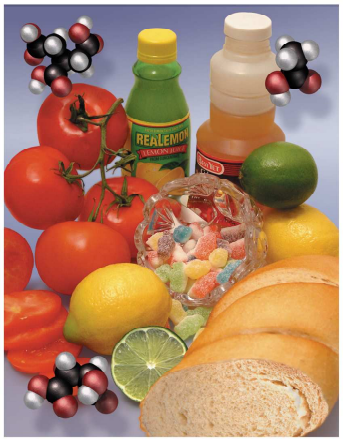
Acids:

- Sour taste
- Turn litmus **red**
- Normally have H written first in formula (HCl, HNO_3, etc.)
- Treated like an ionic compound with H^+ / anion$^-$



Binary acids: H and one other element

Oxyacids: H and an oxyanion

Bases:

- Bitter taste
- Turn litmus **blue**

Ionic hydroxides:

Carbonates:

N-containing molecules:

Acids create H_3O^+ (hydronium) ion in water

hydronium ion structure:

1. Dissociation:

   $HCl(g) \rightarrow$

2. Hydronium ion formation:

   $H^+(aq) + H_2O(l) \rightarrow$

Overall: $HCl + H_2O \rightarrow$

Every acid produces hydronium ions in water by a similar process:

$HNO_3 + H_2O \rightarrow$

$H_2SO_4 + H_2O \rightarrow$

Bases create OH^- (hydroxide) ion in water:

$NaOH(s) \rightarrow$

A **strongly acidic** solution has a relatively high concentration of _____.

A **strongly basic** solution has a relatively high concentration of _____.

A **neutral** solution has

A basic solution still has some H_3O^+ ions,
but $[OH^-]$ $[H_3O^+]$ and vice-versa for acidic solutions.

The **pH scale** is a 0-14 scale which measures the acidity or basicity of solution.

0
1
2
3
4
5
6
7
8
9
10
11
12
13
14

pH = 2 means $[H_3O^+] = 10^{-2}$ *M*

pH = 3 means $[H_3O^+]$ =

Which is **more acidic**, pH = 2 or pH = 3?

If $[H_3O^+] = 10^{-9}$ *M*, then pH =

Logarithms:
log 10^9 = 9
log 10^2 =
log 10^{-9} =
-log 10^{-9} =

pH = -log $[H_3O^+]$

10^0 =
10^{-1} =
10^{-2} =
10^{-3} =

0
1
2
3
4
5
6
7
8
9
10
11
12
13
14

If $[H_3O^+] = 10^{-6}$ *M*, then pH = -log 10^{-6} =

If $[H_3O^+] = 1.0 \times 10^{-12}$ *M*, pH =

If $[H_3O^+] = 4.2 \times 10^{-12}$ *M*, pH =

Text calculator: (-) LOG 4.2 E (-) 12 =

Numerical calculator: 4.2 E 12 +/- LOG +/-

pH calculations

$pH = -\log [H_3O^+]$

If $[H_3O^+] = 2.87 \times 10^{-3}$ *M*, what is pH?

(in pH values, the sig figs are after the decimal point)

If pH = 8, $[H_3O^+]$ =

$[H_3O^+] = 10^{-pH}$

If pH = 2.87, $[H_3O^+] = 10^{-2.87}$ =

text calculator: 10^x (-) 2.87 =

numerical calculator: 2.87 +/- 10^x

If pH = 6.43, $[H_3O^+] = 10$ =

(Use MODE or SCI if your calculator gives you 0.00000…)

$[OH^-]$ and pOH calculations

If $[OH^-] = 10^{-4}$ *M*, pOH = 4

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

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

pH + pOH =

pH	pOH
0	14
1	13
2	12
3	11
4	10
5	9
6	8
7	7
8	6
9	5
10	4
11	3
12	2
13	1
14	0

$[H_3O^+]$ ⇌ pH ⇌ pOH ⇌ $[OH^-]$

If $[OH^-] = 0.0230$ *M*, pOH =

pH =

$[H_3O^+]$ =

pH shows this solution is: acidic / basic / neutral

What is the pH, pOH, $[OH^-]$, and $[H_3O^+]$ of 1.50×10^{-3} *M* HCl(*aq*)*?*

Which is HCl? acid or base

These equations will be given on the final exam:

- $pH = -\log [H_3O^+]$
- $[H_3O^+] = 10^{-pH}$
- $pH + pOH = 14$
- $pOH = -\log [OH^-]$
- $[OH^-] = 10^{-pOH}$

What is the pH, pOH, $[OH^-]$, and $[H_3O^+]$ of 2.43×10^{-5} *M* KOH(*aq*)?

Which is KOH? acid or base

When an acid and a base react, treat them like ionic compounds and do a double displacement reaction, remembering that H^+ and OH^- combine to form:

___ HNO_3 + ___ $Ca(OH)_2$ →

___ H_2SO_4 +