Warm Up

1. Light is incident upon flint glass from water at an angle of 35.0º, what is the angle of refraction?
2. A laser beam in alcohol is incident upon a diamond at an angle of incidence of 57.0º, what is the angle of refraction?
3. How long was 79.0 N of force applied by a 25.0 kg person to increase her speed by 4.90 m/s?
4. What is the centripetal acceleration of a cylinder with a radius of 2.50 m rotating with a velocity of 5.00 km/hr?
5. What is the distance (in meters) that a car traveled if it had a velocity of 93.0 km/hr for 4.00 hrs?

Targets

- I can explain how mirrors and lenses work.

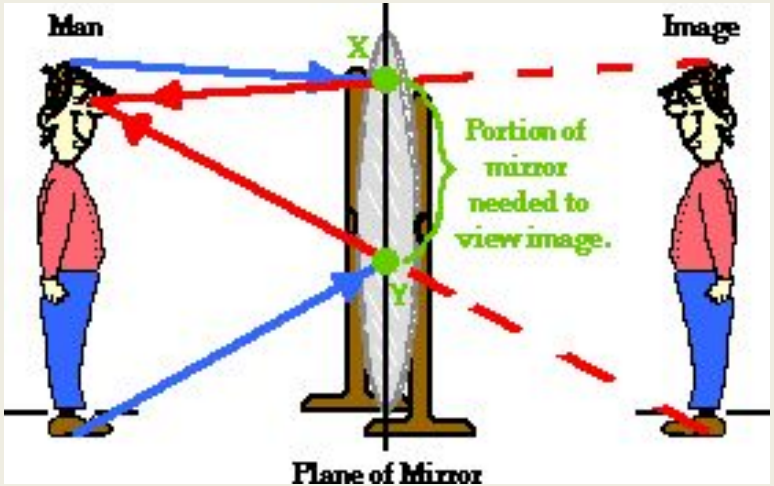
Mirrors and Lenses

Mirrors

- When light strikes an opaque material, the light will reflect off the surface.
- The law of reflection states that the angle of reflection is the same as the angle of incident.
- The angle will be based off the normal or 90^{o} to the surface of the material.
- $\Theta_r = \Theta_i$

- Smooth surfaces produce specular reflections with all the rays reflected in parallel.
- Rough surfaces produce diffuse reflections with scattering of light.
- A plane mirror is a flat, smooth surface that produces specular reflections.
- An object in the mirror is a source of light rays reflected by the mirror.

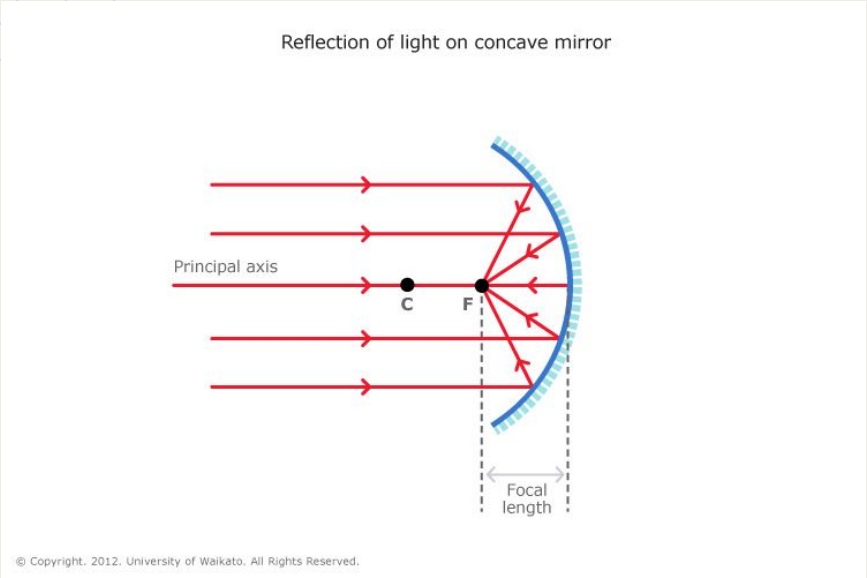
- The planes mirror will produce virtual images, images formed by the diverging of light rays and on the opposite side of the mirror from the object.



