

4

Garden makeover



Anil and Sam want to make their back garden more attractive and useful.

It has a patch of concrete and an area of soil that is very muddy and covered in weeds.

The fence is broken and needs replacing.

Sam would like some grass.

Anil says she would like some flowerbeds and a path.

They both want a play area with a sandpit for the children.

Talk about it

Do you have a garden?

Do you know how big your garden is?

Do you ever watch the gardening programmes on TV?

What would you do with a garden like Anil and Sam's?

What maths skills do you think they might need?

These are the skills you will practise in this unit.

Which are the most useful for you? Tick the boxes.

- ☐ Measuring, using centimetres and metres
- ☐ Using measurements to work out how much you need
- ☐ Finding the perimeter of shapes
- ☐ Finding the area of rectangles
- ☐ Finding the volume of cuboids
- ☐ Using regular shapes, fitting together, to cover an area

Skill code

MSS1/L1.4, MSS2/L1.1

MSS1/L1.6, 7

MSS1/L1.8

MSS1/L1.9

MSS1/L1.10

MSS2/L1.1, 2

Measuring the garden

Anil thinks the shape of the garden is rectangular. Sam thinks it is square. They will need to measure the length and width of the garden to find out. If the length and the width of the garden are the same, it is a square. If they are different, then it is a rectangle.

- 1 The garden measures 7.5 m long and 5.2 m wide. What shape is it?

Sam says the garden is 8 m long to the nearest metre.

Anil used a different tape measure. It was in yards and feet. Anil's measurement was about $8\frac{1}{4}$ yards long by $5\frac{1}{2}$ yards wide. Sam checked Anil's measurements to the nearest yard. She said he was right. What does the garden measure to the nearest yard?

Tip

A yard is a little less than a metre.

- 2 Length (to the nearest yard)

- 3 Width (to the nearest yard)



Activity 1

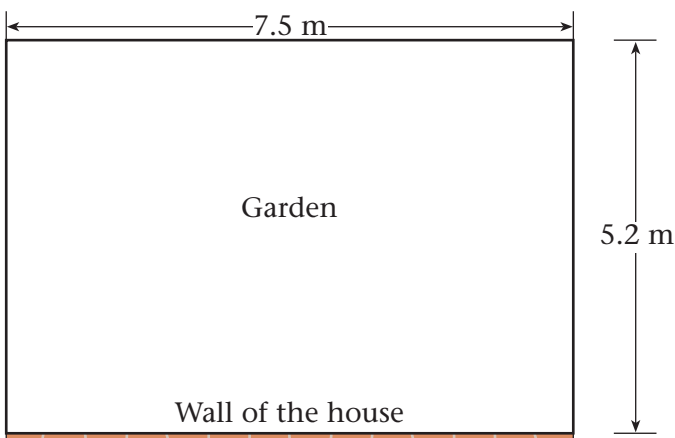
With another person, practise estimating and measuring in metres and writing your results to the nearest metre.

- 1 Choose three or four lengths to measure.

| Length to be measured | Estimate | Accurate measurement | Measurement to the nearest metre |
|-----------------------|----------|----------------------|----------------------------------|
| | | | |
| | | | |
| | | | |
| | | | |

The garden needs new fencing.

It needs fencing around three sides – the wall of the house makes the fourth side of the rectangle.



This is how Anil worked out how much fencing he needed.

He wrote down the two shorter sides and added them together first: $5.2 \text{ m} + 5.2 \text{ m} (= 10.4 \text{ m})$.

Then he wrote down the longer side and added all three sides together: $5.2 \text{ m} + 5.2 \text{ m} + 7.5 \text{ m} = 17.9 \text{ m}$.

The fencing is sold to the nearest metre.

If they bought 17 m, there would be a gap of 0.9 m.

- 2 How many cm is 0.9 m?

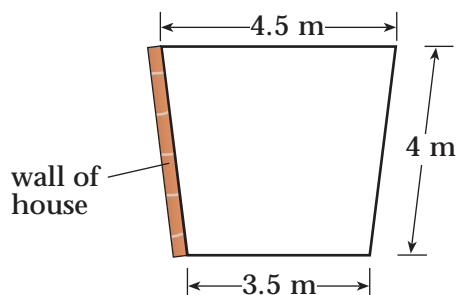
Sam says they will need 18 m. To work out how much will be left over, Sam works out:

$$18 \text{ m} - 17.9 \text{ m}$$

How much is left over in cm or m?

Activity 2

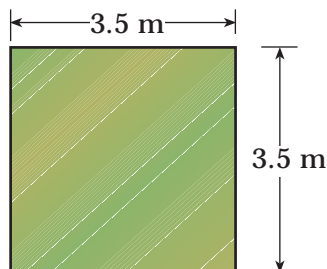
- 1 How much fencing would be needed for these gardens?



a + + =

- b Will need to buy of fencing.

- 2 This garden is square with sides of 3.5 m (or $3\frac{1}{2}$ m).



It needs fencing on 3 sides.

The fencing is sold in 1 metre sections.

- a How many metres are needed?

- b How much fencing must we buy?

- 3 How much fencing must be bought to go round a garden 11.3 m by 8.1 m wide if the house is along the longer side? (Hint: Draw a sketch to help you.)

.....

Review

Do you need more practice in working with lengths?

