Fences Right Round Shapes

Teacher		**Class**	Year 3
Subject	Maths	**Topic**	Perimeter
Date		**Room**	
Lesson length	60 minutes	**Country**	United Kingdom

Pupils learn that perimeter is the distance round a shape. They measure sides in centimetres and add them to find it.

Curriculum links

- measure the perimeter of simple 2-D shapes

Learning objectives

- Students will measure each straight side of simple 2-D shapes in centimetres.
- Students will add all side lengths together to find the perimeter.
- Students will explain perimeter as the distance all round a shape.

Success criteria

- I can measure each side to the nearest centimetre.
- I can add all the sides to find the perimeter.
- I can say perimeter is the distance round a shape.

What students already know

Hold up a card square and ask: how many sides, how many corners, and how could we check how far it is right round the edge?

Key words

perimeter	the distance all round the outside of a shape [4]
centimetre	a small unit for measuring length, written as cm [4]
side	one straight edge round a shape
rectangle	a shape with four corners where opposite edges are equal [3]
square	a shape with four edges that are all the same length [3]

Materials

- card rectangles, triangles and squares with whole-centimetre sides
- short strings, one per pair
- rulers and pencils
- Slides 1, 2, 3, 4, 7, 8, 9, 10, 11, 12
- Worksheet Task B copies

Before the lesson

- Print Worksheet Task B, one copy per pupil, and spare card shapes.
- Mark a start dot on each card shape and check sides measure whole centimetres.
- Test Slide 8 and Video clip 3 (0:00–1:57) plays with sound.
- Set out strings, rulers and pencils for pairs and clear floor space.

Lesson outline

0–10 min **Starter** 10 min · Whole class

To hook pupils with the fence idea and recall that perimeter is the way round.

YOU DO

1. Hold up a card rectangle with string round its edge and ask the hook question.
2. Show Slide 1, then Slide 4 and trace a finger right round the shape.
3. Ask pupils to trace the edge in the air while you say the big idea.
4. Take quick answers on what we are measuring when we go all round.

STUDENTS DO

1. Look at the string fence and listen to the question.
2. Trace the edge in the air and join in saying the big idea.
3. Answer what is being measured when we go all round.

Say: If this string was a fence right round the shape, how long would the fence have to be? Today we measure that fence length. Perimeter is the walk all the way round a shape.

Ask: Where does the walk start and stop when we find the perimeter? (Start at one corner and go right round until back at the start.) · What are we finding when we go right round the edge? (The perimeter, the distance around the outside of a 2D shape [4].)

Check understanding: Thumbs up if you can point all round the edge without missing a bit; re-trace slowly if many are unsure.

Support: Let pupils point to each side of a big card shape and count sides 1, 2, 3, 4 aloud. **Stretch:** Ask what would happen to the fence length if one side was made longer.

Use: Slides 1, 4

10–20 min **Teaching** 10 min · Whole class

To model how to measure each side in centimetres and add them for perimeter.

YOU DO

1. Show Slide 2 and explain peri means around and metron means measure.
2. Show Slide 3 and Slide 7 to compare square, rectangle and triangle sides.
3. Play Video clip 3 (0:00–1:57) on Slide 8 to show ruler start and counting every side once.
4. Model measuring a rectangle and adding the four sides on the whiteboard.

STUDENTS DO

1. Watch the video and say where the ruler starts.
2. Chant the four side lengths and the addition with the teacher.
3. Tell a partner why we count four sides, not two.

Say: Perimeter is the total distance around the edge of a figure or shape [3]. To work out the perimeter, add up the lengths of all the sides together [4]. In a rectangle opposite sides are equal [3], but we still count every side once.

Worked example: Rectangle labelled 5 cm, 4 cm, 5 cm, 4 cm. Step 1: measure each side to nearest cm. Step 2: write 5 cm + 4 cm + 5 cm + 4 cm. Step 3: add 5+4+5+4 = 18. Step 4: write 18 cm. So 10cm + 5cm + 10cm + 5cm = 30cm shows the same adding idea [3].

Ask: A rectangle is 5 cm long and 4 cm wide. What addition gives its perimeter? (5 cm + 4 cm + 5 cm + 4 cm = 18 cm.) · All the sides of a square are equal [3]. If one side is 4 cm, what is the perimeter? (4 cm + 4 cm + 4 cm + 4 cm = 16 cm.) · What unit do we write for this perimeter? (Centimetres, cm, because perimeter is measured in centimetres and metres [1].)

Check understanding: Show mini whiteboards with 5+4+5+4=18 cm; re-model ruler placement if totals differ.

Support: Mark the starting corner with a dot and tick each side 1 to 4 as it is measured. **Stretch:** Ask pupils to say the shortcut: double one long and one short, because opposite sides match.

Use: Slides 2, 3, 7, 8; Video clip 3 (0:00–1:57)

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20–40 min **Main activity** 20 min · Pairs

To measure card shapes in centimetres and add the sides to find each perimeter.

YOU DO

1. Show Slide 9 and Slide 10 and read the steps to success together.
2. Give each pair card rectangles, triangles and squares, string, ruler and pencil.
3. Remind pairs to wrap string round, then measure each straight side to nearest cm.
4. Circulate, checking ruler starts at 0 and every side is added once.

STUDENTS DO

1. Wrap string right round a card shape, then straighten it against the ruler.
2. Measure each straight side to the nearest centimetre and write each length.
3. Add up the lengths of all the sides together to check it matches the string [4] and write the total with cm.

