Colorblindness

There are several types of colorblindness, the most common being "red-green" colorblindness. With this vision, red appears much darker and less sharp than for those who are not colorblind. Hence, it is difficult to:

- Distinguish reds from greens, especially when they are both the same "brightness"
- Difficulty distinguishing colors that vary only in their "red" or "green" components (such as blue and violet, which is blue+red)
- Distinguish reds from black, especially in text
- See red text and symbols against a dark background

Colorblindness is relatively common among males. One in twelve Caucasian (8%), one in 20 Asian (5%), and one in 25 African (4%) males are so-called "red-green" colorblind.

As an illustration, in a room of 250 people, one could expect 10 people to be colorblind. Therefore, it is important to create presentations, reading material, maps, and directional signage that can be easily understood by those with colorblindness.

Basic tips for creating images that are accessible to colorblind viewers:

1. **Separate reds from greens** in pie charts, bar charts, line graphs, and maps (both lines and symbols). Do the same for blues and violets. These colors are difficult to distinguish. If they must be next to one another, separate by a white line for contrast.

2. **Use contrast in brightness as well as color.** For instance, put a dark color next to a pale color if similar colors cannot be separated.

3. **Try not to use red colors to emphasize information**. While it is the brightest, most eye-catching color for non-colorblind people, it appears dark and dull for most who are colorblind. Red text will not stand out well next to black text, for instance.

4. **Avoid dark backgrounds when using red** text, lines, or symbols. Red is difficult to distinguish from dark colors. When using a dark background, make sure to use bolder text, thicker lines, and larger symbols to enhance contrast.

5. **Avoid having a separate legend** to show what the colors represent in a graph, chart, diagram, or map. Label items on the chart itself if possible.

6. **Try not to rely solely on color** to convey information. Instead, use different line styles, hatching patterns for bars and pie slices, and easily-distinguishable symbols, etc. to show differences in information. Also keep the number of colors to a minimum.