

LESSON PLAN CLASS 9



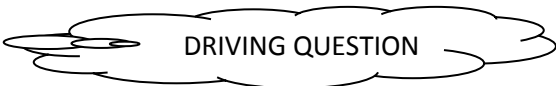
Class	Subject	Time slot	Lesson	Topic P1
IX	MATHS	35 mins 1 Pd	Surface Area and Volume	1. Surface area of a Cube and a Cuboid 2. Ex. 13.1

Expected Learning Outcome :The learners will be able to :
Derive the formula of total and lateral surface area of Cube and Cuboid and its application to practical problems.

Expected skill development:

- Observational and identification skill while identifying the surfaces, edges and vertices of 3- D shapes.
- Numeracy and calculation skills while calculating surface area.
- Procedural thinking while doing questions.
- Developing connections between LSA and TSA
- Visual and spatial ability
- Analytical thinking and problem solving.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)nt types of numbers such as whole

Pedagogy	Content
<u>(5 Min) Warm Up</u> The Facilitator shows a cardboard box to the learners and ask the learners  How would you find the Total Surface Area of the box?	
<u>(20 mins) Demonstration by Facilitator on Board</u> Learners will observe the box and conclude that TSA can be found by adding the areas of all the six rectangular faces. Total Surface Area = $2(lb + bh + hl)$ Driving Question What do you understand by LATERAL SURFACE AREA? How would you find the lateral Surface of the cardboard box shown?	Lateral Surface Area = $2h(l + b)$ The facilitator explains the practical situations where one has to calculate the lateral surface area. Now, the facilitator takes some questions From Ex 13.1 and explains the concept more clearly. The learners explain that LATERAL SURFACE AREA is the area of all the surfaces of a figure excluding the area of the top and the bottom. The same can be derived from TSA of a cuboid when the area of the top and the bottom is subtracted from TSA A plastic box 1.5 m long, 1.25 m wide and 65 cm deep is to be made. It is opened at the top. Ignoring the thickness of the plastic sheet, determine: - The area of the sheet required for making the box. - The cost of sheet for it, if a sheet measuring 1m^2 costs ₹ 20.

(10mins) Inclass Exercise: Closure

There can be situations where one has to calculate any one of TSA and LSA. The facilitator explains these by taking some questions from the exercise

Shanti Sweets Stall was placing an order for making cardboard boxes for packing their sweets. Two sizes of boxes were required. The bigger of dimensions $25\text{ cm} \times 20\text{ cm} \times 5\text{ cm}$ and the smaller of dimensions $15\text{ cm} \times 12\text{ cm} \times 5\text{ cm}$. For all the overlaps, 5% of the total surface area is required extra. If the cost of the cardboard is ₹ 4 for 1000 cm^2 , find the cost of cardboard required for supplying 250 boxes of each kind.

Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

The length, breadth and height of a room are 5 m, 4 m and 3 m respectively. Find the cost of white washing the walls of the room and the ceiling at the rate of ₹ 7.50 per m^2 .

Evaluation/Assessment: Peer discussion will be done. Teacher will assess the children randomly and also through student teacher interaction.

Learners on the way

They will be given:

A cubical box has each edge 10 cm and another cuboidal box is 12.5 cm long, 10 cm wide and 8 cm high.

- Which box has the greater lateral surface area and by how much?
- Which box has the smaller total surface area and by how much?

Advanced Learners

They will be given Higher order Ques. like:

The floor of a rectangular hall has a perimeter 250 m. If the cost of painting the four walls at the rate of ₹ 10 per m^2 is ₹ 15000, find the height of the hall.

Materials needed/Resources: Chalk, blackboard, duster.

Common Misconceptions: Learners might face difficulty in identifying TSA and LSA.
Wrong conversion of metric measurements (Such as changing millimeter to meter or cubic meter to litre.

Addressing the Misconceptions:

- Students will be given practice of such questions.
- Teacher will personally take rounds to cater to the need of students

Home Assignments: Do Q- 2, 4, 6 and 8 of Ex- 13.1 of NCERT Text Book class 9

LESSON PLAN CLASS 9



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Class	Subject	Time slot	Lesson	Topic P2
IX	MATHS	35 mins 1 Pd	Surface Area and Volume	Surface area of a cylinder. Ex. 13.2

Expected Learning Outcome :The learners will be able to :
Calculate the total surface area and Lateral surface area of cylinder in practical problems through Ex 13.2

Expected skill development:

- Observational and identification skill while identifying the surfaces, edges and vertices of 3- D shapes.
- Numeracy and calculation skills while calculating surface area.
- Procedural thinking while doing questions.
- Developing connections between LSA and TSA
- Visual and spatial ability
- Analytical thinking and problem solving.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)nt types of numbers such as whole

Pedagogy	Content
<u>(5 Min) Warm Up</u> The Facilitator shows a thick A4 sheet to the learners and folds it in such a manner that it forms a cylinder and then unfold it so that it lies flat on the table. The facilitator then asks the learners to observe the number of faces. And will ask the learners How would you find the lateral surface area of the cylinder?	

