Digital Accessibility
Create an Inclusive and Accessible Experience

Accessible Colors
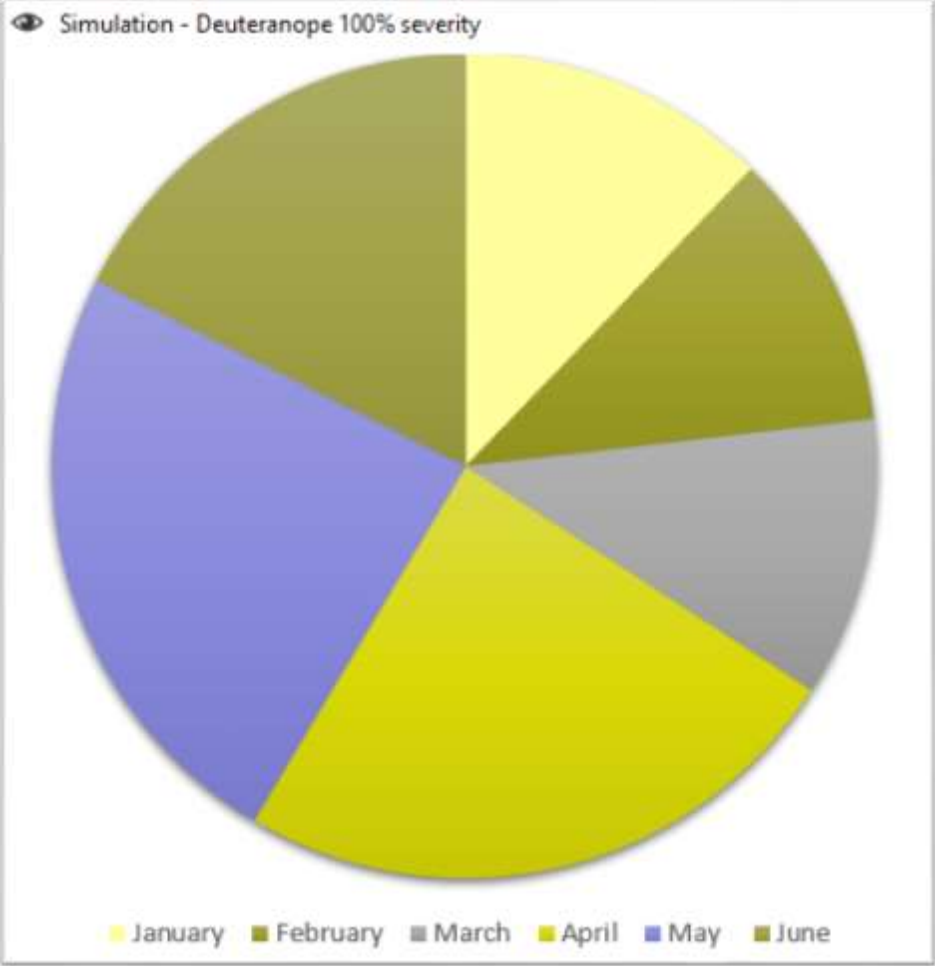
UCONN

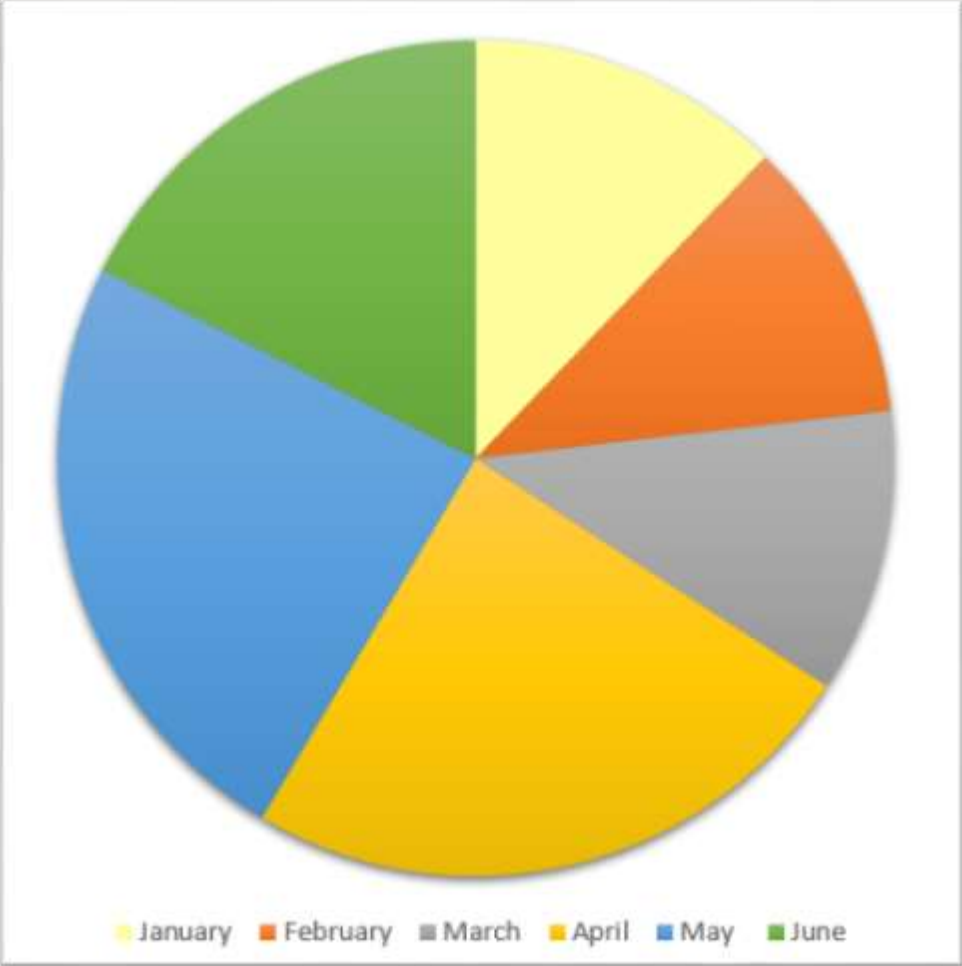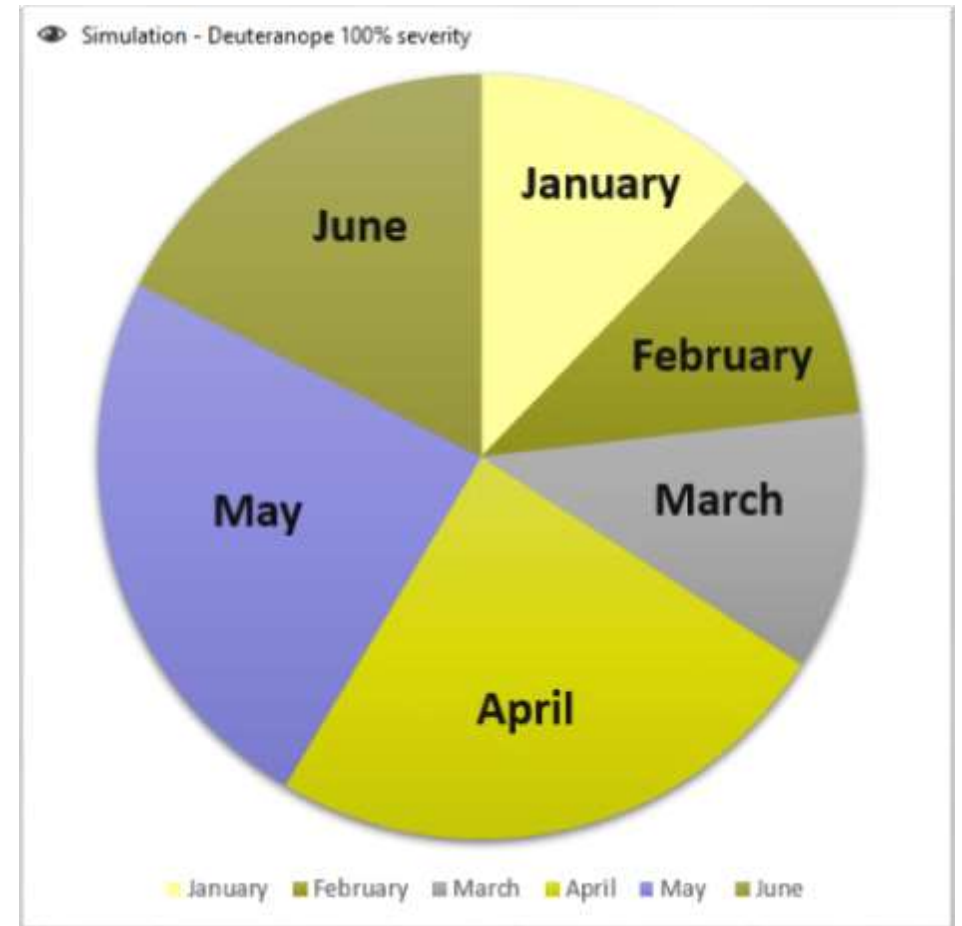