

REFRACTION AND LENSES

Complete this concept review handout and keep it as a record of what you have learned.

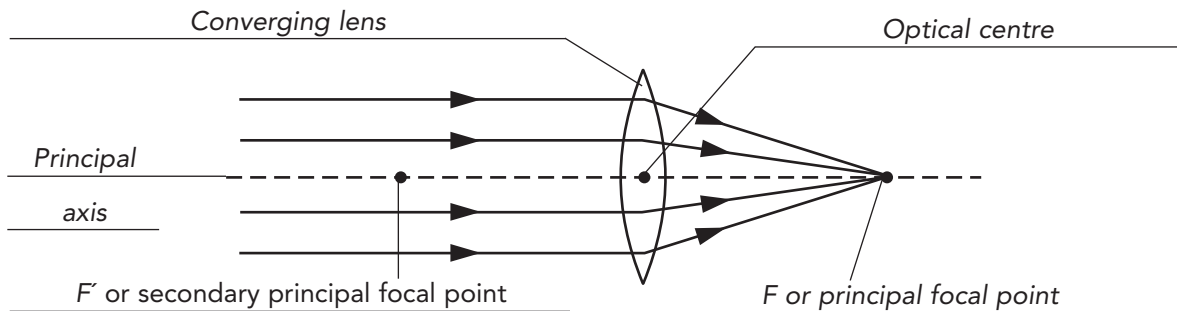
DEFINITIONS

- Refraction is the deviation of a light ray as it passes from one transparent medium to another.
- A lens is an object made of transparent materials that has at least one curved surface, and the ability to refract light as it passes through them.

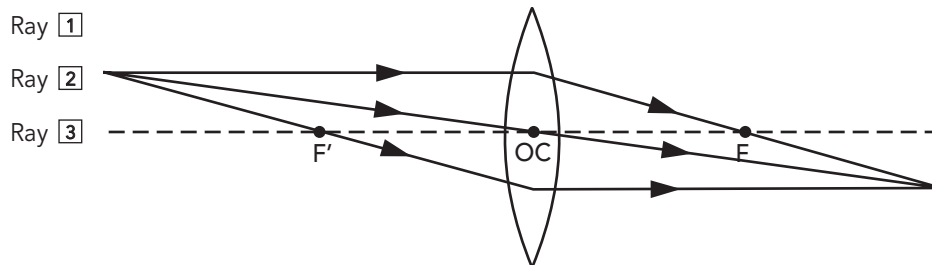
CONVERGING LENS

Focal point of a converging lens

The focal point of a converging lens is the real point where the refracted rays actually meet when the incident rays run parallel.



Basic rays to determine the location of the image



Ray 1 A ray that travels parallel to the principal axis is refracted through the principal focal point.

Ray 2 A ray that travels straight through the optical centre of a lens is not refracted.

Ray 3 A ray that travels straight through the secondary focal point is refracted parallel to the principal axis.

CONVERGING LENS (CONT.)

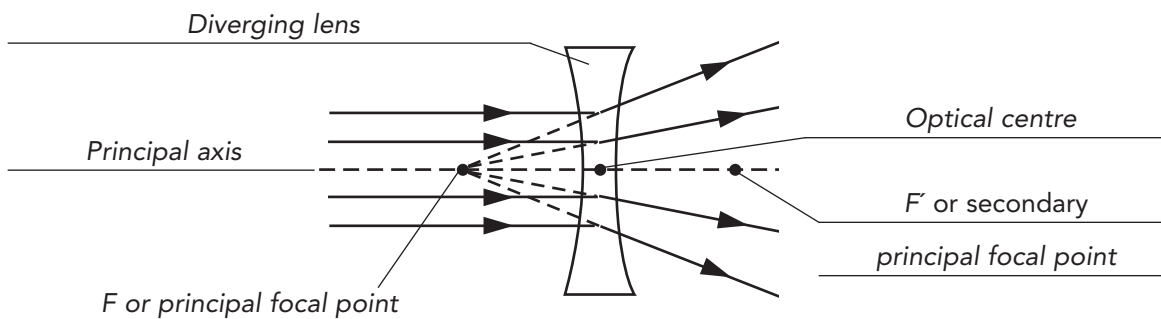
Image produced by the lens

- The final image formed by a converging lens has different characteristics depending on the location of the object in relation to the lens.
- The characteristics, which can vary, are: the type of image (real or virtual), its position, its size and its orientation.

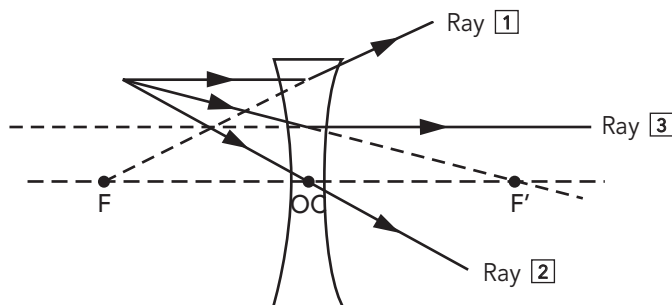
DIVERGING LENS

Focal point of a diverging lens

The focal point of a diverging lens is is the virtual point from which the refracted light rays appear to emanate when the incident rays run parallel.



Basic rays to determine the location of the image



Ray 1 A ray running parallel to the principal axis is refracted, appearing to originate from the focal point.

Ray 2 A ray passing through the optical centre of the lens does not deviate.

Ray 3 A ray travelling toward the secondary focal point is refracted parallel to the principal axis.

Image produced by the lens

- The images obtained by a diverging lens are always virtual, not inverted and smaller than the object.
- The image is always located between the principal focal point and the lens.