Volume of Cube and Cuboids

LO: Calculate the volume of cubes, cuboids and 3D solids made from cuboids.

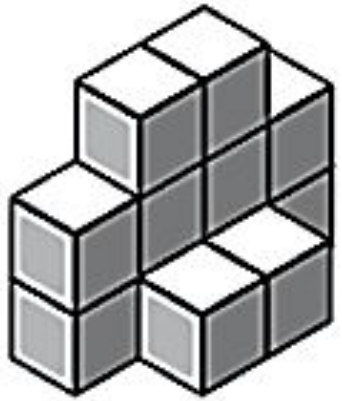
MENTAL MATH

Finding the Volume Counting Cubes

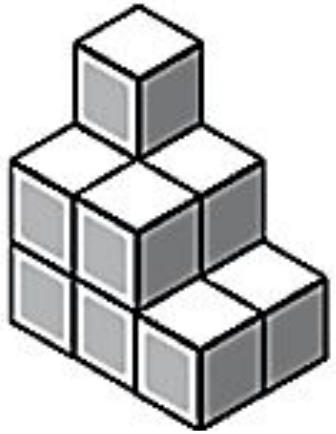
What is the volume of each shape below?

= 1 cubic unit

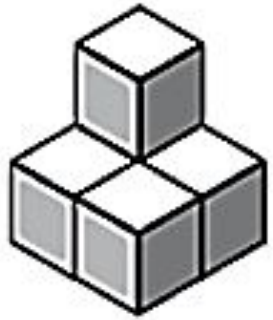
1.



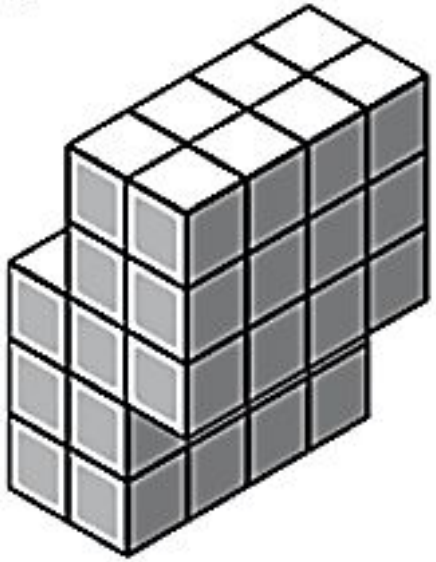
2.



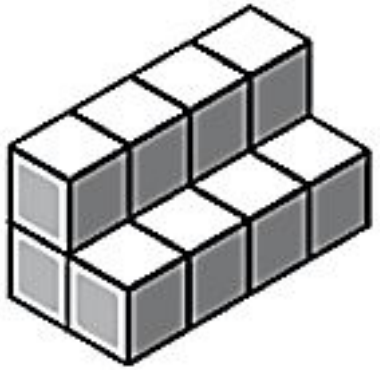
3.



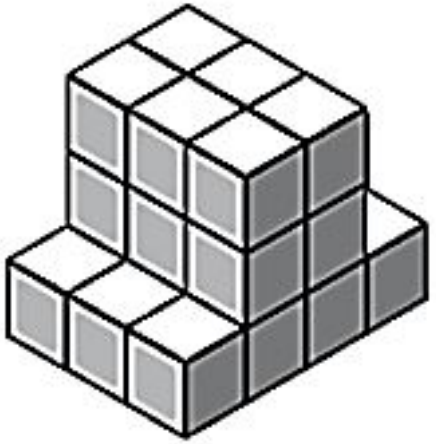
4.



5.



6.



Volume of Cube and Cuboids

LO: Calculate the volume of cubes, cuboids and 3D solids made from cuboids.