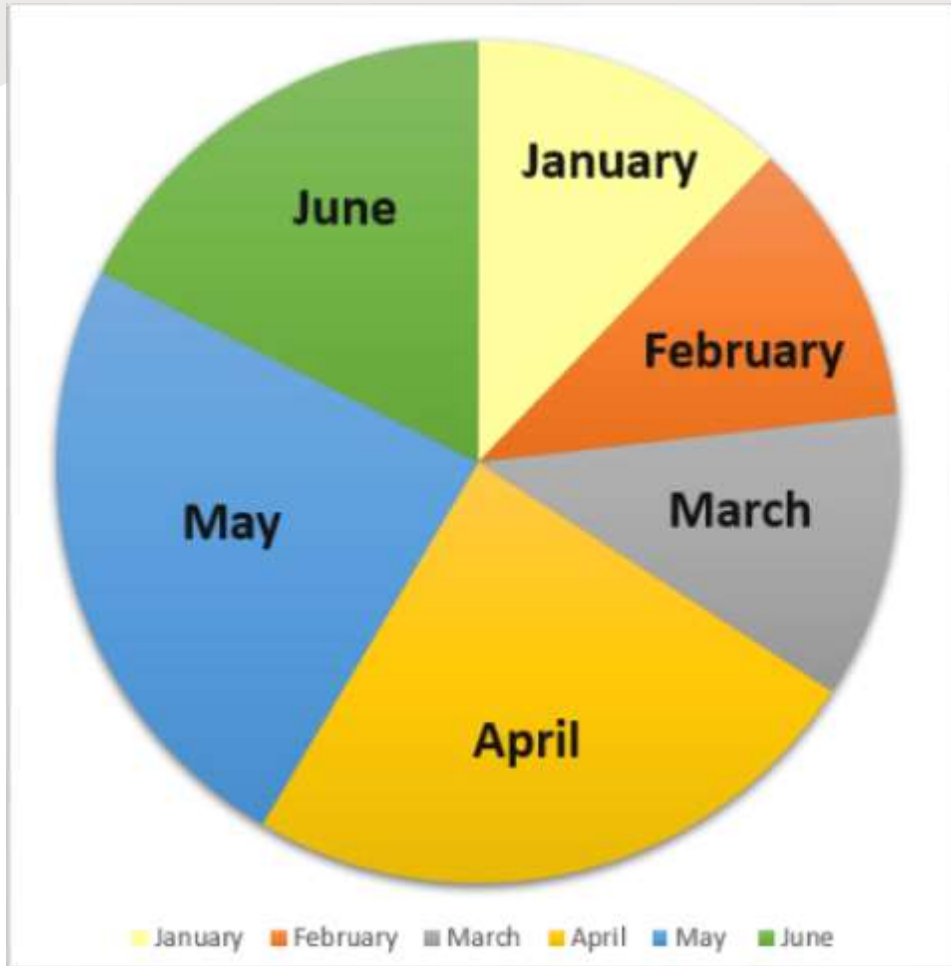# What Are Examples of Barriers with Color?

