Teaching and Learning
Move On with your learners – numeracy

Module 7
Perimeter, area and volume

Session plan

Module 7: Perimeter, area and volume

Group: _____

Teacher: _____

Location: _____

Aim

- To introduce approaches to working out perimeter, area and volume of 2D and 3D shapes.

Outcomes

Participants will be able to:

- work out the perimeter of regular and composite shapes
- work out the circumference of circles
- work out the area of simple and composite shapes
- work out the volume of cuboids and cylinders.

Activity and time	Teacher activity	Learner activity
Introduction 20 mins	• Recap on last module, and explore any issues resulting from independent work. • Set the **Formulae** activity. • Ask for any examples of how skills and approaches acquired in the last session have been used during the week with learners. • Introduce this session's aims and objectives using **module 7 presentation slides 1–3**.	• Listen and respond. • Produce examples of any questions or problems they experienced difficulty with. • Complete task in pairs or small groups. • Provide examples of strategies they have used with their learners.

Activity and time	Teacher activity	Learner activity
Mental maths: visualisation 5 mins	• Explain the purpose of the task and read out the visualisation as described on the **Mental maths: 3D visualisation** activity sheet (or another one if preferred). • Confirm participants' understanding of the vocabulary required for the task.	• Individual activity. • Draw the shape of the new face.
Perimeter 20 mins	• Confirm participants' understanding of 'perimeter', and explore the problem of finding the perimeter of composite shapes using **module 7 presentation slides 4–9**. • Recap on units of measure by asking group to identify appropriate units of measure for large and small shapes, e.g. appropriate units to measure picture frames, gardens, football pitches, cities. • Give out **Perimeter** handout and ask participants to complete the **Finding the missing perimeter** activity.	• Listen and respond. • Contribute to discussion. • Paired activity. • Group feedback.

Activity and time	Teacher activity	Learner activity
Circumference 30 mins	• Clarify the definitions of circumference, diameter and radius. • Distribute the **Circles: relationship between the circumference and diameter** handout and explain the task. • Take group feedback and find the mean calculation resulting from the paired work. • Distribute the **Circumference of a circle** handout. • Show and discuss **module 7 presentation slides 10–15**. • Give out **Perimeter and circumference** activity sheet, and explain task. • Discuss answers.	• Listen and respond. • Complete task in pairs. • Contribute to discussion and activity. • Listen and respond. • Small group work; individual product.
Break 15 mins		
Area 15 mins	• Use **module 7 presentation slides 16–26** to explore finding the area of composite shapes. • Refer back to the **Finding missing perimeter** activity sheet and ask class to work out the areas of the extension and the conservatory. • Q and A: How do we calculate the area of a border? Model a method, using a concrete example. • Distribute **Finding the area of borders** handout.	• Listen and respond. • Complete task – paired work, individual product. • Listen and respond.

Activity and time	Teacher activity	Learner activity
Area of circles 25 mins	• Give out cm squared paper and cans. • Give out **Area of circles** activity sheet. • Explain task and discuss findings. • Refer back to the **Perimeter and circumference** activity sheet and ask participants to work out the area of each part of the garden.	• Complete task in pairs or small groups, and feed back results. • Calculate areas of rectangles and circles.
Area of triangles 10 mins	• Use Q and A and **module 7 presentation slides 27–28** to explore strategies for calculating the area of a triangle and discuss the strategies that the participants use with their learners.	• Contribute to discussion and provide examples.
Volume of cuboids and cylinders 30 mins	• Show **module 7 presentation slides 29–34**, and use the **Volume of cuboids** and **Volume of cylinders** handouts to support next activity. • Explain the **Nitromors versus Dulux Challenge** activity. • Pool answers and discuss.	• Listen and respond. • Complete activity in pairs or small groups.
Summary 10 mins	• Summarise learning points using **module 7 presentation slide 35**. • Distribute the **Inter-session tasks** handout and explain the task. • Set **National Test questions**: **Area, perimeter and volume:** for group homework and negotiate individual independent learning tasks. • Distribute **Journal** sheet for module 7.	• Listen and respond. • Agree independent learning tasks.

Resources/aids

- Module 7 PowerPoint presentation/OHP slides
- Handouts: Perimeter; Circumference of a circle; Finding the area of borders; Volume of cuboids; Volume of cylinders; Inter-session task: try it out on your learners; National Test questions: Area, perimeter and volume; Journal
- Activities: Formulae; Mental Maths – 3D visualisation; Finding the missing perimeter; Circles: relationship between the circumference and diameter; Perimeter and circumference; Area of circles; Nitromors versus Dulux Challenge
- Supplementary materials: Mental maths: 3D visualisation and Possible Visualisations; other resources for individual independent learning tasks
- Personal whiteboards and markers
- Flipchart and markers
- Cm squared paper; rulers; pens, pencils
- Cylindrical drinks and paint tins; cuboid paint stripper tins; string.

Assessment evaluation

Individual learning planning

Learner	Skills	Activity/ Resources	Evaluation (where next?)

Teacher's notes

Module 7: Perimeter, area and volume

Introduction

Recap on module 6 and ask for feedback on any issues resulting from the individual independent learning tasks. Go through any questions or concepts that presented difficulties from examples supplied by the participants. Distribute the **Formulae** activity sheet and explain the task. Use the activity to assess participants' understanding of what was covered in the last session and for consolidation: participants will be using formulae again during this session.

Mental maths: visualisation

This mental 'warm-up' is to help with 3D visualisation and using the vocabulary of 3D shapes. It comes from the Adult Numeracy Core Curriculum training materials, but you could create a different one if you think that the participants may already be familiar with it. You could also ask participants to devise a similar activity for their learners, and to present it at the next session.

Perimeter

Using Q and A, assess participants' understanding of 'perimeter'. When would we need to measure the perimeter of something in real life? (Measuring a perimeter fence, skirting board, etc.) Use **slides 4–8** to explore the concept of finding the missing perimeter measurements and explain that this is a common aspect of National Test questions involving measure. Review units of measure, introduced in module 5, and ask participants to identify appropriate units of measure for different situations. What units do we use for length, area, volume? Why? Relate 'numbers of dimensions' to m, m^2, m^3, and reinforce at every opportunity throughout the session.

Ask participants to work through the **Perimeter** handout and complete the **Finding the missing perimeter** activity in pairs.

Circumference

Using Q and A, establish the definition of **circumference** as the perimeter of a circle, **diameter** as the measurement across the circle at its widest point, and **radius** as the measurement from the centre to the edge. Where would we find, or need to find, these measurements in real life? (Spokes of a wheel, the centre circle of a football

pitch, etc.) What is the length of the diameter in relation to the radius? Ask someone to demonstrate how they could 'prove' this to one of their learners, using the resources available (paper, scissors, cans and tins to draw around, rulers, personal whiteboards or flipchart).

Distribute the **Circles: relationship between the circumference and diameter** handout and ensure that everyone understands the task. Participants work in pairs, measuring the circumference of a drinks can or paint tin among the selection available – you will need to provide a good range of different sizes of 'circles' so that people can see that the relationship between the circumference and the diameter – pi – stays the same whatever the size of circle. Ensure that the participants understand that string can be slightly elastic and is therefore not an accurate measuring tool, so their answers will be approximate.

Once every pair has worked out the number of times bigger the circumference is than the diameter of at least two circles, support the group in working out the average, recording the calculations and working out the mean of the whole group. (**Note:** Although the mean is the most familiar average, explain to the group that they haven't received any formal input on handling data yet, and remind them of when it appears in the programme.) The average should come somewhere close to 3.14. Ask whether anyone recognises this number. Distribute the **Circumference of a circle** handout. Reinforce with **slides 10–15** and the **Perimeter and circumference** activity.

Area

Use Q and A to explore understanding of area, and appropriate units, including the concept of 'squared' units. Can they estimate the area of the table? The room? How close were they? If there is time, or if you feel that the skills aren't secure, suggest that they calculate the actual areas using the tape measures supplied.

Use **slides 16–26** for consolidation, and ask participants to work out the areas of the conservatory and extension from the **Finding the missing perimeter dimensions** activity. Use Q and A, and a visual aid such as a flipchart or whiteboard, to discuss the issues involved in calculating the area of a border, modelling a method from the examples supplied by the participants (garden border, picture frame, etc.) and distribute the **Finding the areas of borders** handout.

Area of circles

Distribute squared paper and drinks tins or cans of the same size, and help participants with the **Area of circles** activity. Explain that in the actual test, a value for π will be supplied, although they will be expected to remember some of the formulae for calculating area and volume. Refer back to the **Perimeter and circumference** activity and ask participants to calculate the area of each section of the garden.