MENTAL MATH

Finding the Volume by Counting Cubes **Answers**

1. 12 cubic units
2. 11 cubic units
3. 5 cubic units
4. 44 cubic units
5. 12 cubic units
6. 24 cubic units

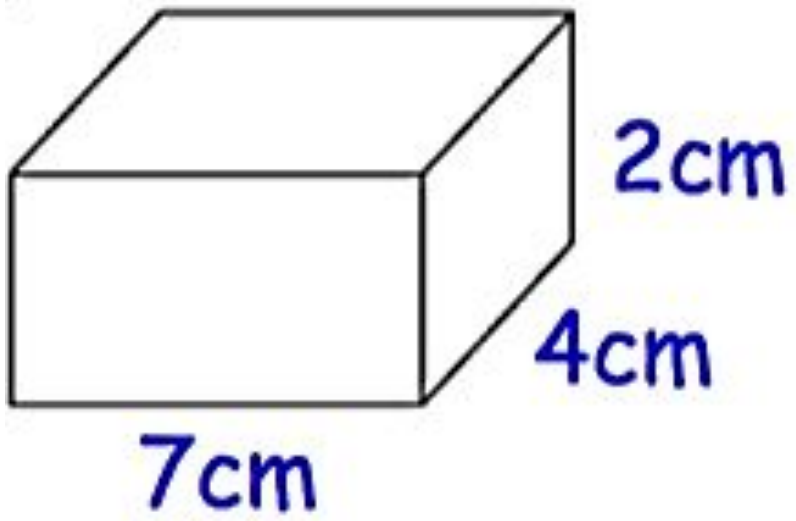
Volume of Cube and Cuboids

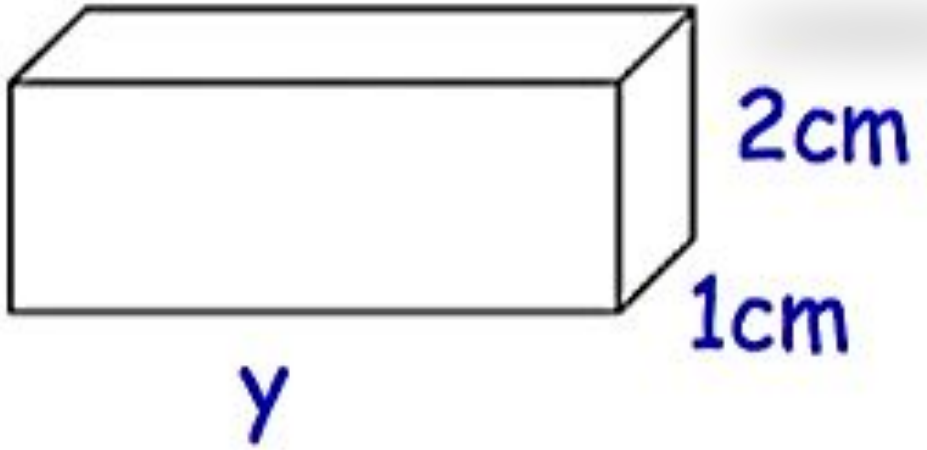
LO: Calculate the volume of cubes, cuboids and 3D solids made from cuboids.

STARTER

03:00

Shown below are two cuboids.





Both cuboids have the same volume.

Find y.

$7 \times 4 \times 2 = 56\ cm^3$

$2 \times 1 = 2$

$56 \div 2 = 28$

28 .....cm

(3)

Volume of Cube and Cuboids

LO: Calculate the volume of cubes, cuboids and 3D solids made from cuboids.

GCSE/iGCSE Assessment Objective Specification – Foundation/Higher

G12 ✓ identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres

G16 know and apply formulae to calculate: area of triangles, parallelograms, trapezia; volume of cuboids and other right prisms (including cylinders)

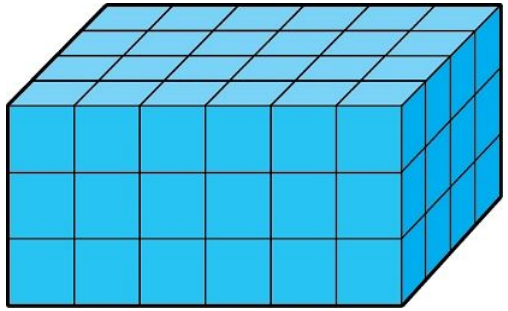
G17 know the formulae: circumference of a circle = $2\pi r = \pi d$, area of a circle = πr^2; calculate: perimeters of 2D shapes, including circles; areas of circles and composite shapes; surface area and volume of spheres, pyramids, cones and composite solids

Volume of Cube and Cuboids

LO: Calculate the volume of cubes, cuboids and 3D solids made from cuboids.

