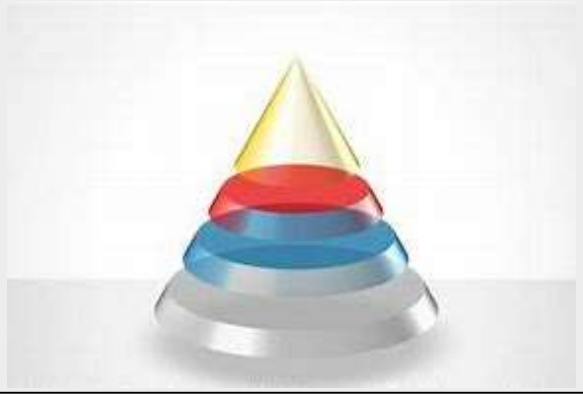
LESSON PLAN 11

CLASS : 9 SUBJECT : MATHEMATICS TEACHER'S NAME :

NAME OF THE UNIT	SUB-TOPICS	NO OF PERIODS REQUIRED			Time line for teaching	
		Teaching	Practice	TOTAL	From	To
SURFACE AREAS AND VOLUMES	11.1 SURFACE AREA OF A RIGHT CIRCULAR CONE	2	3	5		
	11.2 SURFACE AREA OF A SPHERE	2	3	5		
	11.3 VOLUME OF A RIGHT CIRCULAR CONE	2	3	5		
	11.4 VOLUME OF A SPHERE	2	3	5		
	TOTAL	8	12	20		
PRE-REQUISITES & SKILLS	Every Pupil is expected to have basic knowledge in # visualising solid shapes # recognizing the surfaces like lateral surface, curved surface, total surface etc with respect to 3 dimenstional objects # Formulae related to areas of two dimensional shapes like rectangle, square, circle etc., # basic mathematical operations .					

Learning Outcomes
After Completion of this lesson every student will be able to **# distringuish between area and volume of a three dimensional object** **# arrive at formulae for finding the surface areas and volumes of cone & sphere.** **# calculate the lateral surface area and total surface area of conical and spherical shaped real life objects using the formulae.** **# utilize the formulae of volume of cone and sphere in calculating the volume of these objects in real life situations.** **# appriciate the utility of "SURFACE AREAS AND VOLUMES" in real life sums**

Teaching Learning Process

INTRODUCTION /INDUCTION	Experience & Reflection
Teacher introduces the chapter of SURFACE AREAS AND VOLUMES by recalling their previous knowledge on areas and volumes of 3 dimensional objects like cuboid, cube, cylinder in their previous class. Teacher briefs that cone can be considered as circular pyramid.  	# Pupils will recollect their knowledge on surface areas and volumes of cuboids,cubes and cylinders and utilize that in exploring,learning and deducing the formulae for surface area and volume of cone and sphere. # Students will experience the usage of the concept of Surface areas and Volumes and appreciate its usage.

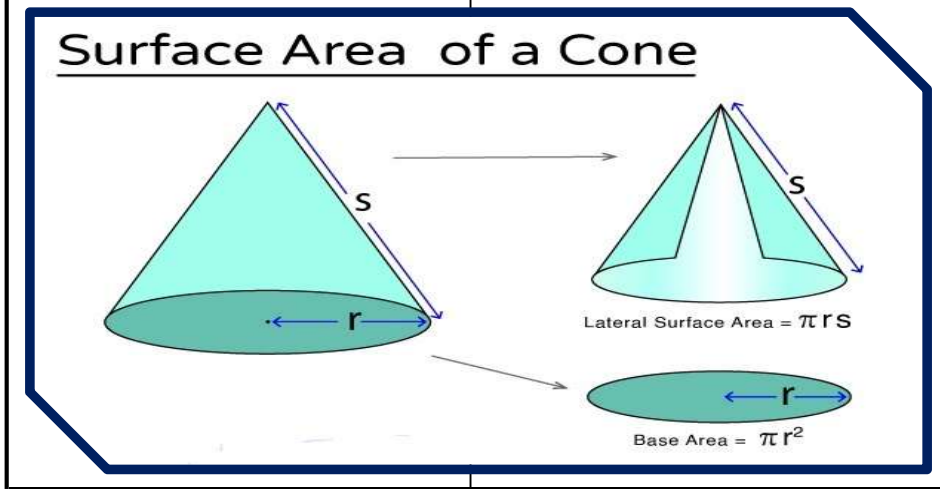
EXPLICIT TEACHING/TEACHER MODELLING (I DO)	GROUP WORK (WE DO)	INDEPENDENT WORK (YOU DO)	NOTES
11.1. Surface Area of a right circular cone Teacher introduces the concept of cone through their previous knowledge on prisms and pyramids and now briefs cone as a circular pyramid. Later teacher guides children arrive at the area of the surface area of cone through an activity.	Pupil groups will be instructed to cut sectors out of a circle paper and twirl the sector along its arc in such a way that the two radii touch along each other. It obviously forms a cone. Now each group will transform each cone into a sector and sub divide the sector into triangles by keeping the slant height of the cone (circle radius) as the the height of the triangle and bases will be parts of the arc. To find the lateral surface area of the cone they add all the areas of the triangles	Every individual will participate in the activity and learn the concept of finding the surface area of a cone	Surface area of a cone formulae

