<u>CONCEPT:</u> pH

1) <u>Calculating pH</u>

●Many enzymes & biochemical processes are strongly affected by the _____ of protons [H$^+$].

●*pH*: logarithmic measurement of the _____ ion concentration in a solution.

  ☐ pH indirectly measures [OH$^-$].

  ☐ pH is mathematically defined as the _____ logarithm of [H$^+$].

$$pH = -log[H^+] = log\frac{1}{[H^+]}$$

EXAMPLE: Determine the pH of a solution with a [H$^+$] of 0.04 M.

  a) pH = 11.2   b) pH = 7.5   c) pH = 3.6   d) pH = 1.4

PRACTICE: Determine the pH of a solution with a [H$^+$] of 2 x 10^{-5} M.

  a) pH = 2.2   b) pH = 4.7   c) pH = 10.9   d) pH = 6.1

2) <u>pH Scale</u>

●The pH scale goes from _____ to _____.

  ☐ _____ solutions have a pH value of _____ & the [H$^+$] = [OH$^-$].

  ☐ _____ solutions have pH value of _____ than 7 (pH < 7) & the [H$^+$] > [OH$^-$].

  ☐ _____ solutions have pH value of _____ than 7 (pH > 7) & the [H$^+$] < [OH$^-$].

EXAMPLE: pH Scale.

	Acidic							Neutral	Basic						
pH:	0	1	2	3	4	5	6	**7**	8	9	10	11	12	13	14
[H$^+$] M:	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-7}	10^{-8}	10^{-9}	10^{-10}	10^{-11}	10^{-12}	10^{-13}	10^{-14}
[OH$^-$] M:	10^{-14}	10^{-13}	10^{-12}	10^{-11}	10^{-10}	10^{-9}	10^{-8}	10^{-7}	10^{-6}	10^{-5}	10^{-4}	10^{-3}	10^{-2}	10^{-1}	1

Lemon juice   Pure H$_2$O   Bleach

●[H$^+$] or [OH$^-$] _____ than 1 lead to pH values outside the normal 1-14 scale (much harder to measure).

  ☐ Biological solutions typically stay in the normal range of the pH scale.

<u>**CONCEPT:**</u> pH

EXAMPLE: Determine the pH of a solution with a [OH⁻] of 3×10^{-4} M. Is the solution basic, acidic or neutral?

    a) pH = 12.9

    b) pH = 10.5

    c) pH = 5.7

    d) pH = 7