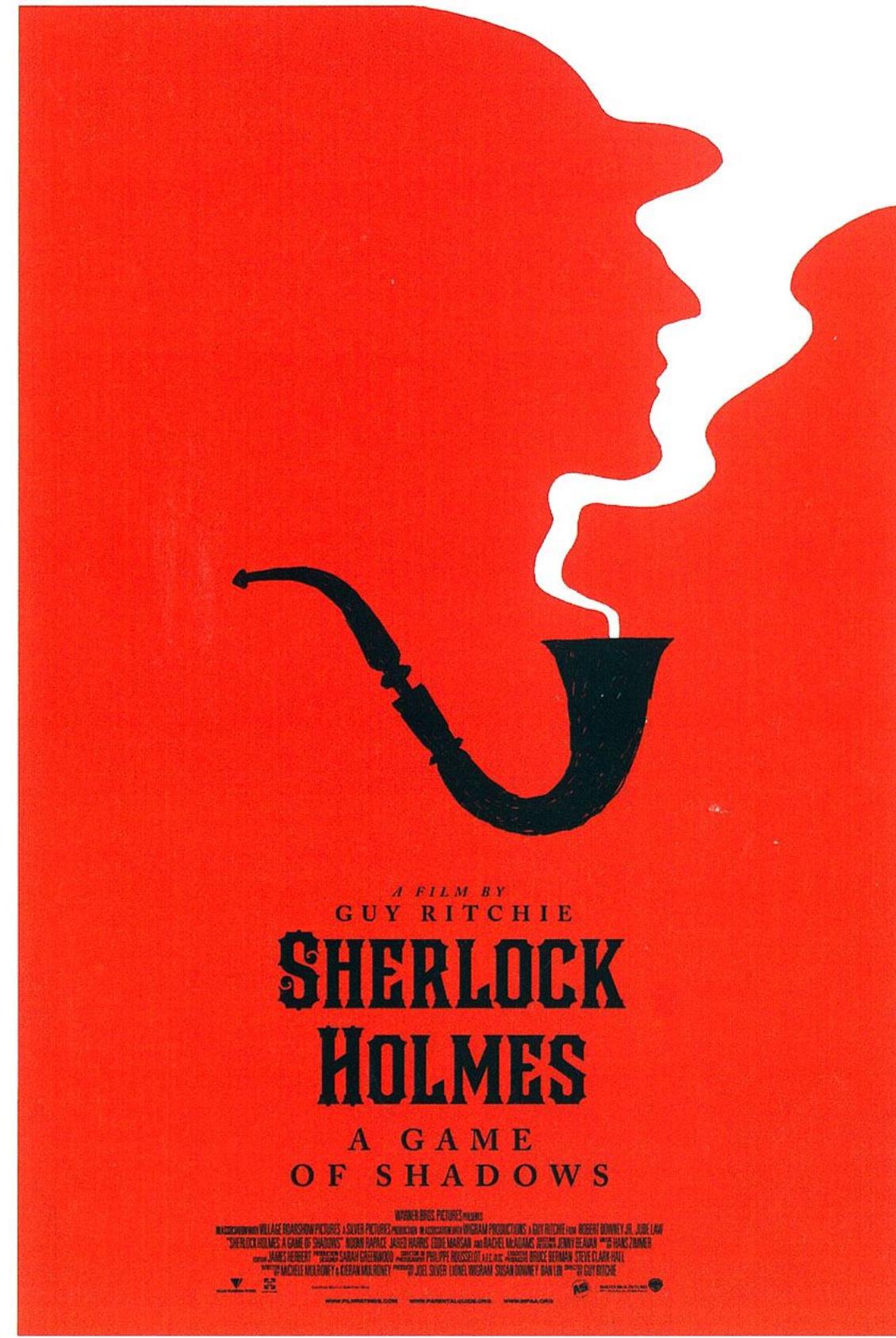
Contrast⁹

Definition: Contrast, or emphasis, is the juxtaposition of design elements that strikingly differ from each other to guide user attention and action.

contrast
visually
and semantically



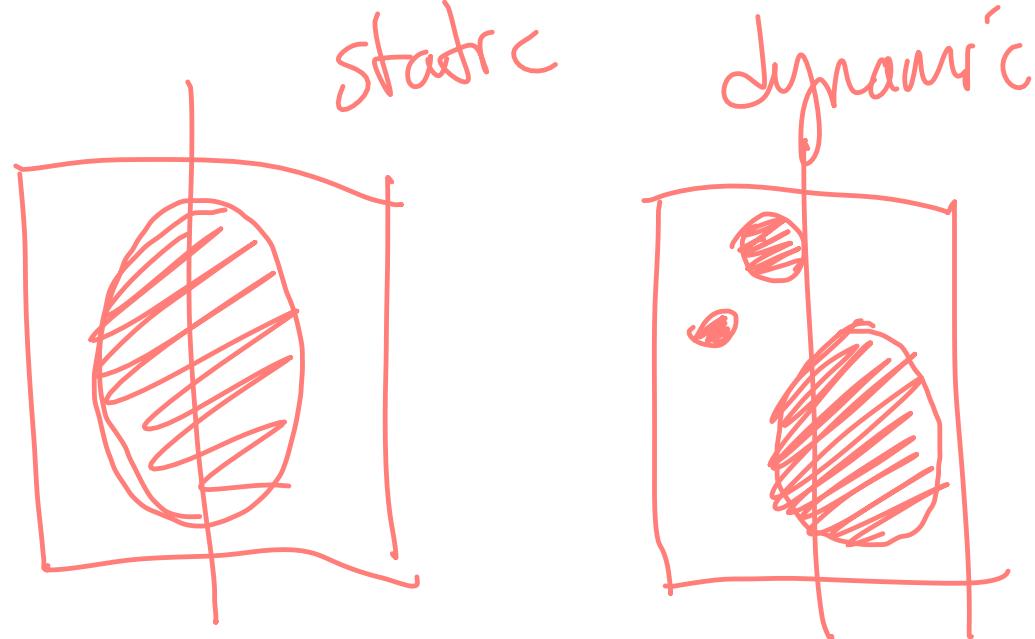
⁹ Image sources: [this slide](#), next slide: [left](#), [right](#)



Balance¹⁰

Definition: The organization of design elements on a canvas to provide a sense of visual balance or imbalance.

Pro Tip: Balance can be achieved through symmetry or asymmetry.



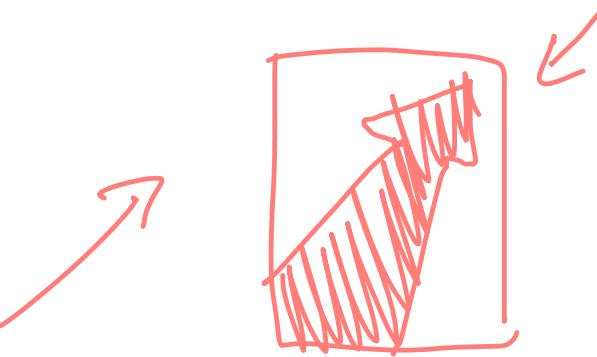
¹⁰ Image source

lively! Goes like a greyhound
with a hotfoot . . . curves 'round corners like a
sports car . . . packs more power than you'll ever expect!
No other small car gives you such terrific
performance—up to 60 miles per gallon—
and seats 4 in such easy comfort.

Austin 850



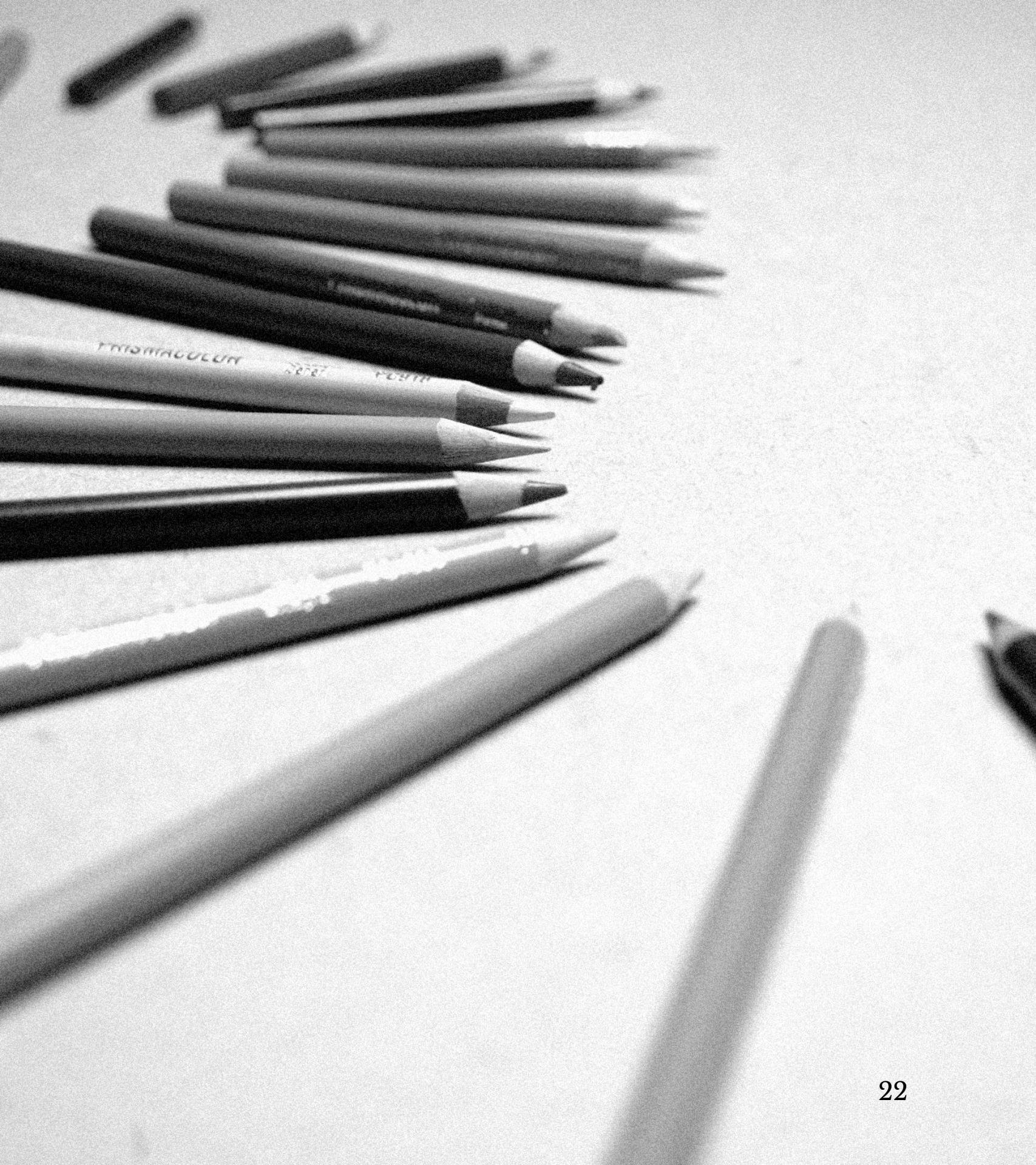
Movement¹¹



Definition: The organization of design elements in a way that suggests a particular flow on the canvas to direct the user's attention in a particular pattern.

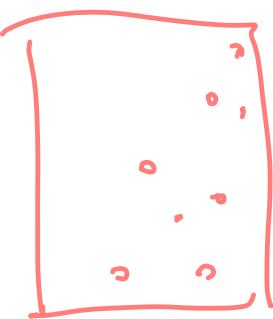


¹¹ Image source



Rhythm¹²

Definition: Patterned use of design elements in a way that communicates movement or order.



element

rhythmic use of the element conveys movement upwards

A red hand-drawn sketch of a stylized, rounded rectangular element with a small red arrow pointing to its top edge, labeled "element". Below it, a larger, more complex red hand-drawn shape is shown. A red arrow points from the text "rhythmic use of the element conveys movement upwards" to the right side of this complex shape.

