Complex Images Accessibility Guide

(last updated 8/13/25)

Complex Images, also known as "data visualizations," include examples like:

- Charts
- Graphs
- Infographics
- Workflows
- Dashboards
- Illustrations
- Dynamic/static maps

Target Audience for this document:

- Chart/graph creators in Microsoft Office products
- Document creators who insert, paste or screenshot visualizations into documents and presentations
- Graphic designers who create visualizations

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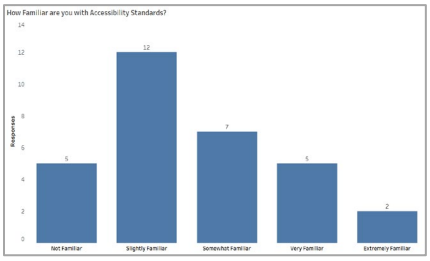
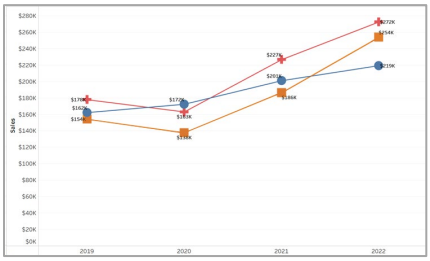
Data Visualization Examples

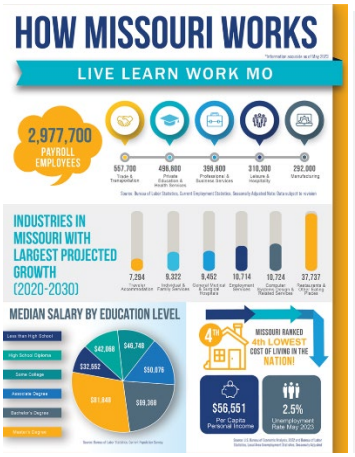
Charts & Graphs





- Charts feature in Excel, Word, PowerPoint
- Exported images from Tableau, Microsoft Power BI, etc.

Infographics and Static/Dynamic Maps



- Infographic or static map created in design software such as Adobe InDesign
- Exported images from Interactive maps like ARC GIS or Google Maps

Use of Color

1. Do not rely on color to convey information.
2. If color-coding information, use color plus another element to get your message across
   Use shapes, patterns, numbers, text, etc.
3. Do not rely on color to convey information.
4. If color-coding information, use color **plus** another element to get your message across or visually distinguish information differences: (shapes, patterns, words, numbers, text, etc.)
   Example below when color coding information:

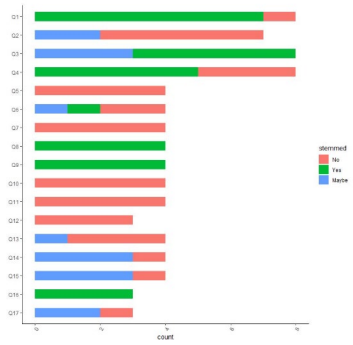


Figure 1 Original image

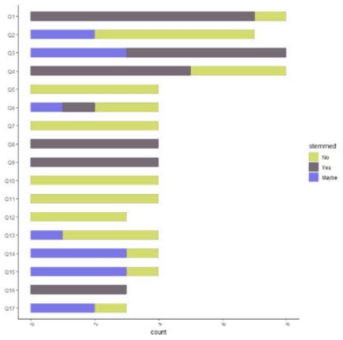


Figure 2 Red-Green Colorblindness. Note how the original red looks light green.

