Guide to designing figures

The main aim of the figures is to complement and follow the narrative of the article. We would encourage you to think about the display items in terms of what will be of most use and interest to readers. Figures can be produced using any drawing software, PowerPoint or in some cases hand-sketched and should contain all the scientific details so that they can be evaluated during peer review. Once the manuscript is accepted in principle, the Art Editor will redraw the figures according to our house style. We will work with you to develop the most effective way to convey the intended message. The following table provides some dos and don’ts to help to guide the design of your figures.

<table>
<thead>
<tr>
<th>Do</th>
<th>Do not</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Information flow</strong></td>
<td>Use a top–bottom/left–right, logical flow of information. If you are unsure of the best way to show something, explain the concepts to the Editor, and we will work on a solution.</td>
</tr>
<tr>
<td></td>
<td>Do not use circular layouts unless there is a recognizable design such as a spider diagram with a clear focal point or you want to show a circular process (such as a life cycle or a cell cycle). A viewer looks top left of a diagram first, so that is usually the best starting point for the flow of information.</td>
</tr>
<tr>
<td><strong>Brevity and clarity</strong></td>
<td>Cut out all unnecessary information or illustrations to make the important points of the figure stand out. On previously published material, please highlight elements that can be removed. Do avoid overcrowded figures — the message will be clearer.</td>
</tr>
<tr>
<td></td>
<td>Do not repeat information unnecessarily or have too many panels — a full-page figure should probably comprise no more than six panels.</td>
</tr>
<tr>
<td><strong>Labels and annotations</strong></td>
<td>Provide thorough and clear labelling of figure elements and, if necessary, clear guidance for our Art Editors.</td>
</tr>
<tr>
<td></td>
<td>Do not use too many abbreviations as these can hamper readability. Do not use italic or font size for emphasis or hierarchy — house style is bold for headings and all text 8 pt.</td>
</tr>
<tr>
<td><strong>Colours</strong></td>
<td>Use colours for grouping or showing relationships. If you colour something a certain way for an important reason, flag it to the Editor or make a note so we know it is important.</td>
</tr>
<tr>
<td></td>
<td>Do not use too many colours in your figures as these will be updated to the Reviews palette. Figure elements do not all have to be coloured differently and will be changed.</td>
</tr>
<tr>
<td><strong>Consistency and agreement</strong></td>
<td>Be consistent (colours, shapes, orientation, ordering) within each figure and between figures, because elements that are aesthetically in agreement will be perceived as related.</td>
</tr>
<tr>
<td></td>
<td>Do not be too concerned about providing beautiful-looking images. Imagery can be used to provide context; for example, using the outer membrane and nucleus as 'landmarks' for showing the location of a biochemical process.</td>
</tr>
<tr>
<td><strong>Itemization</strong></td>
<td>Long lists are difficult to remember. Organize the information into smaller groups (five points per list is optimal).</td>
</tr>
<tr>
<td></td>
<td>Do not use images as labels when words would be more effective, unambiguous and less space-consuming.</td>
</tr>
<tr>
<td><strong>Effective imagery</strong></td>
<td>Imagery can be used to provide context; for example, using the outer membrane and nucleus as 'landmarks' for showing the location of a biochemical process.</td>
</tr>
<tr>
<td></td>
<td>Do not use too many colours in your figures as these will be updated to the Reviews palette. Figure elements do not all have to be coloured differently and will be changed.</td>
</tr>
<tr>
<td><strong>Initial material</strong></td>
<td>You can use any drawing software or provide reference images from other sources (you can even hand-sketch a complex figures for reference). We will help you to get to the optimal final figure. NB! Any BioRender figures will be redrawn.</td>
</tr>
<tr>
<td></td>
<td>Do not be too concerned about providing beautiful-looking figures. What is important is that the figure conveys the information clearly and accessibly for the assessment process and subsequently for Art Editors to interpret.</td>
</tr>
<tr>
<td><strong>Photos, scans, etc.</strong></td>
<td>Ideally provide photographic images at high resolution and unlabelled. For print, TIFF images need to be 300 dpi at their final size.</td>
</tr>
<tr>
<td></td>
<td>Do not have labels flattened as part of the photo. Please keep labels on separate layers or provide unlabelled photos on submission.</td>
</tr>
<tr>
<td><strong>Figure permissions</strong></td>
<td>Although we prefer original figures, it may be possible to reproduce or adapt figures from previously published articles. In this case, keep records of the source material — after peer review, the Editor will ask for these details so as to obtain the necessary permissions from other publishers.</td>
</tr>
<tr>
<td></td>
<td>Do not request permission from publishers yourself because this permission cannot be used by the editorial office.</td>
</tr>
</tbody>
</table>

**Graphs**

When preparing a graph, please ensure that axes are labelled properly (with units), and that a key to colours and symbols is provided. Avoid reproducing data from single studies, unless these are fundamental for the development of the narrative flow of the article. We do not publish original data, but for some article types, a collation of results to show a trend might be appropriate, at the discretion of the editor. Please avoid graphs that report trends in number of publications because, even if these might be interesting data, they do not provide any scientifically relevant information.