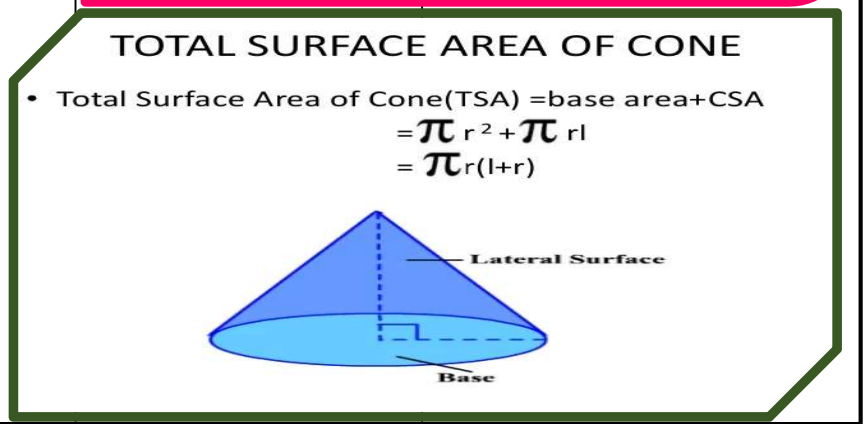
$$= \frac{1}{2}b_1 l + \frac{1}{2}b_2 l + \frac{1}{2}b_3 l + \frac{1}{2}b_4 l + \ldots\ldots\ldots\ldots$$

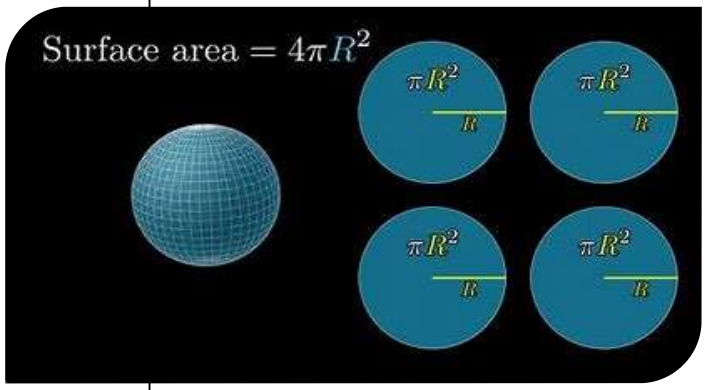
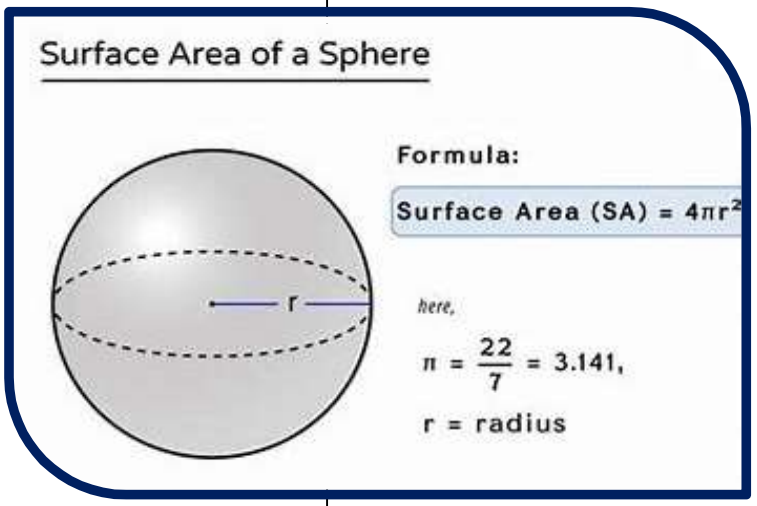
$$= \frac{1}{2}l(b_1 + b_2 + b_3 + b_4 + \ldots\ldots\ldots\ldots)$$

