

Module 7: Developing the personal maths skills of teachers and assessors

Developmental task

Space and shape

Vocational context

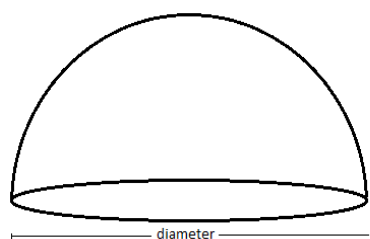
Product design and packaging

A factory produces souvenir items for the tourist trade. They specialise in paperweights either in the shape of a hemisphere or in the shape of a cylinder.

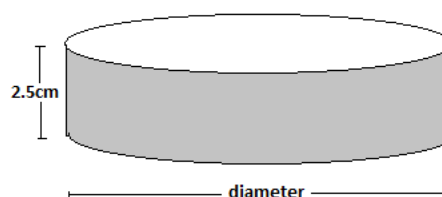
The designer of the moulds is considering diameters between 6cm and 8cm. The machinery is geared so that the height of the cylindrical mould is fixed at 2.5cm. The diameter can be set at intervals of 2mm.

He needs to investigate the amount of resin required to fill each mould and the point at which they use the same amount of resin, as this will affect costings for the two shapes.

The hemi-sphere shaped mould



Cylindrical paperweight mould



Use a spreadsheet to calculate the amount of resin required by each mould for the range of diameters above. Plot the points on a graph to determine how the shapes vary and at what diameter they use an equal amount of resin.

Can you determine the nature of the relationship between the measurements of the moulds and the amount of resin required? Is it linear? If not what is the relationship?

Investigate using a wider range of values for the diameter – consider what would be sensible values to take and use the spreadsheet for your calculations. Explain what you find.

What factors will the designer take into account when determining final measurements? If he settles on them having the same volume and if resin comes in 80kg packs, how many paperweights can be made from each pack? What additional factors should he take into consideration?

Design boxes which could be used to pack the paperweights for distribution to the retailers. Ideally the same box should be used whether packing one type of paperweight or a mixture of the two. What factors will you take into account?

Consider how the findings could be presented to the production manager.