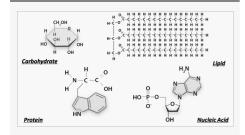


AP Bio Unit 1 Cheat Sheet

by JagritiJha via cheatography.com/182976/cs/38075/

Macromolecules Structure



Carbohydrates

monomer: monosaccharides (linked together into polysaccharides by dehydration synthesis)

functions: energy storage (ex: starch in plants and glycogen in animals) and structural support (ex: cellulose for plan cell walls and chitin for exoskeleton of arthropods and cell walls of fungi)

have a ratio of CH2O (1 carbon: 2 Hydrogen: 1 Oxygen)

Proteins

Monomer: amino acids (which are linked by peptide bonds, which are formed by dehydration synthesis between amino and carboxyl groups of adjacent amino acids)

functions: antibodies, movement, membrane receptors

Primary Structure- unique sequence of amino acids

Secondary Structure- folding of the amino acid chain through hydrogen bonds into alpha helices and beta sheets

Tertiary Structure- overall three-dimensional shape of the protein and often minimizes free energy (hydrophobic interactions, disulfide bridges, H-bonds, ionic bonds)

Quaternary Structure- arrangement of polypeptides (only occurs in some) ex: hemoglobin

Denaturation: unfolding of protein structure due to unideal temperature or pH levels

Lipids

Monomer: N/A because lipids aren't polymers since they are assembled from a variety of components (ex: fats, oils, waxes, & steroids) ALL HYDROPHOBIC

Function: energy storage, protection, insulation, phospholipid bilayer

Fats (aka triglycerides): made of a glycerol molecule and 3 fatty acid molecules (fatty acids: nonpolar hydrocarbon chains)

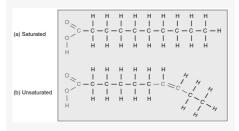
Saturated Fatty Acids: no double bonds between carbons, pack solidly at room temp, max number of hydrogens, commonly produced by animals)

Unsaturated Fatty Acids: have some carbon double bonds which result in kinks, liquid at room temp, commonly produced by plants)

Phospholipids have a hydrophilic (polar) head that includes a phosphate group and 2 hydrophobic fatty acid tails

Steroids have a carbon skeleton of 4 rings that are fused together (ex: cholesterol in animal cell membranes, and estrogen and testosterone)

Saturated vs. Unsaturated Fatty Acids



Nucleic Acids

Monomer: nucleotides

Function: genetic info that codes for amino acid sequences

DNA and **RNA**

Nucleotides are made of 3 parts: nitrogenous base, pentose (5-carbon) sugar (deoxyribose in DNA and ribose in RNA),

Chemical Reactions

Covalent	Nonpolar covalent	polar
Bonds	bonds: electrons	covalent
	are shared	bonds:
	equally	one atom
		has a
		greater
		electrone-
		gativity
		> unequal
		sharing of
		electrons
Ionic	chemical bonds	ex: table
Bonds	formed by the	salt

	attraction of
	oppositely
	charged ions
Hydrogen	weak chemica

Bonds

weak chemical
interactions that
form between a
partial positively
charged hydroger
atom of one
molecule and the
strong electrone-
gative oxygen or
nitrogen of
another molecule

	another molecule
/an der	very weak, short
Vaals	lasting connec-
ntera-	tions that are a
ctions	result of asymme-
	trical distribution
	of electrons within

a molecule

contribute to the 3d shape of molecules

ex:

hydrogen

between

bonds

water

and the phosphate group (PO4)



By JagritiJha cheatography.com/jagritijha/ Published 4th April, 2023. Last updated 4th April, 2023. Page 1 of 3.

