



Master Lesson Plan

For

Does it look the Same

Board	Standard	Subject	Chapter	Language	Reference Link	Creation Date
CBSE	STD V	Mathematics	Does it look the Same	English	Does it look the Same?	2020-07

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Does it look the Same

1. MS_Objectives_Does it Look the Same

Students will be able to :

- 1) Identify symmetrical objects and their lines of symmetry.
- 2) Determine the lines of symmetry for the given shapes using the fold and find activity.
- 3) Identify shapes with rotational symmetry and their transformation after every fraction of a turn.
- 4) Analyse problems based on different types of symmetry.
- 5) Investigate the given shapes for Rotational Symmetry.
- 6) Solve problems on Symmetry.
- 7) Discover symmetry through dance.
- 8) Correlate symmetry in and around us.
- 9) Appreciate symmetry in nature.
- 10) Appreciate the value of an Indian tradition and imbibe the value of respecting all.

Time to teach	Asset Type	Theme	SubTheme
5 Minutes	Main Script	Symmetry	

2. MS_Line, mirror and reflection symmetry

Symmetric figures

A figure is said to be symmetrical if we can fold or divide it into half, such that the two halves match each other exactly.

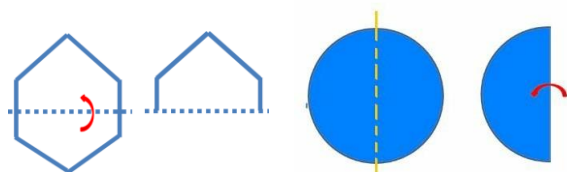


Figure 1

Figure 2

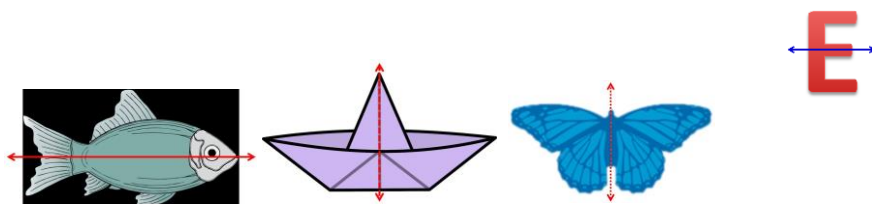
The dotted line in each of the symmetric figures which divides the figure into two equal halves is called the line of symmetry.

The above figures are said to have line symmetry.

Lines of symmetry

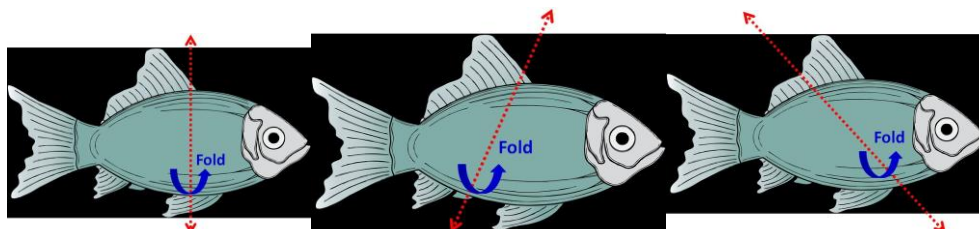
A line of symmetry divides a symmetrical shape into half. An object or figure may have one, two or more number of lines of symmetry.

Shapes possessing one line of symmetry



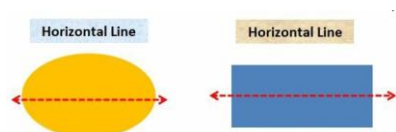
The above shapes can be folded along the dotted line such that the two halves are exactly the same.

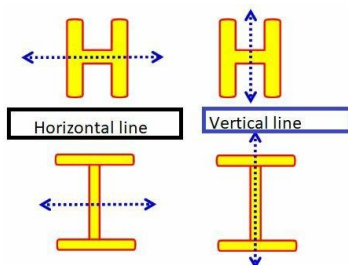
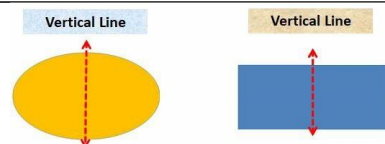
If we try to fold the above shapes along any other dotted line we observe that the two halves on folding will not match each other.



Hence, all the above shapes possess only one line of symmetry.

Shapes possessing two lines of symmetry

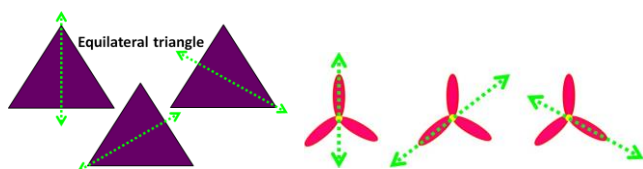




We observe that each of the above shapes can be folded along the vertical line and horizontal line such that the two halves are identical. Hence, the vertical and horizontal lines are lines of symmetry for each of the above figures.

Hence all the above shapes/figures have 2 lines of symmetry.

Shapes possessing three lines of symmetry

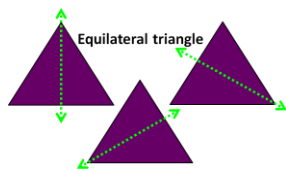


If we fold the above shapes along the lines in the three images, the resulting halves are exactly identical. Hence these lines are lines of symmetry.

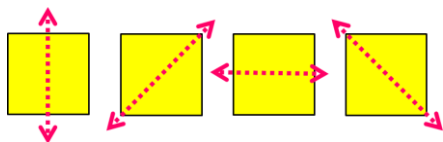
Symmetry in regular polygons

Equilateral Triangle

We have seen that an equilateral triangle has 3 lines of symmetry.

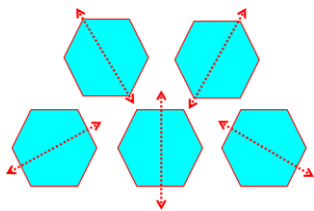


Square



We see that a square has four lines of symmetry.

