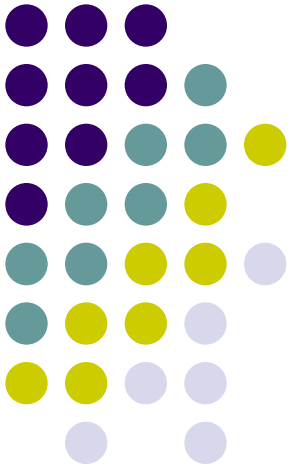
ACIDS, BASES & pH

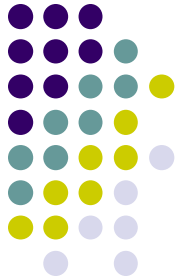
Would you like a FlufferNutter?



ACIDS

- Contain the hydrogen ion [H^+]
- Are sour (if tasted)
- Combine w/ metals to form H_2 gas
- Make good electrolytes
  - Solution that conducts electric current
- Will affect the color of indicators
  - Litmus paper (blue to red)
  - BTB Bromthymol Blue (blue to yellow)
  - Phenolphthalein (no change)

common acids

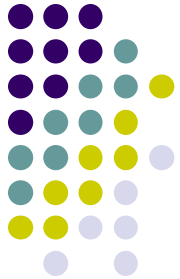


- HCl (hydrochloric acid)
  - Very strong
  - Stomach acid
  - Metal cleaner
- H_2SO_4 (sulfuric acid)
  - Strong dehydrator
  - Fertilizers, acid rain
- $H_3C_6H_5O_7$ (citric acid)
  - OJ, tomatoes

BASES

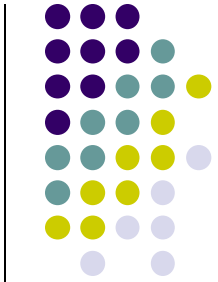
- Contain the Hydroxide ion [OH^-]
- Are bitter (if tasted)
- Are slippery (if touched)
- Will affect the color of indicators
  - Litmus paper (red to blue)
  - Phenolphthalein (red)

common bases



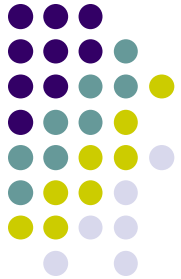
- NaOH (sodium hydroxide)
  - DRĀNO (lye)
- $Mg(OH)_2$ (magnesium hydroxide)
  - Antacid – milk of magnesia
- NH_4OH (ammonium hydroxide)
  - Household ammonia

