WODSS SCIENCE
SNC 2DI

Name: _____
Date: _____

Activity: Introduction to Lenses

Part A – Parallel Lines

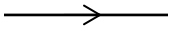
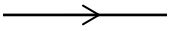
1. Place your lens in the indicated space
2. Using your ray box shine five parallel rays parallel to the principal axis
3. Mark the path of the light with a series of small dots
4. Remove the lens and use a ruler to connect the pencil marks (the light should change direction at the outline of the lens)
5. For the diverging lens use a ruler and trace the reflected rays back behind the lens

Converging lens
Diverging lens

What do you notice about the direction of the refracted rays in each lens?

Why does this happen?

1. Place your lens in the indicated space below and shine a ray of light along the incident ray indicated
2. Use a pencil to lightly trace the path of the light
3. Remove the lens and use a ruler to connect the pencil marks with solid lines to show the path of the light **(the light ray should change direction at the outline of the lens)**
4. **Draw a normal** at the points **where the light enters and exits the lens and measure the angles**

Converging Lens	Diverging Lens
	

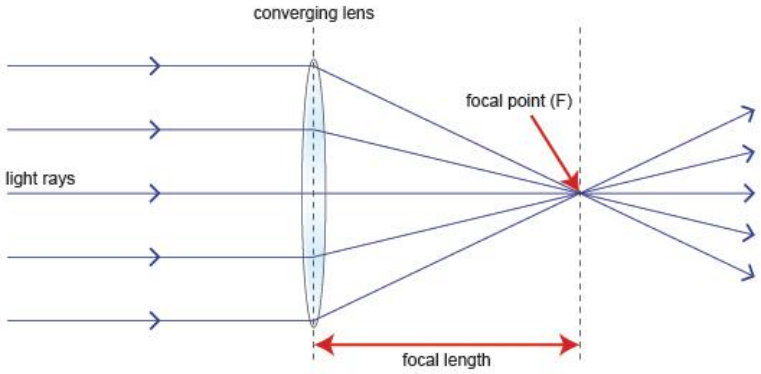
Does the light bend **towards or away from the normal** as it enters the lens? Using your knowledge of refraction explain why.

Does the light bend **towards or away from the normal** as it exits the lens? Using your knowledge of refraction explain why.

