



SCIENCE HOTSPOTS

Dissolving – John Haigh

For chemicals to react the atoms and molecules have to collide.

That means they have to be moving and that means the chemicals have to be either gases or liquids. Even in ancient times alchemists knew that a great way to make chemistry happen was by getting solids to dissolve. Some substances dissolve easily but some don't.

Gold, for instance only dissolves in a mixture of strong acids called 'Aqua Regia'

The alchemists tried to find the 'Universal Solvent', a liquid that would dissolve every known substance, but what could it be stored in?

Strangely enough the nearest we have to this magical liquid is the most common liquid in the world. That's right. water.

Hot spots has a few other dissolving stories to inspire you – take a look!

John Haigh, the 'Acid Bath Murderer'



John Haigh, the notorious 'Acid Bath Murderer', killed 9 people during the 1940's.

He lured people back to his house and killed them with a revolver but the most difficult task of all was to dispose of the bodies, using vats of industrial acid. It was Haigh's mistaken belief that a corpse could be completely dissolved. Unfortunately for Haigh, certain parts of the human body are more resilient to acid than most people realise, such as teeth and bone and artificial items, such as false teeth. Haigh's false assumption that murder could not be proved without the body was to have lead to his downfall.

Imagine you are a forensic scientist trying to reproduce the acid bath conditions.

Unfortunately, you are not allowed to use very strong acid so your teacher (or lab tech) will have to set up the experiment for you.

What 'industrial acid' could you use? The most common acid is battery acid, a strong solution of Sulphuric acid used in lead-acid batteries. Easy to obtain but do you think you could just buy it in large quantities? Instead of using a real body – there are rules about that sort of thing - you will need samples of different tissues. Try nail clippings, bone, cartilage (gristle), meat and fat for instance (all the ingredients of a burger – just joking!).

Your teacher will put samples of each material in strong acid in a fume cupboard.
You can then make your observations.

You can try to dissolve pieces of bone in ordinary dilute acid. There are other liquids, which can dissolve body parts, maybe even better than acid. Alkalis, such as Sodium Hydroxide, dissolve fat in making a slippery substance called – SOAP.

If you wanted to know more about the gruesome story then have a look at these websites.

www.murderuk.com/serialkillers/johnhaigh/htm

www.bbc.co.uk/crime/caseclosed/johnhaigh/shtml

serious YUK warning though!

Teachers Notes:

The acid-bath murders never fails to interest pupils. A discussion of how to dispose of a victim's body is often entertaining. The practical opportunities are limited here, since strong acid must be used. Therefore the experiment must be demonstration only.

The pupils could be involved, however, in how the investigation is conducted. Battery acid (strong Sulphuric acid) is easily made and represents the easiest acid to obtain commercially. Small pieces of meat, fat, gristle and bone are obviously easy to obtain. Boiling tubes containing the acid and animal matter need to be left for some time in a very safe place (fume cupboard, locked prep room).

An appreciation of just how long the process takes is important. Pupils could be asked how this process could be speeded up. Answers like cutting and mincing the body and heating the acid could be reasonably expected.

An extension of this activity, that might have the added benefit of persuading pupils to wear eye protection, is to dissolve pigs eyes, but do beware of religious or vegetarian sensibilities!

Alternative chemicals could be used. Strong alkali solution could be used as a comparison. Alkali will dissolve the fat and protein better.

Disposal of animal material and acid must be done by lab technician.