

THEME:	Water Monitoring
SCOPE & SEQUENCE UNIT:	pH
OBJECTIVE:	What is pH?
ACTIVITY:	Measuring pH

Notes:	In-class activity
Teacher Prep.:	pH paper and household substances, see Materials
Time:	45 minutes

Skills:

- ◆ Math Literacy
- ◆ Writing and oral language
- ◆ Ecological literacy

Objectives:

- ◆ To discover the different values of pH for different substances
- ◆ To experience using a visual colour test

Background Information:

The acidity or alkalinity of a substance can be measured as a pH value. The pH scale is from 1 to 14. A pH of 7 is neutral; lower than 7 is acidic, and higher than 7 is basic or alkaline. Pure water has a pH of 7 (at 25°C). An increase of one whole number corresponds to a ten-fold change. pH is a measure of potential hydrogen (H^+), or the concentration of hydrogen ions in a liquid solution.

pH measurements are important in many areas, including: biology, chemistry, agriculture, forestry, medicine, food science, and environmental science. Within a freshwater ecosystem, the pH of the water will determine whether fish, invertebrates and plants can live in the water, or reproduce. See Resources below for a pH scale and relative value.

Materials:

pH paper, ranging from 1-14 (available from science stores) – have enough multiple colour scales available for the students to take their readings easily

various household substances: ammonia, vinegar, milk, diet coke, baking soda, apple juice, lemon juice, shampoo, household cleaning agent, tap water, milk of magnesia

have each of the substances in a small container (glass jars or beakers work well), labeled

Introduction Discussion:

Introduce the term pH to students assessing their collective knowledge. Students with hot tubs are often familiar with the term and know it involves chemistry. Since this activity is an exploration of pH, a general introduction to the scale and the terms neutral, acidic and basic or alkaline is sufficient to start the activity.

Review the student page with the students and allow them orient to the scale and make their predictions.

in small groups, each group moving around to the different substances.

Reflection Discussion:

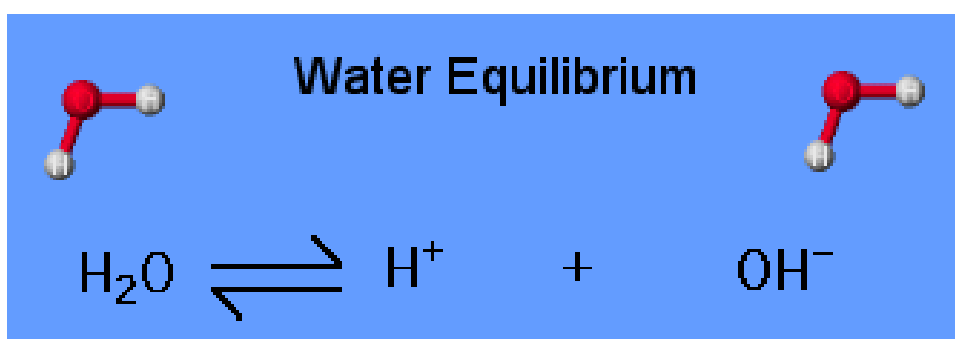
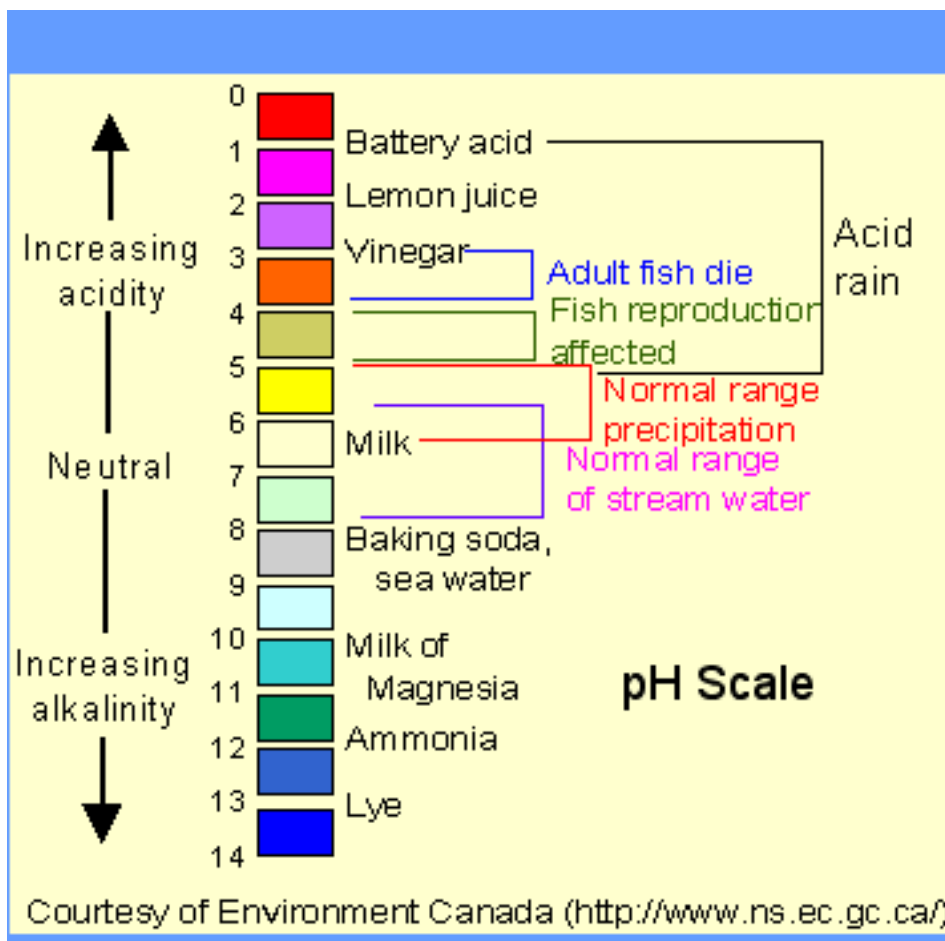
Dialogue as a class on the results once all student groups have tested all substances and written their reflections on their student page. How did the observed measurements compare with predictions? How might slight fluctuations in pH affect life in the water?

