

Collegedunia NCERT Notes

NCERT Revision Notes

Chapter 10: Light: Mirrors and Lenses

These notes explain spherical mirrors, image formation, laws of reflection, convergence, divergence, lenses and common uses from the Class 8 Science Curiosity textbook.

Also see for this chapter: [NCERT Solutions](#) [NCERT Book PDF](#)

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1 Spherical Mirrors

The chapter begins with curved mirrors. A spoon shows why a curved reflecting surface can change the size and direction of an image.

1.1 Concave and convex mirror

A concave mirror has its reflecting surface curved inward. A convex mirror has its reflecting surface curved outward.



concave mirror



convex mirror

Key Terms

Concave means curved inward. Convex means curved outward. For mirrors, this describes the reflecting surface.

1.2 Spoon activity

The inner side of a shiny spoon behaves like a concave mirror. The outer side behaves like a convex mirror.

1.3 How to identify the mirror

Look at the reflecting surface from the side. The inward curve is concave, while the outward bulge is convex.

Mirror	Reflecting surface	Simple clue
Plane mirror	Flat	Same-size erect image
Concave mirror	Curved inward	Can enlarge close objects
Convex mirror	Curved outward	Wide view and small image

2 Images Formed by Spherical Mirrors

Images in spherical mirrors depend on both mirror shape and object distance.

2.1 Concave mirror image

When the object is close, a concave mirror forms an erect and enlarged image. When the object is moved far away, the image becomes inverted.

Concave close
erect enlarged

Concave far
inverted

Convex
erect diminished

Concave Rule

Close object gives enlarged erect image. Far object gives inverted image.

2.2 Convex mirror image

A convex mirror always forms an erect and diminished image. The image becomes slightly smaller as the object moves away.

2.3 Comparison with plane mirror

A plane mirror forms an erect image of the same size. Spherical mirrors can change image size and may invert the image.

Mirror	Object close	Object far
Plane	Erect and same size	Erect and same size
Concave	Erect and enlarged	Inverted, then smaller
Convex	Erect and diminished	Erect and more diminished

3 Uses of Concave and Convex Mirrors

Curved mirrors are chosen by the kind of image or field of view needed.

3.1 Concave mirror uses

Concave mirrors are used in torch reflectors, vehicle headlights and dental mirrors. They can give a bright beam or an enlarged close view.

Concave mirror
torch, dentist

Convex mirror
vehicles, shops

Convex lens
magnifier, glasses

Concave lens
spectacles

3.2 Convex mirror uses

Convex mirrors are used as side-view mirrors, road safety mirrors and shop surveillance mirrors because they show a wider area.

Why Convex Mirrors Help

A convex mirror gives a wide field of view. This helps drivers see more road behind and around bends.

3.3 Safety warning on vehicle mirrors

Convex mirrors make images smaller, so vehicles may look farther away than they really are. This is why the warning says objects are closer than they appear.

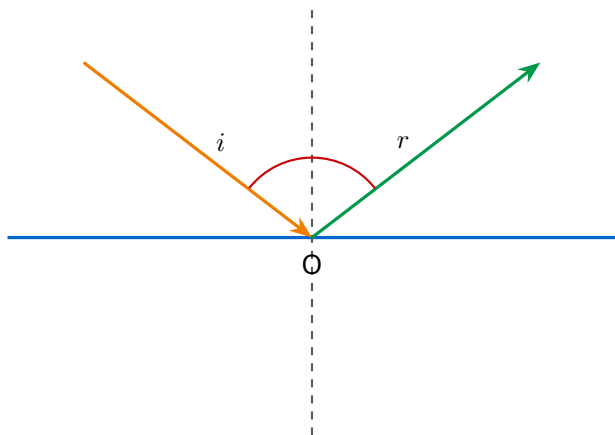
Device	Mirror used	Reason
Torch reflector	Concave mirror	Can direct light into a beam
Dental mirror	Concave mirror	Gives enlarged close image
Vehicle side-view mirror	Convex mirror	Shows wider road area
Shop surveillance mirror	Convex mirror	Covers a larger area

4 Laws of Reflection

Every mirror, plane or spherical, follows the same basic laws of reflection at each point.

4.1 Incident ray reflected ray and normal

The incident ray falls on the mirror. The reflected ray comes back. The normal is drawn at right angles to the reflecting surface at the point of incidence.



angle of incidence = angle of reflection

Law of Reflection

$$i = r$$

Here i is the angle between incident ray and normal. r is the angle between reflected ray

and normal.

4.2 First law of reflection

The angle of incidence is equal to the angle of reflection. If light falls along the normal, both angles are zero.

4.3 Second law of reflection

The incident ray, reflected ray and normal at the point of incidence lie in the same plane.