KEY CONCEPT

The cuboid is made up of cm cubes.



Workout the volume of the cuboid.

Key point

The **volume** of a solid shape is the amount of 3D space it takes up.
The units of volume are **cubic units** (e.g. mm^3, cm^3 or m^3).

$6 \times 4 \times 3 =$ 72 cm^3

Volume of Cube and Cuboids

LO: Calculate the volume of cubes, cuboids and 3D solids made from cuboids.

Think-Pair-Share

03:00

The diagram shows a prism.

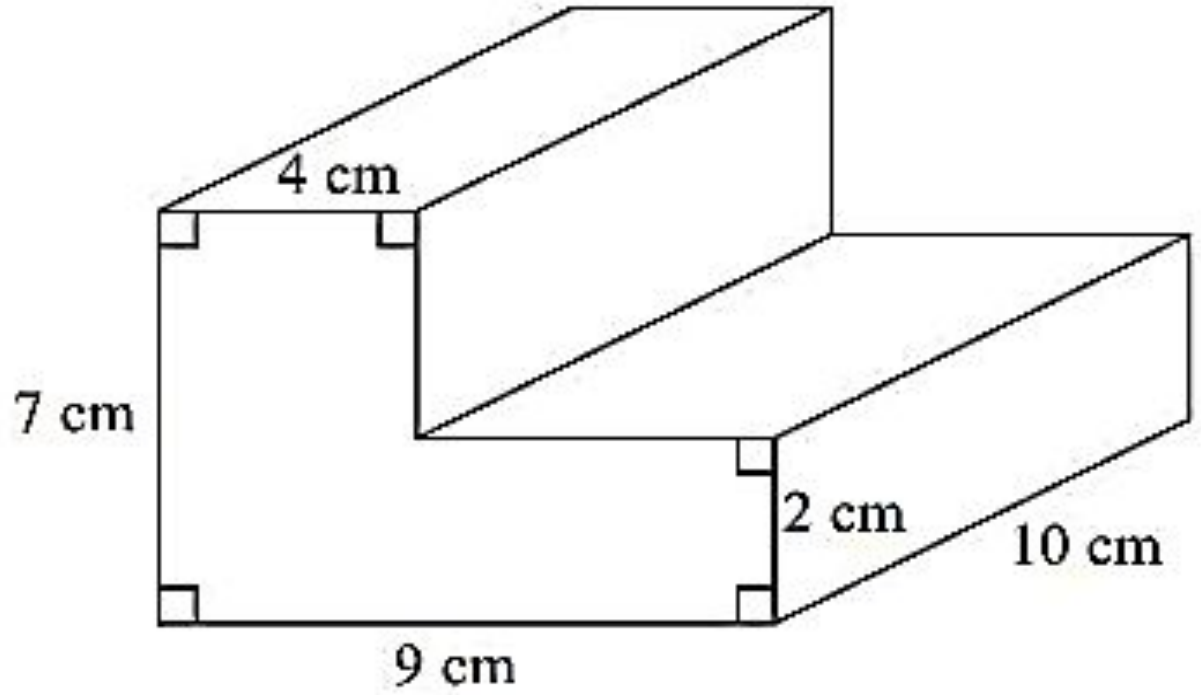


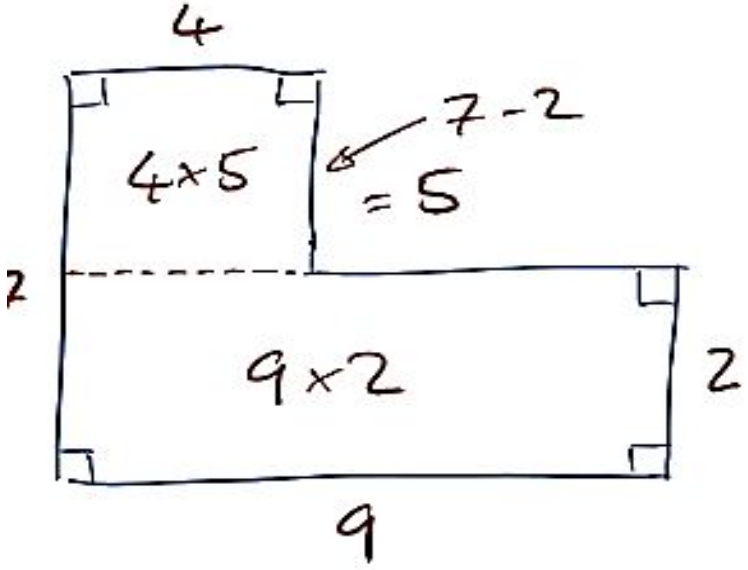
Diagram **NOT** accurately drawn

Work out the volume of the prism.