Student Page:

pH Testing of Household Substances

Resources:

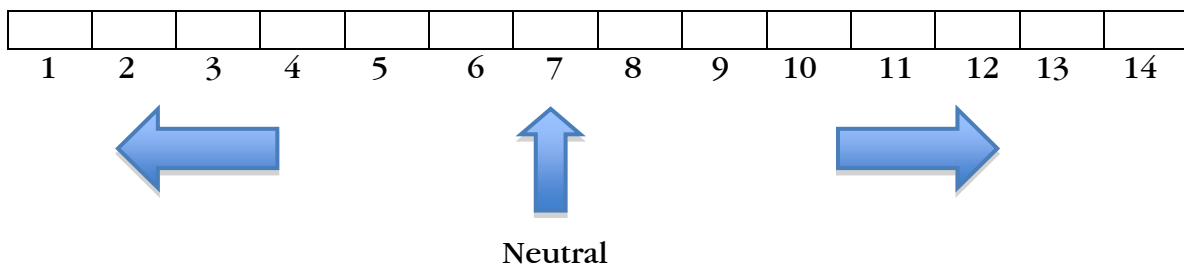
pH scale



Name: _____ Date: _____

pH Testing of Household Substances

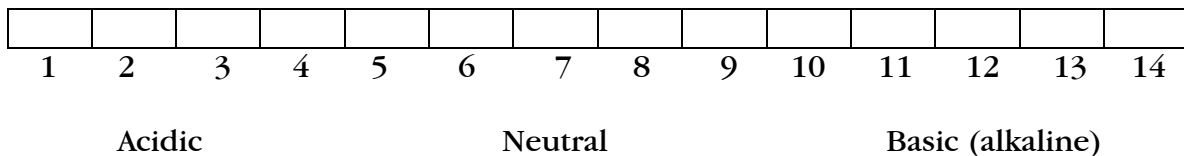
pH Scale



Prediction

Predict which substances will be acidic, neutral and basic (alkaline) and write them under the appropriate headings:

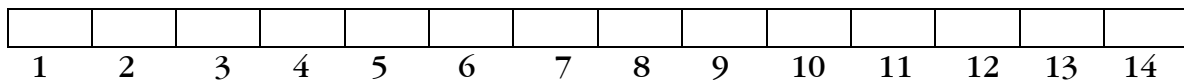
pH Scale



Testing

In groups, measure the pH of each of the substances and record their pH level on the pH scale below.

1. Tear off a approximately 5 cm of pH paper.
2. Hold one end of the paper and dip the other end into the substance for 5 seconds.
3. Place the wet end of the pH paper on to the scale and try to match the colour.
4. Record the substance name on the scale at its pH level.
5. Use a new piece of pH paper for each substance. Repeat procedures.



Compare your measured results with your predictions. What did you discover?

How might even slight fluctuations in the pH affect living creatures in water?

Exemplar:

Name: _____ Date: _____

pH Testing of Household Substances

pH Scale

more acidic Neutral more basic (alkaline)

potential hydrogen pH

Prediction

Predict which substances will be acidic, neutral and basic (alkaline) and write them under the appropriate headings:

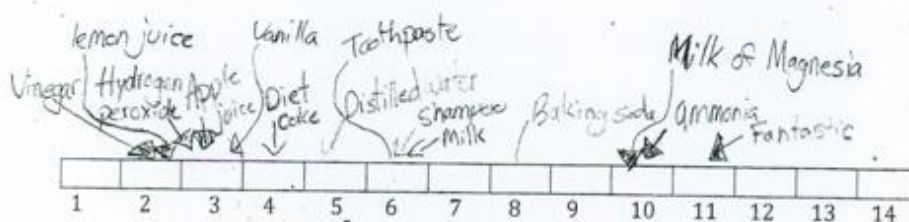
pH Scale

Acidic	Neutral	Basic (alkaline)
Ammonia	lemon juice	apple juice
Vinegar	hydrogen peroxide	Milk of Magnesia
Fantastic	Shampoo	Distilled water
	tooth paste	Milk
	vanilla	baking soda
	diet coke	

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Compare your measured results with your predictions. What did you discover?

I thought that the cleaning products (ammonia & Fantastic)
were really acidic but actually they were one of the highest
basic/alkaline!

How might even slight fluctuations in the pH affect living creatures in water?

Burn their skin. If they didn't die they would be
extremely sick!