<u>(25 mins) Demonstration by facilitator on Board</u> Lateral surface area of cylinder = $2\pi rh$ <u>Driving Question</u> How would you find the total surface area of the cylinder? The facilitator explains the practical situations where one has to calculate the total surface area and hence take some questions from Ex 13.2 and explains the concept more clearly. <u>(5 mins) In class Exercise : Closure</u> There can be situations where one has to differentiate between finding the TSA and LSA even if the term 'TOTAL' is mentioned in the questions. The facilitator explains these by taking some questions from the exercise.	The learners explain that the Lateral Surface Area is the area of the rectangle whose length is the circumference of the base of cylinder and breadth is height and explain how that formula is derived. Learners will also tell total surface is obtained by adding area of top and bottom surface of the cylinder to LSA. i.e $TSA = 2\pi r (r + h)$ or $TSA = 2\pi r^2 + 2\pi rh$ Q - The diameter of a roller is 84 cm and its length is 120 cm. It takes 500 complete revolutions to move once over to level a playground. Find the area of playground in m^2.
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a) Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) The diameter of a roller is 84 cm and its length is 120 cm. It takes 500 complete revolutions to move once over to level a playground. Find the area of playground in m^2.	
b) Evaluation/Assessment: Peer discussion will be done. Teacher will assess the children randomly and also through student teacher interaction.	
Learners on the way They will be given – the curved surface area of a right circular cylinder of height 14 cm is 88 cm. Find the diameter of the base of the cylinder.	Advanced Learners They will be given Higher order Ques.like: A metal pipe is 77 cm long. The inner and outer diameter is 4 cm and 4.4 cm respectively. Find its total surface area.
Materials needed/Resources: Chalk, blackboard, duster.	
Common Misconceptions : Learners might face difficulty in identifying TSA and LSA	Addressing the Misconceptions: - Students will be given practice of such questions. - Teacher will personally take rounds to cater to the need of students

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Class	Subject	Time slot	Lesson	Topic P3
IX	MATHS	35 mins 1 Pd	Surface Area and Volume	Surface area of a cylinder.
Expected Learning Outcome :The learners will be able to : Solve practical problems and problems related to Ex – 13.2 using TSA and CSA				
Expected skill development: - Observational and identification skill while identifying the surfaces, edges and vertices of 3- D shapes. - Numeracy and calculation skills while calculating surface area. - Procedural thinking while doing questions. - Developing connections between LSA and TSA - Visual and spatial ability - Analytical thinking and problem solving.				

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Pedagogy	Content
(5 mins) Warm Up (Individual work) + Black Board Demonstration by learners The facilitator will discuss the problems of the previous day homework	Responses by learners
(20 mins) Demonstration by Facilitator on Board She will reinforce the situations where one has to differentiate between finding the TSA and LSA even if the term “Total” is mentioned in the question. She will reinforce the situations where one has to take something between TSA and LSA. The facilitator explain them by taking some questions from the exercise.	1. Find (i) the lateral /curved surface area of a closed cylindrical petrol storage tank that is 4.2 m in diameter and 4.5 m high. (ii) how much steel was actually used, if $\frac{1}{12}$th of the steel used was wasted making the tank. The students of a Vidyalaya were asked to participate in a competition for making and decorating penholders in the shape of a cylinder with a base, using cardboard. Each penholder was to be of radius 3 cm and height 10.5 cm. The Vidyalaya was to supply the competitors with cardboard. If there were 35 competitors, how much cardboard was required to be bought for the competition? 2.
(10 mins) in class exercise: Closure The facilitator take question from exercise 13.2 and ask them to find the total height of the lampshade.	making the tank. • In Fig. 13.12, you see the frame of a lampshade. It is to be covered with a decorative cloth. The frame has a base diameter of 20 cm and height of 30 cm. A margin of 2.5 cm is to be given for folding it over the top and bottom of the frame. Find how much cloth is required for covering the lampshade  Fig. 13.12

Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) The students of a Vidyalaya were asked to participate in a competition for making and decorating penholders in the shape of a cylinder with a base, using cardboard. Each penholder was to be of radius 3 cm and height 10.5 cm. The Vidyalaya was to supply the competitors with cardboard. If there were 35 competitors, how much cardboard was required to be bought for the competition?	
Evaluation/Assessment: Learners will do the calculation and write their observations in their note books. Teacher will take rounds and assess the children randomly.	
Learners on the way They will be given simple questions like: Find the lateral /curved surface area of a closed cylindrical petrol storage tank that is 4.2 m in diameter and 4.5 m high.	Advanced Learners They will be given Higher order Ques.like: Find.. how much steel was actually used, if $\frac{1}{12}$th of the steel used was wasted in making the tank.
Materials needed/Resources: Chalk, blackboard, duster	
Common Misconceptions: Learners might face difficulty in identifying the usage of LSA or TSA.	Addressing the Misconceptions: • Students will be given practice of such questions by showing them the relation • The struggling ones will be provided with Peer help • Teacher will personally take rounds to cater to the need of students

HOME ASSIGNMENTS: Do questions 7 , 8 and 10 of Ex.13. of NCERT Text Book Class 9.

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Class	Subject	Time slot	Lesson	Topic P4
IX	MATHS	35 mins 1 Pd	Surface Area and Volume	- Surface area of a Cone. - Ex – 13.3
Expected Learning Outcome :The learners will be able to : To find the formula for its Total Surface Area of Cone and Apply TSA + CSA in solving word problems of Ex – 13.3				
Expected skill development: - Observational and identification skill while identifying the surfaces, edges and vertices of 3- D shapes. - Numeracy and calculation skills while calculating surface area. - Procedural thinking while doing questions. - Developing connections between LSA and TSA - Visual and spatial ability - Analytical thinking and problem solving.				