Yes ☐

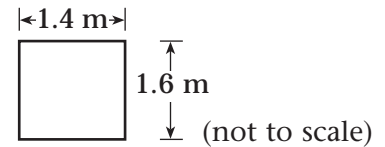
No ☐

For more work on this, go to H1 and H2 (page 13).

This work links to mini-project M2 (page 16).

Making a sandpit

Sam estimates the size the sandpit needs to be. When she measures the length and width, she finds that it is 1.4 m long and 1.6 m wide.



Anil and Sam decide to edge the sandpit with plastic. How much plastic edging must they buy? Anil writes down the lengths in order.

$$1.4 + 1.6 + 1.4 + 1.6 = \dots\dots\dots \text{ m}$$

The edging is sold in 2 m lengths. It can be bent to go around corners.

How many lengths must they buy?

How much will be left over? m or cm.

Perimeter is the distance around the outside of a shape.

Activity 3

Work out the perimeters of these rectangles.

1 Perimeter =
 $\dots\dots\dots + \dots\dots\dots + \dots\dots\dots + \dots\dots\dots = \dots\dots\dots \text{ m}$

2 Perimeter =
 $\dots\dots\dots + \dots\dots\dots + \dots\dots\dots + \dots\dots\dots = \dots\dots\dots \text{ m}$

3 Perimeter =
 $\dots\dots\dots + \dots\dots\dots + \dots\dots\dots + \dots\dots\dots = \dots\dots\dots \text{ m}$

4 Perimeter =
 $\dots\dots\dots + \dots\dots\dots + \dots\dots\dots + \dots\dots\dots = \dots\dots\dots \text{ m}$

- 5 a Can you think of another length and width that will allow Anil and Sam to use exactly 6 m of plastic edging? Show that your length and width work.

.....

- b What shape is the sandpit your length and width would make?

.....

Does everyone in the group have the same shape? Discuss your results.



Review

Do you need more practice in working out perimeters?

Yes ☐ No ☐

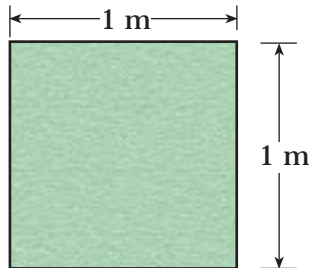
For more work on this, go to H1 and H3 (page 13) or E3 (page 15).

This work links to mini-project M3 (page 16).

Putting down a lawn

Anil and Sam want a big rectangular lawn. Sam measures out a distance 4.5 m along the 7.5 m fence so that the lawn can be the full width of the garden. The lawn will be a rectangle but the turf is sold in square metres (m^2).

A piece of turf looks like this:



To **estimate** the number of pieces of turf they will need, complete the following steps.

- 1 On centimetre squared paper draw a rectangle 4.5 squares long and 5.2 squares wide (be as accurate as you can).
- 2 Each whole square represents a piece of turf.

How many **whole** squares are there in a line in your rectangle?

..... (length)

- 3 How many lines of squares are there in your rectangle?

..... (width)

- 4 How many **whole** squares are there inside your rectangle?

.....

- 5 What do you do with the first two numbers to make the last one?

..... (Hint: $+$ $-$ \times or \div)

The amount of turf needed to cover the rectangle can be found by counting the squares or by the length by the width. This is the **area**.



- 6 If Anil and Sam use a calculator they will be able to work out **exactly** how much turf they need by entering

4 5 \times 5 2 =

It is m^2

Notice that the units are square metres (m^2). This is the amount covered by one piece of turf.

They can only buy whole squares of turf. How many must they buy?

.....

Tip

Area is the measurement of a surface. Area is measured in square units.

Anil calculates the other areas in the garden for when they can afford things like flagstones for the path.

Activity 4

Work out these areas.

| | Length | Width | Calculation | Area in m ² |
|---------|--------|-------|------------------|------------------------|
| Sandpit | 1.4 m | 1.6 m | 1.4×1.6 | |
| Path | 3.6 m | 1 m | | |

All the lengths must be in the same unit before multiplying. If the answers need to be in m² then change them to metres first.

| | | | | |
|----------|-------|-------|-------------------|--|
| Border | 2.4 m | 35 cm | 2.4×0.35 | |
| Border | 3.6 m | 40 cm | | |
| Dry area | 5.2 m | 1.6 m | | |

Anil and Sam are considering slabs for the path, which is a long thin rectangle.

At the local garden centre, they can buy square, hexagon, rectangular and triangular slabs.

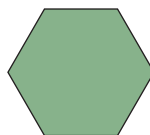
Tip

When shapes fit together leaving no gaps we call this *tessellation*.
It is another word for tiling.



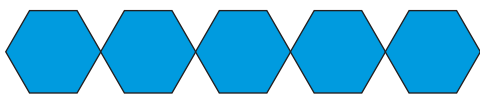
Activity 5

Trace each of the shapes found on this page, and use your tracing to make a tiling pattern on blank paper.

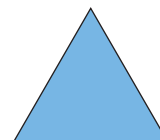


- Which of the shapes tessellate?
- Which shapes are easiest to tessellate?

This is not a tessellation because you cannot fit another hexagon in the gaps.



These need sliding around – try it.



- Do circles tessellate?
- Advise Anil and Sam about which shape to choose.
Give them reasons for your choice.

Review

Do you need more practice in – working out areas?

Yes ☐ No ☐

– using tessellations?