¹² Image source

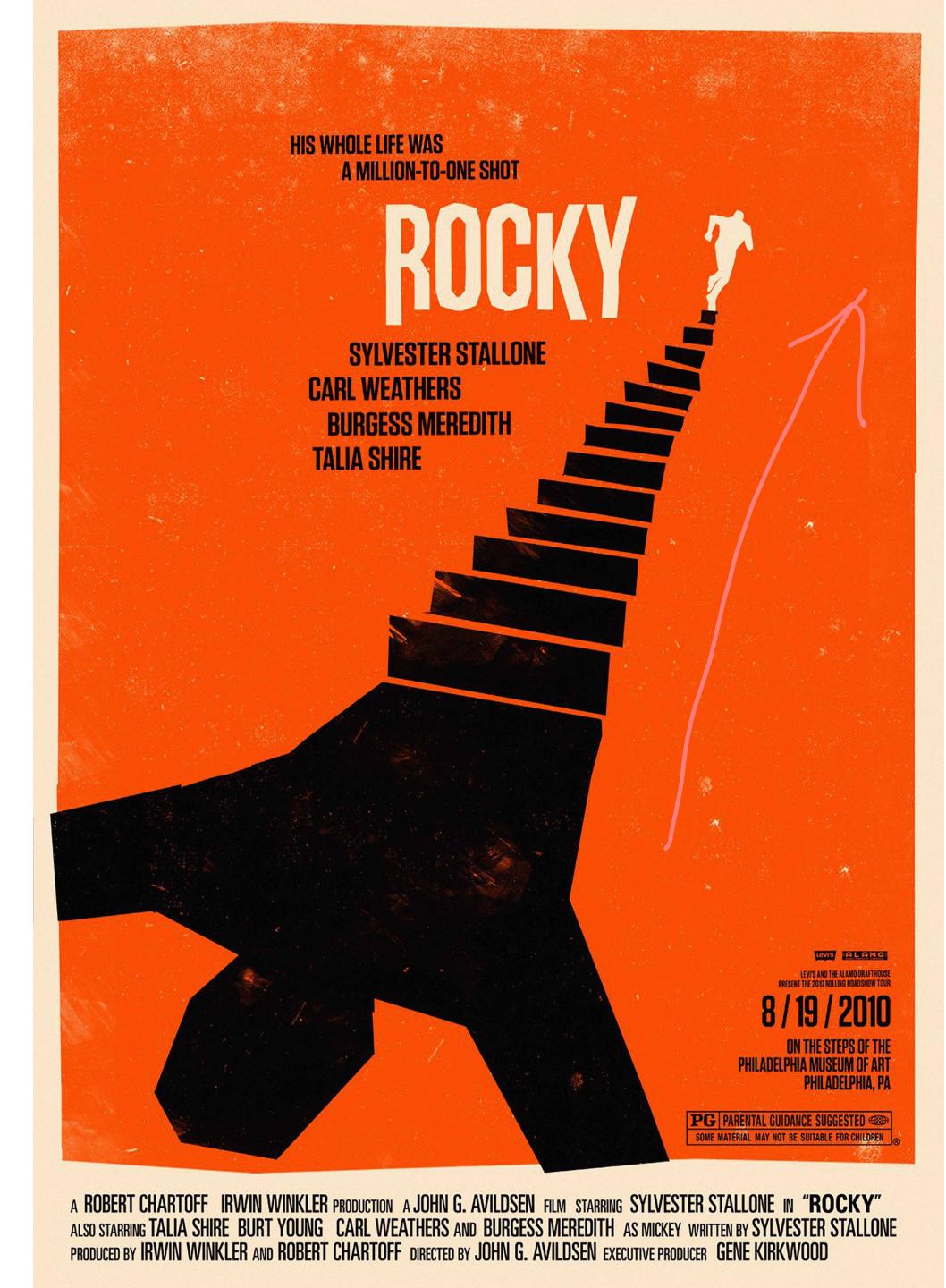
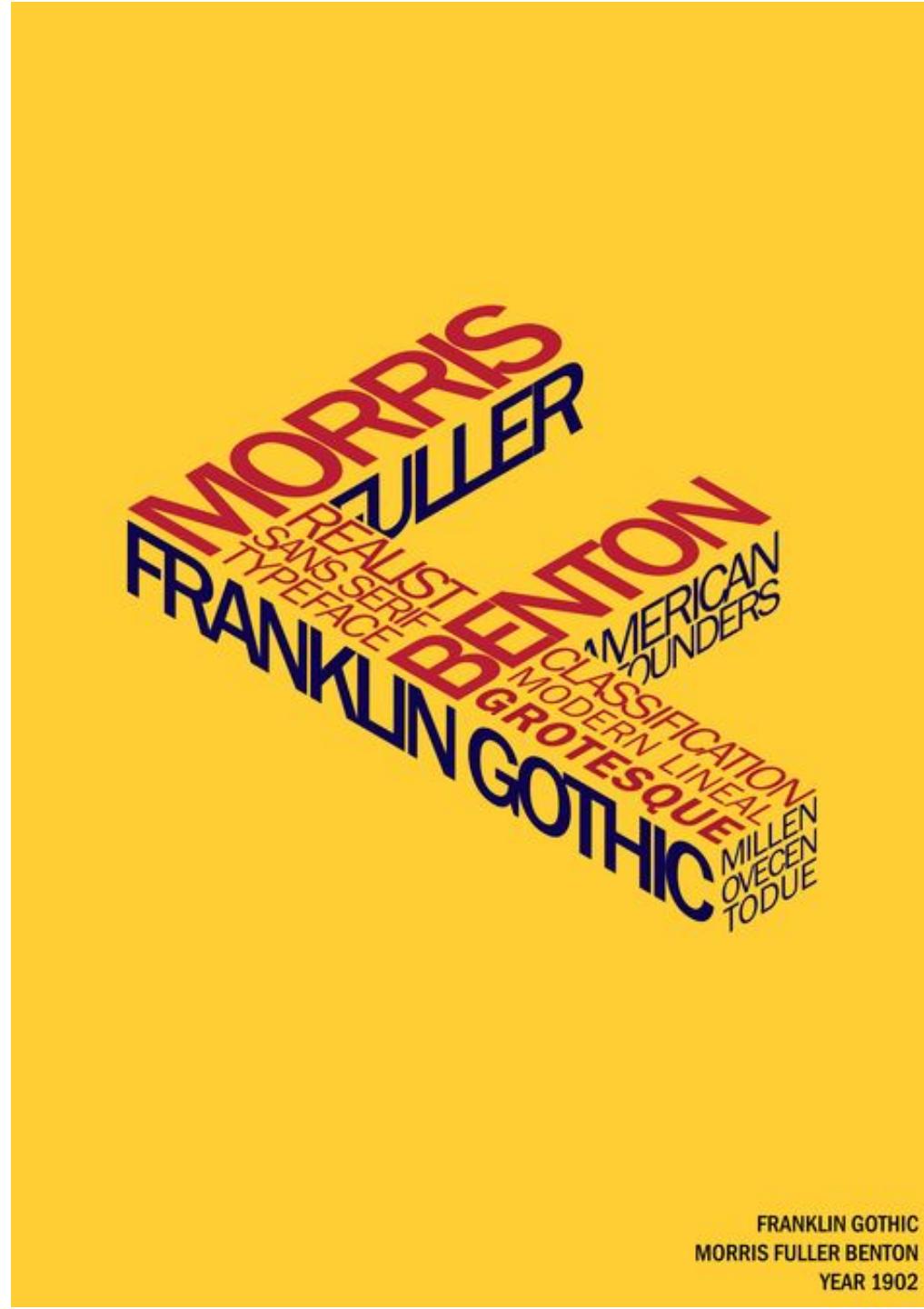


Perspective¹³

Definition: Creating a sense of horizon and movement along the depth axis of canvas.

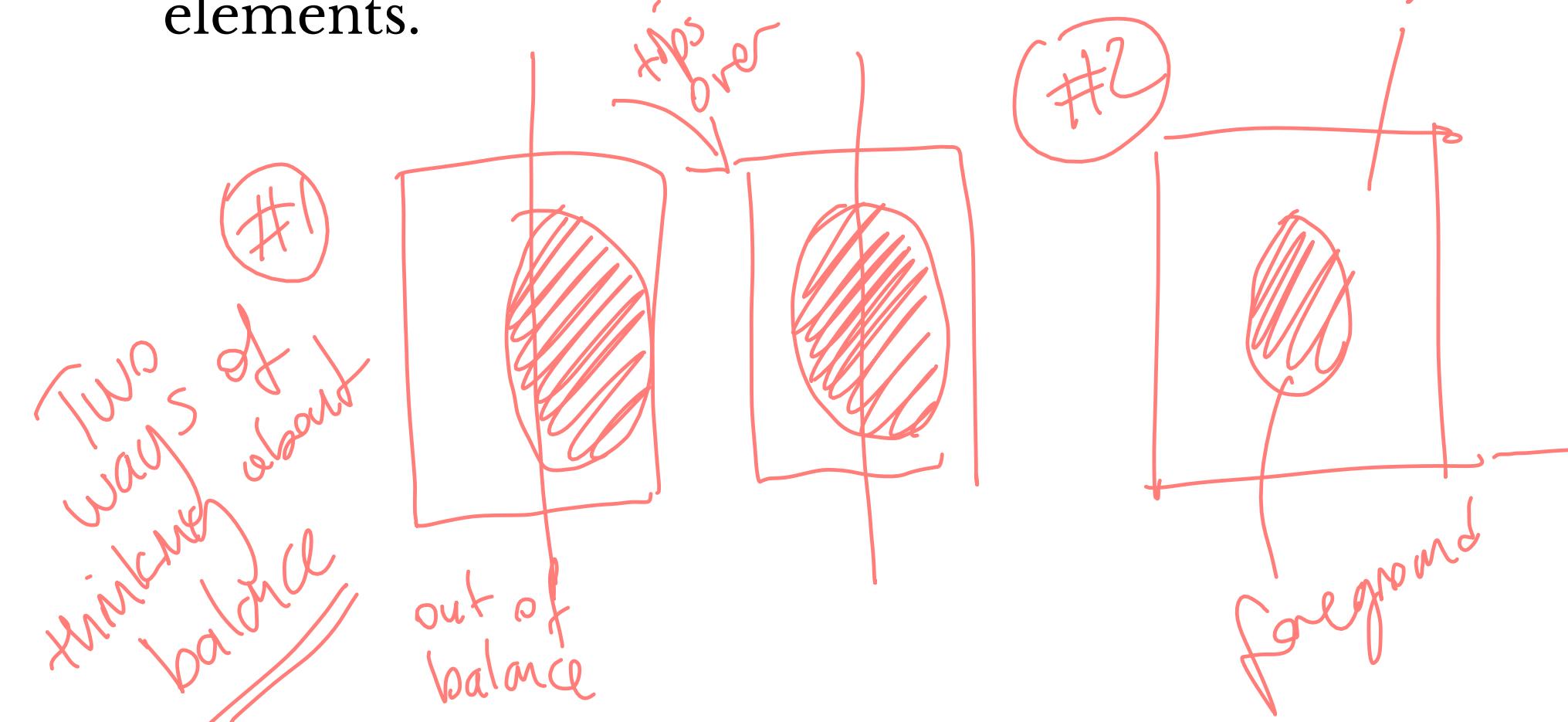


¹³ Image sources: [this slide](#), next slide: [left](#), [right](#)



Unity¹⁴

Definition: Unity reflects the holistic consistency in the use of design elements.



¹⁴ Image sources: [this slide](#), next slide: [left](#), [right](#)



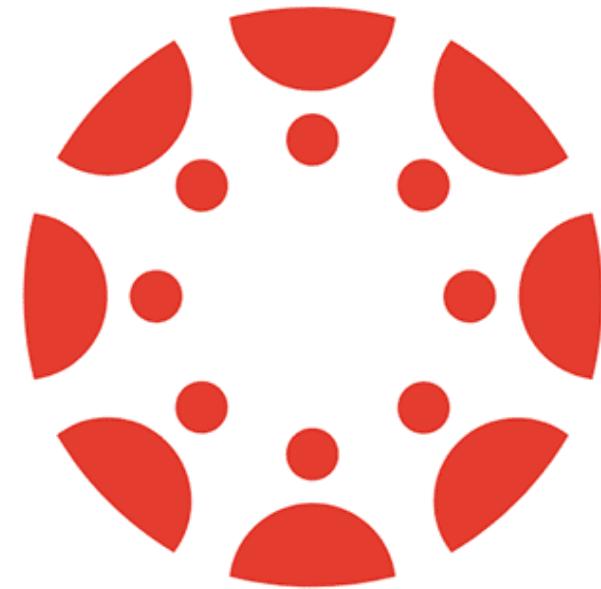
internally
consistent

→ 1930s
design



Quiz 1

Complete the Canvas quiz.



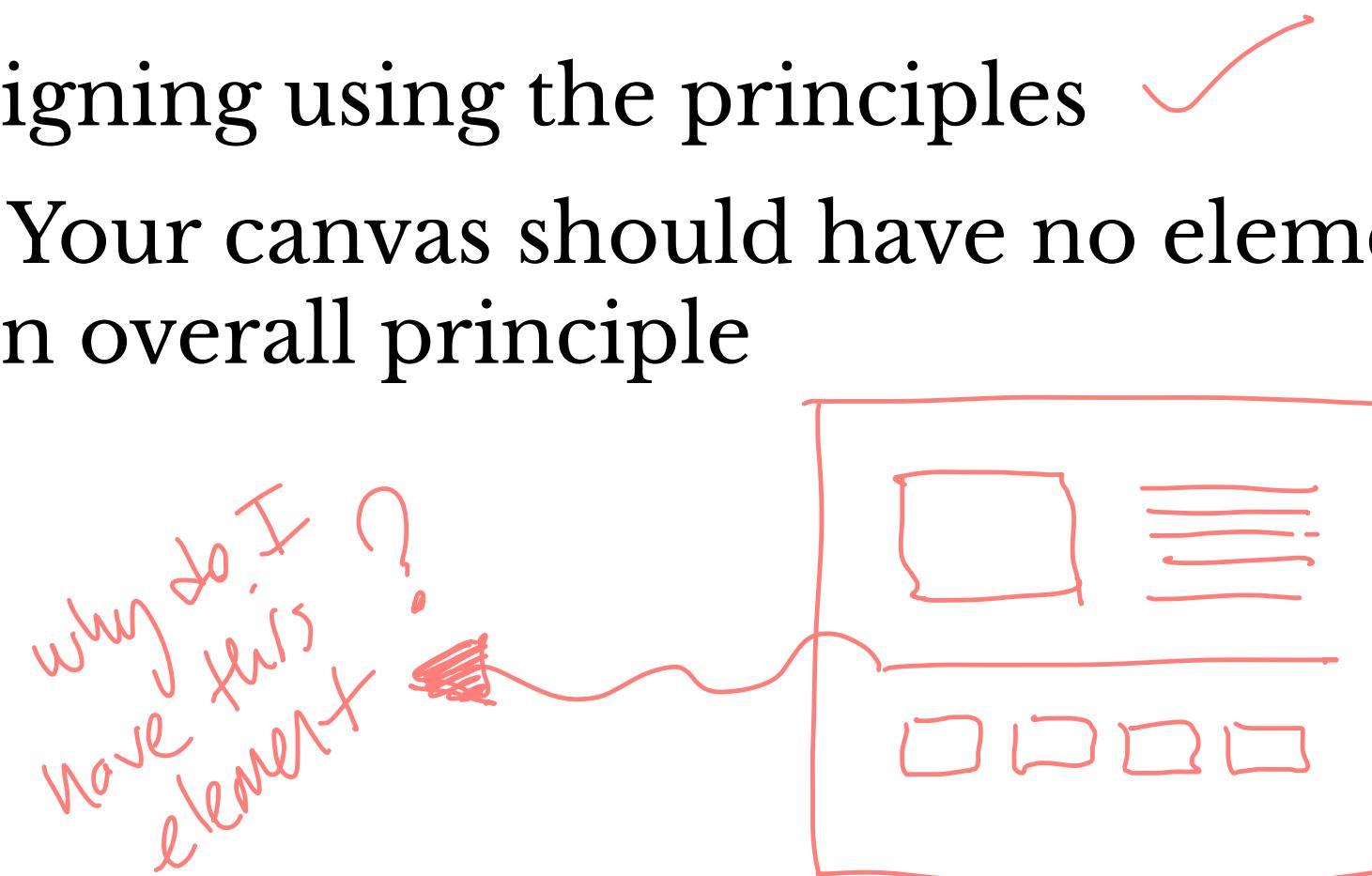
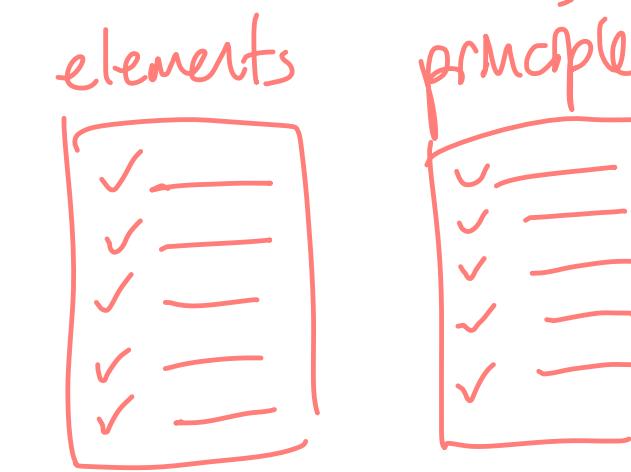
canvas

Questions about *Design Principles*?

