

Guided Notes: pH

Name: _____ Period: _____

pH:

- pH = _____
- acids have a _____
- bases have a _____
- neutral has a _____
- Increases by a factor of _____ between numbers on the pH scale
 - pH of 3 has ten times the [H⁺] of pH 4

pH and pOH:

pH Practice:

Calculate the pH of solutions having the following ion concentrations at 298K.

$$[\text{H}^+] = 1.0 \times 10^{-2} \text{ M}$$

$$[\text{OH}^-] = 8.6 \times 10^{-6} \text{ M}$$

Which of the solutions is more acidic?

pH Practice:

$$[\text{H}^+] = 3.75 \times 10^{-6}$$

What is the pH of a solution with a pOH of 12.5?

Which of the solutions is more acidic?

Finding Ion Concentration:

$$[\text{H}^+] = \underline{\hspace{2cm}}$$

Practice:

Calculate the [H⁺] in a solution with a pH of 2.37.

Calculate the [H⁺] concentration of a solution with a pOH of 8.5.

Strength of Acids and Bases:

- _____: refer to the # of moles of acid or base dissolved in a volume of solution
- _____: refers to degree of ion formation
- _____ acids and bases _____ ionize (also called strong electrolytes)
 - ex: $\text{HCl} \rightarrow \text{H}^+ + \text{Cl}^-$
- _____ acids and bases have _____ ionization (establish equilibrium)
 - ex: $\text{HC}_2\text{H}_3\text{O}_2 \leftrightarrow \text{H}^+ + \text{C}_2\text{H}_3\text{O}_2^-$

Strong Acids: HCl, HI, HBr, HNO₃, H₂SO₄, HClO₄

Strong Bases: LiOH, NaOH, KOH, RbOH, Ca(OH)₂, Sr(OH)₂, Ba(OH)₂

Any acids or bases not on this list are weak!

Practice

Calculate the pH of the following solutions:

0.10 M HI

2.4×10^{-5} M HNO₃

Measuring pH:

- _____: will change the color depending on the hydrogen ion concentration in solution, the color is then compared to a standard scale
- _____: more accurate than pH paper, contains electrode that are immersed in solution, will give a digital readout

Check for Understanding:

1. Calculate the pH of a solution that contains:
 - a. $[H^+] = 3.0 \times 10^{-8}$ M
 - b. 0.050 M HNO₃
 - c. $[H^+] = 9.8 \times 10^{-2}$ M
2. What is the $[H^+]$ in a solution that has a pH of 4.75?