SNC2D0 **Index of Refraction** Date:_____

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

*c = Speed of light in a vacuum = 3.00 x 10^8 m/s

The speed of light in air is 2.9999 x 10^8 m/s. Since this value is so close to the speed of light in a vacuum, we will consider the index of refraction of air to be 1.00.

Example 1:
The speed of light in a vacuum is 3.00 x 10^8 m/s. The speed of light in diamond is 1.24 x 10^8 m/s. What is the index of refraction of diamond?

Example 2: The index of refraction of olive oil is 1.48. Calculate the speed of light in olive oil.

Questions:

1. The speed of light in vinegar is 2.30 x 10^8 m/s. What is the index of refraction for vinegar?

2. The speed of light in sapphire is 1.69 x 10^8 m/s. What is the index of refraction for sapphire?

3. The index of refraction for acetone is 1.36. What is the speed of light in acetone?

4. Crown glass has an index of refraction of 1.52. What is the speed of light in crown glass?

5. Why is the index of refraction a dimensionless quantity? (e.g. Why does it not have any units?)

6. Suppose you calculated the speed of light in an unknown substance to be 4.00 x 10^8 m/s. How could you tell you had made an error in your calculations?

Answers: 1) 1.30 2) 1.78 3) 2.21 x 10^8 m/s 4) 1.97 x 10^8 m/s