

1

Symmetry

After studying this chapter you will be able to get a good understanding of the following:

- ★ identifying the concept of symmetry
- ★ selecting shapes with bilateral symmetry
- ★ drawing the axes of symmetry of symmetrical figures
- ★ constructing figures with bilateral symmetry
- ★ appreciating the nature of symmetry



1.1 Bilateral Symmetry

Observe the following figures.



There is one common feature in all these figures. What is it?

This common feature you identified is present in many living and non-living things which can be seen in the environment we live in. This contributes to the beauty of the environment.

Activity 1.1



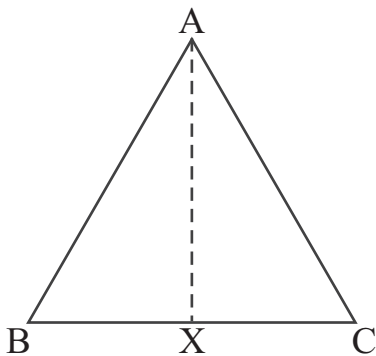
- ★ Copy the above figure on to a sheet of paper.
- ★ Cut it out.
- ★ Fold the figure along the dotted line.
- ★ What do you observe now?
- ★ Unfold the paper and examine the whole shape.

When a plane figure is folded along a line, if the two parts on either side of it coincide (fall one over the other), it is said that the figure has **bilateral symmetry**.

The folding line is defined as the **axis of symmetry**.

In a symmetrical figure, the two parts on either side of the axis of symmetry are equal in shape and size. But location is different.

Example 1



In this figure

- ★ Triangle ABC is a triangle with symmetry
- ★ AX is the axis of symmetry
- ★ $BX = CX$
- ★ $AB = AC$

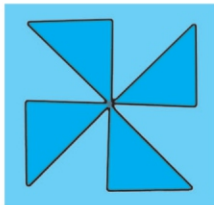
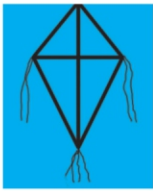
Example 2

- ★ There is no bilateral symmetry in this figure.
- ★ Hence there is no axis of symmetry.




Exercise 1.1

(1) Select the figures with bilateral symmetry



(2) Name three symmetrical shapes you can see in the environment.

(3)  Is this figure symmetric? Give reasons for your answer.

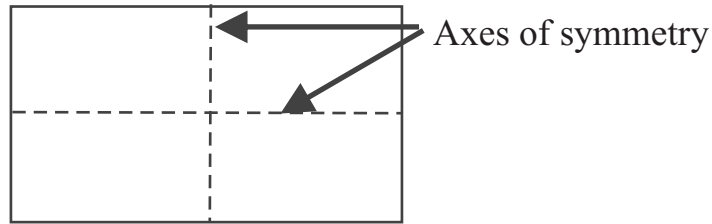
Activity 1.2



- ★ Get a sheet of paper, a piece of thread and some paint.
- ★ Fold the paper into two as shown in the figure.
- ★ Wet the thread with paint and place it on one of the sides of the folded paper keeping out the two ends of the thread.
- ★ Fold the paper as before and pull the thread out so that the paint is applied in the inner sides.
- ★ Unfold the paper and examine the figure.
- ★ Mark the axis of symmetry of the figure.

1.2 Situations having more than one axis of symmetry

We know that a rectangular shape has two axes of symmetry.

