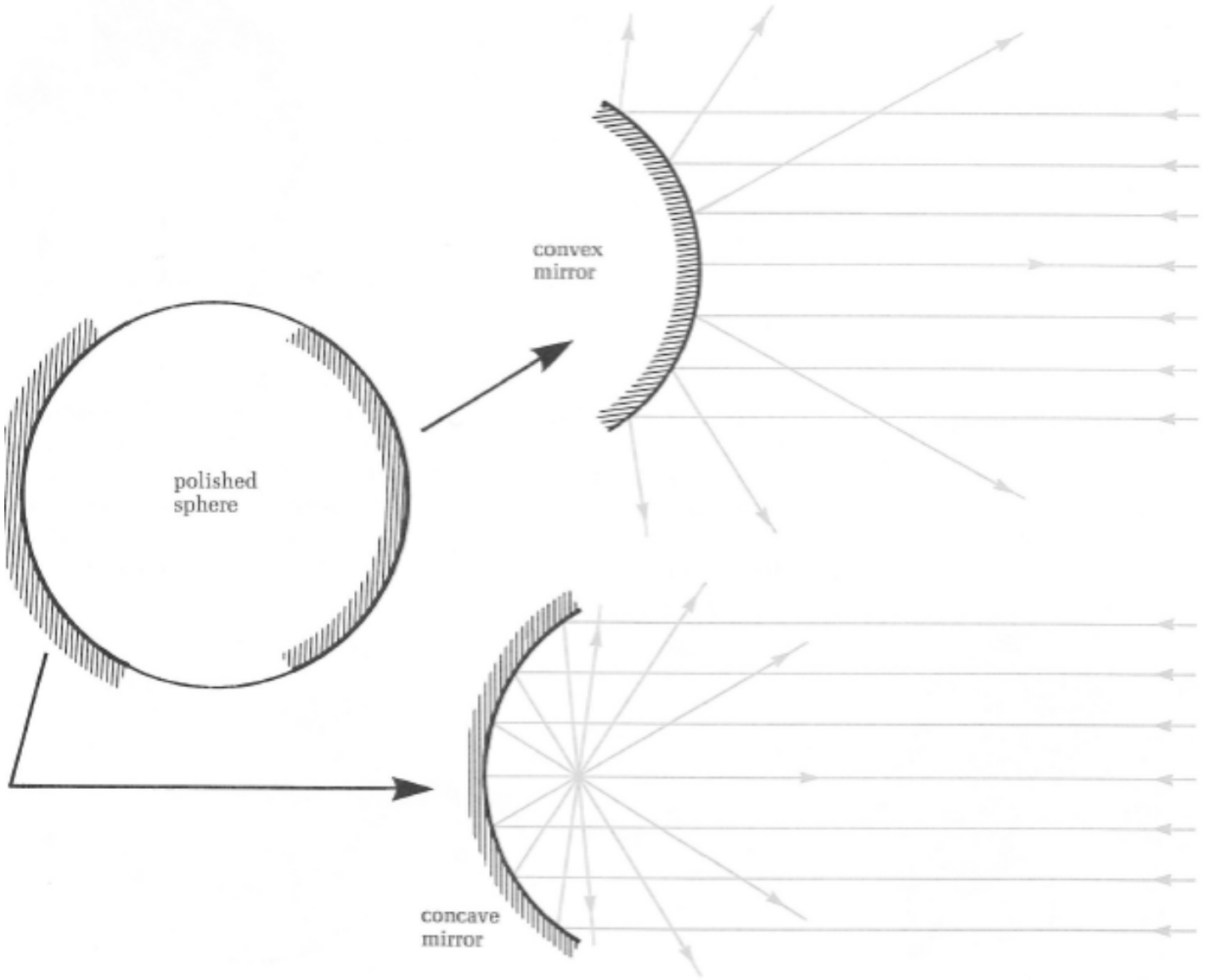
Mirrors 2 – Curved Mirrors

Lesson 5

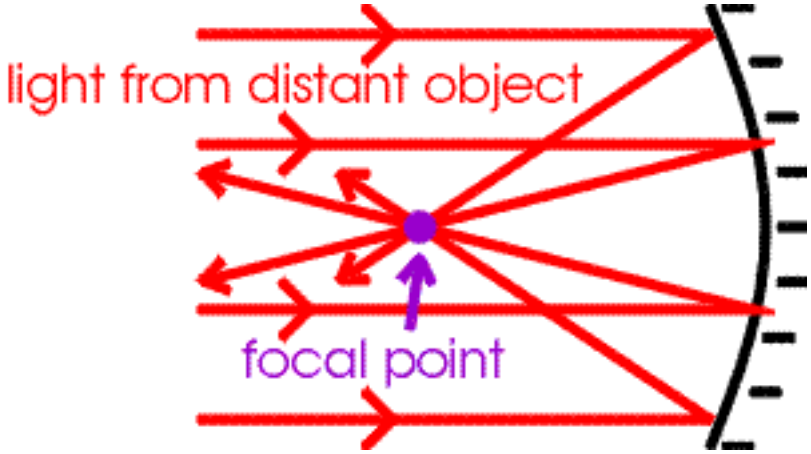
November 9th, 2010

Curved Mirrors



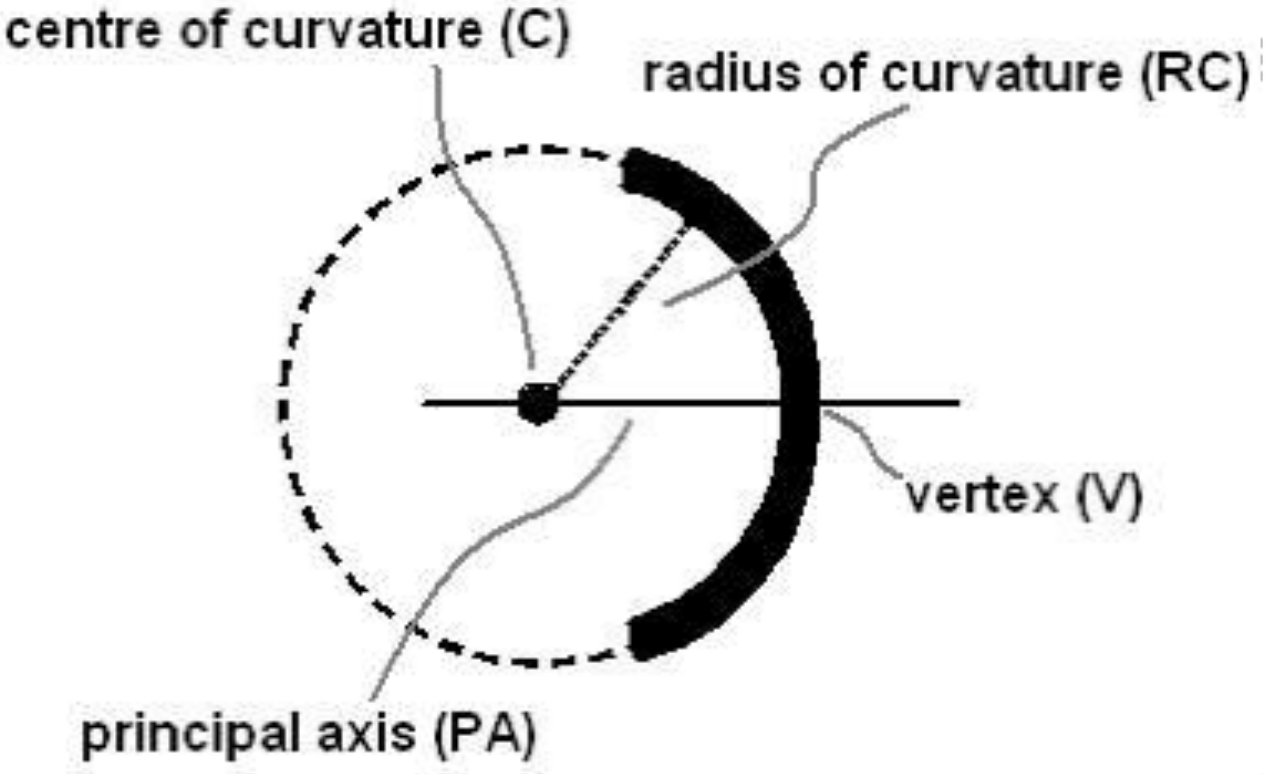
Curved Mirror Terminology

- Curved mirrors also obey the law of reflection.
- When parallel light rays strike a curved surface, each ray of light will reflect at a slightly different position. All of these rays eventually meet at a common point.
  - The point where light rays meet, or appear to meet, is called the **focal point**, **F**