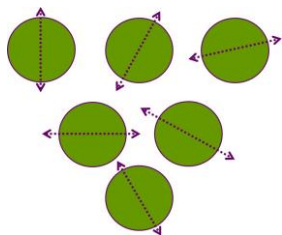
Regular Pentagon



We see that the pentagon(five sided regular polygon) has five lines of symmetry.

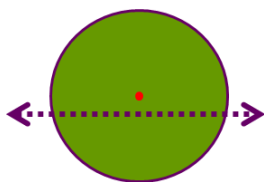
We find that a regular polygon of 'n' sides will possess 'n' lines of symmetry.

Lines of symmetry in a circle

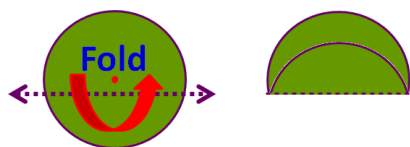


We observe that any line drawn through the center of the circle is a line of symmetry. We can draw any number of lines passing through the center of the circle. Hence, a circle is said to possess infinite (countless) number of lines of symmetry.

Consider the circle given below:



We observe that the line in above image is not a line of symmetry of the circle because folding the circle once along the dotted line does not result in identical overlapping halves as shown below:



Hence we say that the circle is not symmetrical about the given line or the line is not a line of symmetry of the circle.

Asymmetric figures

If a figure cannot be folded into two identical halves, then such a figure is called asymmetrical figure. Such figures have no lines of symmetry.

Consider the figures given below:

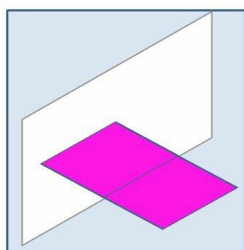




In whichever direction we try to fold these images, we will not get identical halves. Hence these do not possess any line of symmetry. They are called asymmetrical figures.

MIRROR SYMMETRY

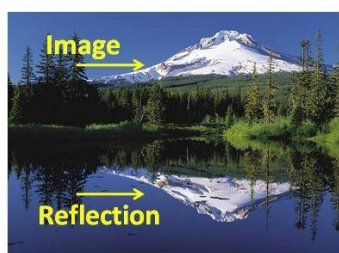
Observe the image given below:



From the image we find that, if a mirror is placed along the line, then we obtain an identical half on the other side of the line.

Hence, line symmetry is also called as mirror symmetry.

The two halves right and left to the mirror line (obtained by reflection) are identical to each other. Hence line symmetry is also called reflection symmetry.



In the picture, the image of the mountain is reflected on the surface of water. We consider the waterline as line of symmetry as the two halves above and below the waterline (obtained by reflection) are identical to each other. The same applies to the image of the swan. Hence, line symmetry is also called reflection symmetry.

So, line symmetry / mirror symmetry / reflection symmetry all mean the same.

In all the above images, if a mirror is placed along the dotted line, we will have two identical halves one is the half of the figure and another is the image in the mirror.

Thus, we observe that:

A symmetrical shape has two halves which look like mirror images of each other.

An asymmetrical shape has two halves which do not make a mirror image.

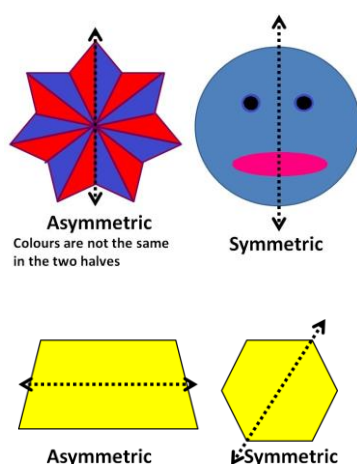


Image Source:

Fish: <http://www.freestockphotos.biz/stockphoto/10702>

Boat - <https://pixabay.com/vectors/paper-boat-toy-folded-crafts-34131/>

Butter Fly - https://en.wikipedia.org/wiki/Symmetry_%28geometry%29#/media/File:Simetria-bilateria.svg

Alphabets – Original contribution by saimiteshrinki@gmail.com

Triangle- https://en.wikipedia.org/wiki/File:Green_equilateral_triangle_point_up.svg

Shape – Original Contribution by saimiteshrinki@gmail.com

House : <http://www.freestockphotos.biz/stockphoto/14938>

Tree : <https://pixabay.com/en/tree-forest-trunk-nature-leaves-576847/>

Mountain mirror image -

https://commons.wikimedia.org/wiki/File:Mount_Hood_reflected_in_Mirror_Lake,_Oregon.jpg

Bird mirror image - <https://pixabay.com/photos/swan-bird-nature-water-bird-293157/>

All others are Original contribution by saimiteshrinki@gmail.com

Time to teach	Asset Type	Theme	SubTheme
10 Minutes	Main Script	Symmetry	Reflection , Line symmetry, symmetry for regular polygo Line symmetry, Lines of syn polygon

3. SA_Fold and Find - Lines of symmetry

Aim:To find the lines of symmetry by fold and find activity.

Materials required: 2 sheets of paper and a printed copy of the worksheet for each student.

Type of Activity : Indoor, classroom, individual.

Instructions to teacher: A day before the activity, please ask students to cut one piece of paper into a square of any dimension and another one into a trapezium.

On the day of the Activity:

Points to Recall:

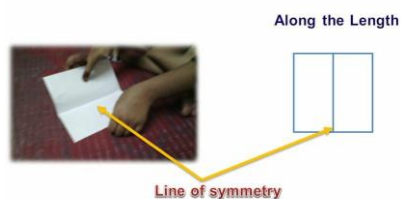
What is a symmetry?

Suggested answer: A symmetry is an exact match in the size of shape between two halves of something.

Procedure:

Teacher instructs the students the following procedure:

1. Take a piece of squared paper. Fold it along its length such that two halves exactly overlap. Unfold the shape and look at the creased line. There is one line of symmetry along the fold.



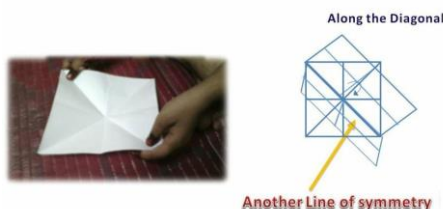
2. Fold it along its breadth into two such that the halves exactly overlap. Unfold the shape and look at the creased line. There is another line of symmetry noticed.

