 Similar solids

What are similar solids?

Two three-dimensional (3D) objects are similar if you can multiply each of the side lengths in the smaller shape, by the same number (called the ‘scale factor’) to get the side lengths of the larger object.

For each of the following real-life objects:

* Find out if they are similar solids, and if they are, find the scale factor.
* If they aren’t similar, adjust the measurements of the larger shape to make them similar
* Find the surface area and volume of each
* Find out what the scale factor is for both the surface area and volume

Your investigation

Task 1 – Gathering data

Vegemite

* 150g: 4.5cm radius and 7.5 cm tall
* 400g: 7cm radius and 9.5 cm tall

SPC Fruit Salad

* 410g: 7.5cm radius and 11cm tall
* 825g: 10cm radius and 12 cm tall

Baked Beans

* 130g: 5.3cm radius and 6.8 cm tall
* 420g: 7.5cm radius and 11cm tall

Flour

* 1kg: 9.5cm wide, 7cm deep, 17cm high
* 2kg: 12cm wide, 9.5cm deep, 22cm high

Cornflakes

* 460g: 24cm wide, 6.7cm deep, 32cm high
* 775g: 25cm wide, 9.5cm deep, 35.8cm high

Toblerone

* 50g: 2.8cm wide, 2.5cm high, 16.5cm long
* 100g: 3.5cm wide, 3cm high, 21cm long
* 200g: 4.5cm wide, 4cm high, 27.5cm long

Duo Laundry Detergent

* 500g: 6cm deep, 13cm wide, 11.5cm high
* 1.5kg: 7.8cm deep, 15cm wide, 20cm high

Task 2 – analysing data

What is the connection between the scale factor for side lengths and the scale factor for surface area and volume?

Outcomes

* MA5.2-1WM selects appropriate notations and conventions to communicate mathematical ideas and solutions
* MA5.2-2WM interprets mathematical or real-life situations, systematically applying appropriate strategies to solve problems
* MA5.2-11MG calculates the surface areas of right prisms, cylinders and related composite solids
* MA5.2-12MG applies formulas to calculate the volumes of composite solids composed of right prisms and cylinders
* MA5.3-13MG applies formulas to find the surface areas of right pyramids, right cones, spheres and related composite solids
* MA5.3-14MG applies formulas to find the volumes of right pyramids, right cones, spheres and related composite solids