Area of triangles

Use Q and A and **slides 27 and 28** to explore strategies for calculating the areas of triangles. For example: draw a rectangle on the flipchart and label the length and width with its measurements. Ask what the area of the rectangle is. Then draw a diagonal line through the rectangle and ask what the area of this shape would be. Participants should be able to come up with the answer 'half', and then derive the formula for calculating the area of a triangle. Ask them to devise other strategies for helping their learners understand the formula. For example, demonstrate how you can cut a triangle from a rectangle (using one full edge of the rectangle as a base and cutting right across) and the 'extra bits' will fit exactly over the triangle.

Volume of cuboids and cylinders

Use **slides 29–34** to explain and discuss how you calculate the areas of cylinders and cuboids, and try to establish the concept of volume being the surface area of an 'end' of any regular shape multiplied by the depth, so that they are confident they are applying the same principle to each concept, even though the formulae are necessarily different. Supply participants with the **Volume of cuboids** and **Volume of cylinders** handouts for reference, and for support for the next activity. Stress the importance of supplying 'real' examples of both shapes to avoid confusion or vocabulary 'blank out'. Explain the **Nitromors versus Dulux Challenge** activity and ask participants to work in pairs or small groups. You could provide 5-litre tins (empty!) of both paint and paint-stripper, and put (removable) sticky labels over the quantity on both tins. After the activity, draw out the following points:

- What is the relationship between cubic centimetres and millilitres?
- Why is the tins' volume larger than the quantity displayed on the tins?
- What would you expect the volume of a tin of paint stripper to be that was the same 'end' surface area but twice the length (height? depth? – discuss the possibility of confusion presented by the vocabulary of measure for 3D shapes)?

Summary

Summarise the learning points using **slide 35** and invite discussion of any remaining issues or questions. Distribute **Inter-sessional task** and suggest that the participants adapt the task to the appropriate level for their learners to try, and report back next session. Set the **National Test questions** for group homework and set independent tasks from supplementary material according to individual needs and priorities.

Module 7 PowerPoint presentation

The National Certificate in Adult Numeracy

Level 2 Skills for Life Support Strategies

Module 7: Perimeter, area and volume

department for education and skills
creating opportunity, releasing potential, achieving excellence

Aim

- To introduce approaches to working out perimeter, area and volume of 2D and 3D shapes.

2

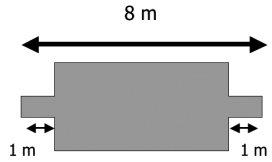
Outcomes

Participants will be able to work out:

- the perimeter of regular and composite shapes
- the circumference of circles
- the area of simple and composite shapes
- the volume of cuboids and cylinders.

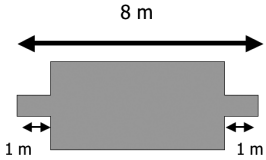
3

Finding 'missing' perimeter dimensions



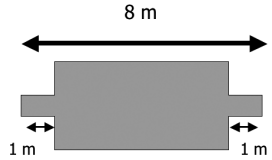
If we know that the total length of the shape is 8 m . . .

4



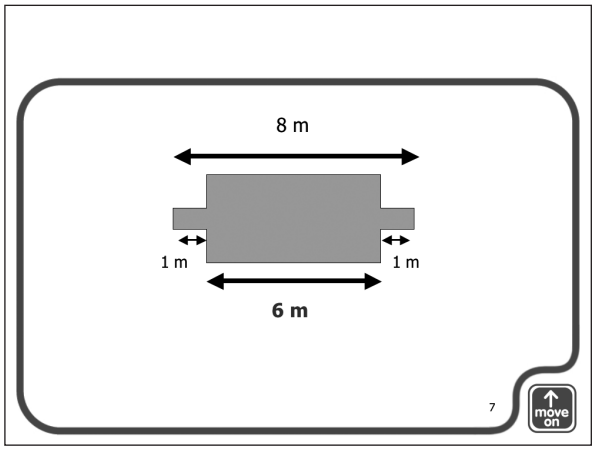
. . . and that the two smaller rectangles are both 1 m long . . .

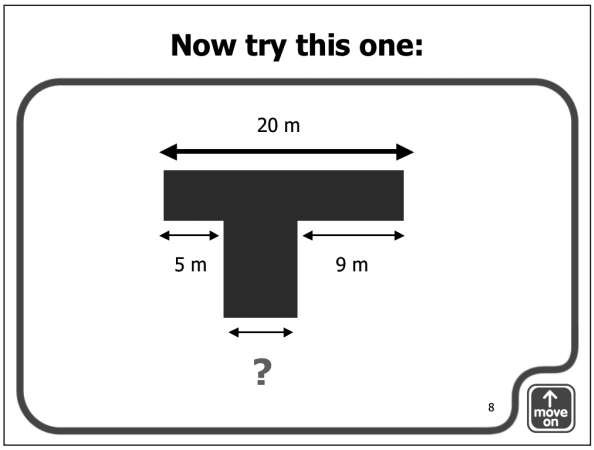
5

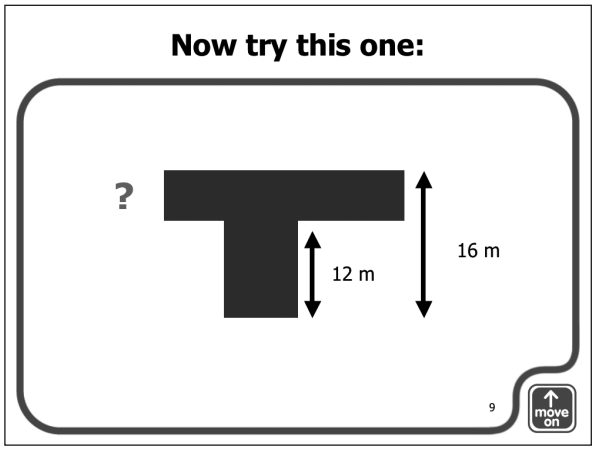


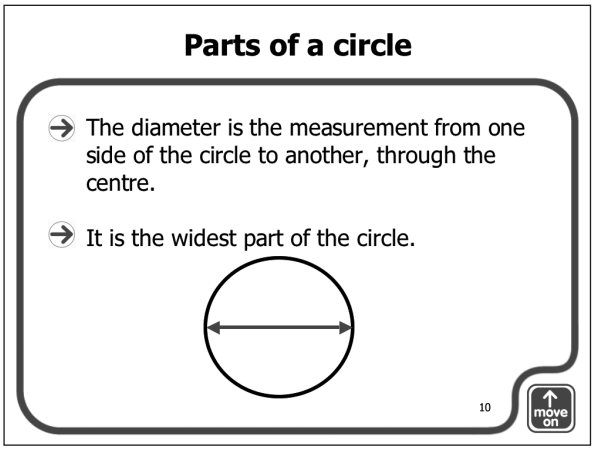
. . . then the length of the large middle rectangle must be . . .

