

Measuring acidity with the pH scale

Grade 8 science (Year 9 · Class 8) · Lab

Name: _____ Date: _____ Class: _____

Red cabbage juice changes colour across the whole pH scale, so a kitchen can double as a laboratory. In this lab you test six household liquids and decide which are acids and which are alkalis, using a colour card to estimate pH.

Level: Grade 8 science (Year 9 · Class 8) · **Curriculum:** MS-PS1-2

Aim

To estimate the pH of six household liquids using red cabbage juice as an indicator.

Equipment

- Red cabbage leaves, hot water, a jug and a sieve
- Six clear cups or test tubes and a marker pen
- Lemon juice, white vinegar, fizzy water, tap water
- Baking soda solution (1 teaspoon in 100 mL water) and washing soda solution
- A syringe or spoon to measure 5 mL, and a white sheet of paper

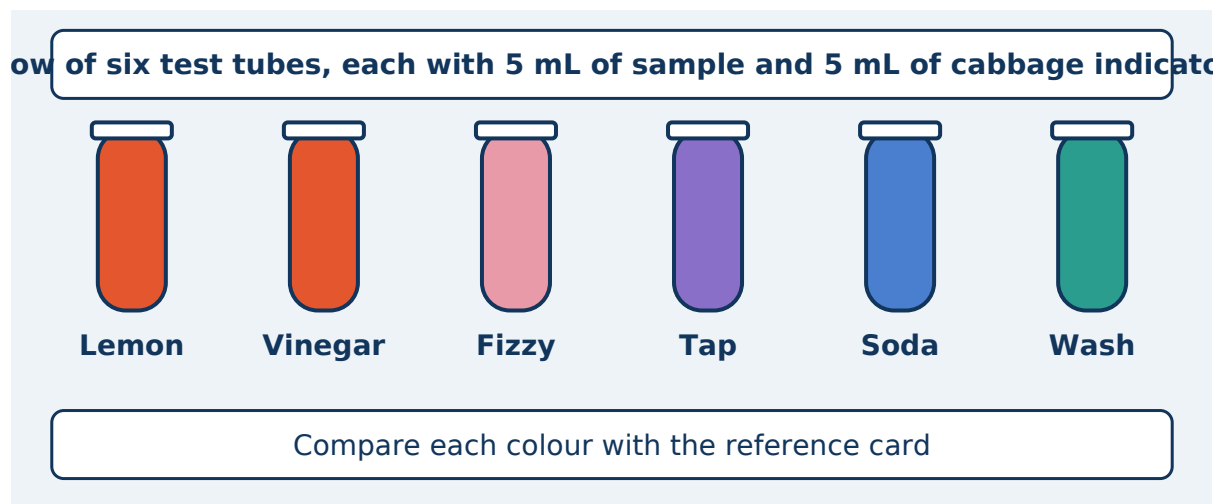
Safety

Safety

Wear goggles. Washing soda solution is irritating, so keep it off skin and eyes and rinse splashes with water. Never taste any sample. Do not use bleach or oven cleaner in this lab.

Method

1. Chop two cabbage leaves, pour on 200 mL of hot water and leave for 10 minutes. Strain the purple liquid. This is the indicator.
2. Label six cups with the sample names and place them on white paper.
3. Measure 5 mL of each sample into its cup.
4. Add 5 mL of indicator to each cup and swirl gently.
5. Record the colour after 1 minute, then use the reference card to estimate the pH range.
6. Repeat with fresh samples to check the colours.



Set-up for the cabbage indicator lab.

Results

Reference card: red is pH 2 to 3, pink pH 4 to 5, purple pH 6 to 7, blue pH 8 to 9, green pH 10 to 12 and yellow pH 13.

Liquid	Colour with indicator	Estimated pH	Type
Lemon juice	Red	2 to 3	Acidic
White vinegar	Red	2 to 3	Acidic
Fizzy water	Pink	4 to 5	Weakly acidic
Tap water	Purple	6 to 7	About neutral
Baking soda solution	Blue	8 to 9	Weakly alkaline
Washing soda solution	Green	10 to 12	Alkaline

Analysis questions

Question 1 Rank the liquids

Rank the six liquids from most acidic to most alkaline.

Question 2 Closest pair

State which two liquids are closest in pH and explain how you know.

Question 3 Limit of the indicator

Explain why the cabbage method gives a range of pH values and not an exact value.

Question 4 Fair test

List three variables you kept the same to make the test fair.

Question 5 Diluting vinegar

Predict the colour of the indicator when 10 mL of vinegar is diluted with 90 mL of water.
State whether the pH can reach 7.

Question 6 Why not bleach?

Give two reasons why bleach was not included.

Question 7 Making colours dependable

Propose two changes that would make the pH estimates more dependable for a different cabbage batch.