



Mirrors and Lenses

Section 1 Mirrors

A. _____ is necessary for eyes to see.

1. Light waves spread in _____ from a light source.
2. The brain interprets light waves as traveling in a _____ line.

B. _____ **mirror**—flat, smooth mirror

1. Light strikes an object and is _____ off the object to the mirror and then back to the object.
2. _____—no light waves pass through the image

C. _____ **mirror**—mirror surface is curved inward

1. _____—imaginary straight line drawn perpendicular to the center of the mirror's surface
2. _____—point on the optical axis through which parallel light rays are reflected
3. Distance from the mirror center to the focal point is the _____.
4. _____—light rays converge to form the image
5. If an object is at the focal point, the mirror reflects light rays in a _____.
6. An object _____ the concave mirror than the focal point forms a real, enlarged, and inverted image.
7. An object _____ the focal point and the concave mirror forms a virtual, upright, and enlarged image.

D. _____ **mirror**—mirror is curved outward

1. Light rays _____ when they are reflected.
2. Images are _____, upright, and smaller than the actual object

Note-taking Worksheet (continued)**Section 2 Lenses**

- A. _____—transparent material with a curved surface that refracts light rays
- B. _____ **lens**—thicker in the middle than at the edges
1. When an object is _____ two focal lengths from the lens, its image is real, reduced, and inverted.
 2. When an object is _____ one and two focal lengths from the lens, its image is real, enlarged, and inverted.
 3. When an object is _____ one focal length from the lens, its image is virtual, enlarged, and upright.
- C. _____ **lens**—thinner in the middle and thicker at the edges; forms a virtual, upright, reduced image
- D. _____ in eyeglasses can help the eyes focus on objects.
1. _____—transparent covering on eyeball
 2. _____—inner lining of the eye that converts light into electrical signals that the brain interprets
 3. The lens in the eye changes _____ to focus on near and far objects.
- E. _____ problems occur when lenses do not focus images properly.
1. _____ people's lenses do not curve enough to form an image of close objects; convex lenses converge incoming light rays before they enter the eye.
 2. _____ occurs when the cornea's surface is unevenly curved; corrective lenses can cancel out the effects of the unevenness.
 3. _____ people's lenses do not flatten enough to form an image of distant objects; concave lenses can spread out incoming light rays before they enter the eye.

Note-taking Worksheet (continued)**Section 3 Optical Instruments**

- A. _____ use mirrors and lenses to gather more light from faraway objects than the eye does.
1. _____ telescopes use two convex lenses.
 2. _____ telescopes—use a concave mirror, a plane mirror, and a convex lens.
 3. The *Hubble Space Telescope* produces sharper images than Earth telescopes because it avoids distortions caused by Earth's _____.
- B. _____ use two convex lenses to magnify small, close objects.
- C. A _____ gathers and bends light with a lens to form an image on light-sensitive film.
1. A _____ lens has a short focal length that produces a relatively small image of the object but includes much of the surroundings.
 2. A _____ lens has a longer focal length and produces an image that seems enlarged and closer than it actually is.