Volume of Cube and Cuboids

LO: Calculate the volume of cubes, cuboids and 3D solids made from cuboids.

CROSS-SECTION



$A = 4 \times 5 + 9 \times 2$

$= 20 + 18$

$= 38\ cm^2$

$V = 38 \times 10$

$V = 380\ cm^3$

Answer

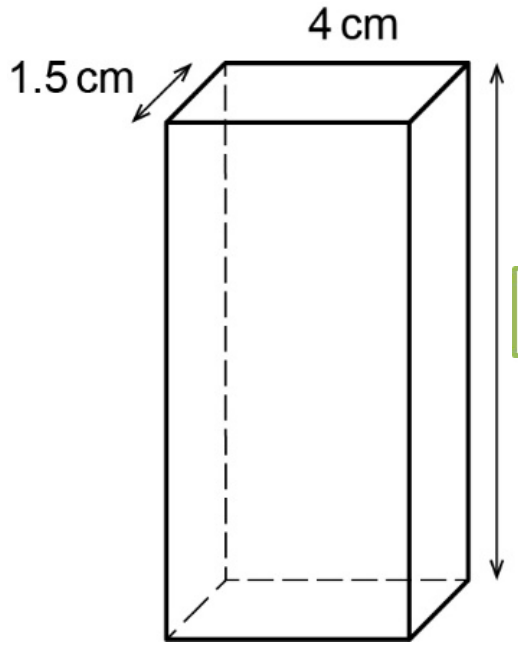
Volume of Cube and Cuboids

LO: Calculate the volume of cubes, cuboids and 3D solids made from cuboids.

Group Task

03:00

The volume of this cuboid is 48 cm^3. Work out the missing side.