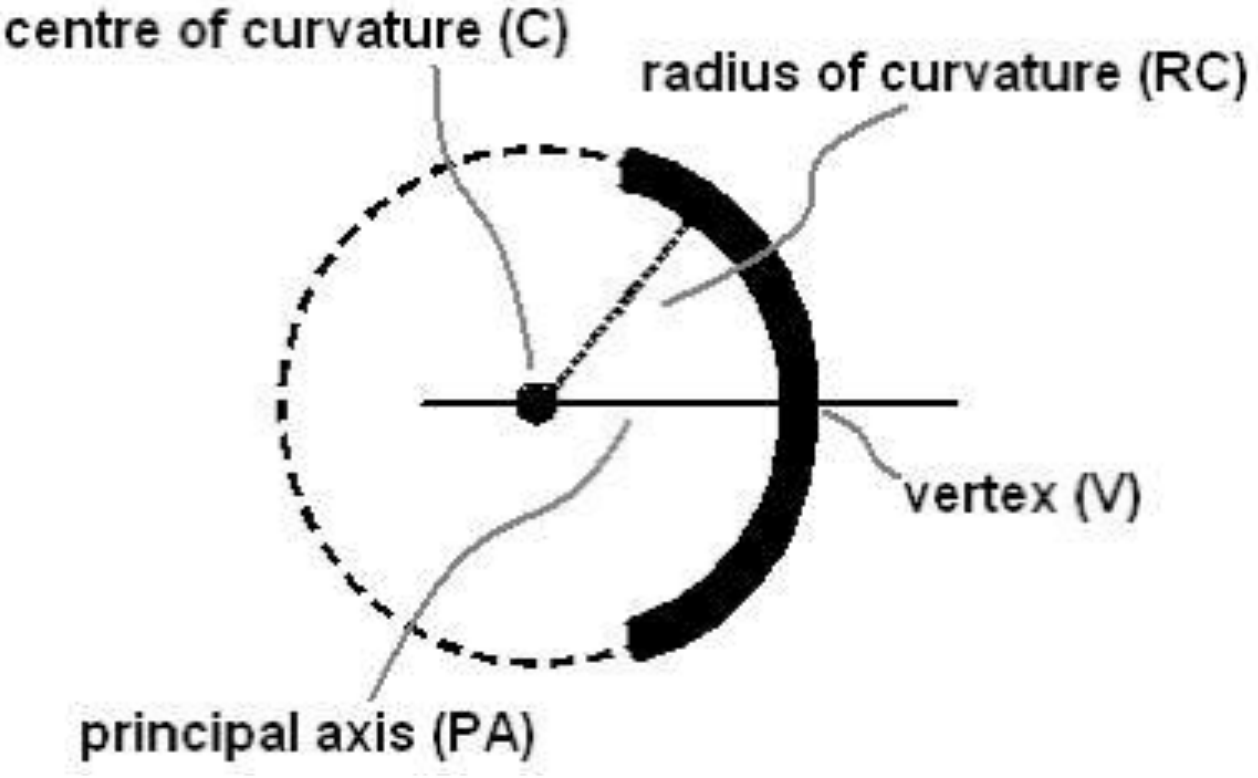
Curved Mirror Terminology

- **Vertex (V)-** The middle point of a curved mirror
- **Centre of curvature (C)** if the mirror were extended to be a circle/sphere, this point would be the centre.