Along the Breadth



3. Fold it along the diagonal and press it such that the halves exactly overlap. Unfold the shape and you will notice that there is another line of symmetry running along the diagonal.

4. Fold it along another diagonal to see the line of symmetry running on the other side. There are 4 lines of symmetry for a square.



5. Now take a piece of paper cut into trapezium shape and fold it vertically into two halves. Unfold and notice that there is one line of symmetry noticed.



6. Fold the piece of paper horizontally into two halves. Crease it and unfold the paper. There is no exact or equal overlapping of sides.



So, there is only one line of symmetry for a trapezium.

Here is a worksheet for you to complete.

Note to the teacher: The Worksheet is attached with this asset as a document along with solutions. The teacher can print only the first page of the worksheet for the activity.

Observation: Students will observe that a square is having four lines of symmetry and trapezium is having one line of symmetry.

Conclusion: After folding along any side or diagonal, if the two shapes on either side of the creased line overlap each other, then the line is called the line of symmetry.

Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Suggested Activity	Symmetry	Line symmetry, Lines of symmetry for regular polygon, Line symmetry, Line of symmetry for regular polygon

4. MS_Rotational Symmetry

Introduction:

We recall that letter “S” does not possess Line Symmetry.

This letter exhibits a different kind of symmetry called the ROTATIONAL SYMMETRY.

What is meant by ROTATION?

"Rotation" means turning around a center.

The distance from the center to any point on the shape stays the same. Every point makes a circle around the center.

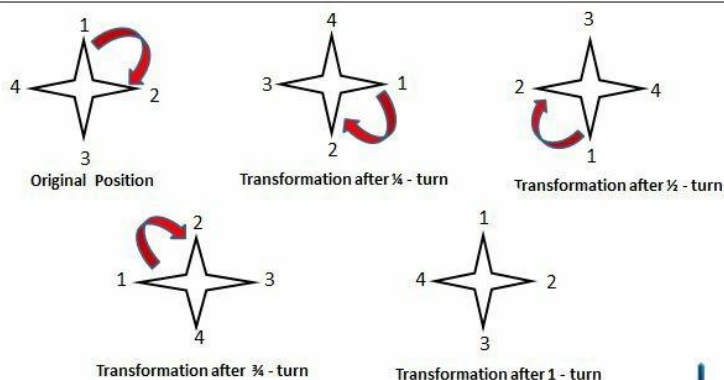
Rotational symmetry:

A shape has Rotational symmetry when it still looks the same after a rotation (of less than one full turn)

Rotational Symmetry is also as "Turn Symmetry"

After a rotation (of less than one full turn) means turning through some angle (in degrees) depending on the object.

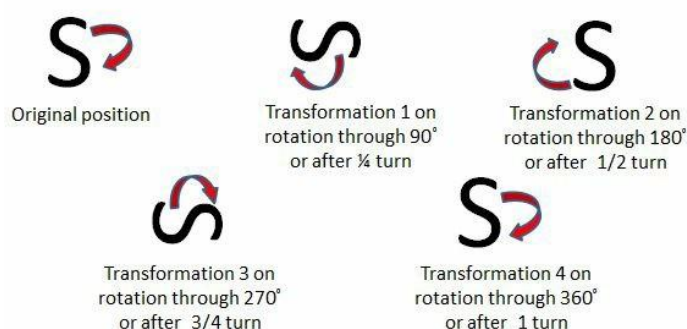
Example 1



Order of Rotational Symmetry:

Example 2

Consider the alphabet “S”. Let us rotate it around a point and observe the transformation



The alphabet “S” appears twice as its original shape on one complete rotation of 360° , in Transformation -2 and Transformation-4.

The number of times we get the same shape on rotating an object (until u complete a circle) is called **ORDER OF ROTATION**.

Hence, the “Order of Rotation” of alphabet “S” is 2.

When the alphabet “S” undergoes $\frac{1}{2}$ turn as in Transformation-2 it regains its original shape.

Example 1 WILL HAVE AN ORDER OF ROTATION AS 4 as it comes back to its same position after 4 turns .

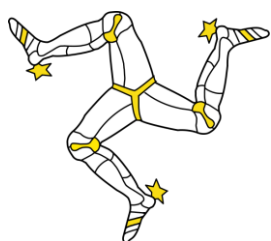
Fraction of turn :

The fraction of turn after which the given shape regains its original position on rotating about a fixed point is called "Fraction of turn symmetry ".

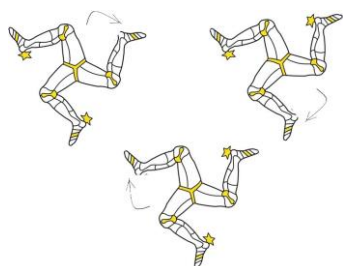
Hence, the "Fraction of Turn Symmetry of alphabet "S" is $\frac{1}{2}$.

Fraction of turn symmetry for the first set of images is $\frac{1}{4}$.

Example 3:



The triskelion appearing on the Isle of Man flag.



The Triskelion shown above can be rotated to three different positions in one complete rotation or turn and each look the same.

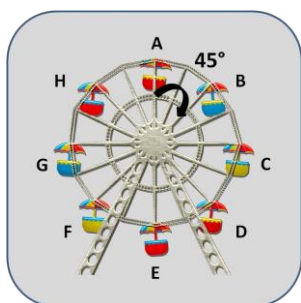
We say the Triskelion has Rotational Symmetry of Order 3.

As the Triskelion undergoes $13\frac{1}{3}$ turn, it regains its original shape, hence, we say that the Triskelion has $13\frac{1}{3}$ turn symmetry.

Angle of rotation:

The angle of rotation is the measure of the angle by which a figure is rotated in the clockwise direction about a fixed point .

In rotational symmetry, after the object is rotated through a specific angle of rotation, the object appears as the original object.



In moving from point A to point B (clockwise), the angle of rotation of the Ferris wheel is 45°

After rotating 45° , the Ferris wheel looks the same except for change of position of the passenger carrying components.

