

LEARNING RESOURCE

RED RAINBOW CABBAGE

MATERIALS

- A red cabbage
- A jug
- Some hot water
- Some small clear pots
- A pipette
- A range of materials to test that are acidic or alkali (sodium bicarbonate, vinegar, lemon juice, coca cola, cleaning products etc)

PREPERATION

- Before doing this experiment you need to prepare your red cabbage indicator. To do this you need to remove some leaves from the red cabbage and shred/cut/rip them up into small pieces placed into a jug. Add some just boiled water to the leaves in the jog and leave to soak. You will notice that the water changes to a purple/blue colour immediately, this will just intensify overnight, and your indicator will be ready to use the next day.

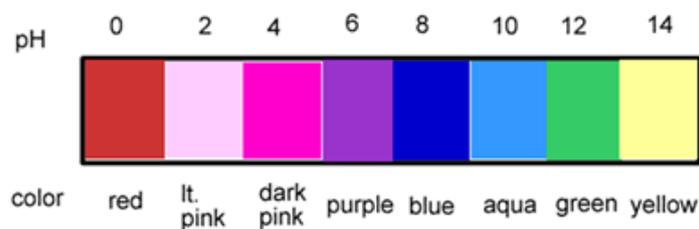
INSTRUCTIONS

1. Find some materials in your kitchen that you are going to test. These could include but are not limited to the following: Lemon juice, any fizzy drinks, orange juice, vinegar, tap water, cleaning fluids, sodium bicarbonate, baking powder.
2. Take some small clear pots and add around 10-20ml of indicator into the pots. Leave one pot with indicator only in throughout the experiment – this is your CONTROL and can be used to compare the colour changes in the other pots.

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- For each material that you are going to test: If the material is already a liquid, use a pipette to add a few drops of the liquid to the indicator and note any colour changes. Using the scale below you can note down the colour change and also what pH number this relates to.

Red Cabbage Color changes with pH



For example; if your indicator changes to a dark pink colour, you can estimate a pH reading of around pH 4. For any materials that are powders, you need to add them to water before testing. Just take a small amount of powder and add to water to make a solution, then use a pipette to add this solution to your indicator.

- Make sure that you are using a CLEAN pipette for each test to ensure no contamination between materials. Keep testing materials in the same way until you have an estimated pH for everything.
- Can you make every colour of the rainbow using this technique!? Have fun!

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EXTENSION

- Line up your indicator test pots in pH order starting from the MOST acidic through to the MOST Alkaline. Are there any colours you couldn't make? Can you find something to make this colour?
- Before testing each material can you predict what colour change you might get using what you already know about acids and alkalis?
- What happens if you add an acid and an alkali together? Do you get another colour change? Can you explain what is happening?

HOW DOES IT WORK?

Indicators are chemicals that can be added to a solution to tell us whether that solution is acidic or alkaline. Sometimes we find that in nature certain materials are natural indicators, red cabbage is one of these because it has a pigment in its leaves called an anthocyanin, this is what changes colour in response to an acid or an alkali.

When you add an acid and an alkali together you cause a chemical reaction between the two, they really don't like each other and when added together carbon dioxide gas is produced resulting in a fizzing eruption. Once this settles down the indicator will go back to 'neutral' and the mixture is no longer an acid or an alkali, this reaction is also known as 'neutralisation'.