

MATHEMATICS THROUGH ACTIVITY

Supplementary Work Book

Class - VIII

State Council of Educational Research & Training (West Bengal)

25/3, Ballygaunge Circular Road, Kolkata-700 019

MATHEMATICS THROUGH ACTIVITY

For Class - VIII

(Supplementary Book)

(English Translation of Kajer Madhyame Ganit)

1. Name :
2. Mother's Name :
3. Father's Name :
4. Name of the School :
5. Name of the Village/City :
6. Name of the District :

Published by State Council of Educational Research & Training (West Bengal)

25/3, Ballygaunge Circular Road, Kolkata-700 019

This supplementary book will be distributed to each student, reading in Class VIII of schools approved by West Bengal Board of Secondary Education, from the Office of the District Project officer of West Bengal Sarba Siksha Mission, approved and financed by West Bengal Sarba Siksha Mission.

Editor & Publisher :

Director, State Council of Educational Research & Training (West Bengal)

Date of Publication : March, 2011

Printed by :

Hooghly Printing Co. Ltd.

41, Chowringhee Lane

Kolkata - 700 071

PREFACE

Some important perspectives regarding teaching learning in school level are published in National Curriculum Framework (2005). It has been Mentioned that for all - round development of child (a) Daily experience of child should be connected with the knowledge acquired from school. (b) Tendency to mere memorisation should be discouraged. (c) It should be carefully noticed that teaching learning shouldn't be text book oriented only. (d) Evaluation system should be flexible and connected to daily classroom-teaching. (e) Democratic environment should be created in classroom for all round development of each child.

It has been directed in the new time-table of West Bengal Board of Secondary Education to arrange peer-learning and remedial lesson in Mathematics and other subjects once in a week and to set up Mathematics laboratory. Its main objective is to learn through activity and to overcome the weakness in Mathematics. In this context, State Council of Educational Research and Training arranged a number of seminars in concerned subjects. Board members and teachers from Schools approved by Board were present in those seminars. The work-sheet obtained from those seminars had been applied in classroom teaching in some selected schools through District Institution for Education and Training (DIET).

After performing the experimental application, some of the opinions obtained from the teachers are as follows :

- To learn Mathematics through activity is encouraging and acceptable.
- This type of teaching learning method is interesting to teachers and learners.
- Application of this method will make the learners attentive and enthusiastic in learning.
- Learners have shown their interests in the application of Mathematics through activity and the lessons delivered were all practical. This method of teaching will make the learners more interested in Mathematics learning.

The teachers of Secondary Schools were invited to make work-sheet (suitable for class VI/VII/VIII) for learning Mathematics through activity in the workshops arranged by DIET and SCERT(WB).

It has been noticed that teachers are very much interested in this type of work and many of them submitted work-sheet to us. State Council of Educational Research and Training (WB) is grateful to all of them.

At first, Sri Subrata Biswas and Sri Gautam Bhattacharya, officers of this Council verified the acceptability of all the work sheets collected and helped in editing of this supplementary book.

This supplementary book is published for each learner, centering the concept of Mathematics Laboratory of class VI/VII/VIII in the 11th five-year-plan of Sarvasiksha Abhijan with objective in qualitative improvement of teaching learning in upper primary level. It is expected that, in due course of time the students will get this book in sufficient number from the office of the District Project Officer. Teachers and learners will be able to further develop new work-sheet taking cue from those already made. So it is expected that more and more new ideas will evolve from the work sheet published in this book.

We shall be more enriched if we get opinions and suggestions from teachers, learners and people interested about this supplementary book.

Prof. Rathindranath De
Director
State Council of Educational Research & Training (W. B.)

Following is the list of materials required to do the activities published in the work sheet of the supplementary book :

- a) Hard straight wire.
- b) Straw, Stick and Jute-Stick.
- c) Scissors.
- d) White paper sheet, graph paper, hard paper sheet.
- e) Sketch pen, pencil, pen.
- f) Box made of paper.
- g) Blocks and cubes of different sizes made of clay or thermocal or wood.
- h) Gum and cellotape.
- i) Protractor.

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Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 1 : To determine average length.

Materials : One straight hard wire, straw, scissors.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

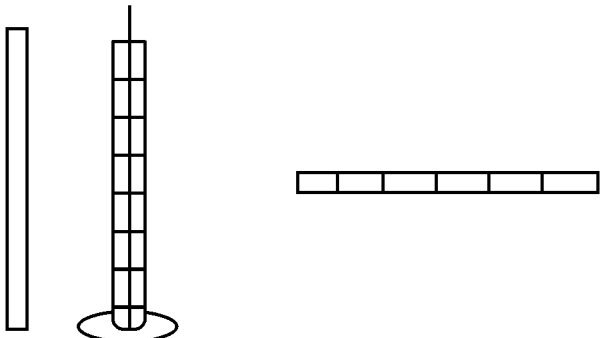
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Description of the activity	Your Comments
<p>1) Arrange some pieces of straw of different sizes in succession and insert a wire through the holes.</p> <p>2) Measure the total length of the pieces of straw arranged.</p> <p>3) Take one piece of straw of length equal to the total length obtained in the 2nd step. Divide it in equal number of pieces that you have taken in the first step.</p> 	

- Questions :**
- 1) What is the length of each equally long piece of straw ?
 - 2) What are these pieces called with respect to the previous pieces ?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

- Activity – 2 :** Concept of frequency distribution
- Submit :** To determine the frequency distribution of the marks obtained by 50 students.
- Material :** Paper, sketch pen , box made of paper.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

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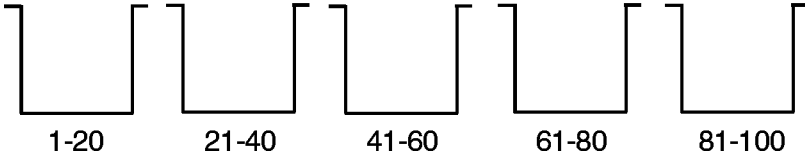
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Preparation of teacher :- On square sheets of same size teacher should record the marks obtained in class seven by the students who have been promoted to class eight. The class interval of the obtained marks should be given too.

