**pH Review for BI 233**

**pH**  
A measure of the negative logarithm of the hydrogen ion concentration. \([H^+]\)  
Unit is in moles/liter (understood)

pH of:  
< 7 = Acidic i.e. 0 - 6.9 → high \([H^+]\)  
> 7 = Basic* i.e. 7.1 – 14 → low \([H^+]\)  
7 = Neutral → \([H^+] = [OH^-]\)

*Basic solutions have more \(OH^-\) than \(H^+\) ions.

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**The difference between Acids & Bases**

**Acids** : release hydrogen ions when dissolved in water. e.g. HCl → H\(^+\) + Cl\(^-\)

**Bases*** are substances that absorb \(H^+\) ions, thereby reducing the number of hydrogen ions. e.g. NaOH.  
Base ≈ Alkalinity

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**pH Scale**

Each unit on the scale represents a tenfold change in pH (because it is a log scale).

pH of 6 is 10 x’s more acidic than pH of 7  
PH of 5 is 100 x’s more acidic than pH of 7  
PH of 3 = _______ x’s more acidic than 7

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**Respiratory Equation**

\[ CO_2 + H_2O \leftrightarrow H_2CO_3 \leftrightarrow H^+ + HCO_3^- \]

Carbon Dioxide + Water  
↔ Carbonic Acid  
↔ Hydrogen ion (acid)  
+ Bicarbonate ion (base)
Correlations

Direct between CO$_2$ & H$^+$
  i.e. if [CO$_2$] ↑ then [H$^+$] ↑

Indirect between CO$_2$ & pH
  i.e. if [CO$_2$] ↑ then pH ↓
  if [CO$_2$] ↓ then pH ↑

Acidemia – ↑ pCO$_2$ but ↓ HCO$_3^-$
  too much acid in the blood

Alkalemia - ↓ pCO$_2$ then ↑ HCO$_3^-$
  too much base in the blood