Text with Low Contrast

Low-contrasting text versus high-contrasting text

Inaccessible Pie Chart Only Using Color to Convey Information: Red/Green Deficiency

Accessible Pie Chart – Red/Green Deficiency

Examples: Red/Green Deficiency

Accessible Colors

- **Contrast Font 18 and higher 3:1**
- **Contrast Font below 18 4.5:1**
- **Do not use color alone to convey information**
- **Avoid using Red and Black or Red and Green Combination**
- **Text on Images**
- **Use tools to check color contrast and simulate color blindness**

Color Contrast

Font 18 or 14 bold and higher 3:1
Font below 18 or 14 bold 4.5:1

- 4.5:1 compensates for the loss in contrast sensitivity usually experienced by users with vision loss equivalent to approximately 20/40 vision.
- 20/40 calculates to approximately 4.5:1.
- 20/40 is commonly reported as typical visual acuity of elders at roughly age 80.

Contrast Algorithms

- The algorithms compare the two colors' relative luminance — which essentially boils down to whether one color is lighter or brighter than the other.
- Here, tomato (ff6347) and cornflowerblue (6495ed) are pretty much equally bright, which is why they're difficult to read together.
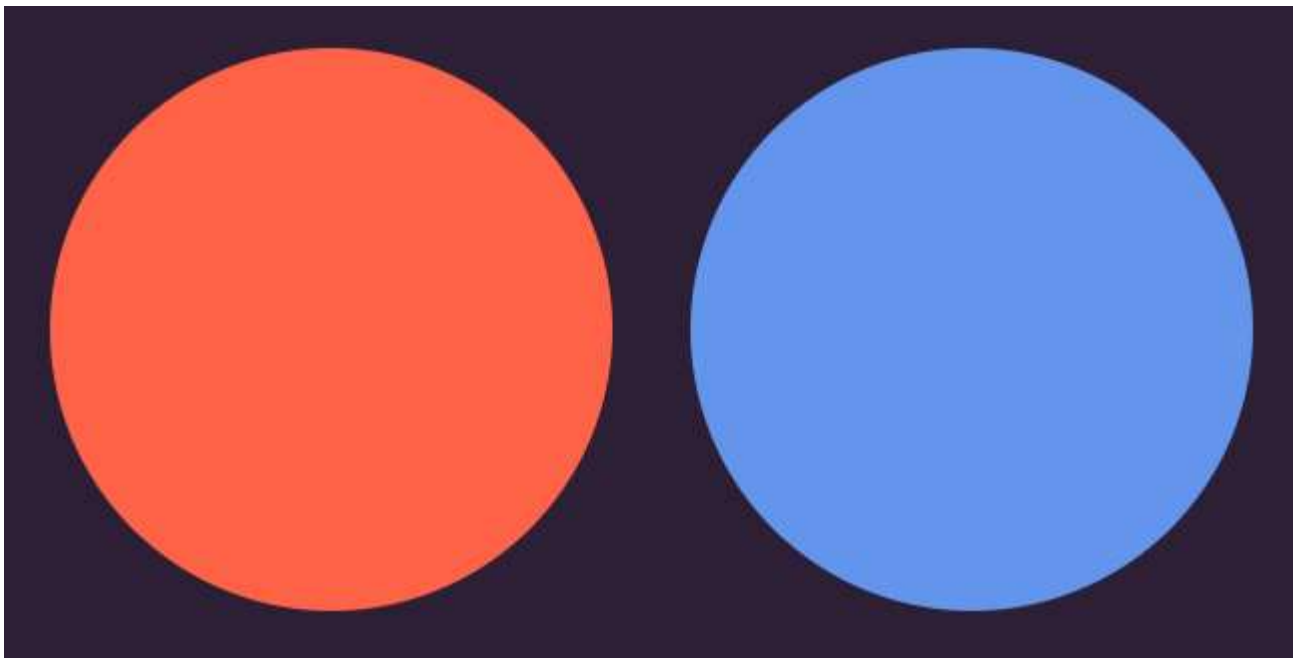
You don't want to read this.

The ratio for these two colors is a 1.009:1 which is barely better than comparing a color to itself (1:1).

Text Passes Large Font but Fails Small Font

This is 18 pt font and it passes at 3.11

This is 16 pt font and it fails at 3.11

This is 18 pt font and it passes at 4.5:1

This is 16 pt font and it passes at 4.5:1

This is 18 pt font and it passes at 4.2:1

This is 16 pt font and it fails at 4.2:1

This is 18 pt font and it passes at 4.5:1

This is 16 pt font and it passes at 4.5:1

Color Blindness: Red-Green Color Deficiency

- The most common type of color vision deficiency makes it hard to tell the difference between **red and green**.
- There are 4 types of red-green color vision deficiency:
  - **Deuteranomaly** is the most common type of red-green color vision deficiency. It makes certain shades of green look more red. This type is mild and doesn't usually get in the way of normal activities.
  - **Protanomaly** makes certain shades of red look more green and less bright. This type is mild and usually doesn't get in the way of normal activities.
  - **Protanopia & deuteranopia** both make someone unable to tell the difference between red & green at all.

