re(Solve) MATHS BY INQUIRY

# Area and Perimeter

Y5

## Summary of learning goals

- Students consolidate their understanding of and skills in calculating the area and the perimeter of rectangles. They observe patterns, reason mathematically and make generalisations.

### Australian Curriculum: Mathematics (Year 5)

**ACMMG109:** Calculate perimeter and area of rectangles using familiar metric units.

**ACMNA098:** Identify and describe factors and multiples of whole numbers and use them to solve problems.

**ACMNA291:** Use efficient mental and written strategies and apply appropriate digital technologies to solve problems.

## Summary of lessons

### Who is this sequence for?

- This sequence assumes that students know how to calculate the perimeter and area of rectangles.
- Students should be familiar with the metric units that are used to measure perimeter and area.

### Lesson 1: What is the Area?

Students explore the relationship between area and perimeter using the context of bumper cars at an amusement park. They design a rectangular floor plan with the largest possible area when given a perimeter of 50 m, and observe that the area of a rectangle increases as the sides get closer in length. Students find that the rectangle with the greatest area for a set perimeter is a square.

### Lesson 2: What is the Perimeter?

Students explore the possible perimeter of a bumper car ride that has a floor area of 48 $m^2$. They recognise that factors of the area form the dimensions of the possible rectangles. Students graph the results and form the generalisation that the smaller the difference in side lengths, the smaller the perimeter.

### Lesson 3: Designing Bumper Car Rides

Students design three different floor plans for bumper car rides: (i) where the area is numerically greater than its perimeter; (ii) with a perimeter numerically greater than its area; and (iii) with a perimeter numerically equal to its area.

**reSolve: Mathematics by Inquiry** is funded by the Australian Government and is managed by the Australian Academy of Science.

BY-NC-SA

Australian Academy of Science

# Reflection on this sequence

## Rationale

Students often confuse perimeter and area. It is important that they know the differences between the two. Perimeter is a linear measurement, measuring the boundary of a figure. Area is a two-dimensional measurement, measuring the space inside the boundary of a figure. A common misconception about perimeter and area is that there is a fixed relationship between the two. This sequence challenges this misconception, showing students that rectangles with a fixed perimeter do not have the same area and vice versa. Students learn how to maximise area when given a fixed perimeter and how to minimise perimeter with a fixed area.

### reSolve mathematics is purposeful

- These lessons help students build a mathematically sound definition for perimeter and area. They develop skills in calculating the perimeter and area of rectangles.
- The sequence addresses the misconception that there is a fixed relationship between perimeter and area.

### reSolve tasks are inclusive and challenging

- Nearly all students will be familiar with bumper car rides.
- Each lesson asks students to find different rectangles that meet certain specifications. While some students might find all the possible rectangles, other students make a valuable contribution to the investigation if they find only one or two rectangles.

### reSolve classrooms have a knowledge-building culture

- Students' data from across the class is used to see regularities and form generalisations.
- Students' current conceptions of area, perimeter and rectangles are challenged.
- The class collaboratively forms mathematically sound definitions.


BY-NC-SA