

Class 8 Science Chapter 10: Light – Mirrors and Lenses

✨ Complete Study Smart – CBSE Revision Notes ✨

Understanding light, mirrors, and lenses is important in everyday life. Mirrors help us see our reflections, while lenses are used in spectacles, cameras, microscopes, and telescopes. In this chapter, we will learn about different types of mirrors and lenses, laws of reflection, image formation, and their practical applications!

1. What Are Spherical Mirrors?

A **spherical mirror** is a curved mirror whose reflecting surface forms part of a hollow sphere. Unlike a plane mirror, a spherical mirror can produce images that differ in size, position, and orientation.

A. Concave Mirror

Curves **inward** (like a cave 🕒).

Characteristics:

- Object close $\rightarrow$ Image is **erect & enlarged**.
- Object moves far $\rightarrow$ Image becomes **inverted**.
- Image size changes with distance.

Uses:

- Reflectors in torches & vehicle headlights.
- Dentists (for enlarged view of teeth).
- Main mirrors in reflecting telescopes.

B. Convex Mirror

Curves **outward** (bulges out 🏐).

Characteristics:

- Always forms an **erect** image.
- Image is **always smaller** than object.
- Gets slightly smaller as object moves away.

Uses:

- Side-view mirrors in vehicles.
- Road intersections & sharp bends.
- Security mirrors in stores.



Concave

Reflecting Surface Inward



Convex

Reflecting Surface Outward

2. Comparison Between Plane, Concave & Convex Mirrors

Feature	Plane Mirror	Concave Mirror	Convex Mirror
Surface	Flat	Curves inward	Curves outward
Orientation	Erect	Erect (close) / Inverted (far)	Always erect
Image Size	Same size	Enlarged or smaller	Always smaller
With Distance	Unchanged	Changes with distance	Changes slightly
Lateral Inversion	Yes	Yes	Yes

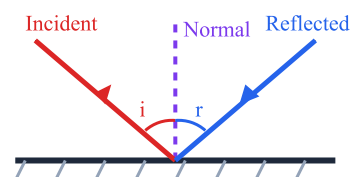
 **Remember:** Plane mirrors form images of the same size as the object, while concave and convex mirrors can produce different image sizes depending on shape & distance.

3. Laws of Reflection

Reflection is the process in which light bounces back after striking a surface. The laws apply to plane, concave, and convex mirrors alike!

Key Terms to Know:

- **Incident ray:** Light ray falling on the mirror.
- **Reflected ray:** Light ray bouncing back.
- **Normal:** Line drawn at 90° to mirror at point of incidence.
- **Angle of incidence (i):** Angle between incident ray & normal.
- **Angle of reflection (r):** Angle between reflected ray & normal.



Law of Reflection Diagram

The Two Laws of Reflection:

1. **First Law:** The angle of incidence is equal to the angle of reflection.

$$\text{Formula: } i = r$$

Example: If $i = 30^\circ$, then $r = 30^\circ$. If light falls along normal, $i = r = 0^\circ$.

2. **Second Law:** The incident ray, normal at point of incidence, and reflected ray all lie in the same plane.

4. Reflection of Parallel Rays by Mirrors

Type of Mirror	Effect on Parallel Rays	Action Name
Plane Mirror	Reflected rays remain parallel.	Parallel reflection
Concave Mirror	Reflected rays come closer together.	Converging
Convex Mirror	Reflected rays spread apart.	Diverging

5. Concentration of Light by Concave Mirror

A concave mirror can concentrate sunlight into a single bright spot because reflected rays **converge** at one point, dramatically increasing light & heat intensity.



Paper Burning Experiment: If paper is held at this focused bright spot, it starts burning!

⚠️ Safety Note: Never look directly at concentrated sunlight or attempt without adult supervision!

6. What Are Solar Concentrators?

Devices that use mirrors or lenses to concentrate sunlight into a small area are called **solar concentrators**.

Practical Applications of Concentrated Sunlight:

- Generating steam to produce electricity. ⚡
- Providing intense heat for large-scale cooking. 🍲
- Operating solar furnaces (capable of melting steel! 🏭).

7. What Is a Lens?

A **lens** is a piece of transparent material (usually glass or plastic) with one or both surfaces curved.

 **Key Difference from Mirrors:** Unlike mirrors, light passes *through* a lens. Objects are viewed through a lens rather than reflected in a lens.

Example: A raindrop on paper acts as a simple lens, making letters look enlarged!

8. Types of Lenses

A. Convex Lens



Thicker in middle than at edges.

Characteristics:

- Object close $\rightarrow$ Image is **erect & enlarged**.
- Object far $\rightarrow$ Image becomes **inverted**.
- Image gets smaller as object moves away.

Converging Lens

B. Concave Lens



Thicker at edges than in middle.

Characteristics:

- Always forms an **erect** image.
- Image is **diminished** (smaller).
- Image size alters with distance.

Diverging Lens

9. Effect of Lenses on Parallel Rays

Transparent Object	Effect on Light Rays	Diagram Representation
Thin Glass Plate	Passes through without changing path significantly.	 (Straight)
Convex Lens	Parallel rays converge after passing through.	 (Focuses in)
Concave Lens	Parallel rays diverge after passing through.	 (Spreads out)

10. Uses of Lenses in Everyday Life

1. Eyeglasses: Correct vision for clear sight. 

2. Magnifying Glasses: Enlarge small prints. 

3. Cameras: Focus light onto sensor/film. 

4. Telescopes: Observe distant stars & planets. 

5. Microscopes: View microscopic cells. 

6. Human Eye: Natural convex lens! 

11. Quick Revision Bullet Notes ⚡

- A spherical mirror has a curved surface forming part of a sphere.
- **Concave mirrors** curve inward; **Convex mirrors** curve outward.
- Plane mirrors form erect images of the exact same size as the object.
- Concave mirrors form erect, enlarged images up close, but inverted images at a distance.
- Convex mirrors *always* form erect, diminished (smaller) images.
- **Laws of Reflection:** Angle of incidence = Angle of reflection ($i = r$).
- Incident ray, normal, and reflected ray lie in the *same plane*.
- Concave mirrors & Convex lenses = **Converging**.
- Convex mirrors & Concave lenses = **Diverging**.
- Solar concentrators focus sunlight to create extreme heat & steam.

12. Frequently Asked Questions (FAQs)

Q1. What is a spherical mirror?

Ans: A mirror whose reflecting surface forms part of a hollow sphere.

Q2. What are the two types of spherical mirrors?

Ans: Concave mirrors and convex mirrors.

Q3. Why are convex mirrors used as side-view mirrors in vehicles?

Ans: Because they form erect, diminished images and provide a wider field of view.

Q4. State the first law of reflection.

Ans: The angle of incidence is equal to the angle of reflection ($i = r$).

Q5. What is the formula for the law of reflection?

Ans: Formula is $i = r$.

Q6. Difference between convex lens and concave lens?

Ans: Convex lens is thicker in the middle (converging); Concave lens is thinner in the middle (diverging).

Q7. What is a solar concentrator?

Ans: A device using mirrors or lenses to concentrate sunlight into a small intense area.

Q8. Name three uses of lenses.

Ans: Used in eyeglasses, cameras, and microscopes.

Q9. Which mirror is used by dentists?

Ans: Concave mirrors (to see an enlarged view of teeth).

Q10. What is meant by an erect image?

Ans: An erect image is an image that appears upright.

🎓 **Best of luck for your exams!** 🎓