$$V = l \times w \times h$$

$$48\ cm^3 = l \times 1.5\ cm \times 4\ \text{cm}$$

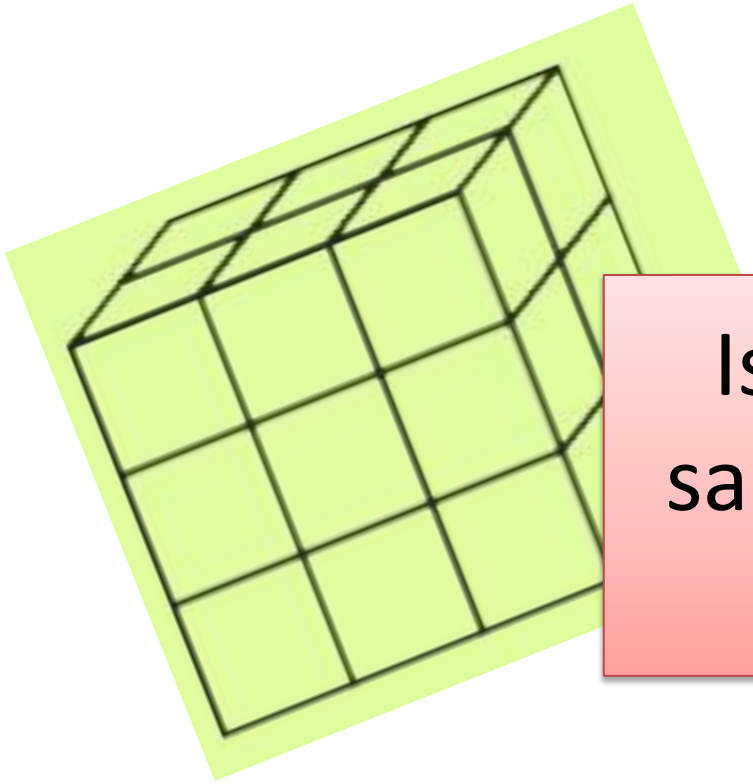
$$48\ cm^3 = l \times 6\ cm^2$$

$$\frac{48\ cm^3}{6\ cm^2} = \frac{l \times 6\ cm^2}{6\ cm^2}$$

$$8\ cm = l$$

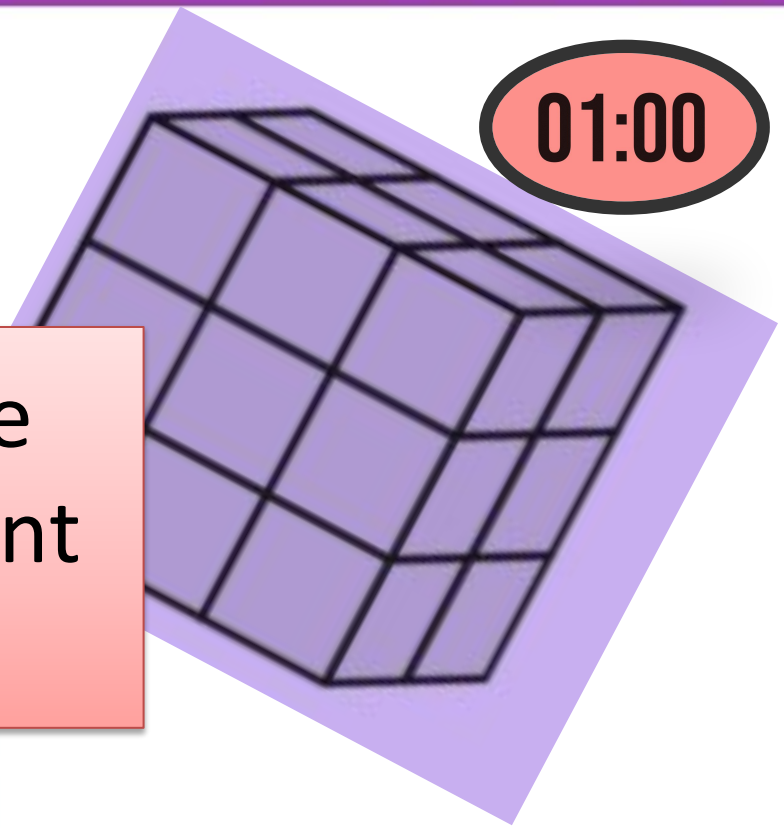
Volume of Cube and Cuboids

LO: Calculate the volume of cubes, cuboids and 3D solids made from cuboids.

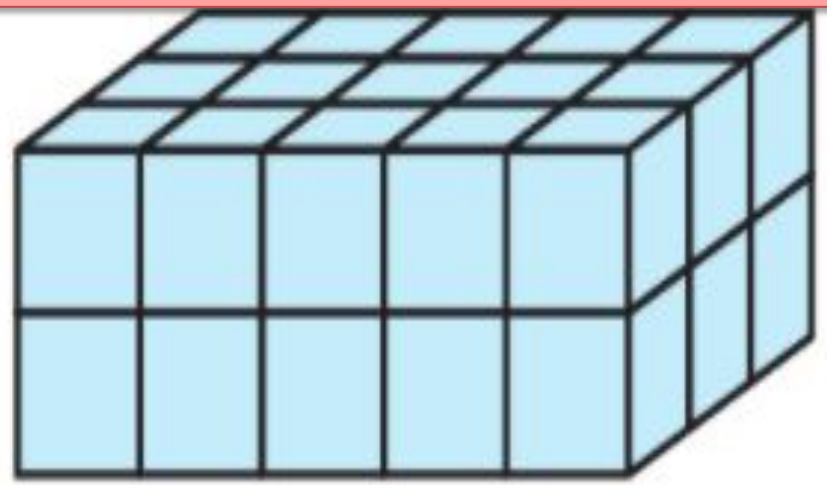


Mini-Plenary

01:00



Is it possible to have the same volume but different measures?



Core Task

LO: Calculate the volume of cubes, cuboids and 3D solids made from cuboids.