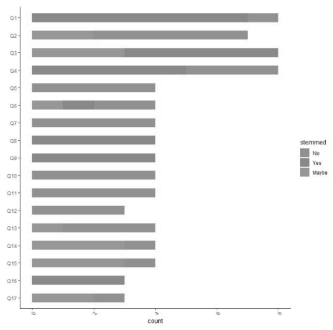
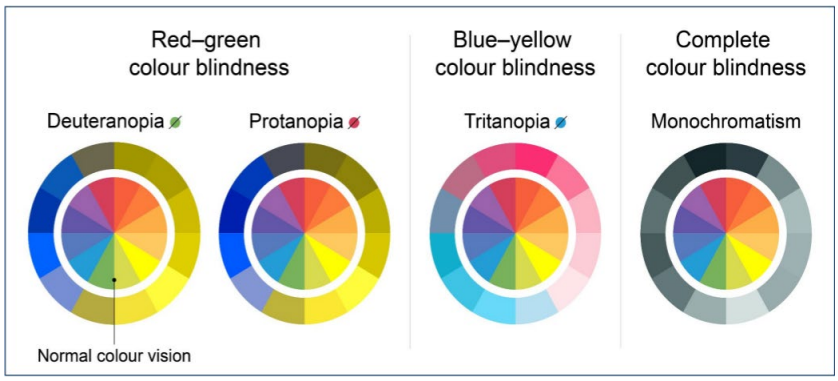


Figure 3 Total colorblindness

5. Specific color hues are difficult for some viewers to be able to differentiate between. Color deficiency/blindness affects 1 in 12 men and 1 in 200 women. Red-green colorblindness is most common, so be careful using this color combination adjacent to each other.



6. Determine if using multiple colors is meaningful. If meaningful, use no more than 7 colors to reduce cognitive load.
7. Color meaning: Keep color symbolism in mind
   - Western societies typically have higher regard for blue over yellow, red sometimes has negative symbolism.
   - Eastern societies prize the color yellow and don't see red as alarming.
8. Use neutral and consistent backgrounds when using color.

Text and Non-Text Color Contrast

- Contrast is a measure of the difference in perceived "luminance" or brightness between two colors. For example, foreground text and the background or bars in a bar chart and the background. This brightness difference is expressed as a ratio ranging from 1:1 (e.g. white on white) to 21:1 (e.g., black on a white).
- Improper contrast can affect those with low vision, color blindness, the aging population or those in bright environments.

Normal-Sized Text Contrast

- **Normal text** size is **less than 18 point (24 pixel)** text **or less than 14 point (18.5 pixel) bold** text.
- WCAG 1.4.3 Level AA compliance requires a contrast ratio of **4.5:1**.

Large-Sized Text Contrast

- **Large text size** is **18 point (24 pixel)** text or **14 point (18.5 pixel) bold and greater** text.
- WCAG 1.4.3 Level AA compliance requires a contrast ratio of **3:1**.

Non-Text Contrast

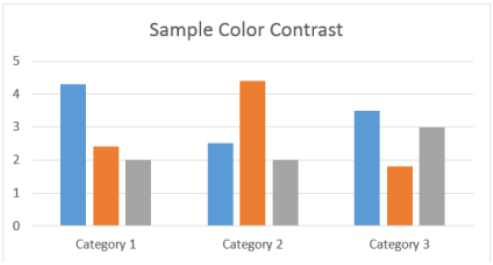
- Non-text examples include print icon image button, bars in a chart or pieces in a pie chart.
- WCAG 1.4.11 Level AA compliance requires a contrast ratio of **3:1**.

Use tools to test color contrast like the Colour Contrast Analyser or WebAIM Contrast checker. These will give you feedback whether contrast passes or fails.

Alternative Solution for Text and Non-Text Contrast: Contrasting Outline

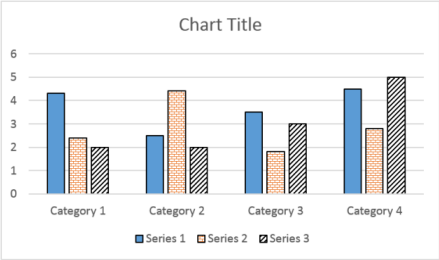
Example 1: Bar Chart

In the following example, we have a 3-color bar chart. When testing the contrast, the blue, orange and gray colors don't pass 3:1 contrast with the background (white).



Bar Chart Solution 1: Darken the bars. Darken the three colors till they pass 3:1 contrast with the white background.

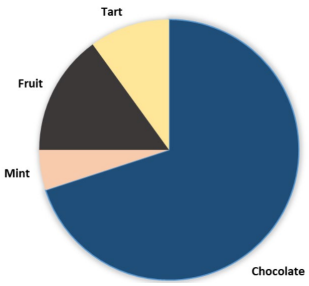
Bar Chart Solution 2: Apply a dark outline. Outline each element (bar) in a dark color, like black. The black now becomes the contrast color for each colored bar. See example below.



