Biology Vocabulary

Chapter 3: Biochemistry and Water

Essential Questions:

- 1. How does water make it possible for life to exist on this planet?
- 2. How are monomer units joined to form polymers in organic compounds?
- 3. What characteristics do carbohydrates, proteins, lipids, and nucleic acids possess that enable them to function in living organisms and support life?
- 4. How does the structure of enzymes enable them to catalyze reactions in living systems?

Vocabulary

Word	Definition in your own terms	Example/Picture/What it's Like
monomer	A simple compound whose molecules can join together to make polymers	Monomer Monosaccharide $w_{ab}^{op} + g_{ab}^{op}$ Fatty acid +111111111111111111111111111111111111
polymer	A long molecule consisting of many similar or identical monomers linked together.	Polymer Carbohydrate Image: State
dehydration synthesis (also called: condensation)	A chemical reaction in which two molecules covalently bond to create a larger molecule with the REMOVAL OF WATER	(a) Dehydration synthesis Monomers are joined by removal of OH from one monomer and removal of H from the other at the site of bond formation.
hydrolysis	A chemical reaction that "lyses", or splits, molecules by the addition of water.	(b) Hydrolysis Monomers are released by the addition of a water molecule, adding OH to one monomer and H to the other.

polar	Water is polar because its structure has one side that is positively charged and one side that is negatively charged.	Polar Molecules When one end of a molecule is slightly positive and one end
adhesion	The ability of water to stick to	slightly negative
	other surfaces	Adhesion
cohesion	The ability of water to stick to itself	E Cohesion
capillarity	The ability of water to defy gravity. This allows it to move up as gravity pulls things down. <i>For example</i> : water can be absorbed up a root of a plant.	Adhesion Cohesion
freezing point	0°C or 32°F, the freezing point allows water molecules to move very slowly	Pure water 0 degrees Celsius, 32 degree Farenheit
specific heat	Water has the highest specific heat capacity of any liquid. Specific heat is defined as the amount of heat one gram of a substance must absorb or lose to change its temperature by one degree Celsius. For water, this amount is one calorie, or 4.184 Joules.	When thermal energy is added, some of the added thermal energy has to break some of the attractions between the water molecules before they can move rate. Strong Image: Strong Image: Strong Image: Strong
surface tension	The tension of the surface film of a liquid caused by the attraction of the particles in the surface layer by the bulk of the liquid, which tends to minimize surface area. In water, the cohesive property of water creates surface tension.	Water striders can walk on water because of the SURFACE TENSION OF WATER.