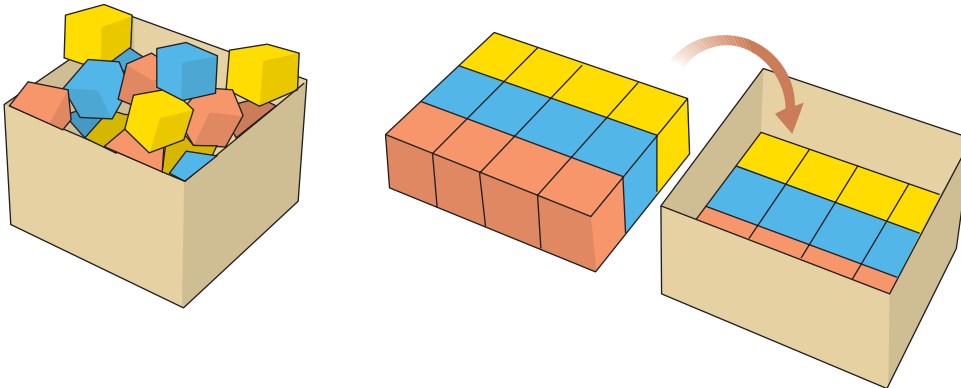
Yes ☐ No ☐

For more work on this, go to H4 and H5 (page 14) or E2 and E3 (page 15).

This work links to mini-projects M1 and M3 (page 16).

Soli's bricks

Anil and Sam's son, Soli, has a set of coloured cubes that fit into a box. He can throw them in but then the last one never fits. He likes to put them in by colour.


Tip

Volume is measured in cubes or cubic units.

- 1 How many cubes are there in a row?
- 2 How many rows are there in a layer?
- 3 How many layers are there in the box?
- 4 Count how many cubes there are altogether in the two layers.
.....

This is the volume. The units are in cm^3 when the measurements are in centimetres and in m^3 when the measurements are in metres.

Tip

You can work without counting the volume of a cuboid, by multiplying **length \times width \times height**.

Activity 6

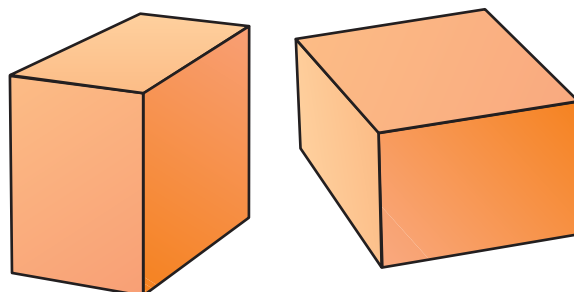
Anil and Sam decide to practise calculating volume. One person finds three box shapes. The other person then has to work out the volume.

With another person, work as either Sam or Anil and then check each other's work.

| Anil's boxes | | | Sam's answers |
|--------------|-------|--------|--------------------------|
| length | width | height | volume (cm^3) |
| 15 cm | 15 cm | 9 cm | |
| 30 cm | 20 cm | 15 cm | |
| 13 cm | 7 cm | 15 cm | |

| Sam's boxes | | | Anil's answers |
|-------------|--------|--------|--------------------------|
| length | width | height | volume (cm^3) |
| 14 cm | 10 cm | 9 cm | |
| 9 cm | 7 cm | 4 cm | |
| 9.5 cm | 7.5 cm | 7 cm | |

Sam says that the last one is a cheat because the height is longer than the length. Anesh says that doesn't matter as it just depends on which way it was laid down. In the group, discuss which of them is correct.



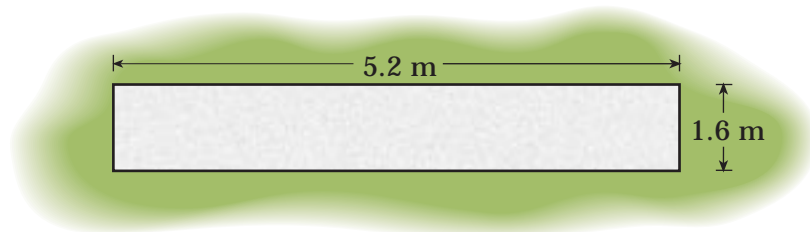
Anil and Sam aren't too keen on weeding, so they decide to put a strip of concrete down one side of the garden. This means that they have more volumes to work out.

Tip

Volume of a cuboid is the length \times width \times height.

Activity 7

(not to scale)



At the builder's yard Sam is told that, to avoid cracks developing, the concrete should be put on top of gravel.

The gravel should be 10 cm thick. He will need at least 8 cm of concrete.

- 1 Work out the volume of the gravel needed.

The thickness of the gravel must be 10 cm.

a This is m thick

b The volume of gravel is length \times width \times height =

..... \times \times = m^3

Now work out the volume of the concrete:

c Thickness of the concrete is 8 cm. This is m

d Volume of concrete = m^3

- 2 Anil and Sam work out how much sand is needed for the sandpit.

Look back at Activity 3 (page 4) to see what size Anil and Sam made the sandpit. They find that they can fill it to a depth of 15 cm.

Work out the volume of sand.

a Length

Width

Height (Check!)

b Volume of sand =

.....

Tip

'Depth' and 'thickness' mean the same as 'height' when talking about volume.

Remember

To work out volume in m^3 all the lengths must be in metres.

- 3 The path will be 3.6 m long and 1 m wide.

What volume of grit must Anil and Sam buy?

.....

