

Colourful Corrosives

Some of you have seen a Universal Indicator before, but refresh your memory of what universal indicator does, what an acid and a base is and how the two different substances react together.



Caution

- The chemicals that you will use in these activities are exceptionally corrosive and will burn if they come into contact with your skin or eyes.
- Make sure that you wear your laboratory glasses, gloves and a lab coat at all times!

Experiment 1 – Indicators

Follow the instructions given to you by the mentors in making an indicator from red cabbage. They will then show you how to make indicator paper from the solution of the red cabbage.

Using the **solution** you have made test the substances in the chart below and make a note of the colour that you observe with this indicator solution.

Substance	Colour with Red Cabbage Indicator
Sodium Carbonate Solution	
Vinegar	
Lemon Juice	
0.5 M HCl	
0.5 M NaOH	
Calcium Hydroxide Solution	
Washing Powder Solution	

Once you have identified the colours that the red cabbage indicator solution gives with different substances use the dilute solutions to paint with. Be as original as possible!

Experiment 2 – Home Indicators

The mentors will have now given you a series of different materials. In your groups discuss which ones you think might also be useful as indicators.

Once you have decided which ones might show to be useful as an indicator test them, with your mentor, with an acidic solution, an alkaline solution and a neutral solution.

► *How will you make this a fair test?*

Experiment 3 – Secret Messages!

Can you think about what happens when an acid and a base react?

We say that the general reaction can be written as follows:



The session leader is going to show you a demonstration of a neutralisation reaction in practice.

- ▶ *With your mentors think about the following things:*
 - *Do you think the reaction gave off heat?*
 - *Is there any gas given off?*
 - *What are the chemicals that are used?*
 - *What do these chemicals produce using the above equations?*

In your groups you are going to look at making and using some disappearing ink from acid-base indicators where a coloured solution (your writing) becomes invisible over a period of a few seconds/minutes.

Your mentor is going to show you how to make up either red or blue 'ink' for you to use.

Using the ink given to you write a secret message on a piece of paper. You should notice that after a few seconds it will disappear...

- ▶ *Why is this?*
- ▶ *Within your groups discuss how you can visualise the message again? What chemical can you treat it with to make it reappear?*

Your mentor will now give you the opportunity to try and make one of your fellow group members' messages reappear!

Experiment 4 – Neutralisation reactions in practice

Your mentor will show you a number of chemicals. You need to choose another chemical from the selection that you can use to neutralise the first chemical given to you.

- ▶ *Put this into practice – Carefully in your groups attempt to neutralise the chemicals given to you and make a note in the chart below which chemical you used and how much of the neutralizing chemical that it took to give you a solution of pH 7.*

Chemical	Acid or alkali	Chemical used to neutralise	Amount required (ml)
A			
B			
C			
D			

► *Discuss your findings with your group*