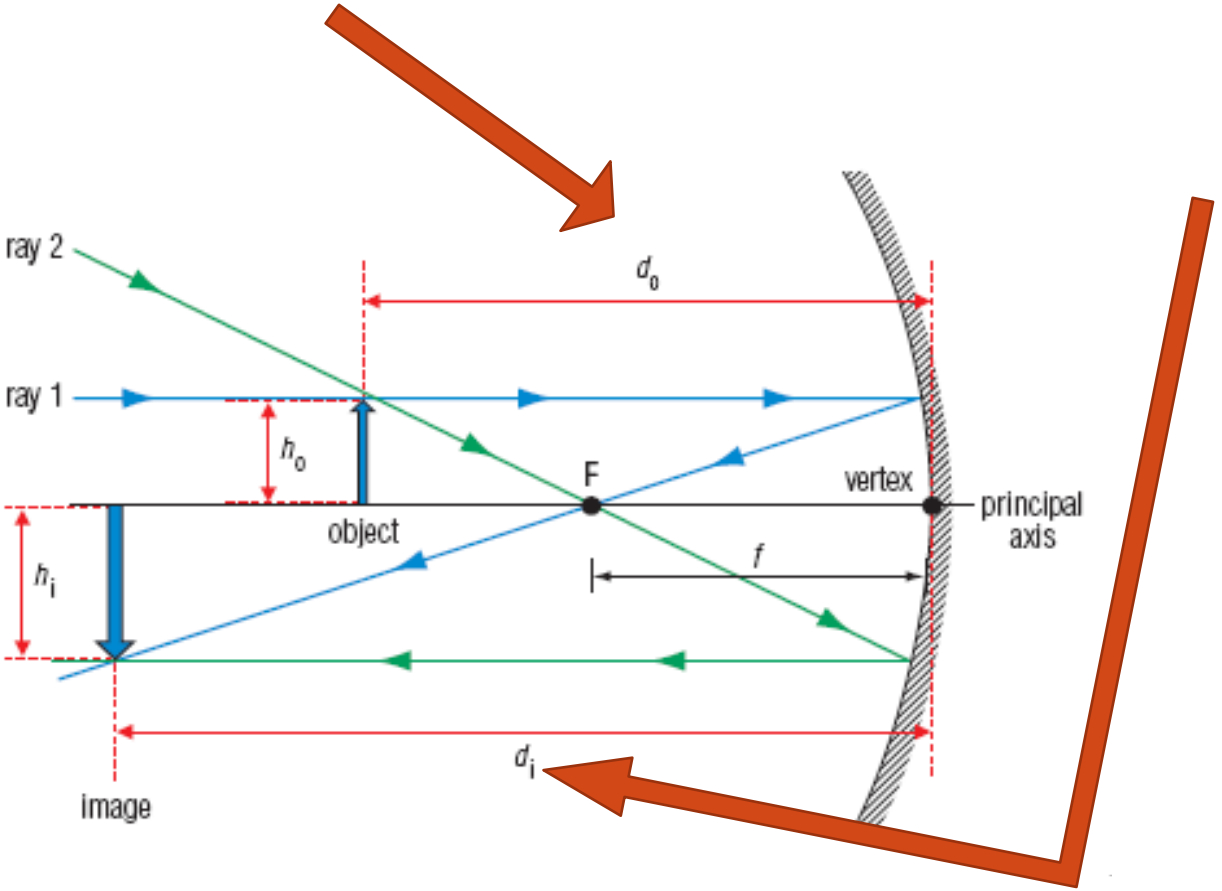
Curved Mirror Terminology

- The **principal axis (PA)**is an imaginary line drawn through the vertex, perpendicular to the surface of the curved mirror.



