Teaching The Fundamentals: Level 1 Area, Perimeter and Volume

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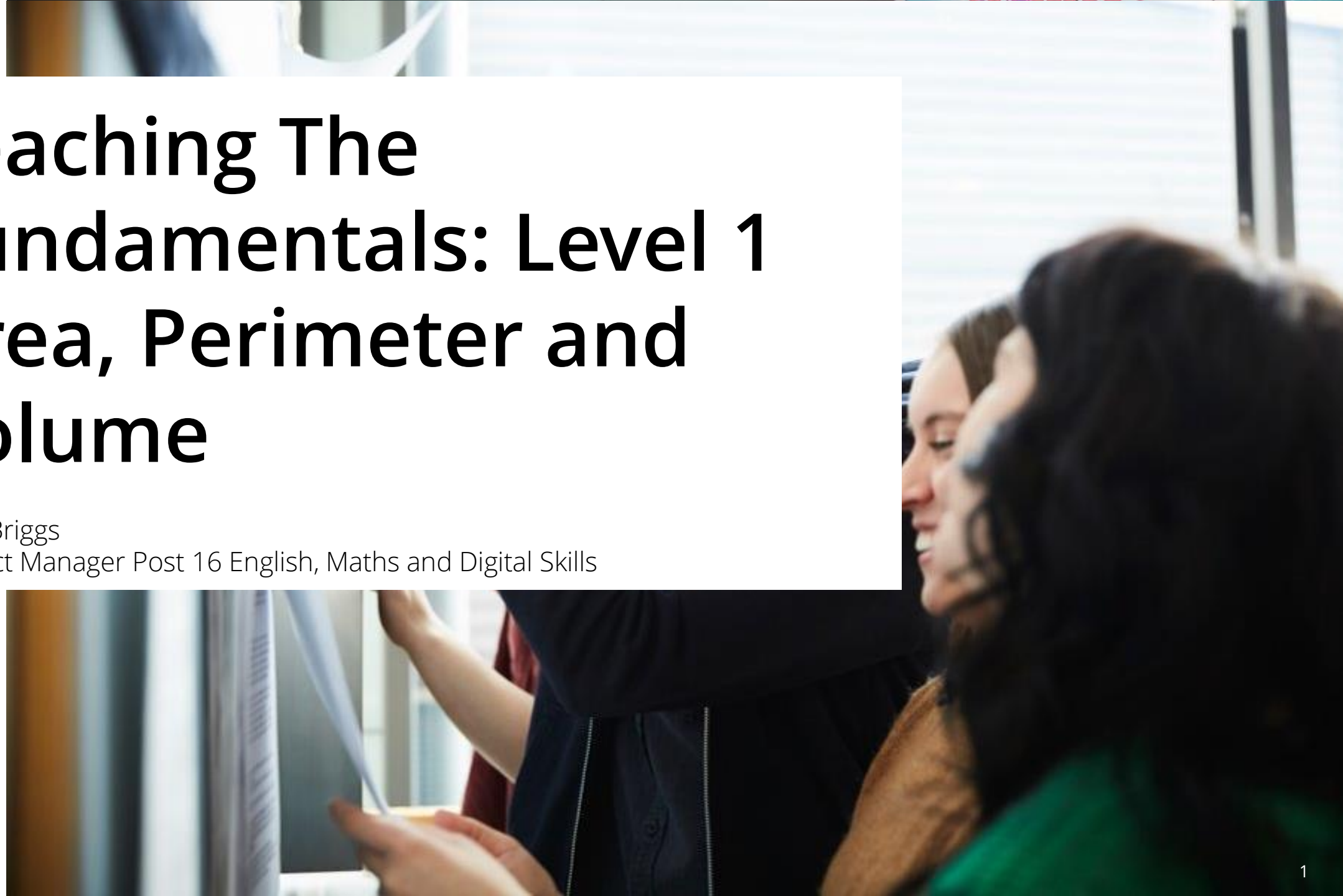


Pearson

Area, perimeter and volume

The Clue is in the Question

- It is recommended that learners look for clues that might remind them what to do, e.g. cm3 implies multiplication of 3 dimensions, cm2 implies multiplication of 2 dimensions and cm focusses on one dimension (often addition or repeated addition/multiplication).
- Identifying clues in the question (words and phrases such as “border”, “goes alone”, “cover,” “area”, “filled to the depth of”) should direct the learners to the correct concept.

