Mirrors and Reflections
(English Medium)

Exercise 48:

Solution 1(a):

We are able to see objects because objects reflect light and this reflected light enters our eyes.

Exercise 50:

Solution 1(a):

Trial of experiment	Angle of incidence (in degrees)	Angle of reflection (in degrees)
1.	35	35
2.	10	10
3.	20	20

Solution 1(b):

The angle of incidence and reflection remain the same in each trial.

Solution 1(c):

The ray of incidence and the ray of reflection are on the opposite sides of the perpendicular.

Exercise 51:

Solution 1(a):

The plane of the incident ray, reflected ray and perpendicular, remains the same.

Solution 1(b):

We can clearly see our face in the polished paper. In case of the polished paper the image seen on the screen by the reflection of the incident light is a bright round spot.

We cannot see our face in the wrinkled paper. The image seen on the screen by the reflection of the incident ray of light appears to be dim.

Exercise 54:

Solution 1(a):

The left hand is raised by your image in the mirror.

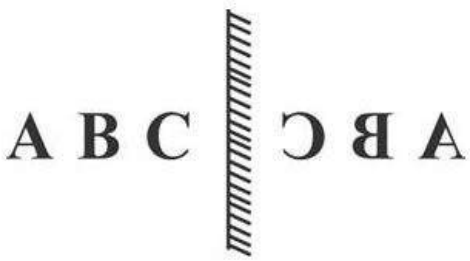
Solution 1(b):

Your left hand would have to be raised to see your right hand raised in the image.

Solution 1(c):

You will observe yourself holding your left ear in the image.

Solution 1(d):



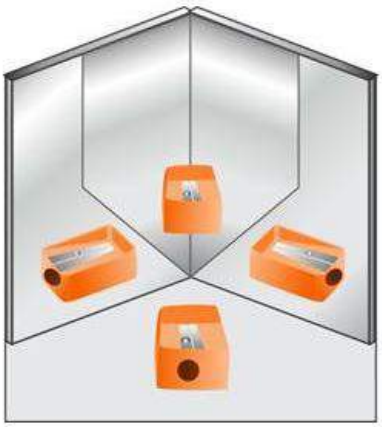
Solution 1(f):

The characteristics of the image formed by a plane mirror based on the observations from the above activities are as follows:

1. The image is formed behind the mirror and it is virtual and erect in nature.
2. The image is laterally inverted with respect to the object.
3. The distances of the image and the object from the mirror are equal.
4. The image is of the same size as that of the object.

Exercise 55:

Solution 1(a):



Three images of the sharpener are seen.

Solution 1(b):

No. of trial	Angle between two mirrors	Total number of images observed
1.	30°	11
2.	45 °	7
3.	60°	5

Solution 1(c):

The number images decreases as the angle between the plane mirrors increases.

Solution 1(d):

We get more than one image of an object placed between the two mirrors by the principle of multiple reflections in which the image of an object in one mirror acts as an object for the other mirror.

Solution 1(e):

To get 5 images of an object, the angle between the two mirrors should be 60°.

Solution 1(f):

$$\text{Number of images} = \frac{360^0}{\text{Angle between two mirrors}} - 1$$
$$= \frac{360^0}{40^0} - 1$$
$$= 9 - 1$$
$$= 8$$

Thus, 8 images are formed.

Exercise 56:

Solution 1(a):

$$\text{Number of images} = \frac{360^0}{\text{Angle between two mirrors}} - 1$$

$$9 = \frac{360^0}{\text{Angle between two mirrors}} - 1$$

$$9+1 = \frac{360^0}{\text{Angle between two mirrors}}$$

$$10 = \frac{360^0}{\text{Angle between two mirrors}}$$

$$\therefore \text{Angle between two mirrors} = \frac{360^0}{10}$$

$$\text{Angle between two mirrors} = 36^0$$

Thus, the two mirrors should be placed at an angle of 36° in order to get 8 images of an object placed between them.

Exercise 58:

Solution 1(a):

There are two mirrors in a periscope which are kept parallel to each other. The parallel rays of light coming from the object get reflected by the two mirrors and enter the eye of the observer. Hence, the object is visible even when there is a board in front of the observer.

Solution 1(b):

The following shape of the periscope is required to observe body parts:

Exercise 59:

Solution 1(a):

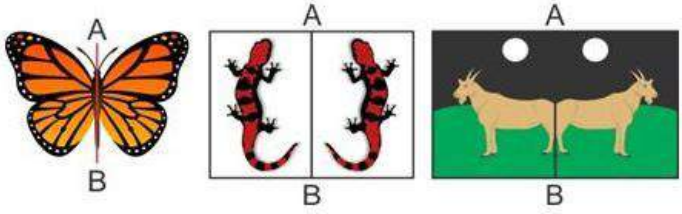
As we rotate the kaleidoscope, the coloured pieces of bangles and beads kept in it, rearrange themselves in different ways. The different figures and designs formed by the three mirrors kept at 60° with each other, also keep on changing. This is how we get different designs in a kaleidoscope.

Solution 1:

The image formed in a plane mirror is laterally inverted with respect to the object. The letters on the ambulance are inverted so that the drivers in front of the ambulance van can read the letters easily when seen through their rear view mirror. So, the other vehicles can give way to the ambulance to pass.

Exercise 60:

Solution 2:

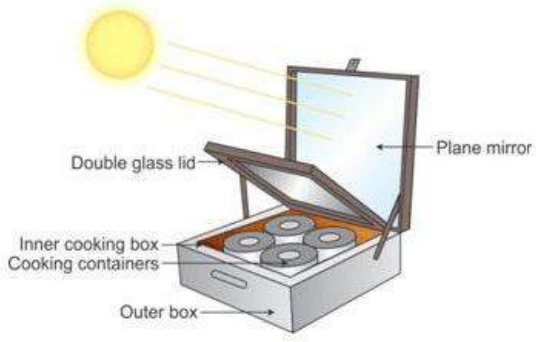


Solution 3:

The materials required to prepare a solar cooker: Aluminium box, plane mirror, two glass covers, insulating material, black colour paint and small containers.

Method of preparing a solar cooker:

1. Take the aluminium box and colour the inner side of the bottom surface black.
2. Fix the plane mirror on the inner side of the top of the box.
3. Place a wooden box slightly smaller in size inside the aluminum box. Fill the gap between the two boxes by insulating material like wool, paper.
4. Paint the container in which food is to be cooked black in colour from outside and place it in the wooden box.
5. Cover the box with a double layered glass sheet which acts as an insulating layer.



The solar cooker is now ready to use.