Around We Go With Perimeter

Teacher		**Class**	Grade 3
Subject	Math	**Topic**	Perimeter
Date		**Room**	
Lesson length	60 minutes	**Country**	United States

Students learn to add sides to find perimeter and find a missing side. They build rectangles to compare area and perimeter.

Curriculum links

- Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures [1]
- Solve problems involving perimeters of polygons [2]
- Understand that rectangles can have equal perimeters but different areas, or rectangles can have equal areas but different perimeters [2]

Learning objectives

- Students will find the perimeter of polygons by adding all side lengths.
- Students will find an unknown side length when the perimeter is known.
- Students will build rectangles with the same area but different perimeters.

Success criteria

- I can add all sides to find the perimeter with correct units.
- I can subtract known sides from the perimeter to find a missing side.
- I can show two rectangles with the same area but different perimeters.

What students already know

Hold up a rectangle card. Ask: How many straight edges does it have? If one long edge is 5 in. and one short edge is 3 in., what are the other two edges?

Key words

perimeter	distance around the outside of a flat shape [7]
polygon	closed flat shape made only with straight edges [14]
area	amount of space inside a flat shape [2]
subtract	take away one number from another to find what is left

Materials

- 12 square tiles per pair
- grid paper
- crayons
- whiteboards and markers
- printed Worksheet Task B and Task D, one per student

Before the lesson

- Print Worksheet Task B and Task D and grid paper with 1-inch squares.
- Count 12 square tiles per pair and put crayons on tables.
- Load Slides 1-7, 9, 11-12 and test Video clip 1 (0:00-3:53) on Slide 6 with sound.

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- Slides 1-7, 9, 11-12 and Video clip 1 (0:00-3:53) on Slide 6
- Draw two starter rectangles on grid paper for support: 4 by 3 and 6 by 2 outlines.

Lesson outline

0–8 min **Starter** 8 min · Whole class

Hook students with rugs and fences and recall that perimeter is distance around.

YOU DO

1. Show Slide 1 Perimeter: Around We Go! and read the hook from the main activity: Can two rugs cover the same floor space but need different amounts of trim around them?
2. Show Slide 2 How Much Fence? and explain the fence fell down around the garden and we need to know how much new fence to buy.
3. Ask students to trace the edge of their desk with a finger, starting at one corner and stopping back at the same corner.
4. Take quick answers on what they traced: the edge or the middle.

STUDENTS DO

1. Trace the desk edge with a finger back to the start point.
2. Answer if painting the frame is the edge or the middle.
3. Predict if two rugs can cover the same floor but need different trim.

Say: Today we are perimeter detectives. Perimeter is the distance around the outside of a flat shape. You start at one point, go all the way around the edge, and stop back where you started.

Ask: What are we measuring when we walk all the way around and back to the start? (The perimeter, the distance around the outside of a 2D shape [7].) · For a fence job, do we need the edge or the middle? (The edge, like buying fence or a picture frame.)

Check understanding: Thumbs up if you can point around the whole edge back to start. If many are unsure, trace a large taped rectangle together again.

Support: Have a partner point to each side while the student traces so no side is missed. **Stretch:** Ask what would happen to the walk if one side of the desk was longer.

Use: Slides 1–2

8–20 min **Teaching** 12 min · Whole class

Model how to add all sides to find perimeter with correct units.

YOU DO

1. Show Slide 3 Did you know? and Slide 4 Find the Perimeter and read the bullets together.
2. Play Video clip 1 (0:00–3:53) on Slide 6. Tell students to spot the start point going around and listen for how sides add up.
3. Model the triangle from Slide 5 step by step on the board, marking a start dot and ticking each side.
4. Think aloud the opposite-sides rule for rectangles to save measuring.

STUDENTS DO

1. Watch and point in the air to show start point and going around.
2. Copy the triangle addition and say the total with units.
3. Tell a partner why a rectangle has two long and two short sides.

Say: Perimeter is distance around a shape. Add every side length together. A polygon is a closed shape with straight sides. Always give units, like inches or feet. To find the perimeter, add up the lengths of all the sides [4].

Worked example: Triangle 3 in., 4 in., 5 in.: mark a start dot. 3 + 4 + 5 = 12. Perimeter is 12 in. Rectangle 5 ft by 3 ft: opposite sides are always equal in length [14], so 5 + 3 + 5 + 3 = 16. Perimeter is 16 ft.