Relation between Fraction of Turn and Order of Rotation:

Fraction of turn	Angle of rotation in degree	Examples of Shapes	Order of Rotation	Shapes
Half	180°	Oval	2	
1/3	120°	Equilateral Triangle	3	
1/4	90°	Hospital first aid symbol (in plus form)	4	
1/6	60°	6 Pointed Star (made of equilateral triangles)	6	
1/8	45°	8 Spoked Wheel	8	
1/8	45°	Regular Octagon	8	
1/4	90°	Square	4	

A shape which has $\frac{1}{n}$ turn symmetry is said to have order of rotation "n" .

Image source:

Triskelion: http://commons.wikimedia.org/wiki/File:Manx_Triskelion.png

Ferris Wheel: <https://pixabay.com/illustrations/circus-clown-strongman-face-4880938/>

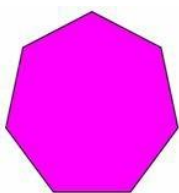
Stop Sign : <https://pixabay.com/vectors/traffic-sign-stop-road-sign-157617/>

All others are original contribution using autosshapes in MS Powerpoint.

Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Main Script	Symmetry	Rotational symmetry, Angle Rotational symmetry, Angle

5. IQ_Why and why not?

1. What is the order of rotational symmetry of a regular heptagon?



Options:

(a) No symmetries can be made

(b) 9

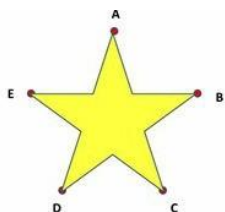
(c) 5

(d) 7

Ans: (d)

Ques:

2. This star is made up of equilateral triangles. What is the order of rotational symmetry of the star?



Options:

(a) 5

(b) 4

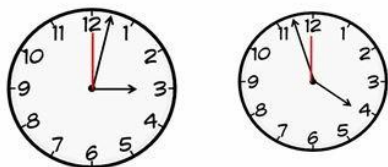
(c) 6

(d) 12

Ans: (a). It has 5 lines of symmetry. Hence, order also 5.

Ques:

3. Imagine the time to be 3:02 p.m. How many full rotations would it take for the seconds hand to reach 3:56 p.m. on the same day?



Options:

(a) 60

(b) 72

(c) 54

(d) 48

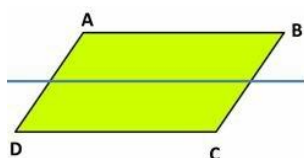
Ans: (c)

Explanation:

The seconds hand makes one full rotation to signify that 1 minute is over. Now, the second hand is at 3:02. It will take it 54 minutes to go to the time 3:56 [as $56-2=54$]. Therefore, it will take 54 rotations to reach the time 3:56.

Ques:

4. How many lines of symmetry does the parallelogram ABCD have ?



Options:

(a) 4

(b) 2

(c) 3

(d) no lines of symmetry

Ans: (b)

Explanation:

It has no lines of symmetry . But It has rotational symmetry of order 2.

Ques:

5. If a car's wheel makes 1.75 rotations, how many degrees has the wheel covered?



Explanation:

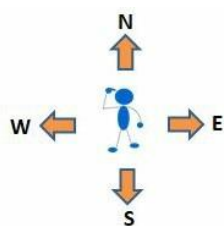
One rotation= 360°

Then,

1.75 rotation= $1.75 \times 360^{\circ} = 630^{\circ}$

Ques:

6. If you start facing south, and then turn 450° clock wise, which direction will you be facing?



Answer : West

Explanation:

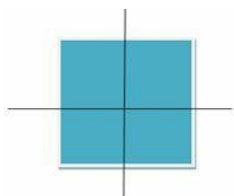
$$450^{\circ} = 360^{\circ} + 90^{\circ}$$

If we turn 360° we'll face the direction which we started in i.e. south. A turn of 90° will make us face the direction towards our right.

[Example- Quest: 90° from south clockwise? Answer : WEST]

Ques:

7. How many minimum number of lines of symmetry will you need to make FOUR squares out of a square?



Answer: 2

You can see four squares being formed inside the square after we have drawn 2 lines of symmetry.

Image Source:**Heptagon**

:https://hi.m.wikipedia.org/wiki/%E0%A4%9A%E0%A4%BF%E0%A4%A4%E0%A5%8D%E0%A4%B0:Basic_heptagon.svg

Wheel :<https://pixabay.com/vectors/classic-car-wheel-sports-cars-295180/>

Blueman :<https://freesvg.org/blueman>

Clock, Star, Parallelogram, Square, Arrow :Autoshapes :OC

Time to teach	Asset Type	Theme	SubTheme
10 Minutes	Inquisitive Questions	Symmetry	Angle of rotation, Angle of r

6. SA_Turn and learn**Worksheet (Activity Sheet)**

Please Note :There is no Power point for this asset.

Activity 1

Aim: To make the students understand rotational symmetry through a group activity.

Materials Required:(per group)

1. Chart Paper (1 Chart paper per group)
2. Activity Sheet and Shapes sheet (attached in the asset as a document which can be printed)
3. A pair of Scissors
4. Glue stick / gum
5. Sketch pen / marker pen / colour pencils.

Setting for the Activity : Indoor

Type of Activity : Group

Instructions to Teacher: The teacher may start the activity by recalling the concepts of:

- a. Rotational Symmetry
- b. Fraction of turn symmetry

c. Order of turn symmetry**d. Angle of turn symmetry**

The teacher must ask the students to prepare the chart paper with the following columns, as shown in the picture below.

Original Shape	Transformation 1	Transformation 2	Transformation 3	Transformation 4	Transformation 5	Transformation 6	Transformation 7	Transformation 8	Order of rotation	Fraction of rotation.

This chart paper has to be filled with the sequence of transformed shapes. Each group will prepare one such chart paper.

Steps to do the Activity :

The teacher can follow the given steps to demonstrate the concepts of rotational symmetry.

Step 1: Prepare a day ahead to do the activity in the class. Collect activity worksheet and shapes worksheet, print them out and distribute one copy of both the sheets to each group. The students will already have the chart paper ready with the columns drawn. { One chart paper per group}.

Step 2: In the class, divide the students into groups of 5 each.(or the teacher can decide according to the class strength.)

