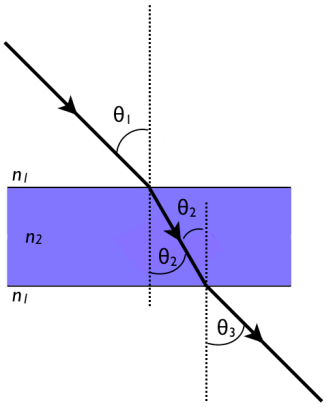
Name _____

Quiz 6: Refraction

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

1. A light beam traveling through a transparent medium of index of refraction n_1 passes through a thick transparent slab with parallel faces and an index of refraction n_2. What is the angle θ_3?



$\theta_3 = \theta_1$. That's just geometry, one doesn't even need Snell's law in this case. Physically, the purple slab bends the light coming in, but bends it back just as much going out.

2. If $n_1 = 1.0$ and $n_2 = 1.923$ in the figure above, what is θ_2 if $\theta_1 = 28°$? Note that the figure is not to scale.

Snell's law:

$$n_1 \sin\theta_1 = n_2 \sin\theta_2 \tag{1}$$

$$\theta_2 = \sin^{-1}\left(\frac{n_1}{n_2}\sin\theta_1\right) \approx 14.1° \tag{2}$$

3. The way the figure is drawn, which material has the lower effective speed of light? *Briefly,* why? The numbers from the previous question do not necessarily imply anything about this question.

The light inside the purple slab bends *toward* the normal, meaning light must be traveling slower in the purple stuff.