

Chapter 16: Volume

Class Work (Page 251)

1. 10 cm^3

2. 12 cm^3

3. 14 cm^3

4. 15 cm^3

Exercise 16A

$$V = l \times b \times h$$

1. (a) $V = 10 \text{ cm} \times 12 \text{ cm} \times 12 \text{ cm} = 1440 \text{ cm}^3$

(b) $V = 3.8 \text{ cm} \times 2 \text{ cm} \times 5 \text{ cm} = 38 \text{ cm}^3$

(c) $V = 1.2 \text{ cm} \times 1.2 \text{ cm} \times 1.2 \text{ cm} = 1.728 \text{ cm}^3$

2. (a) $V = 4 \text{ cm} \times 2 \text{ cm} \times 3 \text{ cm} = 24 \text{ cm}^3$. (b), (c) same as (a)

3. (a) Volume of cube = side \times side \times side = $4 \text{ cm} \times 4 \text{ cm} \times 4 \text{ cm} = 64 \text{ cm}^3$. (b), (c), (d), (e) same as (a)

4. Volume of cube = $100 \text{ cm} \times 100 \text{ cm} \times 100 \text{ cm} = 1000000 \text{ cm}^3$

Volume of cube = $1 \text{ m} \times 1 \text{ m} \times 1 \text{ m} = 1 \text{ m}^3$

$1000000 \text{ cm}^3 = 1 \text{ m}^3$

5. Volume of 1st box = $10 \text{ cm} \times 6 \text{ cm} \times 4 \text{ cm} = 240 \text{ cm}^3$

Volume of 2nd box = $6 \text{ cm} \times 6 \text{ cm} \times 7 \text{ cm} = 252 \text{ cm}^3$

Second box has greater volume

6. Volume of heap of wood = $5 \text{ dm} \times 9 \text{ dm} \times 3 \text{ dm} = 135 \text{ dm}^3$

$$7. \text{ Volume of rectangular solid} = \frac{25 \text{ m}}{2} \times 5.2 \text{ m} \times 0.80 \text{ m} = 52 \text{ m}^3$$

8. Volume of cube = 80 cm^3 . Cuboids that could be built are (b), (e) and (f)

9. Combination of 36 are for l , b and $h = (9 \times 4 \times 1) \text{ cm}^3, (9 \times 2 \times 2) \text{ cm}^3, (6 \times 3 \times 2) \text{ cm}^3, (12 \times 3 \times 1) \text{ cm}^3, (4 \times 3 \times 3) \text{ cm}^3, (18 \times 2 \times 1) \text{ cm}^3$

$$10. \text{ Volume of cuboid} = 6 \text{ cm} \times 3 \text{ cm} \times 3 \text{ cm} = 54 \text{ cm}^3$$

$$\text{Volume of cube} = 6 \text{ cm} \times 6 \text{ cm} \times 6 \text{ cm} = 216 \text{ cm}^3$$

Volume of cube is greater than cuboid.

$$11. (a) \text{ Height} = \frac{24 \text{ cm}^3}{4 \text{ cm} \times 2 \text{ cm}} = 3 \text{ cm}$$

$$(b) \text{ Height} = \frac{30 \text{ cm}^3}{3 \text{ cm} \times 5 \text{ cm}} = 2 \text{ cm}$$

$$(c) l = \frac{210 \text{ mm}^3}{7 \text{ mm} \times 3 \text{ mm}} = 6 \text{ mm}$$

$$(d) \text{ Breadth} = \frac{2.4 \text{ cm}^3}{3 \text{ cm} \times 0.5 \text{ cm}} = 0.6 \text{ cm}$$

$$(e) l = \frac{1.04 \text{ mm}^3}{4 \text{ mm} \times 0.05 \text{ mm}} = \frac{26}{5} \text{ mm} = 5.2 \text{ mm}$$

$$12. \text{ Volume of tank} = 75 \text{ cm} \times 45 \text{ cm} \times 50 \text{ cm} = 168750 \text{ cm}^3$$

$$\text{Volume of water} = \frac{3}{4} \times 168750 \text{ cm}^3 = 126562.5 \text{ cm}^3$$

$$\text{More water needed to fill the tank} = 168750 \text{ cm}^3 - 126562.5 \text{ cm}^3 = 42187.5 \text{ cm}^3$$

