# St. Andrews Scots School

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**Session: 2026-2027**
**Subject: Science**
**Class :VIII**

## Chapter: 10 - Light — Mirrors and Lenses

**(Answer Key)**

**Big Question: (Page no. 138)**

We are able to see things around us because of light. When light falls on an object, it is reflected from the surface of that object and enters our eyes. The light rays then pass through the eye lens and form an image on the retina, allowing us to see the object. If there is no light, nothing can be seen because no light is reflected to our eyes. Thus, light makes vision possible by travelling from a source, reflecting off objects and reaching our eyes.

**Look Beyond: (Page No. 140)**

• Telescopes use concave mirrors because they can collect and focus light from distant objects. A concave mirror bends the incoming parallel rays of light to meet at a single point called the focus, forming a clear, bright and magnified image. Convex mirrors, on the other hand, spread light outward and cannot form focused images suitable for observation.

• If you walk slowly away from a concave mirror, your reflection first appears larger when you are close to the mirror. As you move farther away, the image becomes smaller and eventually inverts (turns upside down) once you cross the mirror's focal point. This happens because the distance of the object from the mirror changes the nature of the image formed by a concave mirror.

**Look Beyond: (Page No. 141)**

Yes, many devices and machines use curved mirrors for different purposes:

1. Concave mirrors (which focus light):

• Reflecting telescopes – to gather and focus light from distant stars.

• Car headlights and torches – to focus light into a strong beam.

• Shaving or makeup mirrors – to give a magnified image of the face.

2. Convex mirrors (which provide a wider view):

• Rear-view and side-view mirrors in vehicles – to see a larger area behind.

• Security mirrors in shops and at road bends – to monitor wide spaces.

• ATM and parking mirrors – to help people see around corners or blind spots. These curved mirrors are used because of their ability to focus or spread light, depending on the need.

**Self-Assessment: Page No. 141**

**A. Multiple Choice Questions: Tick (√) the correct options:**

1. (b) 2. (c) 3. (c) 4. (c)

**B. Assertion-Reason Based Questions:**

1. (c) Explanation: The assertion is true because convex mirrors are commonly used as security mirrors in shops. The reason is false because convex mirrors do not provide a narrow field of view. In fact, they provide a wide field of view, which allows a larger area to be seen. This wide view is exactly why they are used for security purposes.

2. (a)

**Look Beyond: (Page No. 144)**

Yes, there are many examples where light is either collected (converged) or spread out (diverged) on purpose: Examples of light being collected (converged):

1. Solar cookers – concave mirrors focus sunlight at one point to increase heat.

2. Headlights and torches – concave mirrors collect light from a bulb and direct it into a strong, focused beam.

3. Satellite dishes – work on the same principle as concave mirrors to collect signals and focus them onto a receiver. Examples of light being spread out (diverged):

1. Vehicle side-view mirrors – convex mirrors spread light, giving a wider field of view.

2. Street lamps and security mirrors – use convex surfaces to spread light over a larger area.
3. Flashlights and floodlights – designed to distribute light evenly for better visibility. These examples show how understanding convergence and divergence helps in designing optical devices for everyday use.

**Look Beyond: (Page No. 147)**

Yes! We can find several real-life examples of convex and concave lenses around

Convex lenses (converging lenses):

1. Magnifying glass – enlarges small objects.

2. Microscope and telescope lenses – bring light rays together to form magnified images.

3. Camera lenses – focus light to form clear pictures.

4. Projectors – use convex lenses to project enlarged images on a screen.

5. Reading glasses for farsighted people – help them focus on nearby objects.

Concave lenses (diverging lenses):

1. Spectacles for nearsighted people (myopia) – spread out light rays before they enter the eye.

2. Peepholes in doors – make the view wider by diverging light rays.

3. Flashlight beam adjusters – sometimes use concave lenses to spread light evenly. These lenses are used in many devices at home and school to focus, magnify or spread light, depending on the need.

**Self-Assessment: (Page No. 148)**

**A. Multiple Choice Questions: Tick (√) the correct options:**

1. (b) 2. (c) 3. (c)

**B. Assertion-Reason Based Questions:**

1. (a) Explanation: The assertion is true because convex lenses are called converging lenses as they bring parallel light rays together at a single point called the focus. The reason is false because convex lenses do not bend light rays outward and spread them apart. Instead, they bend light rays inward, causing them to converge.

2. (c) Explanation: The assertion is true because the law of reflection applies to all types of mirrors, including plane, concave and convex mirrors. The reason is false because the law of reflection is not limited only to plane mirrors; it is valid for curved mirrors as well.

**EXERCISE**

**SECTION-A**

**A. Oral Questions:**

1. When light hits a mirror, it bounces back. This process is called reflection.

2. A plane mirror forms an image of the same size, while a convex mirror forms a smaller, wider image.

3. A concave mirror makes your face appear upside down when you stand far away because it forms a real, inverted image when the object is beyond its focal point.

**B. Multiple Choice Questions: Tick (√) the correct options:**

1. (b) 2. (c) C. 3. (b) 4. (c) 5. (a) 6. (b)

**Assertion-Reason Based Questions:**

1. (a)

2. (c) Explanation: The Assertion is true because a concave lens is a diverging lens, but the Reason is false since it makes light rays spread outward, not bend inward.

