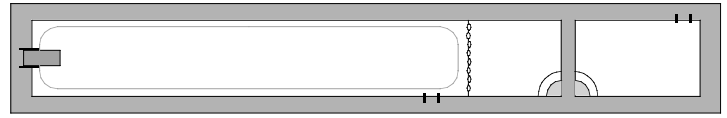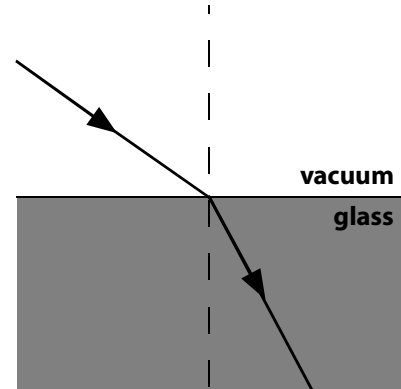# PhyzSpringboard:
Snell's Law

1. Remember The Bends
The diagram to the right shows a beam of light incident from a
vacuum to glass at an oblique angle.

   a. Label the following:
     • incident ray
     • refracted ray
     • normal
     • angle of incidence (θ_1)
     • angle of refraction (θ_2)

vacuum

glass

   b. Add the reflected ray to complete the diagram.

   c. An experiment is performed in which light is directed from a vacuum to glass at a variety of
angles (θ_1) and the subsequent angles of refraction (θ_2) are measured. The results are shown
below.

     i. Complete the table. Use only as many significant figures as you are given.

θ_1	θ_2	θ_1/θ_2	$\sin\theta_1/\sin\theta_2$	$\cos\theta_1/\cos\theta_2$	$\tan\theta_1/\tan\theta_2$
37°	24°				
53°	32°				
75°	40°				

     ii. Which of the following ratios—if any—represent the index of refraction?

   ____θ_1/θ_2 ____$\sin\theta_1/\sin\theta_2$ ____$\cos\theta_1/\cos\theta_2$ ____$\tan\theta_1/\tan\theta_2$

     iii. Express your conclusion in part ii. as an equation.

   d. If 524 nm light had been incident from a vacuum to deucenaquarterium ($n = 2.25$) at 60°,
     i. how fast would the light travel in the deucenaquarterium?

     ii. what wavelength would the light have in the deucenaquarterium?

     iii. at what angle would it have passed through the deucenaquarterium?

 db