# Color Blindness: Blue-Yellow Color Deficiency

- **Blue-yellow color vision deficiency**
  - This less-common type of color vision deficiency makes it hard to tell the difference between **several different color combinations**.
  - There are 2 types of blue-yellow color vision deficiency:
    - **Tritanomaly** makes it hard to tell the difference between blue and green and between yellow and red.
    - **Tritanopia** makes someone unable to tell the difference between blue and green, purple and red, and yellow and pink. It also makes colors look less bright.

Color Blindness: Complete Color Deficiency

If you have complete color vision deficiency, you **can't see colors at all**. This is also called **monochromacy** or **achromatopsia**, and it's rare. Depending on the type, you may also have trouble seeing clearly, and you may be more sensitive to light.

Note: Color deficiencies (color blindness) are so diverse that prescribing effective general use color pairs (for contrast) based on quantitative data is not feasible.

Text on Images: Dos and Don'ts
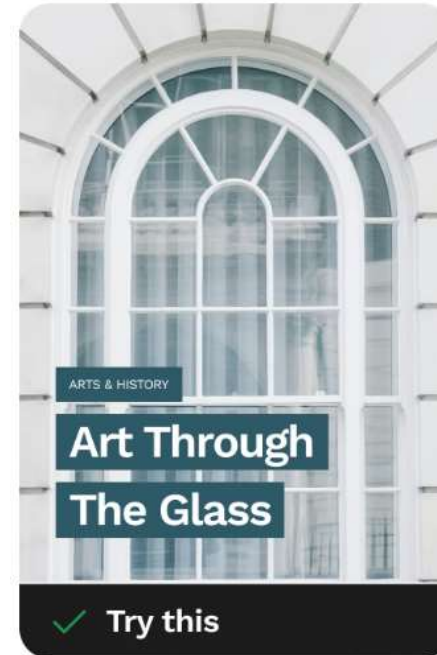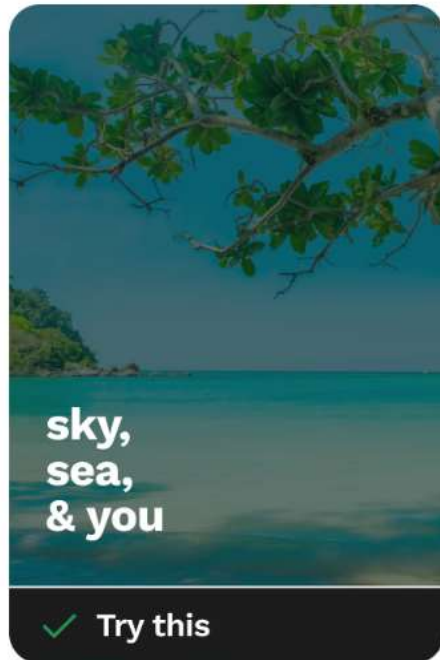
Text on Images that Work
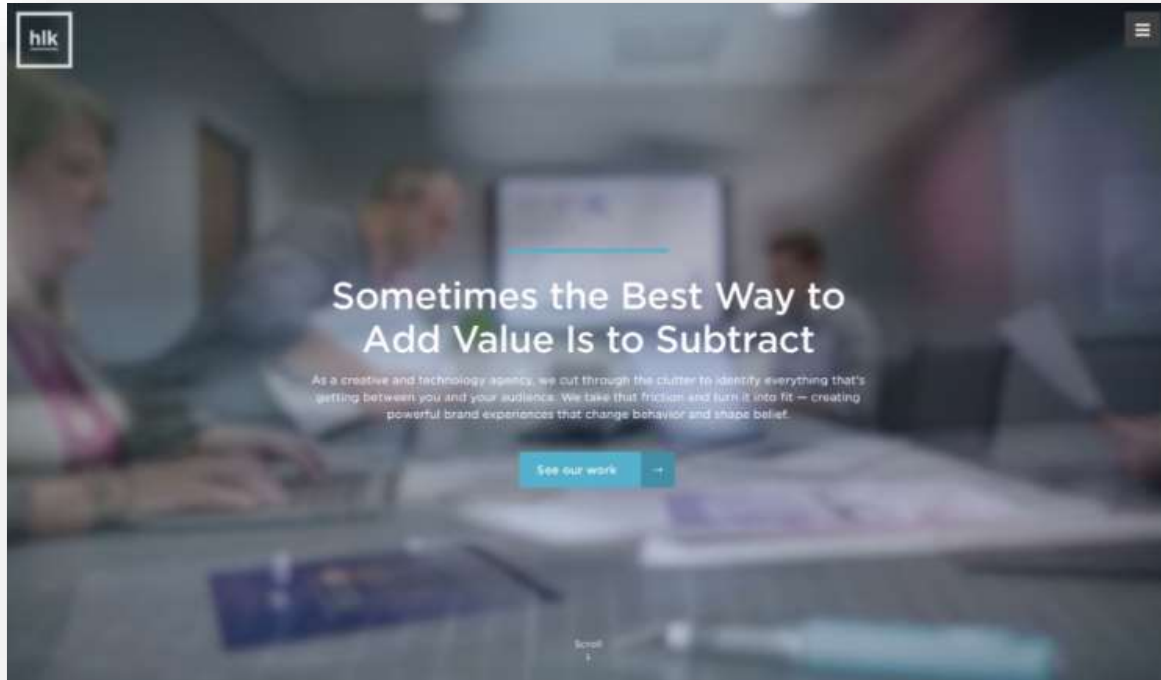
Tools to Check for Accessibility
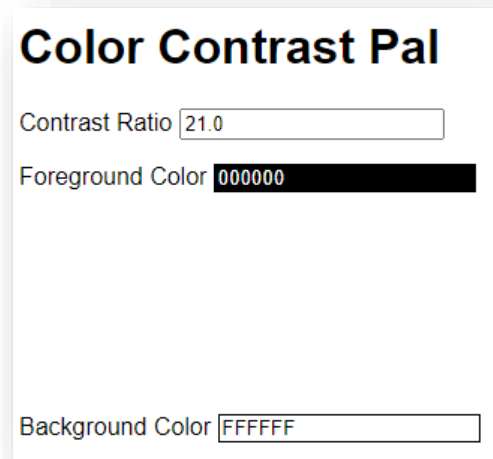
Tools for Color Contrast
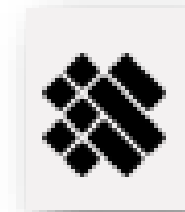
[Colour Contrast Analyser](#)

