The Little Book of Visual Design Principles for Scientists

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A booklet of essential visual design principles.

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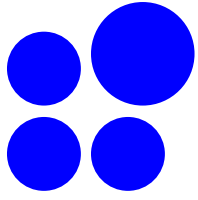
Contrast

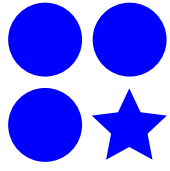
a.k.a. using visual cues to emphasize and make clear the informational differences in your work.

Using contrast helps define the relationships between the elements on your page or in your text. The eye groups similar elements together, regardless of their proximity to each other. While contrast methods can be combined to further enhance distinction, they should not be overused in order to avoid viewer confusion.

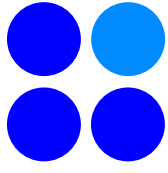
Some of the ways to create and emphasize contrast in your work are:



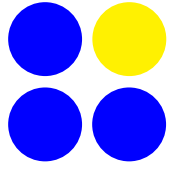
Size



Shape



Shade

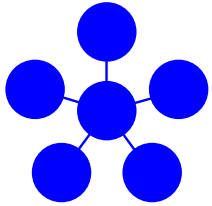


Color

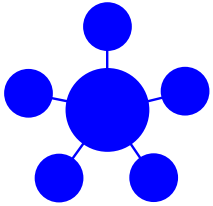
Hierarchy [in Visuals]

a.k.a. using visual cues to show the relationships between elements.

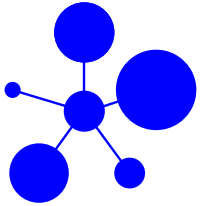
Changing the size and proximity of objects shifts a viewer's perception of their relative importance. What story are you trying to tell through the placement of the various elements in your visuals?



Elements Are Equal



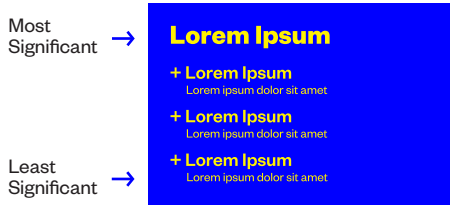
Parent Dominates



Child Dominates

Hierarchy is also important in text. The size, arrangement, and positioning of different textual elements relative to one another determines their importance.

Larger text has more visual importance than smaller text and is more visually dominant on a page. When arranging text, both text and weight [normal, italic, bold, etc] determine the hierarchical ranking of different textual elements.



Size & Location Denote Decreasing Importance

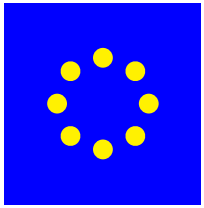
Random Arrangements Disrupt Logical Flow

Proximity

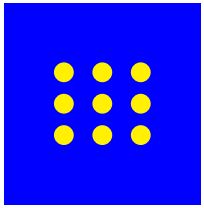
a.k.a. deriving meaning from the location and placement of elements.

Taking care to position the elements in your designs intentionally helps prevent the viewer from making unintended conclusions and helps clarify your narrative.

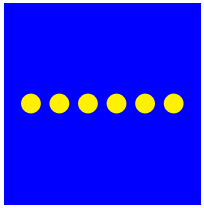
The proximity of visual elements relative to each other communicates their relationship:



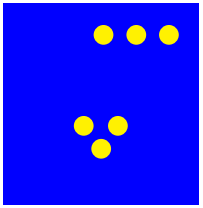
Unite / Fragment

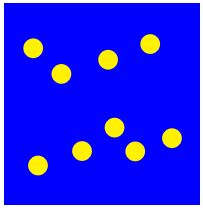


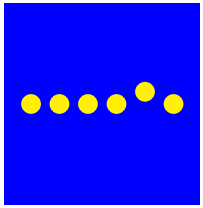
Order / Chaos



Equal / Unequal





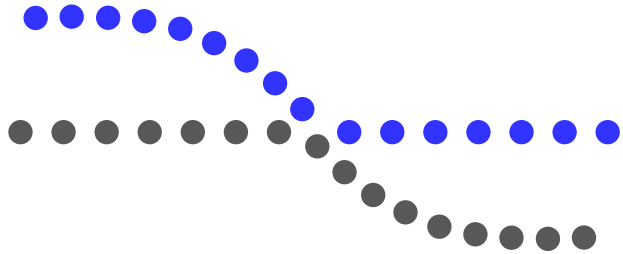


Continuation

a.k.a. using visual cues to guide a viewer's eye in a certain direction.