organic vs.	Organic: a compound that	Organic Inorganic
inorganic	contains carbon	
	Inorganic: non-living compounds	
	that do NOT contain carbon	DNA Table Sugar Table Salt Carbon Disside
		H Methane Ethanol Diamond Silver
<u> </u>		ThoughtCn
fatty acids	I ne monomer of lipids which can	Fatty Acid Structure
	fat	group c P
	101.	≥ ₩ }
		> 🖾 🥇
		n de la companya de la
		chain S
saturated vs.	Saturated: lipids with a straight	Saturated Fatty Acid
unsaturated	structure, single bonds, and are	
	solid at room temperature	
	Unsaturated : linids with a	Unsaturated Fatty Acid
	"kinked" structure double bond	Ω Π Π Π Π H
	between two carbons, and are	
	liquid at room temparture.	H H H H H 4 4 4
		4 4 × 4 4
		⁴ ¹ ¹ ¹
	A class of lipid that forms a bi-	Phospholipid Composition
pnospnolipias		
pnospnolipias	layer and makes up the cell	3 Parts Polar (Phosphate-
pnospnolipias	layer and makes up the cell membrane. The phospholipid	3 Parts Polar Head 1) Phosphate Group Didaradi
pnospnolipias	layer and makes up the cell membrane. The phospholipid structure is one of two non-	3 Parts Polar Head 1) Phosphate Group 2) Giverol Nonpolar Tails -3) Two chains of fatty acids
pnospnolipias	layer and makes up the cell membrane. The phospholipid structure is one of two non- polar/hydrophobic (water-fearing)	 3 Parts Polar Head 1) Phosphate Group 2) Givered Nonpolar Tails 3) Two chains of fatty acids Arrangement:
pnospnolipias	layer and makes up the cell membrane. The phospholipid structure is one of two non- polar/hydrophobic (water-fearing) fatty acid tails and a	 3 Parts Polar Head Polar Head Polar (Phosphate-containing) Polar Head Polar Head Polar Head Polar Head Polar Head Polar Head Fatty acid tail (nonpolar tail) Hydrophilic Polar Heads Hydrophilic Polar Heads Hydrophilic Polar Heads Hydrophilic Polar Heads Polar Heads
pnospnolipias	layer and makes up the cell membrane. The phospholipid structure is one of two non- polar/hydrophobic (water-fearing) fatty acid tails and a polar/hydrophilic (water loving)	 3 Parts Polar Head I) Phosphate Group
amino acids	layer and makes up the cell membrane. The phospholipid structure is one of two non- polar/hydrophobic (water-fearing) fatty acid tails and a polar/hydrophilic (water loving) head.	3 Parts - Polar Head -1) Phosphate Group -2) Glycerol - Nonpolar Tails -3) Two chains of fatty acids Arrangement: - Outside: Polar heads · Hydrophilic - Inside: Nonpolar Tails · Hydrophobic
amino acids	layer and makes up the cell membrane. The phospholipid structure is one of two non- polar/hydrophobic (water-fearing) fatty acid tails and a polar/hydrophilic (water loving) head. The monomer unit of proteins.	• 3 Parts - Polar Head - 1) Phosphate Group - 2) Glycerol - Nonpolar Tails - 3) Two chains of fatty acids • Arrangement: - Outside: Polar heads • Hydrophilic - Inside: Nonpolar Tails • Hydrophobic Amino Acid Structure
amino acids	layer and makes up the cell membrane. The phospholipid structure is one of two non- polar/hydrophobic (water-fearing) fatty acid tails and a polar/hydrophilic (water loving) head. The monomer unit of proteins.	• 3 Parts - Polar Head - 1) Phosphate Grace - 2) Gycerol - 3) Two chains of fatty acids - 4) Two chains of fatty acids -
amino acids	layer and makes up the cell membrane. The phospholipid structure is one of two non- polar/hydrophobic (water-fearing) fatty acid tails and a polar/hydrophilic (water loving) head. The monomer unit of proteins.	• 3 Parts - Polar Head - 1) Phosphate Group - 2) Glycerol - Nonpolar Tails - Ji wo chains of fatty acids • Arrangement: - Outside: Polar heads • Hydrophilic - Inside: Nonpolar Tails • Hydrophobic Amino Acid Structure
amino acids	layer and makes up the cell membrane. The phospholipid structure is one of two non- polar/hydrophobic (water-fearing) fatty acid tails and a polar/hydrophilic (water loving) head. The monomer unit of proteins.	• 3 Parts - Polar Head - 1) Phosphate Grace - 2) Gycerol - 3) Gycerol - 3) Two chains of fatty acids - 4) Two chains of fatty acids - 1) Clysticle: Polar heads - Hydrophilic - Inside: Nonpolar Tails - Hydrophobic Amino Acid Structure H - O Carboxyl
amino acids	layer and makes up the cell membrane. The phospholipid structure is one of two non- polar/hydrophobic (water-fearing) fatty acid tails and a polar/hydrophilic (water loving) head. The monomer unit of proteins.	 3 Parts Polar Head I) Phosphate Group
amino acids	layer and makes up the cell membrane. The phospholipid structure is one of two non- polar/hydrophobic (water-fearing) fatty acid tails and a polar/hydrophilic (water loving) head. The monomer unit of proteins.	 3 Parts Polar Head
amino acids	layer and makes up the cell membrane. The phospholipid structure is one of two non- polar/hydrophobic (water-fearing) fatty acid tails and a polar/hydrophilic (water loving) head. The monomer unit of proteins.	 S Parts Polar Had Shoophate Grave Shoophate of tary adde Shoophate of tary adde Shoophate of tary adde Hydrophilic Inside: Nonpolar Tails Hydrophilic Hydrophilic Hydrophilic Group Hydrophilic <
amino acids	Iayer and makes up the cell membrane. The phospholipid structure is one of two non- polar/hydrophobic (water-fearing) fatty acid tails and a polar/hydrophilic (water loving) head. The monomer unit of proteins. Short chains of amino acids jointed together by peptide bonds	 3 Parts Polar Head
amino acids	layer and makes up the cell membrane. The phospholipid structure is one of two non- polar/hydrophobic (water-fearing) fatty acid tails and a polar/hydrophilic (water loving) head. The monomer unit of proteins. Short chains of amino acids jointed together by peptide bonds 2 peptides = dipeptide	 3 Parts Polar Head I) houghete Group
amino acids	Iayer and makes up the cell membrane. The phospholipid structure is one of two non- polar/hydrophobic (water-fearing) fatty acid tails and a polar/hydrophilic (water loving) head. The monomer unit of proteins. Short chains of amino acids jointed together by peptide bonds 2 peptides = dipeptide Polypeptide – many peptides	 3 Parts Polar Head
amino acids	Iayer and makes up the cell membrane. The phospholipid structure is one of two non- polar/hydrophobic (water-fearing) fatty acid tails and a polar/hydrophilic (water loving) head. The monomer unit of proteins. Short chains of amino acids jointed together by peptide bonds 2 peptides = dipeptide Polypeptide – many peptides	 3 Parts Polar Head Polar Head Polar Head Polar Head Polar Tails Strongolar Tails Inside: Nonpolar Tails Hydrophilic Armino Accid Structure H H Hydrophilic Polar Head Polar Head Hydrophilic Armino Accid Structure H Outside: Polar heads H Outside: Nonpolar Tails H Outside: Polar heads H H Outside: Polar heads H Outside: Nonpolar Tails Inside: Nonpolar Tails H Outside: Polar heads Inside Carboxyl Group Side Chain Number Outside: Polar heads Inside Chain Inside Chai