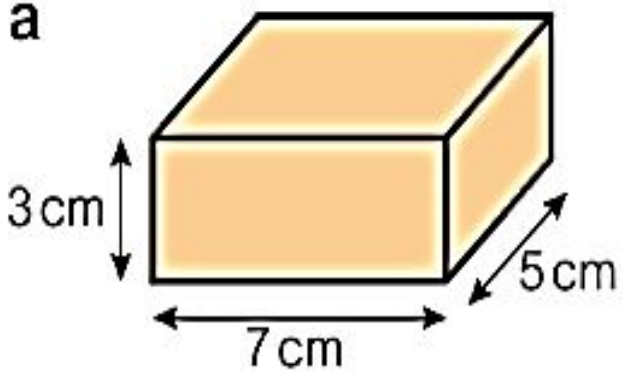
Task 1:

10:00

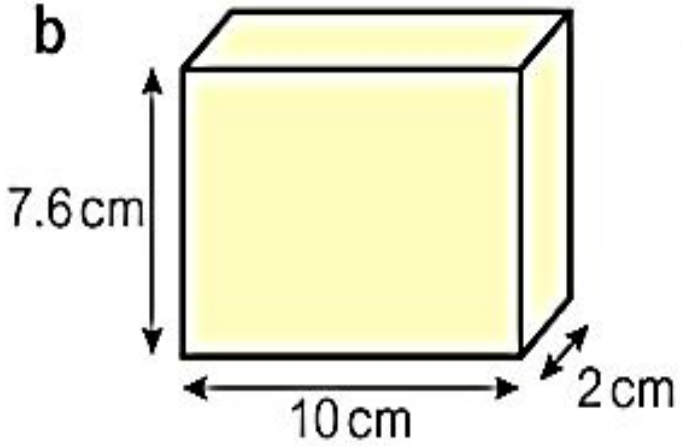
Task 2:

Find the volume of each cuboid.

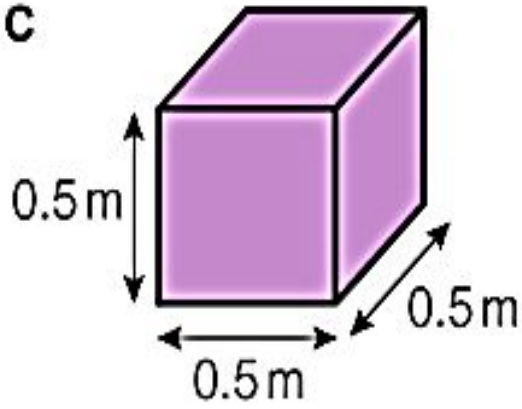
a



b



c



Modelling A lake is estimated to be about 1.5 km long, 200 m wide and 25 m deep.

a Work out an estimate of the volume of water in the lake, by modelling the lake as a cuboid.
Give your answer in cubic metres.

b Do you think a cuboid is a good model for a lake?
Explain your answer.

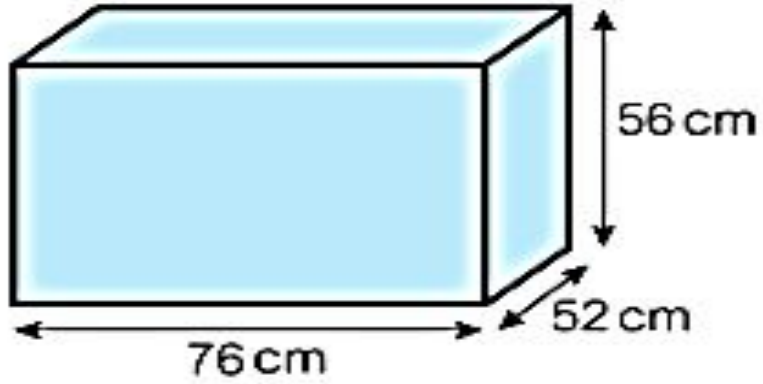
Core Task

LO: Calculate the volume of cubes, cuboids and 3D solids made from cuboids.

Task 3:

10:00

Problem-solving The diagram shows the dimensions of a water tank.



Alex puts water in the tank so that it is three quarters full.
What volume of water is in the tank?

Discussion In how many different ways can you work out the volume of a water tank that is three quarters full?

Extension

LO: Calculate the volume of cubes, cuboids and 3D solids made from cuboids.

10:00

Q6. Sumeet has a pond in the shape of a prism.