Area, perimeter and volume

Where is the Issue?

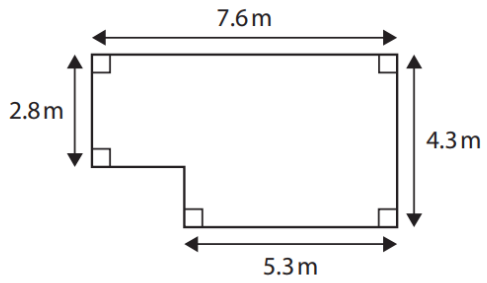
- Only some learners know that volume involves multiplying all three dimensions.
- Very often the concepts of volume, area and perimeter are confused.
- Some questions require an initial step where one, missing, length has to be worked out and while most learners perform the correct calculation first, some work only with the given lengths.
- Some of those who successfully find the accurate figure for the length then work with perimeter where they need to work with area, or work with surface area where they need to work with volume, or even simply add the three given dimensions.

Area, perimeter and volume

The Clue is in the Question: Area

Akeem wants to put wooden flooring in a room.

He has this sketch of the floor in the room.



Akeem will buy the wooden flooring in packs.
Each pack covers an area of 0.4 m^2

Akeem can cut and join the flooring.

Work out the number of packs of wooden flooring Akeem needs to buy.

(5)

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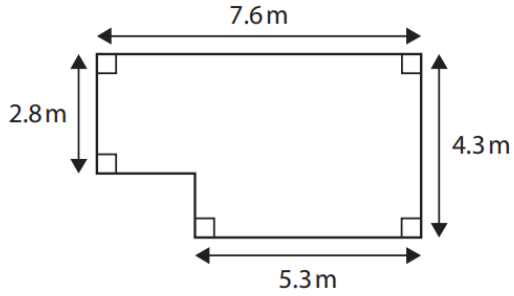

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Area, perimeter and volume

The Clue is in the Question: Perimeter

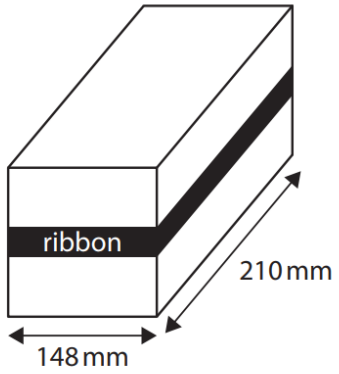
Jenni has a decorative box business.

She has a box in the shape of a cuboid
210 mm long and 148 mm wide.

Jenni is going to glue one piece of ribbon around
all four side faces of the box.

The ribbon will not overlap.

Jenni thinks a 72 cm piece of ribbon will be long enough.



Is Jenni correct?
Show why you think this.

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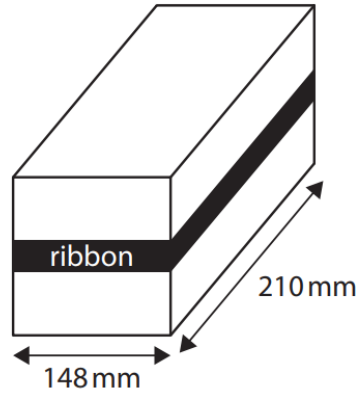

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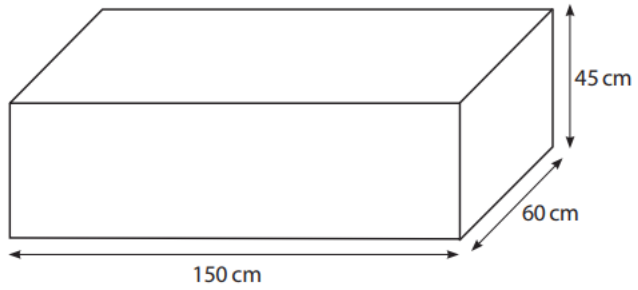
Area, perimeter and volume

The Clue is in the Question: Volume

Nick is a farmer.
He has a tank for water.

