

Chapter 12 Review

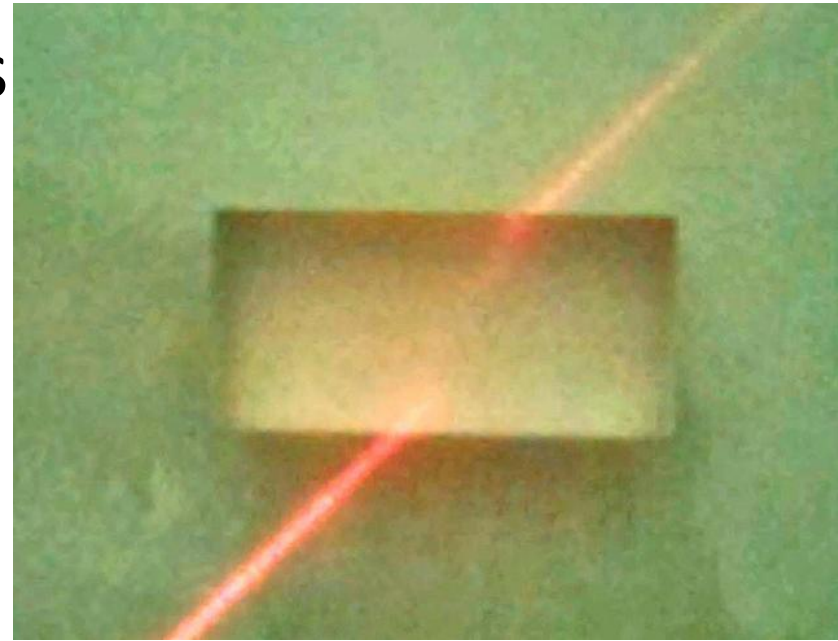
SNC 2D1

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12.1 Refraction

Light entering glass



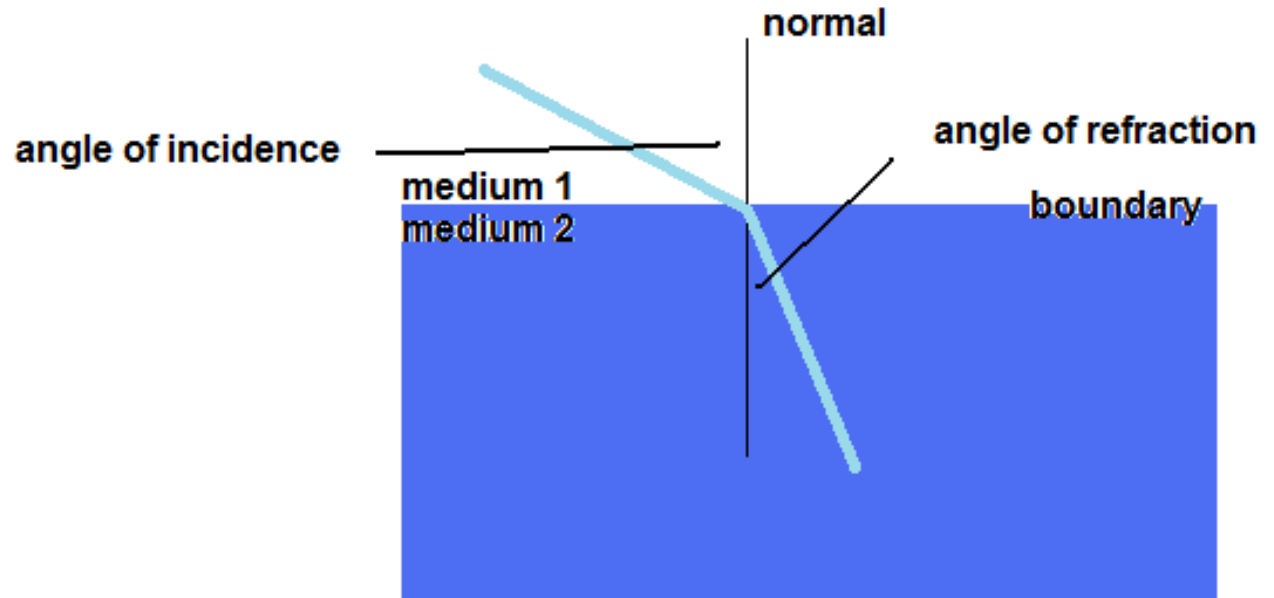
*see attached PDF



Light entering water

12.1 Refraction

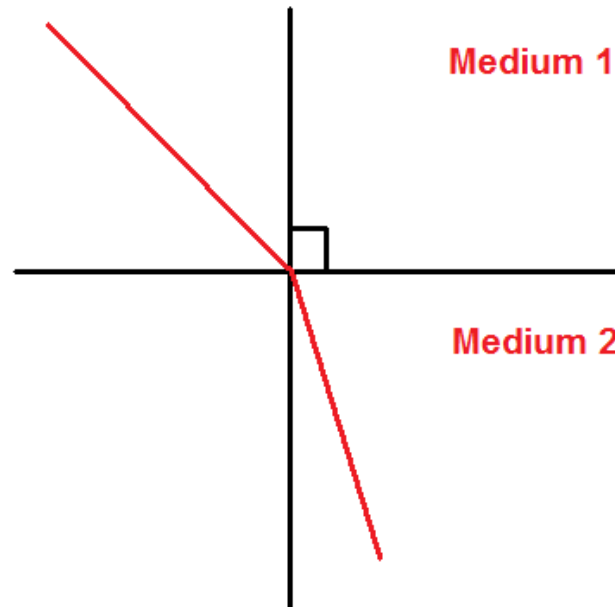
- This section introduces us to refraction.
- We learned about the rules of refraction, what the angle of refraction is, the normal, and a refracted ray.