Ask: Why did we add 5 twice and 3 twice for the rectangle? (A rectangle has two long sides and two short sides, so P = 2 x length + 2 x width [5].) · What must we remember so we count each edge once? (You can start at any point but you must finish at the same point [7].)

Check understanding: Mini whiteboards: write 4 in. + 5 in. + 4 in. + 5 in. = ?. Hold up 18 in. Reteach start-point ticking if answers miss a side.

Support: Give a rectangle where opposite sides are equal so students only measure one long and one short side. **Stretch:** Give a 5-side polygon with whole-number inches and have students add all five sides.

Use: Slides 3–4, Slide 6, Video clip 1 (0:00–3:53)

20–30 min **Guided practice** 10 min · Pairs

Practice adding sides and subtracting to find a missing side length.

YOU DO

1. Show Slide 5 Think, pair, share triangle question and have pairs solve Worksheet Task B: Practice questions: Add all the sides to find the perimeter.
2. Model a fence with perimeter 20 ft and known sides 6 ft, 4 ft, 6 ft. Add known sides, then subtract from total [2].
3. Have pairs solve one triangle with perimeter 18 in. and sides 6 in. and 7 in.
4. Connect to real uses like determining the length of fence needed for a backyard [13].

STUDENTS DO

1. Solve Slide 5 triangle with a partner and read the equation aloud.
2. Do Task B problems, adding all the sides to find the perimeter with units.
3. Check a rectangle case: perimeter 16 ft, one side 5 ft, find the missing sides using equal opposites.

Say: To figure the perimeter of a polygon you just add up the length of the sides [5]. If a piece is missing, first add the sides you know, then take that sum away from the perimeter. That leftover is the missing piece.

Worked example: Missing side: perimeter 20 ft, sides 6 ft, 4 ft, 6 ft. Step 1: 6 + 4 + 6 = 16. Step 2: 20 - 16 = 4. The missing side is 4 ft. Check: 6 + 4 + 6 + 4 = 20 ft.

Ask: Triangle sides 6 in. and 7 in., perimeter 18 in. What is the missing side? (6 + 7 = 13, 18 - 13 = 5 in.) · Rectangle perimeter 16 ft, one side 5 ft. What are the other sides? (Opposite sides are equal [14], so 5 ft, 3 ft, 3 ft because 5 + 5 + 3 + 3 = 16.)

Check understanding: Hold up whiteboards for the 20-ft fence problem. If many write 16 ft, revisit step 2 subtract.

Support: Give a strip with total boxes marked, cover known parts and count up to total to see what is left.
Stretch: Give a 4-side figure with two missing equal sides and the perimeter, and have students split the leftover equally.

Use: Slide 5, Worksheet Task B

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30–50 min **Main activity** 20 min · Pairs

Build two rectangles with the same area to show perimeters can differ.

YOU DO

1. Show Slide 7 Same Area, Different Fence! and read Rug A and Rug B facts together.
2. Hand out 12 tiles, grid paper and crayons. Pairs build a 4 by 3 rug and a 6 by 2 rug with tiles.
3. Show Slide 9 Your task: Draw 2 rectangles with 12 squares on grid. Add sides to find each perimeter and compare.
4. Have pairs trace around to find the total distance around [2], add sides, and do Worksheet Task D: Practice questions: Use perimeter and area to compare rectangles.

STUDENTS DO

1. Build both rugs with 12 tiles, trace the outside edge only once.
2. Draw both rugs on grid paper, label length, width, area in square units and perimeter in units.
3. Complete Task D using perimeter and area to compare the rectangles and post which needs more trim.

Say: Area is the amount of space inside a figure [2]. You both get 12 squares inside. Build them into different rugs, then walk your finger around the outside to get the perimeter. Figures can have the same perimeter but different areas [2], and the same area can have different perimeters.

Worked example: Rug A: 4 ft by 3 ft. Area is 12 square feet. Perimeter: 4 + 3 + 4 + 3 = 14. Perimeter is 14 feet. Rug B: 6 ft by 2 ft. Area is 12 square feet. Perimeter: 6 + 2 + 6 + 2 = 16. Perimeter is 16 feet [2]. Same inside squares, different fence.