3. Both assertion and reason are wrong.

**D. Case-Based Questions:**

1. The side mirror of a car is a convex mirror.

2. The image looks smaller and upright because a convex mirror diverges light rays, forming a diminished, virtual image that allows a wider view of the road.

3. Her face appeared inverted in the shaving mirror because it is a concave mirror and when the object (her face) is far from the mirror, it forms a real and inverted image.

**SECTION-B**

**A. Very Short Answer Questions:**

1. Reflection is the bouncing back of light when it strikes a smooth surface like a mirror.

2. Two types of spherical mirrors are concave mirror and convex mirror. 3. A lens that is thicker at the centre than at the edges is a convex lens.

**B. Short Answer Questions:**

1. Convex mirrors always form virtual, upright and smaller (diminished) images, no matter how far the object is.

2. When light rays fall on a concave mirror, they converge (come together) at a single point called the focus after reflection.

3. When a convex lens focuses sunlight on paper, a bright spot is formed, showing that the lens converges light rays at a point (the focus), producing heat that can burn the paper.

**C. Long Answer Questions:**

1. Spherical mirrors are made by silvering one side of a curved glass surface.

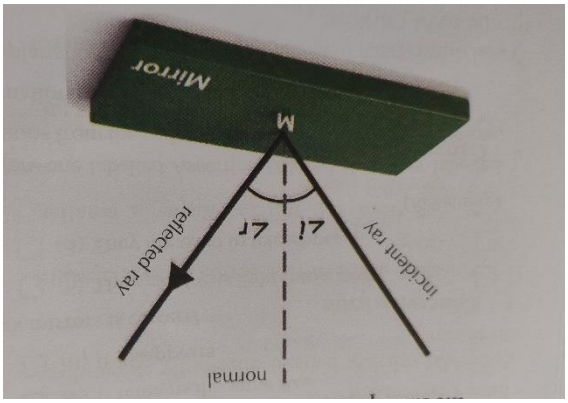
• Concave mirror: The reflecting surface is curved inward; it converges light rays and can form real or virtual images.

• Convex mirror: The reflecting surface is curved outward; it diverges light rays and forms virtual, smaller images. (Include labelled diagrams showing reflection from both mirrors.)

2. Laws of reflection:

• The angle of incidence = angle of reflection.

• The incident ray, reflected ray and normal all lie in the same plane. (Labelled diagram showing incident ray, normal, reflected ray and angles.)




Reflection of light

3. Comparison of Image Formation in Lenses:

| Feature | Concave Lens | Convex Lens |
|---|---|---|
| Shape | thinner at centre, thicker at edges | thicker at centre, thinner at edges |
| Behaviour of light | diverges light rays | converges light rays |
| Image type | always virtual, erect and smaller | real/inverted (far objects) or virtual/upright (close objects) |
| Uses | spectacles for myopia | magnifying glass, camera, microscope |
| | | |

**D. Application-Based Question:**

1. You should never look at the Sun through a concave mirror because it focuses sunlight at one point, which can damage your eyes permanently.

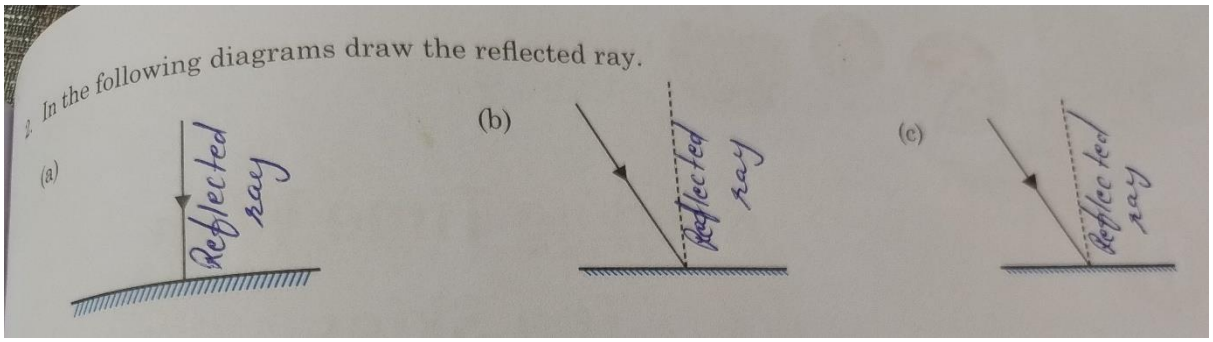
2. The shopkeeper should use a convex mirror because it provides a wide field of view, allowing him to see all corners of the store.

3. A dentist uses a concave mirror to get a magnified, upright image of the teeth by holding it close to the mouth.

**E. Picture-Based Questions:**

1. The rays shown in the diagram are converging, as they meet at a single point after reflection. This means the mirror used is a concave mirror, which focuses parallel rays of light at the focal point (F).

2.




**F. Life Skills:**

Yes, I can choose a concave mirror because it can perform both functions. When you hold a concave mirror close to your face, it forms a magnified and upright image, just like a magnifier. When you hold it farther away, it forms a real and inverted image, helping you see reflections like a normal mirror. This happens because a concave mirror can both converge light rays and magnify images, depending on the distance of the object.