Activity 3: How Dense is That?

So far, you've thought about how much waste is being produced (number of bins) and the weight of waste being made in different areas of your school. In the next part of your investigation, you should link these two things together and see if they make sense!

Have you ever heard the question, "which is heavier: a kilogram of feathers or a kilogram of steel?" The answer of course is that they are both the same weight, even though we tend to think of feathers being light and steel being heavy!

When we think about it, though, we realise that this "lightness" relates to a different property, called DENSITY, which is really how much the same volume of different materials weigh. This property is why ships made of steel float on water, and why air balloons float into the sky!

Density is important to our investigation as we tend to say, "how full is our bin?", and not "how heavy is our bin?".

To convert between heavy and full we need to use our detective science skills to convert weight to volume, and to do that we need to know the density.

This property of a material is so important that the Waste and Resources Action Programme (WRAP) have published their own investigation into the density of different wastes.

In the WRAP report, we can find that mixed plastic waste has a density of 22 kg for every m³ - a m³ is a box where the length, depth and height are all 1 meter long - which is quite big! A big wheeled bin is just 10% larger than this - and it is almost the same size as four of the wheelie bins found in many homes.
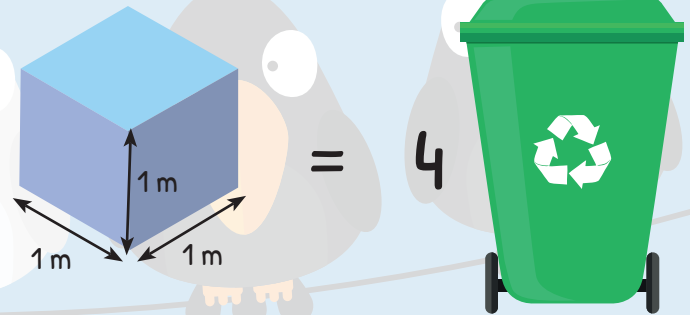
Your teachers will be able to show you how you can use the density value and mathematics to calculate the weight of your waste if you know the volume, and the volume of your waste if you know the weight - these are the kind of calculations that professional scientists do every day! Your teachers will also be able to show you how to carry out your own experiment so that you can calculate your own density data, and use these in your calculations!

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Did you know?

It could cost the same amount of money to empty a bin full of plastic waste as buying the equivalent weight in fresh milk?

For this part of the investigation, Gather your evidence on the density of typical waste plastics around your home and school. Get lots of samples and then average these out. If there are big differences between the different experiments write down why this happened. Present your data within your final investigation case notes as a table or chart and describe the clever ways that you could use to reduce the volume of the plastic waste being produced.

Adding up the Costs of Waste!

Getting rid of waste costs money! Using the data you have obtained already, and the information that your teacher will be able to give you about the cost of removing waste, you should be able to convert the weight of the waste collected from the various parts of your school into an estimated volume, and use this to work out how much this will cost your school in a year!