

## STUDY GUIDE FOR CHAPTER 31

1. Diffraction is the bending or spreading of a wave disturbance into a region behind an obstruction. This spreading can be caused by part of the wave traveling through a hole in the obstruction or traveling around the obstruction.
2. Diffraction occurs when light waves pass through an opening.
  - a. Light casts a sharp shadow with some fuzziness at its edges when the opening is large compared with the wavelength of the light.
  - b. Because of diffraction, it casts a fuzzier shadow when the opening is extremely narrow. (Fig. 31.7)
3. The amount of refraction depends on the size of the wavelength compared to the size of the opening/obstruction. Sound waves can “diffract” into a room, but light waves do not because the wavelength of sound is closer in size to the door than light waves.
4. The extent of diffraction depends on the relative size of the wavelength compared with the size of the obstruction that cast the shadow.
5. FM radio waves have wavelengths that are much smaller than the waves of AM radio. This enables the AM stations to “bend” into mountain canyons or city “canyons”. TV waves are even smaller, so that makes it harder to receive TV and Radio signals in these areas. This is why there are more “towers” or cables for FM and TV, because the waves cannot bend around obstacles.
6. The colors seen in thin films (gasoline on water, soap bubbles, sea shells, etc.) are produced by the interference in the films of light waves of mixed frequencies. (Figure 31.9)