NCERT – GRADE 8 CHEAT SHEET

# LIGHT: MIRRORS AND LENSES

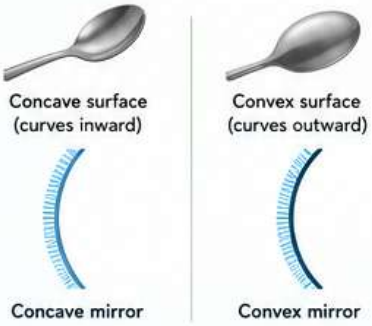
Key Concepts, Definitions, Diagrams & Quick Facts

Based on NCERT (Curiosity) Grade 8 Science – Chapter 10 | Reprint 2026–27 | Pages 152 – 169

Pumpa

## 1 SPHERICAL MIRRORS

- A spherical mirror is a reflecting surface that is part of a hollow sphere.
- If the reflecting surface curves inwards, it is called a **concave mirror.**
- If the reflecting surface curves outwards, it is called a **convex mirror.**




A shiny spoon can act as a concave or convex mirror depending on which side we look at.

## 2 IMAGE CHARACTERISTICS

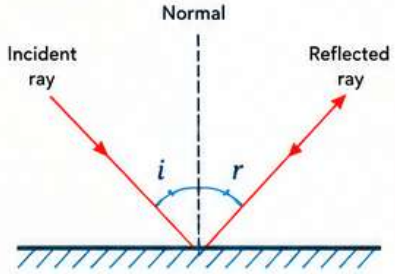
The image formed by a mirror depends on the shape of the mirror and the position of the object.

| Type of Mirror | Image Nature | Image Size | Image Orientation |
|---|---|---|---|
| Plane mirror | Erect | Same size as object | Laterally inverted |
| Concave mirror | (a) Object close to mirror: Erect, enlarged<br>(b) Object far from mirror: Inverted, initially enlarged, then smaller (as distance increases) | Enlarged (near object)<br>Initially enlarged, then smaller (far object) | (a) Erect<br>(b) Inverted |
| Convex mirror | Erect | Smaller (diminished) | Laterally inverted |

**Note:** The image formed by a convex mirror is always erect and diminished.

## 3 LAWS OF REFLECTION

- The angle of incidence is equal to the angle of reflection.
- The incident ray, the reflected ray and the normal at the point of incidence all lie in the same plane.



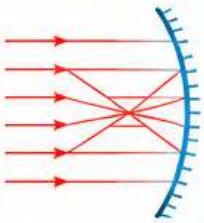

$$\angle i = \angle r$$

($i$ = angle of incidence, $r$ = angle of reflection)

## 4 REAL vs VIRTUAL IMAGE

### Real Image

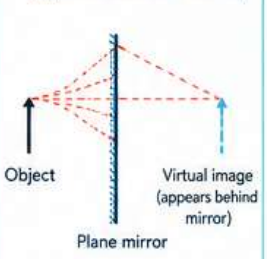
- Formed where light rays actually meet.
- Can be obtained on a screen.
- **Example:** Image formed by a concave mirror when the object is far away (inverted).



Real image (rays meet)

### Virtual Image

- Appears to come from a point (rays do not actually meet).
- Cannot be obtained on a screen.
- Example: Image formed by a plane mirror (appears behind the mirror).

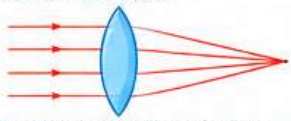



## 5 LENSES

- A lens is a transparent material that bends (refracts) light.

### Convex Lens

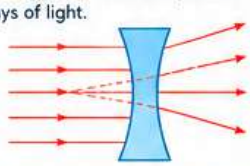
- Thicker in the middle.
- Converges (brings together) parallel rays of light.



Parallel rays meet after refraction (converge).

### Concave Lens

- Thinner in the middle.
- Diverges (spreads out) parallel rays of light.



Parallel rays spread out after refraction (diverge).

## 6 USES & EVERYDAY APPLICATIONS



**Concave mirror**
- Used in torches and headlights to produce a strong, parallel beam of light.
- Used for enlarged close-up viewing (e.g., dentist's mirror, shaving mirror).



**Convex mirror**
- Used in vehicle rear-view and side-view mirrors.
- Gives an erect and diminished image and a wider field of view.



**Convex lens**
- Used in magnifying glass.
- Used in optical instruments (e.g., simple microscope, telescope).



**Concave lens**
- Used in spectacles for short-sightedness (myopia) – only if mentioned in the chapter.



**Sunlight and concentration of light**
- Curved mirrors or lenses can concentrate sunlight at a focal region (a point where the rays meet).
- This can be used for heating or other purposes.

## QUICK FACTS

- The normal is a line perpendicular to the reflecting surface at the point of incidence.
- Angles of incidence and reflection are measured from the normal.
- Reflection is the bouncing back of light from a surface.
- Refraction is the bending (change in direction) of light when it passes through a transparent material.
- Concave mirror and convex lens can converge light.
- Convex mirror and concave lens diverge light.

## COMMON MISTAKES

- ✗ Thinking the incident ray, reflected ray and normal are not in the same plane.
- ✗ Measuring the angle from the surface instead of the normal.
- ✗ Confusing real and virtual images.
- ✗ Believing a convex mirror can form an enlarged image.
- ✗ Mixing up concave and convex lenses (remember: convex lens converges, concave lens diverges).

## KEY TAKEAWAY

- ✓ Mirrors form images by reflection and lenses form images by refraction.
- ✓ Concave mirrors and convex lenses can bring light together (converge).
- ✓ Convex mirrors and concave lenses spread light (diverge).
- ✓ The type of mirror or lens and the position of the object decide the nature, size and orientation of the image.



***Remember:*** Light travels in straight lines. Mirrors reflect light. Lenses bend light. The shape of the mirror or lens decides how the image is formed!