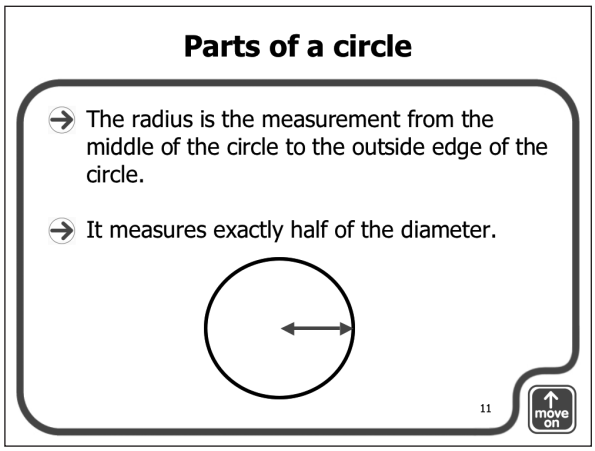
6

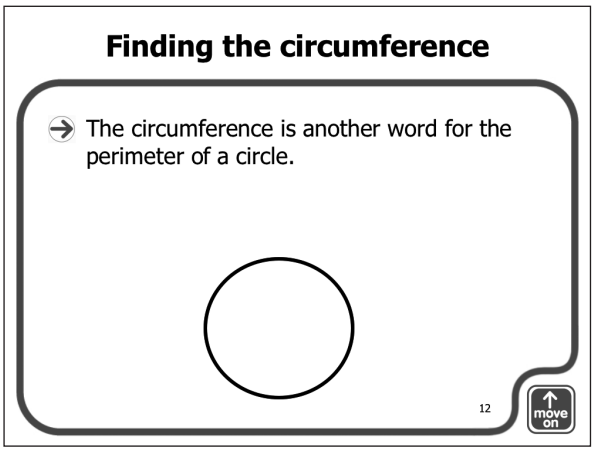

8 m
1 m
1 m
6 m
7
move on

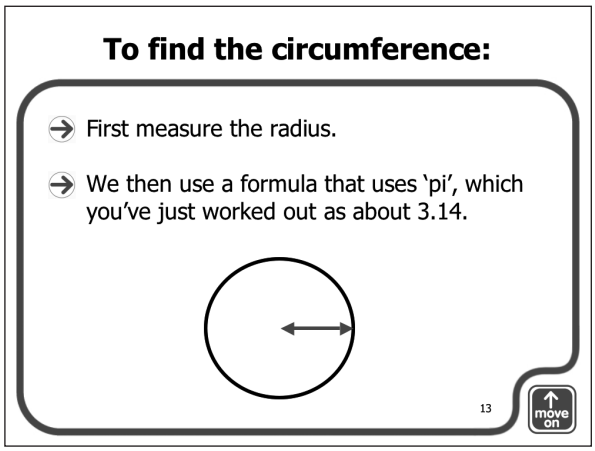

Now try this one:
20 m
5 m
9 m
?
8
move on

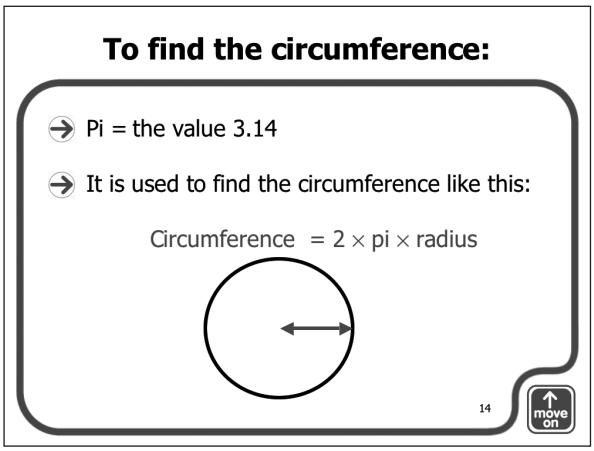

Now try this one:
?
12 m
16 m
9
move on


Parts of a circle
The diameter is the measurement from one side of the circle to another, through the centre.
It is the widest part of the circle.
10
move on


Parts of a circle
The radius is the measurement from the middle of the circle to the outside edge of the circle.
It measures exactly half of the diameter.
11
move on

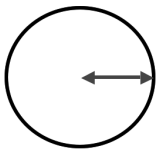

Finding the circumference
The circumference is another word for the perimeter of a circle.
12
move on


To find the circumference:
First measure the radius.
We then use a formula that uses 'pi', which you've just worked out as about 3.14.
13
move on


To find the circumference:
Pi = the value 3.14
It is used to find the circumference like this:
Circumference = 2 × pi × radius
14
move on

To find the circumference:

Circumference = 2 × pi × radius
Circumference = 2 × 3.14 × 5
= 6.28 × 5



Circumference = 34 cm

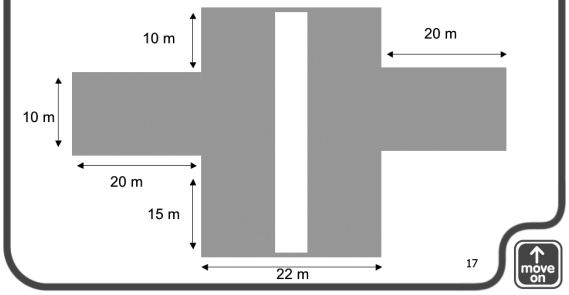
15

Finding the area of composite shapes

- Divide the shape up into separate rectangles.
- Find the area of each separate rectangle.
- Add the areas together to find the total area of the shape.
- First, you may have to work out 'missing' dimensions of the perimeter.

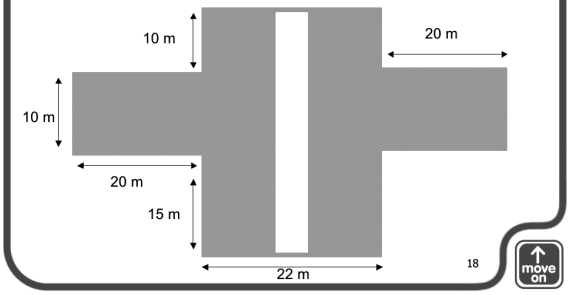
16

This is a plan of a conference centre. There is a centre aisle two metres in width in the middle of the building.



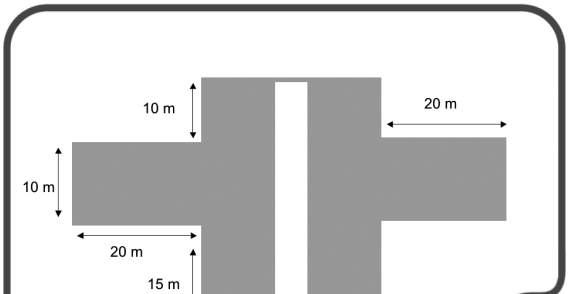
17

Each seat takes up a space of one square metre. How many seats could be placed in the conference centre?



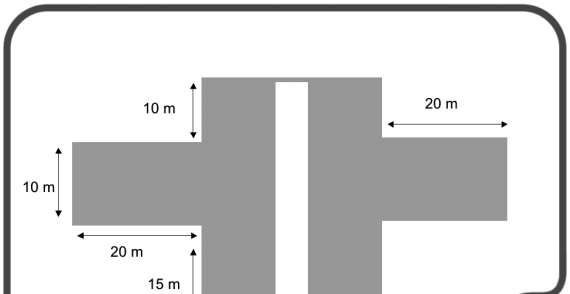
18

Think through ways of solving this task.



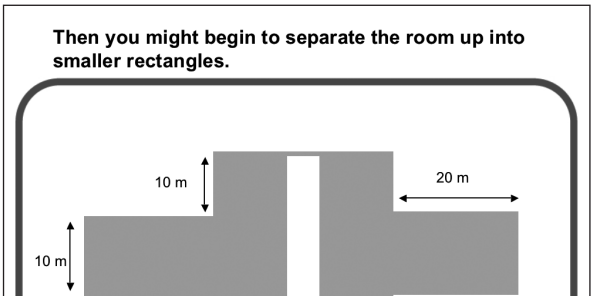
19

A starting point would be to work out the 'missing dimensions' of the perimeter.

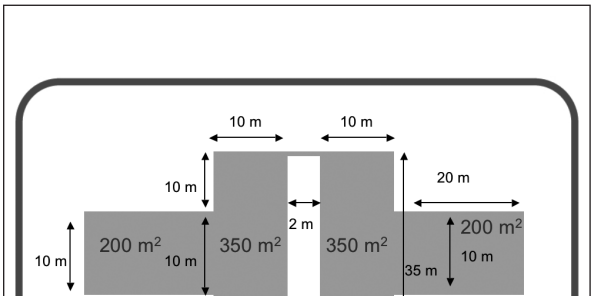


20

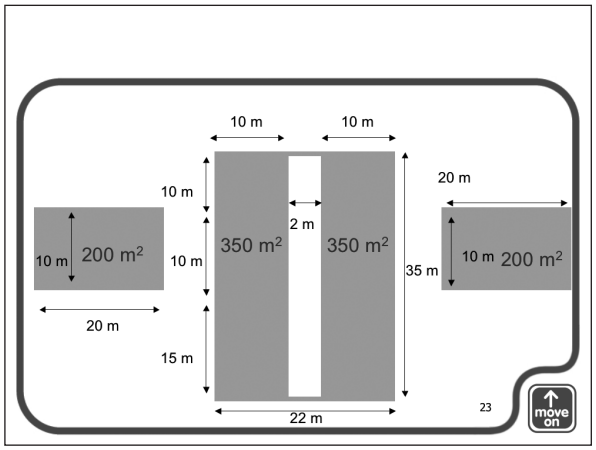
Then you might begin to separate the room up into smaller rectangles.

