 Raindrops

Background

Forces within falling raindrops tend to draw them into a spherical shape. One reason for this phenomenon is that a sphere has the lowest surface area to volume ratio of any solid shape.

Testing the theory

1. Test this statement by calculating the surface area to volume ratios for the following solids. For each shape you will need:

* A heading
* A diagram
* A formula
* All working out
* An answer, underlined and with the correct units
  1. A cube of side 1 cm
  2. A rectangular prism 2cm x 1cm x 1cm
  3. A cylinder of radius 1 cm and height 2cm
  4. A triangle-based pyramid (tetrahedron) of sides 1 cm
  5. A cone of radius 1cm and height 2cm
  6. A square based pyramid of base 1cm and height 1cm
  7. A sphere of radius 1cm

1. List the seven solids in increasing order of surface area to volume ratio.
2. Make up at least 3 of your own solids, these could be composite solids (solids made up by joining other solids). Further test the theory by finding the surface area to volume ratio of each. Can you find one with a smaller ratio than a sphere?



Outcomes

* 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