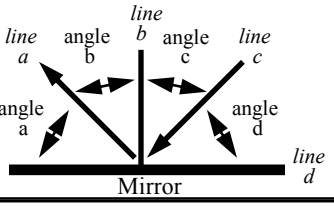
PreAP: Due Mon., Mar 27 (Assigned Thur., Mar 23)
Reg. Due Tues., Mar 29 (Assigned Fri., Mar 24)

Light 4

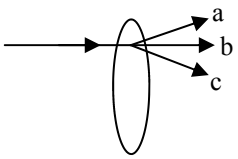
1. Optics	A. The study of how light behaves.
2. Image	B. A lens or mirror that is bigger in the middle.
3. Object	C. Light rays that spread apart.
4. Concave	D. Where your eyes think something is.
5. Convex	E. Light rays that come together.
6. Convergent	F. What you are actually looking at.
7. Divergent	G. A lens or mirror that is bigger at the ends.

1. Normal	A. A line drawn perpendicular to the surface of a mirror or lens.
2. Mirror	B. An optical device that works by refraction to bend light.
3. Angle of incidence	C. From the normal to the incoming ray.
4. Angle of reflection	D. From the normal to the outgoing ray.
5. Lens	E. Where all parallel rays come together.
6. Focus	F. An optical device that works by reflection.

The angle of incidence is: _____
The angle of reflection is: _____
The normal is: _____
The incident ray is: _____
The reflected ray is: _____

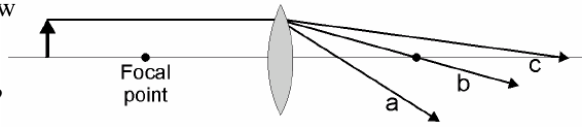


Which letter shows where the incoming light ray will go?



You stand 2 feet in front of a mirror. How far away does your image seem?

Which arrow shows the path taken by the lens?



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.

What has more energy: Radio waves or Visible light?
What has a shorter wavelength: Ultraviolet or Gamma rays?
What has a higher frequency: Visible light or Infrared?
What is the speed of radio waves?

1. Total internal reflection	A. Light created from high heat.
2. Critical angle	B. The part of a light bulb that glows when hot and makes incandescent light.
3. Fiber optics	C. When all light cannot escape glass or another medium and stays inside.
4. Incandescent	D. The angle past which light cannot escape.
5. Fluorescent	E. Technology based on bending light in cables.
6. Filament	F. Efficient light from UV radiation.

1. Polarization	A. An object that screens out all but light in one direction.
2. Polarizer	B. Light amplification by stimulated emissions of radiation.
3. Photoluminescence	C. An element that releases light slowly; used in glow-in-the-dark objects.
4. Phosphorous	D. The act of only allowing one-directional light to pass through a "filter".
5. Laser	E. Objects that give off light slowly and to "glow –in-the-dark."

How is light redirected by fiber optics?

Can a fiber optic cable be bent any direction? Why or why not?

You have an office building and need to cut cost. What kind of lights will you use and why?

Light is passed through a polarizer. How could you cancel out light with a second polarizer?

What element is photoluminescent and why?

Why don't lasers spread out into a rainbow in a prism?

A light ray hits a mirror at 30 degrees (known as the angle of _____). At what angle will it r_____ off?

Draw the above mirror and angles (be sure to put the 30°) in the right place:

Draw mirror here:

Draw and label a convex and concave lens.

Positive or Negative?

____ f for concave mirror
____ f for concave lens
____ f for convex lens

____ f for convex mirror
____ p for convex mirror
____ p for convex lens

____ q for divergent devices
____ if the image is inside a mirror

____ if the image is on the same side of a lens as the object.

From now on we will ALWAYS put the object on the left and the device (mirror or lens) on the right.

A 3 cm object is 5 cm in front of a convex mirror with a 2 cm focal length.

A) Find the distance to the image.

B) Find the magnification of the mirror.

C) Find the height of the image.

D) Is the image real or virtual?

A 5 cm object is 8 cm in front of a convex lens. The image appears inverted and 10 cm behind the lens.

A) Find the focal length.

B) Find the magnification of the lens.

C) Find the height of the image.

D) Is the image real or virtual?

If the index of refraction of glass is 1.52, find the speed of light in glass.

(Honors only from here on)

If a lawn with dandelions is next to a field that is not mowed, you will notice the dandelion blossoms in the lawn grow very short: close to the ground. In the tall grass of the nearby unmowed field the dandelion blossoms grow tall.

A) What do we call this process of differences?

B) Why do the dandelions grow differently?

India (like many countries around the world) has set up many national parks to protect native wildlife, such as the tiger. To their surprise tigers in these parks are becoming inbred and weaker. Why?

Does an adaptation have to be passed genetically? Explain.