**This all sounds good. But
how do we actually use
these?**

Some Strategies

- Create *cheat sheets*, and *checklists* ✓
- Analyze existing designs using these tools to build visual analysis skills ✓
- Practice designing using the principles ✓
 - *Pro Tip:* Your canvas should have no elements that do not follow an overall principle



In-class Design Exercise 1

Analyze an existing page using the design elements and principles

- What elements, principles can you see in use?
- What problems do you see that can be addressed using design principles?

Make a copy of the Google Drawings template, annotate, and submit a PDF within 24 hours as *Quiz 4*.



The screenshot shows the Wisconsin State Journal website on a desktop browser. The header includes the site's name, weather (65° Fair), and navigation links for News, Sports, Food & Fun, Opinion, Obituaries, Politics, and Buy & Sell. There are also links for logging in, becoming a member, and supporting local news. A prominent advertisement for Polo Ralph Lauren features models on a beach. Below the ad, a news banner reads "JUST IN US outlines sweeping plan to provide free COVID-19 vaccines. Get the highlights." A main headline states "Big Ten announces football returning Oct. 23-24". Other news items include "As COVID-19 cases surge, Gov. Tony Evers doesn't rule out extending mask order, other actions" and "Wisconsin clerks work to send out 1 million absentee ballots by Thursday". A sidebar on the right promotes "#AloneTogether" and lists trending news items.

madison.com

News Sports Food & Fun Opinion Obituaries Politics Buy & Sell

Log In Become a Member

WISCONSIN STATE JOURNAL

Wednesday, September 16, 2020 | Print Edition

65° Fair

Celebrity Birthdays: Sept. 15 LAST CHANCE SALE Get 90% off UNLIMITED digital! Subscribe today!

Get local and national politics updates delivered to you SUPPORT LOCAL NOW Click here for the latest updates from local businesses

the YMCA Collaborative Learning Program Register Now! Full-day child care and virtual learning support

JUST IN US outlines sweeping plan to provide free COVID-19 vaccines. Get the highlights.

Breaking News

Big Ten announces football returning Oct. 23-24

Colten Bartholomew | Wisconsin State Journal

Daily COVID-19 testing, cardiac screening after positive tests are keys to conference's plan.

LOCAL EDUCATION

Lake Mills Area School District stops in-person school, activities for rest of week due to COVID-19

Jeff Richgels | 42 min ago

The COVID-19 pandemic continues to affect the start of school, with the Lake Mills Area School District the latest to halt in-person school an...

LOCAL GOVERNMENT

As COVID-19 cases surge, Gov. Tony Evers doesn't rule out extending mask order, other actions

Mitchell Schmidt | Wisconsin State Journal | 47 min ago

Evers said he is exploring the possibility of extending his statewide mask order, which is slated to expire Sept. 28.

UW-Madison threatens 'more drastic action' as experts say COVID-19 outbreak impacting broader community

David Wahlberg | Wisconsin State Journal | 2 hrs ago

UW-Madison threatened "more drastic action" Tuesday if quarantines in two large dorms don't greatly reduce COVID-19 infections, as health experts said a campus coronavirus outbreak is putting the general public at risk with flu season nearing.

Global Connectivity

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lapis

In-class Design Exercise 2¹⁵



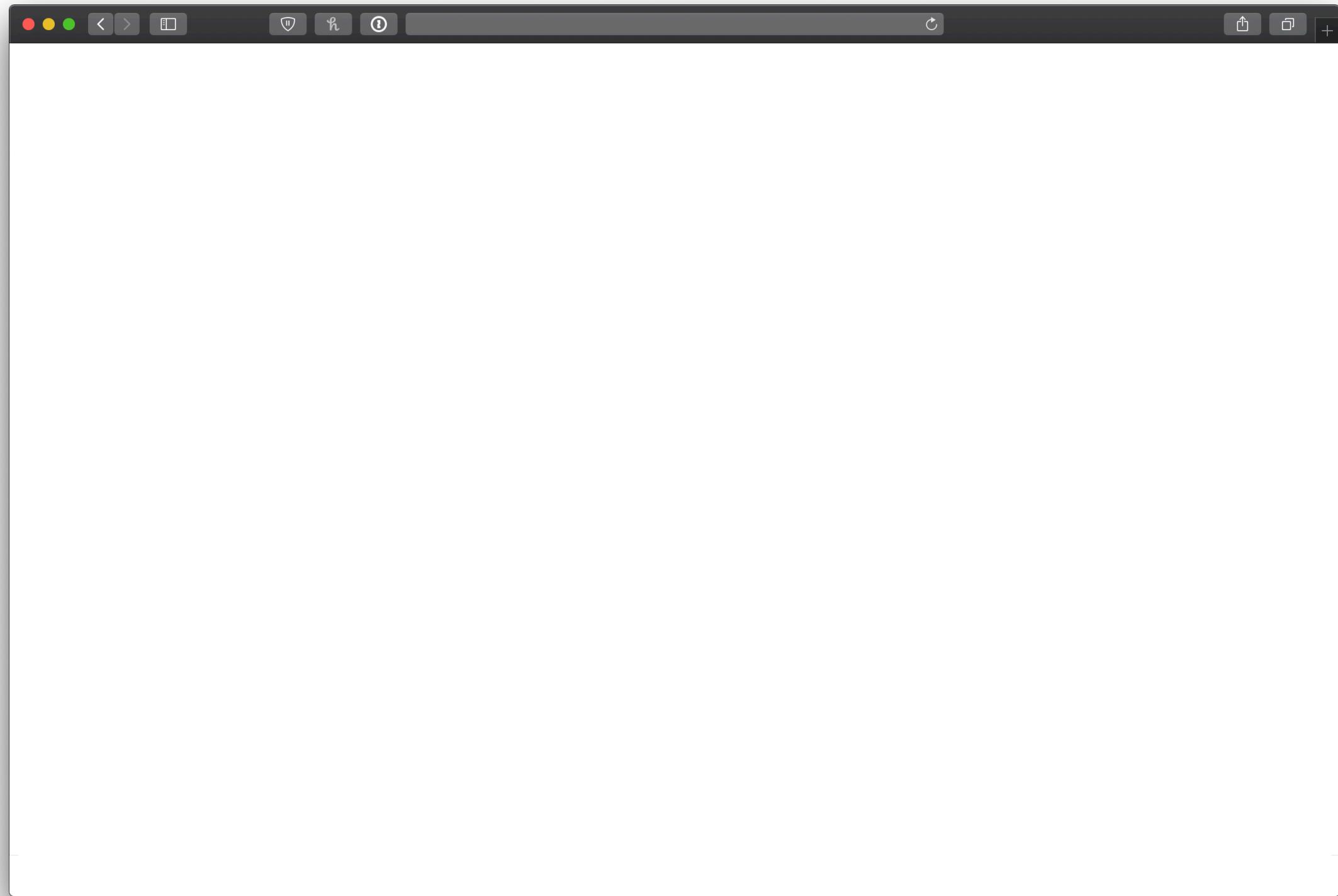
Consider the last product you purchased online. Design a product page with the following elements:

- Product photo
- Product description, reviews, similar items
- Action buttons: choose color, add to cart, add to wishlist

Make a copy of the template, place elements & annotate with your decisions, and submit a PDF as Quiz 4.

¹⁵ Image sources: [this slide](#), elements/principles: [first](#), [second](#)





The Elements of Design

(the tools to make art)

Line		Horizontal, vertical, diagonal, straight, curved, dotted, broken thick, thin.
Shape		2D (two dimensional)/ flat Geometric (square, circle, oval, triangle) Organic (all other shapes)
Form		3D (three dimensional), Geometric (cube, sphere, cone), Organic (all other forms such as: people, animals, tables, chairs, etc).
Colour		Refers to the wavelengths of light. Refers to hue (name), value (lightness/darkness), intensity (saturation, or amount of pigment), and temperature (warm and cool). Relates to tint, tone and shade.
Value		The lightness or darkness of an image (or part of an image).
Texture		The feel, appearance, thickness, or stickiness of a surface (for example: smooth, rough, silky, furry).
Space		The area around, within, or between images or parts of an image (relates to perspective). Positive and negative space.

The Principles of Design

(how to use the tools to make art)

Pattern		A regular arrangement of alternated or repeated elements (shapes, lines, colours) or motifs.
Contrast		The juxtaposition of different elements of design (for example: rough and smooth textures, dark and light values) in order to highlight their differences and/or create visual interest, or a focal point.
Emphasis		Special attention/importance given to one part of a work of art (for example, a dark shape in a light composition). Emphasis can be achieved through placement, contrast, colour, size, repetition... Relates to focal point.
Balance		A feeling of balance results when the elements of design are arranged symmetrically or asymmetrically to create the impression of equality in weight or importance.
Scale		The relationship between objects with respect to size, number, and so on, including the relation between parts of a whole.
Harmony		The arrangement of elements to give the viewer the feeling that all the parts of the piece form a coherent whole.
Rhythm/Movement		The use of recurring elements to direct the eye through the image; the way the elements are organized to lead the eye to the focal area. The eye can be directed, for example, along edges and by means of shape and colour.
Unity		All parts of an image work together to be seen as a whole.
Variety		Using different elements in an image to create visual interest.

LINE

A line is a mark between two points. There are various types of lines, from straight to squiggly to curved and more. Lines can be used for a wide range of purposes: stressing a word or phrase, connecting content to one another, creating patterns and much more.

COLOR

Color is used to generate emotions, define importance, create visual interest and more. CMYK (cyan/magenta/yellow/black) is subtractive; RGB (red/green/blue) is additive.

Some colors are warm and active (orange, red); some are cool and passive (blue, purple).

There are various color types (primary to analogous) and relationships (monochromatic to triad) worth learning more about as well.

TEXTURE

Texture relates to the surface of an object; the look or feel of it. Concrete has a rough texture; drywall has a smooth and subtle texture. Using texture in design is a great way to add depth and visual interest. Printed material has actual, textile texture while screen material has implied texture.

paper leaf

created by Paper Leaf Design. www.paper-leaf.com

SHAPE



Height + width = shape. We all learned basic shapes in grade school - triangles, squares, circles and rectangles. Odd or lesser seen shapes can be used to attract attention.

There are three basic types of shape: geometric (triangles, squares, circles etc), natural (leaves, animals, trees, people), and abstracted (icons, stylized, graphic representations etc).

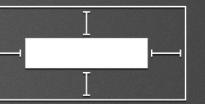


SIZE

Size is how small or large something is: a small shirt vs. an extra large shirt, for example. Use size to define importance, create visual interest in a design (via contrasting sizes), attract attention and more.

VALUE

Value is how light or how dark an area looks. A gradient, shown above, is a great way to visualize value - everything from dark to white, all the shades in-between, has a value. Use value to create depth and light; to create a pattern; to lead the eye; or to emphasize.

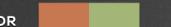


Space is the area around or between elements in a design. It can be used to separate or group information. Use it effectively to: give the eye a rest; define importance; lead the eye through a design and more.

SPACE

CONTRAST

COLOR



TONE/VALUE



SIZE/SHAPE



DIRECTION



To the left, you can see 4 ways to create contrast in your design.

ALIGNMENT

Proper alignment in a design means that every element in it is visually connected to another element. Alignment allows for cohesiveness; nothing feels out of place or disconnected when alignment has been handled well.



REPETITION

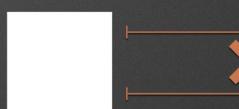
Repetition breeds cohesiveness in a design. Once a design pattern has been established - for example, a dotted border or a specific typographic styling - repeat this pattern to establish consistency.



The short version?

Establish a style for each element in a design and use it on similar elements.

PROXIMITY



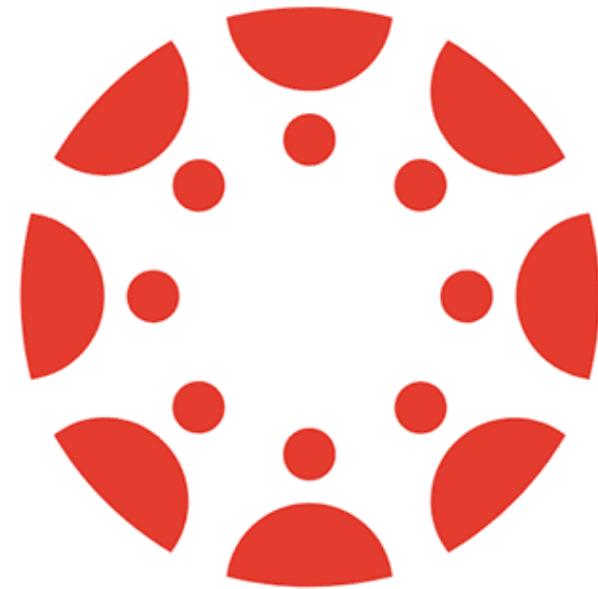
Proximity allows for visual unity in a design. If two elements are related to each other, they should be placed in close proximity to one another. Doing so minimizes visual clutter, emphasizes organization, and increases viewer comprehension.