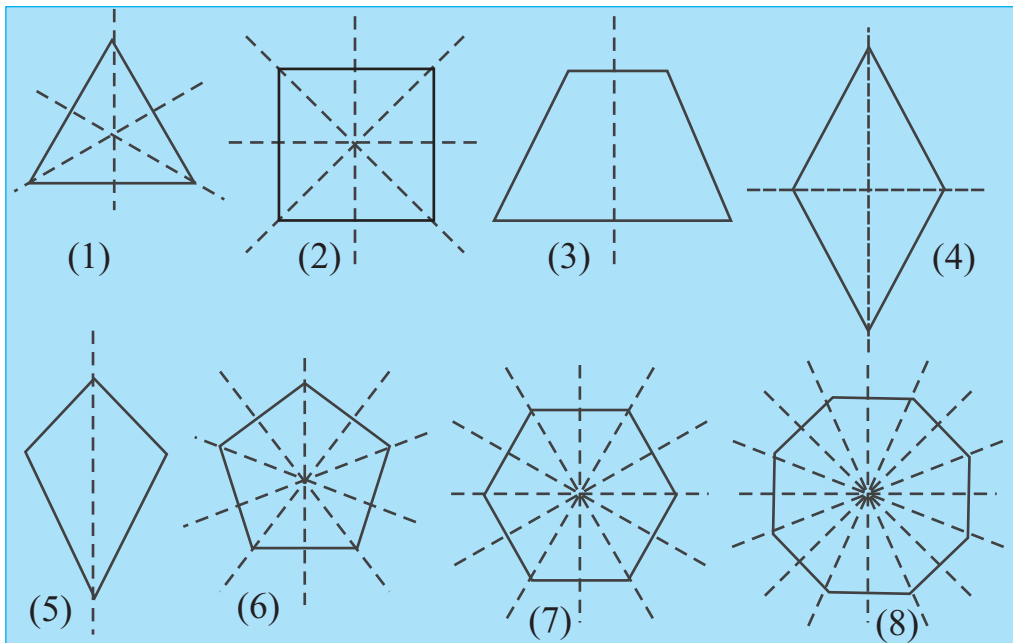


Activity 1.3

- ★ Cut out a square shape from a sheet of paper.
- ★ By folding it find the number of axes of symmetry it has.

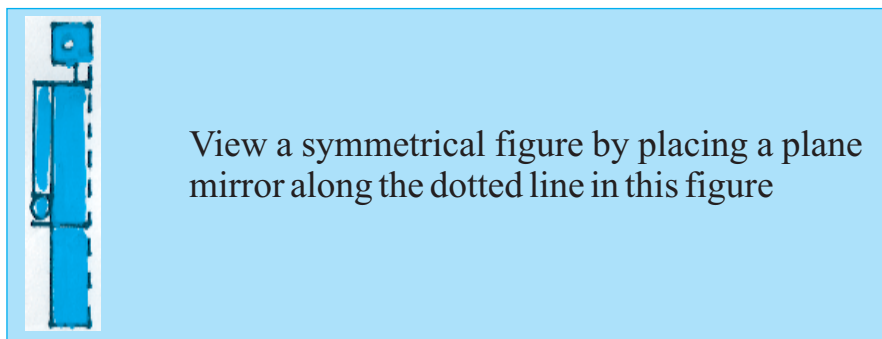
Exercise 1.2

(1) Fill in the table given below with respect to the following figures.



Shape no.	1	2	3	4	5	6	7	8
Number of axes of symmetry								

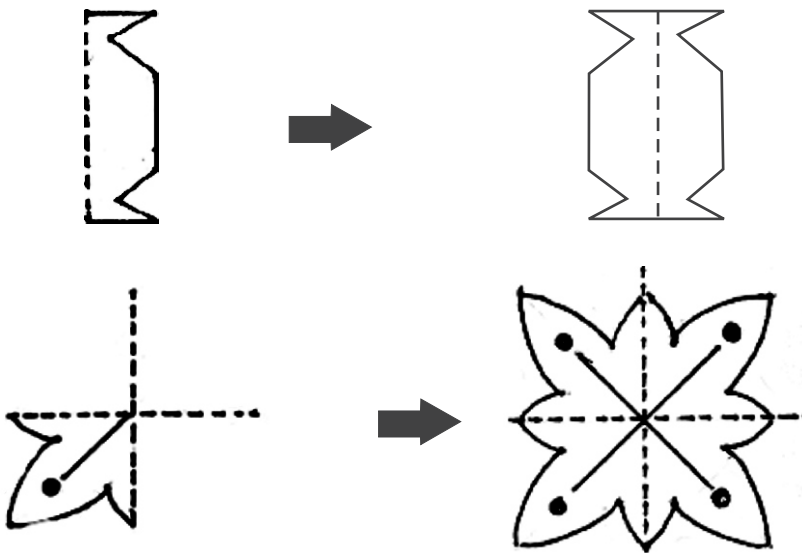
- (02) With the help of the teacher cut out 6 equilateral triangular shapes from a strip of coloured paper.
Placing all those triangular shapes on a piece of paper obtain a symmetrical shape.
Write the number of axes of symmetry it has.
- (03) Name 5 symmetrical plane figures you can see at home and write the number of axes of symmetry of each.
- (04) Draw a plane figure having 2 axes of symmetry, which is not given in this book.
- (05) Draw a circle on a sheet of paper and cut it out carefully.
By folding it mark an axis of symmetry.
State how many such axes of symmetry you can obtain.
- (06)



1.3 Construction of symmetrical figures

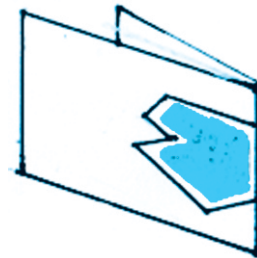
Learn how to obtain a plane figure with bilateral symmetry when a part of the figure and the axis of symmetry are given.

