Color and Contrast

Overview
Several color combinations do not have enough contrast to be visible to color blind students. The most common problem is associated with spot colors when many colors are combined making sections of the content or image blend together. The result is the information cannot be deciphered or interpreted by the color blind student. Designing material to be read by students’ with low vision will create content that is easier for everyone to read. The goal is to ensure there is sufficient difference and brightness in lights/darks and between the background/foreground.

Tip 1
The safest color combinations are black, white and gray followed by blue and yellow. A good best practice is to NOT rely on color cues alone to provide information. When contrasting known color combinations that can cause problems, like red and green use symbols, shapes and text as supplemental information. For example, include a “+” as an indicator of what to include and an “x” as an indicator of what to not to include in the description of an assignment.

Tip 2
There are certain colors and color combinations to avoid. **Avoid orange** in combination with other colors. Orange is difficult to contrast with other colors since it is not very dark or very light. **Avoid contrasts of red and black**, many color blind users do not perceive reds making it appear as "no color" or black. **Avoid contrasts of red and green**, these colors have the relatively same level of darkness making them difficult to contrast from each other.

Tip 3
Brightly colored hues that are touching or close to each other on the page cause difficulties because the colors appear to vibrate on the edges that touch. Examples of combinations to avoid include: green/red, green/magenta, and yellow/cyan.

Tip 4
Dark backgrounds with light text should be avoided. Long blocks of light text on dark backgrounds are more difficult to read.

Tip 5
Strongly textured backgrounds should be avoided. They can make text harder to read. However, textured backgrounds or colored/textured toolbars that are not overpowering can add interest without causing a problem.
Tip 6
Subtle variations of colors may be lost in different monitor settings. To avoid problems test your color combinations on a variety of monitors. Be aware:
   1. Flat panel screens are brighter than other monitors
   2. Macintosh colors are lighter than Windows colors
   3. Monitors set for high color contrast reduce mid-range colors making subtle color differences difficult to read

Tip 7
Use a Color Contrast Analyzer to check background and foreground color combinations and verify your documents provide good color visibility. There are several web sites available to test color contrast.

The Paciello Group provides a Contrast Analyzer for Windows and Macintosh. The download is available at:
http://www.paciellogroup.com/resources/contrastAnalyser

Tip 8
Use a Color Blindness Simulator to see how images may appear to a student with color blindness. The Etre Color Blindness Simulator provides a website to upload an image and analyze the results:
http://www.etre.com/tools/colourblindsimulator/