Step 3: Each group must have a worksheet, shape sheet and one chart paper. All the students should have a pair of scissors, glue stick and colour pen.

Step 4: Now, the teacher can ask the students to cut the given shapes from the shape sheet..

Step 5: First student will have to turn the shape (angle will depend on the shape) and paste it on the chart paper. Then, the next student will paste the next transformation shape. Likewise, every student will paste the consecutive transformation of each shape.

Step 6: The above step must be followed for every shape given in the worksheet.

Step 7: Now, mark each transformation as 1, 2, 3, etc. for all the shapes.

Step 8: The students must be able to find those transformations that are the same and circle them on the chart paper.

Step 9: Count the number of transformations that each shape made to come to the original shape. Then fill the

last two columns of the chart paper.

Step 10. Now, fill the worksheet about their

- a) fraction of turn symmetry and**
- b) order of turn symmetry, as observed in the chart paper.**

Steps 5 to 10 will be followed by every group.

Observation: Order of symmetry and fraction of turn symmetry is different for different shapes.

Conclusion: Every student understands the concepts of rotational symmetry by turning the given shapes with their own hands and discussing with their group members and concludes that:

"A shape whose order of rotation is 'n' has the fraction of turn symmetry as ' $\frac{1}{n}$ '."

Activity 2

Aim : To make the students understand the concepts of rotational symmetry through demonstration .

Materials required :

- 1. Worksheets**
- 2. One flower of 6 petals**
- 3. One playing card of King face**
- 4. One star – a toy or a paper cut out or a Christmas star.**

Setting for Activity : Indoor

Type of Activity : Group – Whole class and the teacher together

Instructions to the teacher : A day prior to the activity, the teacher has to take printouts of the given worksheet for activity 2 and distribute to all the students in the class. On the day of the activity, the teacher will carry a star, a flower and a king face playing card to the class for performing the activity. If not available physically, the teacher can draw the images of a flower and a playing card to show the students.

Recall : To start off the activity the teacher has to make the students recall the first activity and demonstrate the second activity as given in the following steps.

Steps to do the activity :

Step1 : The teacher has to instruct students to keep their worksheets ready to be filled as they perform the activity along with her/ him.

Step2 : The teacher can start off to demonstrate rotational symmetry using the flower.

Step3 : The teacher has to show a flower to the entire class and rotate it with her hands to 90° and ask the students if the obtained / transformed position of the flower is anything different from the earlier original position.

Step4 : The students have to reply with YES / NO. For the flower and star, the objects remain the same in their shape even after rotation. So they should reply "NO – Not different ".

Step5 : Then again turn the flower to another 90° and later to another 90° . Every time the teacher can ask the students to tell if the transformed figure is anything different or same from the original shape.

Step6 : For the flower and the star, the reply from the students will be always “NO – NOT different shape”, for every transformation.

Step7 : The teacher has to rotate the flower and star until it completes 360° . Every time ask the students to find whether the position is the same as the original shape.

Step8 : The students will now note in the worksheet about what is the “Fraction of turn symmetry” and the “order of turn Symmetry” – for the flower and the star.

Step9 : The teacher has to repeat the activity for the king face playing card also.

Step10 : While turning the card to 90° , the transformation is not the same as the original one. So, the students will reply saying that: “YES – The transformation is different – It is not the original shape”.

Step11 : For the King face playing card, the transformations at 180° and 360° are the two transformations that are similar to the original shape. So, the students will reply to the question is it different, as - “NO, not different. It is the same as the original shape.”

Step12 : Now, the students have to fill the “fraction and order of symmetry” for the king card in the worksheet

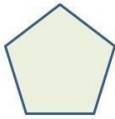
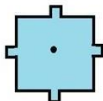
OBSERVATION :

The student will observe that the rotational symmetry for flower and star was obtained for every transformation. But, for the king face playing card it was obtained only twice.

CONCLUSION : So, the students will conclude themselves that

“A shape whose order of rotation is “ n ” has the fraction of turn symmetry as $1/n$ ”

Worksheet (ACTIVITY 1)

Shapes	Order of Rotation	Fraction of Turn Symmetry
		
		
		
		
		

ACTIVITY 2

Shapes	Order of Rotation	Fraction of Turn Symmetry
		
		
		

SOLUTION FOR THE ACTIVITY 1

Shapes	Order of Rotation	Fraction of Turn Symmetry
	2	$\frac{1}{2}$
	5	$\frac{1}{5}$
	2	$\frac{1}{2}$
	4	$\frac{1}{4}$
	8	$\frac{1}{8}$

SOLUTIONS FOR ACTIVITY 2

Shapes	Order of Rotation	Fraction of Turn Symmetry
	6	$\frac{1}{6}$
	2	$\frac{1}{2}$
	5	$\frac{1}{5}$

Alphabet H, Alphabet S, simple shape and Eight pointed star: OC: MS Paint

Pentagon: OC: Autoshapes

Playing card Source: CC-[http://en.wikipedia.org/wiki/King_\(playing_card\)#mediaviewer/File:Poker-sm-212-Ks.png](http://en.wikipedia.org/wiki/King_(playing_card)#mediaviewer/File:Poker-sm-212-Ks.png)

Flower Source : CC

-http://en.wikipedia.org/wiki/Symmetry_in_biology#mediaviewer/File:LiliumBulbiferumCroceumBologna.jpg

Starfish Source: CC-http://commons.wikimedia.org/wiki/File:Horned_Starfish_Macro.JPG

Time to teach	Asset Type	Theme	SubTheme
20 Minutes	Suggested Activity	Symmetry	Rotational symmetry, Angle Rotational symmetry, Angle

7. QA_SYMMETRY**Assessment For Line of Symmetry**

1. Is the dashed line a line of Symmetry? Write Yes or No.



Answer: First figure : No , it is not the line of symmetry.

Second figure : Yes , it is the line of symmetry.

2. Draw the lines of Symmetry. How many are they?



Answer



One line of symmetry

4 lines of symmetry

One line of symmetry

4 lines of symmetry

3. Ques: Which of the following capital letters has at least one line of reflection symmetry?

X P F S

Ans : X

4. Ques: Which of the following Capital letters has exactly one line of symmetry?

X H I T

Ans : T

II. Who am I?

5. Ques: My angle of rotation is 120° and order of rotation is 3.

Ans: An Equilateral triangle.