Imagine how ridiculous it would be if the proximity icons on this graphic were located on the other side of this document.

a handy *paper leaf* resource

Quiz 2

Complete the Canvas quiz.



canvas

Key Components for UX Design

Key Components for UX Design

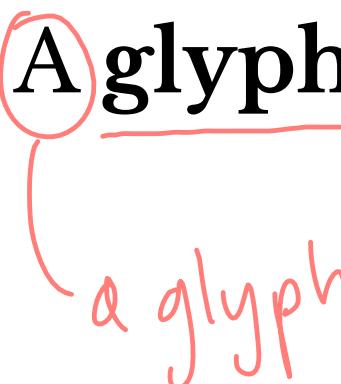
We will focus on *type*, *color*, and *images*.

Type → anything you can read

Definition: Printed letters and characters of language.



Associated Concepts

- A font is the style in which type is created.
- A typeface is a font family that includes fonts of different variations that follow the same style.
- A glyph is a particular character.


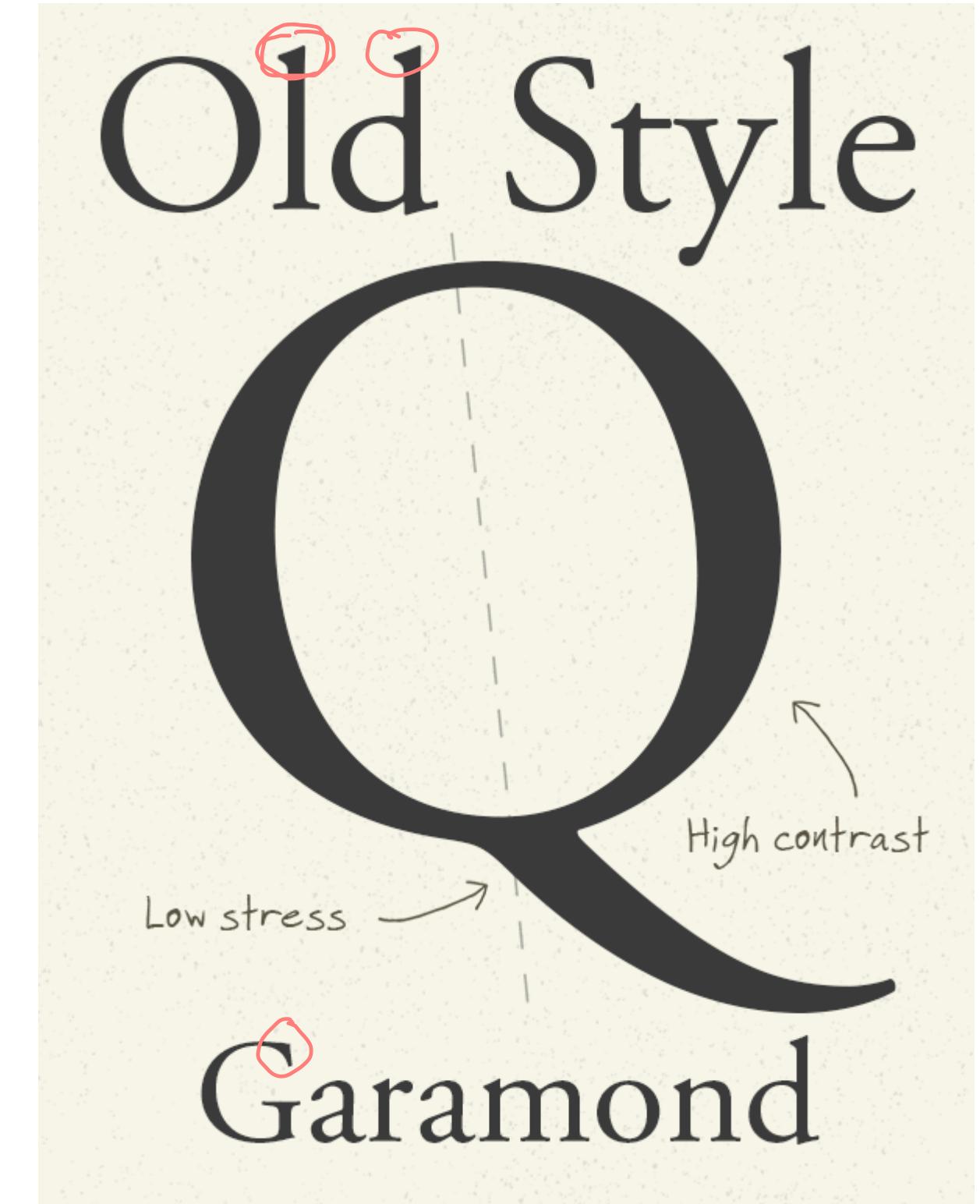
a glyph

Categories of Typefaces

1. Old style
2. Modern
3. Slab serif
4. Sans serif
5. Script
6. Decorative

Old-style fonts

Definition: Old-style fonts have "serifs" at the tips of a glyph that taper closer to the tip.



Modern & slab-serif fonts

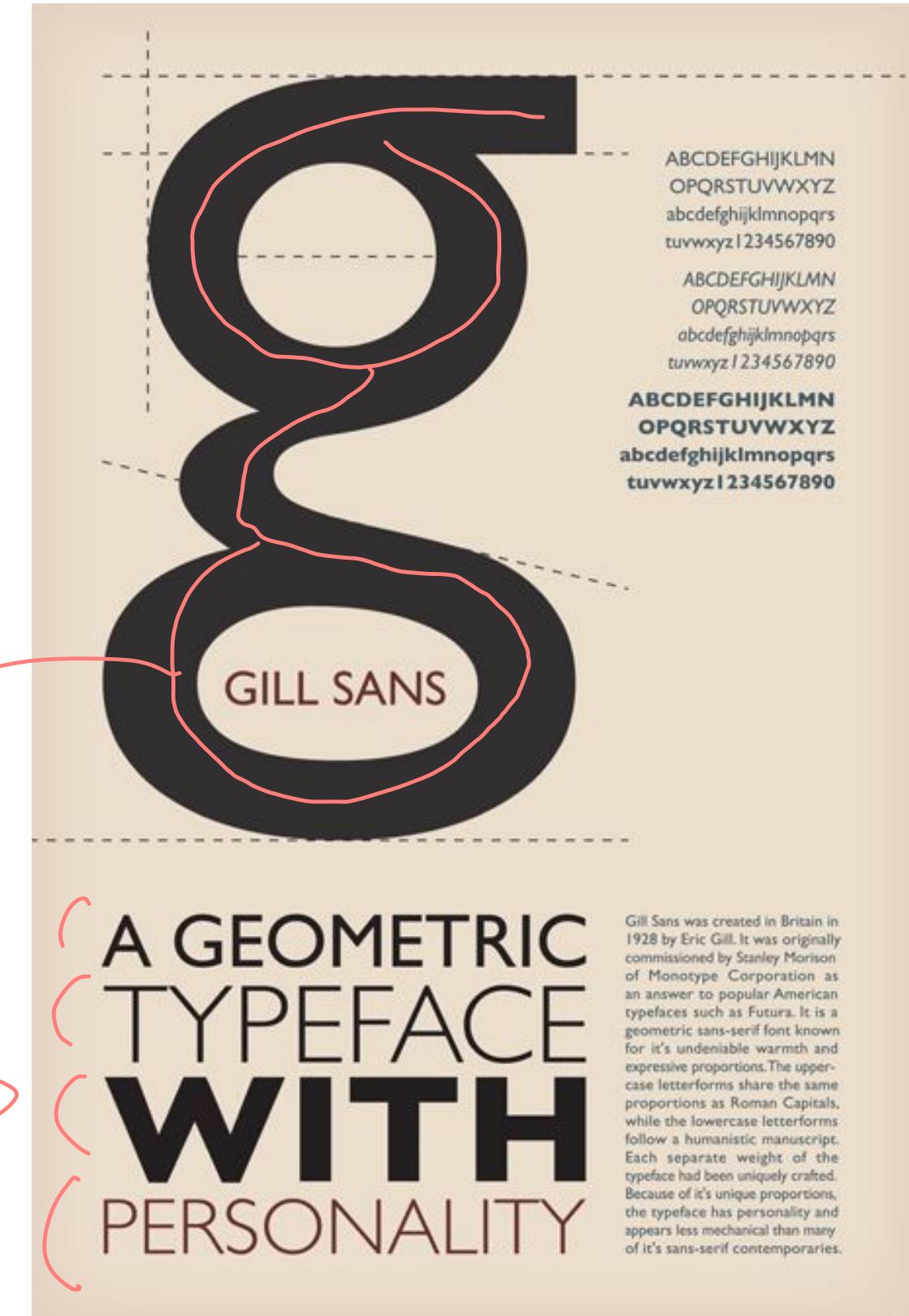
Definition: Modern and slab-serif fonts have very thin or very thick serifs.



Sans-serif fonts

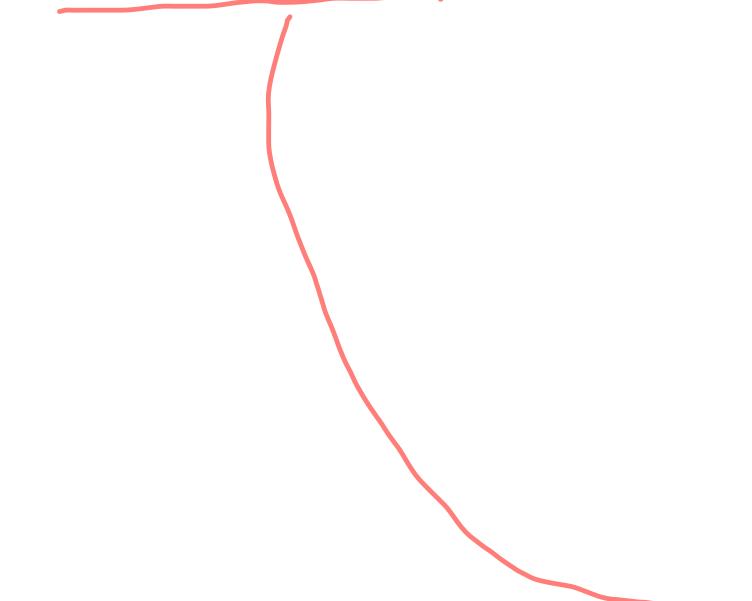
Definition: Sans-serif fonts lack the serif at the tips of the glyphs, and their strokes follow uniform weight.

uniform
weight



Script fonts

Definition: Script fonts simulate cursive writing where glyphs connect with each other at the downstroke.



Babbette

yours truly

Love Affair

mahogany script

quarter note

pen and ink

P.S. script font

alexis maddox

chloe script

candace

brush script

pen pals script

Emiline

gravura com

Decorative fonts

Definition: Decorative fonts are designed specifically to convey a particular context or elicit a particular feeling, e.g., "gothic."