The tank is in the shape of a cuboid.



The tank is $\frac{2}{3}$ full of water.

Nick knows that 1000 cm^3 = 1 litre.

Work out how many litres of water are in the tank.

(5)

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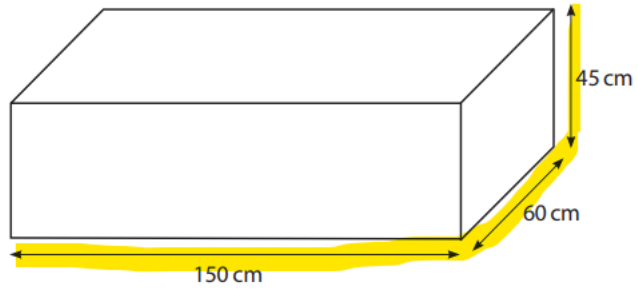

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Area, perimeter and volume

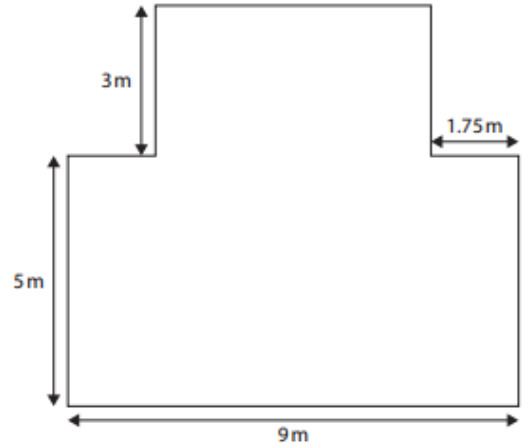
Missing measures

Often learners need to find missing measures.

Steph wants to cover part of her garden with paving blocks.
The diagram shows the part of the garden she will cover with blocks.

The shape of this part of the garden has one line of symmetry.

All corners are right angles.



Paving blocks are sold in packs.
Each pack covers 10 m²

Blocks can be cut and joined.

Work out the number of packs Steph needs to cover this part of her garden.
You **must** show your working.

(6)

Area, perimeter and volume

Composite Shapes

The questions may well use composite shapes for area.

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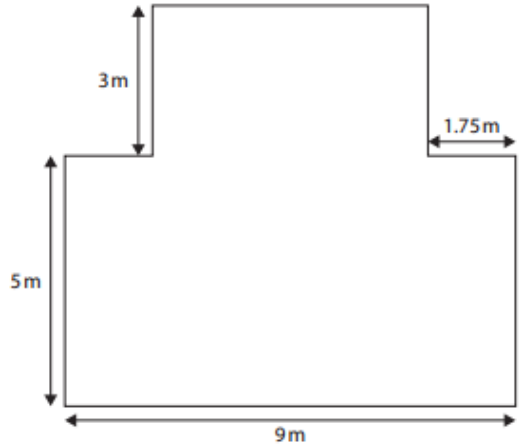