Say: Measure each side in centimetres. Write each length down. Add all the sides together. Measure 3 paper shapes with a ruler and find each perimeter.

Worked example: Square side 3 cm. Write 3 cm + 3 cm + 3 cm + 3 cm = 12 cm. Triangle sides 4 cm, 5 cm, 6 cm. Write 4 cm + 5 cm + 6 cm = 15 cm. Check string length matches the total.

Ask: You measured 5 cm, 4 cm, 5 cm. What must you do next for this rectangle? (Measure the last 4 cm side, then add 5 cm + 4 cm + 5 cm + 4 cm = 18 cm.) · How do you know you have counted every side once? (Start at the dot, tick 1, 2, 3, 4 round the shape back to the start [9].)

Check understanding: Stop at 10 minutes: pairs read one number sentence aloud; correct ruler position on the spot if needed.

Support: Give shapes with whole centimetre sides and only three or four sides, with start dots marked for where to place the ruler. **Stretch:** Ask pupils to predict the last side before measuring, using what they notice about the other sides.

Use: Slides 9–10

40–52 min **Worksheet practice** 12 min · On their own

To practise adding given side lengths accurately with correct units.

YOU DO

1. Hand out Worksheet Task B and read the instruction together.
2. Remind pupils to write cm each time and add every side.
3. Let pupils work alone for 9 minutes on the perimeters.
4. Spot-check books for full number sentences and units.

STUDENTS DO

1. Work through Task B, adding all sides for each shape.
2. Write a full number sentence under each shape including cm each time.
3. Tick each side as it is added so no side is missed.

Say: Add the sides to find each perimeter. Do not forget the units! Write every side in your addition, then write the total with cm.

Ask: A triangle shows 3 cm, 4 cm, 5 cm. What is its perimeter? (3 cm + 4 cm + 5 cm = 12 cm.) · Why must you write cm in the answer? (Perimeter is a length, measured in millimetres, centimetres, metres and kilometres [4].)

Check understanding: Collect two answers on whiteboards; if units or sides are missing, model one more together.

Support: Provide a pre-written frame __ cm + __ cm + __ cm = __ cm and shapes under 6 cm. **Stretch:** Ask pupils to order the shapes from smallest to largest perimeter without re-measuring.

Use: Worksheet Task B

52–60 min **Plenary** 8 min · Whole class

To correct the missing-sides mistake and confirm what perimeter tells us.

YOU DO

1. Show Slide 11: a rectangle 5 cm long and 3 cm wide and ask if all four sides are needed.
2. Draw out that you must include the length of every side [5] and show 5+3+5+3=16 cm.
3. Use Slide 12 quick quiz to check meaning and two calculations.
4. Link back to success criteria and set homework.

STUDENTS DO

1. Show thumbs up or down and explain in one sentence why all four sides are needed.
2. Answer the quick quiz and chant the additions together.
3. Say which success line they can now do.

Say: A student says this rectangle has a perimeter of 8 centimetres because 5 plus 3 is 8. Do you agree? No, we missed two sides. We add all four sides to show the correct total.

Worked example: Rectangle 5 cm by 3 cm. Wrong: 5 cm + 3 cm = 8 cm. Right: 5 cm + 3 cm + 5 cm + 3 cm = 16 cm. Remember to include the length of every side [5].

Ask: What does perimeter tell us? (The distance all around a shape.) · Square with 4 cm sides. Perimeter? (16 cm.) · Rectangle 10 cm, 5 cm, 10 cm, 5 cm. Perimeter? (10 cm + 5 cm + 10 cm + 5 cm = 30 cm [3].)

Check understanding: Thumbs up or down on Slide 11 plus quiz answers; re-add touching sides 1-4 if many choose 8 cm.

Support: Count the sides together by touching each one and numbering 1, 2, 3, 4 on the board [5]. **Stretch:** Ask what shortcut they could use if the opposite sides are the same.

Use: Slides 11–12

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Common mistakes

Mistake	How to spot it	How to fix it
Adding only the two labelled sides, for example 6 cm + 3 cm = 9 cm for a rectangle.	Total is about half the expected string length and only two numbers are written.	Touch and number sides 1 to 4 and remember to include the length of every side [5].
Writing the total without units, for example 18 instead of 18 cm.	Number sentence has no cm after the numbers.	Insist on cm each time because perimeter is a length measured in centimetres and metres [1].
Measuring from the 1 cm mark or skipping a side when counting round.	String total and added total do not match, or one side has no tick.	Start the ruler at 0 at the dot, tick each side once, and go around the whole shape back to the start [9].

Support

- Give shapes with whole centimetre sides and only three or four sides, with start dots marked for where to place the ruler.
- Let pupils tick off each side as they measure it and use an addition frame with cm.

Stretch

- Ask pupils to predict the last side before measuring, using what they notice about the other sides.
- Challenge pupils to draw two different rectangles that both have the same perimeter.

For the LSE or teaching assistant

Stay with the String Fence pairs: check ruler starts at 0 at the dot, prompt ticking of each side, and scribe the addition frame if needed.

Check for understanding

Question	Answer
What is perimeter?	The distance all around the outside of a 2D shape [4].
Triangle sides 4 cm, 4 cm, 3 cm. What is the perimeter?	4 cm + 4 cm + 3 cm = 11 cm.
Square side 5 cm. What is the perimeter and how do you know?	20 cm, because 5 cm + 5 cm + 5 cm + 5 cm = 20 cm and all four sides are equal [3].

Homework

Measure the four sides of a book in centimetres and write the addition to find its perimeter.

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