Wrong Angle

Do not measure the angle from the mirror surface. Measure it from the normal.

Term	Meaning	Label in diagram
Incident ray	Ray falling on mirror	Towards point O
Reflected ray	Ray returning from mirror	Away from point O
Normal	Perpendicular at point of incidence	Dotted reference line
Angle i	Between incident ray and normal	Equals angle r

5 Convergence and Divergence by Mirrors

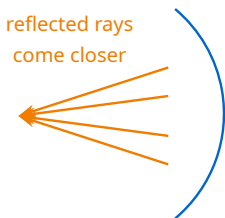
Parallel beams reveal an important difference between concave and convex mirrors.

5.1 Plane mirror

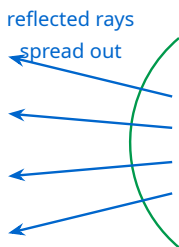
When parallel rays fall on a plane mirror, the reflected rays remain parallel.

5.2 Concave mirror

A concave mirror makes parallel reflected rays come closer. It is a converging mirror.



concave reflection converges



convex reflection diverges

C-C Pair

Concave mirror converges. Both words begin with C.

5.3 Convex mirror

A convex mirror makes reflected rays spread out. It is a diverging mirror.

Surface	Parallel rays after reflection	Word
Plane mirror	Remain parallel	No convergence
Concave mirror	Come closer	Converging
Convex mirror	Spread out	Diverging

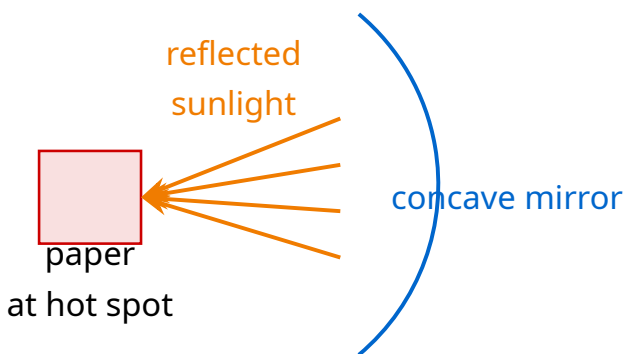
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6 Sunlight Concentration and Solar Uses

A concave mirror can concentrate sunlight at a small bright spot. This must be handled carefully.

6.1 Bright spot activity

When sunlight reflects from a concave mirror, it can concentrate on paper and produce enough heat to ignite it.



6.2 Safety rules

Never look towards the Sun or into a mirror reflecting sunlight. Focus reflected sunlight only on paper under adult supervision.

Safety Line

Any question on focusing sunlight must mention teacher supervision and eye safety.

6.3 Solar concentrators

Solar concentrators use mirrors and lenses to focus sunlight. The heat can produce steam, cook food or run furnaces.

Application	Optical idea	Important caution
Burning paper activity	Concentrated reflected sunlight	Never point at eyes or face
Solar cooker	Sunlight concentrated for heat	Uses mirrors or lenses
Solar furnace	Large heat at focus	Used for high temperature work

7 Lenses and Their Types

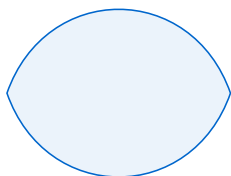
A lens is a transparent piece of glass or plastic with curved surfaces. Lenses change how objects look because light passes through them.

7.1 Water drop as a lens

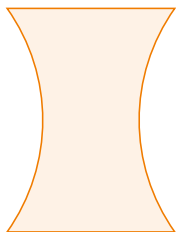
A rounded water drop on a transparent strip can make printed letters look larger. It acts like a simple lens.

7.2 Convex lens

A convex lens is thicker in the middle than at the edges. A magnifying glass is a common example.



convex lens: thick middle



concave lens: thin middle

Magnifying Glass

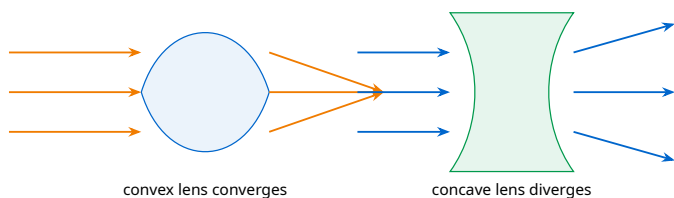
A magnifying glass is a convex lens. It helps read small print because close objects look enlarged.

7.3 Concave lens

A concave lens is thinner in the middle than at the edges. It makes nearby objects appear diminished.

7.4 Converging and diverging lenses

A convex lens converges parallel beams of light. A concave lens diverges parallel beams of light. A thin transparent glass plate does not converge or diverge the beam.