N.B. – Marks must be distributed in the interval between lowest and highest marks obtained.

Description of the activity	Your Comments
<p>1) Put the pieces of paper bearing the marks of 50 students, obtained in class seven, in a large box.</p> <div style="text-align: center;">  </div>	
<p>2) Take five small boxes and label each box as shown in the figure below.</p> <div style="text-align: center;">  </div>	
<p>3) Pick up the pieces of paper from the large box one at a time and put it into the respective small boxes according to the labling done.</p>	
<p>4) Count the number of pieces of paper in each of the small boxes.</p>	

- Questions :**
- 1) What are the numbers of paper pieces bearing marks in each of the small boxes ?
 - 2) What is the total number of paper pieces in all of the small boxes ?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

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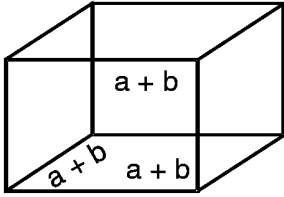
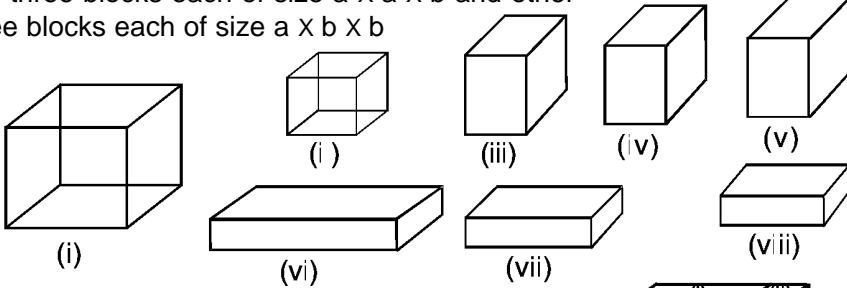
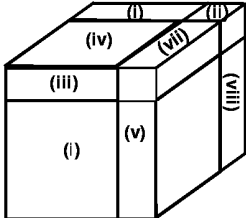
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General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 3 : Geometrical interpretation of the algebraic identity $(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

Material : Cube and blocks of different sizes made of clay or thermocol or wood.

Description of the activity	Your Comments
<p>1) Take a cube of side $(a + b)$ unit.</p>  <p>2) Take two cubes of side a unit and b unit respectively and three blocks each of size $a \times a \times b$ and other three blocks each of size $a \times b \times b$</p>  <p>3) Form a large cube using the above mentioned two cubes and six blocks.</p> 	

- Questions** :
- Are the two cubes of 1st and 3rd step equal ?
 - What are the volumes of cubes and blocks in each step ?
 - What are the volumes of the cubes and blocks present in the cube of the third step ?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

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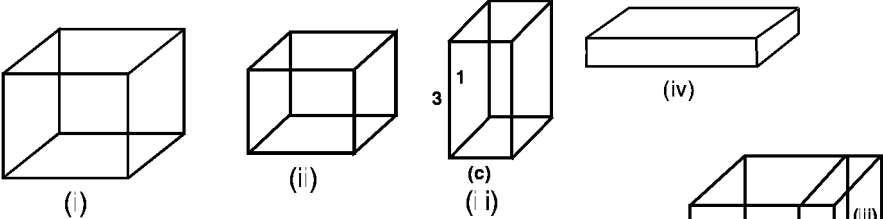
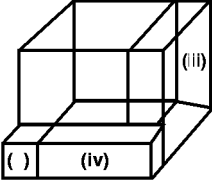
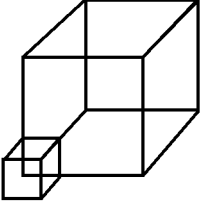
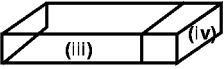
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General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 4 : Geometrical interpretation of the algebraic identity

$$a^3 + b^3 = (a+b)(a^2-ab+b^2)$$

Material : Cube and blocks of different sizes made of clay or thermocol or wood.

Description of the activity	Your Comments
<p>1) Take two cubes of size $a \times a \times a$ and $b \times b \times b$ and two blocks of size $a \times a \times b$ and $a \times b \times b$ respective.</p>  <p>2) Arrange the four cubes and blocks as shown in the following figure.</p>  <p>3) Separate the two blocks.</p>  <p>4) Arrange the blocks as shown in the figure</p> 	

- Questions** :
- 1) What is the volume of each of the cubes and blocks of step 1 ?
 - 2) What is the total volume of the cubes and blocks of step 2 ?
 - 3) What is the total volume of the cubes present in step 3 ?
 - 4) What is the total volume of the blocks present in step 4 ?
 - 5) Is the total volume of the cubes of step 3 equal to the difference of the volume of the blocks present in step 2 and step 4 ?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

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General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 5 : Geometrical interpretation of the algebraic identity
 $a^3 - b^3 = (a-b)(a^2+ab+b^2)$

Material : Blocks of different sizes made of clay or thermocol or wood.

Description of the activity	Your Comments
<p>1) Take five blocks of size $(a-b) \times a \times a, (a-b) \times a \times a, (a-b) \times b \times b, b \times b \times b,$ and $a \times a \times a$ respectively.</p> <p>(i) (ii) (iii) (iv) (v)</p>	
<p>2) Form a large cube using first your blocks which will be equal to the block (V)</p>	
<p>3) Remove the block (IV)</p>	

- Questions** :
- 1) What is the volume of each block in 1st step ?
 - 2) What is the total volume of the blocks in 2nd step ?
 - 3) What is the total volume of the blocks present in 3rd step ?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 6 : Multiplication of polynomials

Sub-unit : Verify the identity
 $(x+1)(x+2) = x^2 + 3x + 2$

Material : Paper, Scissors, Scale, and pencil.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

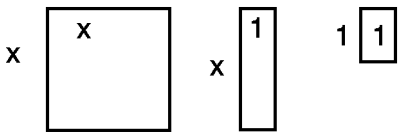
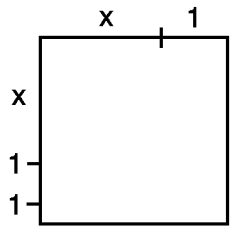
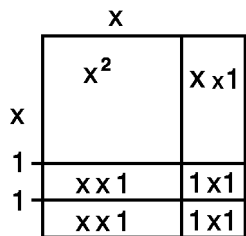
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Description of the activity	Your Comments
<p>1) Take sheets of paper - One of size $x \times x$, Three of size $x \times 1$ and two of size 1×1</p> 	
<p>2) Take a rectangular sheet of size $(x + 1) \times (x + 2)$</p> 	
<p>3) Cover the sheet of 2nd step with the sheets of paper of 1st step.</p> 	

- Questions :**
- 1) What is the area of each sheet of paper in 1st and 2nd step ?
 - 2) What are the areas of paper used to cover the large sheet in step 3 ?
 - 3) What is the product of $(x + 1)(x+2)$

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 7 : Division of polynomials

Sub-unit : To determine the quotient after dividing the expression (x^2+3x+2) by the expression $(x+1)$

Material : Paper, Scale, Scissors. and pencil

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

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Description of the activity	Your Comments												
<p>1) Take a sheet of paper measuring $x \times x$, 3 sheets measuring $x \times 1$ and 2 sheets measuring 1×1. Form a rectangular figure using all the sheets.</p> <div style="text-align: center;"> <table border="1"> <tr> <td></td> <td align="center">x</td> <td align="center">1</td> <td align="center">1</td> </tr> <tr> <td align="center">x</td> <td align="center">x^2</td> <td align="center">$x \times 1$</td> <td align="center">$x \times 1$</td> </tr> <tr> <td align="center">1</td> <td align="center">$x \times 1$</td> <td align="center">1×1</td> <td align="center">1×1</td> </tr> </table> </div>		x	1	1	x	x^2	$x \times 1$	$x \times 1$	1	$x \times 1$	1×1	1×1	
	x	1	1										
x	x^2	$x \times 1$	$x \times 1$										
1	$x \times 1$	1×1	1×1										
<p>2) Measure the length and breadth of the rectangular figure.</p>													

- Questions :**
- 1) What is the area of the large rectangular sheet ?
 - 2) What are the measures of length and breadth of the large rectangular sheet ?
 - 3) What is the quotient when the expression $(x^2 + 3x + 2)$ is divided by $(x + 1)$?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 8 : Factorisation of the expression $ax^2 + bx + c$ where $a > 0, b > 0, c > 0$.

Sub-unit : Factorisation of $2x^2 + 7x + 3$

Material : Paper, Scissors, Sketch Pen.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

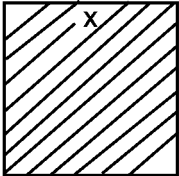
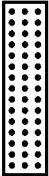

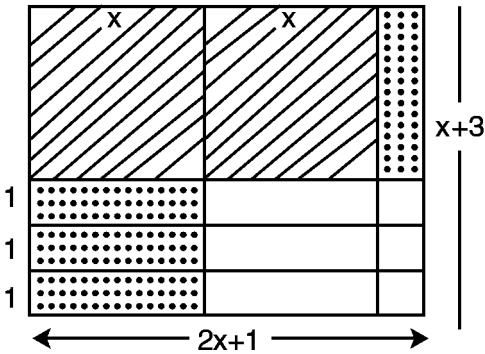
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Description of the activity	Your Comments
<p>1) Take sheets of paper, two of size $x \times x$, three of size 1×1 and seven of size $x \times 1$, and three different coloured sketch pens to colour all the sheets of different size. Colour the sheets of same size with same colour.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <p>2) Form a big rectangular figure with all the sheets taken.</p> <div style="text-align: center;">  </div>	

- Questions :**
- 1) What is the total area of all sheets of paper ?
 - 2) What is the area of the big rectangle ?
 - 3) What are the factors of $(2x^2 + 7x + 3)$?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 9 : Factorisation of the expression ax^2+bx+c where $a>0, b>0, c>0$.

Sub-unit : Factorisation of $x^2 + 5x + 6$

Material : Papers, sketch Pen, scissors

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

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Description of the activity	Your Comments
<p>1) Take sheets of paper one of size $x \times x$, five of size $x \times 1$ and six of size 1×1. Colour the sheets with sketch pen of three different colour in such a manner so that the sheets of same size be of same colour.</p> <div style="text-align: center; margin: 10px 0;"> </div> <p>2) Form a rectangular figure with all the sheet of paper taken.</p> <div style="text-align: center; margin: 10px 0;"> </div>	

- Questions :**
- 1) What is the total area of all sheets of paper ?
 - 2) What is the area of the large rectangular figure ?
 - 3) What are the factors of the expression $(x^2 + 5x + 6)$?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 10 : Factorisation of the expression ax^2+bx+c where a, b, c are integers.

Sub-unit : Factorisation of $(x^2 - x - 6)$.

Material : Papers, sketch Pen and scissors,

Date.....

Name of School.....

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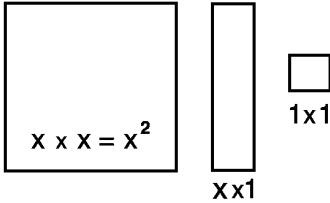
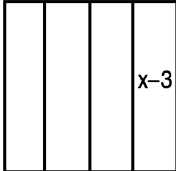
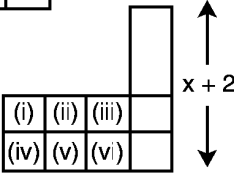
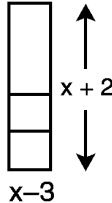
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Preparation of teacher : Write down the expression $(x^2 - x - 6)$ as $(x^2 - 3x + 2x - 6)$

	Description of the activity	Your Comments
1)	<p>Take sheets of paper one of size $x \times x$, five of size $x \times 1$ and six of size 1×1.</p> 	
2)	<p>Place three sheets measuring $x \times 1$ sq. unit each on the sheet measuring $x \times x$ sq. unit and cut out the rest portion of the larger sheet.</p> 	
3)	<p>Place two sheets of size $x \times 1$ each as shown in the figure.</p> 	
4)	<p>Place six sheets of size 1×1 each and cut in such a way so that a rectangle is formed.</p> 	

Questions : 1) What is the area of the rectangle obtained in 4th step ?

2) What are the factors of $(x^2 - x - 6)$?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 11 : Factorisation of the expression ax^2+bx+c where a, b, c are integers.

Sub-unit : Factorisation of $(x^2 - 5x + 6)$

Material : Papers, sketch Pen and scissors,

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

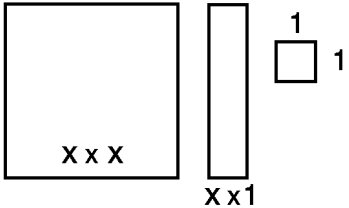
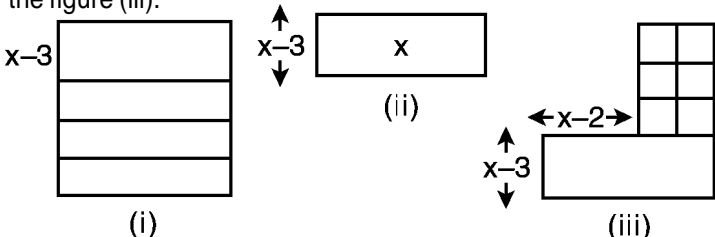
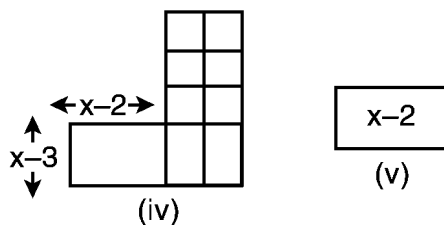
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Description of the activity	Your Comments
<p>1) Take sheets of paper, one of size $x \times x$, five of size $x \times 1$ and six of size 1×1.</p>  <p>2) First of all place three sheets of Papers measuring $x \times x$. Cut out the rest portion of the larger sheet. Stick six sheets of Papers measuring 1×1 each as shown in the figure (iii).</p>  <p>3) Place two rectangular sheets measuring $x \times 1$ sq. units each on figure (iii) cut out the rest portion of the sheet as shown in figure (iv).</p> 	

- Questions :**
- 1) What is the area of the sheet no (v) ?
 - 2) What are the factors of the expression $(x^2 - 5x + 6)$?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 12 : Solution of quadratic equations :

Sub-unit : To solve the equation $x^2 + 4x = 60$

Material : Square paper, Sketch Pen, scissors and adhesive.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

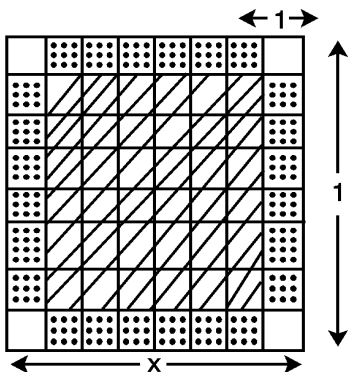
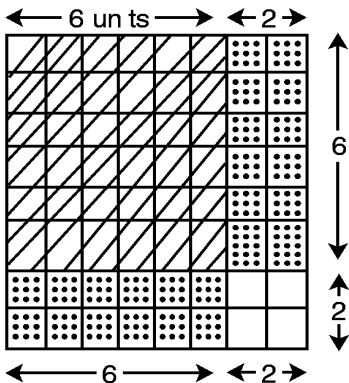
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Description of the activity	Your Comments
<p>1) Take sheets of paper one measuring $x \times x$ sq. units, four measuring $1 \times x$ sq. units each and four measuring 1×1 sq. unit each. Colour the sheets as shown in the figure.</p>  <p>2) Cut out the square and rectangular sheets of different sizes and colours and stick them to another sheet as shown in the figure.</p> 	

- Questions :**
- 1) What is the area of the sheet of 1st step ?
 - 2) What is the area of the sheet of 2nd step ?
 - 3) Are the two areas equal ?
 - 4) What are the solutions of the quadratic equation.
- [Teacher should explain : $(x + 2)^2 = 8^2$ or $x + 2 = \pm 8$ or $x = -10$ or 6]

- Write your observations and queries, if any :
- Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 13 : Concept of exterior angle of a triangle.

Sub-unit : To verify that the exterior angle is equal to the sum of opposite interior angles.

Material : Paper, scissors, Adhesive, pen, Protractor.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

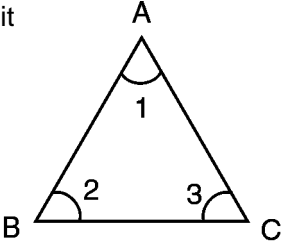
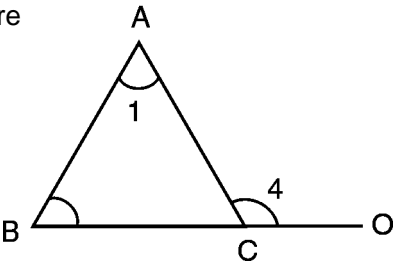
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Description of the activity	Your Comments
<p>1) Take a triangular sheet of paper and label it as shown in the figure.</p> 	
<p>2) Placing the triangle on another sheet extend the base as shown in the figure below and mark the angle.</p> 	
<p>3) Using scissors cut the angles $\angle 4$, $\angle 1$ and $\angle 2$.</p>	
<p>4) Place $\angle 1$ and $\angle 2$ on $\angle 4$.</p>	

- Questions :**
- 1) What angle is formed by extending the base BC to O (ie $\angle 4$) ?
 - 2) Name the angles $\angle 1$, $\angle 2$, $\angle 3$.
 - 3) Is the measure of the sum of the $\angle 1$ and $\angle 2$ equal to that of $\angle 4$?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 14 : To verify that the sum of the three angles of a triangle is 180° by folding paper.

Material : Papers, scale, scissors, pencil, Protractor.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

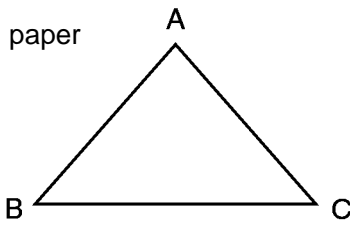
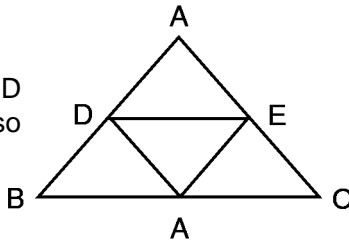
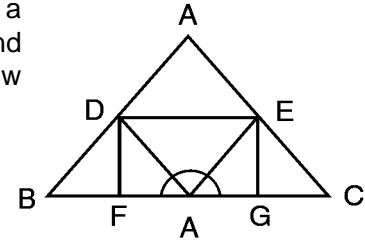
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Description of the activity	Your Comments
<p>1) Take a triangular sheet of paper and label it as ABC.</p>  <p>2) Labeling the mid points of AB and AC as D and E respectively, fold the sheet along DE so that the Point A placed on BC.</p>  <p>3) Again, fold the sheet in such a manner so that the points B and C coincide with the new position of A.</p> 	

- Questions :**
- 1) What type of angle is formed at the point A ?
 - 2) What was the measure of $\angle A + \angle B + \angle C$ in ΔABC ?
 - 3) What is the sum of the three angles ?

N.B. Identifying the mid point of side BC of ΔABC the st. line DE can be obtained by folding the sheet in such a way so that the point A coincide with that mid-point.

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 15 : To verify that the angle opposite to the greater side of a scalene triangle is greater than the angle opposite to the smaller side, by folding paper.

Materials required : Papers, scale, scissors, pencil and Protractor.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

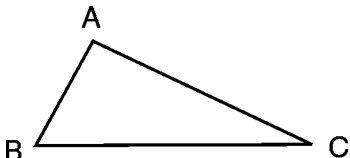
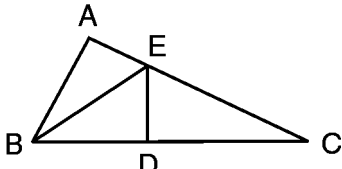
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Description of the activity	Your Comments
<p>1) Take a scalene triangle and label it as ABC.</p> <div style="text-align: center; margin: 10px 0;">  </div> <p>2) Measuring with scale identify the greater and the shorter sides. let AC be the greater and AB is the shorter.</p> <p>3) Place the angular point C which is opposite to smaller side AB on the point B by paper folding. Thus the perpendicular bisector BC is obtained which intersects AC at E. Join E, B</p> <div style="text-align: center; margin: 10px 0;">  </div>	

- Questions :**
- 1) What is the relation between $\angle ACB$ and $\angle EBD$?
 - 2) What is the relation between $\angle ABC$ and $\angle EBC$?
 - 3) What is the relation between $\angle ABC$ and $\angle ACB$?
 - 4) Measure $\angle ABC$ and $\angle EBC$ using protractor ?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 16(A) : To verify that the sum of any two sides of a triangle is greater than the third side.

Material required : Some straw-pipes of there different colours and size, scale.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

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Description of the activity	Your Comments
<p>1) Join three straw-pipes of different size and colour to make one straw. Repeat the process to obtained some multi coloured straws.</p> <p>2) Try to form triangle from each multicoloured straws by leveling at the joins between different Colour.</p>	

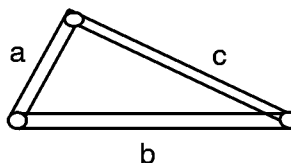
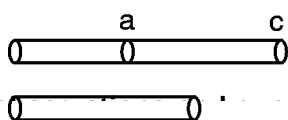
- Questions :**
- 1) From which multi-coloured straw of step a triangle is obtained ?
 - 2) What are lengths of each side of the triangle which is formed in step 2 ?
 - 3) Whether sum of two sides of a triangle is greater or shorter than the third one ?

● **Write your observations and queries, if any :**

● **Teacher’s Remarks :**

Activity – 16 (B)

- 1) Take straw pipes of different length.
- 2) Try to form a triangle out of the three straws.
- 3) Join two straws viz a and c of step 2 in suceession and place the strow b just below them.



- 4) Measure the length of (a+c) and b.

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity-17A : To verify that the sum of all the exterior angles of a polygon is 4 right angle.

Submit : To verify that the sum of all exterior angles of a pentagon is 4 right angle.

Material required : Papers, scissors, sketch pen.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

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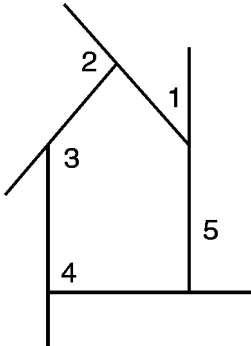
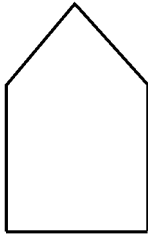
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Description of the activity	Your Comments
<p>1) Cut a peice of paper in the shape of a pentagon.</p>	
<p>2) Place the pentagon on a paper and with a sketch pen, extend the sides in the same direction and mark the exterior angles thus formed.</p>	
<p>3) Cut angular pieces of paper according to the measurements of the angles 1, 2, 3, 4, 5.</p>	
<p>4) On a separate sheet arrange the angles around a point in succession.</p>	



- Questions :**
- 1) Using angles 1, 2, 3, 4, 5 has a clircular diagram been obtanied ?
 - 2) What is the sum of all angle ?
 - 3) What conclusion could be drawn by the verification ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity-17B : To verify that the sum of all the exterior angles of a polygon is 4 right angle.

Submit : To verify that the sum of all exterior angles of a pentagon is 4 right angle.

Material reqrcired : 5 sticks of sparkle of same size and some peices of straw.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

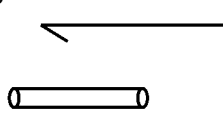
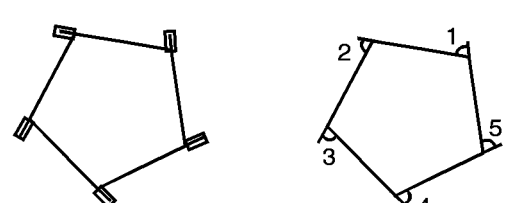
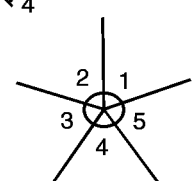
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Description of the activity	Your Comments
<p>1) First of all, bend one side of each stick making on angle.</p> <p>2) Cut the straw pipes into small pieces.</p> <p>3) With the pieces of straw join the straight and of one stick with angular end of other stick.</p>	
	
	
<p>4) Separating the pieces of stick place them on a paper around a point as shown in the figure.</p>	
	

- Questions :**
- 1) With respect to the pentagon what is the name of the angles labeled as 1 to 5 ?
 - 2) What type of figure is obtained from the angles 1 to 5 together ?
 - 3) What is the measure of an angle around a point ?
 - 4) What is the sum of exterior angles of a pentagon ?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 18 : To verify that the sum of all the exterior angles of a polygon is 4 right angle.

Sub unit : To verify that the sum of exterior angles of a hexagon is 4 right angle.

Materials : Papers, scissors, pen and adhesive.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

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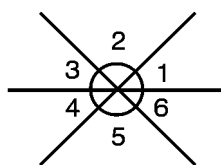
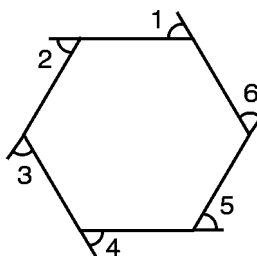
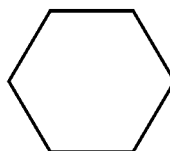
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Description of the activity	Your Comments
<p>1) Draw a hexagon on a paper.</p>	
<p>2) Using pen, extend the sides as shown in the following figure and mark the exterior angles.</p>	
<p>3) Cut six angular pieces of paper making equal to $\angle 1$, $\angle 2$, $\angle 3$, $\angle 4$, $\angle 5$ and $\angle 6$ respectively.</p>	
<p>4) On a separate sheet of paper stick the above angular peices with adhesive as shown in the figure.</p>	



- Questions :**
- 1) Has a circular shape been formed by placing $\angle 1$, $\angle 2$, $\angle 3$, $\angle 4$, $\angle 5$ and $\angle 6$ around a point in succession ?
 - 2) How many angles have been formed by extending the sides of a hexagon ?
 - 3) What is the sum of all the exterior angles ?
 - 4) Using this find out the sum of interior angles ?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 19 : Concept of adjacent angle, corresponding angles and alternative angles when a transversal line cuts two parallel line.

Material : Paper, Scissors, pencil, scale and protractor.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

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Description of the activity	Your Comments
<p>1) Using scale draw two parallel straight line on a sheet of paper.</p> <div style="text-align: center; margin: 10px 0;"> </div> <p>2) Draw a transversal and label all the angles formed as 1, 2, 3, 4, 5, 6, 7, 8.</p> <div style="text-align: center; margin: 10px 0;"> </div> <p>3) Cut angular peices of paper making equal to $\angle 1$, $\angle 2$, $\angle 3$ and $\angle 4$, and measure each of them ?</p>	

- Questions :**
- 1) What are the measures of the angles $\angle 1$, $\angle 2$, $\angle 3$, $\angle 4$, ?
 - 2) Are the measures of $\angle 1$ and $\angle 2$ equal ?
 - 3) Are the measures of $\angle 2$ and $\angle 4$ equal ?
 - 4) the angles $\angle 2$ and $\angle 4$ together form a straight line ?

- Write your observations and queries, if any :
- Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 20 : To verify that the sum of three angles of a triangle is 2 right angle.

Materials : Paper, Scissors, pencil, protractor.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

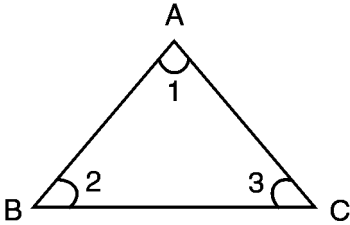
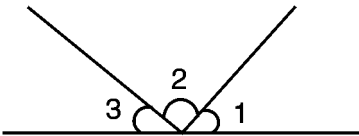
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Description of the activity	Your Comments
<p>1) Take a triangular sheet of paper and label it as ABC.</p> <div align="center">  </div> <p>2) Cut out triangular peices of paper making equal to $\angle 1$, $\angle 2$ and $\angle 3$.</p> <p>3) Place the three angular sheet as shown in the figure.</p> <div align="center">  </div>	

- Questions :**
- 1) Have the three angle $\angle 1$, $\angle 2$ and $\angle 3$ met at a point ?
 - 2) What is the total measure of $\angle 1$, $\angle 2$ and $\angle 3$?
 - 3) How will be the position of exterior sides of $\angle 1$ and $\angle 3$ when $\angle 1$, $\angle 2$ and $\angle 3$ are placed at a point in succession ?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 21 : To verify that the condition of congruency of two triangles.

Sub unit : side - side - side

Materials : Paper, Scissors, sticks

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

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Description of the activity	Your Comments
<p>1) From a sheet of paper cut out a scalene triangle of any size. Placing the triangle on another sheet cut out another triangle of same size and label them as ABC and DEF respectively.</p> <div style="text-align: center; margin: 20px 0;"> </div> <p>2) Take sticks of length same as that of the sides of the triangle.</p> <p>3) Pair the similar sticks and mark each pair.</p>	

- Questions :**
- 1) How many pairs of sticks did you get ?
 - 2) By which sides of the two triangles have the pairs been formed ?
 - 3) What is the relation between the two triangles ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 22 : To verify the condition of congruency of two triangles.