Sponsored by ApolloPad.com Everyone has a novel in them. Finish Yours!

https://apollopad.com



AP Bio Unit 1 Cheat Sheet

by JagritiJha via cheatography.com/182976/cs/38075/

Acids and Bases

pH scale: Measures relative acidity and alkalinity of aqueous solutions (between 0 and 14)

Acids: excess of H+ ions and H+>OH-

Bases: excess of OH- ions and OH->H+

Pure water is neutral (pH=7)

Buffers: substances that minimize changes in pH by accepting H+ from a solution when hydrogen molecules are in excess and donate H+ when hydrogen molecules are depleted

Buffers are **essential** in living tissues to minimize pH changes

Carbonic Acid (H2CO3): important buffer in living systems because it moderates pH changes in blood plasma and the ocean

Carbon

Major elements of life are carbon, hydrogen, oxygen, nitrogen, sulfur, and phosphorus CHNOPS

All organic compounds contain **carbon** and *most* contain **hydrogen**

Carbon is unparalleled in its ability to form large, complex, and diverse molecules because it has 4 valence electrons, which means it can form up to 4 covalent bonds (which can be single, double, or triple), and it can form large molecules (which can be chains, ring-shaped, or branched)

Isomers: molecules that have the same molecular formula but differ in atom arrangement, which can result in molecules that are very different in their biological activities (ex: glucose and fructose)

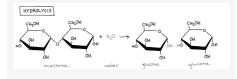
Dehydration Synthesis





By **JagritiJha** cheatography.com/jagritijha/

Hydrolysis Reaction



Functional Groups

Functional Group	Structure	Properties		
Hydroxyl	0—Н	Polar		
Methyl	R CH ₃	Nonpolar		
Carbonyl	R—C—R'	Polar		
Carboxyl	C OH	Charged, ionizes to release H ⁺ . Since carboxyl groups can release H ⁺ ions into solution, they are considered acidic.		
Amino	R — N H	Charged, accepts H* to form NH ₃ *. Since amino groups can remove H* from solution, they are considered basic.		
Phosphate	R P OH	Charged, ionizes to release H*. Since phosphate groups can release H* ions into solution, they are considered acidic.		
Sulfhydryl	R—S	Polar		

Properties of Water

Water oxygen region of molecule has molecules a partial negative charge and are **polar** each hydrogen region has a partial positive positive charge

Properties of Water (cont)

Hydrogen the slightly
bonds negative oxygen
form atom from one
between water molecule is
water attracted to the
molecules slightly positive
hydrogen end of
another molecule

Each
water
molecule
can form
up to 4
hydrogen
bonds

Published 4th April, 2023. Last updated 4th April, 2023. Page 2 of 3. Sponsored by **ApolloPad.com**Everyone has a novel in them. Finish
Yours!
https://apollopad.com



AP Bio Unit 1 Cheat Sheet

by JagritiJha via cheatography.com/182976/cs/38075/

Properties of Water (cont)		Properties of Water (cont)					
Hydrogen	Cohesion:	Adhesion:	Capillary	Cohesion	Water has	Water is	Water is a
Bonds	Linking of	clinging of	Action:	is	a high	less	important
are key to	like	one	movemen	t respon-	specific	dense	solvent
each of	molecules	substance	of water	sible for	heat.	as a	(hydrop-
the		to another	molecules	surface	Specific	solid	hilic
following			up very	tension,	<i>Heat</i> is	than as	substanc
properties			thin xylem	which	the	a liquid,	are water
of water			tubes and	means	amount of	so ice	soluble a
and what			their	that	heat	floats,	hydrop-
makes			evapor-	water	required	which	hobic
water			ation from	droplets	to raise or	keeps	substanc
unique			stomata ir	will resist	lower the	larger	are
			plants; the	rupture	temper-	bodies	nonpolar
			water	when	ature of a	of water	and don'
			molecules	stress	substance	from	dissolve
			cling to	and	by 1	freezing	water).
			each	pressure	degree	solid,	
			other by	are	Celsius.	allowing	
			cohesion	added to	High	life to	
			and to the	the	specific	exist in	
			walls of	system	heat	bodies	
			the xylem		makes the	of water	
			tube by		temper-		
			adhesion		ature of		
					Earth's		
					oceans		
					relatively		
					stable and		
					able to		
					support		
					vast		
					quantities		
					of life		



By JagritiJha cheatography.com/jagritijha/

Published 4th April, 2023. Last updated 4th April, 2023. Page 3 of 3. Sponsored by **ApolloPad.com**Everyone has a novel in them. Finish
Yours!
https://apollopad.com