$$13. \text{ Volume of almirah} = 0.60 \text{ m} \times 0.60 \text{ m} \times 3 \text{ m} = 1.08 \text{ m}^3$$

$$14. \text{ Volume of cube} = 24 \text{ cm} \times 24 \text{ cm} \times 24 \text{ cm}$$

$$\text{Volume of cuboidal container} = 9 \text{ cm} \times 4 \text{ cm} \times 3 \text{ cm}$$

$$\text{Number of containers required} = \frac{24 \text{ cm} \times 24 \text{ cm} \times 24 \text{ cm}}{9 \text{ cm} \times 4 \text{ cm} \times 3 \text{ cm}} = 128$$

$$15. \text{ Volume of cube} = 343 \text{ cm}^3 \quad \text{Side of cube} = (7 \text{ cm}) \times (7 \text{ cm}) \times (7 \text{ cm}) = 7 \text{ cm}$$

$$16. (d) h = \frac{432 \text{ cm}^3}{4 \text{ cm} \times 18 \text{ cm}} = 6 \text{ cm}$$

$$17. (b) \text{ Number of cubes} = \frac{30 \text{ cm} \times 16 \text{ cm} \times 16 \text{ cm}}{8 \text{ cm} \times 8 \text{ cm} \times 8 \text{ cm}} = 15$$

$$18. (c) A = \frac{1350 \text{ cm}^3}{3 \text{ cm}} = 1350 \text{ cm}^2$$

Exercise 16B

- $875 \text{ mL} = 875 \text{ cm}^3$
 - $3 \text{ L} = 3000 \text{ mL} = 3000 \text{ cm}^3$
 - $8 \text{ L } 29 \text{ mL} = 8029 \text{ mL} = 8029 \text{ cm}^3$
 - $16 \text{ L } 3 \text{ mL} = 16003 \text{ mL} = 16003 \text{ cm}^3$
- $728 \text{ cm}^3 = 728 \text{ mL}$
 - $1039 \text{ cm}^3 = 1039 \text{ mL} = 1 \text{ L } 39 \text{ mL}$
 - $8009 \text{ cm}^3 = 8009 \text{ mL} = 8 \text{ L } 9 \text{ mL}$
 - $18070 \text{ cm}^3 = 18070 \text{ mL} = 18 \text{ L } 70 \text{ mL}$
- $V = 3 \text{ m} \times 6 \text{ m} \times 4 \text{ m} = 72 \text{ m}^3 = 72000 \text{ L}$
 - $V = 1.5 \text{ m} \times 2 \text{ m} \times 3 \text{ m} = 9 \text{ m}^3 = 9000 \text{ L}$
 - $V = 0.16 \text{ m} \times 0.25 \text{ m} \times 0.2 \text{ m} = 16 \text{ cm} \times 25 \text{ cm} \times 20 \text{ cm} = 8000 \text{ cm}^3 = 8 \text{ L}$
- Volume of container = $40 \text{ cm} \times 30 \text{ cm} \times 20 \text{ cm} = 24000 \text{ cm}^3$
 - $24000 \text{ cm}^3 = 24 \text{ L}$
 - Cost of 1 container of milk = $24 \text{ L} \times \text{₹}63.50 = \text{₹}1524$
- Capacity of tank = $50 \text{ cm} \times 40 \text{ cm} \times 30 \text{ cm} = 60,000 \text{ cm}^3$
 - $60,000 \text{ cm}^3 = 60,000 \text{ mL}$
 - $60,000 \text{ mL} = 60 \text{ L}$
 - Cost of filling with petrol = $60 \text{ L} \times \text{₹}99.50 = \text{₹}5970$
- Volume of water in tank = $48 \text{ cm} \times 35 \text{ cm} \times (40 \text{ cm} \times \frac{1}{5}) = 13440 \text{ cm}^3 = 13.440 \text{ L}$
 - Water flows in the tank = $6 \times 1.8 \text{ L} = 10.8 \text{ L}$
 - Total water in the tank = $13.440 \text{ L} + 10.8 \text{ L} = 24.240 \text{ L}$
- $1 \text{ L} = 1000 \text{ cm}^3$, side of cube = 10 cm
- $(V = 30 \text{ m} \times 20 \text{ m} \times 5 \text{ m} = 3000 \text{ m}^3 = 3000 \text{ kL})$

Challenge!

