SCIENCE WORLD

At-Home Activities

CABBAGE JUICE INDICATOR

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BACKGROUND SCIENCE:

Chemicals are all around us. We can make sense of these chemicals by determining whether they are acids, bases, or neutral. Acids create hydronium ions when in contact with water and have a sour taste. Bases are the opposite; they create hydroxide ions when in contact with water and have a bitter taste. When these hydronium and hydroxide ions combine, they create water again, which is neutral.

Cabbage juice contains a molecule called anthocyanin. When anthocyanin comes in contact with hydronium ions in an acid it turns pink. When it comes in contact with hydroxide ions in a base it turns blue or green. Because of this, we call cabbage juice a pH indicator, because it can tell us whether a substance is acidic or basic.

MATERIALS:

- Red cabbage, coarsely cut into small pieces
- Heat proof container
- Boiling water
- Strainer
- Small clear cups
- A variety of household substances to test, such as: lemon juice, vinegar, baking soda and water solution, dish soap and water solution, hand soap and water solution, soda water

WHAT TO DO:

1. First, prepare the cabbage juice indicator (best done by an adult):
   a. Add red cabbage pieces to the heat proof container.
   b. Pour boiling water over the cabbage until submerged. Let steep for one hour.
   c. Allow to cool, then strain to remove cabbage pieces. Keep the liquid!
2. Then, perform your experiment:
   a. Pour approximately 50 mL of each household substance you are testing into a clear cup. Keep track of what goes in each cup (you can use a sharpie to write on the cup or place each cup on a labeled piece of paper)!
   b. Add 1-2 tbsp of the cabbage juice into each cup.
   c. Observe the cups. What colour change do you see? Is your substance an acid or a base?

WONDERINGS:

- Does a chemical reaction take place when you mix the cabbage juice with your substance? How do you know? Where else have you observed chemical reactions taking place in your household?
- What other safe household substances could you test the indicator on? Try some of them out!
- Can you predict what colour the mixture will turn by reading the ingredients on a substance that you're testing?
- Look at all of your acids. How do their colours compare? Why aren't they all the same shade of pink?
- Look at all of your bases. How do their colours compare? Why aren't they all the same shades of blue/green?