

Park your car here: Part 1

Related outcomes

- WM 3.2: A student selects and uses appropriate problem solving strategies to complete investigations.
- S 3.1: A student recognises, visualises, describes, makes and represents three-dimensional objects.
- VA 2: A student demonstrates a positive response to the use of mathematics as a tool in practical situations.
- VA 6: A student appreciates the importance of visualisation when solving problems.
- VA 8: A student demonstrates a willingness to persist when solving problems and to try different methods.
- VA 9: A student uses mathematics creatively in expressing new ideas and discoveries.

Possible indicators

- A student can:
- identify the key elements in a problem that need to be addressed
 - negotiate with group members the key features that need to be included in a draft plan.

Syllabus links

Space	3D 15 Position 5 Area 10
Number	Multiplication 11, 12

Teaching activity

This is part one of a two-part activity. In this first part, students will design a carpark, paying attention to key features only.

1. Present students with the following scenario:

A development group is planning to use a demolition site for the development of an open-air carpark. The land is a rectangle, 40 m x 50 m. The development group must prove to the council that it has considered key environmental issues in its design.

2. As a whole class, share ideas about what is usually seen in a carpark. These could include: location of entrances and exits, car spaces, disabled parking, lights, bins, traffic flow in the carpark, pedestrian crossings, stop signs, give way signs, international symbols, arrows indicating the flow of traffic, and a pay station.
3. Students investigate the area of a “parking space”. Which is the biggest car in the school? What about the smallest?
4. In groups, students draw a draft plan which locates the position of various features in a carpark. Details of parking bays will need to be addressed, such as at what angle will the cars be parked? The estimated number of cars will need to be monitored to ensure that the number remains within the

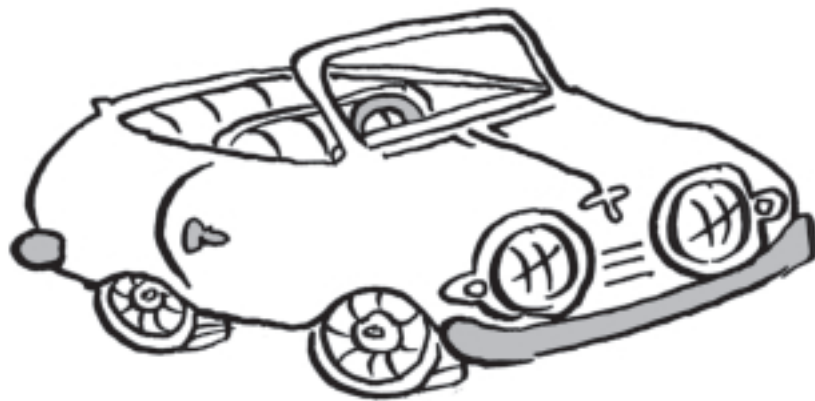
dimensions of the carpark. Students will need to attend to issues such as public safety and ensure that driveways are clear of obstructions such as, poles and trees. To ensure that the carpark is environmentally friendly and attractive, students could include additional features such as trees, shrubs, recycling bins.

5. In turn, the groups share their plans with the class. This provides an opportunity to make suggestions regarding improvements, such as:

- *Is the number of car spaces realistic? Are there too many or too few in any area?*
- *Are the aisles too narrow?*
- *Is traffic flow through the car park safe?*
- *Is two-way traffic reasonable? Is it hazardous?*
- *Has attention been paid to environmental features?*

Language

centimetres, metres, size, measure, scale, space, draft plan



Park your car here: Part 2

Related outcomes

- WM 3.2: A student selects and uses appropriate problem solving strategies to complete investigations.
- WM 3.4: A student gives a valid reason for a solution to an investigation and checks that the answer makes sense in the original situation.
- S 3.2 (c): A student recognises that objects can be represented using scale models and makes simple calculations using scale.
- M 3.2: A student estimates, measures and records lengths in metric units from millimetres to kilometres.
- M 3.3: A student explains the relationship between length, breadth and area of a rectangle and uses it to calculate the area of rectangles.
- VA 2: A student demonstrates a positive response to the use of mathematics as a tool in practical situations.
- VA 6: A student appreciates the importance of visualisation when solving problems.
- VA 8: A student demonstrates a willingness to persist when solving problems and to try different methods.

Possible indicators

- A student can:
- produce a scale diagram, labelling key features
 - use scales accurately in drawing plans
 - produce written work which reflects information contained within a drawing.

Syllabus links

Space	3D 15 2D 22, 25
Measurement	Area 10 Length 12
Number	Multiplication 11, 12

Teaching activity

1. Following feedback from the class, groups develop a scale drawing of the carpark. A scale of 1 cm to represent 1 m could be used on the plan.
2. Provide students with the following information regarding the design criteria:
 - Each car space should be approximately 5.5 m in length by 2.5 m in width
 - The minimal aisle width for one-way or two-way movement of cars is 5.5 m (two-way aisle movement is necessary only for 90 degree parking).
3. Provide groups with pieces of cardboard with side lengths 40 cm x 50 cm. Alternatively, ask groups to use the scale of 1 cm to represent 1 m to determine the side lengths of the cardboard. This piece of cardboard can then be used to assist students when designing their scale models of the car park.
4. Using different coloured cardboard, and the given scale, students make multiple rectangles to represent single car spaces. These cardboard rectangles can

then be placed and repositioned on the large piece of cardboard to assist with the design of the car park. This might need to be modelled before the students begin. Other materials can then be used to represent additional features of the car park.

5. Groups then draw their draft plan to scale.
6. This is followed by groups writing a proposal to the council which outlines the features and details associated with the development of the carpark.
7. Each group's proposal is then given to another group which acts as the council representatives. These representatives outline any advantages or additional features that need to be considered in relation to the design.

Language

centimetres, metres, environment, size, measure, scale, space

