City of Gresham
Columbia Slough Regional Stormwater Treatment Facility (CSRSTF)

Scavenger Hunt

Supplemental information about pH

Note: This sheet provides background information for the activity to test the pH of the creek at the bridge on the west end of the site. This information is from the EPA and can be found at: www.epa.gov/acidrain/measure/ph.html

What is pH?

Definition: A measure of the acidity or alkalinity of a solution that is measured on a scale of 0 to 14, with 0 being most acidic, 7 being neutral, and 14 being most basic.

Acidic and basic are two extremes that describe chemicals, just like hot and cold are two extremes that describe temperature. Mixing acids and bases can cancel out their extreme effects; much like mixing hot and cold water can even out the water temperature. A substance that is neither acidic nor basic is neutral.

How is it measured?

The pH scale measures how acidic or basic a substance is. **It ranges from 0 to 14.**

- **A pH of 7 is neutral.** *Pure water is neutral, with a pH of 7.0.*

When chemicals are mixed with water, the mixture can become either acidic or basic**.**

- **A pH less than 7 is acidic.** *Vinegar and lemon juice are acidic substances.*
- **A pH greater than 7 is basic.** *Laundry detergents and ammonia are basic.*

Discussion point: Strong stuff

Briefly discuss information below and ask how water that is either very basic or very acidic might affect aquatic creatures?

Chemicals that are very basic or very acidic are called “reactive.” These chemicals can cause severe burns:

- Automobile battery acid is an acidic chemical that is reactive. Automobile batteries contain a stronger form of some of the same acid that is in acid rain.
- Household drain cleaners often contain lye, a very alkaline chemical that is reactive.

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Activity to test for pH

You will need:

- the long-handled bailer from the WWTP
- the Water Monitoring kit *(in backpack)*
- the rubber gloves *(in backpack)*

Before you begin:

1. Read safety precautions (p. 4-5) in the booklet in the Water Monitoring kit.
2. Then read the instructions for testing pH (p. 14 -15).
   - Pull out the long plastic test tube from the kit.
   - Tear off one of the pH test tablets.
   - Pull out the pH color test range card.

To start the activity:

1. Use the other side of this sheet to explain to students what pH is and how it is measured.
2. Ask for 3 volunteers. Line these 3 students up from left to right at the front of the group – they will be the points on the scale to measure pH.
   - The student in the middle will be #7 (neutral) on the scale.
   - The student on the right will be #0 (very acidic).
   - The student on the left will be #14 (very basic).
3. Using the information on the other side of this sheet, have a brief discussion about what pH means to aquatic creatures. Talk about how:
   - student #0 represents water that would be like living in vinegar
   - student #7 represents water that would be like living in water from our faucets
   - student #14 represents water that would be like living in ammonia
4. Ask the rest of the students line up behind one of the 3 students on the scale who represents the type of water they would want to live in if they were a fish.
5. Put on the rubber gloves, stand on the bridge, dip the long-handled water bailer into the creek, and pull up a small amount of water.
6. Carefully pour some water into the text tube. Add the pH testing tablet and put the lid on the test tube.
7. You can have one of your students shake the test tube; another student can hold the color test range card and compare the color of the water with the colors on the card to determine the pH of the water.
8. Ask students to stand about where that color might fall on your 3-student scale.