

SCIENTIFIC VISUAL LITERACY

A CHEAT SHEET



University
of Windsor

Faculty of Science



Elements of Design and Their Associated Meanings

1. **Colour** – the first element that we notice in an artistic piece. Colours can subconsciously affect how we feel. It is important to note these are just guidelines, and the meaning of colour is often subtle and subjective.

Colour	Associated meaning(s)	Use to:
Bright colours	Fun, vibrant, energetic, approachable	Catch people's attention, seem less formal, appear approachable
Muted colours	Up-to-date, modern,	Remain professional, emphasize a bright colour
Black & white	Opposites, life and death	Show contrast, appear timeless
Warm colours	Energizing, passionate, positive	Reflect energy and enthusiasm
Cool colours	Calming, relaxing, reserved,	Create a sense of calm or professionalism
Red	Passion, energy, attention, action, danger	Create urgency, draw attention
orange	Adventure, fun, warning, creativity	Command attention without being as overpowering as a red colour
yellow	Enthusiasm, positivity, caution, slow	Appear cheerful and happy
Green	Growth, outdoors, fertility, jealousy, life, wisdom	Represent nature and stability
Blue	Sincerity, harmony, calm, cool, truth	Appear calm and professional
purple	Mystery, imagination, royalty	Promote creativity
Pink	Love, playfulness, immaturity	Draw attention, appear approachable
Black	Power, formality, death	Remove emotion, create authority
White	Freshness, cleanliness, simplicity, purity	Appear clean and simple

2. **Shapes** – different shapes are used in different symbols. Each shape has its own connotations and meanings that it can bring to your visual piece. We may need to encapsulate information in a container, and the shape we choose will affect how our audience perceives that information.

Type of shape	Associated meaning(s)
Angular geometric shapes	Structure, order
	Squares and rectangles Stability Simplicity – the most common geometric shapes Mathematical Contain – resemble a box or container Equality – especially squares right angles and equal sides Formality

	Triangles	Direction - like an arrow Stability - when sitting on its base Instability - when sitting on a point Purpose - show progression and direction
Curved geometric shapes	Connection, rhythm, movement	
	Circles and ovals	Harmony/unity - used in Venn diagrams contain what is within Cycles - no beginning or end Movement -- resemble a wheel or ball Perfection - perfect circle
	Spirals	Growth -- often found in growth patterns in nature Evolution Perfection Journey Expansion
Organic/natural shapes	Spontaneity, approachability	
Abstract shapes (simplified or stylized organic shapes)	Each symbol has their own meaning	

3. **Visual textures** - the surface quality or “feel” of a design.

Texture	Associated meaning(s)	How you can achieve this texture
Hard	Concrete, authoritative, mathematical, sterile, harsh, cold, strong	Use digitally rendered solid shapes, utilize angular shapes
Soft	Natural, organic, approachable, warm, friendly	Use color/value gradients, remove harsh outlines, incorporate photographs of natural subjects
Rough	Attract attention, emulate natural textures, informal	Choose backgrounds like heavy paper or canvas
Smooth	Unobtrusive, understated, unremarkable, sterile, formal	Use solid colours and backgrounds

4. **Typefaces** - the font families that we choose.

Typeface	Associated meaning(s)	The main message	Good for:
Serif	Traditional, formal, practical, easy to read	Timeless	Large blocks of text, logos, titles, printed material
Sans serif	Clean, modern, geometric, easy to read	Neutral	Large blocks of text, small text, logos, titles, captions
Narrow	Condensed, informative	Authoritative	Headings, titles, logos
WIDE	DRAMATIC, BOLD	DRAMA	TITLES, ACCENT TEXT
Bold	Draws attention	Important	Information you want to emphasize
Geometric	Mathematical, scientific, sterile	Futuristic	Titles, headings

<i>Script</i>	<i>Stylish, creative, casual</i>	<i>Elegant</i>	<i>Titles, logos, accent text (may be difficult to read for some audiences)</i>
<i>Artistic</i>	<i>Unique, expresses personality, friendly, approachable</i>	<i>Informal</i>	<i>Titles, accent text, logos</i>

5. **Types of Imagery** - The type of imagery we choose to display alongside information will imply different meanings.

Type	Associated meaning(s)	When to use this type of image
Photographs	Tangible, visible reality, physical representation, truth	When you want your information to appear unbiased and without interpretation
Sketches	Ideas, rough plan, draft, outline, simple	To simplify a complex image into the most basic and important parts
Field notes	Organic, conceptual	When you want to show your audience your process, or background information
Illustrations	Simple to complex, decoration, ideas, main concepts	To translate the important and relevant elements of a literal image to your audience
Graphs	Can be complex, authoritative, concrete, accurate	Visually illustrate relationships, present numerous data, show trends
Tables	Mathematical, factual, scholarly	Organize data into categories, highlight trends, remove numerical data from text
Abstract images	Ideas, emotion, artistic, creative	To imply feeling or movement, visualize an abstract concept

Communication Goals and Ways to Achieve Them: Using the Principles of Design

1. **Emphasis** - drawing attention to a particular aspect of your image.