gothic example

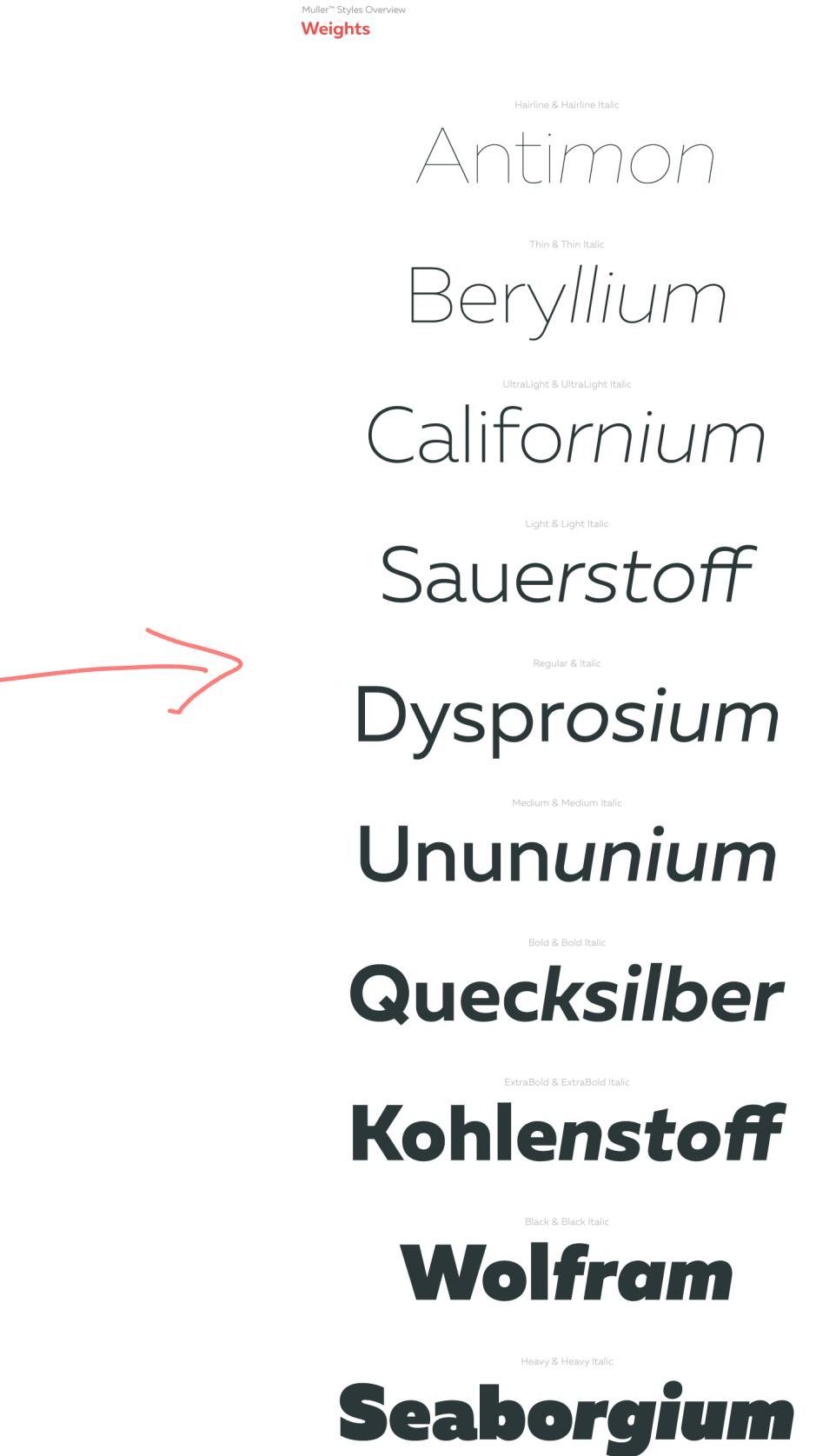


orem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

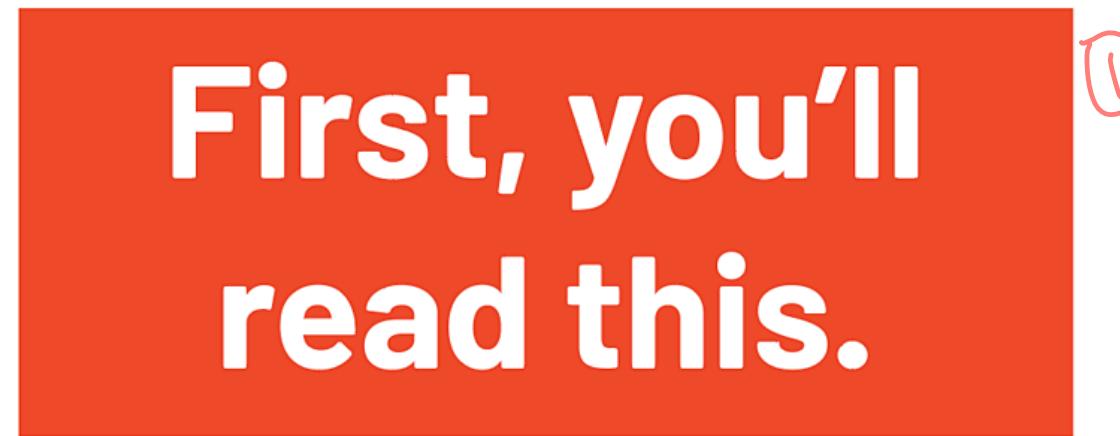
Galdino Otten

Font parameters

- Style variations: bold, italic, oblique
- Caps: all caps, small caps
- Weight: extra light, light, medium, bold

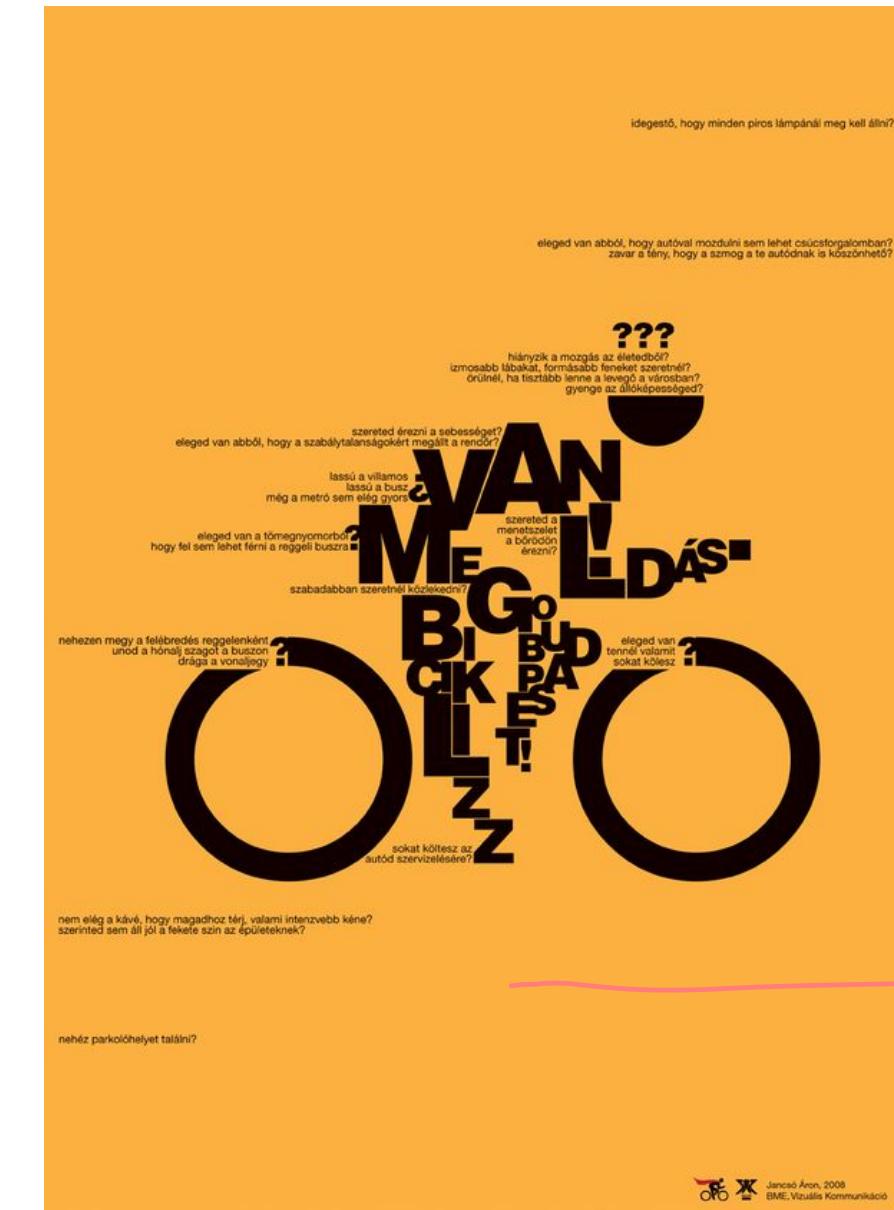


Pro Tip: Type alone can be used to achieve design principles, such as hierarchy and movement.



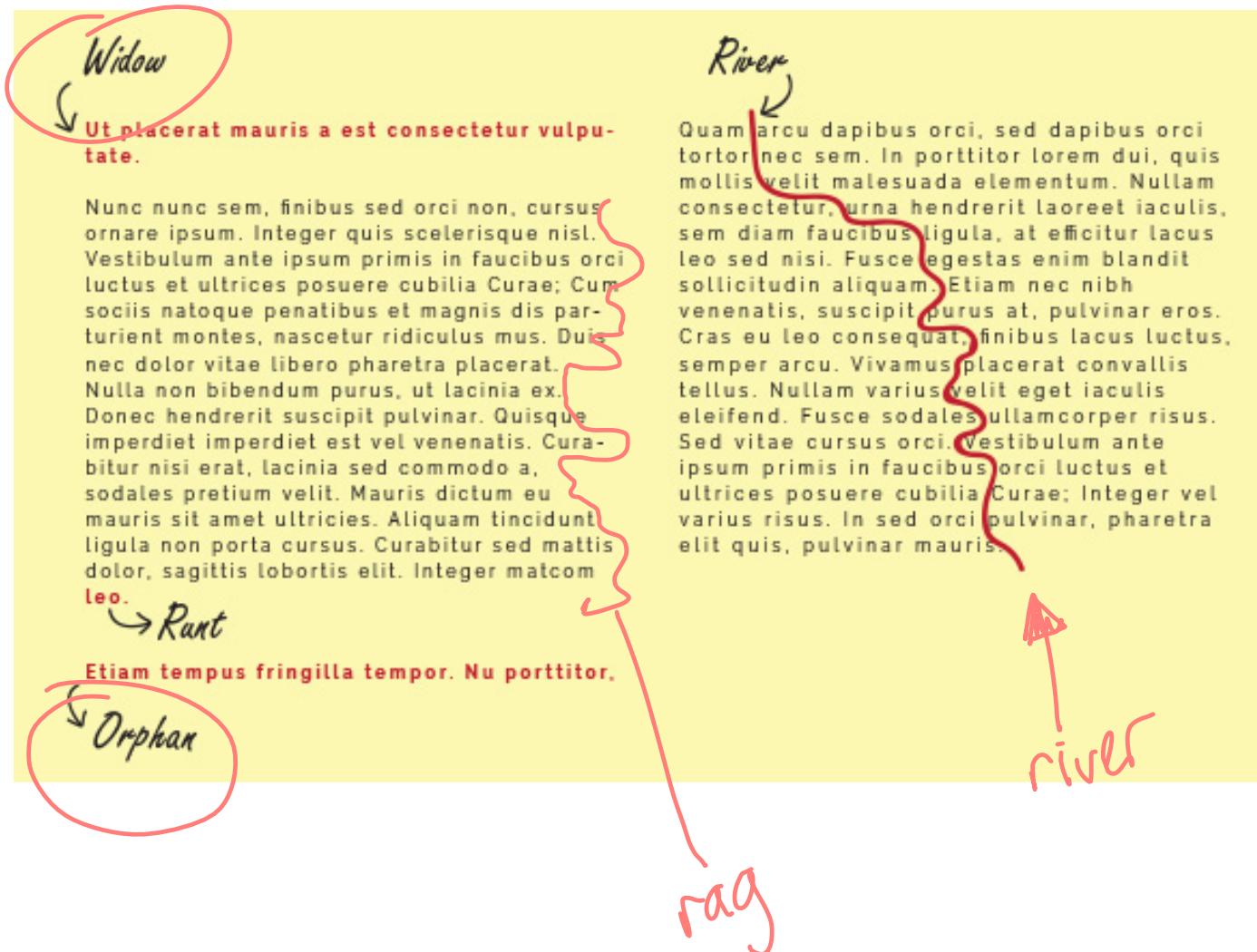
Then, you'll read this. ↗

And then this. 3



~~movement~~

Pro tip: For good typography, become familiar with leading, tracking, kerning, widows, orphans, rags, rivers.



! / , / /
kerning
tracking
leading
point size
typeface
justification
line width

what is typography?

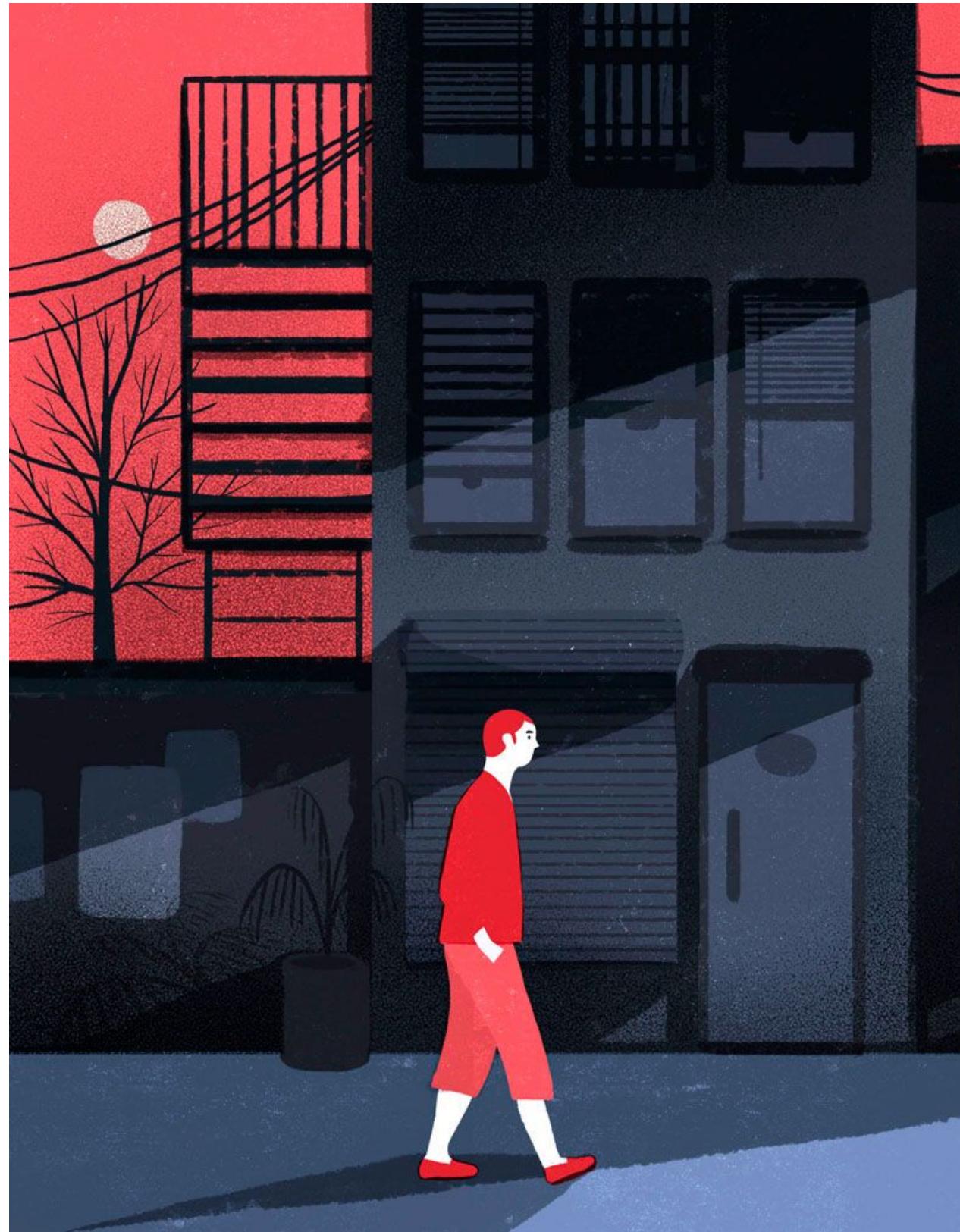
Questions about Type?

Color

Definition: Human visual perception of light reflecting from an object.

- Creates emphasis ✓
- Organizes content ✓
- Evokes emotion ✓





use of color to evoke emotion

Marketing Proposal

Digital Content Team

Client: UNIVERSITY OF WATERLOO

Presented by: GEORGE ZANDER

“

Don’t settle: Don’t finish crappy books. If you don’t like the menu, leave the restaurant. If you’re not on the right path, get off it.