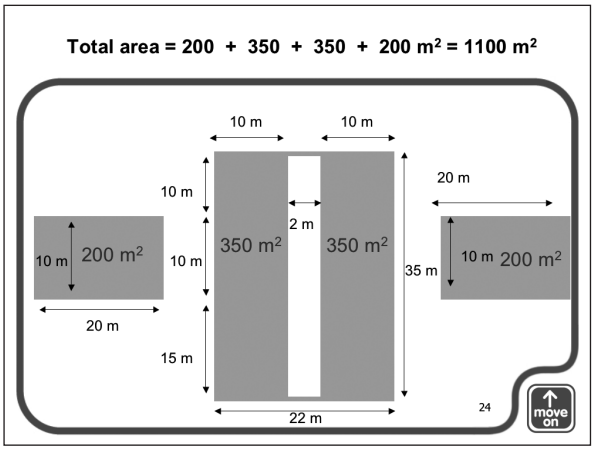


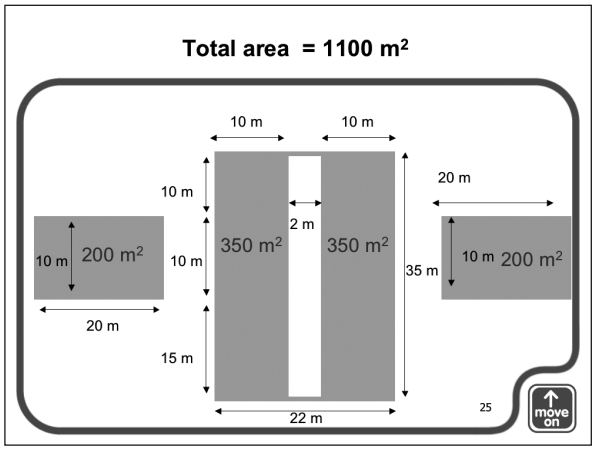
21

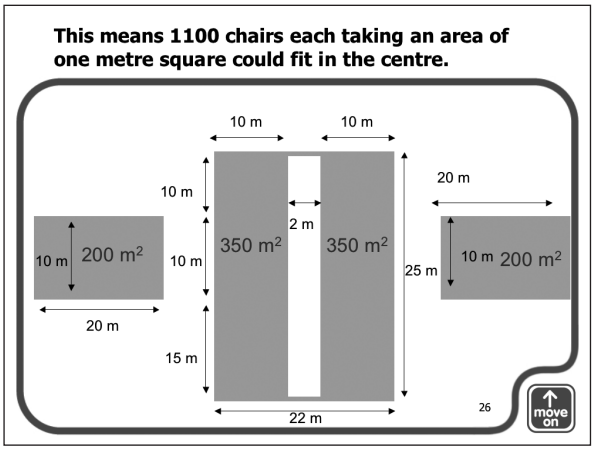


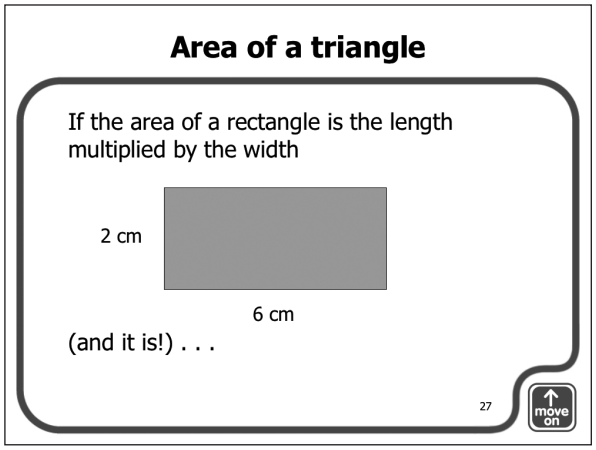
22

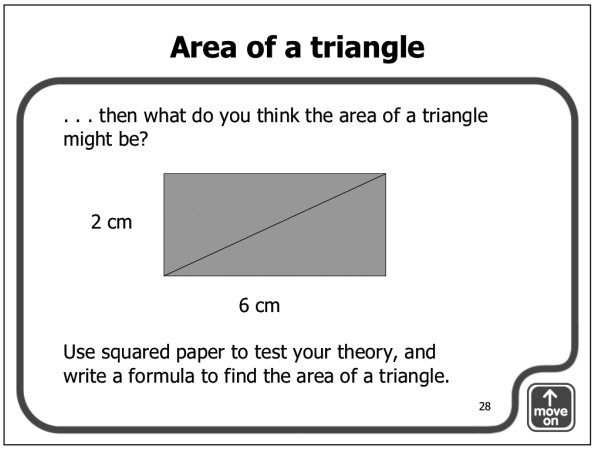

10 m
10 m
10 m
10 m
10 m
200 m²
350 m²
2 m
350 m²
35 m
20 m
10 m 200 m²
20 m
15 m
22 m
23
move on

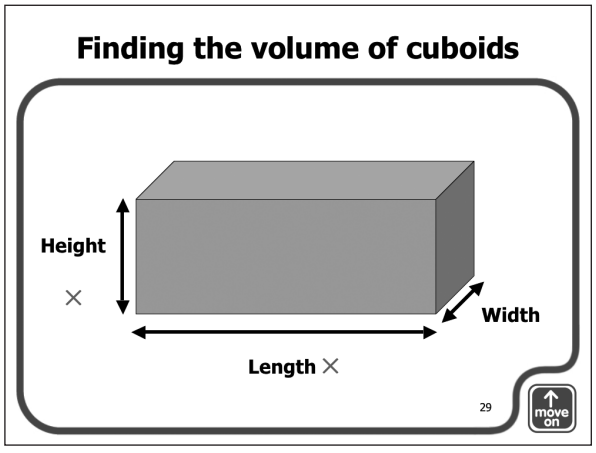

Total area = 200 + 350 + 350 + 200 m² = 1100 m²
10 m
10 m
10 m
10 m
10 m
200 m²
350 m²
2 m
350 m²
35 m
20 m
10 m 200 m²
20 m
15 m
22 m
24
move on

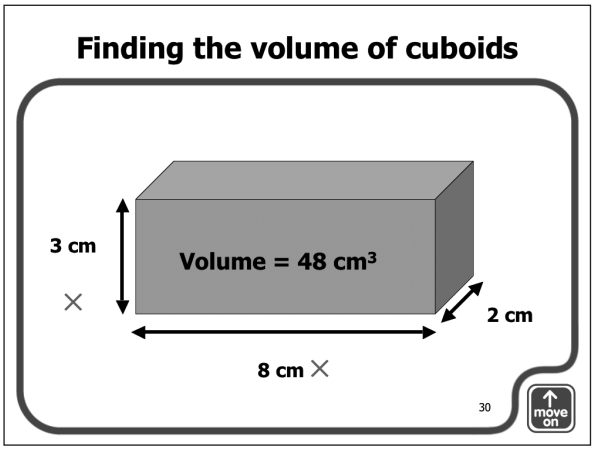

Total area = 1100 m²
10 m
10 m
10 m
10 m
10 m
200 m²
350 m²
2 m
350 m²
35 m
20 m
10 m 200 m²
20 m
15 m
22 m
25
move on


This means 1100 chairs each taking an area of one metre square could fit in the centre.
10 m
10 m
10 m
10 m
10 m
200 m²
350 m²
2 m
350 m²
25 m
20 m
10 m 200 m²
20 m
15 m
22 m
26
move on

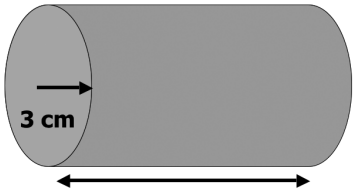

Area of a triangle
If the area of a rectangle is the length multiplied by the width
2 cm
6 cm
(and it is!) . . .
27
move on


Area of a triangle
. . . then what do you think the area of a triangle might be?
2 cm
6 cm
Use squared paper to test your theory, and write a formula to find the area of a triangle.
28
move on


Finding the volume of cuboids
Height
×
Width
Length ×
29
move on


Finding the volume of cuboids
3 cm
×
Volume = 48 cm³
2 cm
8 cm ×
30
move on

Finding the volume of cylinders



31

First, find the area of the circular face

Area of a circle = πr^2

32

Area of a circle = πr^2

Area = 3.14 × 3 × 3
Area = 3.14 × 9
Area = 28.26 cm ^{2}

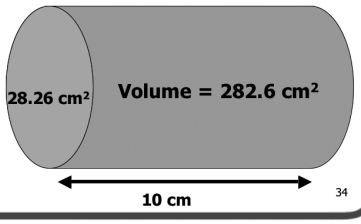
Radius = 3 cm
π = 3.14

33

To find the volume of the cylinder

Multiply the area of the circular face by the length of the cylinder.

Area (28.26 cm^2) × Length (10 cm)



34

Summary: perimeter, area and volume

- Where possible, use real, everyday examples of 2D and 3D shapes when supporting learners to understand these concepts.
- Allow learners to understand through exploring 'first principles' to avoid 'formulae panic'.
- Use visualisation 'warm ups' to develop 2D and 3D spatial awareness.
- Units, units, units!

35

Activity: Formulae

Choose the correct equation that fits the word problem.

