Electrolytes vs Non-electrolytes

	Electrolyte	Non-electrolyte
Definition	Substances when dissolved in water conduct electricity.	Substances when dissolved in water DO NOT conduct electricity.
Why	Because when dissolved in water ions (+ and - charge) are produced.	Because when dissolved in water ions ARE NOT produced.
Identify	The 1st element will start with a metal (Found in group 1, 2 or 3) ex- NaCl	The first element will start with a non-metal (found in groups 4-7) ex- PCl3

The Basics on Electrolytes.mp4

Electrolyte dissociation

Def: The separation of a molecule into its atoms

Ex: $NaCl_{(s)} \Rightarrow Na^{+}_{(aq)} + Cl^{-}_{(aq)}$

$CaS_{(s)} \Rightarrow Ca^{+2}_{(s)} + S^{-2}_{(g)}$

How to determine if electrolyte dissociation will occur?

Look at **1st of compound.**

1st element is a metal = electrolyte = electricity is produced

1st element is a non-metal = non-electrolyte = no electricity

***Elements starting with 'H' will conduct electricity.**

Which examples will conduct electricity?

$CaCl_2$

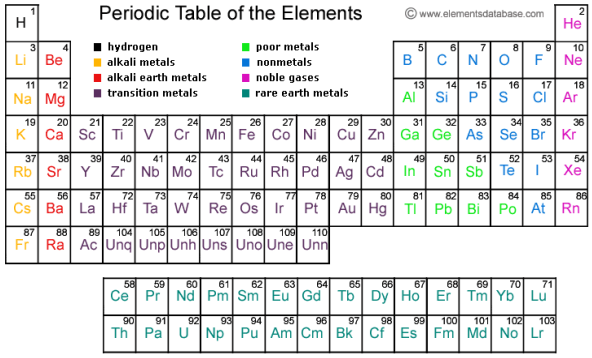
H_2SO_4

P_2S_3

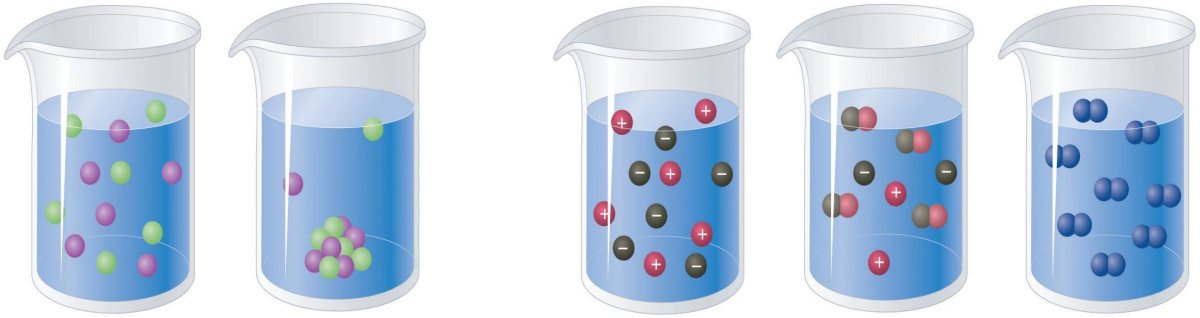
KOH

SCl_2

CCl_4



Conduction capabilities



(a) Compound solubility

(b) Electrical conductivity

Types of electrolytes

	Acid	Base	Salt
Definition	· · · pH less than 7 · · · taste sour · · · turn blue litmus paper RED · · · when dissolved, separate into H^+ and a negative ion · · · (diagram) · · · start with "H" (HCl, H_2SO_4)	· · · pH greater than 7 · · · bitter, slippery · · · turn red litmus paper BLUE · · · when dissolved, separate into OH- and positive ion (diagram) · · · end in "OH" (NaOH, Mg(OH)2	· · · made of metals bonded to non-metals (KCl, CaCl2, MgBr2) · · · have no effect on litmus paper · · · important in human body (minerals), soil, fertilizer
Electrolyte	· · · H+ and a negative ion	· · · OH- and positive ion	· · · made of metals bonded to non-metals
Litmus paper	BRA (Blue -> Red = Acid)	RBB (Red -> Blue = Base)	have no effect on litmus paper
Found in	Fruits, cleaning products, batteries	Blood, cleaning products	Foods, human body, soil
Recognize	**H**	OH	
Examples	HCl	NaOH	NaCl, KCl,
Exceptions	H2O	CH3COOH	

From the molecular formula, how can you determine if a substance is a non-electrolyte?