”

Our Objectives

- To develop creative, high-impact executions that reach large groups of consumers and maximize viewership.
- To deliver cost effective business to consumer communications that builds a strong consumer relationship.

Our Overview

Your marketing plan should start with an executive summary. The summary gives a quick overview of the main points of the plan.

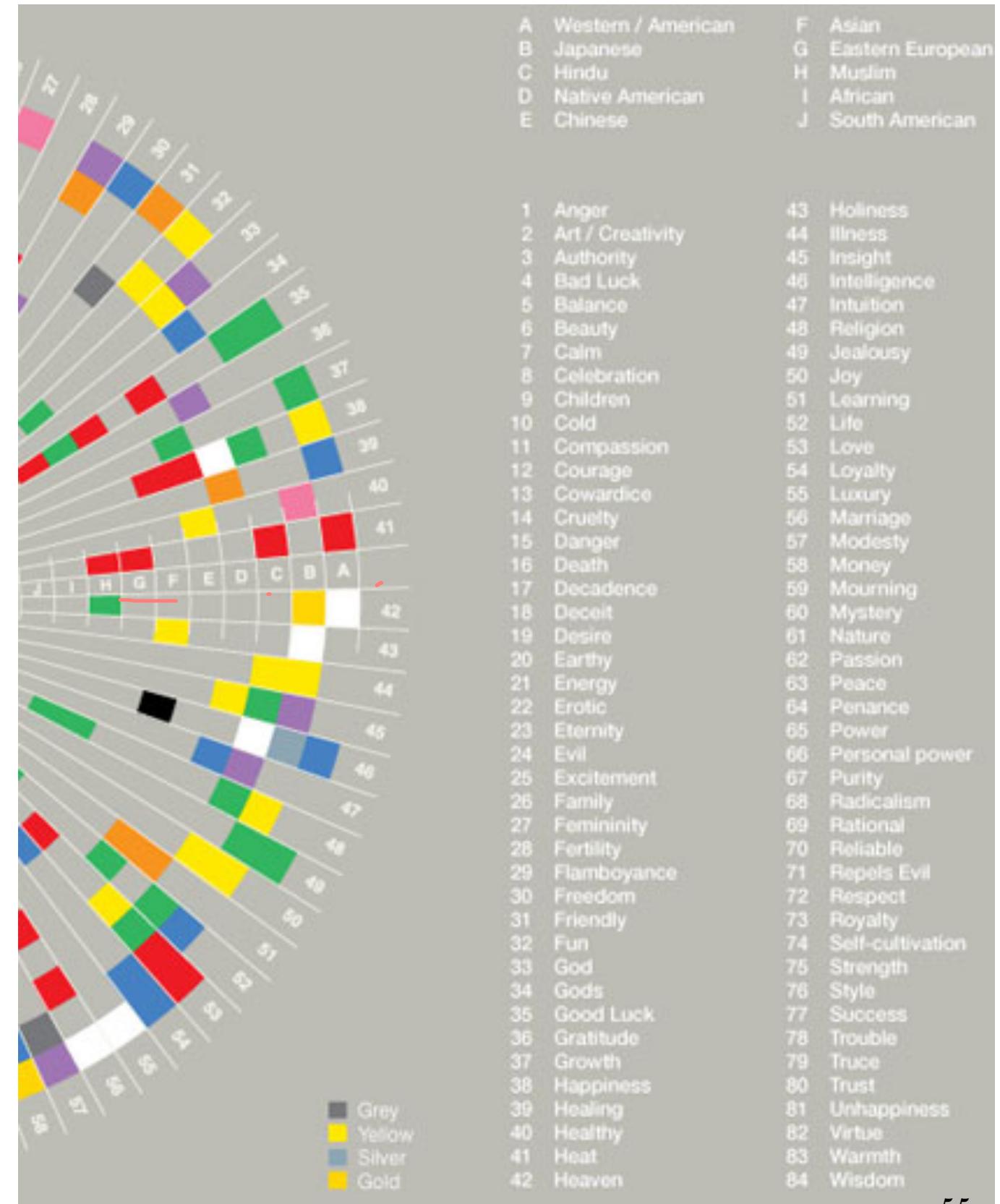
Although the executive summary appears at the beginning of the plan, you should write it last. Writing the summary is a good opportunity to check that your plan makes sense and that you haven’t missed any important points.

emotions elicited by colors

COLORS CONVEY Emotions			
BLUE	TURQUOISE	GREEN	YELLOW
TRANQUILITY, SECURITY, INTEGRITY, PEACE, LOYALTY, TRUST, INTELLIGENCE + COLDNESS, FEAR, MASCULINITY	SPIRITUAL, HEALING, PROTECTION, SOPHISTICATED - ENVY, FEMININITY	FRESHNESS, ENVIRONMENT, NEW, MONEY, FERTILITY, HEALING, EARTH ENVY, JEALOUSY, GUILT	BRIGHT, SUNNY, ENERGETIC, WARM, HAPPY, PERKY, JOY, INTELLECT IRRESPONSIBLE, UNSTABLE
PURPLE	PINK	RED	ORANGE
ROYALTY, NOBILITY, SPIRITUALITY, LUXURY, AMBITION, WEALTH + MYSTERY, MOODINESS	HEALTHY, HAPPY, FEMININE, SWEET, COMPASSION, PLAYFUL - WEAK, FEMININITY, IMMATURITY	LOVE, PASSION, ENERGY, POWER, STRENGTH, HEAT, DESIRE ANGER, DANGER, WARNING	COURAGE, CONFIDENCE, FRIENDLINESS, SUCCESS IGNORANCE, SLUGGISHNESS
BROWN	TAN	GOLD	SILVER
FRIENDLY, EARTH, OUTDOORS, LONGEVITY, CONSERVATIVE + DOGMATIC, CONSERVATIVE	DEPENDABLE, FLEXIBLE, CRISP, CONSERVATIVE - DULL, BORING, CONSERVATIVE	WEALTH, WISDOM, PROSPERITY, VALUABLE, TRADITIONAL EGOTISTICAL, SELF-RIGHTEOUS	GLAMOROUS, HIGH TECH, GRACEFUL, SLEEK INDECISIVE, DULL, NON-COMMITAL
WHITE	GRAY	BLACK	
GOODNESS, INNOCENCE, PURITY, FRESH, EASY, CLEAN + ISOLATION, PRISTINE, EMPTINESS	SECURITY, RELIABILITY, INTELLIGENCE, SOLID - GLOOMY, SAD, CONSERVATIVE	PROTECTION, ELEGANCE, DRAMATIC, CLASSY, FORMALITY DEATH, EVIL, MYSTERY	

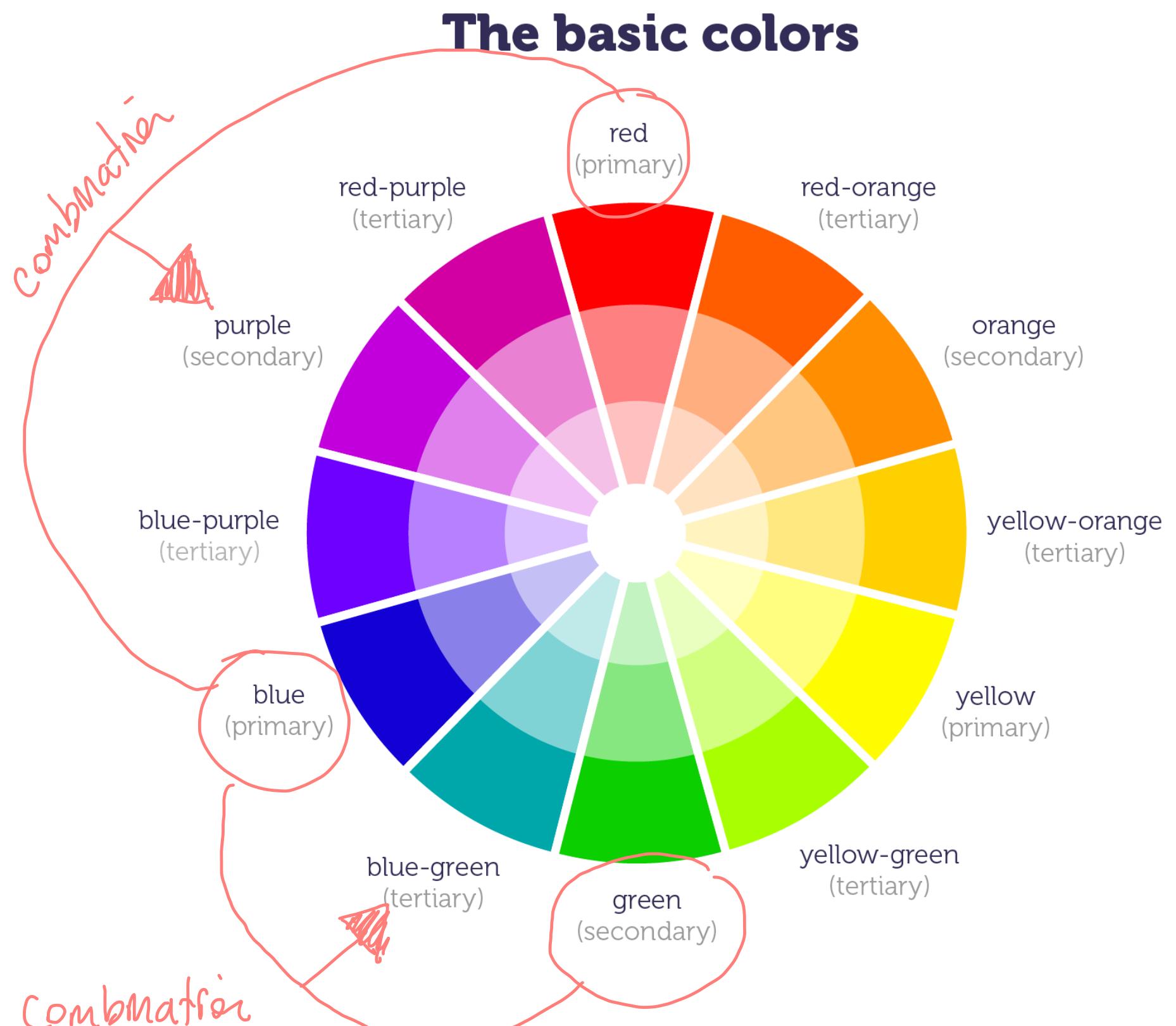
CoSchedule

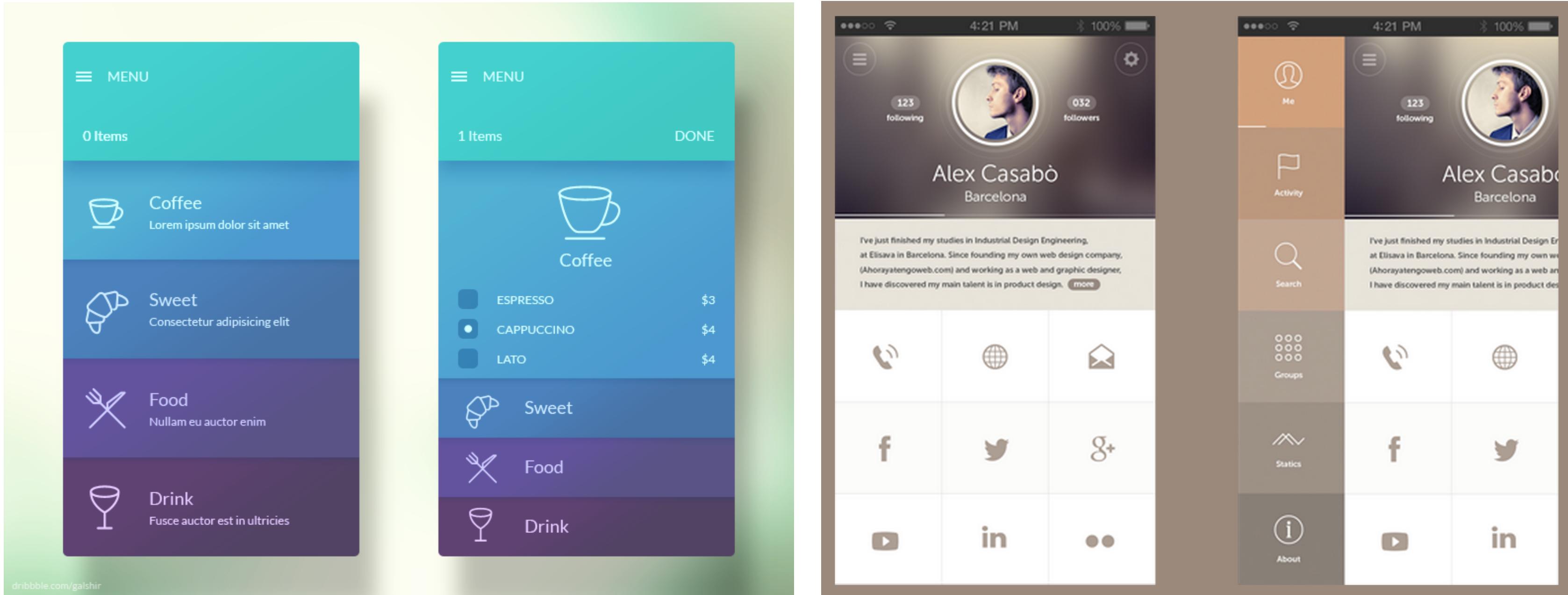
how the color-emotion mapping changes across cultures

