Soluble and insoluble

Some liquids and solids seem to disappear in other liquids. These are called SOLUBLE substances. Not all substances are soluble.

You can add some liquid or solid to some liquids and they will disappear and leave the liquid clear. We call this disappearing act 'dissolving'. For example, we say that salt dissolves in water. Liquids or solids that dissolve in a liquid are called soluble.

But even though the salt seems to have disappeared, the salt and water are still a mixture like we saw on page 18.

Why we use solutions

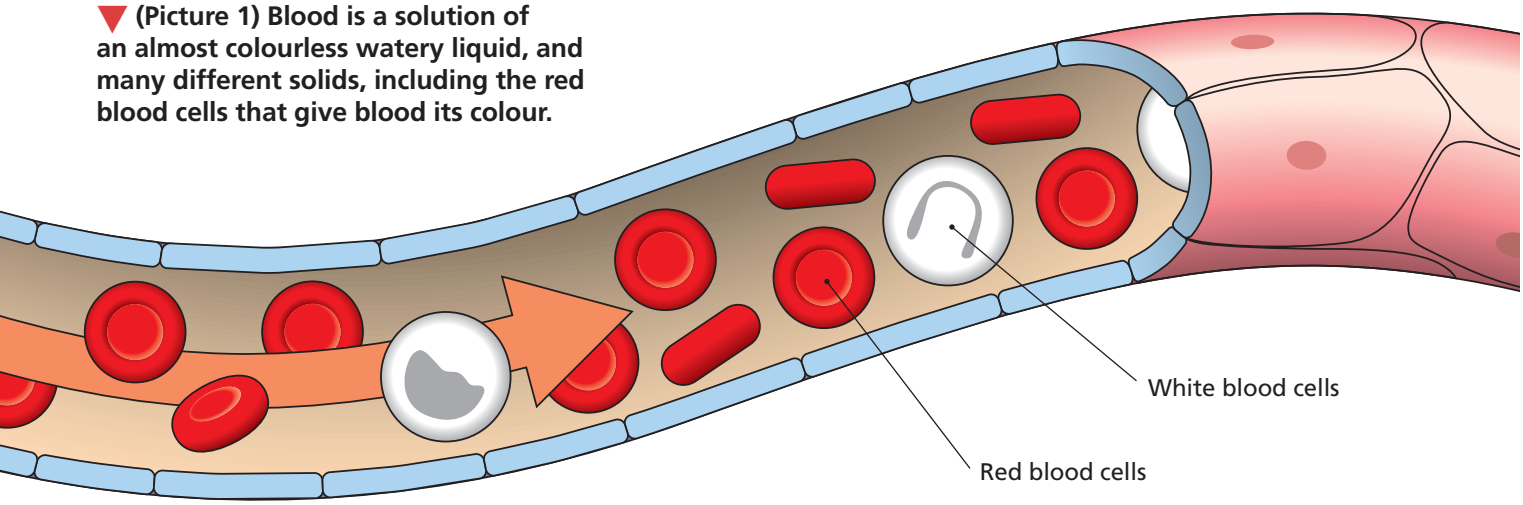
Solutions are very important for carrying materials to where they are needed. A liquid fertiliser, for example, is a way of dissolving a chemical in water so that it can be washed into the soil. Most of the materials from our food are carried around our bodies in a solution – blood (Picture 1).

Not all solids dissolve

If you put soil in water, the soil will settle out at the bottom of the container. It will not dissolve (Picture 2). A material that does not dissolve is called an **INSOLUBLE** material.

If the insoluble material is very tiny, it may stay mixed up in the liquid for a long time, and so it may appear to dissolve. Milk, for example, is made of tiny fat globules spread out in water. They have not dissolved, which is why the cream eventually separates out, leaving a watery substance below (Picture 3). Paint is another material where the solids (in this case a powder of tiny, coloured particles) have not dissolved in the liquid. Most food does not dissolve in water.

▼ **(Picture 1) Blood is a solution of an almost colourless watery liquid, and many different solids, including the red blood cells that give blood its colour.**



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Which liquids dissolve substances best?

Many liquids dissolve other substances, but the most common one is water. More substances dissolve in water than any other liquid.

However, there are many common substances that do not dissolve in water. Peas and carrots, for example, do not dissolve in the water they are cooked in.