False acids and bases (organic molecules)

- molecules that may start with H or end in OH but are NOT electrolytes

- these molecules contain carbon (C)

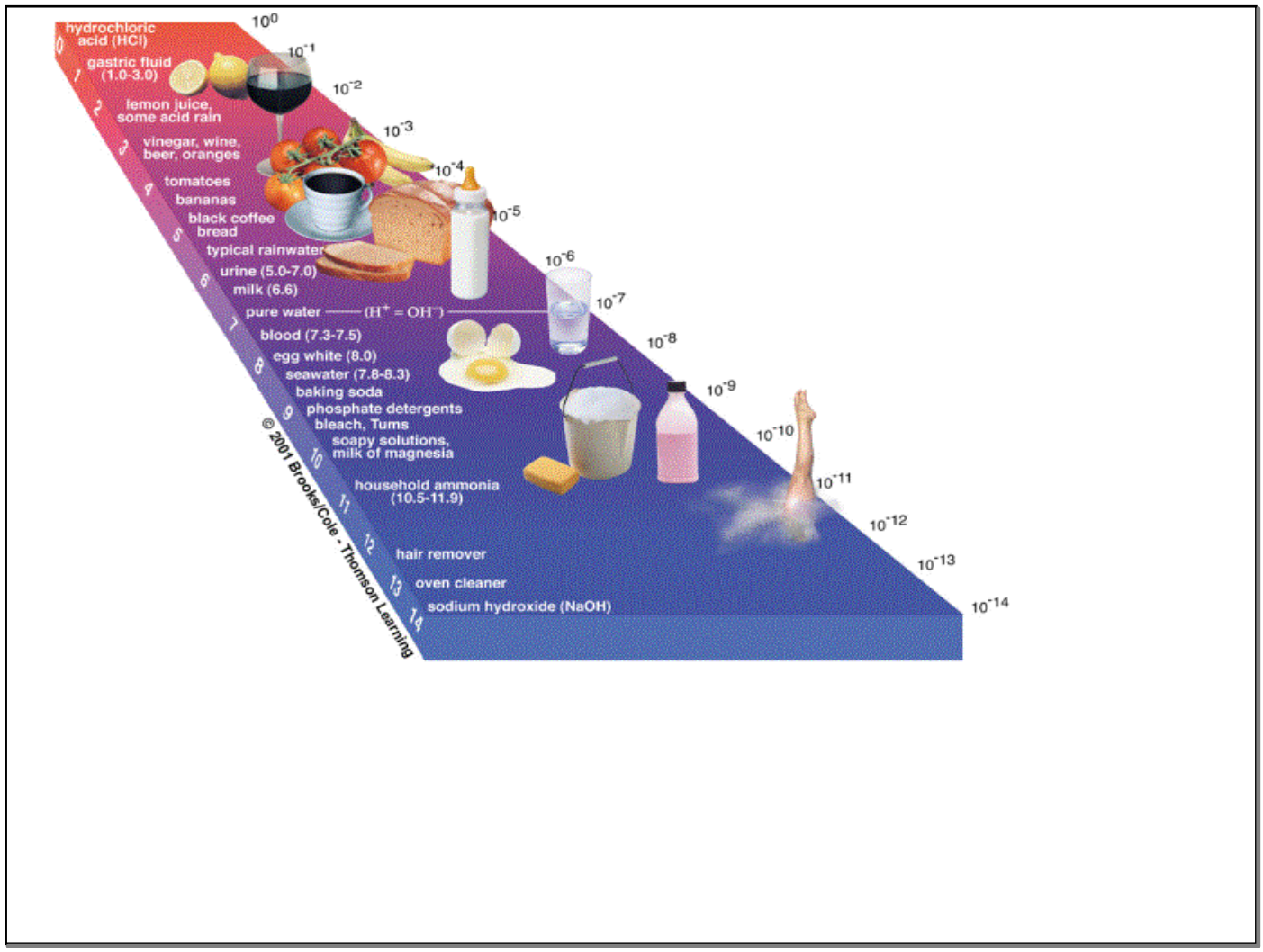
- they do not separate into ions, therefore do not conduct electricity