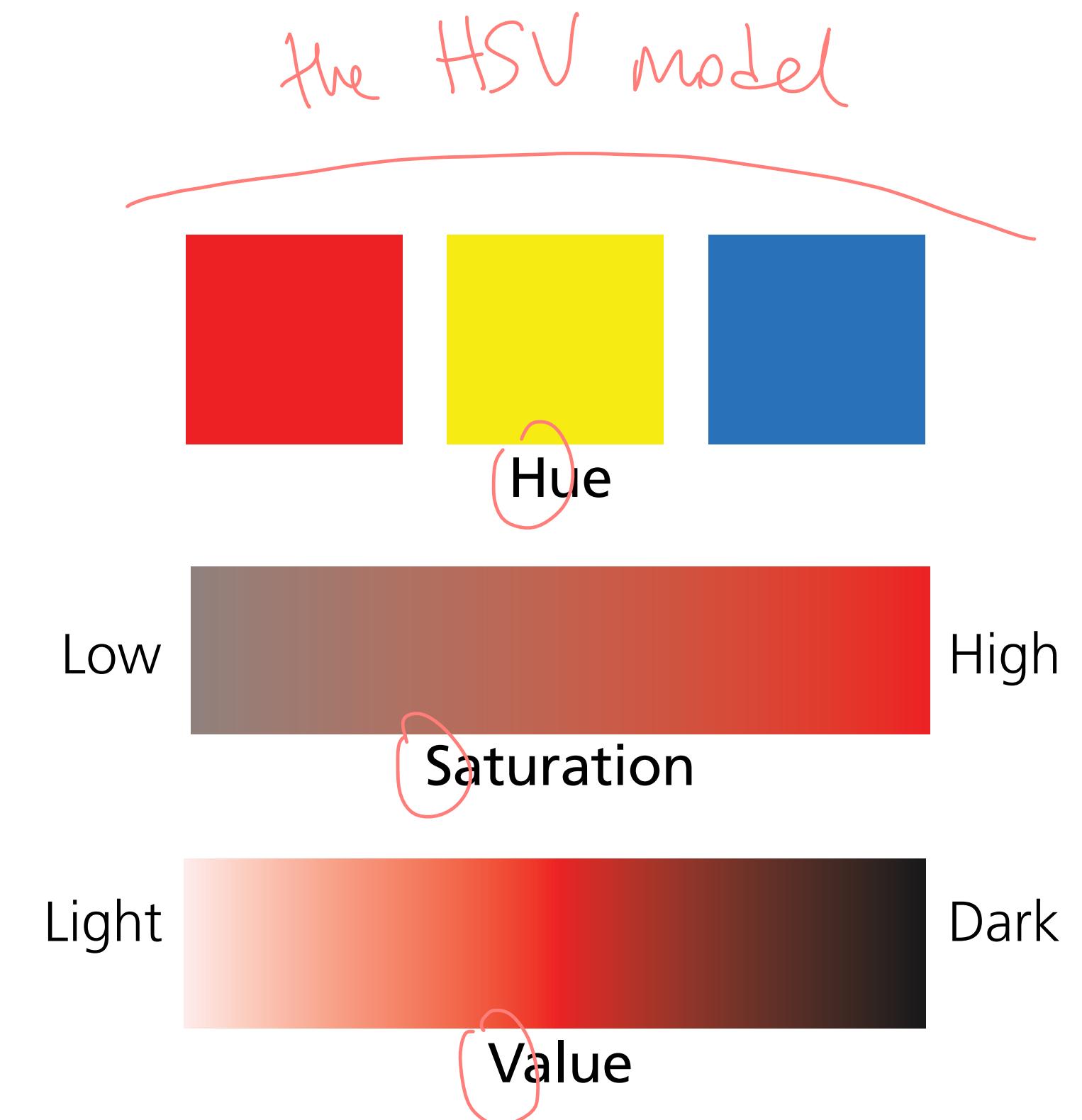


The Color Wheel

- Primary, secondary, tertiary colors
- Tints, hue, shades
- Complementary colors
- Warm, cool colors







Color Palettes

1. Analogous
2. Complementary
3. Split Complementary
4. Triadic
5. Monochromatic
6. Achromatic

UNDERSTANDING COLOR THEORY

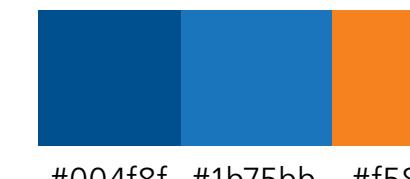
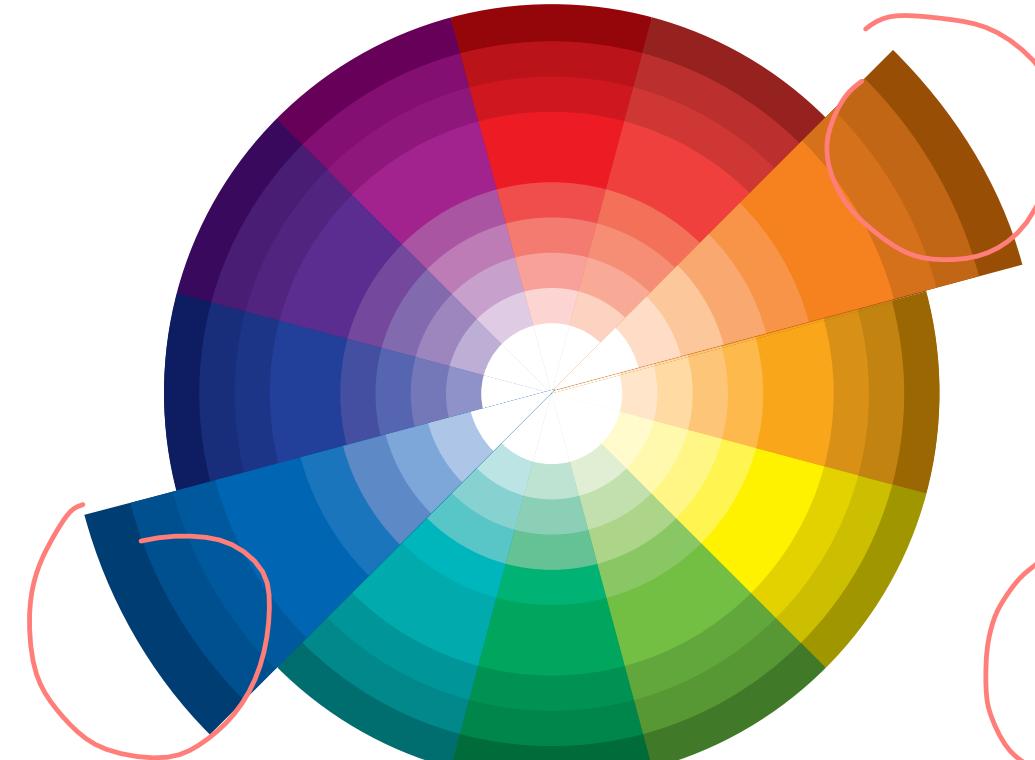


ANALOGOUS



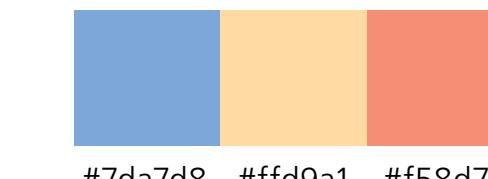
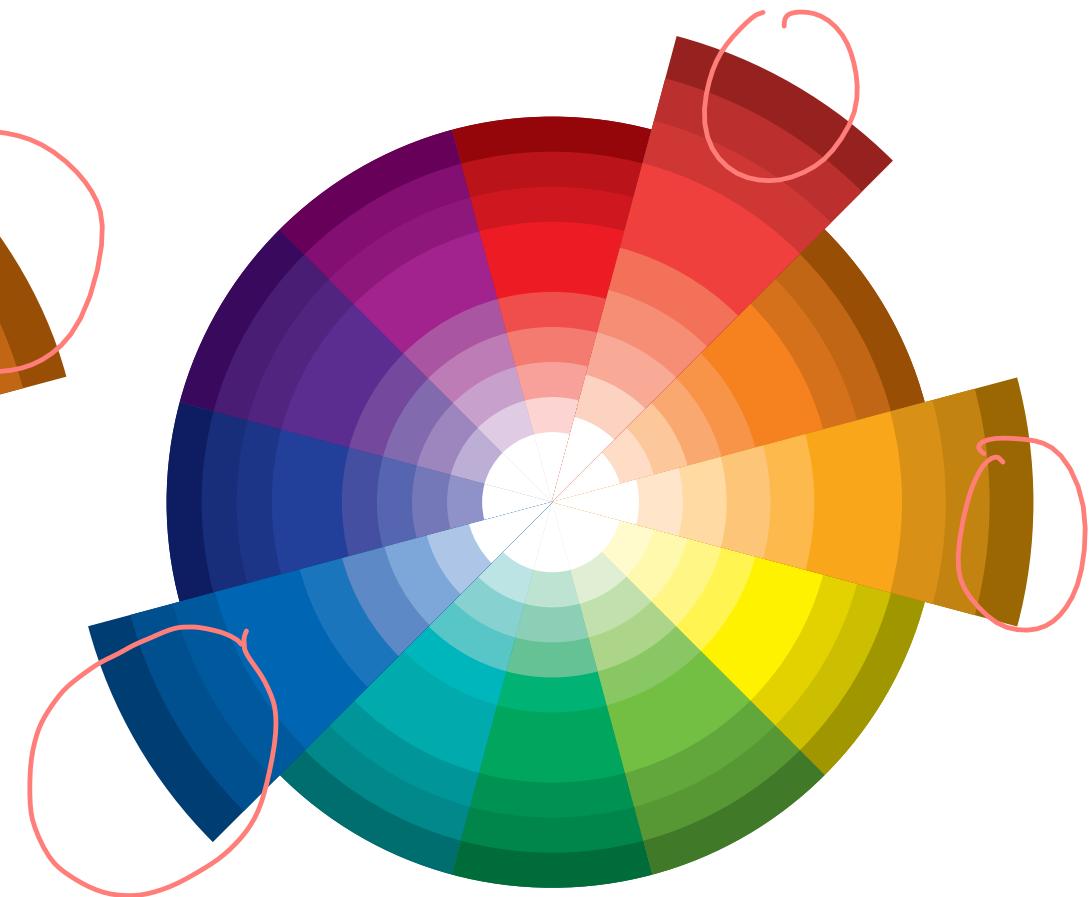
#adc5e6 #00888a #00888a

COMPLEMENTARY



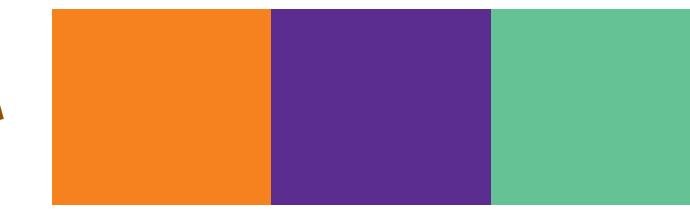
#004f8f #1b75bb #f5821f

SPLIT-COMPLEMENTARY

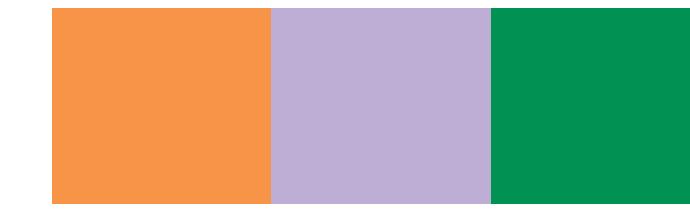


#7da7d8 #ffd9a1 #f58d76

TRIADIC



#f5821f #5c2d91 #65c194



#f79447 #bbaed5 #009252

MONOCHROMATIC



ACHROMATIC



COOL ↗

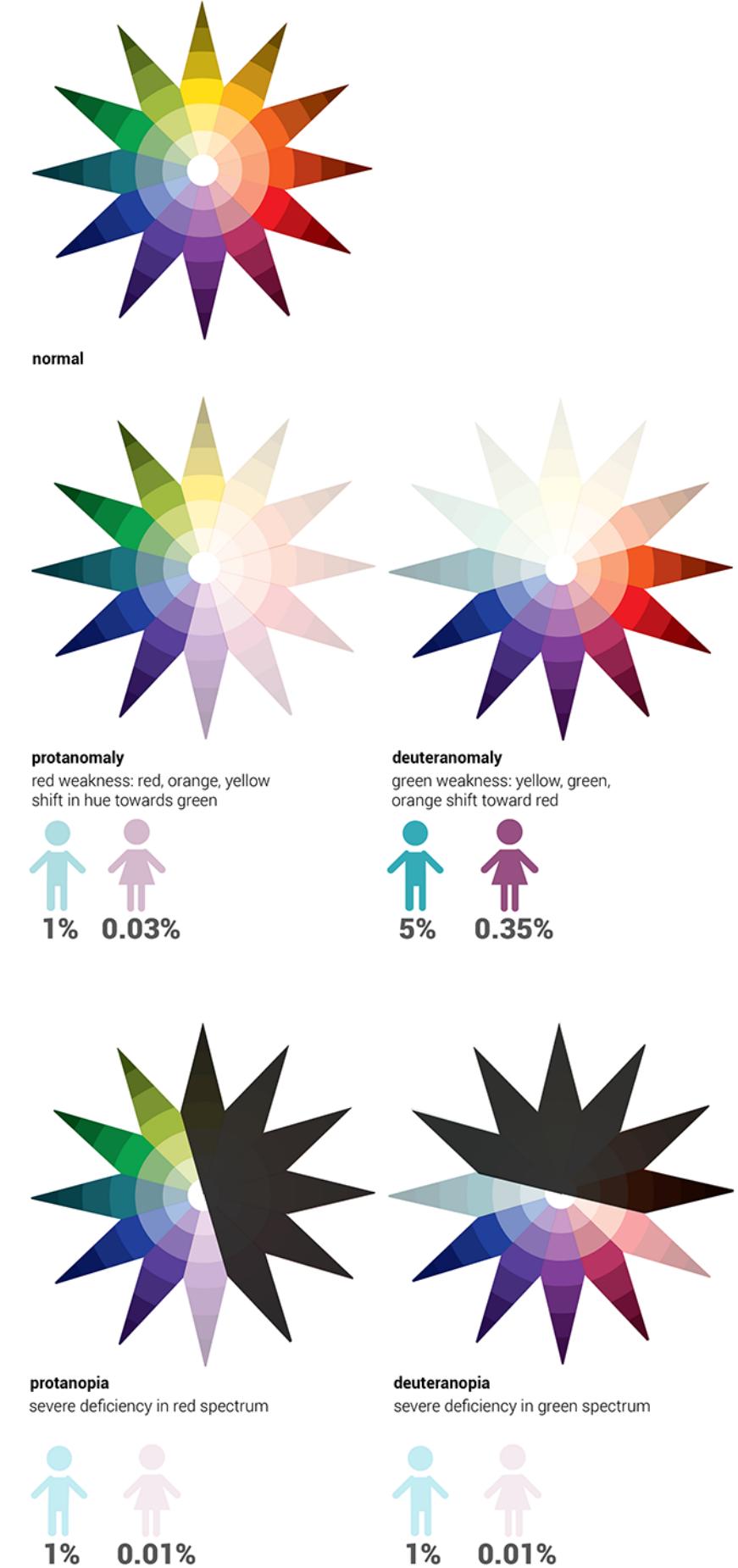
WARM ↘

Color Vision Deficiencies

- Affects 8% of males, 0.5% of females
- Consider alternatives
 - *Intensity* vs. *hue* for emphasis
 - *Size* of colored elements
 - *Proximity* of similar colors
- Use tools to check designs

check them out!

