



SCIENCE FESTIVAL FAMILY GUIDE: ARE YOU AN ACID OR BASE?

Instructions:

Student: Fill two of your jars with a few inches each of distilled water. Fill the third with the same amount of white vinegar.

Adult: Add a teaspoon of baking soda to one of your jars of distilled water and stir. (You will have one jar of white vinegar, one jar of distilled

water and one jar of distilled water mixed with baking soda).

Student: Using a teaspoon, add a few drops of the cabbage juice to each of your jars.

Both: Observe what happens.

Questions for after:

K-2nd:

Can you describe what you saw happen in the different cups?

Why do think that the liquids turned different colors?

3rd- 5th:

-Which ingredients were basic, how could you tell?

-Which ingredient were acidic, how could you tell?

-What other things could you 'test' with your cabbage indicator?

-Can you predict what color they would change?

How It Works:

In this experiment, we are using the red cabbage water as an acid-base indicator. Red cabbage contains anthocyanin or pigment molecules that what gives the cabbage its purple-red color. They will change their color depending on the pH (how much acid or base) of their environment. When added to very acidic solutions (the vinegar cup), the red cabbage water will turn a pinkish-red color. Cabbage water and neutral solutions (the water cup) result in a bluish-purple color. Cabbage water and basic solutions (the baking soda cup) appear greenish-blue.

Vocabulary:

pH or "potential of hydrogen": A numeric scale that tells us whether a substance is an acid or a base. The pH scale ranges from acid (0-6) to neutral (7) to base (8-14).

Basic: A solution is *basic* if it has a low concentration of hydrogen ions, or a pH of greater than 7. Some examples of basic things are soap, bleach, ammonia, and toothpaste.

Acidic: The opposite of basic is *acidic*—acidic solutions have a high concentration of hydrogen ions and a pH of less than 7. Some examples of acidic things are lemon juice, coffee, and soda.

Real-World Application:

If you have ever swum in a chlorinated pool, someone has completed a very similar experiment to make sure the water is safe to swim in. A neutral pH of 7.4 will keep a pool clean without the water hurting your eyes. If you get an upset stomach from eating too much or a certain type of food, you may take some medicine to make your stomach feel better (antacid or pepto bismol) these medicines are basic and help to neutralize the pH of your stomach.

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