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Pedagogy	Content
(5 mins) Warm up Demonstration by facilitator on Black board Facilitator starts the lesson by asking some questions relating to the LSA of a cone. Doubts will be taken up in the class DRIVING QUESTION How would you find the total surface area of the cone?	
(25 mins) Demonstration by Facilitator on Board Facilitator will tell that if the area of the top and the bottom is added then it is called Total Surface Area $TSA = \pi r l + \pi r^2$ The facilitator explains the practical situations where one has to calculate the TSA.	3. Curved surface area of a cone is 308 cm^2 and its slant height is 14 cm. Find (i) radius of the base and (ii) total surface area of the cone. 8. A bus stop is barricaded from the remaining part of the road, by using 50 hollow cones made of recycled cardboard. Each cone has a base diameter of 40 cm and height 1 m. If the outer side of each of the cones is to be painted and the cost of painting is Rs 12 per m^2, what will be the cost of painting all these cones? (Use $\pi = 3.14$ and take $\sqrt{1.04} = 1.02$)

(5 mins) Inclass Exercise: Closure

Now the facilitator takes some question from Ex – 13.3 and explain the concept more clearly.

Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

- 3. Curved surface area of a cone is 308 cm^2 and its slant height is**
(i) radius of the base and (ii) total surface area of the cone.

Evaluation/Assessment: Learners will do the work assigned in their notebook. Teacher will take rounds and assess the children randomly. The teacher will also assess the students by asking the questions orally.

Learners on the way

They will be given simple questions like:

1. Diameter of the base of a cone is 10.5 cm and its slant height is 10 cm. Find its curved surface area.

Advanced Learners

They will be given Higher order Ques. like:

5. What length of tarpaulin 3 m wide will be required to make conical tent of height 8 m and base radius 6 m? Assume that the extra length of material that will be required for stitching margins and wastage in cutting is approximately 20 cm (Use $\pi = 3.14$).

Materials needed/Resources: Chalk, blackboard, duster

Common Misconceptions : Learners might face difficulty in finding the slant height

Addressing the Misconceptions:

- Students will be given more rational numbers for practice of plotting on the number line.
- The struggling ones will be provided with Peer help
- Teacher will personally take rounds to cater to the need of students

HOME ASSIGNMENTS: Do Q 2, 4, 6 and 7 of Ex – 13.3 of NCERT Text Book Class 9

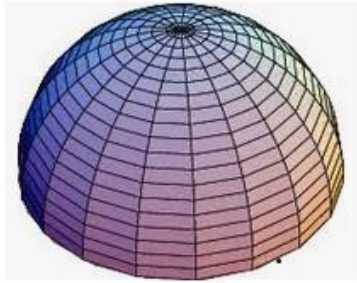
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Class	Subject	Time slot	Lesson	Topic P5
IX	MATHS	35 mins 1 Pd	Surface Area and Volume	• Surface area of a Sphere. • Ex – 13.4
Expected Learning Outcome :The learners will be able to : Derive the formula for TSA of hemisphere. Apply the formula in real life situations.				
Expected skill development: • Observational and identification skill while identifying the surfaces, edges and vertices of 3- D shapes. • Numeracy and calculation skills while calculating surface area. • Procedural thinking while doing questions. • Developing connections between LSA and TSA • Visual and spatial ability • Analytical thinking and problem solving.				

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Pedagogy	Content
(5 mins) Warm Up (Individual Work)+Black Board Demonstration by Learners The facilitator shows a sphere to the learners. She tells that in the sphere all the area is lateral area as the sphere has no base and no top and this is also called curved surface area as the surface is curved. Lateral Surface area of Sphere = $4 \pi r^2$ Total surface area of Sphere = $4 \pi r^2$ Curved/lateral surface Area of Hemisphere = $2 \pi r^2$ Total surface Area of a Hemisphere = $3 \pi r^2$	 

(20 mins) Demonstration by Facilitator on Board

The facilitator explains the practical situations where one has to calculate the lateral surface area

Q 6. Find the radius of a sphere whose Surface area is 154 sq. cm

Q8. 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.

Briefing of activity that children will do at home

What have you achieved in all this?

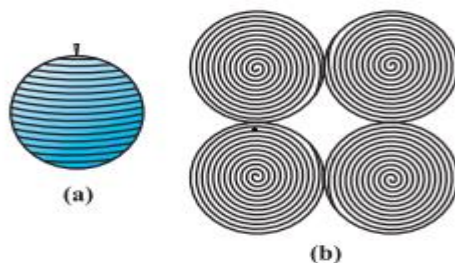
The string, which had completely covered the surface area of the sphere, has been used to completely fill the regions of four circles, all of the same radius as of the sphere.

So, what does that mean? This suggests that the surface area of a sphere of radius r = 4 times the area of a circle of radius $r = 4 \times (\pi r^2)$

So,

$$\text{Surface Area of a Sphere} = 4 \pi r^2$$

where r is the radius of the sphere.



(10 mins) Inclass Exercise : closure

Now, the facilitator take some questions from the exercise and explains the concept more clearly. There can be situations where one has to take something between TSA and LSA. The facilitator explain these by taking some questions from the exercise.

