Blue bottle demonstration

How it works:

The solution in the bottle contains a chemical called methylene blue and glucose dissolved in alkali. Methylene blue has two forms – blue (oxidised) and colourless (reduced). When you shake the bottle oxygen is mixed into the solution, methylene blue oxidises and the liquid turns blue. When you stop shaking glucose reduces the methylene blue and it becomes colourless again.

Why it’s important:

Methylene blue is a very useful chemical. Analytical chemists use it as an indicator and biologists use it for staining DNA. Medically it has been used to treat malaria, cyanide and carbon monoxide poisoning and may even be used as a cancer treatment in the future. Unfortunately, as a side effect, it turns the whites of the eyes blue!

Traffic light demonstration

How it works:

Instead of methylene blue this bottle contains indigo carmine. Indigo carmine has three forms – yellow (reduced), red (partially oxidised) and green (fully oxidised). Like in the blue bottle demonstration, when you shake the bottle oxygen is mixed into the solution, oxidising the indigo carmine. It then reduces again on standing.

Why it’s important:

Indigo carmine is used as a food colouring (E132) and a pH indicator. Doctors also use it to study kidney and bladder function - they inject the dye into the bloodstream and see how long it takes for the urine to turn green!

Teachers – want more ideas for colour-related chemistry practicals and demonstrations? Visit the Learn Chemistry website at http://rsc.li/learn-chemistry and search for ‘colour’

As with all science experiments, make sure you are supervised by a responsible person. And remember to have fun!