A lens is a _____ with at least one _____side that causes light to _____

There are two main types of lenses…

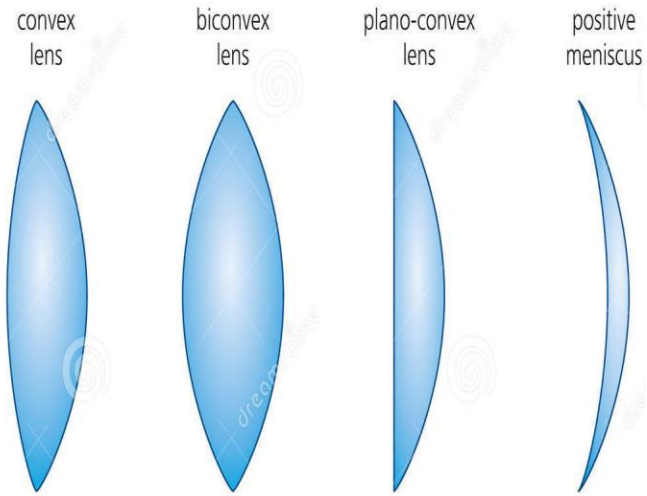
Converging lenses



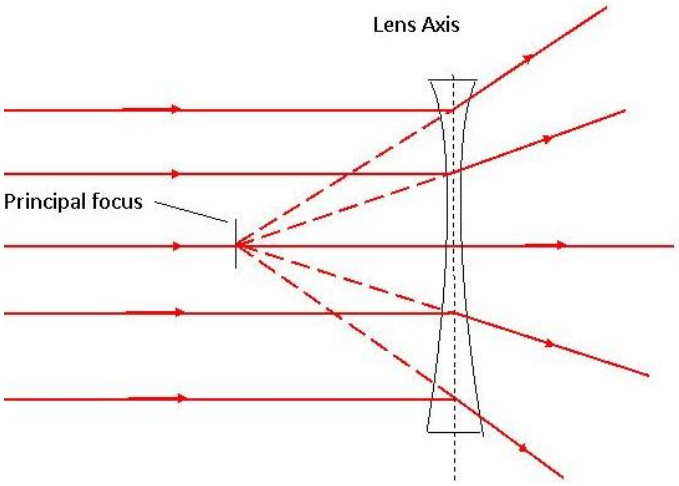
Bring parallel light rays _____

_____

Contain at least one convex surface



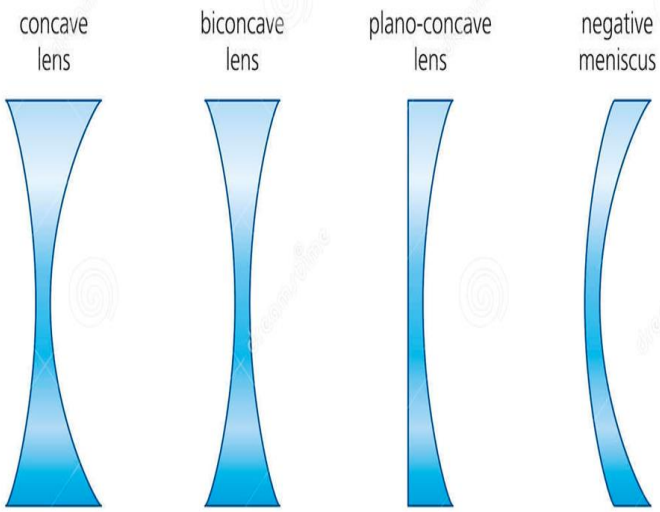
Diverging lenses



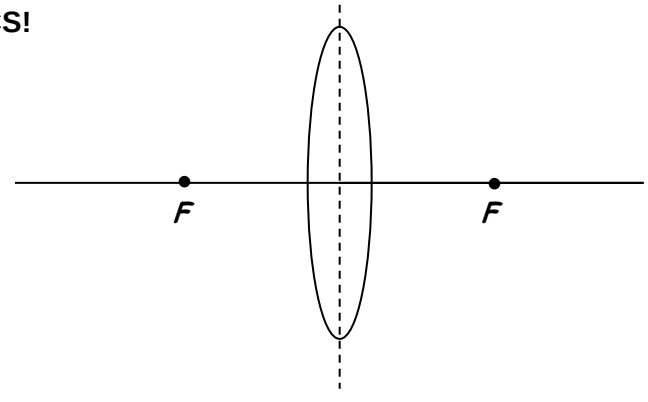
Cause parallel rays to _____

_____

Contain at least one concave surface



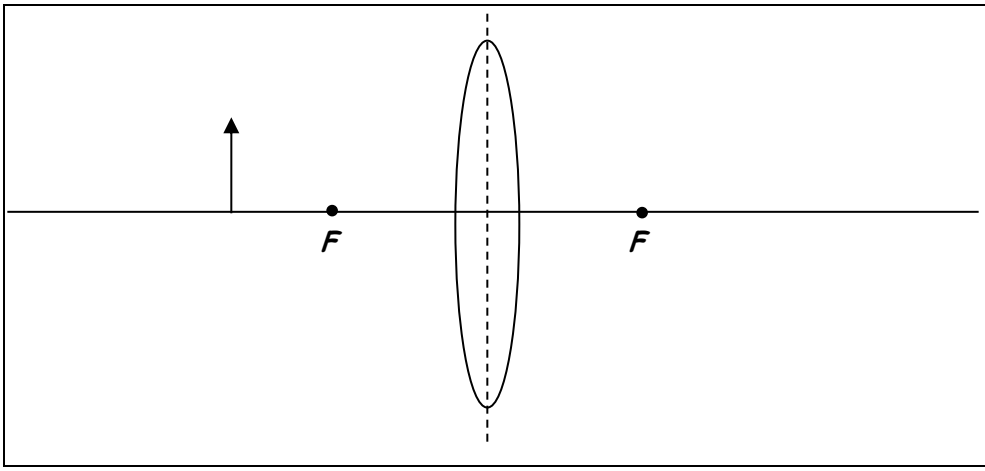
RAY DIAGRAMS – THE BASICS!



Drawing Ray diagrams

For Converging Lenses
Need **three rays originating from a required point of the object** in order to find the image.

- A ray that travels **parallel to the principal axis** will refract through the lens and travel towards **the focal point on the opposite side** of the lens
- A ray that travels in line with the **focal point on the same side** of the lens will refract through the lens and travel **parallel to the principal axis**
- A ray that travels through the **centre** of the lens will continue to travel in the **same direction**
  If the rays do not meet extend them back to find the image



S:

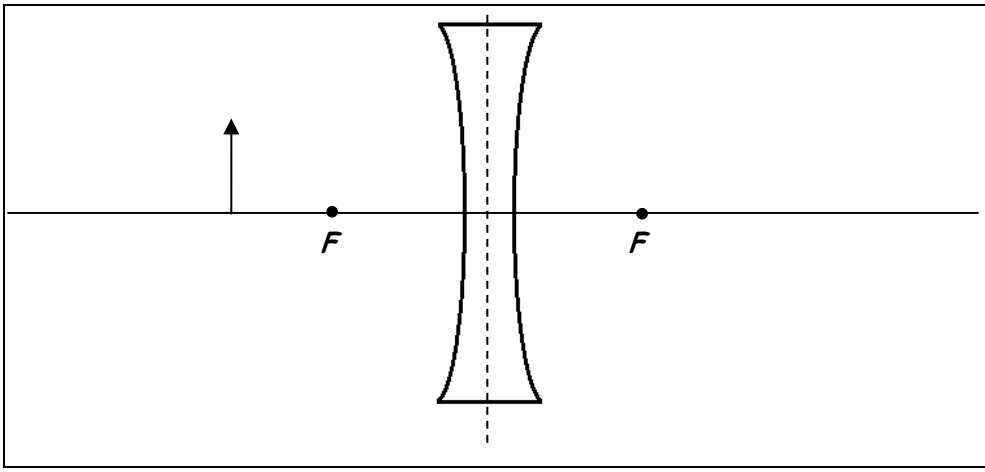
A:

L:

T:

For Diverging Lenses
Need **three rays originating from a point of the object** in order to find the image.

- A ray that travels **parallel to the principal axis** will refract through the lens and travel in line with **the focal point on the same side** of the lens as the object
- A ray that travels in line with the **focal point on the opposite side** of the lens will refract through the lens and travel **parallel to the principal axis**
- A ray that travels through the **centre** of the lens will continue to travel in the **same direction**
  If the rays do not meet extend them back to find the image



S:

A:

L:

T:

With both converging and diverging **LENSES**,

- if your refracted rays actually meet, the image is “real”
- if your refracted rays don’t meet and need to be extended backwards to meet, the image is “virtual”

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