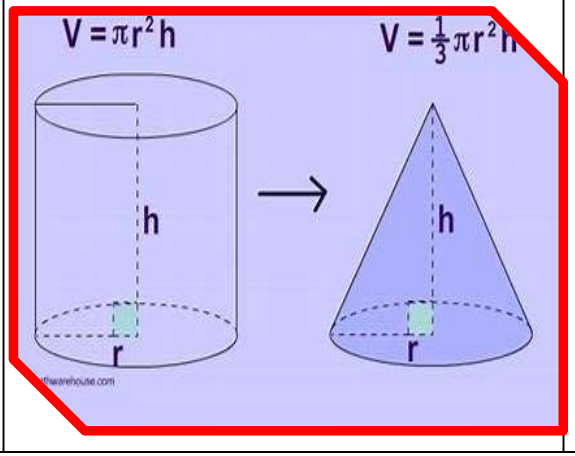
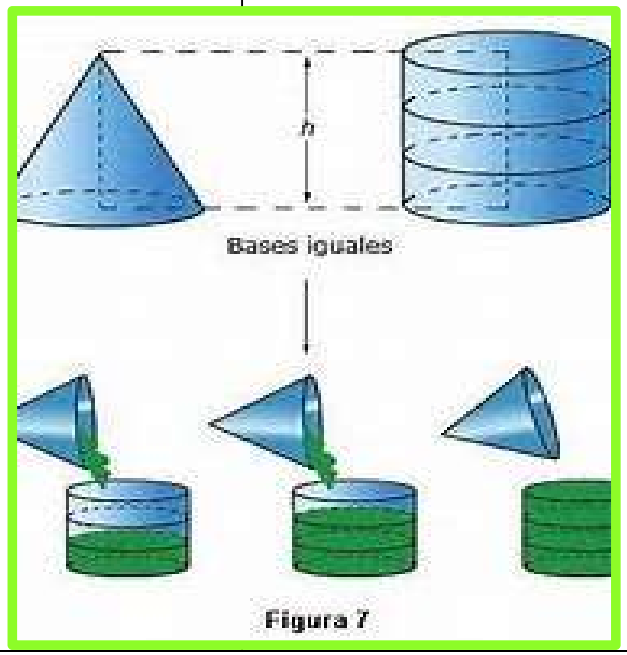
$$= \frac{1}{2}l(2\pi r)$$

