

NCERT SOLUTIONS

CLASS-VI SCIENCE

CHAPTER-11

LIGHT SHADOWS AND REFLECTION

Q1. Classify the objects or materials given below as opaque, transparent or translucent and luminous or non-luminous:

Air, water, a piece of rock, a sheet of aluminium, a wooden board, a sheet of polythene, a sheet of cellophane, a CD, smoke, a sheet of plane glass, fog, a piece of red hot iron, an umbrella, a lighted fluorescent tube, a wall the fame of a gas burner, a sheet of cardboard, a lighted torch, a wire mesh, a mirror, kerosene stove, sun, firefly, moon, a sheet of carbon paper.

Ans:

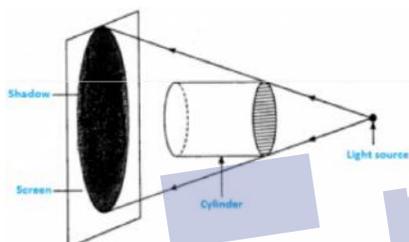
Object	Opaque/Transparent/Translucent	Luminous/Non Luminous
Moon	Opaque	Non-Luminous
Firefly	Opaque	Luminous
Sun	Opaque	Luminous
Kerosene Stove	Opaque	Luminous
A wire mesh		Non-Luminous
A sheet of cellophane	Transparent	Non-Luminous
A lighted torch	Opaque	Luminous
A sheet of cardboard	Opaque	Non-Luminous
The flame of a gas burner	Opaque	Luminous
A sheet of carbon paper	Opaque	Non-Luminous
A wall	Opaque	Non-Luminous
A lighted fluorescent tube	Opaque	Luminous
An umbrella	Opaque	Non-Luminous
A piece of red hot iron	Opaque	Luminous
A sheet of plane glass	Transparent	Non-Luminous

Fog	Translucent	Non-Luminous
Smoke	Translucent	Non-Luminous
A CD	Opaque	Non-Luminous
A sheet of polythene	Translucent	Non-Luminous
A wooden Board	Opaque	Non-Luminous
A mirror	Opaque	Non-Luminous
A sheet of aluminium	Opaque	Non-Luminous
A piece of rock	Opaque	Non-Luminous
Water	Transparent	Non-Luminous
Air	Transparent	Non-Luminous

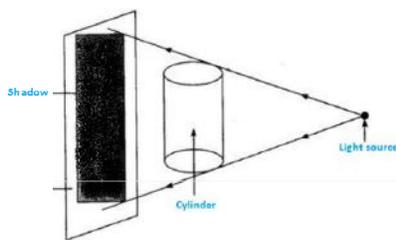
Q2. How would you create a circular shadow if held in one way and a rectangular shape shadow held in another way, with the object?

Ans: Yes, there are many objects like a cylinder and a circular disc, which would give a circular shadow if held in one way and a rectangular shadow if held in another way.

(a) Circular shadow with cylinder



(b) Rectangular shadow with cylinder



Q3. In a completely dark room, if you hold up a mirror in front of you, will you see a reflection of yourself in the mirror?

Ans: No, in a completely dark room, there won't be any light in the room, so there won't be any reflection of light and no image will be formed on the mirror.

VERY SHORT ANSWER TYPE QUESTIONS

Q1. Is the moon luminous or non-luminous body?

Ans: Moon is a non-luminous body.

Q2. What is umbra?

Ans: The dark shadow region which falls behind the object where no light enters is called Umbra.

Q3. How does light ray travel?

Ans: Light ray travels in a straight line.

Q4. Give one natural source of light.

Ans: Sun and stars are some of the natural sources of light.

Q5. What is a shadow?

Ans: Shadow is the dark area behind any opaque object where the light cannot pass through.

Q6. What is penumbra?

Ans: The partially shaded region which is less darker than the umbra, behind any opaque object is known as Penumbra.

SHORT ANSWER TYPE QUESTIONS

Q1. What is the difference between a luminous and a non-luminous body?