Ivan has walked x miles. After another six miles he will have travelled 20 miles.	x + 20 = 6 x – 20 = 6 x + 6 = 20 x – 6 = 20
Jessica cycled y kilometres on Sunday. On Monday she travelled another 24 kilometres, travelling 54 kilometres in total.	y + 54 = 24 y – 24 = 54 y – 54 = 24 y + 24 = 54
My television cost £p. Geoff paid £260, £23 less than me.	p + 23 = 260 p – 23 = 260 p – 260 = 23
Aftab has £25. He buys two calculators at £c leaving him with £9.	2c + 25 = 9 2c + 9 = 25 9 – 2c = 25
Natasha was 170 kilometres away from home. She drove at 40 kilometres per hour for h hours and was still 50 kilometres from home.	4h – 50 = 170 40h – 170 = 50 40h + 50 = 170

Activity: Mental maths – 3D visualisation

Visualisation activities fit well into the oral and mental starter for a session. Some people really struggle to visualise, particularly in three dimensions, which will make tackling some areas of the measures, shape and space part of the curriculum harder for them.

Here is an example of one that you might want to use with your learners:

Imagine a square-based pyramid, made out of modelling clay, in the air in front of you. Ask yourself a few questions (but keep the answers to yourself).

- How many corners or vertices has the shape?
- How many edges?
- How many faces? Are the faces all the same shape?

Now imagine a cube, with square faces the same size as the base of your pyramid, also floating in space.

Slide your pyramid until it sits on top of the cube, with its base exactly in line with the top of the cube. Ask yourself some questions about the new solid.

- How many vertices does it have?
- How many edges?
- How many faces? Are they all the same shape?

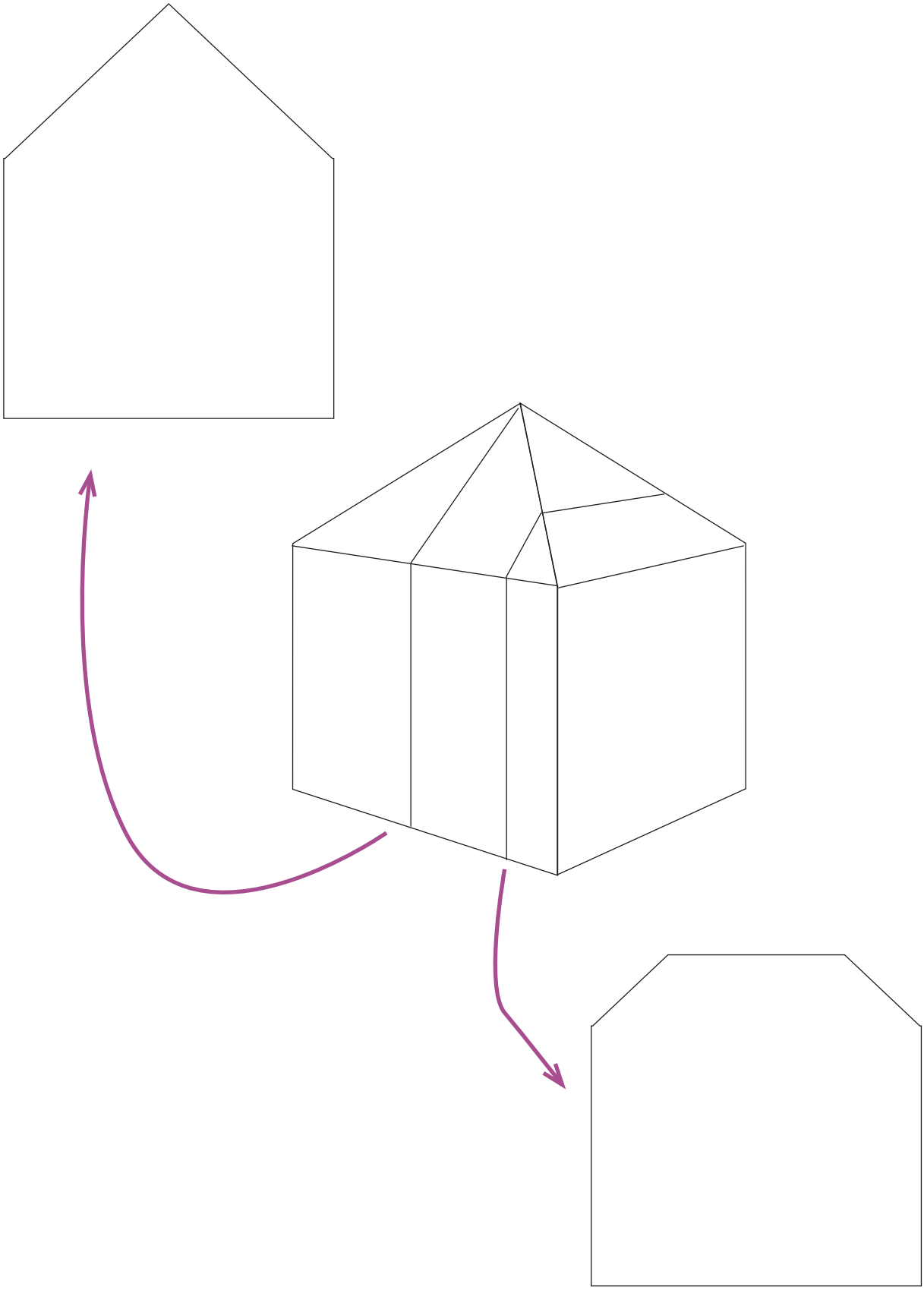
Now imagine a sharp knife making a vertical cut through the solid, from the top to the bottom.

Examine one of the pieces you now have and look at the face created by your cut.

Without saying anything, open your eyes and sketch the shape of this new face. Now compare your drawing with others.

Based on an activity from Adult Numeracy Core Curriculum training materials.

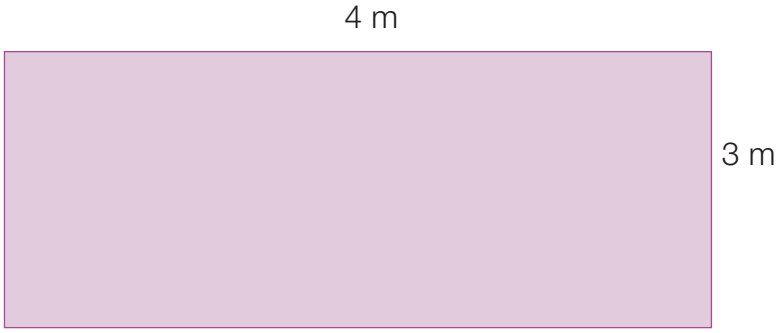
Possible visualisations



Handout: Perimeter

The **perimeter** of a 2D shape is the measurement of its outside edges added together.

For simple rectangles, we simply add the length and the width of all sides.



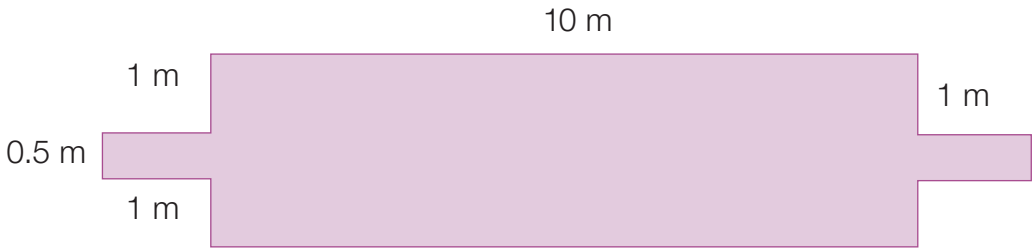
In this example the perimeter would be:

length + width + length + width

or 4 m + 3 m + 4 m + 3 m

= 14 m

For irregular shapes, we use the same method – we simply add together the measurements of all the sides.