- they are neutral

Ex. CH^3OH, C^2H^5OH, CH^3COOH

The pH Scale

Hydrochloric acid
Lemon
Apple
Banana
Water
Baking soda
Ammonia
Drain cleaner
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
Most acidic
Most basic
Vinegar
Tomato
Milk
Blood
Soap


hydrochloric acid (HCl)
gastric fluid (1.0-3.0)
lemon juice, some acid rain
vinegar, wine, beer, oranges
tomatoes
bananas
black coffee
bread
typical rainwater
urine (5.0-7.0)
milk (6.6)
pure water
$(H^+ = OH^-)$
blood (7.3-7.5)
egg white (8.0)
seawater (7.8-8.3)
baking soda
phosphate detergents
bleach, Tums
soapy solutions, milk of magnesia
household ammonia (10.5-11.9)
hair remover
oven cleaner
sodium hydroxide (NaOH)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
10^0
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{-8}
10^{-9}
10^{-10}
10^{-11}
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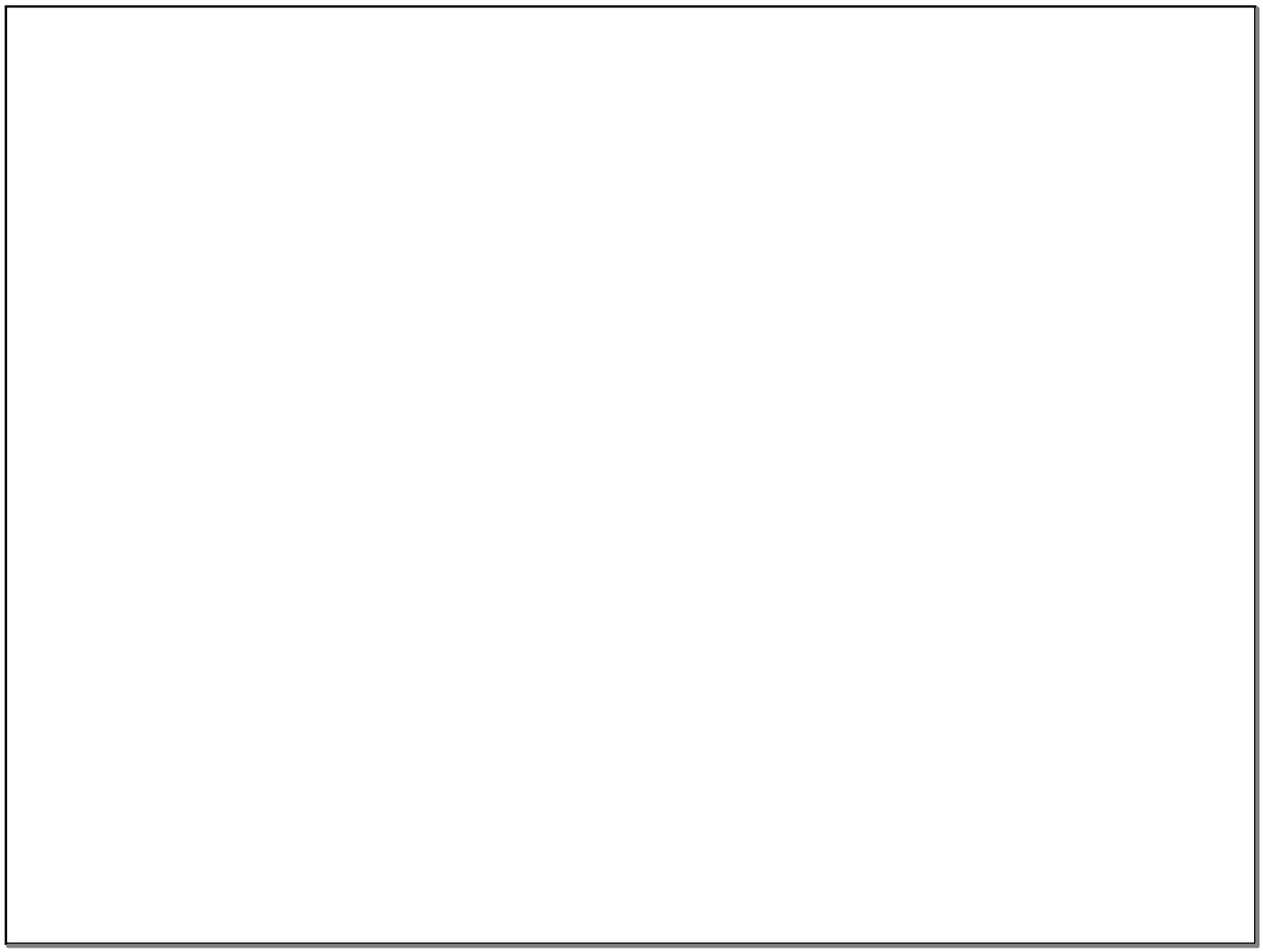
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