Lenses and Ray Diagrams

SNC2D

A **lens** is a piece of transparent material that has been shaped in such a way that it _____ light rays to _____.

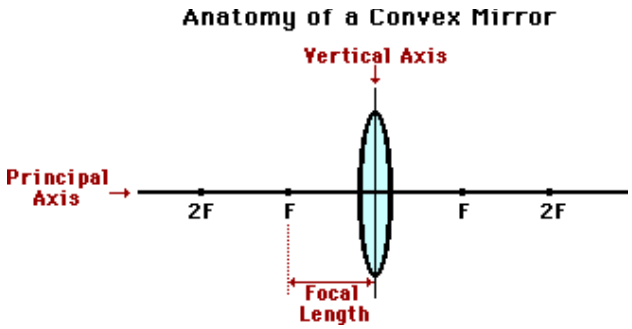
A _____ **lens** (here, a double convex lens) focuses parallel rays to a single point and can form a _____ image.

Sketch:

A _____ **lens** (here, a double concave lens) will always form a _____ image.

Sketch:

Note that there are two _____, one on either side of the lens, and that rather than *C* (the centre of curvature), we have 2*F* (twice the focal length).



Refraction Rules for a Converging Lens

- An incident ray travelling parallel to the principal axis will refract such that it travels

  _____.

- An incident ray travelling through the focal point will refract such that it travels

  _____on the far side of the lens.

Point to note:

Not all converging lenses are double-convex lenses. Converging lenses may have different shapes. When drawing ray diagrams, therefore, we ignore the shape of the lens and refract the rays at

_____ _____.

Refraction Rules for a Diverging Lens

- An incident ray travelling parallel to the principal axis will refract such that its

  _____ travels _____

  on the _____ side of the lens.

- An incident ray travelling towards the focal point on the _____ side of the lens

  will refract such that it travels parallel to the principal axis on the far side of the lens.

The 3rd Rule (for Both Lenses)

- An incident ray travelling through the exact _____ of the lens will continue

  to travel in the _____ direction after refracting through the lens.

Ray Diagrams Redux

We can use ray diagrams to locate and describe the characteristics of an image.

Step 1: Draw the _____ rays (parallel to the axis, through the focus, and/or through the centre).

Step 2: Draw the _____ rays according to the refraction rules.

Step 3: Locate the _____

More Practice

Draw scaled ray diagrams to determine the answers to page 462 #6 and #10.