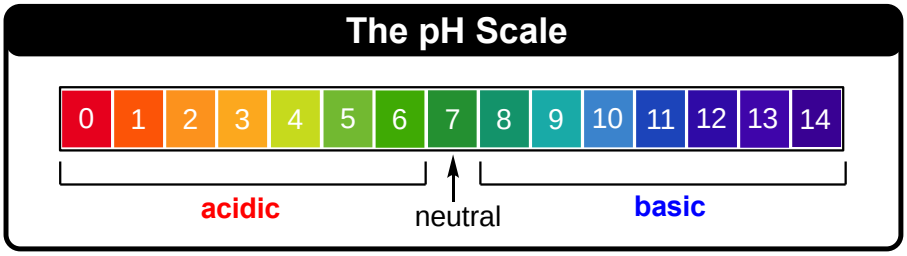
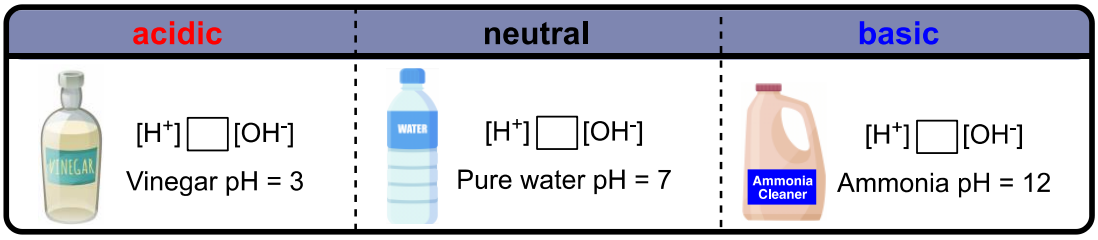
**CONCEPT:** THE pH SCALE

- The **pH Scale** is used to classify _____ or _____ of aqueous solutions.
  - □ pH scale ranges from ___ to ____ under normal conditions (T = ____°C, up to ___ M solution).



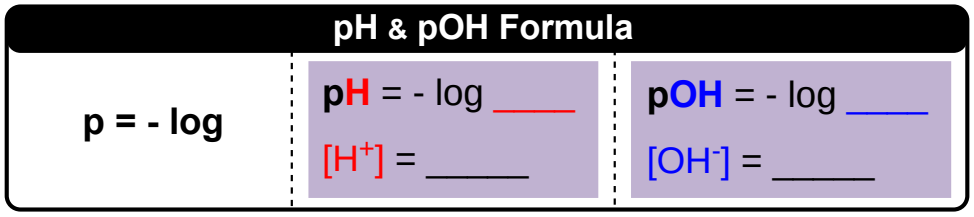

- **Stronger** the Acid: ____ the pH; **Stronger** the Base: ____ the pH.




**EXAMPLE:** Given the [H+] of the following solutions, which one is the least acidic?

a) $HNO_3$: [H+] = 1.2 M  b) HCl: [H+] = 0.025 M  c) $H_2SO_4$: [H+] = 0.27 M  d) $HClO_4$: [H+] = 0.019 M

- We can determine pH or pOH of solution if concentrations (M) of ____ and/or _____ are known, and vice versa.




**EXAMPLE:** A solution is prepared by dissolving HCN in 2 L of water. The $[H^+]$ was found to equal to 0.34 moles. Calculate the pH of this HCN solution.

**PRACTICE:** A solution of NaOH was prepared in a chemistry lab and the pOH was determined to be 9.3. What is the concentration of $OH^-$ ions of this basic solution?

**CONCEPT:** THE pH SCALE

**pH & pOH Formulas**

**pH** = - log $[H^+]$

$[H^+] = 10^{-pH}$

**pOH** = - log $[OH^-]$

$[OH^-] = 10^{-pOH}$

**Additional pH and pOH Calculations**

- Recall: the pH scale goes up to ____ at temperature of 25ºC.
  - □ To calculate pH from pOH or vise versa, we use this formula:

**pH & pOH Formula**

**pH + pOH = _____**

**EXAMPLE:** You prepare a solution of HCl with a pH of 2.3 at 25ºC. What would be the pOH and the concentration of hydronium ions of this solution?

**PRACTICE:** Calculate $[OH^-]$ of a lemon juice solution at 25ºC with a [H+] = $5.7 \times 10^{-4}$ M.

**PRACTICE:** A 345 mL bottle of antacid ($Mg(OH)_2$) contains $1.45 \times 10^{-2}$ moles of hydroxide ions. Determine pH and pOH of the antacid.

**PRACTICE:** Which of the following statement(s) on aqueous solutions is/are correct?

a) aqueous solutions have a pH of 7

b) as concentration of hydronium ion increases, concentration of hydroxide ion decreases

c) solutions of weaker acids generally have a higher pOH then solutions of stronger acids

d) pH of pure water equals to 7 at 35º C.