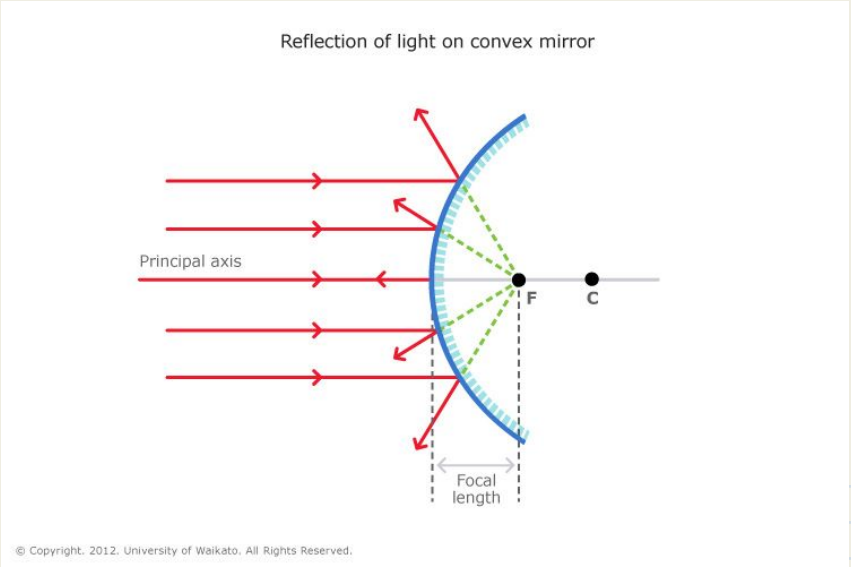
http://www.physicsclassroom.com/class/refln/Lesson-2/What-Portion-of-a-Mirror-is-Required-to-View-an-Im

- Concave mirrors have a reflective surface with the edges curved towards the observer.
- All rays in a concave mirror reflect through a central point called the focal point.
- Concave mirrors can produce a virtual image or a real image, an image that is formed by the converging of light rays and is upside down and larger than the object.

- Convex mirrors are a smooth surface with the edges curved away from the object.
- Convex mirrors form virtual images but appear to be smaller than the object.
- The images are small but the field of view is large, more of the surroundings can be seen in the mirror.



https://socratic.org/questions/is-a-concave-mirror-converging-or-diverging

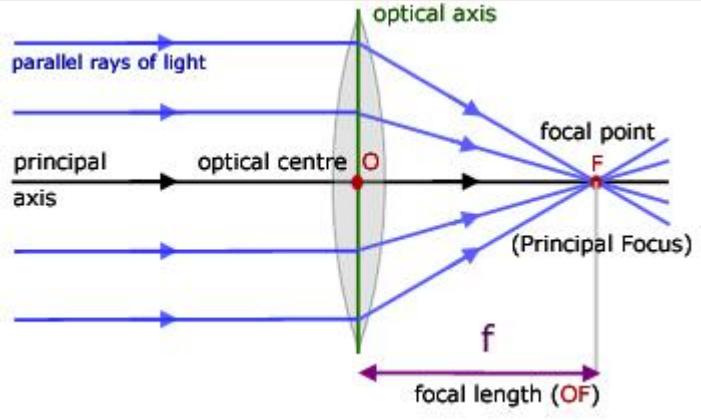


http://sciencelearn.org.nz/Contexts/Light-and-Sight/Sci-Media/Images/Convex-mirror

- A lens is a transparent material with an index of refraction greater than air and is used to focus light.
- Lenses can have either flat or curved faces.

Convex Lenses

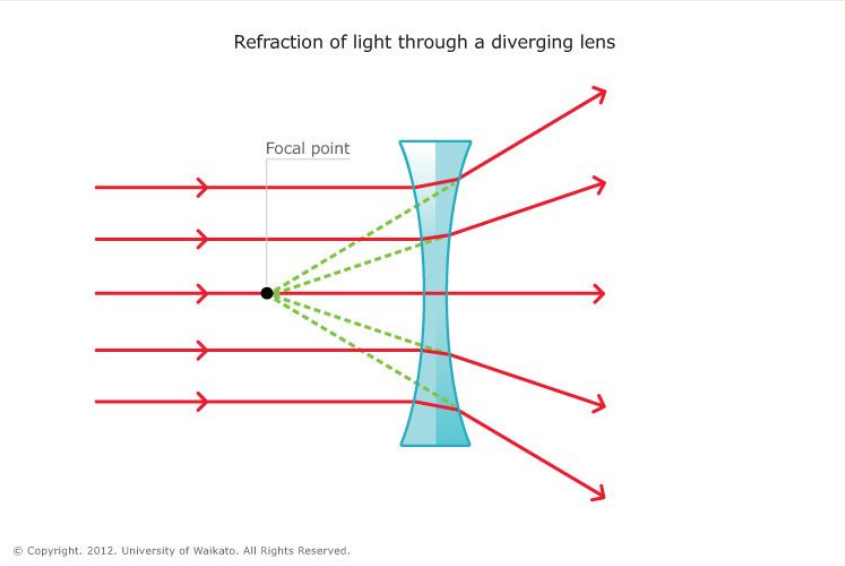
- Convex lenses can take a ray of light and bring it to a focus on the opposite side of the lense.
- Convex lenses can create a real image or virtual image.



http://www.a-levelphysicstutor.com/images/optics/lnss-conv-ray01.jpg

Concave Lenses

- Concave lenses can cause all rays to diverge.
- Concave lenses can only produce virtual images.



http://sciencelearn.org.nz/Contexts/Light-and-Sight/Sci-Media/Images/Concave-lens

Gravitational Lensing

- Gravitational lensing is the bending of light as it encounters objects with gravity.
- The effect allows objects to be seen around stars and galaxies producing gravity.

http://apod.nasa.gov/apod/image/1508/cl0024images_nst_1251.jpg

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