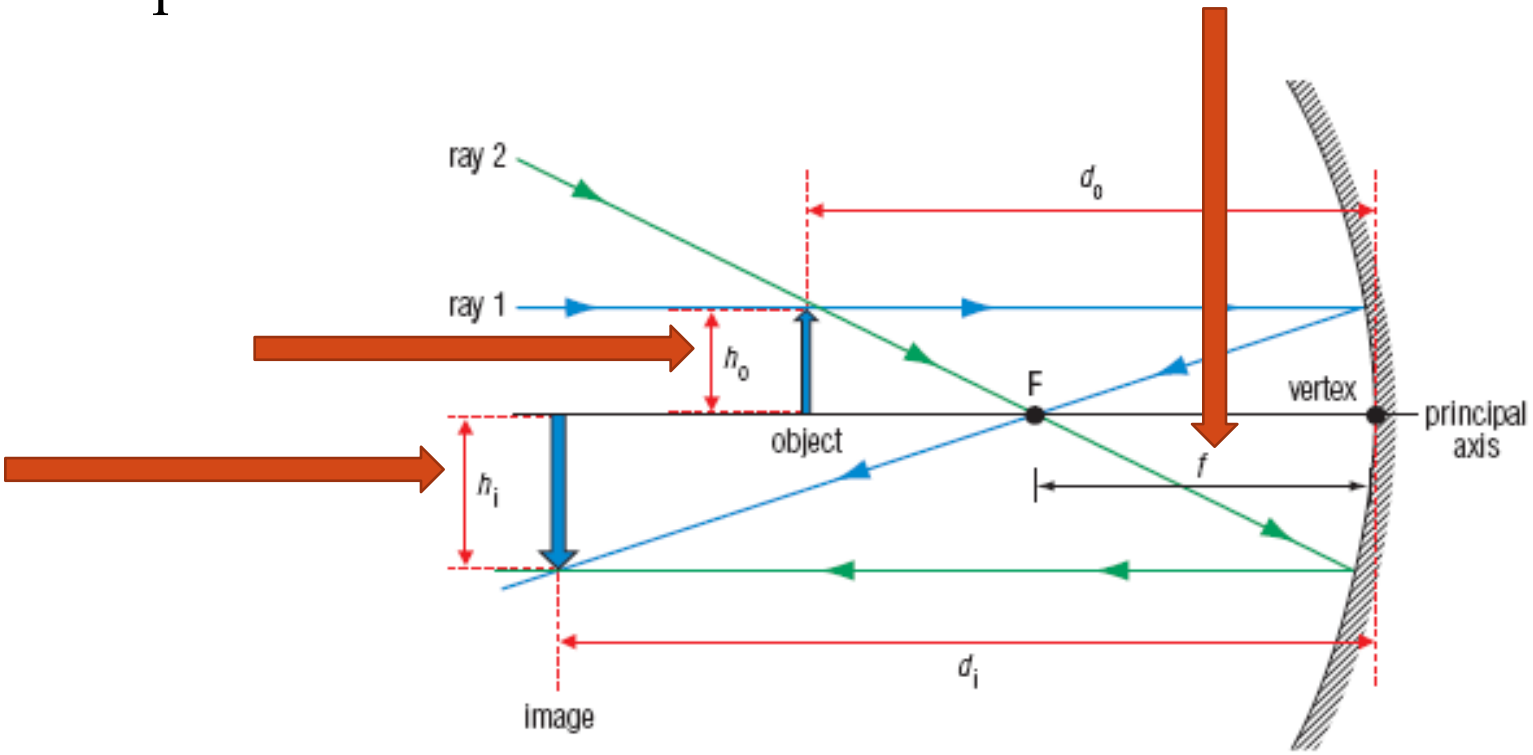
Curved Mirror Terminology

- The distance between the vertex and the object is represented by d_o.
- The distance between the vertex and the image is d_i.



