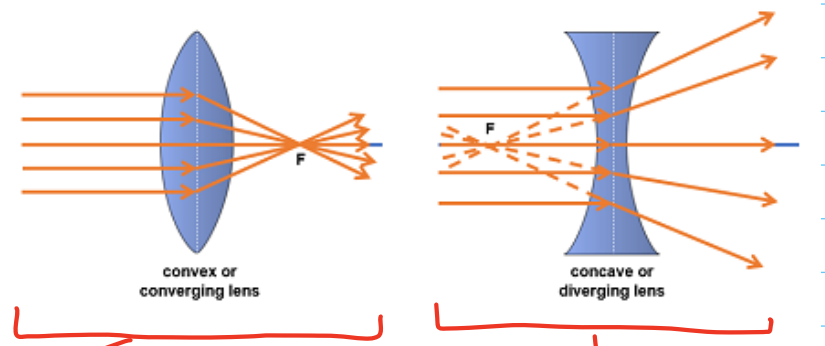
LENSES

A LENS is a piece of curved glass or other transparent material. The material must be:

→ smooth

→ reflect light regularly (not diffuse) so that we can predict reflection

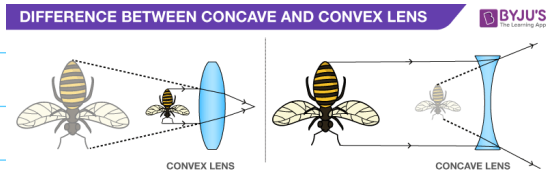


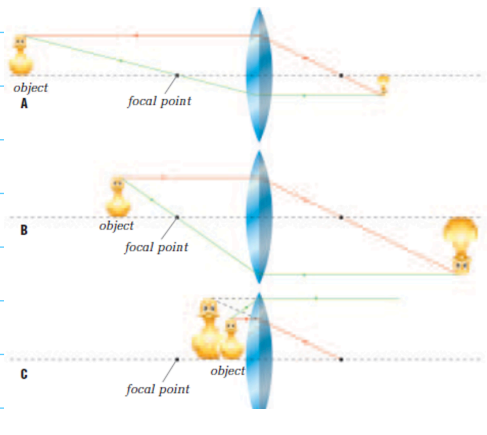
CONVEX LENS

- curves outwards; thicker @ center
- rays are refracted towards center; to a focal point
- focal point varies based on intensity of curve

CONCAVE LENS

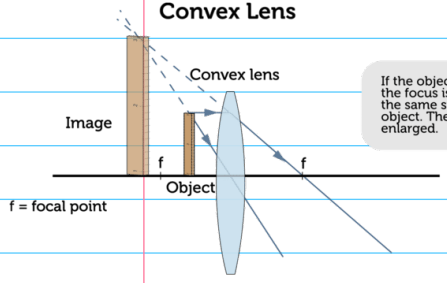
- thinner @ center than @ edges
- light rays NEVER meet @ a focal point
- refracts light away from other rays
- can have single or double concave lenses



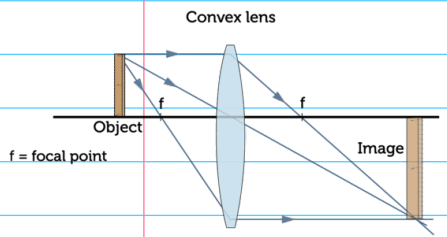


→ The image formed by a convex lens depends on how far the object is from lens

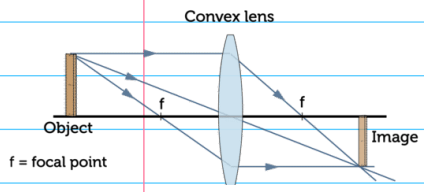
Convex Lens



If the object is closer to the lens than the focus is, a virtual image forms on the same side of the lens as the object. The image is right-side up and enlarged.



If the object is farther from the lens than the focus is, a real image forms on the side of the lens opposite the object, and the image is upside down. The image may be smaller, larger, or the same size as the object, depending on the object's distance from the lens. The farther away the object is, the more reduced the image is.

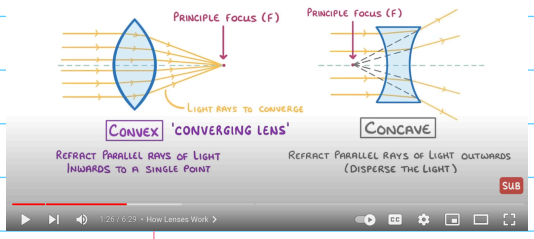


NOTE:

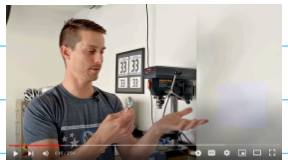
VIRTUAL VS. REAL IMAGES

- FORMED BY **IMAGINARY INTERSECTION** OF LIGHT RAYS.
- CAN ONLY BE **SEEN IN A MIRROR**
- MADE FROM EXTENSIONS OF **DIVERGING RAYS.**

- FORMED BY **ACTUAL INTERSECTION** OF LIGHT RAYS
- CAN BE FORMED ON A SCREEN
- MADE FROM **CONVERGING RAYS.**



CONVEX & CONCAVE LENSES: HOW THEY WORK



DIFFERENCE BETWEEN REAL & VIRTUAL IMAGES.