A right circular cylinder just encloses a sphere of radius r (see Fig. 13.22). Find

- (i) surface area of the sphere,
- (ii) curved surface area of the cylinder,
- (iii) ratio of the areas obtained in (i) and (ii).

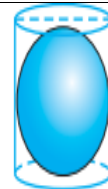


Fig. 13.22

Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

Q. Find the radius of a sphere whose Surface area is 154 sq. cm

Evaluation/Assessment: Learners will do the calculation in their notebook .Teacher will take rounds and assess the children randomly. The teacher will also assess the students by asking the questions to be solved on the board .

Learners on the way Find the surface area of the sphere of radius 10.5 cm.	Advanced Learners The diameter of the moon is approx. one fourth of the diameter of the earth. Find the ratio of their surface areas.
Materials needed/Resources: Chalk, blackboard, duster	
Common Misconceptions : Difficulty in visualising the surface area of the shape formed by joining two solid shapes.	Addressing the Misconceptions: • Students will be given more question for practice. • The struggling ones will be provided with Peer help • Teacher will personally take rounds to cater to the need of students

HOME ASSIGNMENTS: Ex 13.4 Q 2, 3, 4 and 5 of NCERT Text Book Class 9.

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Class	Subject	Time slot	Lesson	Topic P6
IX	MATHS	35 mins 1 Pd	Surface Area and Volume	- Volume of Cube and Cuboid. - Ex – 13.5

Expected Learning Outcome :The learners will be able to :
Acquaint the learners with the term Volume, Volume of Cube and Cuboid and its application to practical problems.

Expected skill development:

- Observational and identification skill while identifying the surfaces, edges and vertices of 3- D shapes.
- Numeracy and calculation skills while calculating surface area.
- Procedural thinking while doing questions.
- Developing connections between LSA and TSA
- Visual and spatial ability
- Analytical thinking and problem solving.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Pedagogy	Content
(5 mins) Warm up (Individual work) + Black Board demonstration by learners Driving Question How would you calculate the capacity of the cardboard box?	Learners Recall $\text{Lateral surface area} = 2h(l + b)$ $\text{TSA} = 2(lb + bh + hl)$ Now, the facilitator takes some examples to tell that the total quantity of substance that can be put into the box is called the capacity or the volume of a cuboid.
(25 mins) Demonstration by facilitator on Board	The facilitator also explain some techniques and DEMONSTRATE how to find the volume of cube and cuboid by keeping piles of sheets together and also deduces the formula to find the volume of a cube and cuboid. $\text{VOLUME} = \text{BASE AREA} \times \text{HEIGHT}$ I.e $V = l \times b \times h$ Volume of cube with length 'l' = $l \times l \times l = l^3$ The facilitator takes some questions from Ex 13.5 and explains the concept more clearly.

(5 mins) Inclass Exercise : Closure Now, the facilitator takes some questions from the exercise and explains the concept more clearly	6. A village, having a population of 4000, requires 150 litres of water per head per day. It has a tank measuring $20\text{ m} \times 15\text{ m} \times 6\text{ m}$. For how many days will the water of this tank last?
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Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

6. A village, having a population of 4000, requires 150 litres of water per head per day. It has a tank measuring $20\text{ m} \times 15\text{ m} \times 6\text{ m}$. For how many days will the water of this tank last?

Evaluation/Assessment: Learners will do the calculation in their notebook .Teacher will take rounds and assess the children randomly. The teacher will also assess the students by asking the questions to be solved on the board.

Learners on the way A cuboidal water tank is 6 m long, 5 m wide and 4.5 m deep. How many litres of water can it hold? ($1\text{m}^3 = 1000\text{ l}$)	Advanced Learners 6. A village, having a population of 4000, requires 150 litres of water per head per day. It has a tank measuring $20\text{ m} \times 15\text{ m} \times 6\text{ m}$. For how many days will the water of this tank last?
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Materials needed/Resources: Chalk, blackboard, duster

Common Misconceptions : Learners might face difficulty while converting capacity in volume and vice – versa.	Addressing the Misconceptions: - Students will be given more question for practice. - The struggling ones will be provided with Peer help - Teacher will personally take rounds to cater to the need of students
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HOME ASSIGNMENTS: Ex 13.5 Q 1, 3 and 4 of NCERT Text Book Class 9

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Class	Subject	Time slot	Lesson	Topic P7
IX	MATHS	35 mins 1 Pd	Surface Area and Volume	- Volume of Cube and Cuboid. - Ex – 13.5 Contd.
Expected Learning Outcome :The learners will be able to : Acquaint the learners with the term Volume, Volume of Cube and Cuboid and its application to practical problems.				
Expected skill development: - Observational and identification skill while identifying the surfaces, edges and vertices of 3- D shapes. - Numeracy and calculation skills while calculating surface area. - Procedural thinking while doing questions. - Developing connections between LSA and TSA - Visual and spatial ability - Analytical thinking and problem solving.				