Ask: Both rugs use 12 squares. Why is the fence longer for Rug B? (It is longer and skinnier, so adding all sides gives 16 ft instead of 14 ft.) · How do we know we counted perimeter, not area? (Perimeter is distance around the outside [7] in linear units like feet; area is inside space in square units [11].)

Check understanding: Pairs hold up drawings with equations. Look for 14 ft and 16 ft. If a pair counted inside squares as perimeter, have them lay string only on outside edge.

Support: Start both rectangles for them on grid paper and let them finish with tiles, then count units around the outside edge only once [14]. **Stretch:** Ask students to try to build a third rectangle with 12 tiles and compare its perimeter.

Use: Slide 7, Slide 9, Worksheet Task D

50–60 min **Plenary** 10 min · Whole class

Check all three goals and show same fence can make different gardens.

YOU DO

1. Show Slide 11 Pick a Garden: Same 16 ft fence: which garden would you plant? Long skinny 7 ft by 1 ft and Even box 4 ft by 4 ft.
2. Add sides together as a class to prove both are 16 ft but inside squares differ.
3. Show Slide 12 True or false? and vote on each line.
4. Give exit ticket on whiteboards.

STUDENTS DO

1. Vote for a garden and justify with perimeter and inside space.
2. Answer true or false with thumbs and full addition aloud.
3. Write exit answers with units.

Say: Same fence can make different gardens. We add to find perimeter, and we subtract known sides from the perimeter to find a missing side. Perimeter uses feet or inches, area uses square units.

Worked example: Long skinny: 7 + 1 + 7 + 1 = 16 ft, inside 7 squares. Even box: 4 + 4 + 4 + 4 = 16 ft, inside 16 squares. Same 16 ft fence, different inside space.

Ask: Perimeter means distance around a shape. True or false? How do you check? (True. Walk the edge back to start [7].) · Find a missing side by subtracting known sides from perimeter. True or false? (True. Total minus known leaves the missing length [2].)

Check understanding: Exit ticket 3 questions on boards. If missing-side step is weak, model one more 1-minute fence before dismissal.

Support: Let students trace each side with fingers while counting aloud to avoid missing or double-counting.
Stretch: Ask students to make their own tricky shape where someone might forget a side, and challenge the class.

Use: Slides 11–12

Common mistakes

Mistake	How to spot it	How to fix it
Counting a side twice or missing a side	Total too big or too small; ticks do not return to start dot	Mark a start point and tick each side once going around back to the same point [7].
Mixing perimeter and area	Student counts inside squares for fence or writes square units for perimeter	Trace only the outside edge for perimeter; perimeter is linear units like inches or feet and area is square units [11].
Adding only known sides to find missing side	Student answers known sum instead of subtracting from total	Add known side lengths together, then subtract the total from the perimeter [2].

Support

- Start both rectangles for them on grid paper and let them finish with tiles, then count units around the outside edge only once [14].
- Provide garden outline already drawn with two sides labeled and use equal opposites to fill others.

Stretch

- Ask students to try to build a third rectangle with 12 tiles and compare its perimeter.
- Test three different rectangles with perimeter 24 and order them from smallest to largest inside space.
- Challenge students to write their own missing-side fence puzzle for a partner.

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- Use whiteboard number line to count up from known sum to perimeter total.

For the LSE or teaching assistant

Stay with target pairs in main activity. Help place tiles inside pre-drawn outlines, prompt finger trace around edge once, and scribe equations with feet and square feet as needed.

Check for understanding

Question	Answer
A triangle has sides 3 in., 4 in., 5 in. What is its perimeter?	3 + 4 + 5 = 12 in.
A fence polygon has perimeter 20 ft and known sides 6 ft, 4 ft, 6 ft. What is the missing side?	4 ft because 6 + 4 + 6 = 16 and 20 - 16 = 4
Rug A 4 ft by 3 ft and Rug B 6 ft by 2 ft both have area 12 square feet. Which has the greater perimeter?	Rug B with 16 ft versus Rug A with 14 ft [2].

Homework

Draw a rectangle garden 6 ft by 2 ft, find its perimeter and explain if a 5 ft by 3 ft garden uses the same fence.

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