Tips for learners

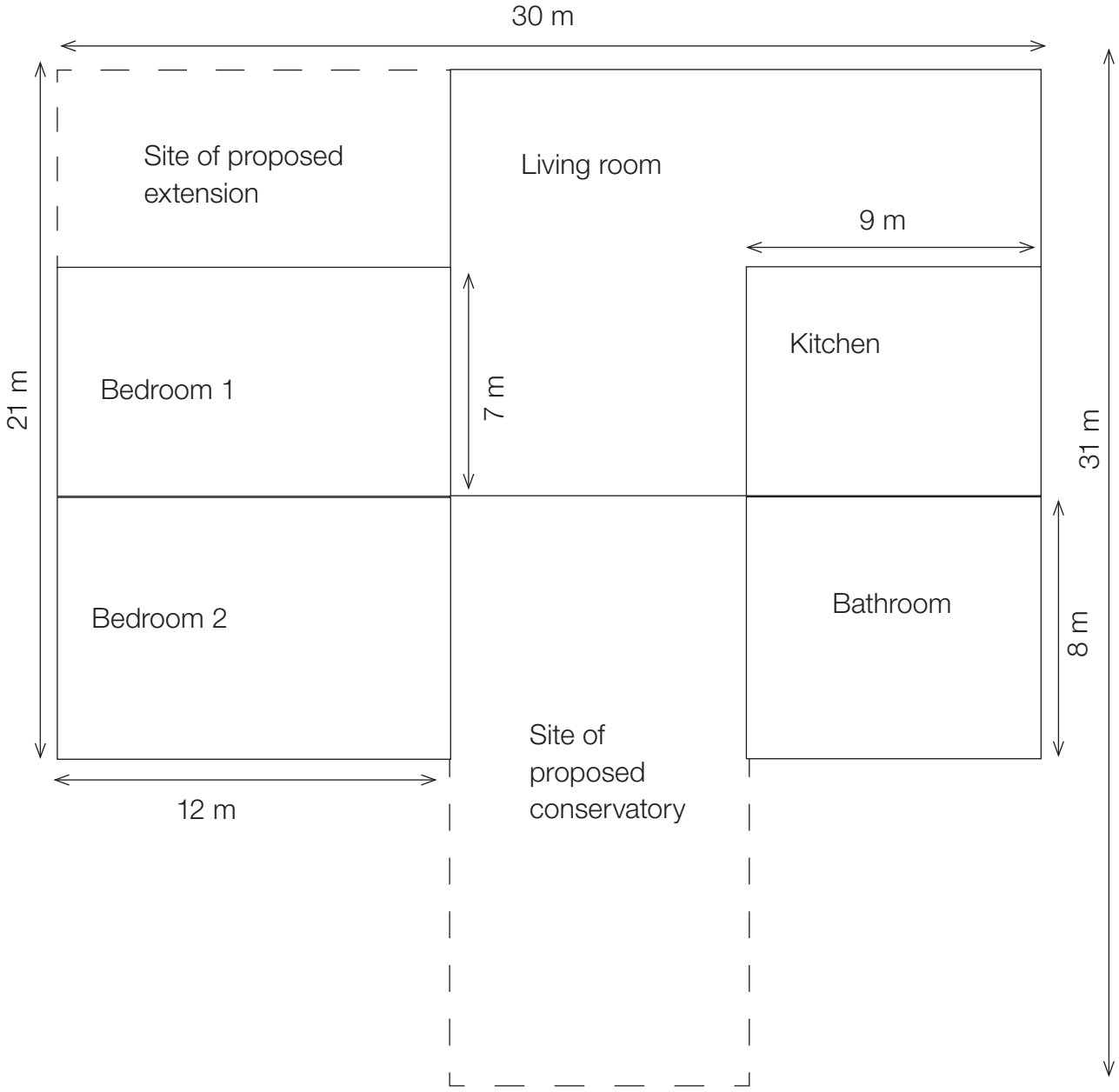
It can help learners to put a mark in the corner they start counting from, and work clockwise around the shape.

Activity: Finding the missing perimeter

Have a look at the plan of the bungalow below.

You want to work out whether there is space for an extension and conservatory, but parts of the dimensions are missing.

In pairs, work out the missing parts of the perimeter. As you do so, note down the method you use.



Activity: Circles – relationship between circumference and diameter

Examine the examples of 'circles' provided (drinks cans, paint tins etc.).

The perimeter of a circle has a particular name: the **circumference**.

The **diameter** of the circle is the measurement from edge to edge, through the centre, and the **radius** is half of this – the distance from the centre to the edge.

The bigger the circle, the bigger the diameter. The circumference increases in **proportion** to the diameter.

Measure the diameter of a can or tin (the widest part). Using the string, measure the circumference (as accurately as you can, but this will be a rough measurement!).

Length of diameter:

Length of circumference:

Note: You need to work in the same units for both measurements.

How many times bigger is the circumference than the diameter, approximately? (Hint: This is the same as asking how many times can you divide the length of the diameter into the length of the circumference? Use a calculator and record your answer to two decimal places.)

Try it with a different size of can or tin.

Once everyone has done this, we'll work out the average answer we get when we divide the circumference of any circle by the diameter.

Group's average (mean):

Ring any bells?

Based on your observations, can you write a formula for working out the circumference of any circle?

Tip for learners

Learners often underestimate the circumference of circles. Using string as a kinaesthetic way of measuring can help learners to more accurately estimate the circumference.

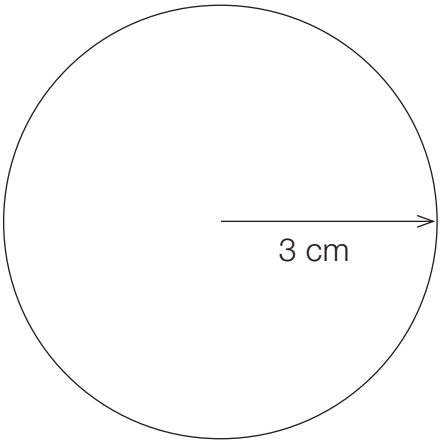
Handout: Circumference of a circle

When we measure the distance of a circle's outside edge, we are finding its **circumference**. It is the specific word for the perimeter of a circle.

As you have proved to yourself by completing the previous activity: **Circles – relationship between the circumference and diameter**, the length of the circumference is in direct proportion to the length of the radius.

The **diameter** is the distance from one side of the circle to the other through the centre. The **radius** must be half of this (look at the picture below).

The circumference is the diameter (radius × 2) multiplied by **pi.** You have just discovered that pi = 3.14 (rounded to two decimal places). (In maths, pi is written using the symbol π.)



Here, the radius of the circle is 3 cm.

The formula for working out the circumference of any circle is:

Circumference = diameter × pi

= 2 × radius × 3.14

So in this example, the circumference = 2 × 3 cm × 3.14 = **18.84 cm.**

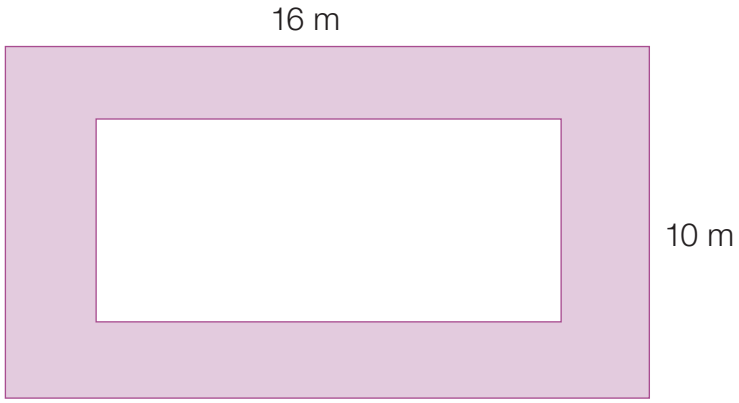
To work out the circumference of a circle, we are therefore using this formula:

Circumference = 2πr

It is worth learning this formula to find the circumference – it is one of the few formulae you might be expected to know for the test.

Handout: Finding the areas of borders

Sometimes we will have to find the area of a border – for example the area of paving around the outside edge of a rectangular lawn like this:



The border is 2 m deep.

We find the area of the shaded border by subtracting the area of the smaller rectangle from the area of the larger rectangle.

In this case, the larger rectangle measures 16 m by 10 m.

So Area $= L \times W$

$= 160\ m^2$

We now have to find the area of the smaller rectangle. To get the dimensions of the smaller rectangle, we have to subtract 2 m for the shaded border from each side of the large rectangle.