Curved Mirror Terminology

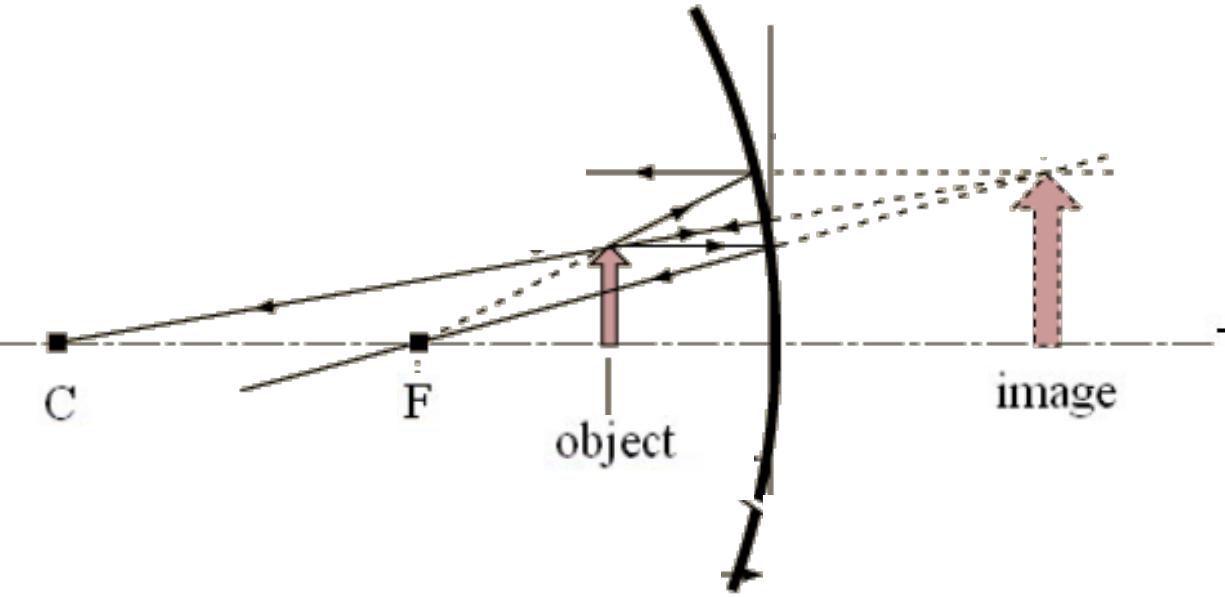
- The height of the object is h_o,
- The height of the image is h_i.
- The **focal length**, f, is the distance from the vertex to the focal point of a curved mirror.

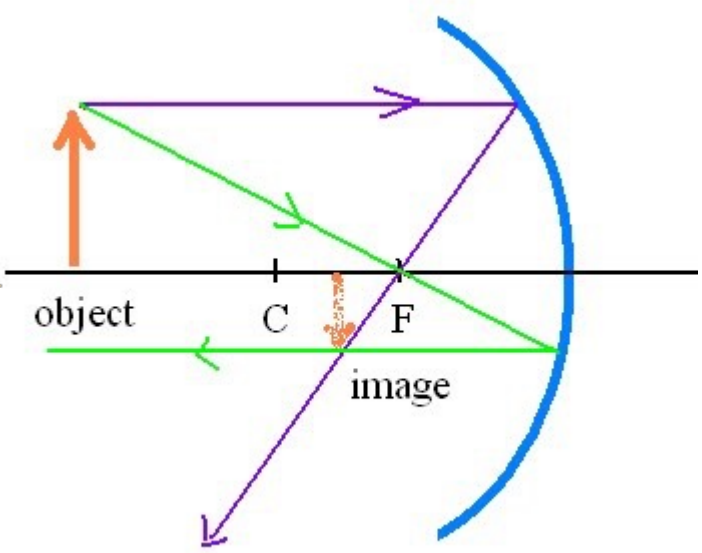


- If the object is farther away from the mirror than the focal point, the reflected rays form a real image.
- **A real image is an image formed by light rays that converge at the location of the image.**

Concave Mirrors

- **A concave mirror, also called a converging mirror, has a surface that curves inward like a bowl**
- The image formed by a concave mirror depends on how far the object is from the focal point of the mirror.
  - The image can be larger or smaller than the object as well as inverted or upright and real or virtual



