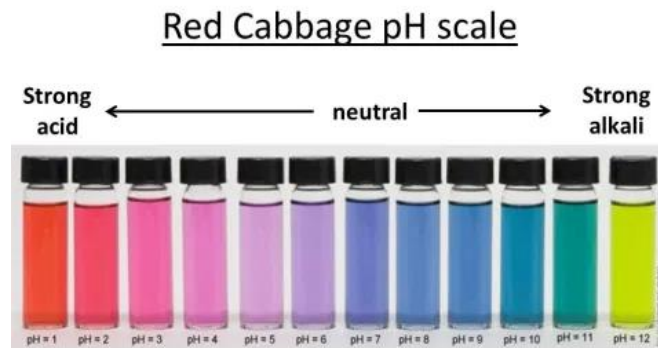


Red Cabbage pH Experiments

Preparing red cabbage to be used as a pH indicator

1. Cut up a cabbage and cover with water in a pot
2. Bring to a boil for a few minutes
3. Let cool then strain out the cabbage. Keep the purply liquid.

Red cabbage contains anthocyanins, which can be used as a pH indicator! The liquid is purple when neutral, pink or red when acidic, and blue or green when basic.



Experiment 1: Household Acid and Base Exploration (great for all ages)

Materials:

- Red cabbage
- Pot
- Water
- Various household acids and bases (e.g. lemon juice, vinegar, baking soda, dish soap, toothpaste, citric acid, antacids, tomato juice, and laundry detergent)
- Colourless (or white) bowls or cups

Instructions:

1. Introduce the topic: Acidic foods have a tangy or sour taste, like lemons! What else? Tomatoes, pickles, vinegar. Basic foods have a bitter taste, like baking soda. What else? Spinach and other leafy greens, soap, antacids.
2. Give each participant a few small dishes with some cabbage juice.
3. Allow them each to pick an item they want to test (either from the items provided or you can give them the option to test something of their choosing). Have them guess what color it will be. Arrange the containers from acidic to basic. Repeat so that each participant can try a few items.

4. Ask participants what they think will happen if you mix 2 acids together? 2 bases? An acid and a base? Give it a try!
5. Option: give students extra time to experiment and play with their “potions”.

Safety note: be careful when handling/mixing acids and bases – stick with baking soda and vinegar/lemon or similar food items if working with elementary students (avoid harsh cleaning supplies)!

Experiment 2: Create a pH scale and test strips (great for junior high and high school students)

Materials:

- Red cabbage
- Pot
- Water
- Various acids and bases (e.g. lemon juice, vinegar, baking soda, dish soap, toothpaste, citric acid, antacids, tomato juice, and laundry detergent)
- Colourless (or white) small containers
- Filter paper or coffee filters

Instructions:

1. Introduce pH and acids/bases and connect to the curriculum.
2. Create red cabbage liquid as described above but boil it longer to reduce it (let the water boil off) to concentrate it.
3. Submerge filter paper or coffee filters into the red cabbage juice. Soak it for at least an hour, then remove and allow to dry (hanging works well).
4. Meanwhile, you can put cabbage juice into small containers and test each acid and base separately. Line them up from most to least acidic. Use items with known pH values (or look them up) to create a pH scale (like in the image at the top). Note: you will not be working with whole numbers as above and you’ll likely have some items that produce very similar colours
5. Once your filter paper has dried, cut it into strips/squares. Add a small drop of substances with unknown pH and use your pH scale to estimate how acidic or basic they are.

These experiments are inspired by <https://frugalfun4boys.com/kitchen-chemistry-kids-test-acids-bases-red-cabbage/> and <https://www.thoughtco.com/making-red-cabbage-ph-indicator-603650>.