6. Ques: My order of rotation is 5 and angle of rotation is 72°

Ans: A Pentagon.

7. Ques: I have four pairs of opposite sides. My angle of rotation is 45° .

Ans: An Octagon.

Note: Worksheet file is attached with Questions and Answers separately. Teacher is requested to print only Questions and give each child.

Image Source:

Original Contribution

Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Assessments	Symmetry	Rotational symmetry, Line s of rotation, Rotational symm symmetry, Angle of rotation

8. SA-Symmetry through dance

Aim:

- To understand the concept of line symmetry, rotational symmetry and reflection symmetry through dance.
- To be able to differentiate between symmetrical and asymmetrical postures in dance.

Resources Required:

Coloured Chalk, music player with some music to be played and a long stick (prop).

Setting for the Activity:

Indoor

Type of Activity:

Demonstration by the teacher- (With the help of Students)

Group activity by students

Instructions to Teacher:

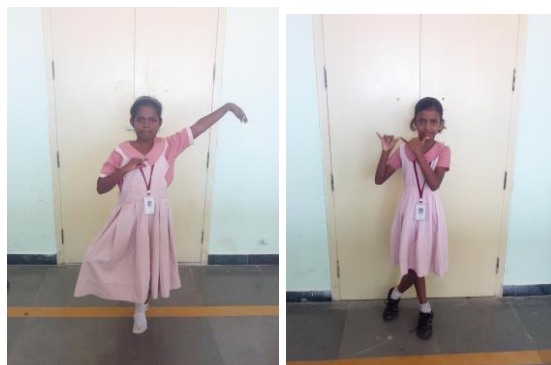
1. The teacher may start the activity by recalling the meaning of the terms Symmetry, line of symmetry, rotational symmetry and reflection symmetry. The teacher can also introduce the different forms of dance in India.
 - Symmetry: Symmetry means one shape becomes exactly another while moving in any one of the ways (flip, slide or turn).
 - Asymmetrical Figures or Objects: If an object or figure is not symmetrical it is called as asymmetrical object or figure.
 - Line of Symmetry: It is the line that divides the symmetrical figures into exactly identical parts. It can be horizontal/vertical/or any direction.
 - Rotational Symmetry: Rotational symmetry occurs when an object or figure is rotated about a fixed point and even after rotation the object or figure continues to be symmetrical.
 - Reflection Symmetry: Reflection symmetry occurs when the object is reflected in the other part. One part of the figure is the exact replica of the other.
 - There are various forms of dance in India like Kathakali, Kuchipudi, Odissi, Kathak, Bharatanatyam, Western etc.
 - Each dance form reflects the diverse culture of our country.
 - Symmetry in dance makes it very appealing.

2. The teacher can first demonstrate the concept of 3 types of symmetry by the following steps given below.

- The teacher calls a student to explain the concept of line symmetry. The student is asked to take the posture as shown in the following picture.



- The line of symmetry is explained by the teacher to the other students using a long stick (denoting the line of symmetry). Teacher calls for 2 more students to demonstrate Asymmetrical postures. Each student is asked to take position as shown in the below pictures.



- The teacher explains to the other students that the postures are Asymmetrical because the right hand side is not exactly the same as left hand side of the posture.
- The teacher calls 4 students to explain the rotational symmetry. The teacher draws 2 straight lines intersecting at 90 degrees on the floor. The 4 students take their positions on top of the intersecting lines as shown in the following picture.



1. The teacher asks the children to rotate in each step through 90 degree. The resulting moves possess rotational symmetry because the new posture is identical to the original posture.
- The teacher calls 2 students to demonstrate reflection symmetry. Teacher draws a line on the floor. The students are asked to stand on either side of the line facing each other and take a posture as shown in the following figure.



- The teacher explains to the students that both students exhibit reflection symmetry as poses are identical on either side of the mirror line (shown on the floor).
- The teacher plays the video of the dance activity to the class (This is attached in the asset).

Note to the teacher : Any low music can appropriately be played. A sample is attached in the asset.

- The teacher conducts the group activity as per the instructions given in the procedure.

Procedure:

Step 1: Teacher divides the class into groups of 6 students each.

Step 2: Each group is asked to create a set of dance moves involving the 3 types of symmetry for a count of 1 beats. The dance moves can be of any style.

Step 3: Each group is given a time of 5 minutes for preparation.

Step 4: Teacher goes to each group and guides them in case of doubts.

Step 5: Soft music is played in background.

Step 6: Each team is asked to perform.

Step 7: The performance of each team is analysed by other team members on basis of their innovation in step and synchronisation of group.

Observation:

- The students observe and identify the type of symmetry in various dance forms.
- The students recognize the fact that symmetry enhances the beauty of the dance.

Conclusion:

- The students understand the concept of line symmetry, reflection symmetry and rotational symmetry through dance.
- The students are able to differentiate between symmetrical and asymmetrical postures in dance.

Image Source:

SSSVV Gallery

Stick : CC: http://pixabay.com/p-297184/?no_redirect

Time to teach	Asset Type	Theme	SubTheme
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15 Minutes	Suggested Activity	Symmetry	Rotational symmetry, Reflex symmetry, Rotational symmetry, Line symmetry
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9. Practical uses of Symmetry in our daily life

The uniforms that you wear are symmetrical. Would you like to wear a shirt with one sleeve half and the other to be sleeveless?



<https://pixabay.com/en/polo-shirt-t-shirt-shirt-clothing-48105/>

<https://pixabay.com/en/blouse-pink-clothing-female-shirt-154159/>

<https://pixabay.com/en/pants-maroon-cloth-2414348/>

<https://pixabay.com/en/pants-blue-cloth-2414349/>

No, isn't it?

Now try designing your own dress with symmetry.

Observe the T-shirt and some casual dresses that you wear. Most of them would contain symmetrical designs in it. Asymmetrical design creates a sort of incomplete feeling in our brain even though it might aid our fashion needs.