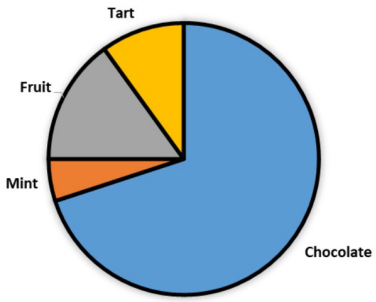
Example 2: Pie Chart

In the case of pie charts and maps, the contrast check involves testing adjoining elements (or elements that touch each other).

Pie Chart Solution 1: Alternate the contrast in each pie piece. You'll notice in the following 4-color pie chart, the pie pieces alternate with light and dark colors. The adjoining pie pieces are tested and they pass 3:1 color contrast.

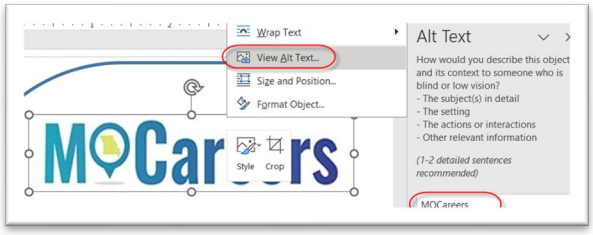


Pie Chart Solution 2: Apply a dark outline. In the following 4-color pie chart, the color contrast does not vary. Instead of changing the pie piece colors, a black outline was applied to each pie piece. All pie pieces now pass the 3:1 contrast against the black outline.



Alternative Text

- Alternative text, also known as "alt text," is used by people who do not see the image.
- Alternative text: Conveys the purpose of an image
    - Represents the image function
    - Provides an equivalent user experience



Determining How Much Information to Include in Alt Text

1. Alt text property should be a maximum of 150 characters or roughly 30 words.
2. **Reason:** Assistive tech devices have limited reading control within long alt text (can't pause, stop, or easily resume reading if interrupted)
3. ***If the information is partially described within the surrounding text***, alt text should include the portion not described and refer to the remaining text location.
4. ***If the information is fully described within the surrounding text***, alt text should refer to the existing text description location.
5. ***If the full text cannot fit within the alt text****, use one of the below options:*
    a. **Place the full text (data table, text outline, etc.) above or below the image**. Alt text should refer to the text location.
    b. **Place the full text on another page or other document** and link to it underneath the image. Alt text should reference the link.
    c. **Place the full text at the end of the document**, clearly labeled. Alt text should reference the location.

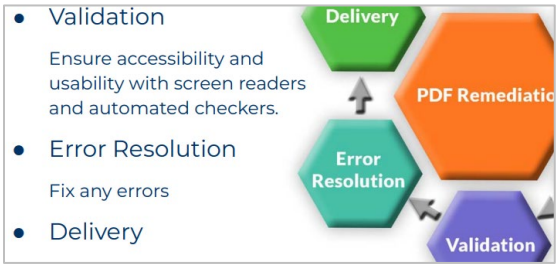


Figure 4 Example of a flowchart where the text equivalent is adjacent to the image

Alt Text Formatting Guide by Image Type

Charts and Graphs

Incorporate data summaries into the alt text.

Format: "(**Chart type**) of (**type of data**) where (**reason for including chart**)"

Examples:

- Alt="Bar graph of favorite cereals by vote. Life 6 votes, Cornflakes 4 votes, Kix 3 votes, Cheerios 2 votes." (full text fits within alt text)

- Alt=”Line graph of average student grades over time, where grades improve gradually over the semester. Refer to the data table which follows.”
- Alt=”Line graph of number of bananas sold per day in the last year where the winter months have more banana sales. Refer to the labeled data table at the end of this presentation.”

Flowcharts, Organizational Charts and Infographics

Examples:

- Alt=”Organizational chart of Agency Human Resources staff. Refer to the outline which follows.”
- Alt=”Flowchart to determine whether content should be a PDF document or a webpage. Refer to the linked outline which follows.”
- Alt=”Infographic showing tourism impact facts and figures across Missouri. Refer to the linked details which follow.”