Review

Do you need more practice with volume?

Yes ☐

No ☐

For more work on this, go to H7 (page 14).

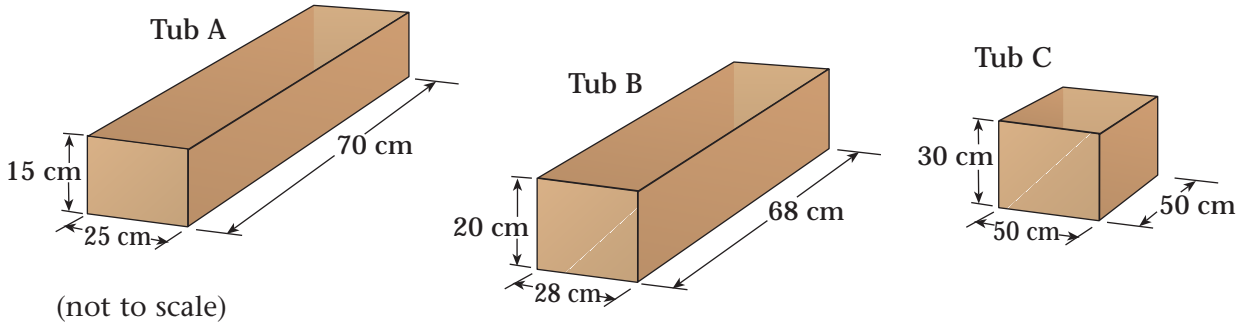
Before laying slabs, put down a 4 cm layer of grit.

Tubs for flowers

Sam has bought three tubs for flowers for Anil for his birthday. Anil wants to get the compost so that he can plant flowers straight away. Working out volumes is easy now so Sam measures the tubs.

Activity 8

One tub is square at the top and the others are rectangular. It seems sensible for Sam to measure flower tubs in cm. She can then work out the volumes in cm^3 .



- 1 Volume of tub A =
- 2 Volume of tub B =
- 3 Volume of tub C =
- 4 Total volume of all three tubs
- 5 Therefore, Sam must buy cm^3 of compost.

When Sam goes to buy the compost for the boxes she finds that it is sold in bags and measured in **litres**!

How many litres does she need?

She needs cm^3 ,
which is ml,
which is litres.

Tip

1 cm^3 is the same volume as 1 ml. There are 1000 ml in 1 litre.

The compost comes in 100 litre and 50 litre bags.

- 6 a What should Sam buy?
- b Will any be left over?
- c How much?



Review

Do you need more practice in volume and capacity?

Yes ☐

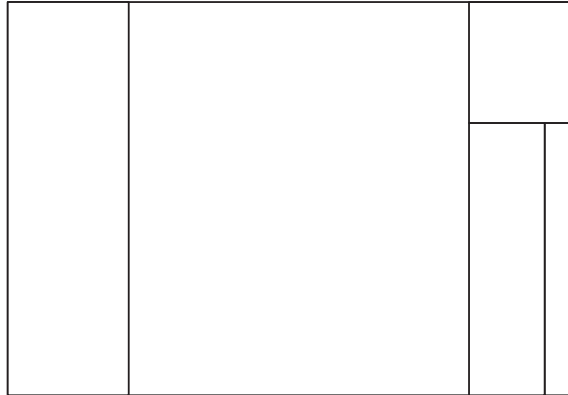
No ☐

For more work on this, go to H6 (page 14) or E1 (page 15).

This work links to mini-project M1 (page 16).

What does the garden look like?

Here is a plan of Anil and Sam's garden.



Look back through the unit and write down the sizes of the following features.

| | Length | Width |
|-------------------------|--------|-------|
| Path (page 8) | | |
| Lawn (page 5) | | |
| Sandpit (page 4) | | |
| Concrete strip (page 8) | | |



Activity 9

1 cm on the plan represents 1 m in the garden.

Measure the plan (above) and decide where the path, lawn, sandpit and concrete strip go. Label them on the plan.

The flowerbed has not yet been labelled. Measure it and write the actual garden measurements here.

Length

Width

Tip

The more complex the shape, the more difficult it will be to record the dimensions.

Activity 10

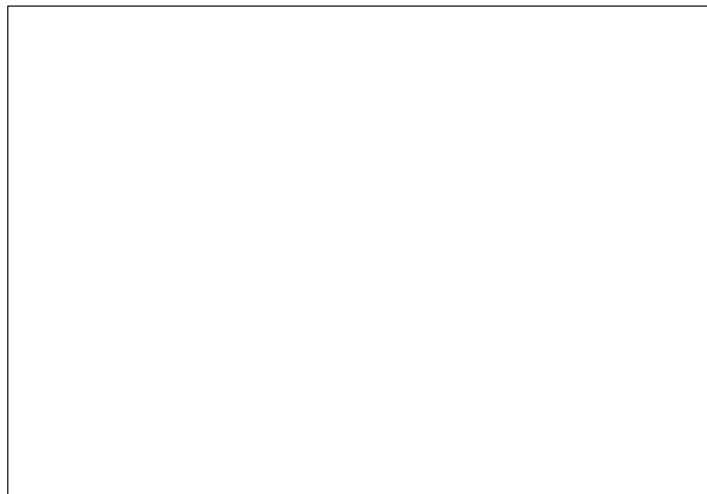
Mo and Jamil live next door to Anil and Sam. This is their garden.

