Name _____ **Date** _____
Teacher _____ **Period** _____

Physics - "Refraction" Notes

What is Refraction?
What is refraction? _____
_____

Why does refraction occur? _____

The amount of refraction is related to the _____

Which color of light refracts the most? _____ Which color of light refracts the least? _____

Optical Density
What is optical density? _____
_____

How is optical density related to the speed of light in the material? _____
For example, the higher the optical density of a material, the _____ the speed of light.

Index of Refraction
The index of refraction (n) is the _____
_____

Equation: n =

As the index of refraction increases, the speed of light _____

Numbers you should know:
n_{air} = _____
n_{water} = _____

Common Indexes of Refraction	
Air	1.0003
Water	1.33
Ethanol	1.36
Crown Glass	1.52
Quartz	1.54
Flint Glass	1.61
Diamond	2.42

Sample 1
A ray of light passes through a boundary between air and an unknown substance. The ray slows down to a speed of 1.24×10^8 m/s. What is the index of refraction of the unknown substance? What is the substance?

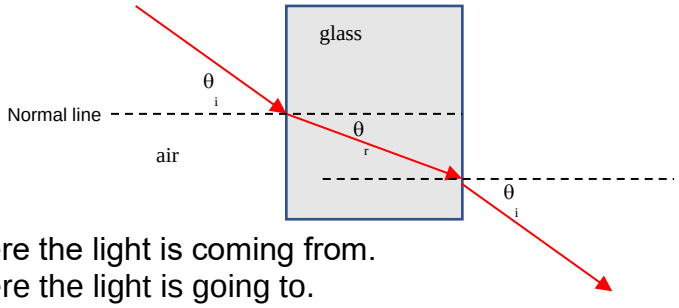
Example 2
What is the speed of light in a sapphire? (n = 1.77)

Laws of Refraction

- 1st Law
  - All rays and normal line lie in the same geometric plane
- 2nd Law
  - The index of refraction in a homogeneous medium (medium is the same throughout) is constant
- 3rd Law
  - Lower to higher optical density => bends towards normal
  - Higher to lower optical density => bends away from normal

Snell's Law

Equation:



The "___" side of the equation refers to where the light is coming from.
The "___" side of the equation refers to where the light is going to.

Example 1

Light is incident on water at an angle of 32^0. What is the angle of refraction as the light travels into the water?

Example 2

Light passes through a 2 inch thick piece of glass (n = 1.55) into water. The angle in the water is 47^0. What is the angle of incidence in the glass?