LESSON 2

SUMMER BAG:
pH OF HOUSEHOLD SUBSTANCES

Hands - On Distance Learning
Provided By Downeast Institute

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pH OF HOUSEHOLD SUBSTANCES

(appropriate for all ages though younger students may require more assistance)

Background: pH is a scientific measurement used to determine if a substance is acidic (an acid), alkaline (a base), or neutral (neither an acid nor a base). A pH reading of 7.0 indicates a neutral substance; a pH lower than 7.0 indicates an acidic substance (an acid); a pH higher than 7.0 indicates an alkaline substance (a base).

Materials:

- data notebook (or piece of paper)
- pencil or pen
- collecting bottle
- pH strips and color code

Lesson Procedure:

1. Set up a data table with 4 columns and 3 rows. Label the first column **substance**, the second column **pH color,** the third column **pH number**, and the 4th column **acid, base, or neutral substance**. See page 3 for the data sheet.
2. Fill the collecting bottle about ½ full with water.
3. Dip one end of a pH strip into the water sample.
4. Remove the pH strip from the water sample and immediately match the color of the wet end of the strip with the pH color code (to determine the pH of the water sample).
5. Record (write down) the name of the substance, the color of the pH strip immediately after removing it from the substance, and the pH number on the data sheet. Also write the word acid, base, or neutral.
6. Empty and rinse the collecting bottle.
7. Fill the collecting bottle about ½ full with vinegar.
8. Hypothesize (guess) whether vinegar is an acid, base, or neutral substance.
9. Repeat steps 4-7.
10. Place a pinch of baking soda in the collection bottle.
11. Hypothesize whether baking soda is an acid, base, or neutral substance.
12. Repeat steps 4-7.
13. Procedure may be repeated with other substances.

DEI Connection/Real Life Application: Tanks and aquariums must be maintained at the proper pH to ensure proper water quality for animals living and growing in them. Fecal material (waste) and uneaten food can cause pH changes. Marine fish and invertebrates require a pH between 8.2 and 8.4.

Adaptations/Extensions/Helpful Hints:

- A pre-printed data table is included on the next page if desired for time constraints or other reasons.
- Students may wish to investigate pH of other substances, first by hypothesizing the pH of each substance.
- Color of pH strip must be matched with color-coded scale immediately after removing from substance as color on strip can undergo further change when exposed to possible substances in the surrounding air.

NEXT GENERATION SCIENCE STANDARDS (NGSS)

All Grades

Practices	3. Planning and Carrying Out Investigations 4. Analyzing and Interpreting Data 8. Obtaining, Evaluating, and Communicating Information
Crosscutting Concept	6. Structure and Function
Disciplinary Core Idea	PS1A: Structure and Properties of Matter

Performance Expectations (right click on blue text links to NGSS)

Grade 2:

2-PS1-1 Matter and Its Interactions

Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Grade 5:

5-PS1-3 Matter and Its Interactions

Make observations and measurements to identify materials based on their properties.

Data Sheet
pH of Household Items

Substance	pH color	pH number	Acid, base, or neutral substance?

More lessons available at: http://www.DowneastInstitute.org/curriculum-resources.