Waves

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light is an electromagnetic wave

- waves have - wavelength λ distance between crests
- amplitude a
- velocity v

$$v = f\lambda$$

describes the relationship between frequency of a wave and it's wavelength, to it's velocity.

Reflection

For a reflection of a flat surface, the angle of incidence θ_i, is always equal to the angle of reflection θ_r.

The speed of light in a vacuum is a universal speed limit, when light moves from one medium to another, light's speed will change, although each individual 'particle' always goes the same speed,

There is a bend at the change of material, called refraction

the index of refraction

the index of refraction n is based on the ratio of c to the velocity of light in a medium

$$n = \frac{c}{v}$$

index of refraction is determined experimentally

Index of refraction is unitless, and must always be greater than one,

Snells law

$$n_1 \sin\theta_1 = n_2 \sin\theta_2$$

the ratio of the index of refractions multiplied by the angle of incidence is equal to the ratio of the index of refraction times the angle of refraction

homework

Page 452 1-9

The Spectrum

visible light contains many rays of light with different wavelengths, where each wavelength corresponds to a different color higher frequency

Prisms

Even though light travels at the same speed through a vacuum, different wavelengths have different indexes of refraction when traveling through different media, blue light refracts the most, red light refracts the least, resulting in rainbows

Critical angle

is the smallest angel of incidence at which a light ray can be totally reflected from the boundary between the two

$$\sin \theta_{critical} = \frac{n_2}{n_1}$$