pH



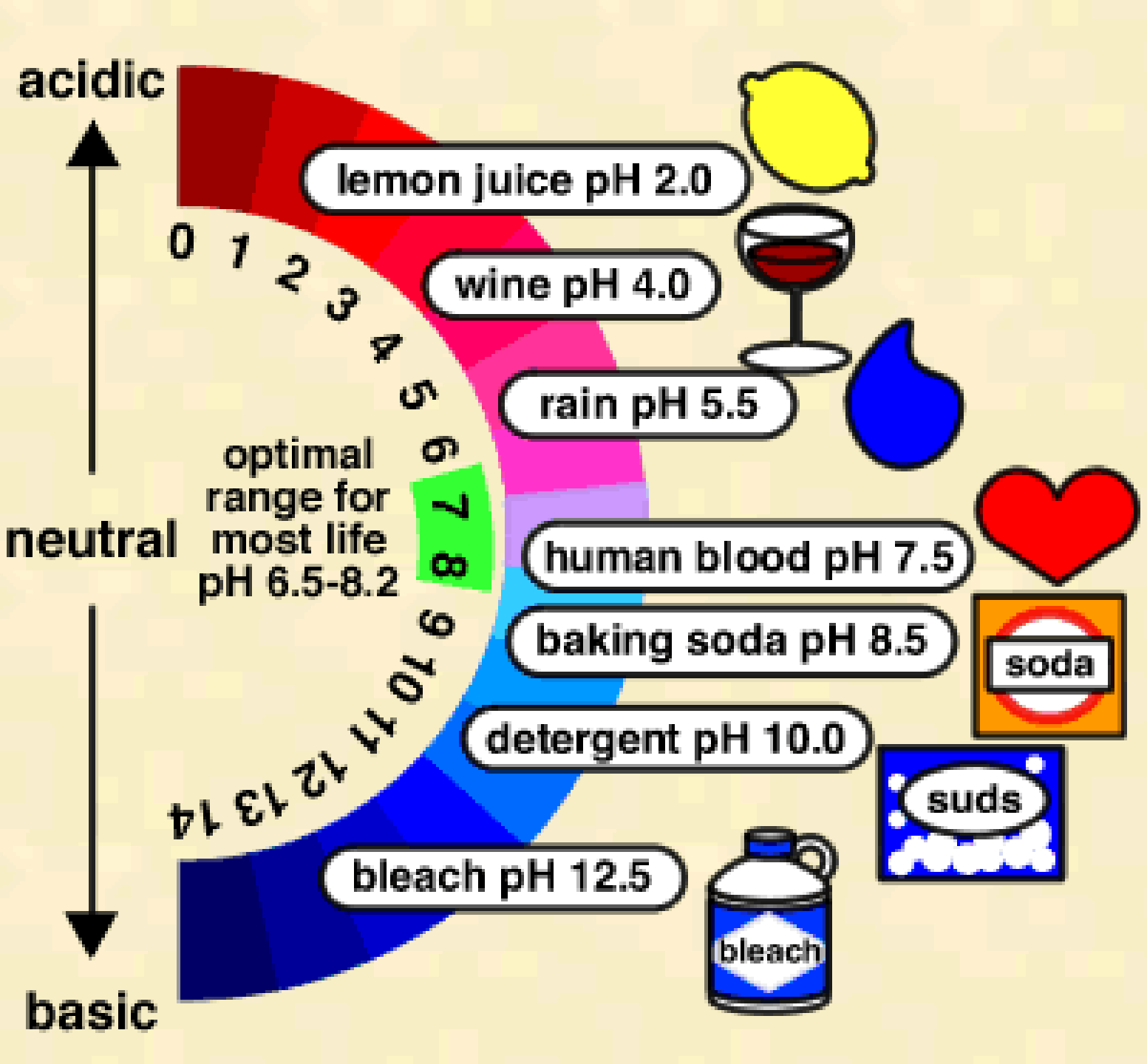
- Guess what – some BASES are every bit as strong and dangerous as some ACIDS
- The relative strength or weakness of an acid or base can be measured using the pH scale
- pH stands for the French "*puissance d'hydrogène*" or "power of hydrogen"

The pH scale

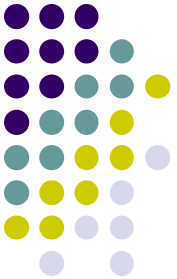


- pH scale goes from 0 - 14
- Acids pH < 7 (0 – 6.9)
- Neutral pH = 7
- Bases pH > 7 (7.1 – 14)

pH SCALE

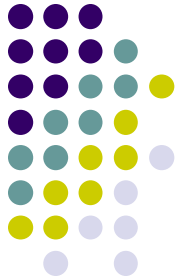

acidic
neutral
basic
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
optimal range for most life pH 6.5-8.2
lemon juice pH 2.0
wine pH 4.0
rain pH 5.5
human blood pH 7.5
baking soda pH 8.5
detergent pH 10.0
bleach pH 12.5
soda
suds
bleach

I digress…



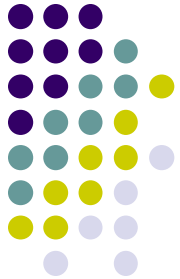
- Back to my initial point… a BASE with a pH of 14 is every bit as dangerous/corrosive as an ACID with a pH of 0.

neutralization



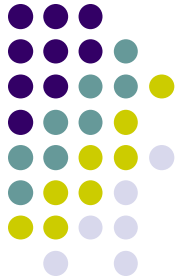
- what happens if you have a substance that has no H^+ or OH^-?
- It is neutral (pH 7)
- What happens when you mix an acid with a base??

Lets look…



- HCl + NaOH → ???
- HCl + NaOH → NaCl + HOH
- HCl + NaOH → NaCl + H_2O
- You make a salt (neutral) and water (neutral)
- Salt: compound formed by the combination of an acid and a base (that is not water…)
- acid + base = salt + water
- Why is this good to know???????????

Acids, Bases & Indicator: The Lab



- Be SAFE: goggles, aprons, shoes, hair, etc…
- Stand up – stools pushed in
- Circulate the 7 solutions; Amity Water® from sink
- Measure once (7mL) – eyeball the rest…
- Label your test tubes (paper underneath)
- Do not waste indicator (8 drops = fine)
- Answer the questions (keep one for your notes)
- Cleanup = good rinse on all test tubes, grads & funnels

IT'S LAB TIME!