Purpose How Do We Detect Acids + Bases?

(#1) Indicators change colors to show acid or base

(#2) Electronic meters give exact decimal pH numbers.

(#3) How Do Their Formulas Look?

Formulas with (Metal Atom) & (O)(H) is usually a base

NH_3 is a base.

Formulas that start with H are often acids.

Substances that give H^+ during a reaction are acids.

Substances that receive H^+ during a reaction are bases.

Do
3, 4A
6, 12
for a stamp.

Name of who is writing on this side:

Name of who is watching AND offering advice on this side:

Answers

Colored indicators ----------

1. (page 590 in our Wilbraham Chemistry Textbook)
   An indicator is a valuable tool for measuring pH. Why?

   _____

   _____

2. (p. 589) What color is phenolphthalein when the pH is 2? COLORLESS!
3. (p. 589) What color is phenolphthalein when the pH is 10? PINK!
4. (p. 589) Name two other substances that are indicators besides phenolphthalein:
   methyl red ~~red~~ bromothymol blue

Math ----------

5. Fill in the chart using the rule: **[H+] multiplied by [OH-] equals $1x10^{-14}$**

Test tube	concentration of hydronium (mol/L)	concentration of hydroxide (mol/L)
A	1×10^{-10}	1×10^{-4}
B	1×10^{-5}	1×10^{-9}
C	1×10^{-6}	1×10^{-8}
D	1×10^{-7}	1×10^{-7}
E	1×10^{-7}	1×10^{-7}

6. Using page 584 from your textbook fill in the chart:

concentration of hydronium (mol/L)	concentration of hydroxide (mol/L)	
1×10^{-5}	1×10^{-9}	coffee
1×10^{-2}	1×10^{-12}	lemon juice

Now switch!

Who is writing on this side:

Who is helping on this side:

Colored indicators

7. (p. 590) What color is bromocresol green when the pH is 1? yellow
8. (p. 590) What color is bromocresol green when the pH is 5? green/blue
9. (p. 590) What color is bromocresol green when the pH is 10? blue

10. Fill in the chart using the rule: **pH = - log[H+]**

Test tube	[H+]	pH
F	5.22×10^{-10}	9.282
G	1×10^{-15}	15
H	1×10^{-17}	17
i	1.58×10^{-12}	11.8

Math

antilog (−11.8)

11. Using page 584 from your textbook fill in the chart:

concentration of hydronium (mol/L)	concentration of hydroxide (mol/L)	
1×10^{-12}	1×10^{-2}	washing soda
1×10^{-7}	1×10^{-7}	pure water

acid math

CHeMistry: http://gmeat.weebly.com

Stop in for help every day at lunch and Tues. &Thurs after school!

Test 6 is Friday May 27 (short period); study the new material learned from May 9th through Wednesday May 25th.

Name_____

Period_____

1. If a beaker contains 0.00000593 moles of H+ ions, in 30.0 mL of water,
   a. What is the [H+]?

$$\frac{0.00000593 \text{ moles}}{0.0300 \text{ L}} = 1.98 \times 10^{-4} \text{ M}$$

   b. what is the pH?

$$pH = -\log(1.98 \times 10^{-4} \text{ M})$$

1. (Memorized Formula #1) What is the mathematical definition of pH (give the formula)?

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

2. (Memorized Formula #2) What two concentrations always give 1×10^{-14} when multiplied together?

hydroxide concentration and hydrogen concentration

$1 \times 10^{-14} = [H^+][OH^-]$

3. **If the concentration of [H+] is 2.33×10^{-9}, calculate the concentration of [OH-]**

Start by writing an appropriate formula. Circle the unknown…	Then rearrange to get the unknown alone.	Plug in the known values and solve.
$1 \times 10^{-14} = [H^+][OH^-]$	$\frac{1 \times 10^{-14}}{H^+} = OH^-$	$\frac{1 \times 10^{-14}}{2.33 \times 10^{-9}} = 4.29 \times 10^{-6}$

4. If the concentration of [H+] is 7.30×10^{-4}, calculate the concentration of [OH-]

1.3696×10^{-11}

1.37×10^{-11} M (#4)

5. If the concentration of [H+] is 7.30×10^{-4}, calculate the pH

3.14 (#5)

6. ** If the concentration of [H+] is 2.33×10^{-9}, calculate the pH and ~~pOH~~

8.63 (#6)

7. If the concentration of [OH-] is 2.33×10^{-9}, find the [H+] and then calculate the pH (you will

$1 \times 10^{-14} = [OH^-][H^+]$

$1 \times 10^{14} = (2.33 \times 10^{-9})(H^+)$

$\frac{1 \times 10^{-14}}{2.33 \times 10^{-9}} = H^+$

$H^+ = 4.29 \times 10^{-6}$

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

$pH = -\log(4.29 \times 10^{-6})$

$pH = 5.37$

HARVARD UNIVERSITY
Division of Continuing Education

This is to certify that

Evan Genest

has participated in

CS50 for Educators

a workshop held 29 April 2016 – 1 May 2016
with 16 hours of in-person instruction
and 15 hours of preparatory work.

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