Refraction II

Frequency remains constant throughout refraction. Higher frequencies have greater n values, travel slower, and are bent more than lower frequencies

Refraction II

- The index of refraction is not only dependent on the nature of the medium but also the frequency of the light at the boundary.
- Higher frequency light have higher n values meaning they travel slower in the second medium and are “bent” more than lower frequencies.
- Example: Blue and Violet have higher n values and are bent more than orange or red.

Dispersion

If white light is passed through a prism, it is separated into its component colors.

Violet has a high frequency, high n value, and is bent more than red.

Example: rainbow --- red at the top (bent the least) and blue at the bottom (bent the most).

Critical Angle

- If light is in a dense medium (with n1 for denser medium) and is directed toward a less dense medium (with n2 for less dense medium), there is a critical angle where the light is directed along the boundary.
- Sin(critical angle) = n2/n1

Total Internal Reflection

- If light is directed from a more dense medium toward a less dense medium at an angle greater than the critical angle, the light is reflected (cannot escape).
- Example: Diamond has a critical angle of 24 degrees. Light directed at more than 24 degrees will totally internally reflect (cannot escape and will sparkle !!!)
- Example: fiber optic cables (Verizon Fios)