**Chemical structures**

If possible, please provide chemical structures as ChemDraw files. When preparing the chemical structures please use the Nature Research Chemical Structures Guide and ChemDraw template to ensure that your chemical structures will require minimal changes by our Production team. Submit final files as .cdx files.

**Equations**

Please ensure that variables are italic, constants are roman and vectors are bold.
Scientific illustration for commissioned content: Our guiding principles for conceptual figures

Nature-branded journals use a specific set of guidelines and principles to create our award-winning scientific illustration. This guide is a short summary created specifically to aid authors working with our editorial teams to create summary and explanatory figures for content like News & Views, Reviews and other expert-authored commissioned content, where draft figure suggestions are often redesigned and edited by in-house art teams, and consistent styling is applied. This guide chiefly applies to conceptual figures (as opposed to data figures).

Here we explain our basic principles of visual communication for scientific illustration:

- Hierarchy
- Visual editing
- Clarity
- Accessibility

As well as: How to avoid common mistakes

Hierarchy

Scientific diagrams by their nature contain layers of complex information. Our job as visual communicators is to guide the eye to the most important information first, creating a visual hierarchy that reflects the information hierarchy of the figure. There are a few key techniques that can be used to create visual hierarchy, such as use of colour and drawing for focus.

**Colour.** The most important elements of a figure should be the most saturated - weighted by significance - with background elements in a more neutral tone. We use a consistent colour palette for areas of focus within each figure or set of figures.

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**Drawing for focus.**

Hierarchy can be achieved through drawing technique. For areas of focus, add depth and detail; for areas of less focus, simplify.

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Visual editing

Just like good prose, the more intuitively and clearly a figure reads, the more refinement it probably took to get there. There can be a misconception that art editors simply ‘re-draw’ proposed figures to make them ‘look pretty’. In truth, we more often ‘redesign’ them to make them understandable. Just like text editing, visual editing takes time and expertise.

As art editors working on the world’s best scientific content, we use principles of visual editing when approaching each figure.

We ask ourselves:
• What are the essential elements?
• Is anything missing?
• What can we remove and still clearly communicate?
• Is there unnecessary repetition?
• Is there unnecessary decoration?

Clarity

Scientific diagrams often visualise complexity. Therefore, it is essential to ensure that every element is defined. There should be no ambiguity.

We aim to:
• Explain all elements in labels or the legend.
• Label the first instance of every object.
• Use figure parts (a, b, etc) and subheadings to give the figure hierarchy and structure.
• Remove unnecessary elements.

X We try to avoid:
• Using icons for the sake of decoration. Only use icons to aid understanding and context.
• Relying solely on colour for definition. Try to label where possible.
• Using multiple arrow weights and styles when their meaning is not clear.

Accessibility

We aim to create illustrations that are as accessible as possible to those with disabilities, such as colour blindness or other visual impairments. We do this by:

Using our colour palette properly, to ensure adequate contrast.
Using primarily black type rather than coloured.
Adhering to rules for colour behind text.
X Avoiding red/green colour combinations.
Using tools to check for colour blindness and contrast.
Common mistakes

**X Expecting submitted figures to run without edits.** It is important to know that your figures will be edited for content, style and accessibility, even if you have commissioned them from a third-party artist/designer, or have used a third-party scientific illustration tool or service.

**X Too many colours / random use of colour.** The Nature-branded colour palette has been designed specifically for scientific illustration. The organisation of the palette reflects our principles of hierarchy, clarity and accessibility, and has been thoroughly tested.

We use colour thoughtfully, for:

- Hierarchy
- Categorising information
- Scientific conventions, or real world depictions (colours as found in nature, as appropriate)

Summary figures require focused attention to important elements, highlighting them with our main accent colours from the palette, for maximum contrast. Backgrounds elements share the same neutral tone.

Representations of the natural world, such as plants, animals, bodies of water and environmental scenes, can be drawn realistically as needed, using the extended colour palette. This is usually necessary when they are the focus of an illustration, rather than in the background.

Some scientific disciplines use specific colours in their diagrams to represent elements, and we will go off-palette to respect these conventions.

For complex figures, and for multi-panel figure sets, colours can be used to help categorise information and group elements. Our extended palette is available as needed for this type of use.
Is it a figure? We are occasionally presented with figures that would be better displayed as lists or tables. Usually these ‘faux figures’ are tables dressed up with unnecessary icons that do not aid communication or comprehension.

A real figure generally shows some kind of process or phenomenon. There is usually some kind of action.

X Overcrowded figures.
Avoid trying to fit too much information into a small space. This causes cognitive overload and reduces comprehension. In addition, labels and images that are too small are not accessible or legible for those with visual impairments.

We have standards for minimum type size and will edit accordingly.

X Don’t cram lots of panels and small labels into one figure.

Do give images the space they require to be legible, with at least 7 point size text in your draft figures.

On behalf of the art teams at Nature and our portfolio of Nature-branded journals, we thank you and look forward to working with you to create beautiful and enlightening visual content.