

20 density

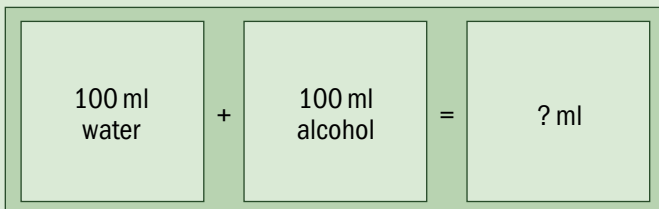
The mystery of the vanishing liquid

Ireland

Different liquids are made up of different-sized molecules

You will need...

- ✓ two graduated cylinders (the smaller the better)
- ✓ some alcohol (any type)
- ✓ some water



Background

Matter is made up of molecules of various sizes. When different-sized molecules are mixed, the smaller ones can occupy the vacancies between the larger molecules.

Follow these steps

1 Measure equal amounts of water and alcohol and note the volumes poured (the smaller the volumes the better – say 100 ml of each).

2 Add the contents of one of the cylinders to the other and measure the total volume of the mixture.

So what happened?

The total volume of the mixed liquids should be about 5% less than the sum of the previous two volumes, because the smaller molecules of the water occupy some of the vacancies between the larger alcohol molecules.

What next?

The same principle can be illustrated by using materials where the students can see the individual units that make them up (e.g. grains of rice or dried peas take the place of the molecules in water and alcohol).

Discuss how quicksand and avalanches are examples where particles can behave like fluids.

White ball, black ball

Belgium

Particles can behave like fluids

You will need...

- ✓ a container and lid
- ✓ some rice
- ✓ a black ball-bearing
- ✓ a white polystyrene ball

Background

This exercise introduces density and flotation and shows how, under some circumstances, particles can behave like fluids.



Follow these steps

- 1 Pour the rice into the container.
- 2 Hide the white ball just below the surface of the rice, then place the black ball on top.
- 3 Show the container to the students.
- 4 Put the lid on the container and then give the vessel one vigorous vertical shake. (Some special magic words might help here!)



So what happened?

The heavy black ball-bearing sinks into the rice whereas the light polystyrene ball floats to the surface. To the students the ball appears to have mysteriously changed colour.