Mixtures

When you mix some materials together, they do not change, and so you can sometimes separate them out again.

There are many kinds of **MIXTURES**. You can mix solids, like powders or soil, you can mix liquids, like water and orange juice, and you can mix solids and liquids, like sugar in water.

Mixing solids

If you make a cup of coffee, you might begin by mixing a spoonful of instant coffee granules with a spoonful of sugar (Picture 1). If you make a cake, you might first mix flour and sugar.

All that has happened is that the particles of coffee and the sugar, or of flour and sugar, have got jumbled up. But if we wanted to take the trouble, we could eventually separate the sugar from the coffee or the flour again.

You can mix things up in any proportion you choose: three parts of coffee and two parts of sugar, or ten parts of sugar and one part of flour. Whatever you do, it will still be possible – if very difficult – to separate out all of the ingredients.

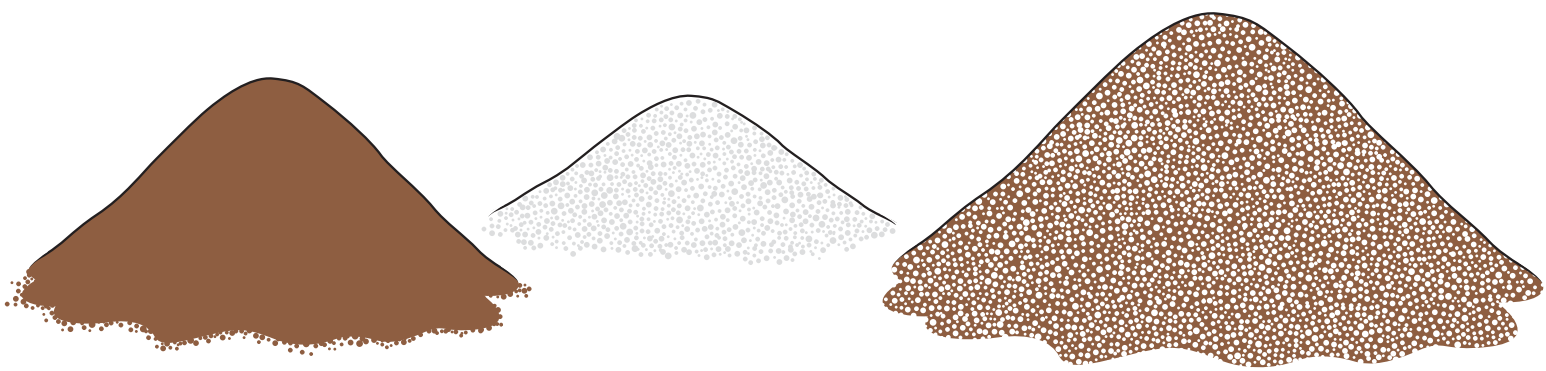
Mixing liquids

If you stir two liquids together you also get a mixture – it is called a **SOLUTION**.

In a solution, one of the substances seems to have disappeared completely into the other one. When this happens, we say that one substance has **DISSOLVED** in another substance. You cannot see two separate liquids any more.

But actually, nothing has changed. When one substance dissolves in another, it spreads out so evenly in the solution that the particles are too small to see (Picture 2). But the particles of the two substances are still separate.

▼ **(Picture 1) A mixture of coffee granules (brown) and sugar (white) show that when solids are mixed they are simply jumbled up. It doesn't matter what the proportions are.**