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Pedagogy	Content
(5 mins) Warm up (Individual work) + Black Board demonstration by learners Learners Recall Lateral surface area = $2h(l + b)$ $TSA = 2(lb + bh + hl)$ VOLUME = BASE AREA x HEIGHT I.e. $V = l \times b \times h$ Volume of cube with length 'l' = $l \times l \times l = l^3$	
(25 mins) Demonstration by facilitator on Board The facilitator takes some questions from Ex 13.5 and explains the concept more clearly.	7. A godown measures $40\text{ m} \times 25\text{ m} \times 10\text{ m}$. Find the maximum number of wooden crates each measuring $1.5\text{ m} \times 1.25\text{ m} \times 0.5\text{ m}$ that can be stored in the godown. 8. A solid cube of side 12 cm is cut into eight cubes of equal volume. What will be the side of the new cube? Also, find the ratio between their surface areas. 9. A river 3 m deep and 40 m wide is flowing at the rate of 2 km per hour. How much water will fall into the sea in a minute?
(5 mins) Inclass Exercise: Closure Now, the facilitator takes some questions from the exercise and explains the concept more clearly.	10. A river 3 m deep and 40 m wide is flowing at the rate of 2 km per hour. How much water will fall into the sea in a minute?

Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)
Given

Evaluation/Assessment: Learners will do the calculation in their notebook .Teacher will take rounds and assess the children randomly. The teacher will also assess the students by asking the learners to solve the questions on the board after completion of the test.

Learners on the way
They will be given simple questions like:
A godown measures $40\text{ m} \times 25\text{ m} \times 10\text{ m}$. Find the maximum number of wooden crates each measuring $1.5\text{ m} \times 1.25\text{ m} \times 0.5\text{ m}$ that can be stored in the godown.

Advanced Learners
They will be given Higher order Ques. like:
A solid cube of side 12 cm is cut into eight cubes of equal volume. What will be the side of the new cube? Also, find the ratio between their surface areas.

Materials needed/Resources: Chalk, blackboard, duster

Common Misconceptions: Learners might face difficulty in converting capacity in volume and vice - versa.

Addressing the Misconceptions:

- The struggling ones will be provided with help
- Teacher will personally take rounds to cater to the need of students

HOME ASSIGNMENTS: Complete the Ex – 13.5 in Note Book of NCERT Text Book Class 9

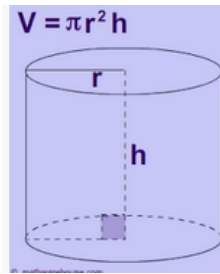
Class	Subject	Time slot	Lesson	Topic P8
IX	MATHS	35 mins 1 Pd	Surface Area and Volume	- Volume of Cylinder. - Ex – 13.6

Expected Learning Outcome :The learners will be able to :
Deduce the formula to find the volume of Cylinder and its application to practical problems.

Expected skill development:

- Observational and identification skill while identifying the surfaces, edges and vertices of 3- D shapes.
- Numeracy and calculation skills while calculating surface area.
- Procedural thinking while doing questions.
- Developing connections between LSA and TSA
- Visual and spatial ability
- Analytical thinking and problem solving.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Pedagogy	Content
(5 mins) Warm up Demonstration by Facilitator on Black Board DRIVING QUESTION How would you calculate the capacity of the Cylinder?	The learners recalls that Lateral surface area of cylinder = $2 \pi r h$ Total surface area of cylinder = $2 \pi r h + 2 \pi r^2$ Now, the facilitator takes some examples to tell the total quantity of substance that can be put into cylinder, this total quantity is called the capacity or volume of the cylinder. 

(25 mins) Demonstration by facilitator on Board The facilitator will take some practical examples where the learner is supposed to find the volume of a cylinder.	The facilitator also explains some techniques and Demonstrate how to find the volume by keeping piles of circular sheets together and deduce the formula to find the volume Volume of cylinder = $\pi r^2 h$ 1. The circumference of the base of a cylindrical vessel is 132 cm and its height is 25 cm. How many litres of water can it hold? ($1000 \text{ cm}^3 = 1\text{ l}$) 2. The inner diameter of a cylindrical wooden pipe is 24 cm and its outer diameter is 28 cm. The length of the pipe is 35 cm. Find the mass of the pipe, if 1 cm^3 of wood has a mass of 0.6 g. 3. If the lateral surface of a cylinder is 94.2 cm^2 and its height is 5 cm, then find (i) radius of its base (ii) its volume. (Use $\pi = 3.14$)
(5 mins) Inclass Exercise: Closure Now the facilitator takes some questions from Ex 13.6 and explains the concept more clearly.	1. If the lateral surface of a cylinder is 94.2 cm^2 and its height is 5 cm, then find (i) radius of its base (ii) its volume. (Use $\pi = 3.14$)

Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

1. The circumference of the base of a cylindrical vessel is 132 cm and its height is 25 cm. How many litres of water can it hold? ($1000 \text{ cm}^3 = 1\text{ l}$)

Evaluation/Assessment: Learners will do the calculation in their notebook .Teacher will take rounds and assess the children randomly. The teacher will also assess the students by asking the learners to solve the questions on the board after completion of the test.

Learners on the way

They will be given simple questions like:

1. A soft drink is available in two packs – (i) a tin can with a rectangular base of length 5 cm and width 4 cm, having a height of 15 cm and (ii) a plastic cylinder with circular base of diameter 7 cm and height 10 cm. Which container has greater capacity and by how much?

Advanced Learners

They will be given Higher order Ques. like:

1. If the lateral surface of a cylinder is 94.2 cm^2 and its height is 5 cm, then find
 - (i) radius of its base
 - (ii) its volume. (Use $\pi = 3.14$)

Materials needed/Resources: Chalk, blackboard, duster

Common Misconceptions: Learners might face difficulty in converting capacity in volume and vice - versa.

