Thursday, April 25th

Objective: Students will learn how to calculate pH.

1. Bellringer
2. Notes: pH
3. Finish Acid/Base Lab

HW: Acid Base Lab (Mon.), Test Corrections (tom.), Article (tom.) pH calculations (tom.)
Due: none

May 2-8:40 AM

Acid-Base Lab

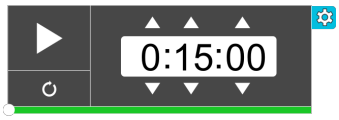
Purpose: determine pH of common substances

Googles **NEED** to be worn at ALL times!!!

3 stations are set up (A, B, and C)

Read the directions carefully and do not mix the substances or switch pipets.

You need to **FINISH TODAY** with your group of 3-5.



Apr 26-12:24 PM

pH:

- pH = -log [H^+]
- acids have a pH < 7 (less than)
- bases have a pH > 7 (more than)
- neutral has a pH = 7
- Increases by a factor of 10 between numbers on the pH scale
  - *pH of 3 has ten times the [H^+] of pH 4*

pH scale

0 ..... 7 14

acidic ↑ ← [H+] ↑

basic ↑ → [OH-] ↑

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pH and pOH:

$14 = pH + pOH$

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pH Practice

$-\log[H^+]$

- Calculate the pH of solutions having the following ion concentrations at 298K.
  - > $[H^+] = 1.0 \times 10^{-2}$ M

$pH = -\log(1.0 \times 10^{-2}) = 2$

  - > [H+] = 8.6×10^{-6} M

$pH = -\log(8.6 \times 10^{-6}) = 5.1$

Which of the solutions is more acidic? 2

= - LOG (1 2nd EE x^{-1} -2)

= - LOG (8.6 E 2nd x^{-1} -6)

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pH Practice

- Calculate the pH of solutions having the following ion concentrations at 298K.
  - > $[H^+] = 3.75 \times 10^{-6}$ M

$-\log(3.75 \times 10^{-6})$ pH = 5.4

  - > What is the pH of a solution with a pOH of 12.5? $14 = pH + 12.5$ pH = 1.5

12.5 − 12.5

1.5

Which of the solutions is more acidic? 1.5

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Finding Ion Concentration

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

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Practice

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

$[H^+] = 10^{-2.37}$

10^-2.37 = 0.004 M

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Practice

- Calculate the $[H^+]$ of a solution with a pOH of 8.5.

14 = 8.5 + pH
-8.5 pH = 5.5

$10^{-5.5} = 0.000003$

10^-5.5 3 E -6

3×10^{-6} M

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Strength of Acids and Bases

- Dilute and Concentrated: refer to the # of moles of acid or base dissolved in a volume of solution
- Weak and Strong: refers to degree of ion formation
  - > Strong acids and bases completely ionize (also called strong electrolytes)
    - *ex: HCl --> $H^+ + Cl^-$*
  - > Weak acids and bases have incomplete ionization (establish equilibrium)
    - *ex: $HC_2H_3O_2$ <--> $H^+ + C_2H_3O_2^-$*

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Strength of Acids and Bases

- Strong Acids: HCl, HI, HBr, HNO_3, H_2SO_4, $HClO_4$
- 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!

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