Example 3



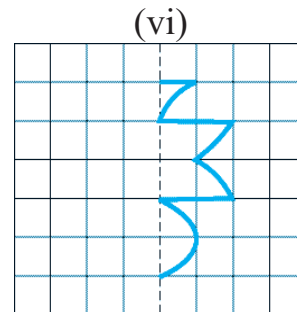
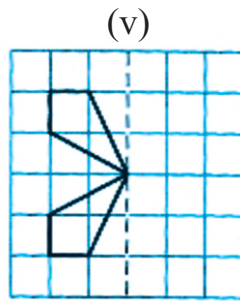
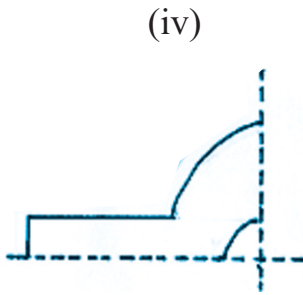
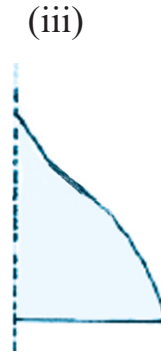
Activity 1.4

- ◆ Fold a piece of paper into two and draw a figure you like on one page close to the folding line as shown in the figure.
- ◆ Cut out the figure so that both parts of the paper are cut.
- ◆ Unfold the cut out figure and draw the axis of symmetry.
- ◆ Examine the symmetry of the hole in the original paper.

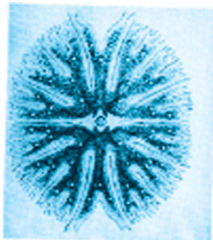


Exercise 1.3







- (1) Draw the following figures on a square ruled paper using a tissue paper. A part of each figure, and the axes of symmetry are given. Place the tissue paper in correct position and trace to obtain symmetrical figures.



- (2) Magnified photographs of four micro-organisms are given below. Discuss their bilateral symmetry.



(3) Fill in the given table with respect to the following figures.

Plane figure	Whether the figure is symmetrical or not	If symmetrical then number of axes of symmetry
(i) 		
(ii) 		
(iii) 		
(iv) 		
(v) 		
(vi) 		

(4) Select the figures having bilateral symmetry and write their numbers in your exercise book.



(i)



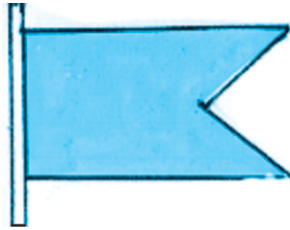
(ii)



(iii)



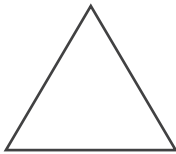
(iv)



(v)



(vi)



(vii)



(viii)



(ix)



(x)

(xi)

- (5) Write the number of axes of symmetry in each of the following figures.



(i)



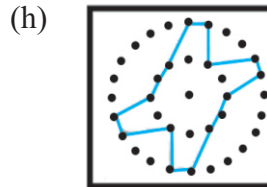
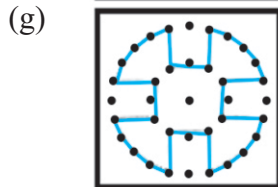
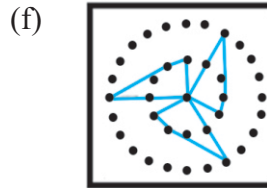
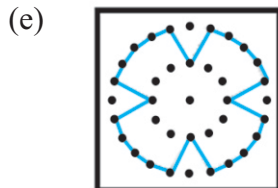
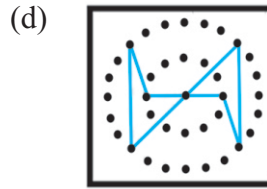
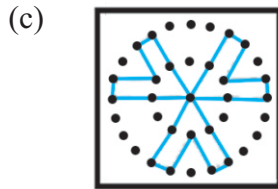
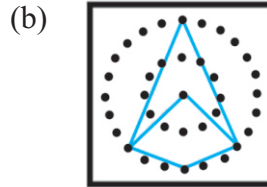
(ii)



(iii)

- (6) Draw a symmetrical figure using only a pair of compasses and a pencil.
- (7) Select from the English alphabet, the letters having symmetry, and write them.
- (8) Draw a figure having four axes of symmetry.

- (9) Given below are a few figures drawn using two circles with the same centre. Select the symmetrical figures out of them and write the relevant letters.



Summary

- ★ There are shapes having bilateral symmetry in our environment.
- ★ In a symmetrical figure the parts on either side of the axis of symmetry are equal in size and shape.
- ★ Some shapes have more than one axis of symmetry.
- ★ Symmetry can be applied when constructing patterns.