

EduTrend Contents

W4C · CHEMISTRY · PRIMARY

Cabbage Colour Detectives

Can a vegetable tell us which liquids are acids?

Ages 7–10 | Level: Foundation | 60 minutes | Groups of 3 · up to 30 | Activity 01

Inside: activity at a glance · step-by-step session plan · facilitator notes · 3 pupil worksheets · assessment checklist

ACTIVITY 01 · AT A GLANCE

Cabbage Colour Detectives

Pupils use red cabbage water as a natural indicator to test everyday liquids. They predict, observe colour changes and sort the liquids into acids, neutral liquids and alkalis on a class colour scale. The activity introduces careful observation, fair testing and the idea that some substances change when they are mixed.

Learning outcomes

By the end of the session pupils can:

- describe the colour changes of red cabbage indicator in different liquids;
- sort liquids into acids, neutral and alkalis using a colour scale;
- make and check a prediction;
- record observations clearly in a table.

KEY WORDS

acid · alkali · neutral · indicator · observe · predict · colour scale

CURRICULUM LINKS

Science: properties and changes of materials, working scientifically.
Maths: sorting and ordering.
English: using precise describing words.

1	2	3	4	5	6
QUESTION	**PREDICT**	**PLAN**	**TEST**	**OBSERVE**	**EXPLAIN**
What do we want to know?	What will happen?	Keep it fair	Try it safely	Record results	Why did it happen?

Materials (per group)

- Red cabbage indicator (prepared by the teacher), about 150 ml
- 6 small clear cups or a white egg box lined with cups
- Pipettes or teaspoons
- Test liquids: lemon juice, vinegar, tap water, milk, bicarbonate of soda solution, soapy water
- Labels and a pencil
- Worksheets 1, 2 and 3

Before the session

- Chop half a red cabbage, cover with hot water, leave 15 minutes, strain and cool.
- Pour the test liquids into labelled bottles for each group.
- Put everything on trays to catch spills.
- Make a large colour scale strip for the board (red, pink, purple, blue, green, yellow).
- Try each liquid yourself so you know the colours to expect.

SAFETY

Goggles on. Nothing is tasted or drunk. The teacher handles hot water. Wipe spills at once and wash hands at the end.

ACTIVITY 01 · SESSION PLAN

Step by step

Timings are for a 60-minute session. The indicator can be made the day before and kept in a fridge for up to three days.

Time	What happens	Say or ask
0–5 min **Hook**	Pour cabbage water into two glasses. Secretly add vinegar to one and bicarbonate solution to the other. The colours change to pink and green.	*"What do you think happened?"* *"Is it magic or chemistry?"*
5–15 min **Predict**	Groups look at the six liquids, smell them from a distance and predict whether each will turn the indicator pink, purple or green. They write predictions on Worksheet 1.	*"Which liquids taste sour? What might that tell us?" (Do not taste.)*
15–35 min **Test**	Groups add ten drops of each liquid to a cup of indicator, one at a time, and record the colour. They keep the number of drops the same.	*"How are we keeping the test fair?"*
35–45 min **Sort**	Groups arrange their cups from pink to green and place them on the class colour scale. Introduce the words acid, neutral and alkali.	*"Which liquids were acids? Were your predictions right?"*
45–55 min **Challenge**	Groups use the scale to identify two mystery liquids (for example diluted lemonade and washing soda solution).	*"What evidence tells you what it is?"*
55–60 min **Explain**	Pupils complete Worksheet 3 and tidy up.	*"Where else might an indicator be useful?"*

CHALLENGE CARD (print or copy onto the board)

Use your cabbage colour scale to identify two mystery liquids. Is each one an acid, neutral or an alkali? Give your evidence.

ACTIVITY 01 · FACILITATOR NOTES

The chemistry in brief

Red cabbage contains natural dyes called anthocyanins. These dyes change colour depending on how acidic or alkaline a liquid is. In acids such as lemon juice and vinegar the dye turns red or pink. In neutral liquids such as tap water it stays purple. In alkalis such as bicarbonate of soda solution and soapy water it turns blue, green or even yellow.

Scientists measure acidity on the pH scale, which runs roughly from 0 to 14. Acids have a pH below 7, neutral substances about 7 and alkalis above 7. Pupils do not need the numbers yet, but the colour scale they build is an early version of the pH scale used in laboratories, gardens and swimming pools.

Common ideas to listen for

- "Acids are always dangerous." Many acids are weak and everyday, such as lemon juice.
- "The colour change means the liquid is poisonous." The colour shows acid or alkali, not harm.
- "More drops make a different kind of liquid." More drops can deepen the colour but the liquid stays the same kind.

Adapting the activity

Support

Use four liquids only and provide a printed colour strip to match against.

Stretch

Mix an acid and an alkali drop by drop and watch the colour move back towards purple. Explain what is happening.

WORKSHEET 1

Predict and test

Name: _____ Class: _____ Date: _____

Predict the colour, then add ten drops of each liquid to the indicator and record what you see.

My results

Liquid	Prediction	Colour I saw	Acid, neutral or alkali?
Lemon juice			
Vinegar			
Tap water			
Milk			
Bicarbonate			
Soapy water			

Was it a fair test?

Tick the things you kept the same:

- ☐ the same amount of indicator
- ☐ the same number of drops
- ☐ a clean pipette for each liquid

WORKSHEET 2

Our colour scale

Colour in the scale using your results. Write each liquid under its colour.

Colour scale

Red	Pink	Purple	Blue	Green	Yellow

Mystery liquids

Mystery liquid	Colour	What is it?
A		
B		

My evidence

WORKSHEET 3

Scientist's log

Colour in the box that is true for you.

What I can do

I can...	Not yet	Nearly	Yes!
name an acid and an alkali			
use the colour scale			
keep a test fair			
explain what an indicator does			

Something that surprised me was...

Home challenge

With a grown-up, find three liquids at home and predict whether they are acids or alkalis. Draw them here.

FOR THE TEACHER

Assessment checklist

Use during the session. One sheet covers up to eight pupils; copy as needed.

Pupil	Observes carefully	Keeps the test fair	Uses evidence to sort

Suggested codes: W = working towards · E = expected · G = greater depth

ABOUT THIS ACTIVITY

Cabbage Colour Detectives is a sample activity from the EduTrend Contents W4C Chemistry programme (primary, level: foundation). Every activity in the programme follows the same format: a practical challenge, a clear session plan, facilitator notes and ready-to-print worksheets, so that teachers, club leaders and parents can run it without extra preparation.

Full 15-, 20- and 32-week programmes are available from EduStore at edutrend.org.

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