Design the layout of their garden, marking these features on the plan.

- Flowerbed
- Lawn
- Path
- Hut
- Paved area

Add two other features to improve the garden.

Carefully measure each feature and record the real-life dimensions in the table below.



Scale: 1 cm to 1 m.

| Feature | Dimensions (plan) | Dimensions (in garden) |
|------------|---------------------|--------------------------|
| Flowerbed | | |
| Lawn | | |
| Path | | |
| Shed | | |
| Paved area | | |
| | | |
| | | |



Review

Do you need more practice in measurements and plans?

Yes ☐ No ☐

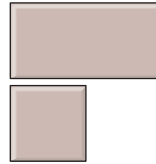
This work links to mini-projects M2 and M3 (page 16).

Tiling patterns

Sam agrees to help Jamil to pave the area by the shed.

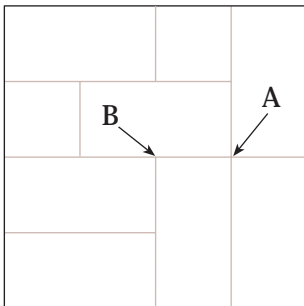
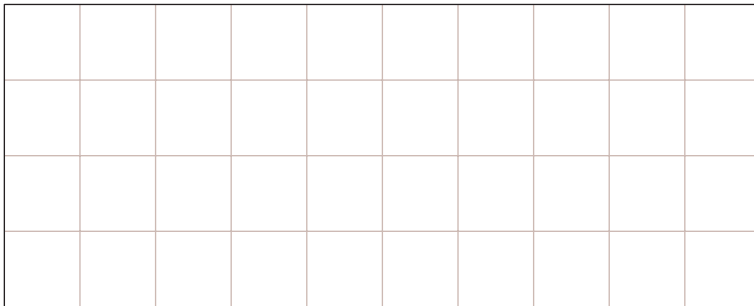
Jamil and Mo want to use rectangular tiles like this.

Two square tiles fit on top of one rectangular tile.



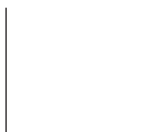
Activity 11

Create as many patterns using these tiles as you can on squared paper and draw the one you like best here.



1 How many tiles meet at point A?

Each corner that meets here is a **right angle**.



How many tiles meet at B?

Look closely to see the difference between how the tiles meet at A and B.

Discuss with others in the group how tiles fit together.

Tip

Square tiles are expensive so don't use more than you need.

Tip

Angles are measured in degrees.
A right angle is 90 degrees, written 90° .

Review

Do you need more practice in making plans and fitting shapes together?

Yes ☐ No ☐

For more work on this, go to H5 (page 14).

This work links to mini-project M3 (page 16).

Activity H1

How many metres of fencing are needed to go round all four sides of these gardens?

| Measurements of garden | Calculation needed | Fencing needed |
|------------------------|--------------------|----------------|
| 1 4 m by 7 m | | |
| 2 5 m by 3 m | | |
| 3 8 m by 6 m | | |

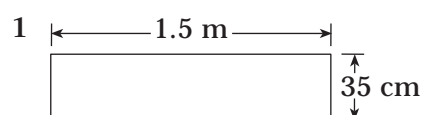
Activity H2

| Change these lengths from cm to m | | |
|-----------------------------------|--------|--|
| 1 | 260 cm | |
| 2 | 170 cm | |
| 3 | 230 cm | |
| 4 | 510 cm | |
| 5 | 820 cm | |

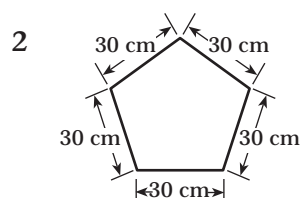
| Change these lengths from m to cm | | |
|-----------------------------------|--------|--|
| 1 | 0.5 m | |
| 2 | 2.3 m | |
| 3 | 0.15 m | |
| 4 | 3.85 m | |
| 5 | 0.05 m | |

Activity H3

Work out the perimeter of these planters in centimetres. Change your answer from cm to m.

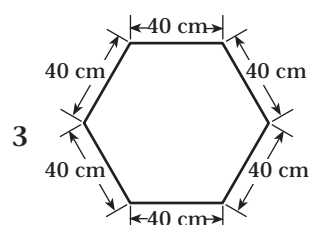


Perimeter = + + + = cm = m



The roses go in a regular **pentagon**-shaped planter.

Perimeter =



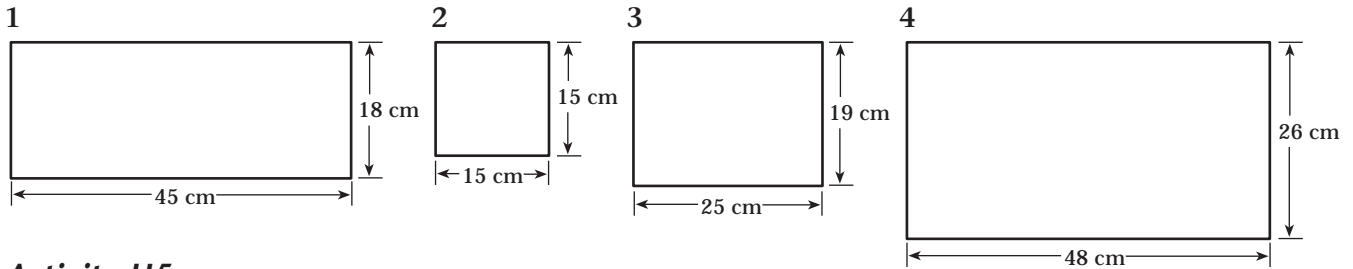
Perimeter =



Activity H4



Work out the area of these rectangles. Write down the calculation you will do first (use a calculator). Give your answers in cm^2 .