Vegetables and flowers follow symmetry as well.



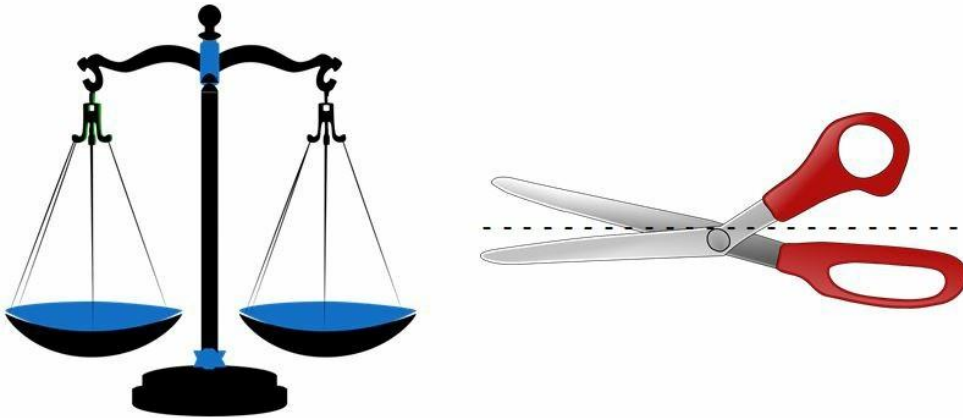
1. Pumpkin: <https://pixabay.com/en/pumpkin-white-back-ground-squash-963043/>

3. Onion : https://commons.wikimedia.org/wiki/File:Berlinwohnung_rote_zwiebel_schnitt_10.04.2012_14-59-48.jpg

2. Flower: <https://pixabay.com/en/floral-daisy-blossom-plant-natural-50157/>

The simple gadgets that we use for our day to activities are symmetrical.

The tools that are symmetrical are handier to use. Any vendor will give the things that we want to buy, only when the pans of the balance is the same! Check out next time when you go for a shopping in the market!



1. Weighing Scale: <https://pixabay.com/en/scales-balance-measure-weigh-blue-309810/>

2. Scissors: <https://pixabay.com/en/scissors-office-open-scissor-tool-28697/>

Ceilings and walls of temples have symmetrical designs to create harmony and balance.



1.Wall : <https://www.srisathyaasaividya vahini.org/index.php/component/joomgallery/default/temple-wall-painting-8270.html>

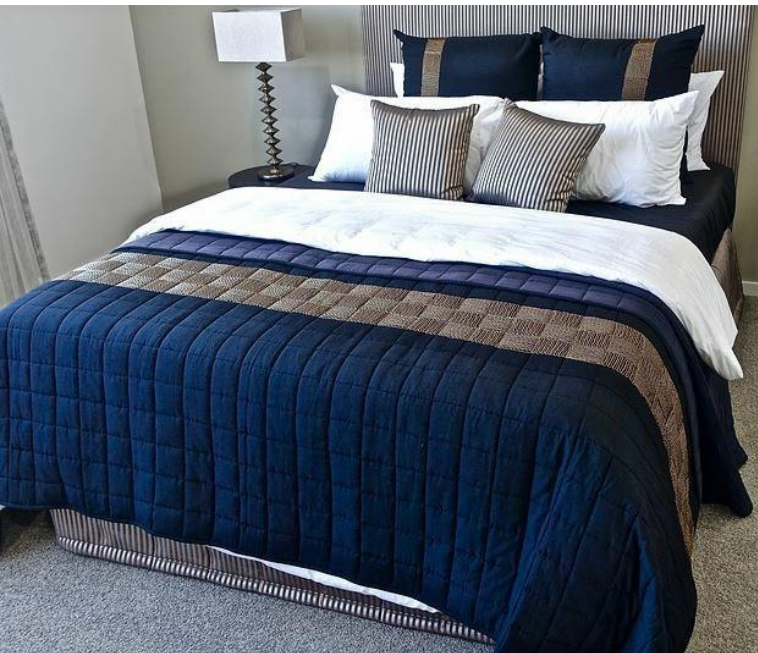


1.Ceiling : <https://www.srisathyaasaividya vahini.org/index.php/component/joomgallery/default/religious-1065.htm>

The bedsheets, pillow covers and carpets that we use all have symmetrical designs in it.



<https://pixabay.com/en/pillow-sofa-cozy-furniture-2092155/>



<https://pixabay.com/en/bed-bedroom-pillows-design-modern-1834916/>

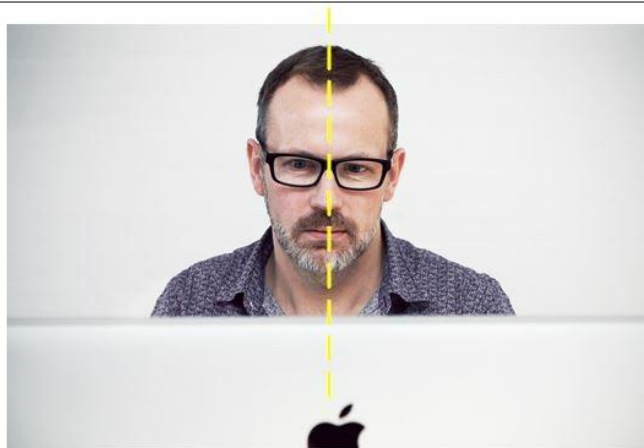
Asymmetrical designs create a sort of visual disturbance. Designers prefer symmetrical design as it gives a pleasing effect to human brain.



<https://pixabay.com/en/necklace-pearl-jewelry-luxury-gift-2125146/>

Symmetry creates a sense of completeness in the things that we see. Moreover symmetrical design in jewellery-making reduces the cost and amount of time taken to complete it.

Photographers try to bring more of symmetry in the picture that they capture because, symmetry makes the photograph visually more appealing. Asymmetrical photographs give a sort of weird look.



Facial Symmetry:CC: <https://pixabay.com/en/man-male-adult-person-caucasian-1209494/>

The human face and body is considered to be symmetrical in nature. The more the symmetry is there in the human body the more the person looks beautiful and attractive. That's why sometimes when we try taking selfies, our face looks weird because it is not symmetrical.