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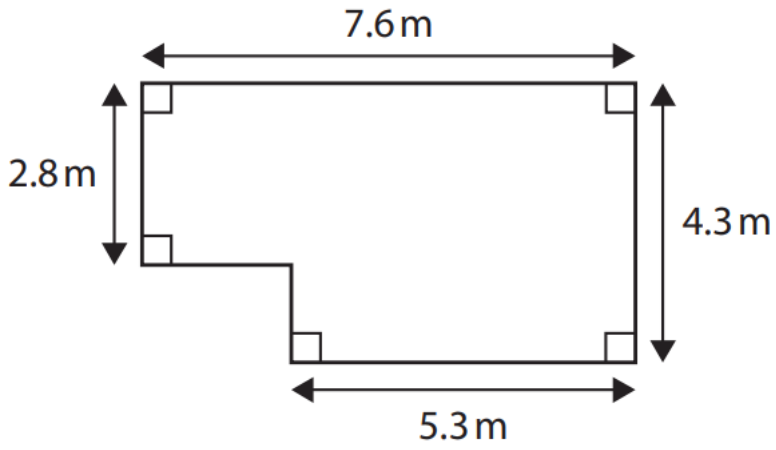
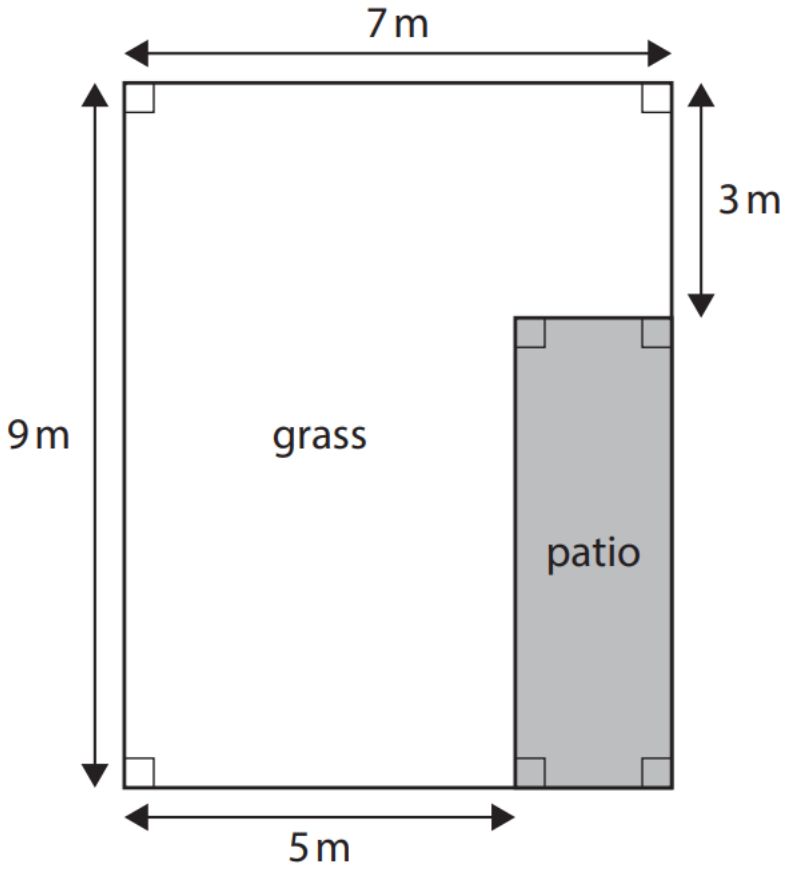
Area, perimeter and volume

The difference between calculator and non-calculator





Area, perimeter and volume

Teaching Tips

- Collate some area, perimeter and volume questions (examwizard is good for this).
- Encourage the learners to decide what the ask is: area, perimeter or volume.
- Encourage the learners to highlight the vocabulary in the questions that make them think this.