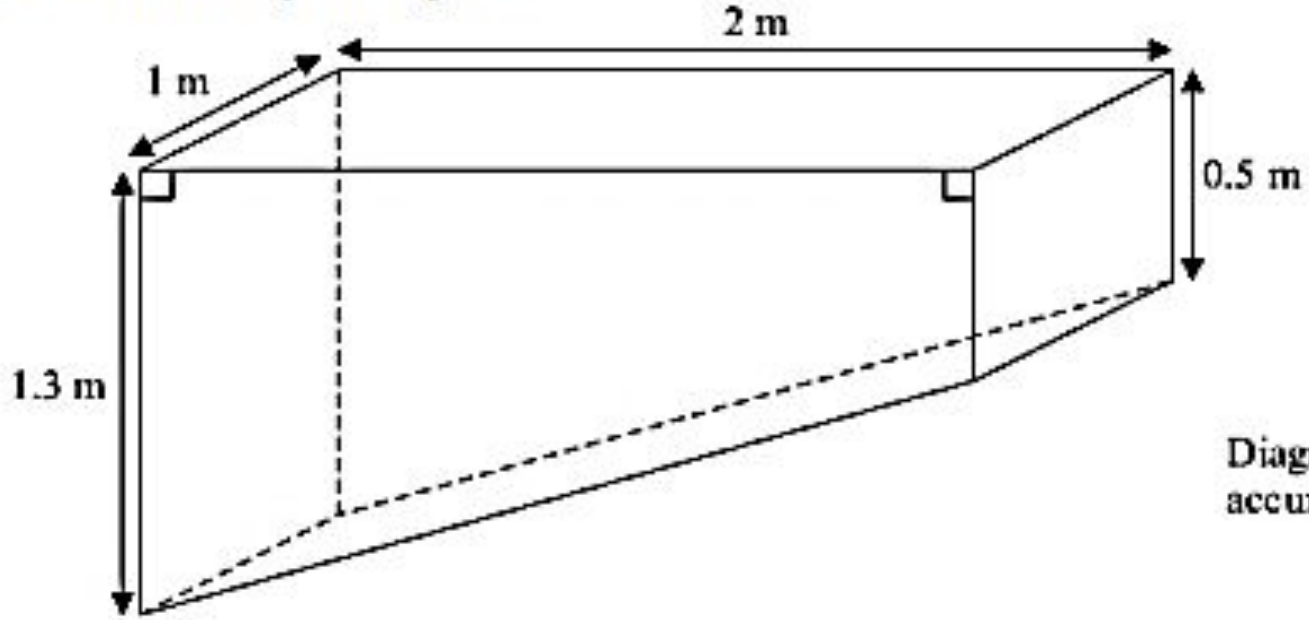


Diagram NOT accurately drawn

The pond is completely full of water.
Sumeet wants to empty the pond so he can clean it.
Sumeet uses a pump to empty the pond.

The volume of water in the pond decreases at a constant rate.
The level of the water in the pond goes down by 20 cm in the first 30 minutes.

Work out how much more time Sumeet has to wait for the pump to empty the pond completely.

Volume of Cube and Cuboids

LO: Calculate the volume of cubes, cuboids and 3D solids made from cuboids.

GCSE/iGCSE Assessment Objective Specification – Foundation/Higher

G12 ✓ identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres

G16 ✓ know and apply formulae to calculate: area of triangles, parallelograms, trapezia; volume of cuboids and other right prisms (including cylinders)

G17 ✓ know the formulae: circumference of a circle = $2\pi r = \pi d$, area of a circle = πr^2; calculate: perimeters of 2D shapes, including circles; areas of circles and composite shapes; surface area and volume of spheres, pyramids, cones and composite solids

Plenary

LO: Calculate the volume of cubes, cuboids and 3D solids made from cuboids.

I have a swimming pool which has a capacity of 40,000 litres - it is half full, so has 20,000 litres of water in it.

I put an elephant in the swimming pool whose volume is 5000 litres.

03:00

1. What is the new volume in the swimming pool?
2. How many elephants can I fit in the swimming pool before it overflows.

Plenary

LO: Calculate the volume of cubes, cuboids and 3D solids made from cuboids.