## Index of Refraction & Snell's Law Classwork 55/14

Make sure to show all of your work!

Index of refraction =  $n = \frac{c}{v}$   $c = 3.00 \times 10^8 \text{ m/s}$ 

- 1. Calculate the speed of light in the following media:
  - a. Water (ans:  $v = 2.26 \times 10^8 \text{ m/s}$ )
  - b. Diamond
- 2. Calculate the refractive index for a substance if the speed of light in that medium is
  - a. 2.12 x  $10^8$  m/s (answer: n = 1.42)
  - b. 1.59 x 10<sup>8</sup> m/s
- 3. When light passes from air into water at an angle of  $60^{\circ}$  from the normal, what is the angle of refraction? (ans:  $40.6^{\circ}$ )

4. When light passes from water into diamond at an angle of 45.0° from the normal, what is the angle of refraction?

Name	
Date	Hour
Snell's Law:	$n_1 \sin(\theta_1) = n_2 \sin(\theta_2)$

Table 1: Indices of Refraction for Selected   Modia	
Medium	Index of Refraction
Vacuum	1.0000 (exact)
Air	1.0003
CO <sub>2</sub>	1.0005
Water	1.33
Ethyl Alcohol	1.36
Pyrex glass	1.47
Plexiglass	1.49
Table Salt	1.51
Flint Glass	1.61
Ruby	1.779
Sapphire	1.794
Cubic Zirconia	2.17
Diamond	2.42

5. A block of amber is placed in water and a laser beam travels from the water through the amber. The angle of incidence is  $35^{\circ}$  while the angle of refraction is  $24^{\circ}$ . What is the index of refraction of amber? (ans: n = 1.88)

6. In an experiment, a jewel is placed in water. A laser beam is passed from the water through the jewel. The angle of incidence is 50.0°, and the angle of refraction is 28.0°. What is the index of refraction, and what type of jewel is it?