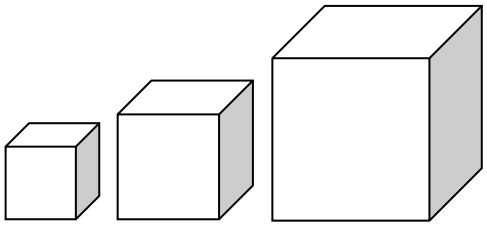
A Question about Cubes for Year 6 Maths Fans from Nick!

Imagine lots of cubes of different sizes. For any cube of course, each of the sides are the same length but each cube has sides of a different length.

To calculate the volume you multiply the length x width x height. This is easy for a cube because the three numbers are the same.

Eg: What is the volume and the total surface area of a cube which has 3cm long sides?



Volume = 3 x 3 x 3 = 27 cm^3

Area of one face = 3 x 3 = 9 cm^2

Total surface area for all 6 faces = 9 x 6 = 54 cm^2

Copy and complete this table:

Length of one side (cm)	Total surface area (cm^2)	Volume of cube (cm^3)
1	1	1
2	24	8
3	54	27
4	96	64
5	150	125
6	216	216
7	294	343

Q: For the cubes with sides less than or equal to 5cm, what do you notice about the size (or value) of the number you get for the area compared to the volume for each cube? Which is smaller, the number for the area or the number for the volume?

The size (magnitude) of the area is larger than the size of the number for the volume

Q: What do you notice about the size of the numbers you get for the area and volume of the cube with a side length of 6cm?

They are the same!

Q: What do you notice about the size of the numbers you get for the area and volume of the cube with a side length of 7cm or greater?

The volume number(s) are now larger than the area numbers for any cube with a side length greater than or equal to 7.

Science Question: heat escapes from the surface of an object. Imagine two very hot blocks of metal, one is large, one is small. Which would cool down faster? The large one or the small one?

The small one. Its surface area has a greater value than its volume. It is hard for heat to stay inside, it radiates from the surface. (Look at a radiator at home, can you see it is sort of crinkly? This is to increase its surface area to it can radiate more heat energy and keep you warm better.

Science Question: Why is it helpful to a polar bear to be so large?

It lives in a very cold place but it is hot blooded. Its volume has a greater value than its surface area (true for big things) so it can keep itself warm better. Of course, thick fur helps too.

Science Question: why do elephants (which are very large) have such large flappy ears?

They are huge animals but they live in warm climates. They have to have a way to cool down which is hard for big animals to do. So, the ears are like radiators, they have a large surface, warm blood is pumped through them and is cooled down before returning to the rest of the elephant! So, this means it can be advantageous for animals that live in hot climates to be small.