Activity H5

Work with another person and a set of regular shapes.

Try out different ways of putting the shapes together, making sure that no gaps are left.

Make a list of the shapes that **tessellate** and a list of the shapes that do not tessellate.

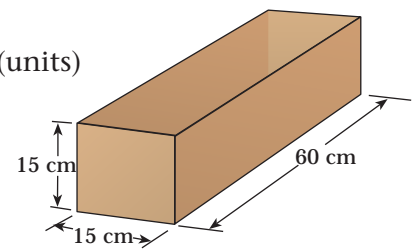
| These shapes tessellate | These shapes do not tessellate |
|-------------------------|--------------------------------|
| | |
| | |
| | |
| | |

Activity H6

Work out the amount of compost needed for this window box.

1 Volume = \times \times = (units)

2 Capacity = ml = litres.



Activity H7

1 Work out the volume of lawn fertiliser in a box 12 cm long, 8 cm wide and 7 cm high.

.....

2 My path is 10 m long and 2 m wide. I want to lay concrete 15 cm thick. What volume of concrete should I order? (Hint! Be careful with your units.)

.....

Remember

volume = length \times width \times height

Tip

1 cm^3 is the same volume as 1 ml.



Extension



Activity E1

Anil has worked out the volume of the planters that Sam has made for Mo.

The volumes are $75\,000\text{ cm}^3$, $50\,000\text{ cm}^3$ and $25\,000\text{ cm}^3$.

The bag of compost holds 35 litres.



- 1 How many bags will be needed to fill all three planters?
.....



Activity E2

500 ml of paint for the fence panels will cover an area of 12 m^2 .

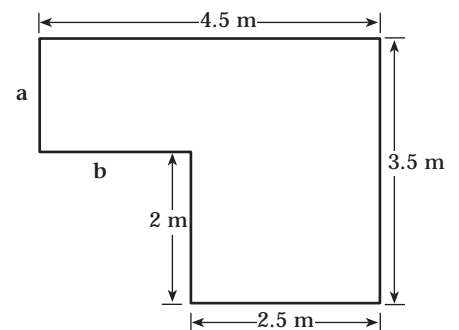
- 1 The fence panels are 2.5 m by 2 m so the area of one side is
.....
- 2 Both sides need to be painted so the area to be painted on one panel is
.....
- 3 If there are seven fence panels, the total area is
.....
- 4 How many tins of paint will be needed?



Activity E3

This garden is a different shape.

- 1 How long is side **a**?
How long is side **b**?
- 2 Work out the perimeter of the shape.
.....
- 3 Work out the area.
.....





Mini-projects



Activity M1

Anil has bought a box of lawn food granules. The instructions on the packet say, 'Sprinkle 350 grams on each square metre'.

1 What is the area of a lawn 3.5 m by 2.5 m?

.....

2 How much will he need to feed a 3.5 m by 2.5 m lawn?

.....

.....

3 How many packs would you buy?

.....

4 Give your reason.

.....

.....



Tip

1000g = 1 kg

Find out about different products that help to make a lawn grow well.

Look at liquids as well as boxes. Make a note of the volumes and capacities that are shown on the labels and discuss these with your group.



Activity M2

Use your own garden or one that you know. Make a plan of the garden and how you would like it to look.

You may keep any features like patios, paths, etc. or you may change everything.

Try measuring various lengths in the garden and transferring them to the plan.

Use 1 cm on the plan for 1 m in the garden.

(If this is your own garden and you follow the work Anil and Sam did, you will be able to make over your garden bit by bit.)



Activity M3

Search the Internet for garden design sites.

Look at the different kinds of paving slab and plan an unusual slabbed area.

Find out about different kinds of fencing. Make a shopping list of all the things you would need to put a new fence around your garden and work out how much it would cost.



Check it



Activity C1

What is 250 cm in m? m

Change 1.6 m to cm. cm

There are ml in a litre

1 cm³ is the same volume as



Activity C2

Work out the perimeters of these garden features.

| Item | Length | Width | Calculation | Perimeter | Units |
|------------|--------|-------|-------------|-----------|-------|
| Sandpit | 1.3 m | 1.8 m | | | |
| Window box | 90 cm | 30 cm | | | |
| Planter | 1.2 m | 90 cm | | | |
| Garden | 15.3 m | 6.9 m | | | |

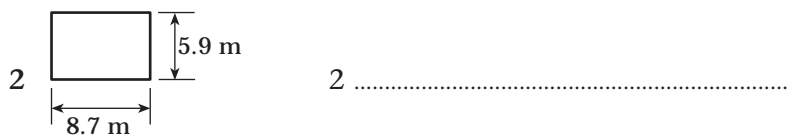
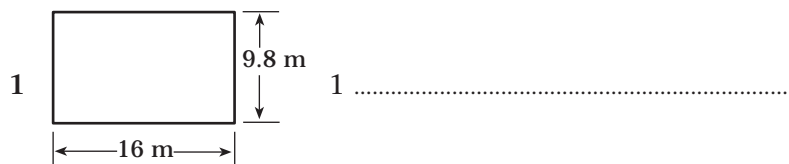


Activity C3



Work out the area of these gardens:

Use a calculator.