Ans: The bodies which have its own source of energy to emit light are called luminous bodies. Example: Stars, burning candle, sun, etc.

The bodies which are not able to emit light but are visible only when they reflect light produced by the luminous objects are called non-luminous bodies. Example: earth, blackboard, moon.

Q2. Why is the moon a non-luminous body?

Ans: Moon is a non-luminous body because it only reflects the light from the sun falling on its surface.

Q3. What is an incandescent body? Give example.

Ans: The bodies which emit light when a very high temperature heat is applied to them are called incandescent bodies. Example: hot filament in an electric bulb.

Q4. What causes a shadow to form?

Ans: When light cannot pass through an opaque object, a dark region is formed behind the object called a shadow.

Q5. Draw a diagram to illustrate the formation of umbra and penumbra.



Q6. What are the essential conditions for the formation of shadow?

Ans: (1) The object should be opaque where light cannot pass through.

(2) Source of light and a screen is needed for the formation of shadow. The opaque object should be placed in between the source of light and screen.

Q7. Define reflection of light.

Ans: When light rays after striking the smooth and shiny surface return to the same medium, this phenomenon is called reflection of light.

Q8. Write the differences between a shadow and an image.

Ans:

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Image	Shadow
(1) It is formed by reflected rays. It is formed when no light is allowed to pass through the object.	(1) It is formed when no light is allowed to pass through the object.
(2) Images can be seen when reflected light approaches observer's eye.	(2) No light approaches observer's eye.
(3) Image provides a lot of information like colour, shape, etc.	(3) Shadows are vague and don't provide any information.
(4) Image can be straight or inverted.	(4) Shadow is not inverted.
(5) Size is same as that of the object.	(5) Size can be smaller or larger.

Q9. How will you convert a glass sheet into a translucent sheet?

Ans: There are a couple of ways to convert a glass sheet into a translucent sheet:

(a) By applying a thin layer of oil on the glass sheet.

(b) By placing a butter paper on the glass sheet.

Q10. What is a shadow? How does the colour of an opaque object affect the colour of the shadow?

Ans: Shadow is the dark area behind any opaque object where the light cannot pass through. The colour of an opaque object doesn't affect the colour of the shadow.

Q11. Write the differences between umbra and penumbra.

Ans:

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Umbra	Penumbra
(1) It is the darkest region of the shadow.	(1) It is the partially shaded region which is less darker than umbra.
(2) No light approaches this region.	(2) Some light rays reach this region.
(3) It can be found at the centre most region of shadow.	(3) It can be found in the outermost region of shadow.

Q12. What are the things we need to produce a shadow?

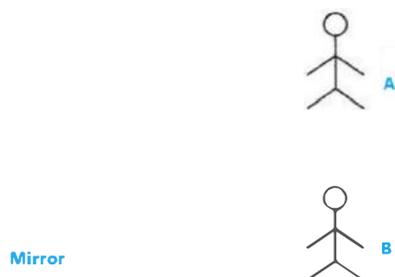
Ans: We need:

- (a) An opaque object.
- (b) A screen
- (c) A source of light.

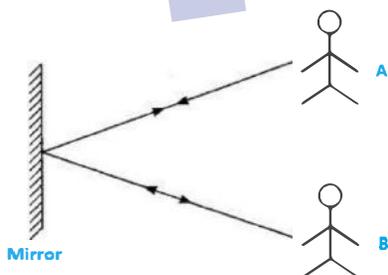
Q13. What do you mean by scattering of light?

Ans: When light rays enter a rough medium like gases, the light rays get deflected in random directions. This is known as scattering of light.

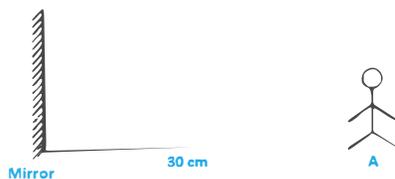
Q14. A and B are facing the mirror and standing in such a way that A can see B and B can see A. Explain this phenomenon.