Method	How the method achieves emphasis
Variation in general	Our eye tends to be drawn towards elements that are different in some way, whether that be a different shape, colour, texture, size, value, or line type.
Contrasting colours	Our eye is drawn to the colour that stands out the most relative to all the colours used in the piece.
Large size	The larger something is, generally, the more important something is.
Central placement	Unusually our eye is drawn to the center of a page.
Contrasting values	Light stands out on dark and vice versa.
Boldness	Boldening text that is important helps to emphasize its importance.

2. **Balance** - when the visual weight of our piece is distributed asymmetrically, symmetrically, or radially.

Type of Balance	Meaning
Symmetrical	Balance through repetition. Implies formality, order, stability.
Asymmetrical	Balance through contrast of different elements with equal visual weight. Implies casual, dynamic, interest
Radial	All elements radiate from a central point. Creates a strong focal point.
Elements of Balance	Visual Weight
Placement of objects	Objects are distributed evenly throughout the visual piece. Central objects appear heavier than peripheral objects. Upper objects appear heavier than lower objects.
Colours	Warmer colours typically appear heavier than cooler colours.
Value	Darker objects are heavier than lighter objects.
Shapes	Regularly shaped objects are visually heavier than irregularly shaped objects. Compact shapes are heavier than non-compact shapes.
Size	Larger objects appear heavier than smaller objects.
Texture	Complex texture is visually heavier than no texture. Blocks of text can be considered rough texture.

3. **Unity/Harmony** - how we show elements are related and make the visual piece feel cohesive.

Method	How the Method Achieves Unity/Harmony
Repetition	Elements that share characteristics like colour, shape and size appear related.
Overlapping objects	Elements that touch or overlap appear united.
Lines	Using implied or explicit lines unifies the elements they contain.
Alignment	Aligning a group of elements on a common axis creates unity.
Proximity	Elements that are close together appear related.

4. **Contrast** - how we highlight differences in objects. Contrast emphasizes our focal point, improves the readability of our piece, and adds visual interest.

Visual Elements	How to Contrast the Element
Colour	Contrast dark with light colours, complementary hues, or cool with warm colours.
Shape	A different shape compared to the others will stand out.
Size	Larger objects will stand out against smaller objects and vice versa.
Value	Contrasting black and white is the most intuitive way to add contrast.
Texture	Textured backgrounds create contrast against untextured elements.
Space	Surrounding important elements with white or negative space helps them stand out.

How to Improve Professionalism and/or Approachability in your Work

1. Professionalism

Method	Explanation
Font choice	<ul style="list-style-type: none">• Choose regular or condensed, serif or sans serif fonts• Avoid overly artistic fonts and scripts
Colour	<ul style="list-style-type: none">• Use colour to appear modern, but keep it neutral or muted• Avoid overuse of bright and flashy colours
Shapes to use	<ul style="list-style-type: none">• Use angular geometric shapes for order, and structure• Use curved geometric shapes to show connection, cycles, or unity
Textures	<ul style="list-style-type: none">• Use smooth textures to appear professional
Types of imagery to use	<ul style="list-style-type: none">• Photographs, graphs, tables, and illustrations are most professional
Important considerations	<ul style="list-style-type: none">• Utilize repetition and patterns to create harmony throughout your piece• Symmetrical balance tends to be most professional

2. Approachability

Method	Explanation
Font choice	<ul style="list-style-type: none">• Use geometric and engaging fonts for titles, headings, and featured text• Avoid the use of script as it can be difficult to read• Avoid overuse of artistic fonts, as they can look cluttered
Colour	<ul style="list-style-type: none">• Use bright colours to draw in your audience• Remember to balance the visual weight of your colours• Stick to a few bright colours and used muted tones for the rest to avoid overstimulation
Shapes to use	<ul style="list-style-type: none">• Use organic and rounded shapes when appropriate
Textures	<ul style="list-style-type: none">• Use natural textures to feel approachable
Types of imagery to use	<ul style="list-style-type: none">• Illustrations, icons, photographs, and sketches are most approachable• Avoid overusing tables and complex graphical representations
Important considerations	<ul style="list-style-type: none">• Remember to think of what is approachable for your specific audience• Balance and overall aesthetics of the piece are important• Asymmetrical balance is typically most interesting