Chapter 24: Wave model of light

1. Be able to describe Huygens' principle in your own words.
2. Be able to describe experiments and phenomena for which the ray model of light fails and a wave model of light succeeds.
3. Be able to describe what we mean by the "phase" of a wave and what it means when two waves are "in phase" and when two waves are "out of phase."
4. Be able to explain how nodes and antinodes come to be in two-source interference.
5. Be able to determine the wavelength of light by using it to make a two-source interference pattern.
6. Be able to describe how a two-source interference pattern will change if the separation of the sources increases or decreases. As a special case, be able to explain what happens to a two-source interference pattern if the sources are separated by *less* than the wavelength λ.
7. Be able to describe how a two-source interference pattern will change if the wavelength of the the waves increases or decreases. As a special case, be able to explain what happens to a two-source interference pattern if the wavelength λ *exceeds* the separation of the two sources.
8. By using a two-slit interference pattern be able to determine the wavelength of light by measuring the source separation, d, the position x of nodes or antinodes on a screen, and the distance L from the sources to the screen.
9. Be able to explain how nodes and antinodes come to be in single-slit interference.
10. Be able to determine the wavelength of light by using it to make a single-slit interference pattern.
11. Be able to describe how a single-slit interference pattern will change if the width of the slit increases or decreases.
12. Be able to describe how a two-source interference pattern will change if the wavelength of the the waves increases or decreases. As a special case, be able to explain what happens to a two-source interference pattern if the wavelength λ *exceeds* the separation of the two sources.
13. Be able to describe and explain Poisson's spot.
14. Be able to describe the condition under which a light wave phase inverts upon reflection.
15. Be able to determine the range in thickness of a soap film illuminated by monochromatic light from observing the interference fringes it produces.
16. Be able to explain why light traveling past you is strongly polarized when its direction of travel is perpendicular to your line of sight. (Would it be strongly polarized were you observing it directly down its direction of travel?)
17. Be able to explain why sunsets are red and why the sky is blue in terms of the scattering of light waves.

18. Be able to describe

    - how light reflected at 90° with respect to the refracted ray is polarized, and
    - how sunlight scattered from air at 90° from the direction of travel of sunlight is polarized.