According to the Gestalt Law of Continuity, the human eye will follow the smoothest path when viewing lines, even if variables are changed to prevent it from doing so.

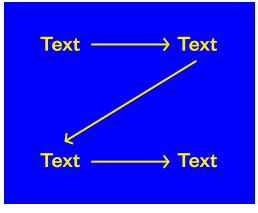
Below, note that the eye will follow the straight line into the curved line first, despite the color shift indicating that you should follow the lines designated by color instead.



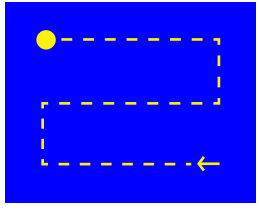
Flow

a.k.a. curating an informational order that determines how a viewer will process you content.

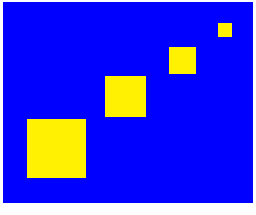
While western reading patterns typically run from left to right and top to bottom (a Z-shape), there are alternative ways to show informational flow.



Standard Flow



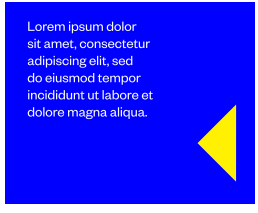
Arrow Flow

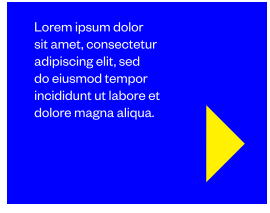


Perspective Flow

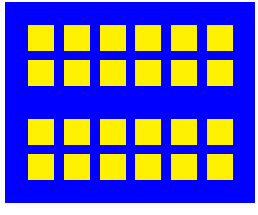
The positioning of different elements in your visual can be used to direct a viewer's gaze–it can help keep a viewer on the page and target them to a different area of content or lead them off of spread entirely.

Elements can be clustered in ways that help direct how a viewer should navigate your visual. Clustering elements around a horizontal gap indicates horizontal flow, while a vertical gap indicates vertical flow.

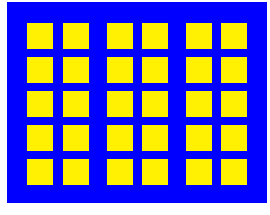




Element Direction Can Redirect Flow



Horizontal Flow

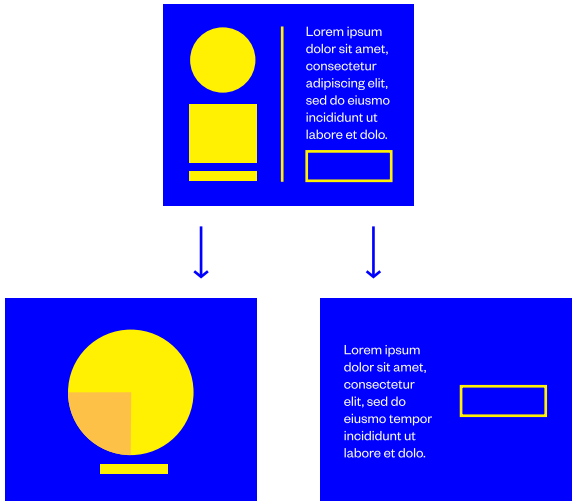


Vertical Flow

Space

a.k.a. using negative space (the empty areas of a visual) to focus the viewer's attention, show the relationships between elements, and improve visual comprehension.

Whitespace is essential, and clutter is a failure of design. If your slide is busy, break it up into several pages when possible.

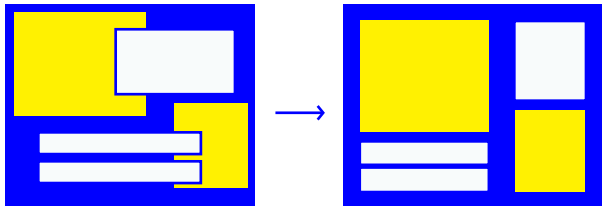


Break Up Pages With Too Much Information

Micro Space

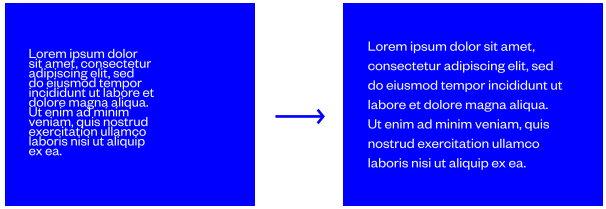
a.k.a. making adjustments to the small spaces between design elements can directly impact content legibility.

