# YuMi Deadly Maths

## Year 5 Teacher Resource:

## MG – Patrolling the perimeter

Prepared by the YuMi Deadly Centre
Faculty of Education, QUT

YuMi Deadly Maths Year 5 Teacher Resource: **MG – Patrolling the perimeter**

## ACKNOWLEDGEMENT

We acknowledge the traditional owners and custodians of the lands
in which the mathematics ideas for this resource were developed,
refined and presented in professional development sessions.

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## Year 5 Measurement and Geometry

# Patrolling the perimeter

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| **Learning goal** | Students will measure the dimensions of rectangles (including squares) in the environment then estimate and measure the perimeters of rectangles (including squares) using metric units. |
| **Content description** | Measurement and Geometry – Using units of measurement<br>• Calculate the perimeter and area of rectangles using familiar metric units (ACMMG109) |
| **Big idea** | Measurement – interpretation vs construction |
| **Resources** | Maths Mat, elastics, metre rulers, long retractable tape measures, trundle wheels, rulers, household tape measures, grid paper |

## Reality

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| **Local knowledge** | Students identify rectangles and squares in their local environment, classroom and outside; e.g. fencing a paddock, timber edge to lay foundations. |
| **Prior experience** | Ensure students understand the concept of length, properties of rectangle and square, centimetres and metres as units of measurement, perimeter as length of edge or border, total length around an object. |
| **Kinaesthetic** | Discuss the meaning of perimeter – the line that goes around the edge of a shape, the boundary. Rope out series of rectangles.<br><br>Using the Maths Mat and elastics, ask students, one at a time, to put their elastics around a shape that would contain 16 squares (16 × 1, 8 × 2, 4 × 4). Discuss the length and width of the sides. After each shape had been constructed, ask: *How will we find out the number of squares around the edges?* [Walk around the shape, counting the squares as you go to find the perimeter. Use the process of repeated addition.] When all the shapes have been made, ask the following questions: *Do all these shapes have the same perimeter? What has made the difference?* [In the 16 × 1, there are only two edges per square that are not counted apart from the ends where there is only one edge not counted. In the 8 × 2, all the squares, except the four squares at the ends, have only one edge counted. In the 4 × 4 square, the four squares in the centre have no edges counted at all while there are another eight squares that have only one edge counted.] Each time, reinforce the principle that the perimeter is the sum of the number of squares along each side. |

## Abstraction

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| **Body** | Discuss the metric units of measurement, centimetres and metres. *Show me parts of your body that would be about 1 cm, 10 cm, 30 cm. How could you estimate 1 metre?* Students choose personal referents to help them make an informed prediction when considering length.<br><br>Measuring tools, e.g. metre rulers, retractable tape measures, trundle wheels, rulers. Students measure the dimensions of the classroom. Students go outside to measure the perimeter of garden beds, handball courts, seat benches, steps, shapes drawn on the concrete that include squares and rectangles. Students estimate, state the appropriate unit of measurement and then measure objects to find the perimeter. They record the name of the object, their estimate, the perimeter and the unit of measurement being used, the tool they used, and the final perimeter in centimetres or metres, showing how they reached their answer. They compare their estimate with the actual measurement to gauge the degree of accuracy. They share their findings with the class, explaining what they did to make an accurate estimate and how it compared with the actual measurement. |

*Find an object that would have a perimeter of 6 m, 9 m. Record its name and actual measurement.*

**Hand** Students estimate, state the appropriate unit of measurement and then measure objects in their classroom to find the perimeter of objects; e.g. pad, desk, school bag, table, lunch box, pencil case, bench, cupboard door. They make calculations as above.

**Mind** *Take out a pad that is different in size to any you have measured. Close your eyes. Run your finger around the edge of the sides of the pad and estimate the perimeter. Think of an object in the classroom that would have an approximate perimeter of 80 cm. Mentally estimate the perimeter of the whiteboard.*

**Creativity** *Choose your own objects that have perimeters up to 50 cm, 10 metres. Draw, measure and calculate the perimeters.*

## Mathematics

**Language/ symbols** length, width, boundary, perimeter, shape, rectangle, square, centimetre, metre

**Practice**

1. Estimate then measure the dimensions and calculate the perimeter of various objects in the local environment using the following template:

| 1st Estimate | Dimensions | | 2nd Estimate | Perimeter |
|---|---|---|---|---|
| | Length | Width | | |
| | | | | |
| | | | | |

   (a) Estimate then measure and calculate the perimeter of the garden bed in metres.

   (b) Estimate then measure and calculate the perimeter of the school building in metres.

   (c) Add local objects to estimate, measure and calculate the perimeter.

2. Find an object that has a perimeter of 16 cm.
3. For virtual activities, search: http://www.apples4theteacher.com/math.html; http://au.ixl.com/math/

**Connections** Relate to perimeter of irregular shapes, triangles and circumference of circle.

## Reflection

**Validation** Students check where perimeter calculations are necessary in their world, e.g. checking to see there is sufficient space to mark out handball courts by marking out the court with chalk.

**Application/ problems** Provide applications and problems for students to apply to different real-world contexts independently; e.g. *Read the floor plan to find the perimeter of each room in the house*.

**Extension** **Flexibility**. Show different ways of calculating the perimeter of rectangles and squares.

**Reversing**. Students are able to apply their knowledge of perimeter in relation to the following types of problems:

1. Perimeter unknown – measure and calculate perimeter from dimensions.
2. Object unknown – find an object that has a given perimeter.
3. Unit unknown – given object has a perimeter of 50 units, are these units cm or m?

**Generalising**. *The perimeter of any shape is its outside boundary that encloses an interior space. It is calculated by adding the sum of all the measures of its edges. Formulae for regular shapes can be constructed to help in these calculations*.

 

**Changing parameters**. Have students create a display of different regular shapes with the same perimeter, e.g. 36 cm, using grid paper. Explore different ways of writing the "formula". Investigate area.

## Teacher's notes

- Ensure that students have a sound understanding of the basic meaning of perimeter before attempting any perimeter calculations.
- Students need to be taught the skill of visualising: closing their eyes and seeing pictures in their minds, making mental images; e.g. show a picture of a shape, students look at it, remove the picture, students then close their eyes and see the shape in their mind; then make a mental picture of a different shape.
- Suggestions in Local Knowledge are only a guide. It is very important that examples in Reality are taken from the local environment that have significance to the local culture and come from the students' experience of their local environment.
- Useful websites for resources: www.rrr.edu.au; https://www.qcaa.qld.edu.au/3035.html
- Explicit teaching that **aligns with students' understanding** is part of every section of the RAMR cycle and has particular emphasis in the Mathematics section. The RAMR cycle is not always linear but may necessitate revisiting the previous stage/s at any given point.
- Reflection on the concept may happen at any stage of the RAMR cycle to reinforce the concept being taught. Validation, Application, and the last two parts of Extension should not be undertaken until students have mastered the mathematical concept as students need the foundation in order to be able to validate, apply, generalise and change parameters.