- Number of cubes = $\frac{15^3 \text{ cm} \times 15^3 \text{ cm} \times 15^3 \text{ cm}}{8 \text{ cm} \times 8 \text{ cm} \times 8 \text{ cm}} = 27$
- (Volume of stone = $40 \text{ cm} \times 30 \text{ cm} \times (20 - 18) \text{ cm} = 40 \text{ cm} \times 30 \text{ cm} \times 2 \text{ cm} = 2400 \text{ cm}^3$)

Mental Maths

- Volume = 8 cu units
- Volume of matchbox = $5 \text{ cm} \times 2 \text{ cm} \times 3 \text{ cm} = 30 \text{ cm}^3$
- Volume of cube = $4 \text{ cm} \times 4 \text{ cm} \times 4 \text{ cm} = 64 \text{ cm}^3$
- $5 \text{ L} = 5000 \text{ cm}^3$
- Number of ice cubes = $\frac{10^5 \text{ cm} \times 12^6 \text{ cm} \times 8^3 \text{ cm}}{2 \text{ cm} \times 2 \text{ cm} \times 2 \text{ cm}} = 90$

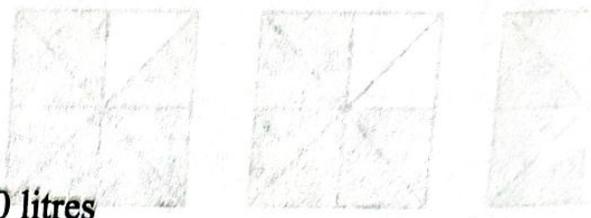
Chapter Test

- $3 \text{ L } 50 \text{ mL} = 3050 \text{ mL} = 3050 \text{ cm}^3$
 - $19,358 \text{ cm}^3 = 19,358 \text{ mL} = 19 \text{ L } 358 \text{ mL}$

2. Volume of water tank = $4 \text{ m} \times 3 \text{ m} \times 2 \text{ m} = 24 \text{ m}^3$

Volume of water filled = $24^3 \times \frac{1}{8} \text{ m}^3 = 3 \text{ m}^3$

It can hold more water = $24 \text{ m}^3 - 3 \text{ m}^3 = 21 \text{ m}^3 = 21000 \text{ litres}$



3. Number of cubes = $\frac{20^{10} \text{ cm} \times 16^8 \text{ cm} \times 12^6 \text{ cm}}{2 \text{ cm} \times 2 \text{ cm} \times 2 \text{ cm}} = 480$

4. Volume of water in the tank = $15 \text{ cm} \times 8 \text{ cm} \times 5 \text{ cm} = 600 \text{ cm}^3$

Volume of water poured to fill the tank = $240 \text{ mL} = 240 \text{ cm}^3$

Volume of water tank = $600 \text{ cm}^3 + 240 \text{ cm}^3 + 840 \text{ cm}^3$

Height of tank = $\frac{840 \text{ cm}^3}{15 \text{ cm} \times 8 \text{ cm}} = 7 \text{ cm}$

5. Volume of tank = $30 \text{ cm} \times 30 \text{ cm} \times 15 \text{ cm} = 13500 \text{ cm}^3$

Volume of tank to be filled = $13500 \times \frac{3}{8} \text{ cm}^3 = 8100 \text{ cm}^3$

$2.7 \text{ l} = 2700 \text{ cm}^3$ flows in 1 min

$\therefore 8100 \text{ cm}^3$ flows in $\frac{8100 \text{ cm}^3}{2700 \text{ cm}^3} = 3 \text{ min}$

6. (c)



7. (b) $l = \frac{360 \text{ cm}^3}{24 \text{ cm} \times 2 \text{ cm}} = \frac{15}{2} = 7.5 \text{ cm}$

8. (d) $V = 20 \text{ m} \times 2 \text{ m} \times 0.2 \text{ m} = 8.0 \text{ m}^3$

9. (a) Number of bricks = $\frac{18000 \text{ cm} \times 120 \text{ cm} \times 45 \text{ cm}}{30 \text{ cm} \times 15 \text{ cm} \times 10 \text{ cm}} = 2160$

10. (c) Volume of large container = $8 \text{ cm} \times 8 \text{ cm} \times 1 \text{ cm} = 64 \text{ cm}^3$
height of small container = $4 \times 4 \times 4 \text{ cm}^3 = 4 \text{ cm}$