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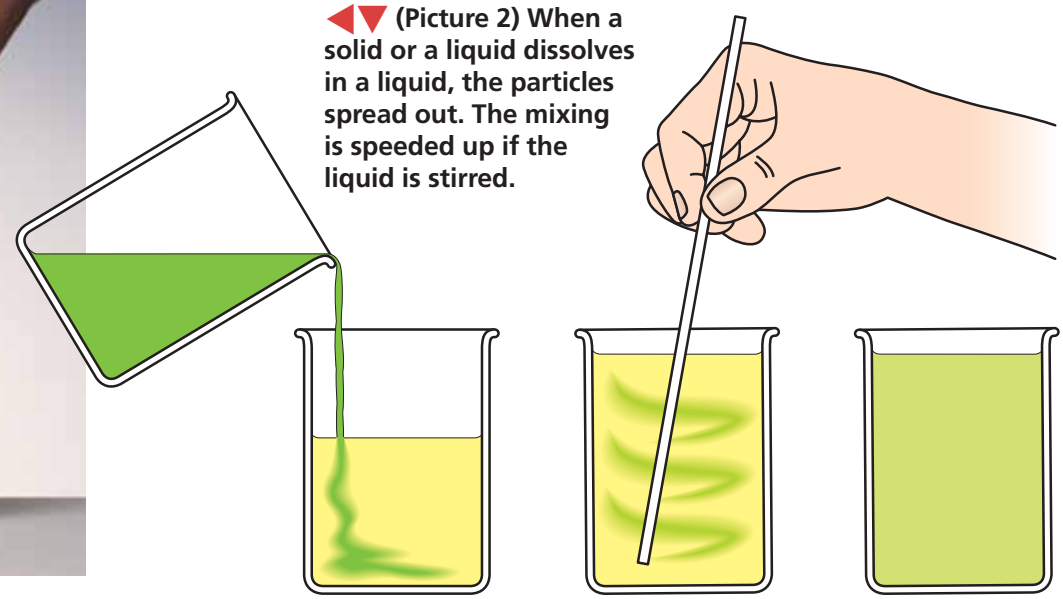


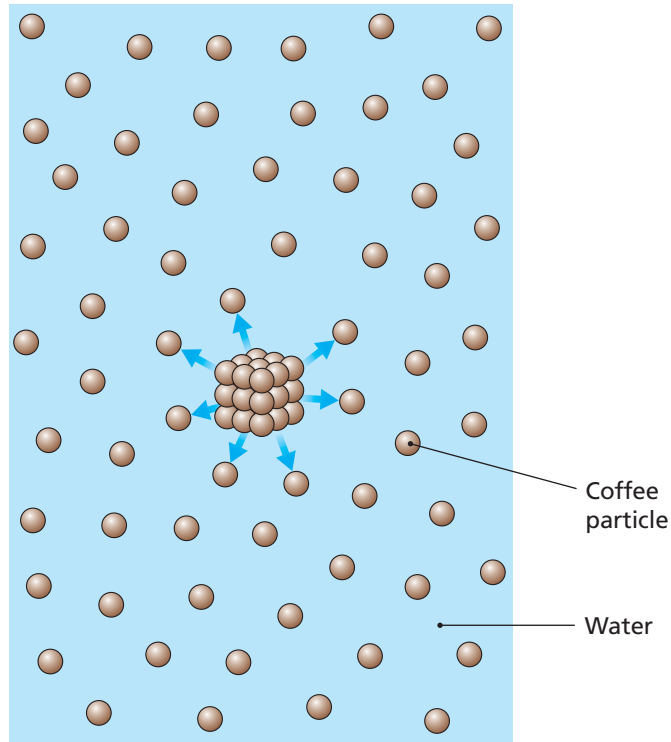
◀▼ (Picture 2) When a solid or a liquid dissolves in a liquid, the particles spread out. The mixing is speeded up if the liquid is stirred.

Mixing solids and liquids

Many solids dissolve in liquids to form a solution. If you watch grains of coffee, food dye, or another coloured substance dissolve in water, you can see what happens (Picture 3). Particles of the solid substance, such as the coffee, are attracted to the water. First, all of the surface particles are attracted away. This exposes new particles to the water, and they are then attracted away, too. As this happens, the particles in the water start to move away, spreading out evenly in the water. Each particle is too small to see, but we know they are still there because they give the water a new colour.

However, you can't keep pouring more and more liquids or solids into liquids. There is a limit to how much a liquid can dissolve. After this, no amount of stirring will help, and the remainder will settle at the bottom of the container.

▼ (Picture 3) What happens when a coffee granule dissolves in water.



Summary

- Solids can be mixed together in any proportions.
- There is a limit to how much of a solid or a liquid can be dissolved in another liquid.
- Solids or liquids that won't dissolve will stay unmixed at the bottom of the container.

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