Addressing the Misconceptions:

- The struggling ones will be provided with help
- Teacher will personally take rounds to cater to the need of students

HOME ASSIGNMENT: Ex 13.6 Q 3, 5 and 6 of NCERT Text Book Class 9.

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Class	Subject	Time slot	Lesson	Topic p9
IX	MATHS	35 mins 1 Pd	Surface Area and Volume	- Volume of Cylinder. - Ex – 13.6 contd.
Expected Learning Outcome :The learners will be able to : Deduce the formula to find the volume of Cylinder and its application to practical problems.				
Expected skill development: - Observational and identification skill while identifying the surfaces, edges and vertices of 3- D shapes. - Numeracy and calculation skills while calculating surface area. - Procedural thinking while doing questions. - Developing connections between LSA and TSA - Visual and spatial ability - Analytical thinking and problem solving.				

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Pedagogy	Content
(5 mins) Warm up demonstration by learners	The learners recalls that Lateral surface Area = $2 \pi r h$ Total surface Area = $2 \pi r h + 2 \pi r^2$ Volume of the cylinder = $\pi r^2 h$
(25 mins) Demonstration by Facilitator on Board The facilitator explains some practical examples where the learners have to find the volume of a cylinder.	HW questions discussion - It costs Rs 2200 to paint the inner curved surface of a cylindrical vessel 10 m deep. If the cost of painting is at the rate of Rs 20 per m^2, find - inner curved surface area of the vessel, - radius of the base, - capacity of the vessel. - The capacity of a closed cylindrical vessel of height 1 m is 15.4 litres. How many square metres of metal sheet would be needed to make it? - A lead pencil consists of a cylinder of wood with a solid cylinder of graphite filled in the interior. The diameter of the pencil is 7 mm and the diameter of the graphite is 1 mm. If the length of the pencil is 14 cm, find the volume of the wood and that of the graphite. - A patient in a hospital is given soup daily in a cylindrical bowl of diameter 7 cm. If the bowl is filled with soup to a height of 4 cm, how much soup the hospital has to prepare daily to serve 250 patients?

(5 mins) Inclass Exercise: Closure Now the facilitator takes some questions from Ex 13.6 and explains the concept more clearly.	

Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) 6. The capacity of a closed cylindrical vessel of height 1 m is 15.4 litres. How many square metres of metal sheet would be needed to make it?	
Evaluation/Assessment: Learners will do the calculation in their notebook .Teacher will take rounds and assess the children randomly. The teacher will also assess the students by asking the learners to solve the questions on the board after completion of the test.	
Learners on the way They will be given simple questions like: 6. A patient in a hospital is given soup daily in a cylindrical bowl of diameter 7 cm. If the bowl is filled with soup to a height of 4 cm, how much soup the hospital has to prepare daily to serve 250 patients?	Advanced Learners They will be given Higher order Ques. like: 7. A lead pencil consists of a cylinder of wood with a solid cylinder of graphite filled in the interior. The diameter of the pencil is 7 mm and the diameter of the graphite is 1 mm. If the length of the pencil is 14 cm, find the volume of the wood and that of the graphite.
Materials needed/Resources: Chalk, blackboard, duster	
Common Misconceptions : Learners might face difficulty in converting capacity in volume and vice - versa.	Addressing the Misconceptions: • The struggling ones will be provided with help • Teacher will personally take rounds to cater to the need of students

HOME ASSIGNMENT: Complete Ex – 13.6 in Note Book Of NCERT Text Book Class 9

LESSON PLAN CLASS 9



DLF Public School

THE LEARNING ACADEMY

Managed By Darbari Lal Foundation

Class	Subject	Time slot	Lesson	Topic P10
IX	MATHS	35 mins 1 Pd	Surface Area and Volume	- Volume of Cone. - Ex – 13.7

Expected Learning Outcome :The learners will be able to :
Deduce the formula to find the volume of cone and its application to practical problems.

Expected skill development:

- Observational and identification skill while identifying the surfaces, edges and vertices of 3- D shapes.
- Numeracy and calculation skills while calculating surface area.
- Procedural thinking while doing questions.
- Developing connections between LSA and TSA
- Visual and spatial ability
- Analytical thinking and problem solving.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Pedagogy	Content
(5 mins) Warm up (Individual work) + Black Board Demonstration by learners DEMONSTRATION The facilitator ask the learners to recall Lateral surface area of cone = $\pi r l$ Total Surface Area = $\pi r l + \pi r^2$ The facilitator will give the small demonstration of the activity and encourage them to do the same on their own at home.	The facilitator takes some examples to tell the total quantity of substance that can be put into the cone, this quantity is called the capacity or the volume of the cone. Facilitator will show the relationship between VOLUME OF CONE AND VOLUME OF CYLINDER by pouring the sand in the container. It shows that one cylinder of radius 'r' and height 'h' can fill three cones of same radius 'r' and height 'h'. Volume of cone = $\frac{1}{3} \pi r^2 h$
(25 mins) Demonstration by facilitator on board The facilitator explains some practical examples, where the learners are suppose to find the volume of a cone. The facilitator takes some questions from Ex 13.7 and explains the concept more clearly.	2. Find the capacity in litres of a conical vessel with (i) radius 7 cm, slant height 25 cm (ii) height 12 cm, slant height 13 cm 4. If the volume of a right circular cone of height 9 cm is $48 \pi \text{ cm}^3$, find the diameter of its base.

