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# Introduction about Symmetry

## Symmetry:

The quality of being made up of exactly similar parts facing each other or around an axis of symmetry.

Or

Symmetry is when one shape becomes exactly like another if you flip, slide or turn it.



In this figures, dotted lines are line of symmetry.

## Making Symmetric Figures: Ink-blot Devils

Take a piece of white paper. Fold it in half. Spill a few drops of ink on one half side. Now press the halves together. The resulting figure is symmetric. Look at this figure.



### Inked- string pattern

Fold a paper in half. On one half-portion, arrange short lengths of string dipped in a variety of coloured inks or paints. Now press the two halves. You will get the symmetrical figure.



## Figures which are not symmetrical

There are figures which are not symmetrical.



# For example: Hockey, Smiley and Quadrilateral







Hockey

smiley

quadrilateral



## Line of Symmetry

### Figures with Two Lines of Symmetry

#### A rectangle

Take a rectangular sheet. Fold it once lengthwise so that one half fits exactly over the other half. You will get one line of symmetry. As shown below:



Open it up now and again fold on its width in the same way. Now you will get two line of symmetry.



2nd fold

Hence, a rectangle has two lines of symmetry. Similarly, an alphabet H has also two lines of symmetry.

Look at this figure:





## Number of lines Symmetry

### Figures with Multiple (more than two) Lines of Symmetry

There are figures which have more than one line of symmetry. Let us consider the following examples.

A regular polygon has all sides equal, and all angles equal:



An Equilateral Triangle (3 sides) has 3 Lines of Symmetry

- A Square (4sides) has 4 Lines of Symmetry
- A Regular Pentagon (5 sides) has 5 Lines of Symmetry
- A Regular Hexagon (6sides) has 6 Lines of Symmetry



## **Reflection and Symmetry**

Line symmetry and mirror reflection are naturally related and linked to each other.

Here is a picture showing the reflection of the English letter M. You can imagine that the mirror is invisible and can just see the letter M and its image.



Let us see some examples:



The object and its image are symmetrical with reference to the mirror line. If the paper is folded, the mirror line becomes the line of symmetry.

### Use Measurement or Counting

Draw the half fi gure onto a grid, and label the vertices A, B, C, and D. All points not on the line of symmetry are refl ected on the opposite side of the line. In this fi gure, this is points B and C. The refl ected points are drawn the same perpendicular distance from the fold line so that BX = B'X and CD = C'D. Join A to B', B' to C', and C' to D to complete the figure.





## Paper decoration and Kaleidoscope

### Paper decoration

Use thin rectangular coloured paper. Fold it several times and create some intricate patterns by cutting the paper, like the one shown here. Identify the line symmetries in the repeating design.



### Kaleidoscope

A kaleidoscope uses mirrors to produce images that have several lines of symmetry (as shown here for example). Usually, two mirrors strips forming a V-shape are used. The angle between the mirrors determines the number of lines of symmetry.