Static Directional and Regional Maps

Examples

- Alt=”Map of the course for a marathon. Start at the intersection of Jefferson St. and Stadium Dr. Make the second right onto Jackson Street. Turn right at the fifth intersection”
- Alt=”Map of Missouri career centers by region. Refer to the region dropdown selection which follows”

(**NOTE:** The state currently has a license for a cloud tool called Equidox. Equidox can add hidden alt text within PDF documents, accessible to assistive tech devices like a screen reader. For example, you can add a hidden data table or a hidden bulleted/numbered list. (Insert link to external information on how to do this)

Keep Visualizations Understandable

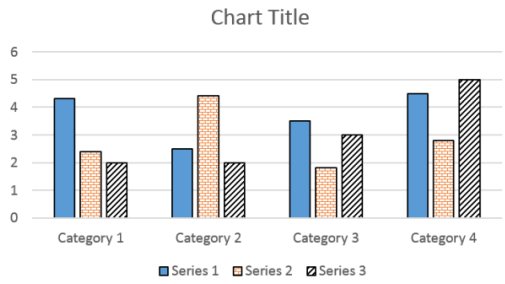
- Use plain language (6th-8th grade reading level). Take advantage of the Editor feature in MS Word.
- Create simple, easy to understand titles to describe your visualizations
- Use 11 pt. font or larger, sanserif fonts like Tahoma or Verdana
- Don’t use unnecessary words and abbreviations
- Don’t overload, balance with whitespace

Charts and Graphs

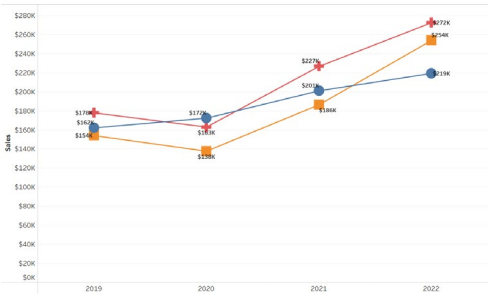
Choose an Appropriate Type

- Keep it simple

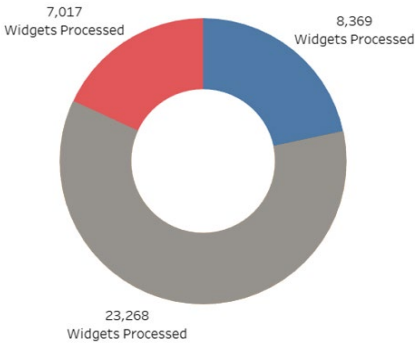
Bars/Stacked Bars – **Quantities** across **categories**. They provide clear distinctions between data points and are generally easy to interpret.



Line/Area Graphs – **Patterns** over **time**



Pie/Donut Charts – **Proportions** within a **whole.** They can be challenging for some users to interpret accurately, especially when segments are similar in size. Stacked bar charts accomplish the same goal.



Axes, Shapes and Labels

Assistive tech devices have limited reading control within long alt text (can't pause, stop, or easily resume reading if interrupted)

- Y axes should almost always start at zero
    - Certain cases should truncate (trim) axes
- Use both shapes and labels that are clear and distinctive
- Redundant encoding is key! (i.e., specific point along a line and numeric labels)

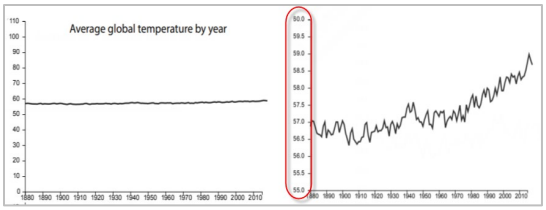


Figure 5 Example of when to use a truncated axes

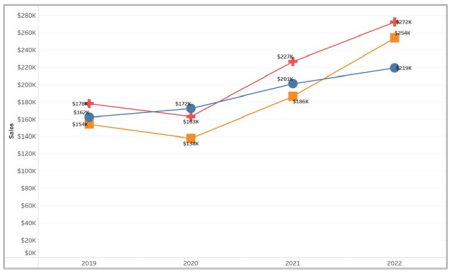


Figure 6 Example of using redundant encoding