(5 mins) Inclass Exercise : Closure Now the facilitator take some questions from Ex 13.7 and explains the concept more clearly.	4. If the volume of a right circular cone of height 9 cm is $48\pi\text{ cm}^3$, find the diameter of its base.
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Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

- 4.** If the volume of a right circular cone of height 9 cm is $48\pi\text{ cm}^3$, find the diameter of its base.

Evaluation/Assessment: Learners will do the calculation in their notebook .Teacher will take rounds and assess the children randomly. The teacher will also assess the students by asking the learners to solve the questions on the board after completion of the test.

Learners on the way
They will be given simple questions like:

- 2.** Find the capacity in litres of a conical vessel with
 (i) radius 7 cm, slant height 25 cm (ii) height 12 cm, slant height 13 cm

Advanced Learners
They will be given Higher order Ques. like:

- 4.** If the volume of a right circular cone of height 9 cm is $48\pi\text{ cm}^3$, find the diameter of its base.

Materials needed/Resources: Chalk, blackboard, duster

Common Misconception : Learners might face difficulty in converting capacity in volume and vice - versa.

Addressing the Misconceptions:

- The struggling ones will be provided with help
- Teacher will personally take rounds to cater to the need of students

HOME ASSIGNMENT: Ex 13.7 Q1, 2(ii) and Q3 of NCERT Text Book Class 9.

LESSON PLAN CLASS 9



DLF Public School

THE LEARNING ACADEMY

Managed By Darbari Lal Foundation

Class	Subject	Time slot	Lesson	Topic P11
IX	MATHS	35 mins 1 Pd	Surface Area and Volume	- Volume of Cone. - Ex – 13.7 contd.
Expected Learning Outcome :The learners will be able to : Deduce the formula to find the volume of cone and its application to practical problems.				
Expected skill development: - Observational and identification skill while identifying the surfaces, edges and vertices of 3- D shapes. - Numeracy and calculation skills while calculating surface area. - Procedural thinking while doing questions. - Developing connections between LSA and TSA - Visual and spatial ability - Analytical thinking and problem solving.				

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Pedagogy	Content
(5 mins) Warm up (Individual work) DEMONSTRATION The facilitator ask the learners to recall Lateral surface area of cone = $\pi r l$ Total Surface Area = $\pi r l + \pi r^2$ Volume of cone = $\frac{1}{3} \pi r^2 h$	
(25 mins) Demonstration by facilitator on Board The facilitator tells some practical examples, where the learners have to find the volume of the cone The facilitator takes some questions from Ex 13.7 and explains the concept more clearly.	7. A right triangle ABC with sides 5 cm, 12 cm and 13 cm is revolved about the side 12 cm. Find the volume of the solid so obtained. 8. If the triangle ABC in the Question 7 above is revolved about the side 5 cm, then find the volume of the solid so obtained. Find also the ratio of the volumes of the two solids obtained in Questions 7 and 8. 9. A heap of wheat is in the form of a cone whose diameter is 10.5 m and height is 3 m. Find its volume. The heap is to be covered by canvas to protect it from rain. Find the area of the canvas required.
(5 mins) Inclass Exercise: Closure Now, the facilitator takes some questions from Ex 13.7 and explains the concept more clearly.	9. A heap of wheat is in the form of a cone whose diameter is 10.5 m and height is 3 m. Find its volume. The heap is to be covered by canvas to protect it from rain. Find the area of the canvas required.

Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

7. A right triangle ABC with sides 5 cm, 12 cm and 13 cm is revolved about the side 12 cm.
Find the volume of the solid so obtained.

Evaluation/Assessment: Learners will do the calculation in their notebook .Teacher will take rounds and assess the children randomly. The teacher will also assess the students by asking the learners to solve the questions on the board after completion of the test.

Learners on the way
They will be given simple questions like:

Find the ratio of the volumes of the two solids obtained in Q 7 and 8

Advanced Learners
They will be given Higher order Ques. like:

7. A right triangle ABC with sides 5 cm, 12 cm and 13 cm is revolved about the side 12 cm.
Find the volume of the solid so obtained.

Materials needed/Resources: Chalk, blackboard, duster

Common Misconceptions : Learners might face difficulty in converting capacity in volume and vice - versa.

Addressing the Misconceptions:

- The struggling ones will be provided with help
- Teacher will personally take rounds to cater to the need of students

HOME ASSIGNMENT: Do qQ5 and Q 6 Of Ex – 13.7 of NCERT Text Book Class 9.

LESSON PLAN CLASS 9 [2018 -2019]



DLF Public School

THE LEARNING ACADEMY

Managed By Darbari Lal Foundation

Class	Subject	Time slot	Lesson	Topic P12
IX	MATHS	35 mins 1 Pd	Surface Area and Volume	- Volume of Sphere - Ex – 13.8
Expected Learning Outcome :The learners will be able to : Deduce the formula to find the volume of sphere and its application to practical problems.				
Expected skill development: - Observational and identification skill while identifying the surfaces, edges and vertices of 3- D shapes. - Numeracy and calculation skills while calculating surface area. - Procedural thinking while doing questions. - Developing connections between LSA and TSA - Visual and spatial ability - Analytical thinking and problem solving.				