[WebAIM Website](#)

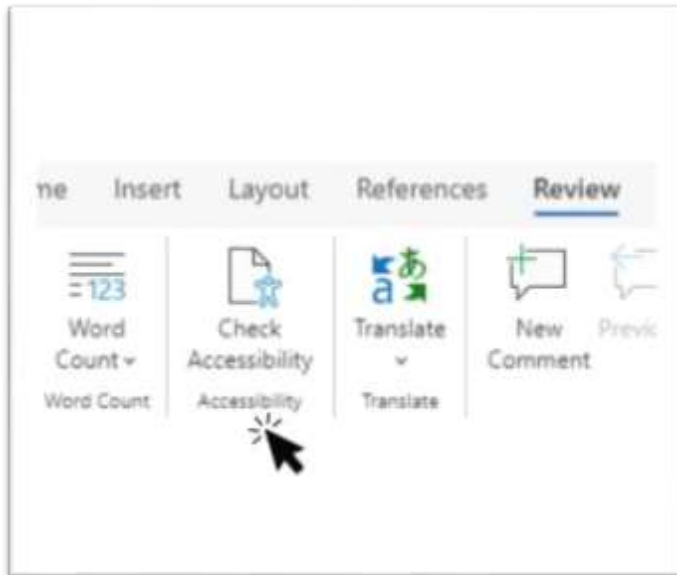[Color Contrast Pal](#)

[Contrast Grid](#)

[Color Simulations](#)

Tools to Check Word and PowerPoint

- Microsoft Office Accessibility Tool
  - Review > Check Accessibility
- Blackboard Ally (if you have access to a Bb course or organization)

Tools to Check Websites

- [WAVE](#) by WebAIM
  - Browser Extension
  - Displays code for webpage
- [Sa11y](#)
  - Bookmarklet
  - Has Color Filter to simulate color blindness

Tool to Check PDFs

- [PDF Accessibility Checker: PAC 2021](#)
  - Free
  - Windows only
- [Acrobat Pro](#)
  - Doesn't check reading order or color contrast
  - Only knows what it knows
  - Has OCR
  - Very technical

Basic Accessibility Checklist for Colors

- ❑ Contrast Font 18 and higher 3:1
- ❑ Contrast Font below 18 4.5:1
- ❑ Do not use color alone to convey information
- ❑ Avoid using Red and Black or Red and Green Combination
- ❑ Text on Images
- ❑ Use tools to check color contrast and simulate color blindness