The smaller rectangle measures 16 m – 2 m – 2 m = 12 m

by 10 m – 2 m – 2 m = 6 m

Area of small rectangle $= L \times W$

$= 12 \times 6\ m$

$= 72\ m^2$

We can now find the area of the border:

Area of large rectangle $160\ m^2$

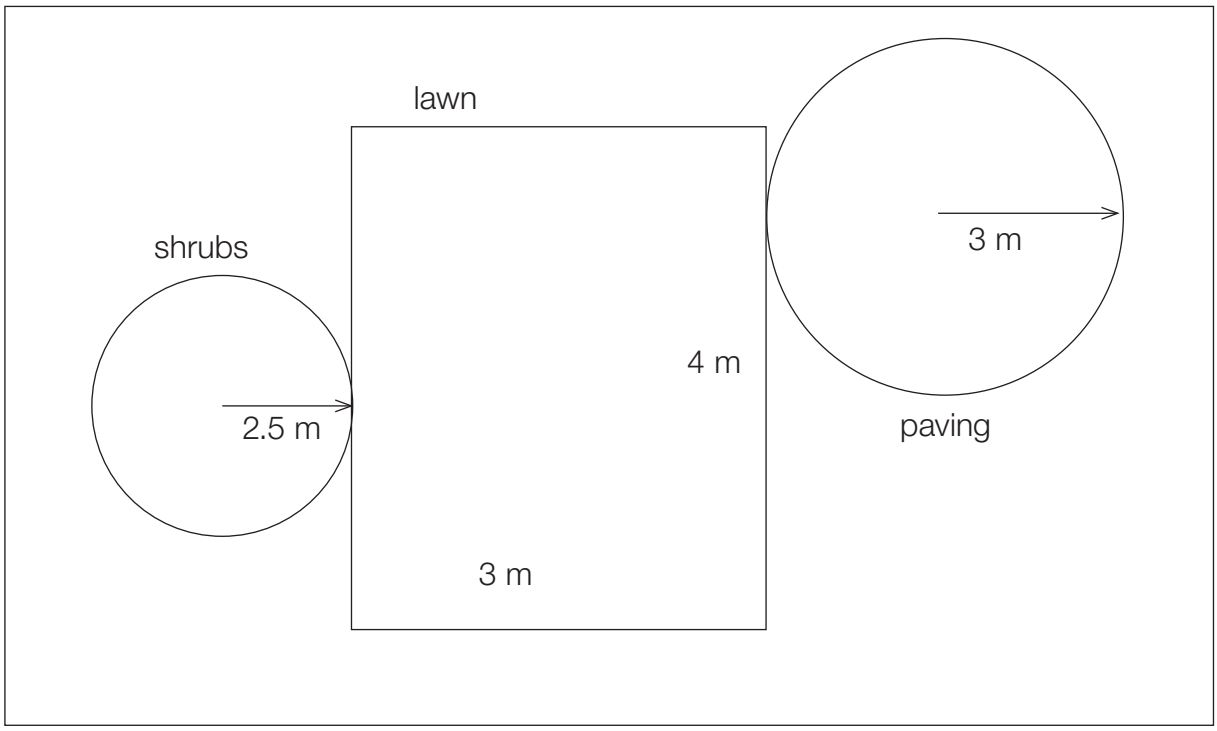
Subtract area of small rectangle $72\ m^2$

Border = 88 m²

Activity: Perimeter and circumference

You are planning to landscape your garden, and you want to put fencing around the different sections of the garden.

Here is a plan of the garden:



What is the total length of fencing you will need?

Shrubs

Lawn

Paving

Total:

Activity: Area of circles

Draw around the circular edge of the can onto the squared paper provided. Count the number of whole square centimetres. You may have to add on the partially drawn square centimetres by estimating their area.

Next, work out the area using this formula:

$$\text{Area} = \text{pi} \times \text{radius}^2$$

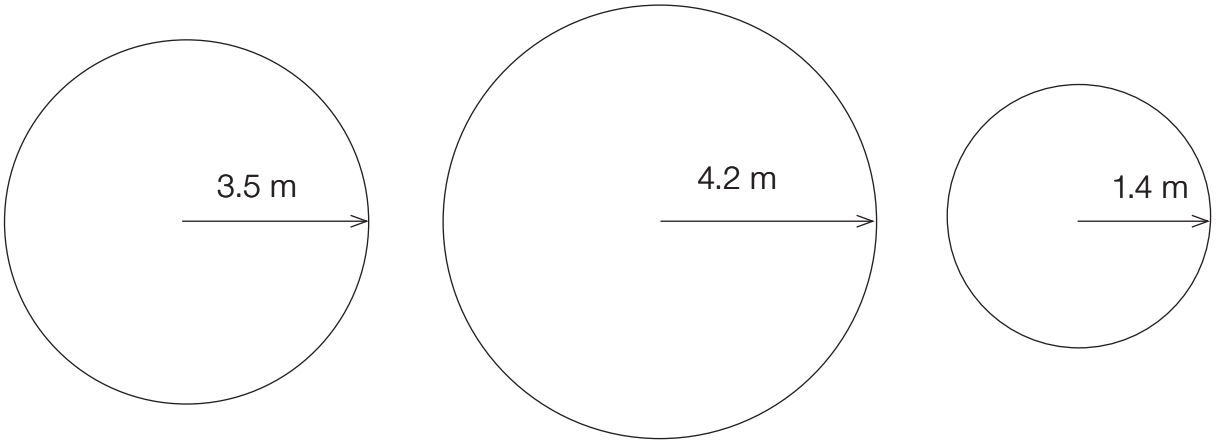
or $$A = \pi r^2$$

where $\pi = 3.14$.

Compare your answers.

Are they similar?

Now have a go at working out the areas of these circles (not drawn to scale):



Handout: Volume of cuboids

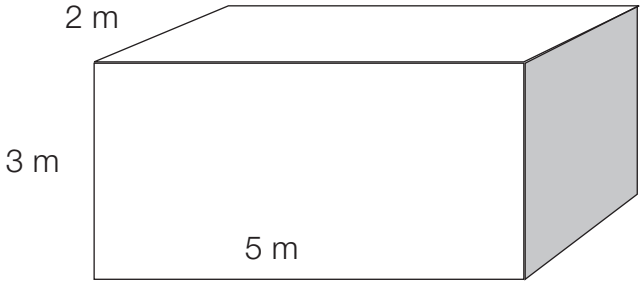
To measure the amount of space inside a 3D shape, we need to find its volume. Volume is measured in the number of cubic units that would fit inside the 3D shape.

You could visualize this by imagining the number of cubic tea chests that would fit inside a shipping container, or the number of cooking stock cubes that fit perfectly inside a box.

To find the volume of a cuboid, we multiply the length by the height by the width.

As a formula this is: $V = L \times H \times W$

Example:



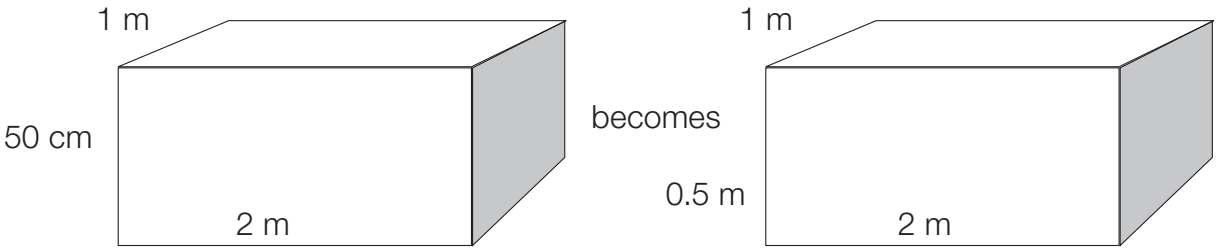
This cuboid has a length of 5 m, a height of 3 m and a width of 2 m:

$$\text{Volume} = L \times W \times H$$
$$= 5 \times 3 \times 2$$
$$= 30 \text{ m}^3$$

This means that we could fit 30 cubic metre tea chests exactly into the box.

Make sure that all the units of measure are the same before you start multiplying.

So:



Handout: Volume of cylinders

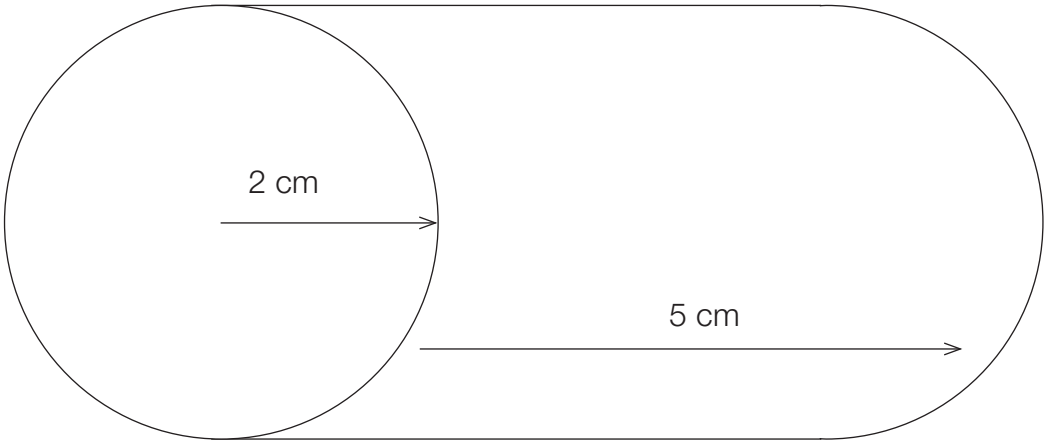
To find the volume of cylinders, we use the same approach as when we wish to find the volume of a cuboid.