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Pedagogy	Content
(5 mins) Warm up Demonstration by learners	Learners recalls that Total/Lateral surface Area of a sphere = $4 \pi r^2$ Curved Surface Area of a hemisphere = $2 \pi r^2$ Total Surface Area of hemisphere = $3 \pi r^2$ Now the facilitator takes some examples to tell the total quantity of substance that can be put into the sphere, this total quantity is called the capacity or the volume of the sphere. Volume of the Sphere = $\frac{4}{3} \pi r^3$ Volume of the hemisphere = $\frac{2}{3} \pi r^3$
(25 mins) demonstration by facilitator on board The facilitator take some practical examples where the learners have to find the volume of a sphere. The facilitator takes some questions from Ex 13.8 and explains the concept more clearly. The facilitator will give the small demonstration of the activity and encourage the learners to do the same on their own at home.	3. 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? 4. The diameter of the moon is approximately one-fourth of the diameter of the earth. What fraction of the volume of the earth is the volume of the moon? 6. A hemispherical tank is made up of an iron sheet 1 cm thick. If the inner radius is 1 m, then find the volume of the iron used to make the tank.

(5 mins) Inclass Exercise: Closure Now the facilitator takes some questions from the exercise and explains the concept more clearly.	6. A hemispherical tank is made up of an iron sheet 1 cm thick. If the inner radius is 1 m, then find the volume of the iron used to make the tank.
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Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

- 3.** 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 ?

Evaluation/Assessment: Learners will do the calculation in their notebook. Teacher will take rounds and assess the children randomly. The teacher will also assess the students by asking the learners to solve the questions on the board after completion of the test.

Learners on the way They will be given simple questions like: 3. 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 ?	Advanced Learners They will be given Higher order Ques. like: 4. The diameter of the moon is approximately one-fourth of the diameter of the earth. What fraction of the volume of the earth is the volume of the moon?
Materials needed/Resources: Chalk, blackboard, duster	
Common Misconceptions : Learners might face difficulty in converting capacity in volume and vice - versa.	Addressing the Misconceptions: - The struggling ones will be provided with help - Teacher will personally take rounds to cater to the need of students

HOME ASSIGNMENT : Do Q 1,2 and 5 of Ex – 13.8 of NCERT Text Book Class 9.

LESSON PLAN CLASS 9 [2018 -2019]



DLF Public School

THE LEARNING ACADEMY

Managed By Darbari Lal Foundation

Class	Subject	Time slot	Lesson	Topic P13
IX	MATHS	35 mins 1 Pd	Surface Area and Volume	- Volume of Sphere - Ex – 13.8 contd.
Expected Learning Outcome :The learners will be able to : Deduce the formula to find the volume of sphere and its application to practical problems.				
Expected skill development: - Observational and identification skill while identifying the surfaces, edges and vertices of 3- D shapes. - Numeracy and calculation skills while calculating surface area. - Procedural thinking while doing questions. - Developing connections between LSA and TSA - Visual and spatial ability - Analytical thinking and problem solving.				

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Pedagogy	Content
(5 mins) Warm up (Individual work) + Black Board Demonstration by learners Learners recalls that Volume of the Sphere = $\frac{4}{3} \pi r^3$ Volume of the hemisphere = $\frac{2}{3} \pi r^3$	
(25 mins) Demonstration by facilitator on Board The facilitator takes some practical examples where the learners have to find the volume of a sphere. The facilitator takes some questions from the exercise and explains the concept more clearly.	7. Find the volume of a sphere whose surface area is 154 cm^2. 8. A dome of a building is in the form of a hemisphere. From inside, it was white-washed at the cost of Rs 498.96. If the cost of white-washing is Rs 2.00 per square metre, find the (i) inside surface area of the dome, (ii) volume of the air inside the dome. 9. 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'. 10. A capsule of medicine is in the shape of a sphere of diameter 3.5 mm. How much medicine (in mm^3) is needed to fill this capsule?
(5 mins) Inclass Exercise: Closure Now the facilitator takes some questions from the exercise and explains the concept more clearly.	9. 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'.

Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

A dome of a building is in the form of a hemisphere. From inside, it was white-washed at the cost of ₹ 4989.60. If the cost of white-washing is ₹ 20 per square metre, find the
(i) inside surface area of the dome, (ii) volume of the air inside the dome.

Evaluation/Assessment: Learners will do the calculation in their notebook. Teacher will take rounds and assess the children randomly. The teacher will also assess the students by asking the learners to solve the questions on the board after completion of the test.

Learners on the way
They will be given simple questions like:

7. Find the volume of a sphere whose surface area is 154 cm^2 .

Advanced Learners

They will be given Higher order Ques. like:

8. A dome of a building is in the form of a hemisphere. From inside, it was white-washed at the cost of Rs 498.96. If the cost of white-washing is Rs 2.00 per square metre, find the
(i) inside surface area of the dome, (ii) volume of the air inside the dome.

Materials needed/Resources: Chalk, blackboard, duster

Common Misconceptions : Learners might face difficulty in converting capacity in volume and vice - versa.

Addressing the Misconceptions:

- The struggling ones will be provided with help
- Teacher will personally take rounds to cater to the need of students

Home Assignment: Complete Ex – 13.8 in Note Book Of NCERT Text Book class 9.