Ans: The light rays from Person A reach the mirror and get reflected to reach Person B. Likewise, the light rays from person B reach the mirror and get reflected to reach person A. This phenomenon is known as reflection of light.



Q15. 'A' is 30 cm away from the mirror. If he moves couple of steps away from the mirror, what will happen to the image?



Ans: The size of the image will be as same as the size of the object.

Q16. Write the mirror image of 'SCIENCE'.

Q17. If you have ever seen an ambulance, the word 'AMBULANCE' is written in the form of mirror image in vehicles. Why is it so?

Ans: The mirror image of AMBULANCE is . It is written in mirror image so that the driver in the vehicle going in front of the ambulance could read it correctly from his rear view mirror and he would make way for the ambulance to reach the hospital or patient as soon as possible.

Q18. You have to cast the shadow of your pencil on the wall with the help of a candle in a dark room. How can you obtain the shadow of the same size, small size and big size of the same pencil?

Ans: (a) The shadow of the pencil will be small in size when the pencil is taken away from the candle and close to the wall

(b) The shadow will be big in size when the pencil is taken away from the wall and closer to the candle.

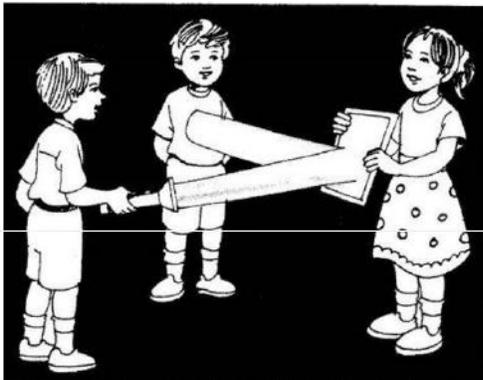
(c) To get the same sized shadow as the pencil is, move the pencil to bring it at an equal distance between the wall and the candle.

LONG ANSWER TYPE QUESTIONS

Q1. What is reflection of light? Explain reflection of light with the help of an activity.

Ans: When light rays hit a highly polished smooth surface like a mirror, it bounces back to the same medium like a ball thrown against a wall. It is called reflection of light.

Activity to show reflection of light: Ask 3 of your friends to join this activity. In a dark room or in the night, ask one of your friends to hold the mirror in one corner of the room. You and your other friend stand anywhere in the room. Take a torch and direct beam of light to the mirror that your friend is holding. Adjust the direction of the torch so that some of the beam of light hits on your friend. This activity shows that the light you directed hits the mirror and bounces back to your friend.

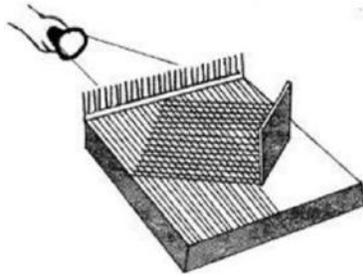


A mirror reflecting beam of light

Q2. Explain the manner in which light travels with the help of an activity.

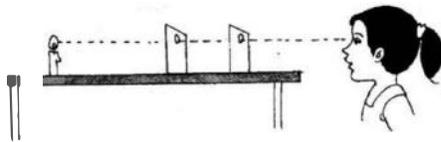
Ans: Take a comb and fix it on one side of a wooden block. Fix a mirror on the

other side as shown in the figure. Spread a dark coloured sheet of paper between the mirror and the comb. Send a beam of light from a torch through the comb. You get a pattern of light similar to that shown in the figure. This activity explains the manner in which light travels and gets reflected from a mirror.



Q3. Explain that light has the property of rectilinear propagation with an activity.

Ans: Take three pieces of cardboard. Stack the 3 pieces of cardboard and make a hole in the middle of each cardboard by using a thick nail. Erect these cards up on the table at a short distance away from each other. Take a candle which is of the same height as the holes in the cards. Light the candle and place it in front of the cards. We see that the light of the candle is visible only when the holes on cards lie in a straight line. If we disturb them the light from the candle disappears. This experiment proves that light propagates in a straight line.



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