Take care to preserve small-scale negative space. Refining the small spaces between visual elements can help improve legibility as well as distinguish and highlight the different sections of your content.



Unrefined Figure

Adjusted Figure



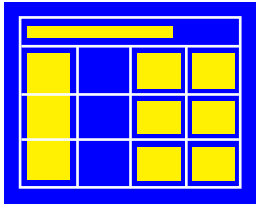
Unrefined Text

Adjusted Text

Unity

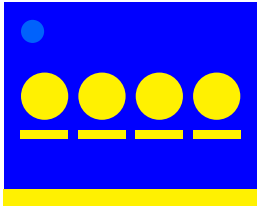
a.k.a. emphasizing overall structural and visual cohesion in your work.

Visual unity can be achieved by standardizing structure (using a grid), look (graphical style), and theme (big idea). A grid is a structure of lines used to organize content that can be used over multiple slides in order to maintain visual consistency.

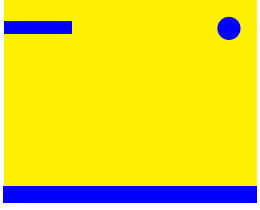


*Draw rectangles to create regions for placement of elements. Each region is a container for an element. The grid is deleted and saved after use. This method is particularly helpful for slides.

Structure (Grid)*



Look (Graphic Style)



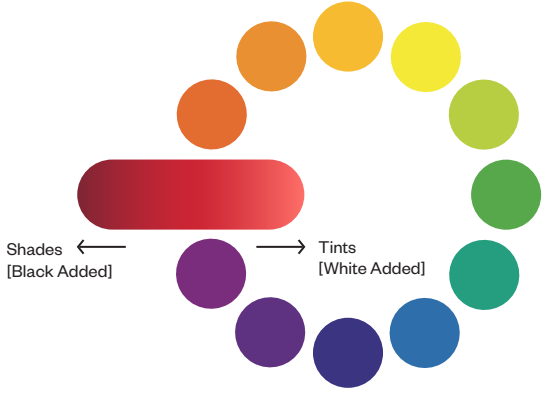
Theme (Big Idea)

Color

a.k.a. what sets the tone and establishes what your audience should expect.

When choosing a color scheme for your work, consider your audience, your industry, and, if applicable, who you are.

Understanding the color wheel can help you choose a successful palette. The color wheel has 3 primary colors (red, yellow, blue), and the blending of those colors creates the full color wheel.



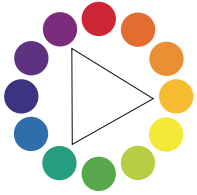
Using the color wheel can help you find balanced and contrasting color combinations, in order to differentiate and emphasize your content.

Monochromatic

Analogous

Complementary

Split Complementary

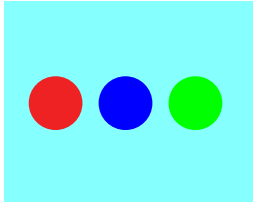


Triadic

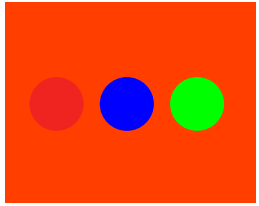
Tetradic

The human eye requires contrast in order to distinguish information. In a majority of cases, black and white backgrounds have the best opportunity for contrast because they lack color.

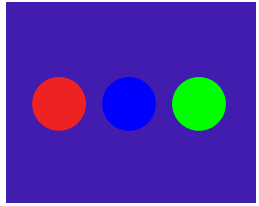
When choosing a color palette, make sure that it contrasts with your background and the other colors you have chosen, and test how it looks on a projector or screen. While colors may seem to have sufficient contrast when first selected, they can still blend in with each other when paired.



Green is Low Contrast



Red is Low Contrast



Blue is Low Contrast

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Researcher's Toolkit for Visual Design and Critique

Visual design is an important way to optimize, advance, and make clear the meaning of your work. Bettering your visual design skills will allow your work to more quickly communicate the information you intend it to, avoid unnecessary confusion, as well as look better overall.

Don't know where to start? Consider these principles when creating and refining your next scientific visual.