7.5 Convex lens sunlight safety

A convex lens can concentrate sunlight on paper, just like a concave mirror can. Never look at the Sun directly or through a lens.

Lens	Shape	Common example
Convex lens	Thicker in middle	Magnifying glass
Concave lens	Thinner in middle	Some spectacles

Water drop	Curved outward surface	Simple lens effect
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8 Images Formed by Lenses

Convex and concave lenses form different images as object distance changes.

8.1 Convex lens image

When an object is close to a convex lens, it appears erect and enlarged. When moved farther, it appears inverted and may become diminished.

Convex close
erect enlarged

Convex far
inverted

Concave lens
erect diminished

8.2 Concave lens image

A concave lens always makes the object appear erect and diminished.

8.3 Lens versus mirror

Mirrors form images by reflection. Lenses form images by allowing light to pass through and bend at curved surfaces.

Mirror Lens Mix-up

*A convex mirror gives a diminished erect image.
A convex lens can enlarge a nearby object.*

Lens	Nearby object	Farther object
Convex lens	Erect and enlarged	Inverted, then diminished
Concave lens	Erect and diminished	Erect and diminished

9 Quick Revision and Exam Frames

Use this section to revise definitions, comparisons and one-mark answer frames before the exam.

9.1 Definition checklist

Define each term with one clear feature. For example, concave mirror means inward reflecting surface.

9.2 Comparison checklist

Compare by shape, image, ray behaviour and use. This prevents mixing convex mirror with convex lens.

Four-Column Compare

For comparison answers, write shape, image, ray behaviour and use.

9.3 Diagram checklist

Always label incident ray, reflected ray, normal, angle of incidence and angle of reflection in law diagrams.

Revision block	Textbook anchor	Use it for
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Laws of reflection	Keep the curiosity alive Q1, Q2, Q5	Angles with normal and reflected rays
Mirror identification	Keep the curiosity alive Q3, Q6, Q7, Q11	Plane, concave and convex image rules
Lens identification	Keep the curiosity alive Q4, Q8, Q9	Convex and concave lens image rules
Convex mirror use	Keep the curiosity alive Q10	Assertion-reason on wider view
Transparent water and glass	Keep the curiosity alive Q12	Lens-like effect through water

Question type	Start with	Then add
Define concave mirror	Reflecting surface curves inward	Give one use
State laws of reflection	i equals r	Incident ray, normal and reflected ray lie in same plane

Explain convex side mirror	It forms erect diminished images	It gives wider field of view
Compare lenses	Convex thick middle, concave thin middle	Mention image rule

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Reading Glasses

Some reading glasses use curved lenses to help focus light for clear near vision.

In and Out

Concave mirror curves in. Convex mirror bulges out.

10 One-Page Formula and Definition Sheet

Use this page for fast revision before solving textbook questions.

Term or rule	Meaning	Remember
Concave mirror	Reflecting surface curves inward	Can converge rays
Convex mirror	Reflecting surface curves outward	Diverges rays and gives wide view
Incident ray	Ray falling on the mirror	Towards point O
Reflected ray	Ray coming back from mirror	Away from point O
Normal	Perpendicular line at point O	Angles are measured from it
Law of reflection	i equals r	Both rays and normal lie in same plane
Convex lens	Thicker in middle	Can magnify close objects

Concave lens	Thinner in middle	Always gives diminished erect image
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Ray Diagram Routine

Draw the reflecting surface first, mark point O, draw the normal, then draw incident and reflected rays with arrows.

11 Common Mistakes and Correct Lines

These are the most common mistakes in this chapter.

Mistake	Correct line	Why
Convex mirror magnifies vehicles	Convex mirror forms diminished erect images	It gives wider area, not magnification
Angles are measured from the mirror	Angles are measured from the normal	Normal is the reference line
Concave mirror always makes inverted images	Close object gives erect enlarged image	Image depends on distance
A lens reflects light like a mirror	A lens allows light to pass through it	Lens image formation uses transmission
Concave lens can enlarge close objects	Concave lens gives diminished erect image	Convex lens is the magnifier

Keyword Trap

Convex mirror and convex lens do not have the same image rule. Learn them separately.

12 Practice Answer Frames

Use these frames to write full answers in tests.

Prompt	Begin with	Then add
Why do vehicles use convex mirrors?	They form erect diminished images	They show a wider area behind the vehicle
Why does a concave mirror burn paper?	It converges sunlight	Light and heat are concentrated at a small bright spot
State two laws of reflection	i equals r	All three lines lie in one plane
Differentiate concave and convex lens	Convex thick middle, concave thin middle	Give one image rule for each
What is lateral inversion?	Left and right appear interchanged	It is seen in mirror images