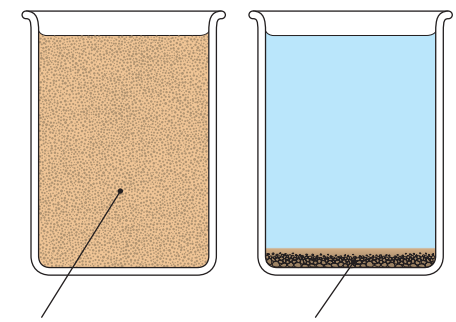
Metals do not dissolve in water, neither does pottery or glass. This is why we can use these materials as containers to hold water.

Other common substances that do not dissolve in water include greasy substances. This is why you have to use a special chemical (washing-up liquid) when you want to wash greasy dishes.

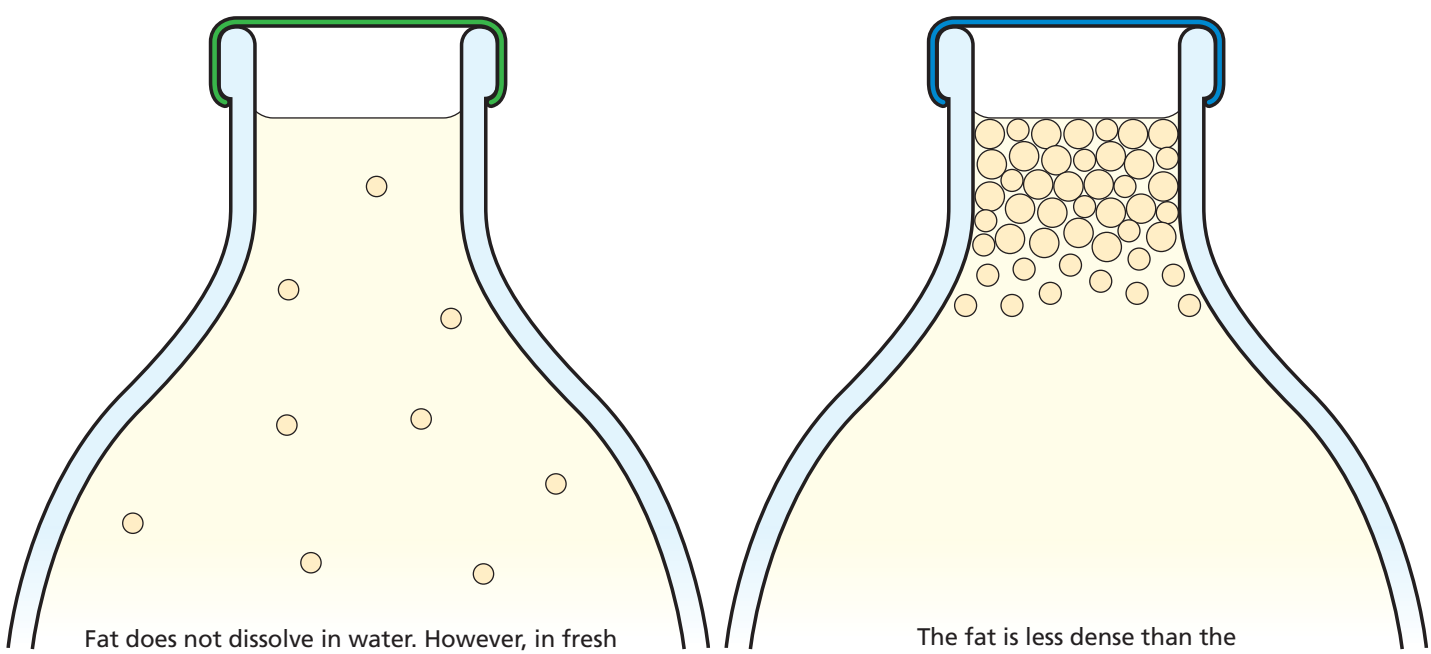
Summary

- **Not all substances dissolve.**
- **Some insoluble materials take a long time to settle out.**
- **Water dissolves more substances than any other liquid.**

▶ (Picture 2) Particles of soil are insoluble in water. If you stir soil in water, the swirling water will make the particles stay SUSPENDED for a while, but then they will settle to the bottom, leaving the water clear.



▼ (Picture 3) Milk contains fat that does not dissolve. When milk is left to stand, the fat rises to the surface as cream. (In 'homogenised' milk, a special process breaks the fat down into such small pieces that it takes a very long time to separate from the liquid.)



Fat does not dissolve in water. However, in fresh milk that has been shaken up, the particles are spread evenly in the watery liquid (called whey).

The fat is less dense than the water and it slowly rises to the surface as cream.

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