

# PreAP Light and Optics 4

- A convex lens is used to make an image.
  - Is the imager real or virtual?
  - \* Give the three ways you know this for certain: (See "Optic Basics")

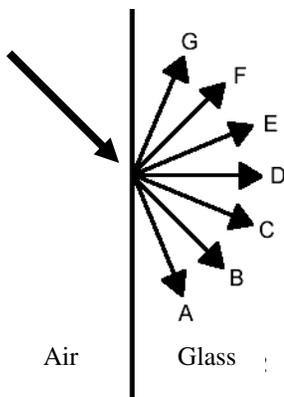


- What happens if the top half of the lens is blocked by a piece of paper?
- Why do telescopes have really large lenses?

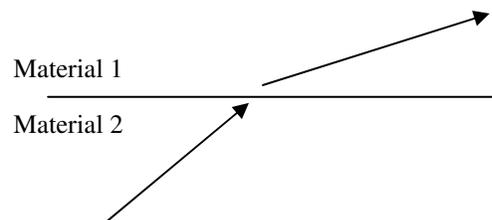
A metal spoon will help you answer the following questions. The part you scoop with is a concave mirror. The opposite side (non-eating side) is a convex mirror.

- Convergent or divergent device (could be both)?
 

A. ___ A concave mirror.	D. ___ Can magnify.
B. ___ A convex mirror.	E. ___ Can make a real image.
C. ___ Can only reduce.	F. ___ Can make a virtual image.



- The diagram at the left shows a light ray traveling from air into glass. After marking the straight path (SP) and normal (N), decide which path the light ray will take.
- In the right diagram, light goes between two unknown mediums.
  - Did the ray bend toward or away from the normal?
  - Which material is faster?
  - Which material has the higher index of refraction?

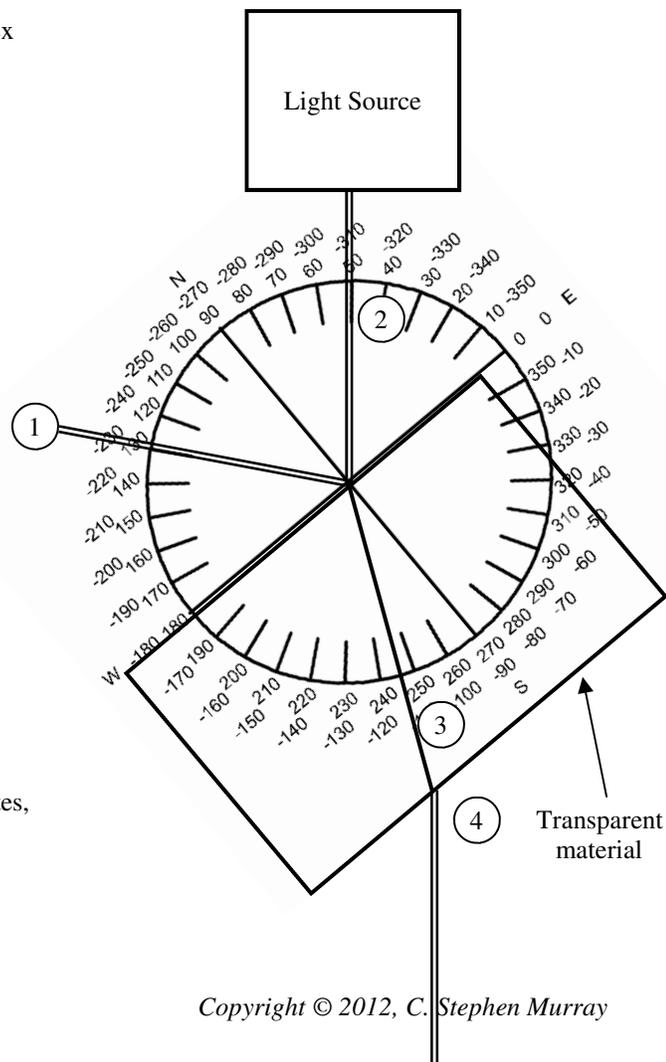


- The diagram at the right is from the index of refraction lab we did in class. I have provided a protractor for those of you that do not have one. The different light rays are numbered.
  - Which light ray is the incident ray?
  - \* What is the angle of incidence?
  - Which ray is the reflected ray?
  - What is the angle of reflection?
  - How do these angles compare?

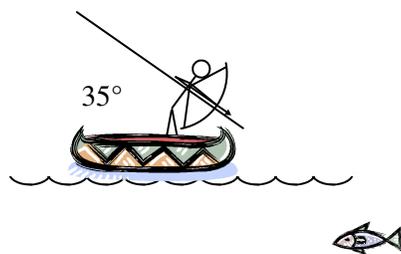
(This is ALWAYS the case. This is known as the "Law of Reflection". Also, it is always true that when a wave crosses a boundary some of the energy is reflected.)

- Which ray is the ray that refracts inside the block?
- \* For Snell's Law, what is  $\theta_1$ ?
- What is  $\theta_2$ ?
- What is  $n_1$  (for air)?
- Calculate the index of refraction for this material.

- Using the table of indexes of refraction on your "Refraction" notes, what material is this?



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6. Slim Jim decides to go fishing. Fortunately for the fish, Jim forgets his physics. In his optical ignorance Jim aims exactly where he SEES the fish.
- Draw where the fish may really be (*approximately*).
  - Where are all angles measured from in optics?
  - What angle do we need to use for our equations?
  - You know the indexes of refraction for air and water, so calculate the angle that the light actually travels in the water.

Using your TAKS notes (all 5 objectives)....

- (Day 14) Salt is dissolved in water. Is this a physical or chemical change? Why?
- (Day 15) Things that are less dense float or sink? This can lead to what kind of heat transfer?
- When a liquid is heated it tends to flow better this means it has less \_\_\_\_\_.
- (Day 16) Give an element that has the same reactivity as oxygen.
- What is the chemical symbol for sodium? Potassium?
- Consider Magnesium. A) How many valence electrons? B) How many protons?  
C) Metal or nonmetal? D) Does it tend to gain or lose electrons?
- (Day 17) Give the formula for the balanced ionic compound created when Beryllium combines with Fluorine.
  
- (Day 19) Which dissolves faster:  
A. Powdered sugar or granulated sugar? B. In hot water or in cold water?  
C. Stirred or not stirred? D. Large particles or small particles?
- (Day 20) Which side of water is positive? This makes water a \_\_\_\_\_ molecule.
- (Day 21) A compound is mixed into water and it creates a lot of OH<sup>-</sup> ions. Is it an acid or a base?
- A compound has a pH of 2.5. Acid or base?
- A solution has a pH of 11. To get its pH to 9, what do you add?
- What is the pH of pure water?
  
- (Day 6) Which organelle is responsible for keeping unwanted materials out of the cell?
- Which organelle makes proteins? Makes energy?
- (Day 7A) Are two organisms more closely related if they have the same class or the same genus?
- Which of the four organisms are the most closely related? (*And can you name any of them?*)  
A. Ursus Maritimus B. Melursus Ursinus  
C. Ailuropoda melanoleuca D. Ursus arctos
  
- (Day 7B) If the diagram shows a round membrane that is permeable to water, which way will the water flow?

\* 1B) hint: which side is real? 5B) 40° G) 40°