$$= \pi r l$$

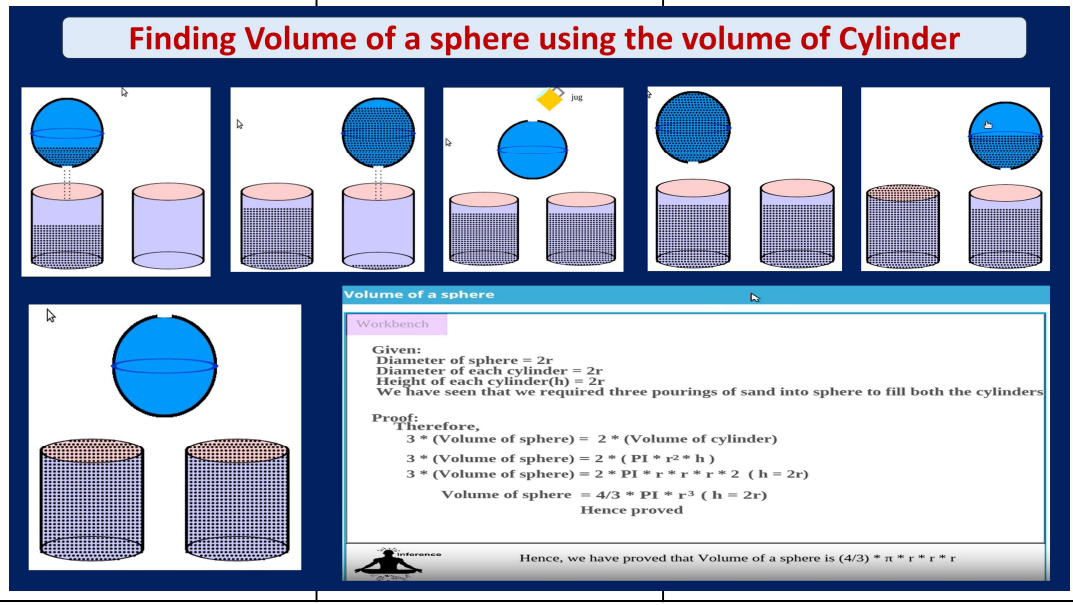




EXPLICIT TEACHING/TEACHER MODELLING (I DO)	GROUP WORK (WE DO)	INDEPENDENT WORK (YOU DO)	NOTES
11.2. Surface Area of a Sphere Teacher induces the concept of surface area of a sphere through an activity.	Pupil groups will be given rubber balls along with a thin rope and are instructed to stick the rope in such a way that it covers the entire ball. Then the part of the rope that covers the ball is now arranged to cover the area of circles with equivalent radius of the sphere. This obviously comes to a conclusion that the part of the rope that covered the sphere is equivalent to the area of 4 circles with same radius to that of a sphere 	Every individual will participate in the activity and learn the concept of finding the surface area of a sphere 	Surface area of a sphere formula

EXPLICIT TEACHING/TEACHER MODELLING (I DO)	GROUP WORK (WE DO)	INDEPENDENT WORK (YOU DO)	NOTES
11.3. Volume of a right circular cone Teacher explains the concept of Volume of a cone using laboratory method by engaging children in an actitivity where groups of children are provided with a cylinder and a cone of equal base radius and height.	Pupil groups will be given a cone and a cylinder with **equal base radius and height.** Now a heap of sand is also provided and each group is instructed to fill the cylinder with sand using the cone. It obviously end up with 3 complete fillings of a cone makes a completely filled cylinder. Through this teacher guides children to arrive at the volume of cylinder = 3 x volume of cone 	Every individual will participate in the activity and learn the concept of finding the volume of a cone  Figura 7	Volume of a cone formula

EXPLICIT TEACHING/TEACHER MODELLING (I DO)	GROUP WORK (WE DO)	INDEPENDENT WORK (YOU DO)	NOTES
11.4. Volume of a Sphere Teacher explains the concept of Volume of a sphere using laboratory method by engaging children in an actitivity where groups of children are provided with 2 cylinders and a sphere of equal radius	Pupil groups will be given a sphere and a cylinder with **equal base radius and height**. Now a heap of sand is also provided and each group is instructed to fill the cylinder with sand using the sphere. It obviously end up with 3 complete fillings of a sphere make 2 completely filled cylinders. Through this teacher guides children to arrive at the 2xvolume of cylinder = 3 x volume of sphere	Every individual will participate in the activity and learn the concept of finding the volume of a sphere	Volume of a sphere formula



CHECK FOR UNDERSTANDING QUESTIONS	
1. Factual	1)Find the totalsurface area of a cone, if its slant height is 21m and diameter of its base is 24 m. 2) The diameter of a metallic ball is 4.2 cm. What is the mass of the ball, if the density of the metal is 8.9 g per cm^3?
2. Open Ended/Critical Thinking	1) Twenty seven solid iron spheres, each of radius r and surface area S are melted to form a sphere with surface area S'. Find the (i) radius r' of the new sphere, (ii) ratio of S and S'. 2) A hemispherical bowl is made of steel, 0.25 cm thick. The inner radius of the bowl is 5 cm. Find the outer curved surface area of the bowl.
3.Student Practice questions & Activities	1. A hemispherical bowl made of brass has inner diameter 10.5 cm. Find the cost of tin plating it on the inside at the rate of ` 16 per 100 cm^2 2.A joker's cap is in the form of a right circular cone of base radius 7 cm and height 24 cm. Find the area of the sheet required to make 10 such caps.
4. Assessment	Exercise sums and worksheet on Surface Area & Volumes