3 The length is 7.4 m and the width is 6.9 m

4 The length is 12.7 m and the width is 10.2 m



Activity C4

How many bags of compost will Anil need to fill each of these planters?

1 litre = 1 000 cm³
1 bag holds 35 litres.

| Length | Width | Height | Volume in cm ³ | Volume in litres | Number of bags |
|--------|--------|--------|---------------------------|------------------|----------------|
| 70 cm | 50 cm | 10 cm | | | |
| 120 cm | 90 cm | 12 cm | | | |
| 1 m | 140 cm | 15 cm | | | |
| 0.6 m | 25 cm | 23 cm | | | |
| 0.9 m | 58 cm | 30 cm | | | |

How am I doing?

Now look back at the skills listed on page 1.

Then complete the sentences below.

I am confident with

.....

.....

I need more practice with

.....

Date

Introduction to Activity 1

- 1 rectangle
- 2 8 yards
- 3 6 yards

Activity 1

- 1 Check your answers with your teacher.
- 2 90 cm. 10 cm or 0.1 m is left over.

Activity 2

- 1 a $3.5 \text{ m} + 4.5 \text{ m} + 4 \text{ m} = 12 \text{ m}$.
b They will need to buy 12 m of fencing.
- 2 a 10.5 m. b We must buy 11m of fencing.
- 3 $11.3 + 8.1 + 8.1 = 27.5 \text{ m}$. They must buy 28 m.

Introduction to Activity 3

- 6 m
They need to buy 3 lengths (or 4 if they do not wish to have joins on the sides).

Activity 3

- 1 $1.3 + 1.5 + 1.3 + 1.5 = 5.6 \text{ m}$
- 2 $1.3 + 1.6 + 1.3 + 1.6 = 5.8 \text{ m}$
- 3 $1.2 + 1.6 + 1.2 + 1.6 = 5.6 \text{ m}$
- 4 $1.4 + 1.5 + 1.4 + 1.5 = 5.8 \text{ m}$
- 5 a Any rectangle whose adjacent sides add to 3.0 m or a square of side 1.5 m. Check your answers with your teacher.
- 5 b Check your answers with your teacher.

Introduction to Activity 4

- 1 Check your answers with your teacher.
- 2 4 (or 5)
- 3 5 (or 4)
- 4 20
- 5 \times (multiplying)
- 6 23.4 m^2 They must buy 24 squares of turf.

Activity 4

| Surface | Length | Width | Calculation | Area in m^2 |
|--|--------|-------|-------------------|----------------------|
| Sandpit | 1.4 m | 1.6 m | 1.4×1.6 | 2.24 |
| Path | 3.6 m | 1 m | 3.6×1 | 3.6 |
| Area is measured in m^2 so ALL the lengths must be in metres before multiplying | | | | |
| Border | 2.4 m | 35 cm | 2.4×0.35 | 0.84 |
| Border | 3.6 m | 40 cm | 3.6×0.4 | 1.44 |
| Dry area | 5.2 m | 1.6 m | 5.2×1.6 | 8.32 |

Activity 5

- 1 Square, rectangle, hexagon, triangle
- 2 Probably square or rectangle
- 3 No
- 4 Check your answers with your teacher.

Introduction to Activity 6

- 1 4 in a row
- 2 3 rows in a layer
- 3 2 layers
- 4 24 cubes

Activity 6

| | | | |
|------|---------------------|-----|-----------------------|
| Anil | 2025 cm^3 | Sam | 1260 cm^3 |
| | 9000 cm^3 | | 252 cm^3 |
| | 1365 cm^3 | | 498.75 cm^3 |

Activity 7

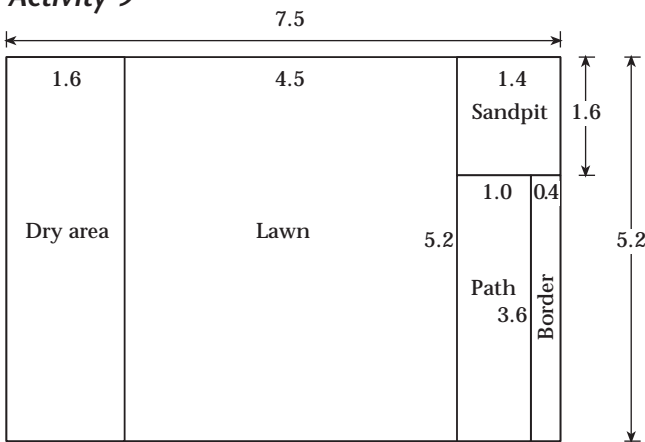
- 1 a Gravel is 0.1 m thick.
b Volume of gravel is $5.2 \times 1.6 \times 0.1 = 0.832 \text{ m}^3$
c Concrete is 0.08 m thick.
d Volume of concrete is $5.2 \times 1.6 \times 0.08 = 0.6656 \text{ m}^3$
- 2 a Length 1.4 m Width 1.6 m Depth 0.15 m
b Volume of sand is $1.4 \times 1.6 \times 0.15 = 0.336 \text{ m}^3$
- 3 Volume is $3.6 \times 1 \times 0.04 = 0.144 \text{ m}^4$



Activity 8

- 1 $70 \times 25 \times 15 = 26\,250 \text{ cm}^3$
- 2 $68 \times 28 \times 20 = 38\,080 \text{ cm}^3$
- 3 $50 \times 50 \times 30 = 75\,000 \text{ cm}^3$
- 4 Total $139\,330 \text{ cm}^3$
- 5 $139\,330 \text{ cm}^3 = 139\,330 \text{ ml} = 139.33 \text{ litres}$
- 6 a Sam should buy one 100 litre bag and one 50 litre bag or three 50 litre bags.
- b Yes
- c 10.67 litres will be left over.