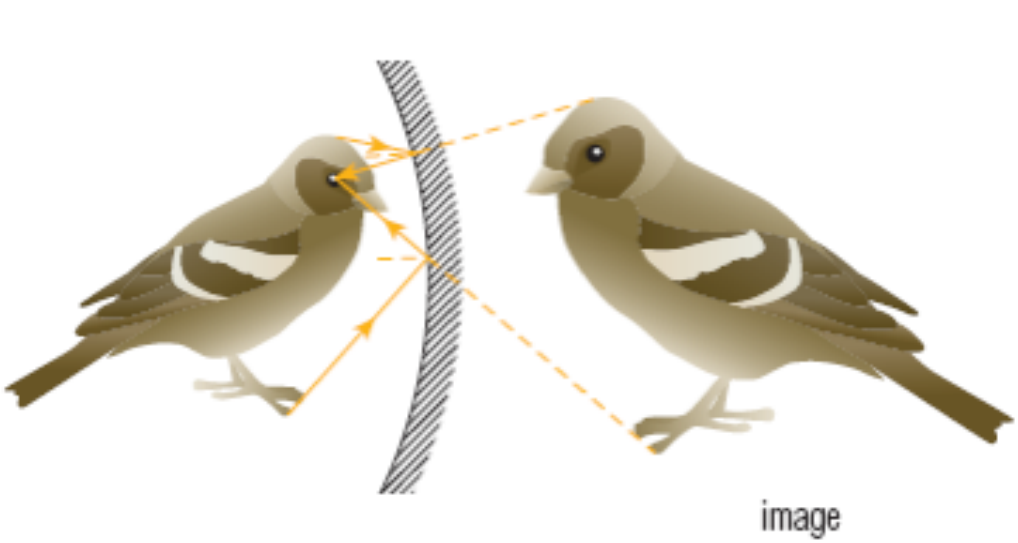


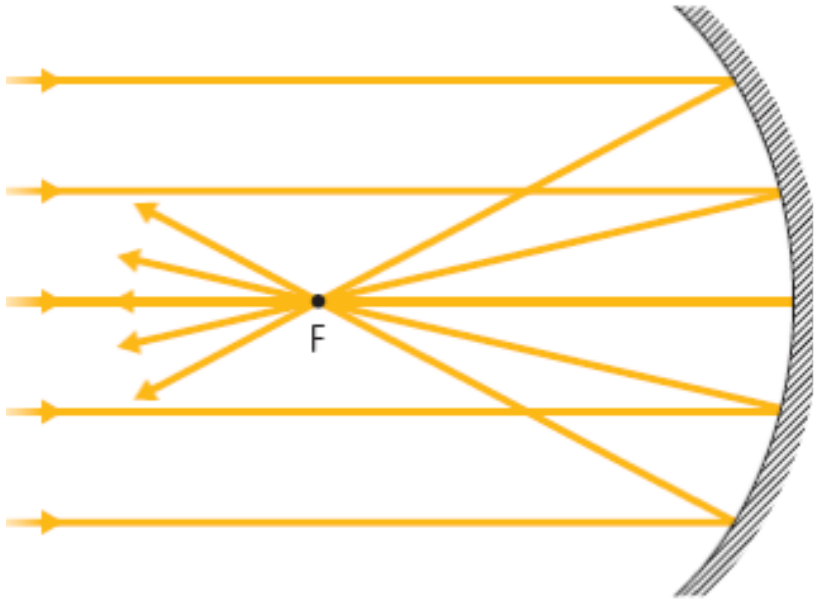
Concave Mirrors

- To explain the size, location and type of image, the acronym **S.A.L.T** is used.
- **Size of image**: compared to the object: same, larger, or smaller
- **Attitude of image**: oriented compared to object: upright or inverted
- **Location of image**: distance from mirror surface
- **Type of image**: real or virtual (A real image is formed when the light actually arrives at the image location.)No real image forms in a plane mirror.

Some Uses for Concave Mirrors

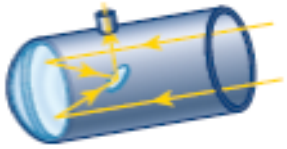
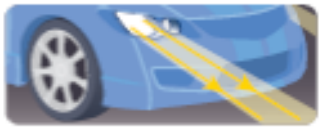
- **Concave mirrors are specially designed to collect light and bring it to a single point.**





Some Uses for Concave Mirrors

- Used in telescopes to collect light rays from a great distance and bring them together.
- flashlights, car headlights, dental examination lights, and other applications

Device	Use of Concave Mirror
Flashlight 	To produce a parallel beam
Telescope 	To collect light from a distant source and focus it for viewing
Cosmetic mirror 	To produce an enlarged image
Headlights of a car 	To produce a parallel beam of light that can be directed down (low beam) or straight ahead (high beam)

Solar Ovens

- **Device that uses light from the Sun as its energy source to heat or cook food.**
- A solar oven uses a concave mirror to concentrate the Sun's rays, converting light to heat through absorption if the interior of the oven is a dark colour, and using a clear cover so that the Sun's rays can enter but very little heat can leave.