Unit 4 • Classifying Chemicals

STUDY LIST

I can…

Acids & Bases

- ☐ state the operation definitions of acids, bases, and neutral chemicals.
- ☐ state the theoretical definitions of acids, bases, and neutral chemicals. [Formulas]
- ☐ use cabbage juice and conductivity data to identify strong acids, weak acids, strong bases, and weak bases, salts, and molecular compounds.
- ☐ use pH paper, universal indicator, litmus paper, or phenol red solution in place of cabbage juice.
- ☐ neutralize an acid with a base.
- ☐ write formulas of common acids and bases and state whether they are weak or strong.
- ☐ write equations showing the neutralization of acid with base to form water and a salt.
- ☐ explain that water is a VERY weak electrolyte, making its formation a driving force for the double replacement reaction that is acid-base neutralization.

Solutions & Molarity

- ☐ identify the solute and solvent in a solution.
- ☐ quantify the concentration of a solution using the definition of molarity.
- ☐ state the definition of molarity, $\frac{\text{moles of solute}}{\text{Liters of solution}}$
- ☐ make a solution correctly.
- ☐ dilute a concentrated solution to make a specified quantity of a dilute solution, $V_i \cdot \underline{M}_i = V_f \cdot \underline{M}_f$
- ☐ perform a titration using an acid-base indicator such as phenolphthalein solution.
- ☐ calculate the concentration of an unknown acid or base given titration data.

How Can An Acid Be "Weak"?

- ☐ explain how an acid can be weak in terms of "dissociation equilibrium."
- ☐ explain why the H^+ ion is referred to as a proton.
- ☐ explain that when an acid donates a proton, another molecule (H_2O) must accept the proton to form hydronium ion (H_3O^+).
- ☐ define acids & bases according to the Arrhenius definition.
- ☐ define acids & bases according to the Brønsted-Lowry definition.

What is pH?

- ☐ write the equilibrium equation associated with pure water. $2H_2O(l) \rightleftharpoons H_3O^+(aq) + OH^-(aq)$
- ☐ write the K_{eq} expression for water and state that the value of $K_w = 1.0 \times 10^{-14}$
- ☐ use Le Châtelier's Principle to explain the "Z" diagram.
- ☐ explain that every aqueous solution contains some H^+ and OH^- and that $[H^+][OH^-] = 1 \times 10^{-14}$.
- ☐ calculate the $[H^+]$ and $[OH^-]$ for any aqueous acidic or basic solution.
- ☐ state the definition of pH as the "power" of the $[H^+]$.
- ☐ state the pH given simple data such as $[H^+] = 1 \times 10^{-5}$ $\underline{M}$ or $[OH^-] = 1 \times 10^{-11}$ $\underline{M}$.
- ☐ State that pH + pOH = 14 and explain:

$[H^+]$	$[OH^-]$
pH	pOH