Lenses

Terms related to Lenses:

Centre of Curvature: it is the centre of the sphere of which the surface of lens is a part.
Radius of curvature: it is the radius of the sphere of which the surface of the lens is a part.
Principle axis: line passing through the optic centre of lens and perpendicular to both the faces of lens
Optical centre: is the geometrical centre of the lens
Principle Focus:

- *Of Convex lens* : Rays of light entering parallel to principal axis after refraction converges at a point on principal axis called "Focus "
- *Of Concave lens* : Rays of light entering parallel to principal axis after refraction appears to diverge from a point on principal axis called "Focus "

Focal length: is the distance between its optical centre and principal focus

LENS

Convex or Converging Lens

- On touch – Thick in middle and thin at edges
- Converge light rays
- Forms mostly real and inverted image

Uses:

- In optical instruments like camera, microscope
- Reading lens
- Magnifying glass
- Correction for long sightedness

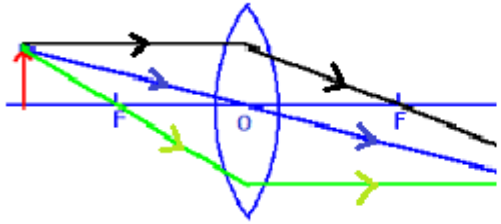
Concave or Diverging Lens

- On touch – Thin in middle and thicker at edges
- Diverge light rays
- Always forms virtual, erect and diminished image.

Uses:

- In telescopes
- Correction for short sightedness

Principal or Construction rays – Convex Lens

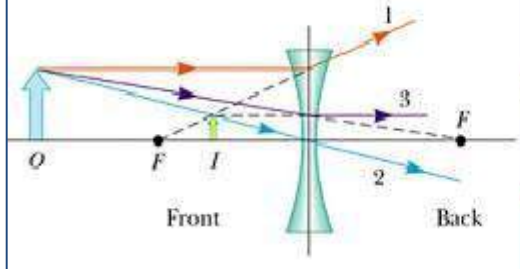


Ray incident parallel to principal axis – After refraction pass through Focus

Ray incident at the optic centre – passes undeviated through the lens

Ray passing through Focus – After refraction emerges parallel to principal axis

Principal or Construction rays – Concave Lens

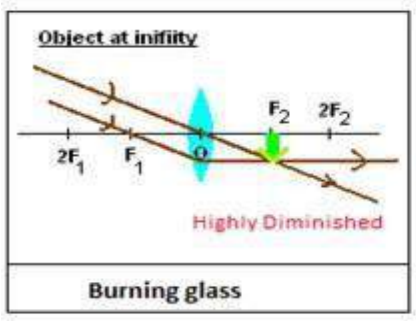


Ray incident parallel to principal axis – After refraction appears to come from focus

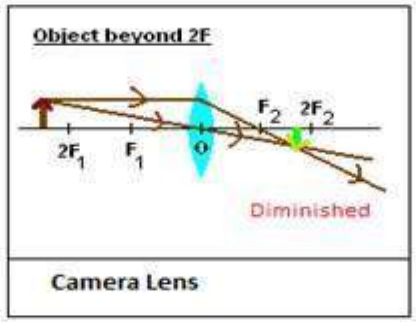
Ray directed towards Focus – After refraction emerges parallel to principal axis

Ray incident at the optic centre – passes undeviated through the lens

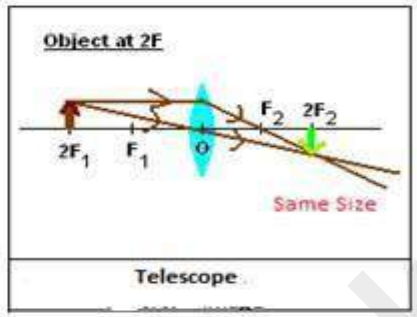
Convex Lens Ray Diagrams:



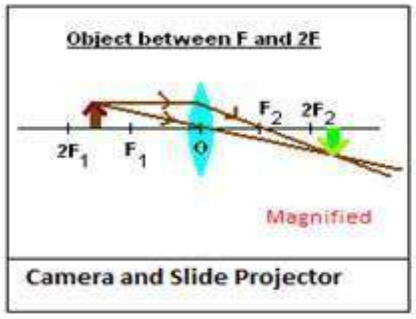
Burning glass



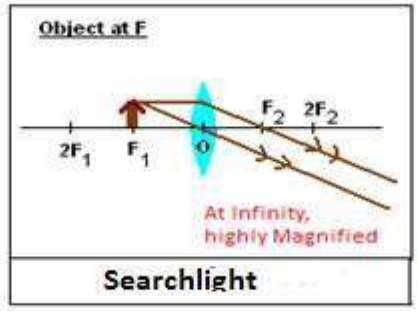
Camera Lens



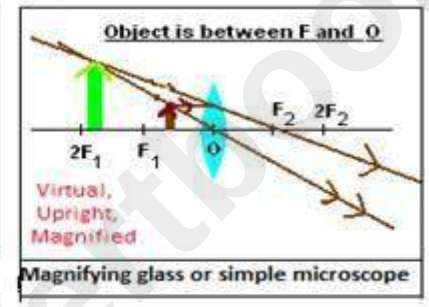
Telescope



Camera and Slide Projector



Searchlight



Magnifying glass or simple microscope

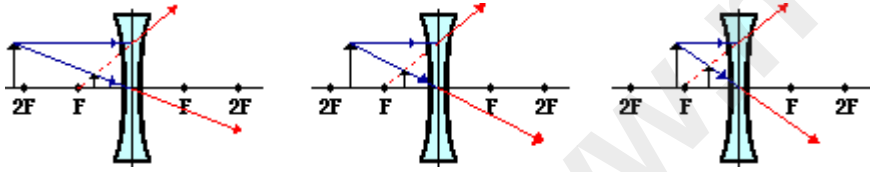
Object – Brown

Image - Green

Convex Lens :

- Mostly Real and Inverted image
- Virtual Image - only for the object positioned between 'F' and 'O'

Concave Lens Ray Diagrams :



Object –Black

Image - Blue

Concave Lens :

- Always Virtual Image
- Always Diminished Image

Real Image	Virtual Image
Formed due to actual intersection of refracted rays	Formed when refracted rays appear to meet if they are produced backwards
Can be obtained on a screen	Cannot be obtained on a screen
Always inverted	Always erect (upright)

To find focal length of convex lens: