

# LESSON PLAN 13

**TEACHER'S NAME :**

**SUBJECT: MATHEMATICS**

**CLASS: 7**

**UNIT : VISUALISING SOLID SHAPES**

**No.of Periods: 8+8=16**

## PERIOD ALLOTMENT

NAME OF THE UNIT	SUB-TOPICS	NO OF PERIODS REQUIRED			Time line for teaching	
		Teaching	Practice	TOTAL	From	To
<b>VISUALISING SOLID SHAPES</b>	13.1 INTRODUCTION : PLANE FIGURES AND SOLID SHAPES	1	1	2		
	13.2 FACES, EDGES AND VERTICES	1	1	2		
	13.3 NETS FOR BUILDING 3-D SHAPES	1	1	2		
	13.4 DRAWING SOLIDS ON A FLAT SURFACE	3	3	6		
	13.4.1 OBLIQUE SKETCHES					
	13.4.2 ISOMETRIC SKETCHES					
	13.4.3 VISUALISING SOLID OBJECTS	3	3	6		
	13.5 VIEWING DIFFERENT SECTIONS OF A SOLID					
	13.5.1 ONE WAY TO VIEW AN OBJECT IS BY CUTTING OR SLICING					
	13.5.2 ANOTHER WAY IS BY SHADOW PLAY	3	3	6		
13.5.3 A THIRD WAY IS BY LOOKING AT IT FROM CERTAIN ANGLES TO GET DIFFERENT VIEWS						
TOTAL	8	8	16			

### PRE-REQUISITES OF THE LESSON

Every Pupil is expected to have basic knowledge in

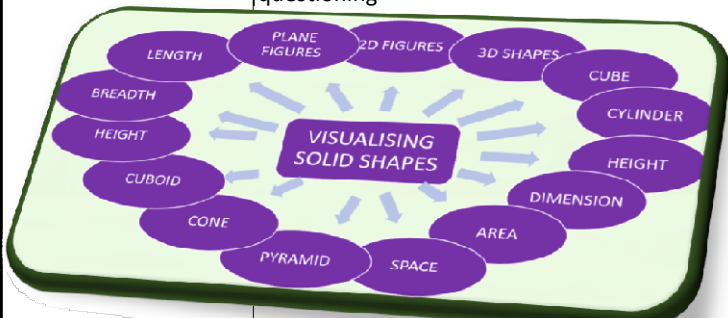
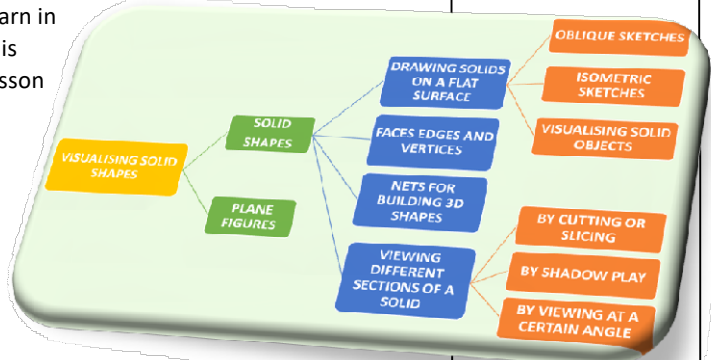
- # 2-dimensional figures and their nomenclature
- # 3-dimensional objects and their nomenclature
- # correlating the surfaces of 3D objects with 2D figures
- # different terms related with 2D and 3D shapes like sides, perimeter, area, capacity etc.,
- # drawing 3D shapes on 2D surfaces using net forms or on isometric dot sheet.
- # identifying and associating different objects in nature with the known 3D objects of geometry

### LEARNING OUTCOMES

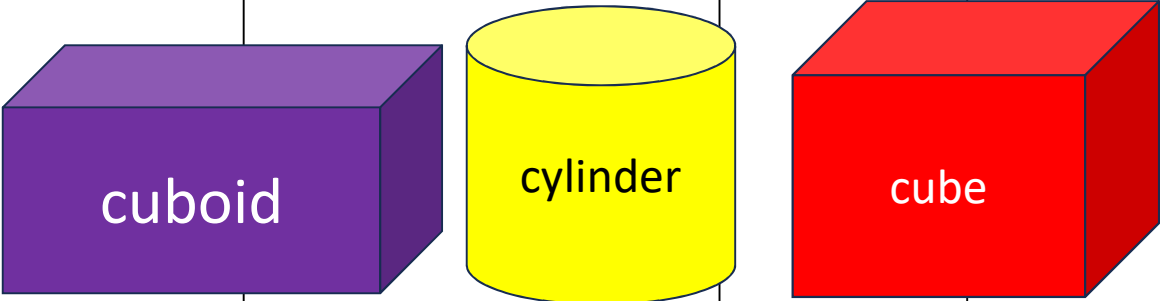
After Completion of this lesson every student will be able to

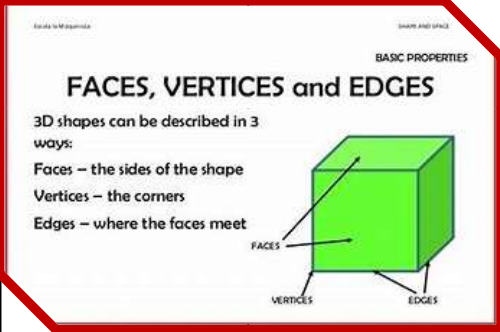















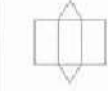

















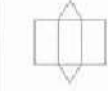

















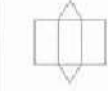


- # identify and name 3D objects
- # recognize the edges, faces and vertices of 3D solids.
- # draw solids on a flat surface using different methods like oblique sketching, isometric sketching, and visualize them.
- # view and understand solids in different ways like object cutting view, shadow play, top angle view etc.,
- # correlate the real life objects by visualising them with 3D shapes known.
- # appreciate the utility of "Visualising Solid Shapes" in real life situations





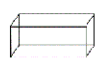


















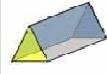







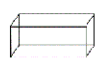


















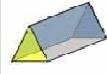







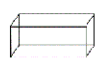


















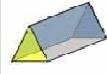



## TEACHING PERIOD : 1 ( PRE - REQUISITES & INTRODUCTION)

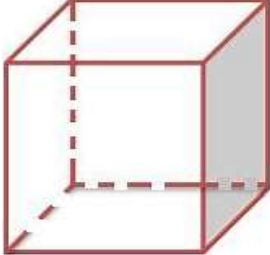
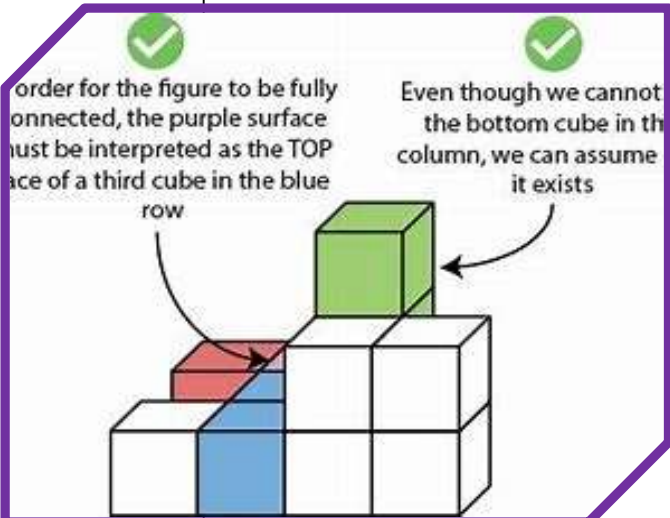
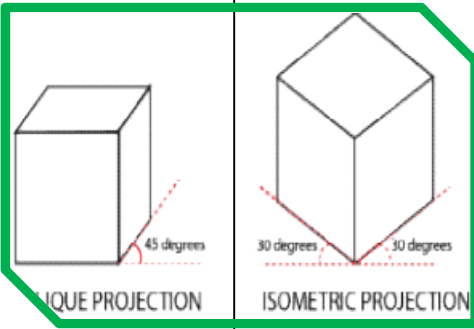
CONCEPTS/STEPS	TEACHER ACTIVITY ( I DO )	GROUP ACTIVITY ( WE DO )	INDIVIDUAL ACTIVITY ( YOU DO )
PRE REQUISITES	Brain storming session involving children with pre-requisites vocabulary and concepts related to previous knowledge. Introduction of new vocabulary and key words associated with the concept through questioning # Plane figures # 2D figures # 3D shapes # Cube # cuboid # cylinder # Height # Dimension # Area # Space # cone # Pyramid # Length # Breadth # solids	* Students read the pre-requisites and answer the questions to the teacher (whole class activity)	Every Pupil will read and write the key words in their note books
MIND MAPPING	Teacher writes the key word " VISUALISING SOLID SHAPES" on the black board and will elicit its other related words through questioning  	Heterogeneous groups are created. One group will read the words and other will explain the meaning	Pupils individually read the keywords associated with the lesson
RELEVANCE OF THE LESSON	Teacher conducts a discussion on the importance of the lesson through questioning ex. 1. What kind of figures do you know among Plane figures? 2. Mention any 3D objects around you? 3. Do you remember the names of 3D objects you have heard in your previous classes and lessons? 3. Can you correlate the 3D objects around you to the 3D shapes known to you?	Students participate in the discussion and ask questions	Pupils individually write their responses to the questions asked
CONCEPT MAP	Teacher displays the concept map depicting various concepts that pupil are going to learn in this lesson  	Whole class read the concept map	
ASSESSMENT	Teacher poses some questions to test their knowledge on prerequisites and sums based on them.	every group will do the task by discussion among each other	every individual solves the task on their own

**PRACTICE PERIOD: 1**

CONCEPTS/STEPS	TEACHER ACTIVITY (I DO)	GROUP ACTIVITY (WE DO)	INDIVIDUAL ACTIVITY ( YOU DO )
KEY WORDS READING	Teacher writes the key words from previous class's teaching period and asks children to read and write them in note books # Plane figures # 2D figures # 3D shapes # Cube # cuboid # cylinder # Height # Dimension # Area # Space # solids # cone # Pyramid # Length # Breadth	Students read these key words in groups and will try to give examples to each key word	Every child comes to the board and reads the key words and notes them down in their note books
SIMILAR LINES READING	Teacher shows some real life 3D objects and asks children to identify the names of those objects and asks children to find some more objects from nature which resemble these 3D shapes.  	Each group will observe the similar lines and will frame some more by discussion	Every Individual will frame some more using similar lines
SUMMARY/ SYNOPSIS	Teacher writes synopsis on the board and detailing about basic terminology and asks children to read, note down and practice.	pupils will note down and read the summary in groups	every individual spells and reads the summary and notes it down
WRITING/ EDITING	Teacher conducts a dictation on key words ,pre-requisites and similar lines and asks children to exchange books for editing after writing is finished.	One group will check the writings of the other and vice versa	Slow learners are focused and teacher will ascertain that every individual learns the

TEACHING PERIODS : 2	FACES, EDGES AND VERTICES NETS FOR BUILDING 3-D SHAPES																				
CONCEPTS/STEPS	TEACHER ACTIVITY ( I DO )	GROUP ACTIVITY ( WE DO )	INDIVIDUAL ACTIVITY ( YOU DO )																		
KEY WORDS	Brain storming session involving children with key words # Faces # Edges # Vertices # net diagrams # skeleton # outline	* Students read the keywords answer the questions to the teacher (whole class activity)	Every Pupil will read and write the key words in their note books																		
CONCEPTUAL UNDERSTANDING	Teacher first demonstrates the faces, edges and vertices of a solid and engages children groups in an activity where each group will be given different solids and are asked to tabulate by identifying and counting the no. of faces, edges and vertices of each solid and verify whether $F+V=E+2$ . later teacher engages children in an another activity where teacher asks them to prepare a cube or cuboid using the paper provided to them. Here teacher guides children in such way that they will apprehend that making net diagrams and converting them into solids will be the easiest way.	Each group will understand the concepts by participation in the activity	Every child learns the concept through the learning activity																		
LEARNING ACTIVITY																					
<div style="display: flex; justify-content: space-around;"> <div> <p><b>Properties of 3D shapes</b></p> <table border="1"> <tr> <td><b>Cone</b>  2 Faces 1 Edge 1 Vertex</td> <td><b>Sphere</b>  1 Face 1 Edge 0 Vertices</td> <td><b>Tetrahedron</b>  4 Faces 6 Edges 4 Vertices</td> <td><b>Cuboid</b>  6 Faces 12 Edges 8 Vertices</td> </tr> <tr> <td><b>Cylinder</b>  3 Faces 2 Edges 0 Vertices</td> <td><b>Cube</b>  6 Faces 12 Edges 8 Vertices</td> <td><b>Triangular Prism</b>  5 Faces 9 Edges 6 Vertices</td> <td><b>Square-based pyramid</b>  5 Faces 8 Edges 5 Vertices</td> </tr> </table> </div> <div> <table border="1"> <tr> <td><b>Square-based pyramid</b> </td> <td><b>Cylinder</b> </td> <td><b>Triangular Prism</b> </td> <td><b>Cuboid</b> </td> <td><b>Cube</b> </td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> </div> </div>				<b>Cone</b>  2 Faces 1 Edge 1 Vertex	<b>Sphere</b>  1 Face 1 Edge 0 Vertices	<b>Tetrahedron</b>  4 Faces 6 Edges 4 Vertices	<b>Cuboid</b>  6 Faces 12 Edges 8 Vertices	<b>Cylinder</b>  3 Faces 2 Edges 0 Vertices	<b>Cube</b>  6 Faces 12 Edges 8 Vertices	<b>Triangular Prism</b>  5 Faces 9 Edges 6 Vertices	<b>Square-based pyramid</b>  5 Faces 8 Edges 5 Vertices	<b>Square-based pyramid</b> 	<b>Cylinder</b> 	<b>Triangular Prism</b> 	<b>Cuboid</b> 	<b>Cube</b> 					
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SUMMARY	Teacher once again writes important key words and procedures and asks children to note down and adopt.	Pupils will note down and read the summary in groups	Every individual reads the summary and notes it down and adopts the procedure																		
ASSESSMENT	Teacher gives some questions from Exercise 13.1 & Try These sections as well as some examples and asks children to solve those sums	Every group will do the sums by discussion among each other	Every individual solves the sums on their own																		

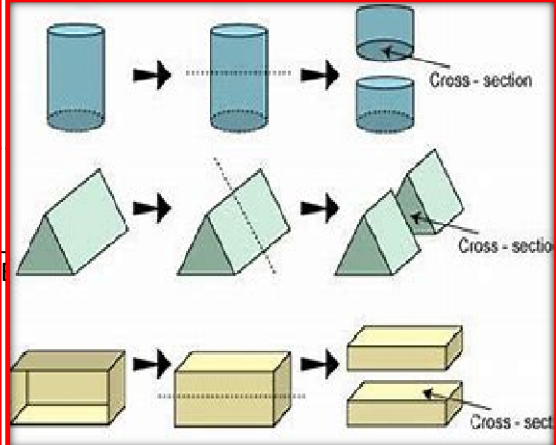
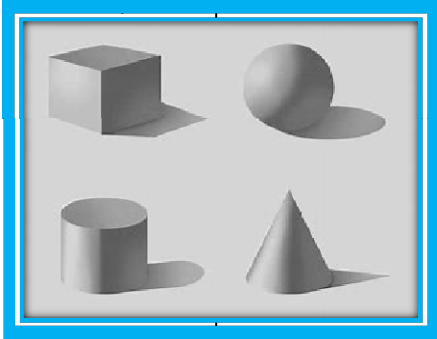
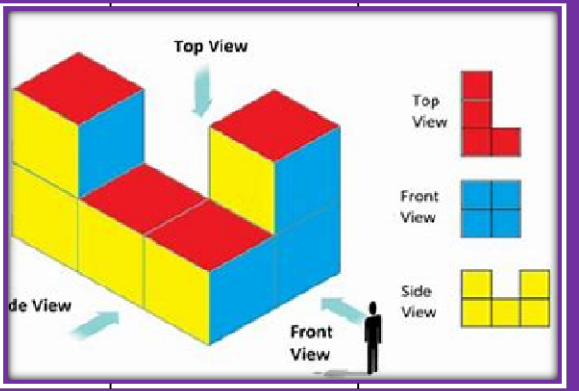
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KEY WORDS READING	Teacher writes the key words from previous class's teaching period and asks children to read and write them in note books # Faces # Edges # Vertices # net diagrams # skeleton # outline	Whole class activity : one child comes to the board and reads the key words loudly and the remaining class follows.	Every child comes to the board and reads the key words and notes them down in their note books																																																												
SIMILAR LINES READING	Teacher finds the no.of edges,vertices and faces of some solid objects, and draws net diagrams of some objects and asks children to draw and count for some more by watching similar lines in the worksheets provided to them.	Each group will read the similar lines and will frame some more by discussion	Every Individual will do a few more by watcing similar lines																																																												
<div style="display: flex; justify-content: space-around;"> <div style="border: 2px solid purple; padding: 5px;"> <p><b>FACES, EDGES AND VERTICES SHEET 2</b> Count the number of faces, edges and vertices.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Shape</th> <th>faces</th> <th>edges</th> <th>vertices</th> </tr> </thead> <tbody> <tr> <td>1)</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2)</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3)</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4)</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>5)</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>6)</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>7)</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> </div> <div style="border: 2px solid cyan; padding: 5px;"> <p><b>FIND THE NETS SHEET 1</b> For each 3d shape, shade the correct net.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> </div> </div>					Shape	faces	edges	vertices	1)					2)					3)					4)					5)					6)					7)																								
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WRITING/ EDITING	Teacher gives some questions from Exercise 13.1 and asks children to solve those sums and teacher checks the writings of children	One group will check the writings of the other and vice versa																																																													

TEACHING PERIODS : 3 TO 5			
DRAWING SOLIDS ON A FLAT SURFACE, OBLIQUE SKETCHES, ISOMETRIC SKETCHES, VISUALISING SOLID OBJECTS			
CONCEPTS/STEPS	TEACHER ACTIVITY (I DO)	GROUP ACTIVITY (WE DO)	INDIVIDUAL ACTIVITY ( YOU DO )
KEY WORDS	Brain storming session involving children with key words # Oblique sketch # Isometric sheet # measurement # visualisation # dot sheet	* Students read the keywords answer the questions to the teacher (whole class activity)	Every Pupil will read and write the key words in their note books
CONCEPTUAL UNDERSTANDING	Teacher explains about the basic terminology like oblique sketch, isometric sketch etc., and now conducts an activity by involving heterogeneous groups. Each group is instructed to depict an oblique sketch and an isometric sketch of each type of solid on the paper and isometric sheet provided to each. Here teacher guides children in drawing or plotting those sketches. Later teacher guides children in visualising solids and count no of solids by presenting different models of solids and arranging them in different shapes	Each group will understand the concepts by participation in the activity	
LEARNING ACTIVITY			
SUMMARY	Teacher once again writes important key words and procedures and asks children to note down and adopt.	Pupils will note down and read the summary in groups	Every individual reads the summary and notes it down and adopts the
ASSESSMENT	Teacher gives some questions from Try These sections as well as some examples and asks children to solve those sums	Every group will do the sums by discussion among each other	Every individual solves the sums on their own

<b>PRACTICE PERIODS : 3 to 5</b>			
<b>DRAWING SOLIDS ON A FLAT SURFACE, OBLIQUE SKETCHES, ISOMETRIC SKETCHES, VISUALISING SOLID OBJECTS</b>			
<b>CONCEPTS/STEPS</b>	<b>TEACHER ACTIVITY (I DO)</b>	<b>GROUP ACTIVITY (WE DO)</b>	<b>INDIVIDUAL ACTIVITY ( YOU DO )</b>
<b>KEY WORDS READING</b>	Teacher writes the key words from previous class's teaching period and asks children to read and write them in note books # Oblique sketch # Isometric sheet # measurement # visualisation # dot sheet	Whole class activity : one child comes to the board and reads the key words loudly and the remaining class follows.	Every child comes to the board and reads the key words and notes them down in their note books
<b>SIMILAR LINES READING</b>	Teacher draws some models of oblique and isometric sketches and asks children to draw some more by identifyin them.	Each group will read the similar lines and will frame some more by discussion	Every Individual will do a few more by watcing similar lines
<b>SUMMARY/ SYNOPSIS</b>	Teacher once again writes important key words and definitions and asks children to note down and adopt.	Pupil groups will read and adopt the procedure	Teacher focuses on every individual so that every child is able to learn the concept in successive upcoming practice sessions
<b>WRITING/ EDITING</b>	Teacher gives some questions from Exercise 13.3,13.4 and asks children to solve those sums and teacher checks the writings of children	One group will check the writings of the other and vice versa	



**VIEWING DIFFERENT SECTIONS OF A SOLID,  
ONE WAY TO VIEW AN OBJECT IS BY CUTTING OR SLICING, ANOTHER  
WAY IS BY SHADOW PLAY,  
A THIRD WAY IS BY LOOKING AT IT FROM CERTAIN ANGLES TO GET  
DIFFERENT VIEWS**

CONCEPTS/STEPS	TEACHER ACTIVITY (I DO)	GROUP ACTIVITY (WE DO)	INDIVIDUAL ACTIVITY (YOU DO)
KEY WORDS	Brain storming session involving children with key words #solid view by slicing # Shadow view # Angular view # top view # front view # side view	* Students read the keywords answer the questions to the teacher (whole class)	Every Pupil will read and write the key words in their note books
CONCEPTUAL UNDERSTANDING	Teacher demonstrates and involves children in practical activity by depicting different views of solids by cutting or slicing, by shadow play, and by viewing at an angle say front view, real view etc., with the help of a number of models and ascertains that every child is well acquainted with the different views.	Each group will understand the concepts by participation in the activity.	every child learns the concept through the learning activity and observation of TLM
			Every individual reads the summary and notes it down and adopts the
SUMMARY	Teacher once again writes important key words and procedures and asks children to note down and adopt.	Pupils will note down and read the summary in groups	Every individual reads the summary and notes it down and adopts the
ASSESSMENT	Teacher gives some questions from Try These sections as well as some examples and asks children to solve those sums	Every group will do the sums by discussion among each other	Every individual solves the sums on their own

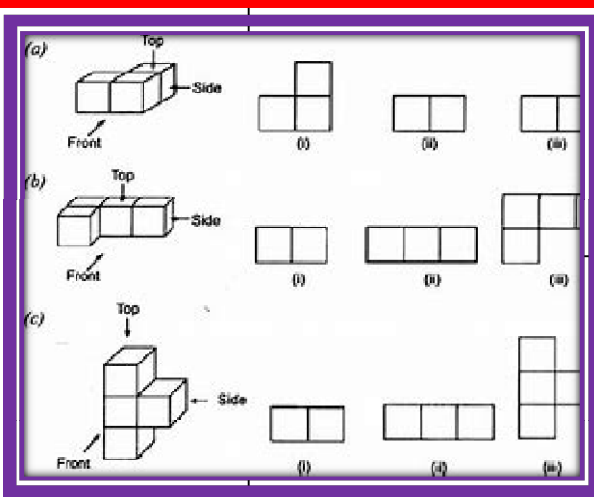
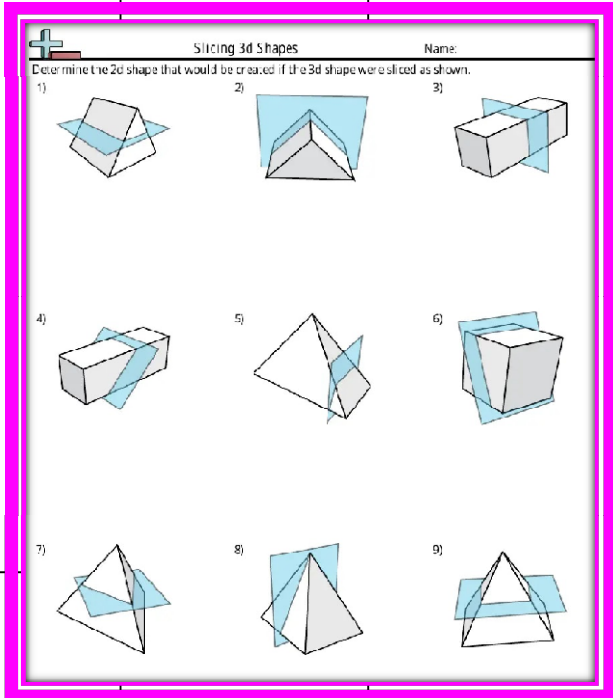
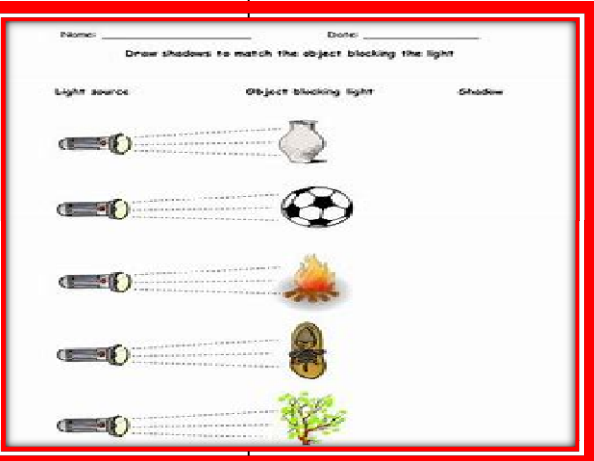


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 ONE WAY TO VIEW AN OBJECT IS BY CUTTING OR SLICING, ANOTHER  
 WAY IS BY SHADOW PLAY,  
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 DIFFERENT VIEWS**

CONCEPTS/STEPS	TEACHER ACTIVITY (I DO)	GROUP ACTIVITY (WE DO)	INDIVIDUAL ACTIVITY (YOU DO)
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KEY WORDS READING	Teacher writes the key words from previous class's teaching period and asks children to read and write them in note books #solid view by slicing # Shadow view # Angular view # top view # front view # side view	Whole class activity : one child comes to the board and reads the key words loudly and the remaining class follows.	Every child comes to the board and reads the key words and notes them down in their note books
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SIMILAR LINES READING	Teacher cites some illustrative shapes and their different views and asks children to find some more in the worksheets provided to them by watching similar lines	Each group will read the similar lines and will frame some more by discussion	Every Individual will do a few more by watching similar lines
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SUMMARY/ SYNOPSIS	Teacher once again writes important key words and definitions and asks children to note down and adopt.	Pupil groups will read and adopt the procedure	Teacher focuses on every individual so that every child is able to learn the concept in successive upcoming practice sessions
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WRITING/ EDITING	Teacher gives some questions from Exercise 13.4 and asks children to solve those sums and teacher checks the writings of children	One group will check the writings of the other and vice versa	
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