Subunit : side-angle-side

Materials required : Papers, (white and coloured), seissors and & sticks.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

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Description of the activity	Your Comments
<p>1) Cut out two scalene triangles of same size one from the white sheet and the other from the coloured one and label them as ABC and DEF respectively.</p> <div style="text-align: center;"> </div> <p>2) Take two sticks of length same as AB and AC of the white triangle.</p> <div style="text-align: center;"> </div> <p>3) Cut an angular piece of paper of measure equal to $\angle A$</p> <p>4) Place the angular piece of paper and two sticks obtained in step 3 and step 2 on the coloured triangle.</p>	

- Questions :**
- 1) Are the sticks of length AB and AC coincide entirely with sides DE and EF respectively ?
 - 2) With which angle of DEF will the angular piece of paper coincide ?
 - 3) What is the relation between two triangles ?

● **Write your observations and queries, if any :**

● **Teacher's Remarks :**

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 23 : To verify the condition of congruency of two triangles.

Subunit : Angle - Side - Angle

Materials : A peice of white paper, A peice of coloured paper.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

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Description of the activity	Your Comments
<p>1) Cut two scalene triangles of same size – one from the white paper and other from the coloured one and label them as ABC and DEF respectively.</p> <div style="text-align: center; margin: 10px 0;"> </div> <p>2) Take a stick of length same as the side BC.</p> <div style="text-align: center; margin: 10px 0;"> </div> <p>3) Cut two angular peices of paper making equal to the measure of $\angle B$ and $\angle C$</p> <p>4) Place the stick and two angular sheets obtained from 2nd and 3rd step on the coloured triangle DEF.</p>	

- Questions :**
- 1) Is BC coinciding with EF ?
 - 2) As angular peices of measure $\angle B$ and $\angle C$ coinciding with any two angles of DEF ?
 - 3) What is the relation between two triangles ?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 24 : To verify that the sum of any two sides of a triangle is greater than the third side.

Material : Papers, Scissors, Protractor.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

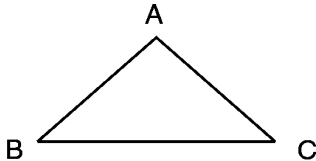
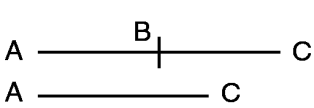
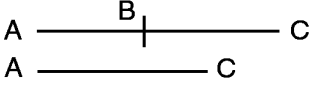
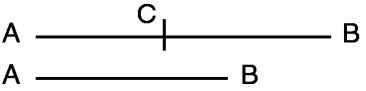
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Description of the activity	Your Comments
<p>1) Take a triangular sheet of paper and marked it as ABC.</p> <div style="text-align: center;">  </div> <p>2) Take three sticks of length equal to the line segment AB, BC and CA respectively of ΔABC.</p> <p style="text-align: center;">A ————— B A ————— C B ————— C</p> <p>3) Take two similar sets of sticks as of step 2.</p> <p style="text-align: center;">A ————— B A ————— C B ————— C A ————— B A ————— C B ————— C A ————— B A ————— C B ————— C</p> <p>4) From each set take any two sticks and join them to form a straight line and place the third one just below them.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <div style="text-align: center; margin-top: 10px;">  </div>	

- Questions :**
- 1) What are the length of the sticks of step 4 ?
 - 2) Whether the total length of the pair of sticks of the pair of sticks in each case is longer as shorter than the stick below ?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 25 : The relation between the angles formed by intersection of two straight line.

Materials : Papers, scissors, Pencil, Protractor.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

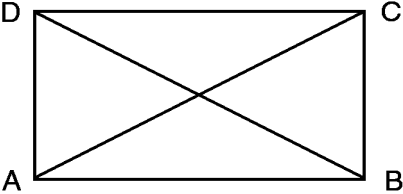
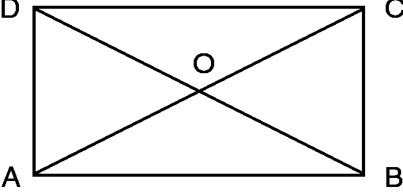
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Description of the activity	Your Comments
<p>1) Take a rectangular sheet of paper and marked its vertices as A,B,C,D respectively. Fold the sheet along AC and BD. Draw two lines along the folds.</p> <div style="text-align: center;">  </div> <p>2) Mark the point of intersection of two folds.</p> <div style="text-align: center;">  </div> <p>3) Cut out the angles $\angle BOC$, $\angle AOD$, $\angle AOB$ and $\angle DOC$ and measure them by protractor.</p> <p>4) Separate the angles which coincide with each other.</p>	

- Questions :**
- 1) Which angles coincide with each other ?
 - 2) Is two opposite angles formed by the intersection of two straight lines ?

N.B. : This activity can also be done by drawing two straight lines which intersect each other.

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 26 : To verify that if the sum of two adjacent angles be equal to two right angles, then their exterior sides be in the same straight line

Material : Papers, scissors, Adhesive, Protractor.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

1)

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Description of the activity	Your Comments
<p>1) Draw angles of different measure such as 60°, 120°, 80°, 100°, 50° and 130°.</p> <p>2) For the pair of angles whose sum is equal to two right angles place their vertex one above the other with one of their sides coinciding with each other while the other sides lying on opposite direction of the common side.</p> <div style="display: flex; justify-content: space-around; align-items: center; margin: 10px 0;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> </div> </div> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px auto; width: fit-content;"> </div>	

- Questions :**
- 1) What is the sum of the pairs of angles of step 2 ?
 - 2) How is the position of interior sides of the pair of angles whose vertex and one side coincide with each other ?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 27 : To verify that when a straight line stands upon another straight line the sum of the adjacent angles to formed is equal to two right angles.

