ACTIVITY 7 - Gloopy Liquids

When the solar system was forming, some masses of rock orbiting the Sun became large enough, and hot enough that they started to differentiate – high density material sank to the core of the planet and lower density material floated to the top.

Why do you think there are different densities of material within the Moon, or any planetary body? Where do you think they came from?

This activity investigates how materials of three different densities will arrange themselves when added to the same beaker. You will measure the density of each liquid and then make a prediction as to how the liquids will arrange themselves in the beaker.

The density of a material can be calculated from

$\rho = \frac{M}{V}$, where ρ is the density in gcm^{-3}, M is the mass in grams, and V is the volume in cm^3.

For simplicity, use 100 cm^3 of each liquid. Use 3 separate beakers to measure the mass of each liquid – remember to tare the scales so that you are only measuring the mass of the liquid (and not the beaker!).

Liquid	Mass/g	Volume/cm^3	Density/gcm^{-3}
Black		100	
Blue		100	
Red		100	

You now need to make a prediction as to the order the liquids will settle in, based on their densities, and explain why.

My prediction is that...

This is because...

Now try it out! Were your predictions correct? Does it matter what order you pour in the liquids? How do you think the density of these liquids compares the density of the layers in the Earth? How about the Moon?

Extension:

The SI units for density are kgm^{-3}. Convert your values of density to this SI unit.
The value for the red liquid should be $1gcm^{-3}$.
What do you think this red liquid is?
What does this mean about how the gram was originally defined?