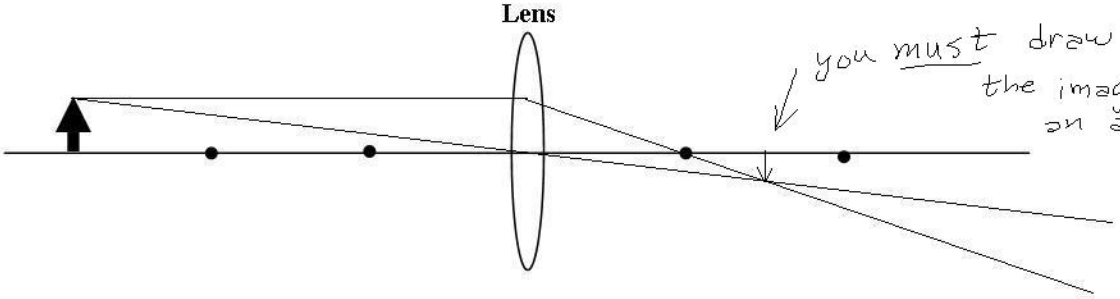
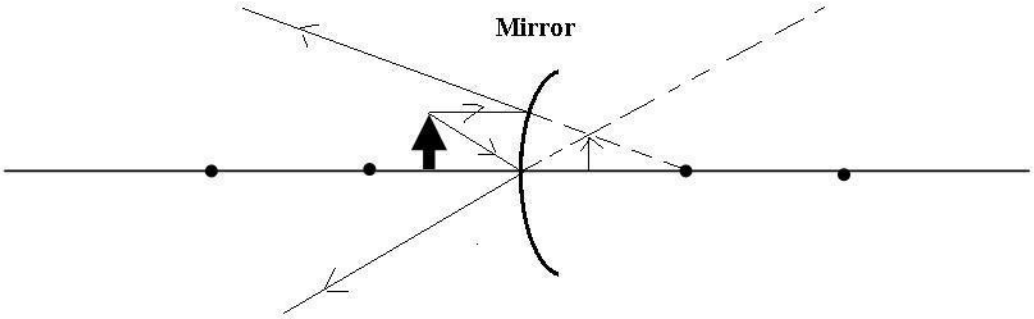
In Class Light Review 1

Lens



Mirror



Is light a wave or a particle? Prove your answer.

Both - wave because it can destructively interfere (black lines between your fingers); Particle - because it can go thru the vacuum of space.

Where does light come from?

electrons falling from high to low orbits in the atom.

Why did the phosphorous pad (glow-in-the-dark) glow slime green regardless of the light that we shined on it?

phosphorus can only glow green because of the # of protons and electrons it has.

A convex lens is convergent/divergent and magnifies/reduces.

A concave lens is convergent/divergent and magnifies/reduces.

A convex mirror is convergent/divergent and magnifies/reduces.

A concave mirror is convergent/divergent and magnifies/reduces.

f is + or –?	The Real (+) Side is Left or Right?
– Convex Mirror	L Convex Mirror
– Concave Lens	R Concave Lens
+ Convex Lens	R Convex Lens
+ Concave Mirror	L Concave Mirror

Find the wavelength of radio waves of 6.2 MHz.

$c = 3 \times 10^8$ m/s $c = f\lambda$

$f = 6.2 \times 10^6$ Hz $\lambda = c/f$

$\lambda =$?

Calculate the speed of 1,200 m microwaves.

3×10^8 m/s → still light

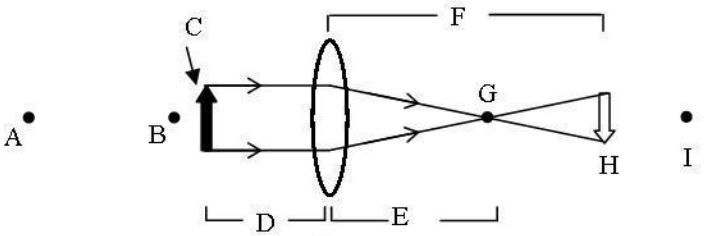
Which has more energy: Microwaves or X-rays?
Which has a shorter wavelength: gamma rays or radio waves?
Which has a faster speed: green light or radio waves? same
Which has a higher frequency: gamma rays or visible light?
Which has less energy: red light or blue light?

If it takes the sun's light 8 minutes to reach the earth, calculate the time it would take a satellite to send its radio signals back to NASA if it is the same distance from the earth as the sun.

8 mins. radio waves travel at the same speed as visible light.

Are the following + or –?

+ q if image is inverted. real	– q if the image is on the left side of a lens virtual side
+ h	– h' if the image is on the right side of a lens. real
+ h' if the image is upright	+ q if the image is on the left side of a mirror.
+ M if the image is upright	– M if the image is real.
+ h' if the image is on the right side of a mirror	
+ M if the image is virtual	



A = radius of curv.

B = virtual focal pnt

C = object

D = p

E = focal length (f)

F = q

G = focal point

H = image

I = rad. of curv.

A 4 cm object is in front of a convex mirror with a 3 cm focal length. The image is found to be 2 cm to the right of the mirror.

A) Find where the object is.

f = -3cm $\frac{1}{p} + \frac{1}{-2} = \frac{1}{-3}$ $p = \frac{1}{.1666}$

h = 4cm

q = -2cm $\frac{1}{p} = \frac{1}{-3} + \frac{1}{2} = .1666$ $p = 6\text{ cm}$

B) Find the height of the image.

$\frac{h'}{h} = \frac{-q}{p}$ $h' = \frac{-qh}{p} = \frac{-(-2)(4)}{6} =$

C) Find the magnification of the mirror.

D) Is the image real or virtual? R side of mirror

The object is placed between the focal length and center of curvature of a convex lens.

A) Where will the image be? outside C

B) Will the image be real or virtual?

C) Will the image be magnified or reduced?

Make the following additive colors using RGB.

Cyan G B	White all	Yellow R G
Red R	Magenta R B	Black none

Make the following subtractive colors using CMYK.

Blue C M	White none	Green C Y
Red Y M	Magenta M	Black K

What color does Magenta absorb?
reflects R+B so absorbs G
What color does Cyan absorb? R

Why does light refract?
one side enters a medium of diff speed first.

How can you decide which way light will refract?

It bends toward whatever side is hits the slow medium first. OR away from the side that speeds up first.

Find the speed of light in a diamond.

$n = \frac{c}{v}$ so $v = \frac{c}{n} = \frac{3 \times 10^8}{2.419} = 1.24 \times 10^8 \text{ m/s}$

Light travels thru a substance at 1.6 x108 m/s. What is its index of refraction?

$n = \frac{c}{v} = \frac{3 \times 10^8}{1.6 \times 10^8} = \frac{3}{1.6} = 1.875$

Find the critical angle from a diamond to air.

$\sin\theta_c = \frac{n_2}{n_1}$ $\theta_c = \sin^{-1}\left(\frac{1}{2.419}\right)$

$= 24.4°$

Two new substances: A (n = 1.65); B (n = 2.44).
In which substance will light travel slower? B

In which substance will light refract more from air? B

A ray of light is going 15° in water. At what angle will it be going when it passes into air?

$n_1 \sin\theta_1 = n_2 \sin\theta_2$ $\theta_2 = \sin^{-1}(.344)$

$1.33 \sin 15° = 1 \sin\theta_2$ $\theta_2 = 20.1°$

$.344 = \sin\theta_2$