Exploring area and volume

(Italy)

Background

This is a lovely investigation that students could carry out as part of maths or science class when studying area and volume or enlargements.

In enlargements, the ratio of any two **corresponding lengths** in two similar geometric figures is called a Scale Factor.

The area of a scaled object will be equal to the scale factor **squared**.

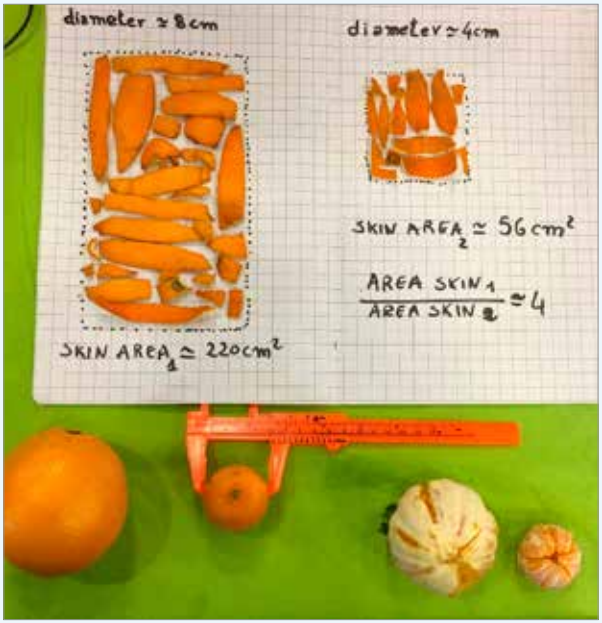
The volume of a scaled object will be equal to the scale factor cubed.

You will need:

- ✓ Fruit with skin e.g. citrus fruit,
- ✓ Vernier callipers
- ✓ graph paper

Follow these steps:

1. Use the Vernier callipers to get the diameter of your fruit.
2. Carefully peel your fruit and arrange them into a rectangle shape, for easier calculations, on a piece of graph paper. See figure 1.
3. Calculate the area taken up by the skin i.e. the surface area of the fruit.



4. Work out the scale factor for the diameter (or radius):
5. Work out the ratio for the area:

So what happened?

The area increases by a scale factor of k^2.

What next?

Students could use an overflow can and work out the volume of the pieces of fruit and compare.

The volume increases by a scale factor of k^3.