1 **Unit 2: Color**

Brent Royuk
Sci-202
Concordia University

2 **Groundwork: How We See**

- Ancients: Do rays emanate from eyes and "grab" objects?
- Seeing is a physical process: light gathered in pupil, retina has light-sensitive cells.
- *Light must be present to see objects, all are luminous or illuminated*
- So we don't "see" objects, we see their light

3 **Making a Rainbow**

4 **Rainbows**

- What are the colors of the rainbow?
- How many colors are there?
  - –Monochromatic/Polychromatic
- Newton: There are seven.
  - –Orange and indigo

7 **Observing Nature**

- Color gels

8 **Color Laws**

- White light contains all the colors
- The colors we see in everyday life are generally polychromatic.
- Some colors are extraspectral.
- Lighter shades contain more colors.

9 **A Color Model**

10 **A Color Model**

11 **A Color Model**

- Let's use the model: try color mixing
- How about magenta/green?
  - –Red/light blue?
  - –What should we do about these?

12 **Applications**

- What about colored objects?
  - –Absorptive filtering
  - –The green light on the red apple
- Contrast suppression/enhancement

17 **3-D Pictures**
- Anaglyphs

41 **More Color Mixing**
- Yellow and blue make?
- Additive vs. Subtractive
  - –Pigments, paint, crayons, ink
  - –?

43 **Television**

47 **Color Mixing**
- Additive & Subtractive “Color Wheels”

48 **Color Mixing**

49 **More Examples**
- What is a primary color?
- CYMK color separation & printing
- Color Mixing Practice worksheet
- Color illusions

56 **Color Blindness**
- The different kinds of inherited color blindness result from partial or complete loss of function of one or more of the different cone systems. When one cone system is compromised, dichromacy results. The most frequent forms of human color blindness result from problems with either the middle or long wavelength sensitive cone systems, and involve difficulties in discriminating reds, yellows, and greens from one another. They are collectively referred to as "red-green color blindness", though the term is an over-simplification and somewhat misleading. Other forms of color blindness are much more rare. They include problems in discriminating blues from yellows, and the rarest forms of all, complete color blindness or monochromacy, where one cannot distinguish any color from grey, as in a black-and-white movie or photograph.
- http://en.wikipedia.org/wiki/Color_blindness

57 **Color Blindness**
- Color-sensitive cones
  - –http://hyperphysics.phy-astr.gsu.edu/hbase/vision/colcon.html

58 **Color Blindness**

- The bottom picture simulates what a dichromat would see.

59 **Ishihara Color Blindness Tests**

60 **Ishihara Color Blindness Tests**

Normal Protanope Deutanope

http://colorvisiontesting.com