CHAPTER 22 - WAVE OPTICS

Physics for scientists and engineers: A strategic approach; Randall Knight, 2nd ed.
**** also includes a PhET component (below)**

22.1 Light and Optics - This section is interesting but optional.

22.2 The Interference of Light. We started discussing this on Friday. Read this section carefully and try to see how the geometry and the concept of path length difference leads to the conditions stated for constructive and destructive interference.
This is similar to interference in two dimensions we discussed when looking at sound. For the subsection on intensity of the double slit, think about how the total energy is related to A^2.

22.3 - Diffraction Grating. This section will help you in lab next week(s). This is mostly conceptual. Try to reason through the text; take a minute-break while reading to picture what the text is talking about.

22.4 Single-Slit diffraction. Read this section *carefully*. Equation 22.20 is often confusing for students, as it would imply MAXIMUM interference for a DOUBLE slit (m), BUT IS A DARK MINIMUM for a SINGLE-slit diffraction (p). Also compare the width of the central fringe for a single-slit and double-slit interference pattern.

22.5 Circular-Aperture Diffraction -- only p.685 (including example 22.6). Interference still occurs from a pinhole, but the geometry of the slit changes the shape of the interference pattern. Equation 22.23 tells us the 'Rayleigh criterion': the limit for distinguishing small details of an object. This is important for resolving power of microscopes, telescopes, and our own eyes. There is a good *short* summary of this here: http://hyperphysics.phy-astr.gsu.edu/hbase/phyopt/raylei.html

**COMPUTER SIMULATION:

THIS WEEK: Using a different simulation. Got to http://vsg.quasihome.com/interfer.htm and play with the different settings. Notice the changes to the interference pattern on the screen as you adjust the different parameters. It's good to get a sense of the what wavelengths are associated with the different colors, particularly red, green, and blue.