

Cabbage Chemistry

Aim: To use red cabbage indicator to tell the difference between every day substances and identify whether they are acids or bases.



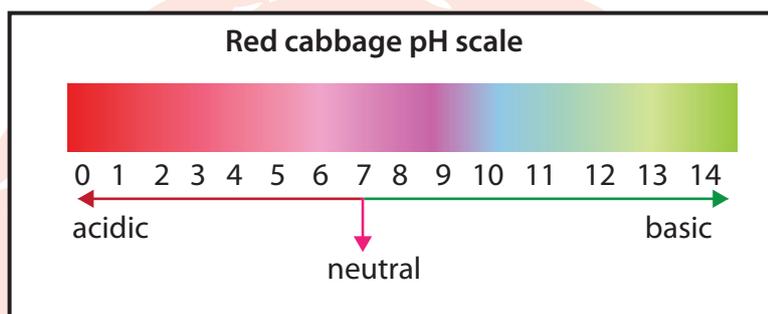
Background Information

Acids and bases are all around us! In order to describe whether things are acidic, basic or neutral, we need to use an indicator. This will change colour depending on whether the substance being tested is an acid or a base. We can then match the colour to a pH scale like the one below. The indicator you are going to use today has been made from red cabbage.

What to do

Your teacher will have prepared the red cabbage indicator, now you need to use it to test some liquids.

- 1 There will be cups on the table with different liquids inside. See if you can guess what they are by looking at them and smelling them. Write your answers in the results table below.
- 2 Have a look at the colour of each liquid. Write your answers in the table below.
- 3 Carefully add red cabbage indicator to cup 1 using a plastic dropper. 2 full droppers of indicator should be enough. Stir the liquid.
- 4 Look carefully at the colour of the liquid now and compare it to the pH scale.
- 5 Record your result in the table below.
- 6 Repeat steps 3 – 5 for all of the other cups.



Your Table

Cup	Contents	Colour Before	Colour After	pH	Acid/Base/ Neutral
1					
2					
3					
4					
5					

Conclusions

- ?** Why did the cabbage water change colour when it was added to each of the different cups?
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- ?** What would happen to the colour of the indicator if you mixed vinegar (containing indicator) and bicarbonate of soda?
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- ?** There is acid in your stomach which helps to digest your food and sometimes, if the acid travels up towards your mouth, it causes a burning feeling in your chest called heartburn. Why do you think Milk of Magnesia is used to make this better?
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Exploring the Science

Acids are often found in the foodstuffs we eat and drink and tend to have a tangy taste that makes you pull faces! Think about lemons and limes for example or vinegar. Interestingly, bread, cheese and fizzy drinks are acidic too. These are all weak acids so they are safe for us to eat but, the acid in your stomach which digests your food is really strong. Some foods are basic, for example lettuce, green beans and spinach. We often use basic substances for cleaning because they are good at removing dirt and grease.

Have a think about the liquids opposite.
Do you think they are acids or bases?
Fill in the table

Liquid	Acid or Base	Colour of Indicator
Toothpaste		
Lemonade		
Washing-up liquid		

Extra Information

One of the first known indicators was litmus – a collection of dyes extracted from lichens. Litmus turns red in an acid and blue in a base.



Acid rain is very damaging. It is caused by gases from power stations being absorbed by rain drops in the sky. Acid rain can damage buildings (particularly those built of limestone which is a base). It can also damage plants and cause harm to aquatic animals.



An indicator can be made from red cabbage leaves. Red cabbage gets its unique colour from pigment molecules called anthocyanins. Anthocyanins dissolve in water we can get them from lots of coloured plants or plant parts including poppy or rose petals, blueberries, blackcurrants and rhubarb stems



Red cabbage contains lots of antioxidants which prevent damage to the body's cells.

Red cabbage has twice the vitamin C of green cabbage.

