

Title: Acids and Bases:Cabbage Juice Indicator

Grade Level: 5

Standard Connection: chemical reaction, making observations and recording data, drawing conclusions

Introduction (5 min)

- Introduce ourselves
- Chemistry is important because chemical reactions happen all around us every day (body, gasoline, cooking).
- Learning chemistry helps us to understand our world better and improve our world (understand what chemicals are polluting our air, make new medicines)

Background (10 min)

Chemical Reaction – process in which molecules rearrange into different products that have different properties

- Sometimes we can see chemical reactions occurring (bubbles, color change) Today's reaction we'll see a color change

We will learn about 2 types of chemicals called acids and bases

Many things around your house are acids and bases and we'll explore this more today

An acidic solution has excess H^+ molecules

A basic solution has excess OH^- molecules

A neutral solution is neither acidic or basic

Scientists use something called a pH scale to measure how acidic or basic a solution is. The scale goes from 0 to 14.

Acidic solutions have a pH of 0-6

Neutral solutions have a pH of 7

Basic solutions have a pH of 8-14

Today's chemical reaction

- A purplish colored molecule in cabbage juice + acids → a red/pink colored molecule

-Also the molecule in cabbage juice + bases → blue/green colored molecule

-The molecule in cabbage juice does not react with neutral molecules so no color change

Therefore cabbage juice can be used to indicate if a solution is acidic or basic so it is called an indicator.

Demonstration (10 min)

- Show how the cabbage juice strips change color in different solutions showing examples of the colors.
- Explain how to perform experiment and fill in work sheet and safety concerns

Hand-on Experience (30 min)

Will have prepared cabbage juice paper strips and solutions of common household acids and bases : sprite, vinegar, water, lemon juice, laundry detergent, windex, and alka seltzer.

Students will pair up and drop the solutions on the strips. The color change will indicate to them whether the solution is acidic, basic, or neutral. They can even try to approximate the pH by looking at the pH color scale or just say whether the pH is 0-6, 7, or 8-14. They will fill in the table with their observations.

Wrap Up (5 min)

- Give directions for clean up
- Ask what did we learn today?
- Ask if they can think of any other chemical reactions we can see by color change?
- Give the students cabbage juice strips to take home and experiment with