enzyme	Proteins that act as a catalyst to	, The
	speed up chemical reactions in the body. Ex: digestion	Mechanism of enzyme activity
		Substrate Products
		Enzyme Enzyme-substrate Complex
peptide bond	A chemical bond formed between two molecules when the carboxyl group of one molecule reacts with the amino group of the other molecule, releasing a molecule of water (H2O). This is a dehydration synthesis reaction (also known as a condensation reaction), and usually occurs between amino acids.	Peptide Bond Formation H = H = 0 +
R-group (side chain)	A chemical group that is attached to a core part of the molecule called the "main chain" or "backbone." The side chain (R- group/functional group) is a hydrocarbon branching element added to the carbon backbone to give molecules different structures (shapes) and functions (roles).	Hydrogen Atom H H Group H R-Group
nucleotide	The monomer unit of nucleic acids. A nucleotide is made-up of a sugar, phosphate and a nitrogen base	Phosphate Group Nitrogenous Base Pentose Sugar
nitrogen base	A nitrogen-containing molecule that has the same chemical properties as a base. They are particularly important since they make up the building blocks of DNA and RNA: adenine, guanine, cytosine, thymine and uracil.	 Desayribonucleic acid (DNA) Double Heid Parks Desayribonucleic acid (DNA) Double Heid Parks Desayribonucleic acid (DNA) Double Heid Parks Desayribonucleic acid (DNA) Desayribonucl

catalyst	A substance that increases the rate of a chemical reaction without itself undergoing any permanent chemical change.	CATALYSTS INCREASE THE RATE OF REACTION		
inhibition / inhibitor	An enzyme inhibitor is a molecule that binds to an enzyme and decreases its activity.	NORHAL REACTION Substrate ochive site eneyme Competitive Substrate products connective Substrate connective site competitive substrate substrate connective substrate substrate connectifice substrate substrate		
activation energy	The energy required to start a reaction.	Uncatalyzed Reaction energy barrier reactants course of reaction Catalyzed Reaction energy barrier reactants course of reaction Catalyzed Reaction energy barrier reactants course of reaction		
substrate	A <u>molecule</u> (chemical reactant) acted upon by an enzyme. A substrate is loaded into the <u>active</u> <u>site</u> of the enzyme, or the place that allows weak bonds to be formed between the two molecules.	(a) Key (substrate) Lock (enzyme) Lock-Key Complex Enzyme-Substrate Complex		
active site	The site at which the enzyme binds to the substrates and increases their chances of reacting.	Active site Enzyme		
рН	A measure of the concentration of hydrogen ions in the solution. A solution with a high number of hydrogen ions is acidic and has a low pH value. A solution with a high number of hydroxide ions is basic and has a high pH value. The pH scale ranges from 0 to 14, with a pH of 7 being neutral.	The pH Scale Annonia Stornach Add Vinegar Coffee Water Baking Sodi Blach Stornach Add Vinegar Coffee Water Baking Sodi Blach Battery Lerior Tornato Mater Somach Drain Cleaner 0 1 2 3 6 Tornato Blood Somach Drain Cleaner 0 1 2 3 6 Tornato Blood Somach Drain Cleaner 0 1 2 3 0 1 1 2 3 0 1 1 2 3 0 0 1 1 <th 2"2"2"2"2"2"2"2"2"2"2"2"2"2"2"2"2"2<="" colspan="2" th=""></th>		

biochemical pathway	A series of interactions among molecules in a cell that leads to a certain product or a change in a cell. Such a pathway can trigger the assembly of new molecules, such as a fat or protein. Pathways can also turn genes on and off, or spur a cell to move.	Ist intermediate substrate Enzyme 1 Inhibition Ist intermediate Enzyme 2 Intermediate Substrate Enzyme 3 Intermediate Enzyme 3 Intermediate
------------------------	---	--