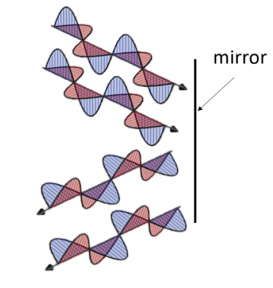
CAS PY 106

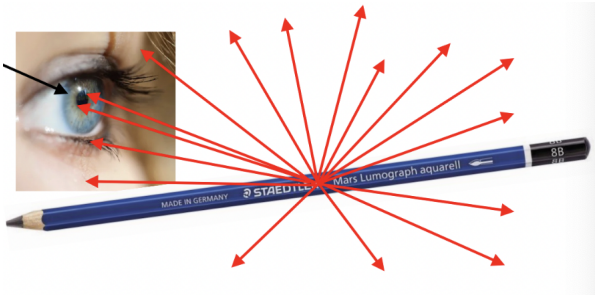
InClass Note 27

1. EM waves can change direction when they hit matter

a. 

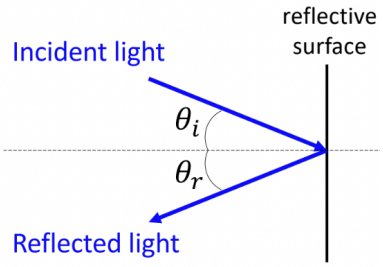
2. Ray Model of Light: Ray Optics

    a. Light very often travels in straight lines. We can represent light (an electromagnetic wave of oscillating electric and magnetic fields) using rays: straight lines emanating from an object.

b. 

    c. What we only see is the light that goes into your eyes

3. The Law of Reflection



a.

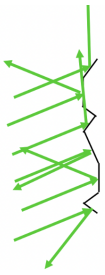
b. Angle of incidence = angle of reflection

4. Reflection

   a. Rough surfaces exhibit diffuse reflection (or scattering)

   b. Most of what we see gets reflected off of rough surfaces

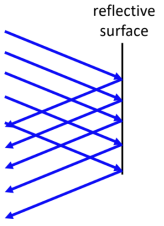
   c. The law of reflection still holds, but the angle of incidence varies

   d.  → rough surface

5. The Law of Reflection

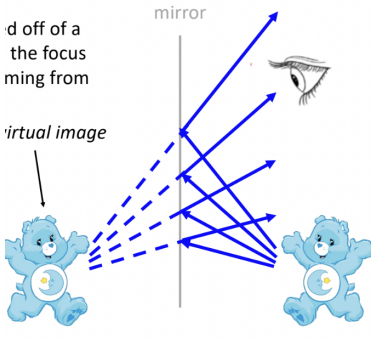
   a. With smooth, flat surfaces, such as plane mirrors, the law of reflection applies on a large scale

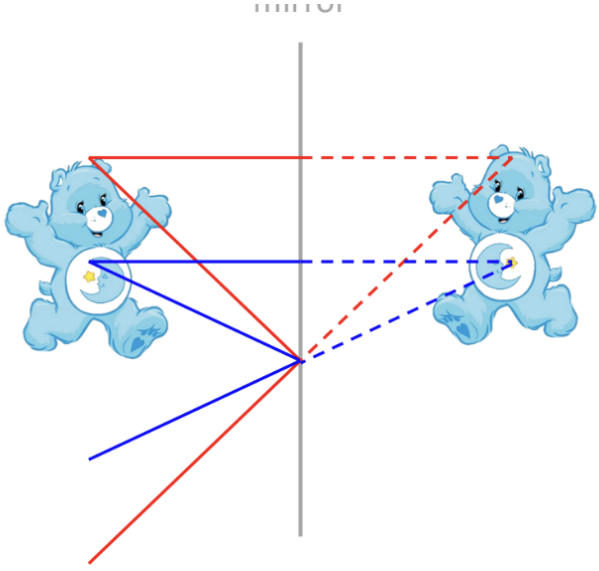
   b. All light traveling in one direction is reflected in one direction

   c. 

→ reflective surface

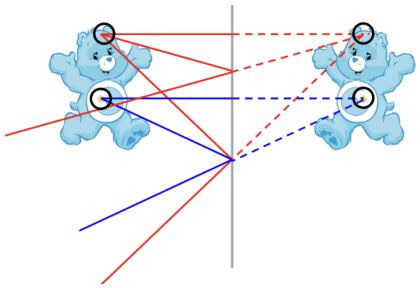
   d. This figure above is called specular reflection

6. Images
    a. The rays of light reflected off a mirror form an “image”, the focus point for rays of light coming from an object
    b. A plane mirror forms a virtual image
    c. 

    d. Light rays do not actually pass through the image (it comes off of the mirror)
7. How to find an image?
    a. Draw rays from the object to the mirror and reflect them back according to the law of reflection
    b. Make dotted lines showing where the reflected rays appear to come from
    c. The point where they converge is the image
    d. 

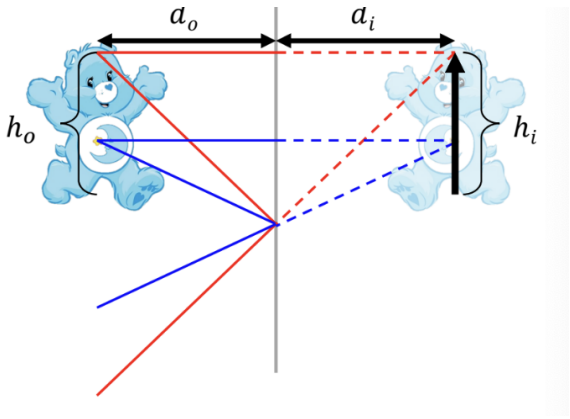
e. With a virtual image like this from a planar mirror, the image will not be located at the intersection of real rays, but the hypothetical extension of diverging rays

8. Why is this spot the image?

a. 

b. All light rays that emerge from the same point here … are projected onto the point on the right image.

9. Characteristics of images from plane mirrors

a. 

b. Images are upright

c. Images are the same size as the object

d. We define magnification:

$m = h_i/h_0$

e. The image distance d_i is the same as the object distance d_0

f. Images are virtual: no real light ray pass through the mirror from the image location