12.1 Refraction

Problem:

One medium is vinegar, which has a speed of light of 2.30×10^8 m/s. The other medium is sapphire in which light has a speed of 1.69×10^8 m/s. Use this information to identify medium 1 and medium 2.



12.4 Index of Refraction

Problem:

Vegetable oil's index of refraction is 1.47. The speed of light in vegetable oil is?

12.4 Index of Refraction

Problem:

The speed of light in an unknown medium is 2.2×10^8 m/s. Determine the unknown medium.

12.4 Index of Refraction

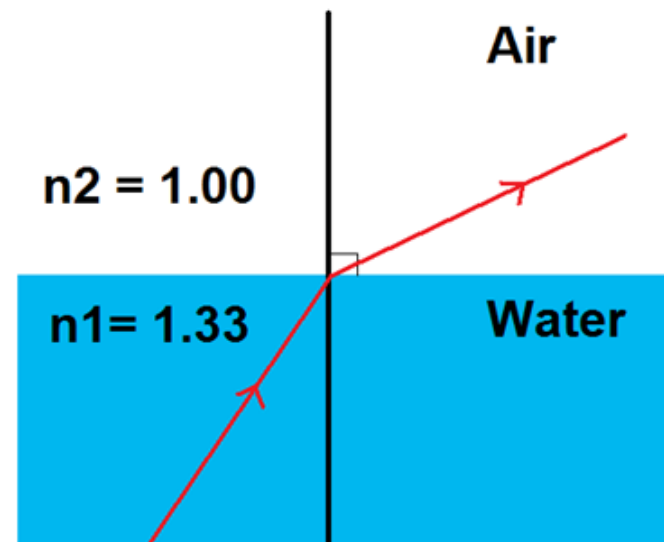
What two pieces of info are required to calculate the index of refraction?

What two pieces of info are required to calculate the speed of light in a medium?

What is the index of refraction? Be prepared to define! Why and what does it mean that it is dimensionless?

12.5 Total Internal Reflection

- if you increase the angle of incidence past the critical angle, the refracted ray will no longer enter the second medium
- understand what the critical angle is, and what will happen if we increase or decrease the incident angle.



12.5 Total Internal Reflection

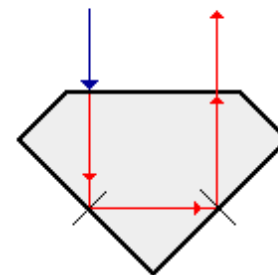
- Know the two conditions that must be met for total internal reflection to occur. –this is in our notes and in the text.
- Be very familiar with Figure 3 on page 527.

12.5 Total Internal Reflection

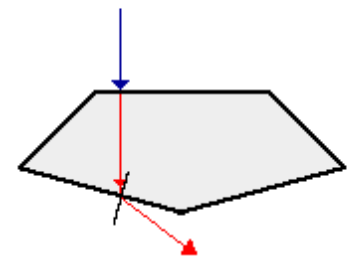
Diamonds – as a medium, it has a small critical angle. That means you get more total internal reflection. Understand why! –Smaller critical angle means most light rays enter from angle greater than critical angle and therefore reflect.

This concept is **important**.

TIR and the Importance of a Diamond's Cut



Light entering through the top facet undergoes TIR a couple of times before finally exiting.



Light entering through the top facet of the diamond quickly exits at the second boundary since its angle of incidence is less than the critical angle.

12.7 Phenomena Related to Refraction

Apparent depth

-remember when the archer fish hunts, how it aims its spray of water.

-likewise, when we are hunting something in water, where should we aim our target?

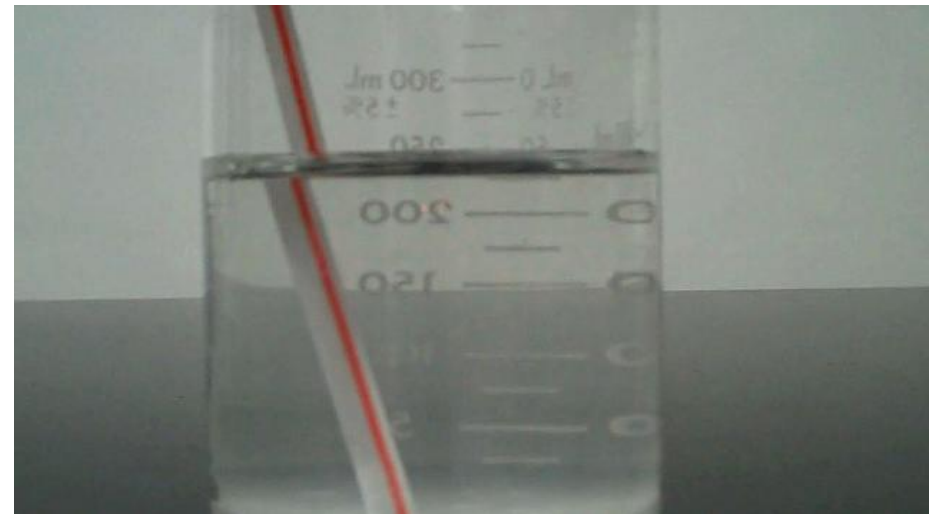
Page 525 figure 2.

Order of events: light travels from object in water to air where it refracts, then reaches our eyes. Your brain then projects the rays backward in a straight line to create a virtual image in the water.

12.7 Phenomena Related to Refraction

Think about the following:

When we see the flattened sun, is it a real image or a virtual image? When we see a mirage in the desert is it a real image or virtual?



12.7 Phenomena Related to Refraction

The Mirage – think about what conditions are required for a mirage, i.e. differences in air temperature from the ground to higher up. What part of the year is the sky often sunny and the ground very hot?