Activity 9



Activity 10

Answers will vary.

Activity 11

- 1 a 4 tiles meet here. The corners are right angles.
- b 3 tiles meet here.

Help

Activity H1

| | Measurements of garden | Calculation needed | Fencing needed |
|---|------------------------|--------------------|----------------|
| 1 | 4 m by 7 m | $4 + 7 + 4 + 7 =$ | 22 m |
| 2 | 5 m by 3 m | $5 + 3 + 5 + 3 =$ | 16 m |
| 3 | 8 m by 6 m | $8 + 6 + 8 + 6 =$ | 28 m |

Activity H2

| Change these lengths from cm to m | | |
|-----------------------------------|--------|-------|
| 1 | 260 cm | 2.6 m |
| 2 | 170 cm | 1.7 m |
| 3 | 230 cm | 2.3 m |
| 4 | 510 cm | 5.1 m |
| 5 | 820 cm | 8.2 m |

| Change these lengths from m to cm | | |
|-----------------------------------|--------|--------|
| 1 | 0.5 m | 50 cm |
| 2 | 2.3 m | 230 cm |
| 3 | 0.15 m | 15 cm |
| 4 | 3.85 m | 385 cm |
| 5 | 0.05 m | 5 cm |

Activity H3

- 1 Perimeter $150 + 35 + 150 + 35 = 370 \text{ cm} = 3.7 \text{ m}$
- 2 Perimeter $30 + 30 + 30 + 30 + 30 = 150 \text{ cm}$
(or 5×30)
- 3 Perimeter $40 + 40 + 40 + 40 + 40 + 40 = 240 \text{ cm}$
(or 6×40)

Activity H4

| Calculation | Area |
|------------------|---------------------|
| $45 \times 18 =$ | 810 cm^2 |
| $15 \times 15 =$ | 225 cm^2 |
| $25 \times 19 =$ | 475 cm^2 |
| $48 \times 26 =$ | 1248 cm^2 |

Activity H5

| These shapes tessellate | These shapes do not tessellate |
|---|--------------------------------|
| square | circle |
| rectangle | pentagon |
| equilateral triangle | quadrilaterals |
| isosceles triangle | irregular hexagon |
| regular hexagon | |
| parallelogram (name will not be known) | |

Activity H6

Volume = $60 \times 15 \times 15 = 13\,500 \text{ cm}^3$
 $13\,500 \text{ ml} = 13.5 \text{ litres}$



Activity H7

- 1 $12 \times 8 \times 7 = 672 \text{ m}^3$
- 2 $10 \times 2 \times 0.15 = 3 \text{ m}^3$

Extension

Activity E1

- 1 Total of the 3 volumes = $150\,000 \text{ cm}^3 = 150\,000 \text{ ml} = 150 \text{ litres}$
Divide 150 by 35 = 4.29 bags – rounded up – she needs 5 bags (or equivalent calculation)

Activity E2

- 1 5 m^2 2 10 m^2 3 70 m^2 4 6 tins

Activity E3

- 1 a 1.5 m b 2 m
- 2 Perimeter is 16 m
- 3 11.75 m^2

Mini-projects

Activity M1

- 1 8.75 m^2
- 2 3062.5 g or 3.0625 kg
- 3 3 packs
- 4 Spread the last bit out farther

Activity M2

Ask your teacher to check.

Activity M3

Ask your teacher to check.

Check it

Activity C1

- 1 2.5 m 2 160 cm 3 1000 4 1 ml

Activity C2

| Item | Calculation | Perimeter | Units |
|------------|--|------------|---------|
| Sandpit | $1.3 + 1.8 + 1.3 + 1.8$ | 6.2 | m |
| Window box | $90 + 30 + 90 + 30$ $0.9 + 0.3 + 0.9 + 0.3$ | 240 2.4 | cm m |
| Planter | $120 + 90 + 120 + 90$ $1.2 + 0.9 + 1.2 + 0.9$ | 420 4.2 | cm m |
| Garden | $15.3 + 6.9 + 15.3 + 6.9$ | 44.4 | m |

Activity C3

- 1 156.8 m^2 2 51.33 m^2 3 51.06 m^2 4 129.54 m^2

Activity C4

| Length | Width | Height | Volume in cm^3 | Volume in litres | Number of bags |
|--------|--------|--------|-------------------------|------------------|----------------|
| 70 cm | 50 cm | 10 cm | 35 000 | 35 | 1 |
| 120 cm | 90 cm | 12 cm | 129 600 | 129.6 | 3.7 buy 4 |
| 1 m | 140 cm | 15 cm | 210 000 | 210 | 6 |
| 0.6 m | 25 cm | 23 cm | 34 500 | 34.5 | 0.99 buy 1 |
| 0.9 m | 58 cm | 30 cm | 156 600 | 156.6 | 4.5 buy 5 |