Different ways of addressing the same effect



Questions about Color?

Images

Definition: Photographs, illustrations, three-dimensional art, silhouettes, icons, dingbats, infographics, and simpler shapes that convey rich information or context.

purpose

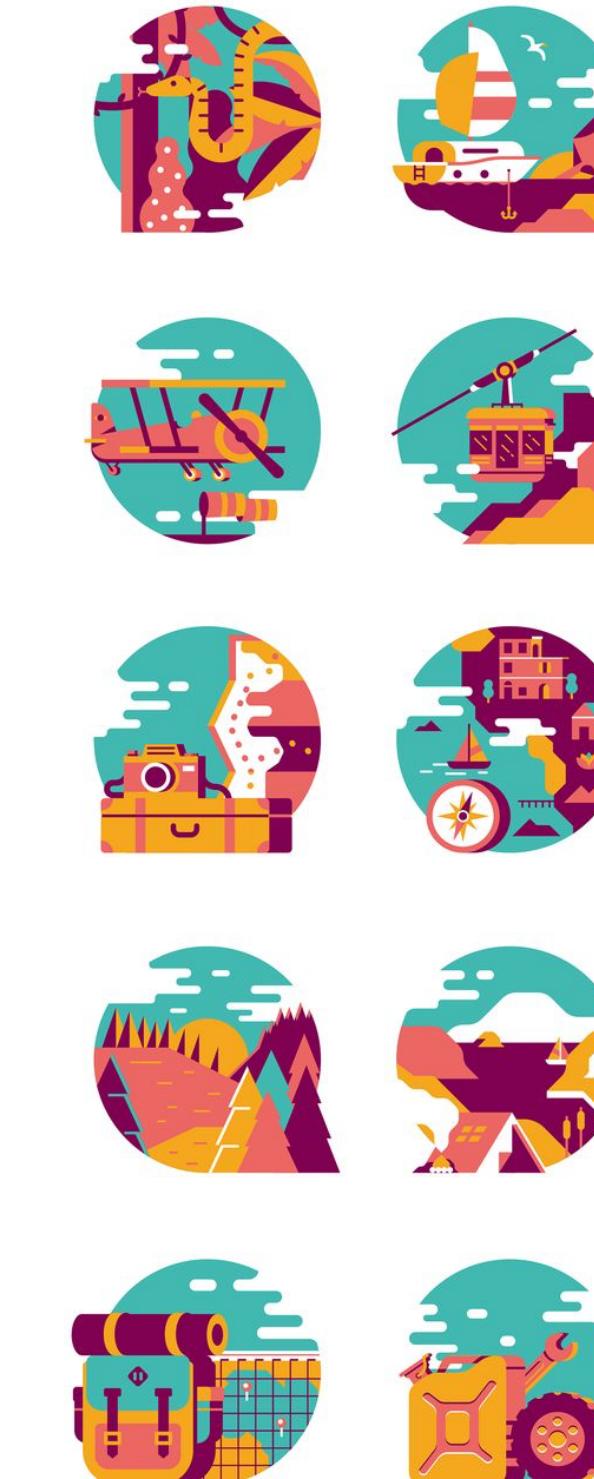
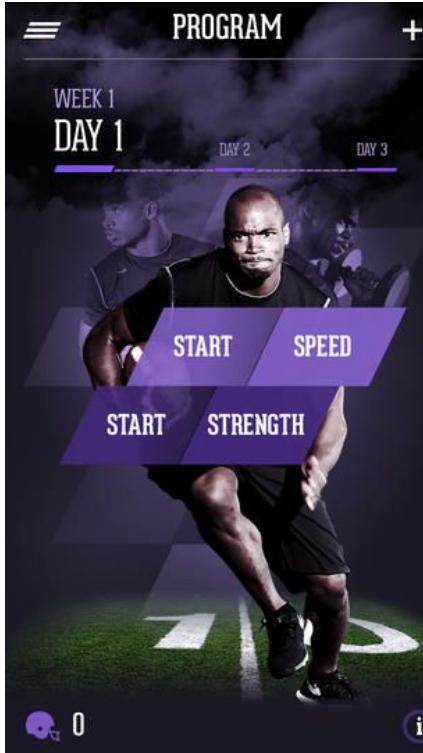
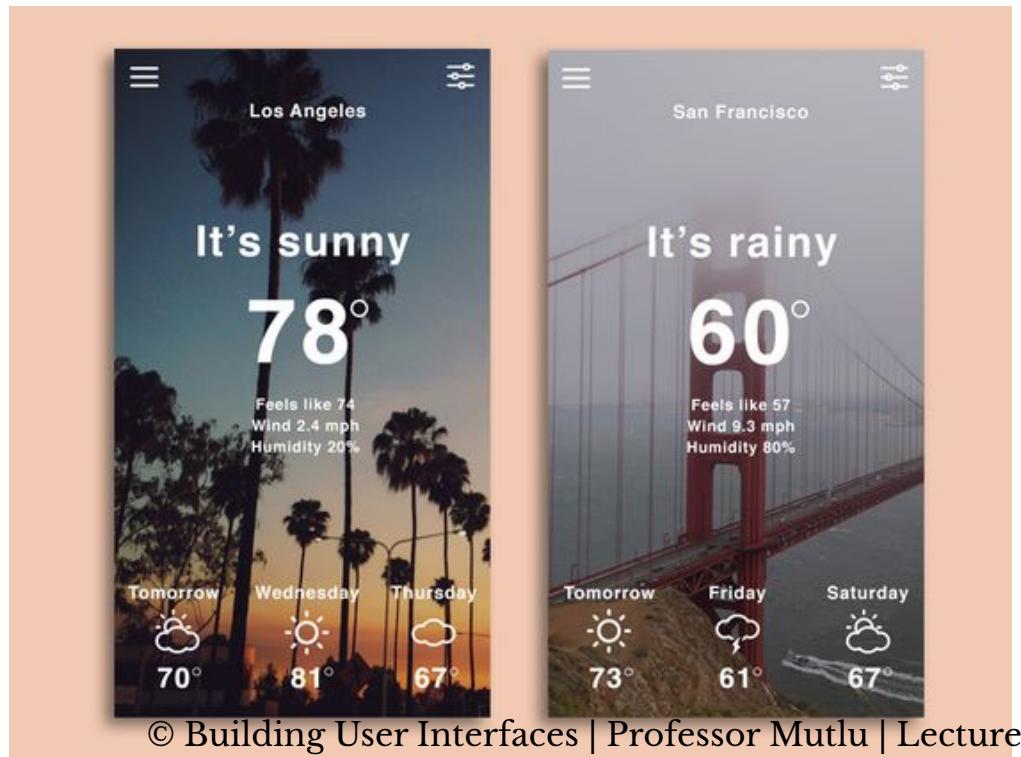
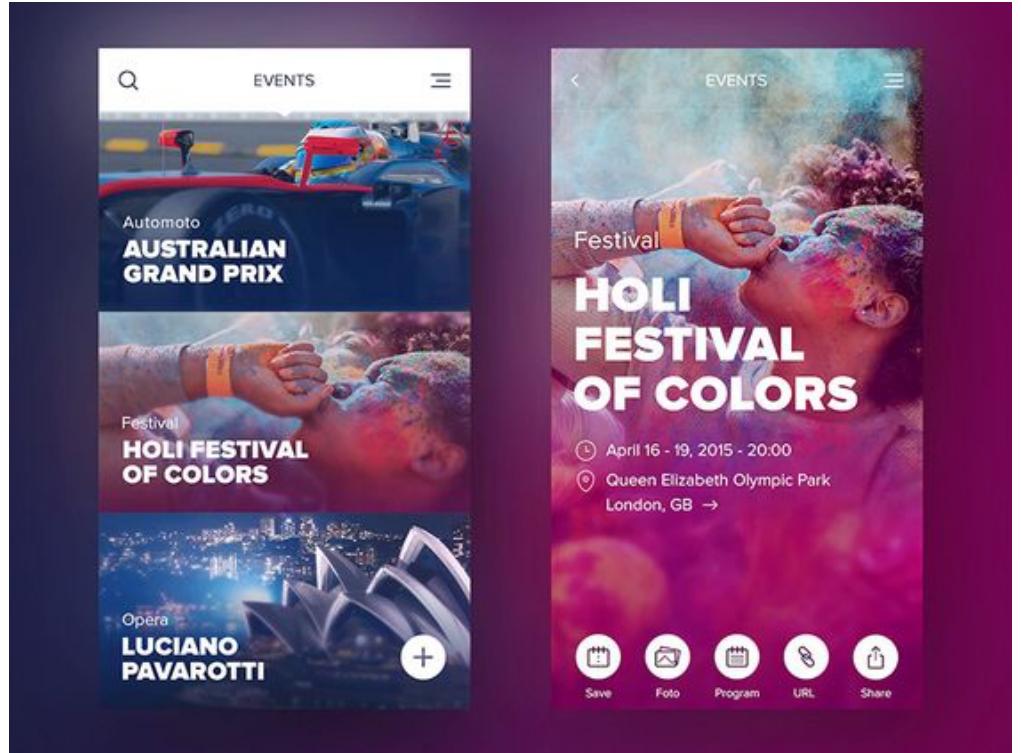
image

type

TABLE 5.1. Graphic types to use for varied goals.

Instructional or Communication Purpose	Consider These Graphic Types
Depict concrete objects	Photograph 3-D graphic Illustration Clip art (particularly in diagrams and as game elements)
Tell a story or provide a scenario	Sequence of photographs Sequence of illustrations Timeline
Persuade an audience	Sequence of photos or illustrations to tell a story Photographs that evoke emotions Visualization of statistics and data
Explain unfamiliar or complex concepts and theories	Visual metaphor Diagram showing connections
Demonstrate a procedure	Show the steps in a sequence of photos or illustrations Flow chart Series of screen captures for software simulation
Explain a process	Diagram the stages or operations of the process Icons or simple illustrations to represent each component
Point out something specific	Arrow or pointed shape Highlight Outline of a circle
Depict components of a system	Illustrated object with labels Diagram of the structure
Make comparisons	Bar graph Pictograph Line graph with multiple lines Table (when specific values are important)
Demonstrate trends in data	Line graph Scatter plot
Organization of information	Various chart types (hierarchical, radial, etc.) Concept map
Demonstrate motion without animation	Show object moving along a path Illustrations with motion lines Illustrations with arrows or dashed lines depicting movement
History or changes over time	Timeline (these don't have to be arrows) Sequence of photos or illustrations

RASTER GRAPHICS





◀ More Realistic

Less Realistic ▶



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2°

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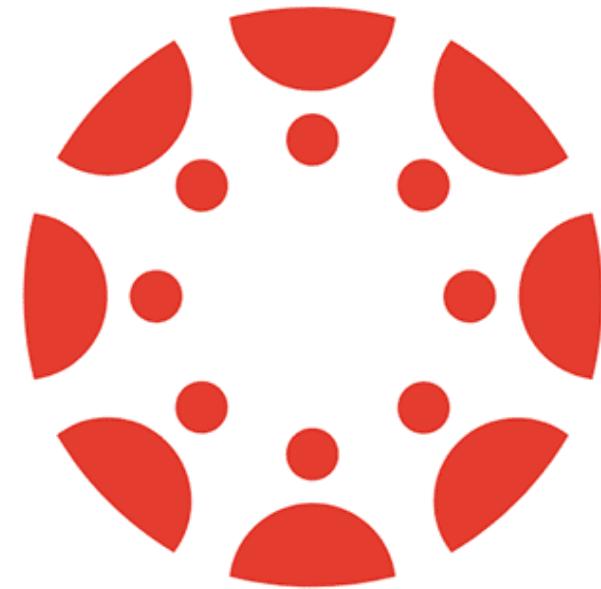
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Questions about *Images*?

Quiz 3

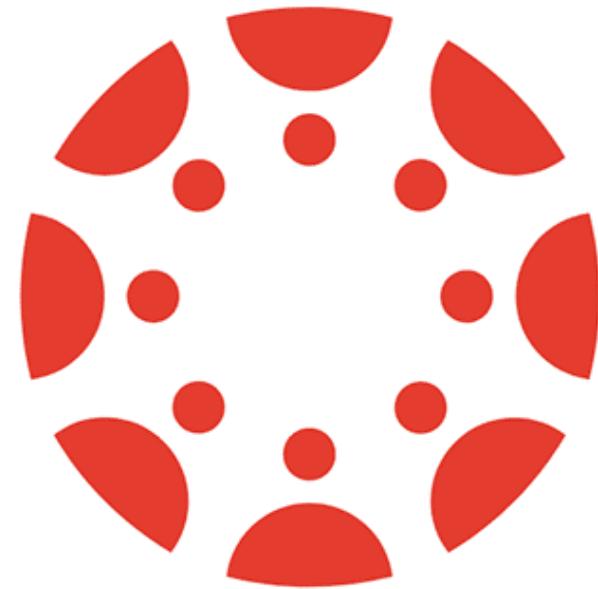
Complete the Canvas quiz.



canvas

Quiz 4

Complete the Canvas quiz.



canvas