

Activity: Tea Ink

On SCOPE's Chemistry episode, you saw Julia make ink out of tea. Here's how she did it:



What you need:

Hydrogen Peroxide (you can get it from the supermarket or chemist)
Steel wool
Vinegar
Jar with a lid
Tea bags
Mug
Boiling water

What to do:

1. First, submerge the steel wool in a jar of vinegar and let it sit overnight.
2. The next day, make a strong cup of tea with the boiling water, mug and about three tea bags. Young scientists should ask an adult to them with this part. Put the cup of tea aside to brew.
3. Take the steel wool out of the jar and add about half a cap of hydrogen peroxide – the vinegar should turn a murky red colour.
4. Next, add the tea to the jar.
5. After about an hour, solid bits should have settled to the bottom of the jar. Carefully pour out some of the excess liquid and what is left in the jar is your black tea ink!
6. Now you can use the ink to create a masterpiece! But be careful as it could stain your clothes!

What's happening?

Chemical reactions can be used to make all kinds of everyday things – including ink! The first chemical reaction happened in the jar of steel wool and vinegar. Vinegar is an acid and it produces lots of hydrogen ions. When you add the steel wool, which is made of iron, the hydrogen ions react with the steel wool and turn the iron atoms into iron ions. Basically, this is what's happening:



When you add hydrogen peroxide, the vinegar turns a murky red colour and this tells us that another chemical reaction has happened! Iron actually has two different types of positive ions – iron II and iron III. The peroxide turns all the ions in the solution into iron III, which gives it the red colour.

The vinegar also reacts with the tea. Tea contains a substance called tannic acid – it's what makes the tea brown, and this acid reacts with the iron III ions to make iron tannate, which is black.



Our black ink is the iron tannate bits that have settled to the bottom of the jar!