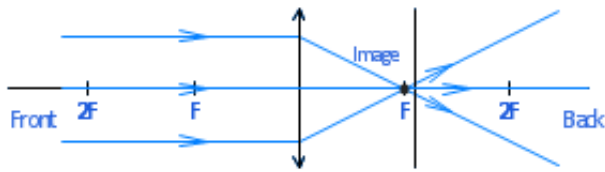


**PHYSICS
FORM 5
LENSES**

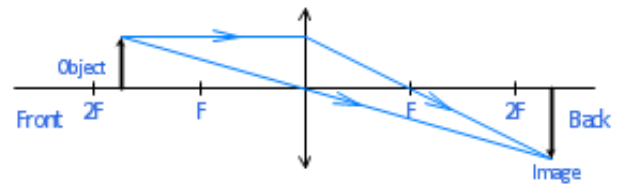
Things to remember when drawing ray diagrams:

1. All real rays of light are drawn as a solid line with arrows to indicate direction.
2. All virtual rays and images are drawn as broken lines.
3. Rays are drawn from the tip of the object.
4. Rays are shown bending only once half way through the lens.
5. The images on the same side of a lens as the object are always virtual and erect.
6. Images on the opposite side of the lens is real and inverted.



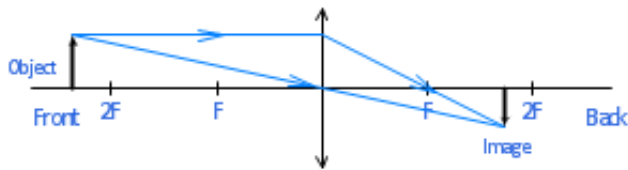
Object at infinity: point image at F

Applications: burning a hole with a magnifying glass



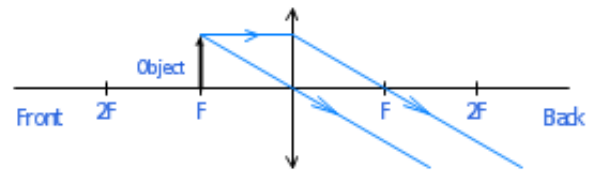
Object between F and 2F: magnified real image outside 2F

Applications: motion picture or slide projector and objective lens in a compound microscope



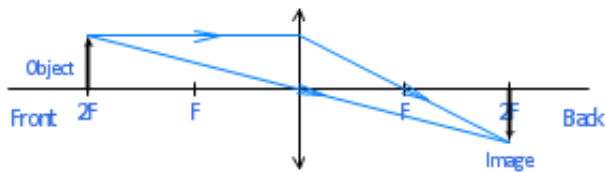
Object outside 2F: real, smaller image between F and 2F

Applications: lens of a camera, human eyeball lens, and objective lens of a refracting telescope



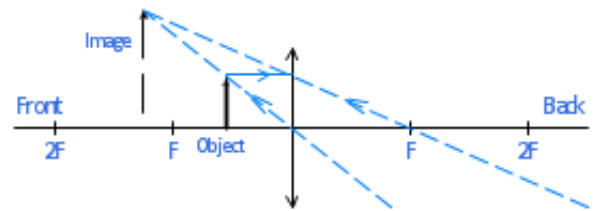
Object at F: image at infinity

Applications: lenses used in lighthouses and searchlights



Object at 2F: real image at 2F same size as object

Applications: inverting lens of a field telescope



Object inside F: magnified virtual image on the same side of the lens as the object

Applications: magnifying with a magnifying glass, eye-piece lens of microscope, binoculars, and telescope