Material : Paper, Scissors, Protractor, Pencil.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

1)

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Description of the activity	Your Comments
<p>1) Draw the following figure on a sheet of paper ?</p> <div style="text-align: center; margin: 10px 0;"> </div> <p>2) Cut the angles $\angle BOC$ and $\angle AOC$.</p> <div style="display: flex; justify-content: space-around; margin: 10px 0;"> <div style="text-align: center;"> </div> <div style="text-align: center;"> </div> </div> <p>3) Measure the angles using protractor.</p>	

Questions : 1) What is the sum of angles $\angle BOC$ and $\angle AOC$?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 28 : To verify that among all the straight lines drawn from an external point to given straight line, the perpendicular is the shortest.

Material : Card Board, Sticks, Adhesive, Scale, Protractor.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

1)

2)

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Description of the activity	Your Comments
<p>1) Fix some sticks on a card board as shown in the figure below.</p> <div style="text-align: center; margin: 20px 0;"> </div> <p>2) Measure the length of sticks \overline{OP}, \overline{OQ}, \overline{OR}, \overline{OS}.</p> <p>3) Measure the angles $\angle OPQ$, $\angle OQR$, $\angle ORS$ and $\angle OSA$ using protractor.</p>	

- Questions :**
- 1) What is the measure of $\angle OPQ$?
 - 2) How the stick OP stands on AB ?
 - 3) What are the length of the other sticks ?
 - 4) What is the length of the stick which is perpendicular to AB ?
 - 5) Which stick is the shortest ?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 29 : To verify that the angles adjacent to the base of an isosceles triangle are equal by folding paper

Materials : Papers, Scissors, Pencil and Protractor.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

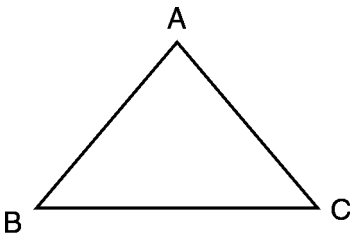
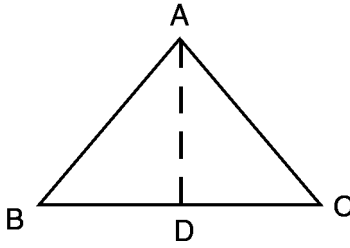
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Description of the activity	Your Comments
<p>1) Take an isosceles triangle ABC.</p> <div style="text-align: center; margin: 10px 0;">  </div> <p>2) Fold the triangle along AD the perpendicular bisector of BC.</p> <div style="text-align: center; margin: 10px 0;">  </div> <p>3) Cut the triangle along AD.</p>	

- Questions :**
- 1) How many peices and what type of geometrical shapes are obtained after step 3 ?
 - 2) Are $\triangle ADB$ and $\triangle ADC$ congruent ?
 - 3) Are $\angle B$ and $\angle C$ equal ?

● Write your observations and queries, if any :

● Teacher's Remarks :

Mathematics Through Activity

WORK SHEET FOR CLASS VIII

General Instruction : Learners, do yourself the work according to the instruction. Write the question in the work sheet in your own language and submit it to your teacher. Teachers may add the appropriate questions if necessary.

Activity – 30 : To verify that the diagonals of a parallelogram bisect each other by folding of paper.

Material : Papers, Scissors, Pencil.

Date.....

Name of School.....

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write the names of the participants (not more than 5 or 10).

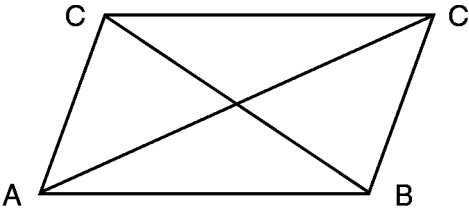
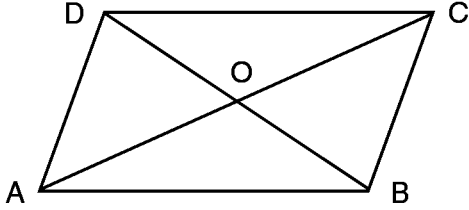
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Description of the activity	Your Comments
<p>1) Take a sheet of paper of the shape of a parallelogram and draw two diagonals AC and BD on it.</p> 	
<p>2) Find out the point of intersection 'O' of two diagonals folding the sheet along two diagonals and measure the lengths of the line segments OD, OB, OC and OA.</p> 	

- Questions :**
- 1) How many point of intersection is obtained by folding the sheet along the two diagonals ?
 - 2) Which segments of the diagonals are equal ?

● Write your observations and queries, if any :

● Teacher's Remarks :

MATHEMATICS THROUGH ACTIVITY

Continuous And Summative Evaluation of Learners' Activity.

Learners' Name :

Class :

Section :

Roll No :

It is clearly mentioned in the notice (No- SSA/226/08. date : 29/12/2008) regarding evaluation for the schools approved by West Bengal Board of Secondary Education that, oral examination may be replaced by Project work. So it is proposed that the evaluation -sheet in this supplementary book may be used for each learner instead of oral examination of 10 marks in Mathematics. It is advised to do each activity as a group-work. Though the learners do their activity in a group. They should write their observations and remarks in their work-sheet in own language either individually or after discussing with their co-learners. The learners should write their queries individually, too, about their activities. the teachers while evaluating, each activity should consider 4 point scale A,B,C,D to calculate the efficiency with regard to the following abilities of the learners –

- a) Ability to do the work, mixing with others in the group.
- b) Sincerity, seriousness, enthusiasm and regularity in every-activity on its part.
- c) Leadership.
- d) Special ability to observe/remark.
- e) Ability to analyse information/result.
- f) Ability to express valued opinion.
- g) Ability to solve a problem.
- h) Ability to frame perfect and clear sentences.
- i) Ability to question properly about the activity.
- j) Ability to apply Mathematics in practical life.
- k) Ability to express in mathematical language.

Mathematics Through Activity

Considering above mentioned points teachers may award grade to the learner's on the basis of 4 point scale A = very good, B = good, C= Average and D = needs improvement. They can evaluate the learner's for obtaining average grade in project work.

Activity No.	Abilty (a)	Abilty (b)	Abilty (c)	Abilty (d)	Abilty (e)	Abilty (f)	Abilty (g)	Abilty (h)	Abilty (i)	Abilty (j)	Abilty (k)	Teacher's signature	Guardian's signature
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