To work out the volume of the cylinder we use the formula:

Volume = area × length,

or $V = A \times L$

Look at this example:



We find the area of the circular face of the cylinder using this formula:

$A = \pi r^2$

$A = 3.14 \times 2^2$ cm^2

$A = 3.14 \times 4$ cm^2

Area = 12.56 cm^2

Volume of cylinder = area of circular face × length of cylinder

= 12.56 cm^2 × 5 cm

= 62.8 cm^3

Note: When measuring capacity, 1 cm^3 is equivalent to 1 ml, so 1 litre = 1000 ml or 1000 cm^3 (and 62.8 cm^3 = 62.8 ml).

Activity: Nitromors versus Dulux Challenge

Part 1

Using an empty paint can, measure its circumference by accurately wrapping string around the circular edge of the can.

What is the length of the string?

Now, with a ruler, measure the diameter of the can.

Halve the diameter to get the radius.

Work out the circumference using this formula:

$$\text{Circumference} = 2 \times \text{pi} \times \text{radius}$$

or $$C = 2\pi r$$

Are your answers similar?

Part 2

Next, work out the area of the circular end of the can.

Use the formula:

$$\text{Area} = \text{pi} \times \text{radius}^2$$

or $$A = \pi r^2$$

Now, draw around the circular edge of the can onto the squared paper provided. Count the number of whole square centimetres. You may have to add on the partially drawn square centimetres by estimating their area.

Compare your answers when you have counted the squares. Are they similar?

Part 3

Finally, work out the volume of the can.

First, measure the length of the can.

Work out the volume of the can using this formula:

$$\text{Volume} = \text{area} \times \text{length}$$

or $$V = A \times L$$

Look at the capacity of the can shown on its label. What do you notice?

Handout: Inter-session task (try out on your learners)

Note: Here's an activity to try out with your learners. You will need to adapt it for different levels. Different brands of stock cubes come in different sizes, so you will need to plan ahead. The easiest to work with (with a very famous brand name) are two-centimetre-square cubes.

Activity: Integrated area and volume

In small groups, examine the box of cooking stock cubes. Do not open the box yet!

Look at the end of the box.

Measure its length and width.

What is the area of the ends of the box?

How could you write this as a formula?

Now, measure the length of the box.

What is the formula to work out the volume?

What is the volume – and what units do you use to give your answer in?

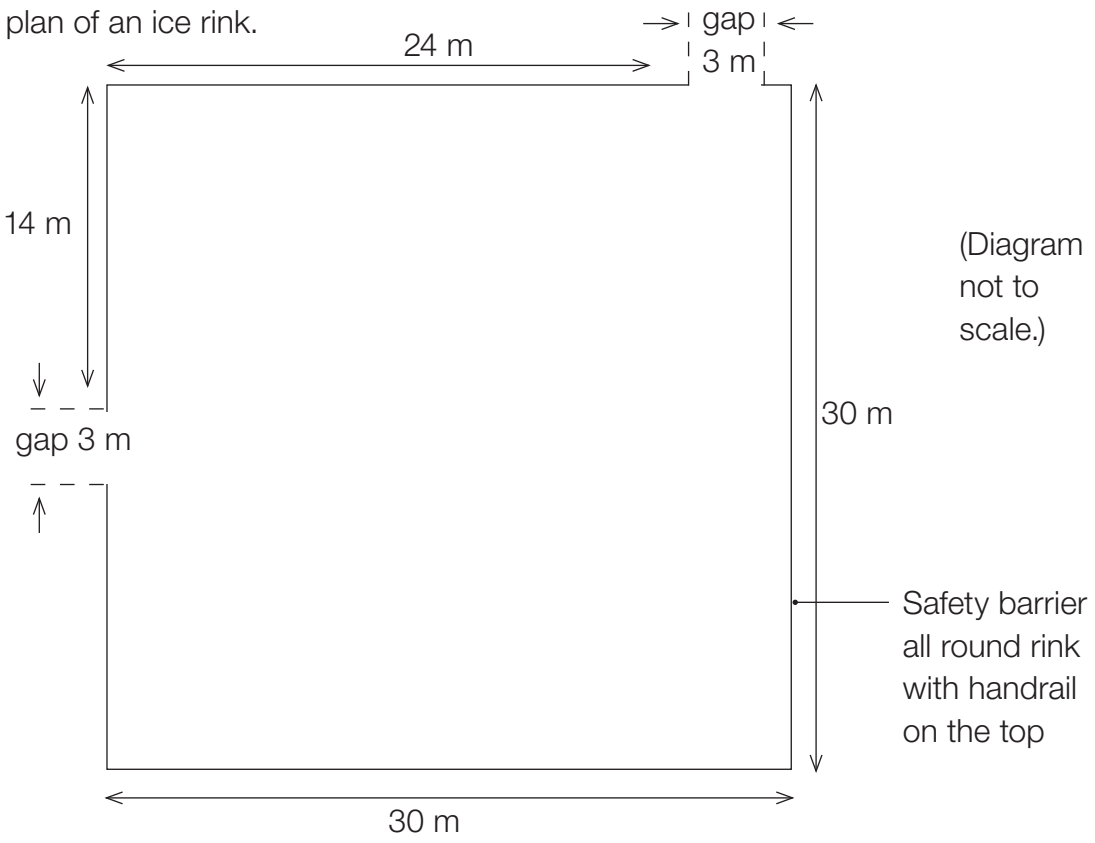
Now, open the box and take out one stock cube. Work out the volume of one cube by the same method that you used to work out the volume of the box.

Using your answer, work out how many cubes you should be able to fit in the box (how many times does the volume of one cube 'go into' – literally – the volume of the box?)

Do your answers correspond?

Handout: National Test questions (Numeracy Level 2 – Area, perimeter and volume)

This is a plan of an ice rink.



1 The ice is 10 centimetres thick. What is the volume of ice in the ice rink?

A 12 m^3

B 90 m^3

C 1 200 m^3

D 9 000 m^3

2 There is a safety barrier all round the ice rink, with two gaps for access. There is a handrail along the top of the safety barrier. The manager wants to replace the handrail. What length of handrail does she need?

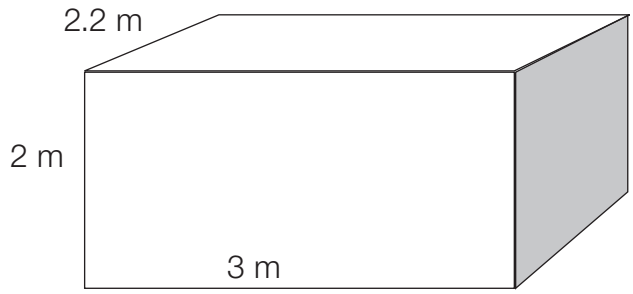
A 98 m

B 104 m

C 114 m

D 120 m

3 The diagram shows the dimensions of a waste container.



(Diagram not to scale.)

What is its volume?

A 7.2 m^3

B 13.2 m^3

C 17.0 m^3

D 21.6 m^3

4 A shopkeeper's freezer has baskets. The shopkeeper arranges the ice cream blocks to fit as many as he can into the basket. What is the maximum number of ice cream blocks he can fit into the basket?

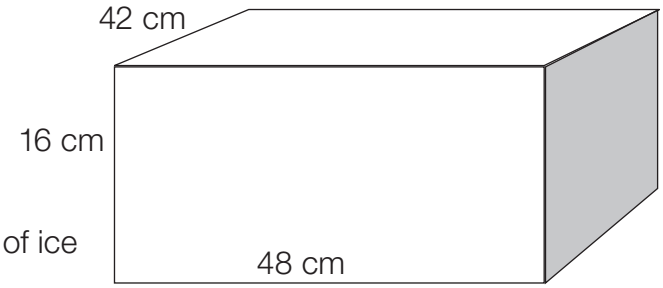
A 6

B 8

C 12

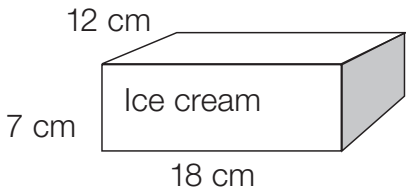
D 16

Freezer basket



(Diagram not to scale.)

The shopkeeper packs one basket with blocks of ice cream.



Journal

Module 7: Perimeter, area and volume

What have you learnt from this module?

How will you apply skills/strategies learnt with learners within your organisation?