

### How to make red cabbage indicator

- 1) Chop about a handful of cabbage into chunks and put into a glass or jug
- 2) Add around 100 ml of very hot or boiling water
- 3) Leave for 2-3 minutes
- 4) Sieve, strain or filter out the chunks of cabbage
- 5) Leave to cool for a few minutes
- 6) Prepare your substances to test. You need only a small amount of each substance - around 1 tablespoon - in a small glass, ramekin or ice-cube tray. Make sure you know which substance is which.
- 7) Add indicator to each of the substances. If you don't have a pipette (or turkey baster) you could use a spoon, or a jug to pour small amounts in.
- 8) Complete the first two columns of the table below

Chemical Name	Colour of indicator at end	pH	Acid, alkali or neutral

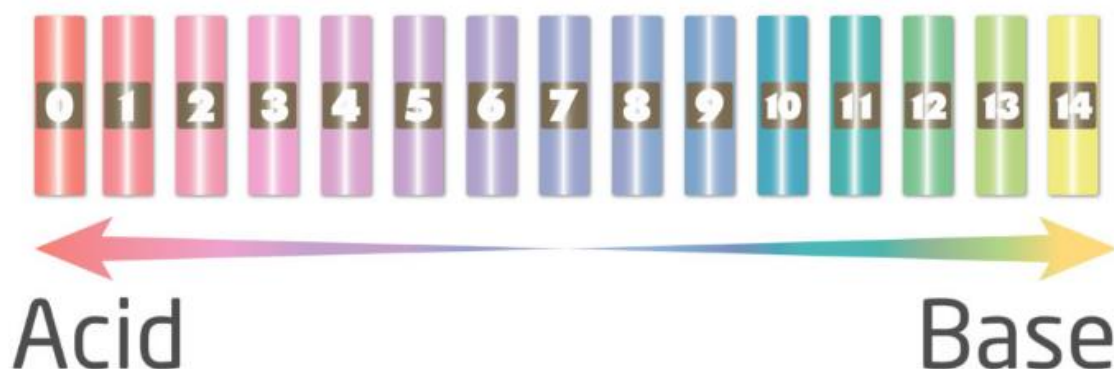
### Indicators

Indicators are special substances that change colour in acid or alkaline (sometimes called basic - we will talk about why in another lesson) solutions.

The acidity or basicity of a substance can be measured on the pH scale. This is a numerical scale from 0-14. Anything that has a pH from 0 to 6 is acidic, pH 7 is neutral, and pH 8-14 is basic or alkaline.

- 1) Your indicator will change colour depending on whether the substance tested is an acid or an alkali. **Use the scale below to match the colour to the pH value, and fill in the third column of your results table.**
- 2) Using the scale below and the information above decide whether each substance is an acid, an alkali or neutral? **Fill in the final column of your results table.**

# Red Cabbage Indicator



## Rainbow Challenge

The rainbow has become a symbol of hope during the Coronavirus outbreak, so it seems fitting that we are going to attempt to make a rainbow during the lesson.

Your challenge is to use your indicator to create a rainbow effect. Use the results table and pictures below for inspiration. If you manage to create a rainbow please take a picture of it and upload it onto this document so that I can see it!

Chemical name	Colour change	pH	Acid, alkali or neutral?
Ammonia	Green-yellow	12	Alkali
Baking soda	Blue-green	10	Alkali
Sodium carbonate	Green-yellow	12	Alkali
Lemon juice	Red	2	Acid
Vinegar	Purple	4	Acid
Seltzer water	Purple	4	Acid
Hydrochloric acid	Red	2	Acid

## A RED CABBAGE pH INDICATOR



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### Extension questions

- 1) **Can you spot any patterns in your results?** For example, is there a link between the pH of the substance and its use? See also the results table above, in case you didn't have a wide enough range of results.
- 2) Are pH indicators useful? Can you think of any examples of where they might be used? Is there anywhere that they aren't useful?

- 3) Is the colour change of the indicator reversible? You may need some of the remaining indicator to test this out.
  
- 4) Find out about the Chemistry of red cabbage indicator and write a paragraph below about what you find. You can also include a picture of the molecule involved if you like.
  
- 5) Are there any other indicators? Research some different indicators and make a table of their colours in acid, neutral and alkaline solutions.