# AP Biology Unit 1: Biochemistry Cheat Sheet

by hlewsey via cheatography.com/36676/cs/11528/

## Properties of Water

Polarity:
- allows cohesion, adhesion, surface tension

High Specific Heat:
- resists temp change
- high heat of vaporization
- allows evaporative cooling (high energy particles vaporize)

Universal Solvent:
- dissolves hydrophilic/repels hydrophobic

## Properties of Carbon

| | |
|---|---|
| tetrav-alence | 4 bonds->complex molecules |
| hydroc-arbons | C and H, release energy |
| structural isomer | differs in covalent arrang-ement of atoms |
| geometric isomer | differs in spacial arrang-ements around double bonds |
| enantiomer | mirror image of 4 molecules attached to asymmetric carbon |

## Functional Groups

| | | |
|---|---|---|
| -OH | hydroxyl | polar/hydrophilic |
| -CH3 | methyl | nonpolar/hydrop-hobic |
| -COOH | carboxyl | polar/hydrophilic |
| -COH | carbonyl | polar/hydrophilic |
| -NH2 | amino | polar/hydrophilic |
| -SH | sulfhydryl | nonpolar/hydrop-hobic |
| -PO4 | phosphate | polar/hydrophilic |

## Acids and Bases

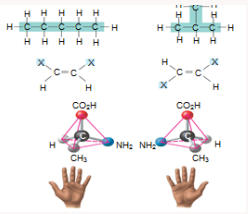
| | |
|---|---|
| Acid | increases H+ in solution |
| Base | reduces H+ in solution (accepts H+or donates OH-) |
| pH | =-log[H+] |
| Buffer | accepts/donates H+ to stabilize pH |

## Metabolism

| | |
|---|---|
| metabolic pathway | a specific molecule that is altered in defined steps catalyzed by enzymes that result in a certain product |
| catabolic pathway | releases energy by breaking down complex molecules |
| anabolic pathway | consumes energy to build more complex molecules |
| energy | the capacity to cause change or rearrange matter |

## Isomers

- Structural
- Geometric
- Enantiomers



## Laws of Thermodynamics

1st Law of Thermodynamics

> energy can be transferred and transf-ormed but not created or destroyed

2nd Law of Thermodynamics

> every energy transfer/transformation increases the entropy of the universe; a process must increase entropy to be spontaneous

## Free Energy

Gibbs free energy- ΔG=ΔH-TΔS

> energy in a temp/pressure constant system that can perform work

exergonic

> has a net release of free energy (-ΔG)

endergonic

> absorbs free energy (+ΔG)

ATP

> ribose, adenine, 3 phosphate groups
> hydrolyzed to ADP+$P_i$
> phosphorylated molecules=more reactive

## Large Biomolecules

Carbohydrates

> -monosaccharides held by glycosidic linkages
> -energy storage, structure, protection

Lipids

> -fatty acids held by ester linkages
> -hydrophobic, saturated/unsaturated, hormones

Nucleic Acids

> -nucleotides held by phosphodiester H-bonds
> -enable reproduction, controls protein synthesis

Proteins

> -amino acids held by peptide bonds
> -follow varied instructions from DNA

## Enzymes

Enzymes

> these macromolecules act as catalysts that lower activation energy barriers by forming an induced fit w/substrate in the active site

By **hlewsey**
cheatography.com/hlewsey/

Published 23rd April, 2017.
Last updated 23rd April, 2017.

## Enzymes (cont)

### Enzyme Activation

-gene regulation= enzymes produced when needed
-activators=cofactors (inorganic) and coenzymes (organic) make up and help enzymes function

### Enzyme Inhibition

-competitive=inhibitor molecule binds to active site to block substrate
-allosteric=inhibitor molecule binds to allosteric site to cover or change shape of the active site

### Optimal Conditions

-enzymes have optimal temp+pH
-cofactors+coenzymes bind to enzyme or substrate

By **hlewsey**
cheatography.com/hlewsey/

Published 23rd April, 2017.
Last updated 23rd April, 2017.