Time to teach	Asset Type	Theme	SubTheme
7 Minutes	Day-to-day Relevance	Symmetry	Application of reflectional sy

10. IA_Symmetry in nature

Nature is a resource for many symmetrical objects.

S.No	Category	Type of symmetry
1)	Symmetry in Leaves	Line symmetry
2)	Symmetry in Flowers (sunflower)	Rotational symmetry
3)	Symmetry in fruits (Any fruit cut in the middle)	Line symmetry
4)	Symmetry in insects (cockroach, housefly)	Line symmetry
5)	Symmetry in birds (peacock feather)	Line symmetry

Note to the teacher :Teacher can encourage the students to give more such examples.

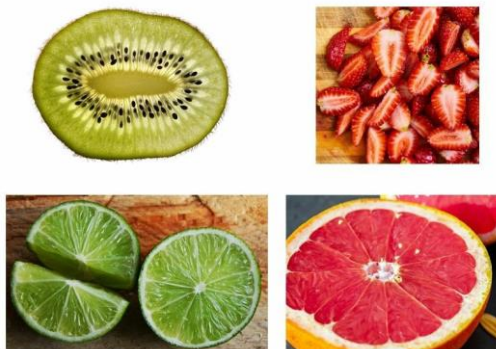
Symmetry in Leaves



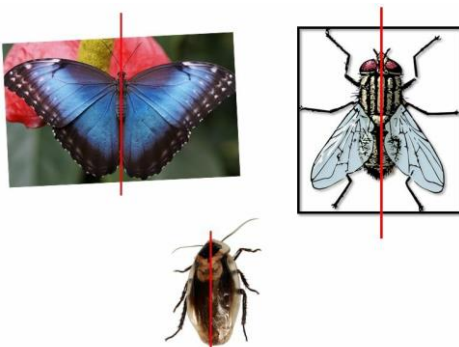
Symmetry in Flowers



Symmetry in Fruits



Symmetry in Insects



Symmetry in Birds



Image Source:

<https://pixabay.com/photos/fern-leaves-green-nature-purity-821293/>

<https://pixabay.com/photos/leaf-leaves-jack-fruit-leaf-green-299931/>

<https://pixabay.com/photos/leaf-leaves-colorful-green-macro-318743/>

<https://pixabay.com/photos/sunflower-flower-petals-bloom-3614728/>

<https://pixabay.com/photos/flower-dahlia-blossom-bloom-plant-197343/>

<https://pixabay.com/photos/dahlia-dahlia-flower-petals-pink-4539336/>

<https://pixabay.com/photos/kiwi-fruit-food-delicious-eat-2673038/>

<https://pixabay.com/photos/strawberry-fruit-red-diet-food-2960533/>

<https://pixabay.com/photos/lime-citrus-fruit-sour-green-2133091/>

<https://pixabay.com/photos/grapefruit-fruit-red-sweet-1647688/>

<https://pixabay.com/photos/blue-morpho-butterfly-rainforest-784979/>

<https://pixabay.com/illustrations/fly-housefly-bug-2330928/>

<https://pixabay.com/photos/cockroach-insect-imago-blaberus-566712/>

<https://pixabay.com/photos/peacock-feather-macro-peacock-bird-3030297/>

<https://pixabay.com/photos/eagle-bird-bird-of-prey-natural-1753002/>

Time to teach	Asset Type	Theme	SubTheme
5 Minutes	Interesting Asides	Symmetry	Symmetry in nature, Symme

11. VC_ Reduce wants - live simply

Reduce wants; live simply.

What is a mirror half? Imagine you draw a dotted line to divide any shape into two halves. When you fold it along the dotted line and one half covers the other similar half completely, the two are said to be mirror halves.

Mirror halves happen when the two halves are symmetrical or identical. When we see certain figures with evenly balanced proportions, we say, “They are Symmetrical”.

Symmetry teaches us balance and evenness.

It teaches us to have balance between our ‘wants’ and ‘needs’. Wants are our ‘desires’, whereas needs are our ‘basic necessity.’ The pursuit of those desires and wants force worries, anxieties and restlessness on us.

We do not rest until those desires are fulfilled. When one desire is fulfilled, another one crops up creating more and more pressure thus affecting the balance.

The sooner we renounce these excess desires the balance sets in and we start enjoying peace of soul.

Here is a Parable of Sri Ramakrishna.

In a certain place the fishermen were catching fish.

A kite swooped down and snatched a fish. At the sight of the fish, about a thousand crows chased the kite and made a great noise with their cawing.

The kite flew to the south and the crows followed it there. The kite flew to the north and still the crows followed after it. The kite went east and west, but with the same result. Whichever way the kite flew with the fish, the crows followed it.

As the kite began to fly about in confusion, lo, the fish dropped from its mouth. The crows at once let the kite alone and flew after the fish.

Thus relieved of its worries, the kite sat on the branch of a tree and thought: That wretched fish was at the root of all my troubles. I have now got rid of it and therefore I am at peace.

As long as the kite was holding on to the fish, it was under lot of pressure from the crows to release it. The moment he released it he was at peace.

One should be mentally strong to control desires and keep a balance in life. Children! Let us learn to develop the qualities of mental & emotional balance, and right attitudes for a happy, healthy & peaceful coexistence with others in the society.

“Every want is a shackle that hinders movement and is a drag on the foot. Reduce wants; live simply, that is the way to happiness.” Sathya Sai Baba

Time to teach	Value Type	Value Sub Type	Value Attribute
3 Minutes	Peace		Open

12. MS_Summary _Does it Look the Same

The following is covered in the chapter :

- 1) Line or Reflection or Mirror symmetry and Rotational symmetry are defined.
- 2) Asymmetry is defined.
- 3) How to find if an object is having Line or Reflection or Mirror symmetry or Rotational symmetry is explained
- 4) Method of finding order of rotation, angle of rotation and fraction of turn is explained .
- 5) Uses of symmetry in day to day life are discussed.
- 6) Value on living a simple life by reducing wants was taught using balance and evenness concept.

Time to teach	Asset Type	Theme	SubTheme
5 Minutes	Main Script	Symmetry	