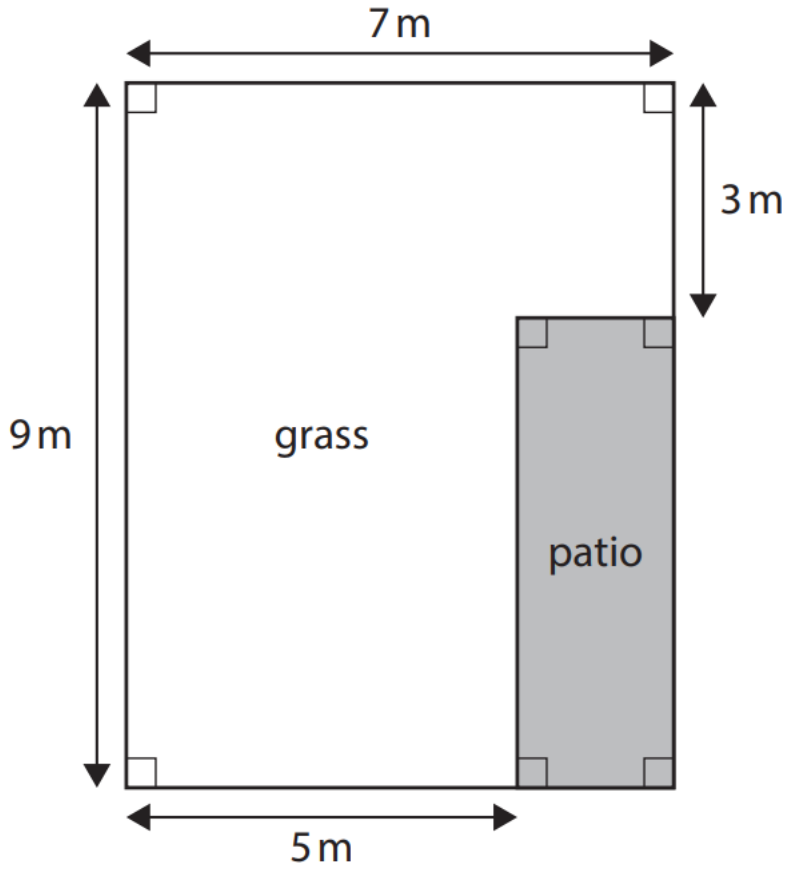
- Encourage learners to think of practical usages for area, perimeter and volume in the real world.
- Collate a list.
- What does this list tell them.

- Football analogy.
- What is the difference between the penalty area and the deadball line?
- What does this tell you about area and perimeter?

Area, perimeter and volume

Teaching Tips

- Allow the learners to work with composite shapes in their preferred way.
- But teach them to choose the easier option.



Area, perimeter and volume

Scaffolded Questions

- Scaffolded questions allow the learners to work through a problem step by step.

2. Rosa makes candles to sell.

Each candle is in the shape of a cuboid height 8cm.

The base of the cuboid is a square of perimeter 20cm.

Rosa needs to know the volume of one candle.

a. What is the formula for the volume of a cuboid?

b. Work out the length of each side of the square base.

c. Work out the volume of the candle (give units with your answer)

d. Use a reverse calculation to check any part of your working.

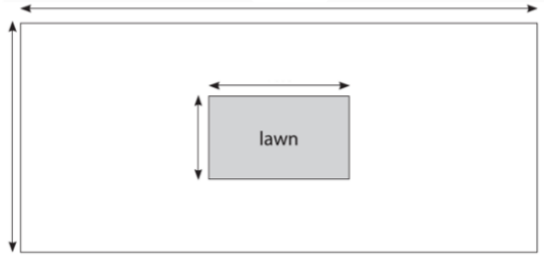
Area, perimeter and volume

Numberless Problem Solving

- The concept is that the learners focus on the process and not on the actual answer.

Alfie sells flooring for playgrounds.

He has this diagram of a playground.



Alfie will put flooring on all the space inside the playground but not on the lawn.

He knows how much the flooring costs per square metre.

How does he work out the total cost of the flooring?

Ali is preparing for a race.

She runs laps around the football pitch to prepare for the race.

The length of each lap is the total distance along the four edges of the pitch.

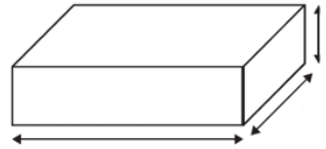
Ali wants to run a certain distance.

How does she work out how many laps she has to run to reach this distance?

Gosia needs a container to put in her freezer.

She sees this container.

The container is in the shape of a cuboid.



Gosia knows the following formula

$1000\,cm^3 = 1$ litre.

How can Gosia work out how many litres the container holds?

Pearson