

SURFACE AREA OF PRISMS

INVESTIGATION

OPTIMAL SURFACE AREA OF RECYCLE BINS

Your business has won a contract to make 1 million recycle bins, each to contain 80 litres (i.e. 80 000 cubic centimetres or 80 000 millilitres).

To minimize costs and maximize profit, you are given the task of designing the recycle bin with minimum surface area and therefore minimum materials.

There are 2 types of bins to consider – a circle-based cylinder and a square-based rectangular prism. There is a base but no lid.



INSTRUCTIONS FOR A CYLINDRICAL BIN

- Find the formula for the volume and the outer surface area in terms of the radius and the height.
- Draw a table with increasing radius measurements (i.e. 10, 20, 30 and so on), and corresponding height and surface area calculations. Work in centimetres.
- Draw a line graph with radius on the horizontal axis and surface area on the vertical axis.
- From your graph, determine the dimensions that are the most effective.

INSTRUCTIONS FOR A SQUARE-BASED RECTANGULAR PRISM BIN

- Find the formula for the volume and the outer surface area in terms of the base side and the height.
- Draw a table with increasing base side measurements (i.e. 10, 20, 30 and so on), and corresponding height and surface area calculations. Work in centimetres.
- Draw a line graph with base side on the horizontal axis and surface area on the vertical axis.
- From your graph, determine the dimensions that are the most effective.

