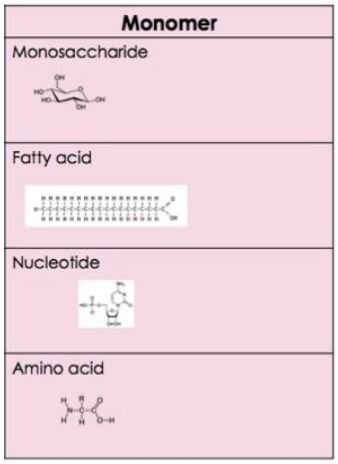
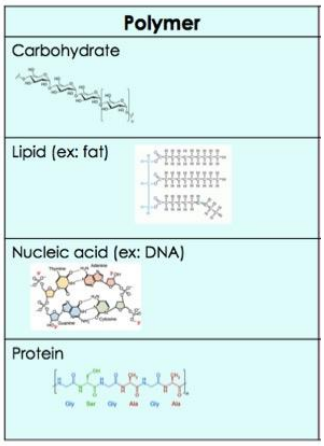
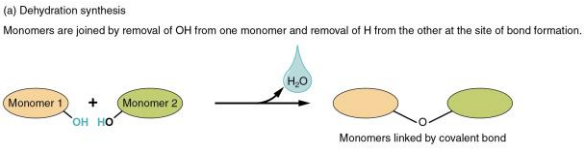
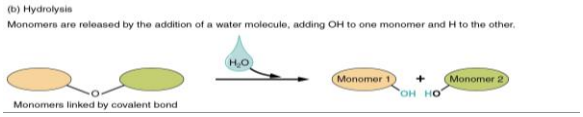
Biology Vocabulary

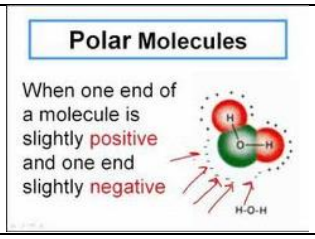
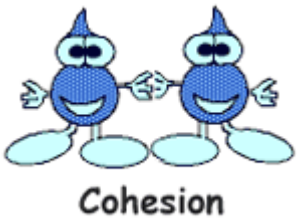
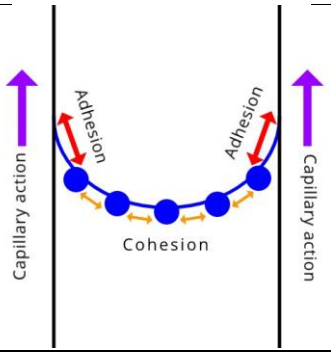
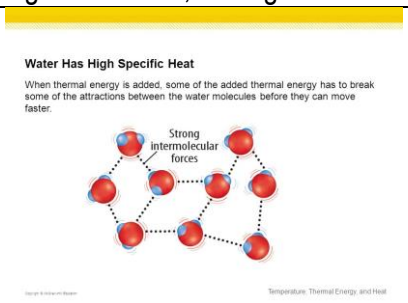
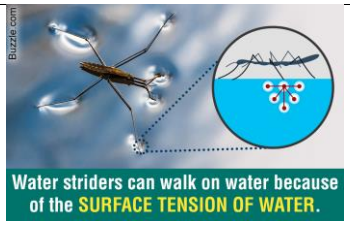
Chapter 3: Biochemistry and Water

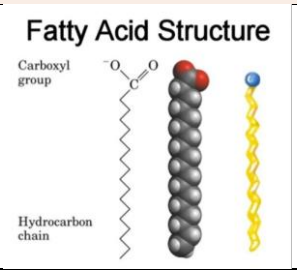
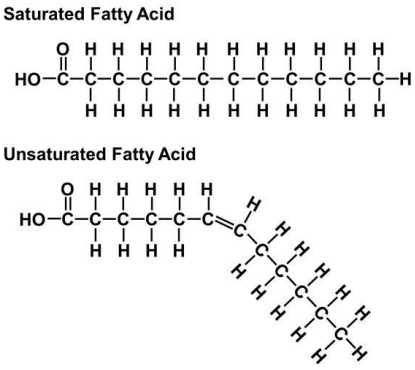
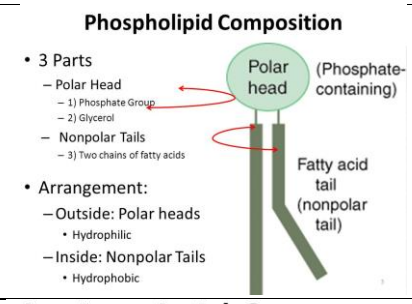
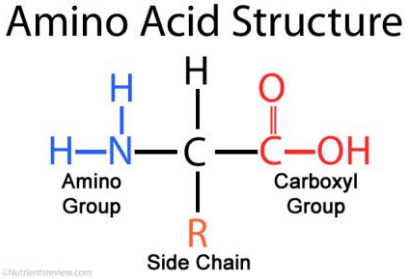
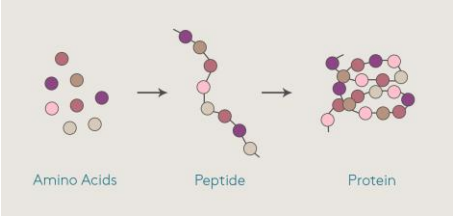
Essential Questions:

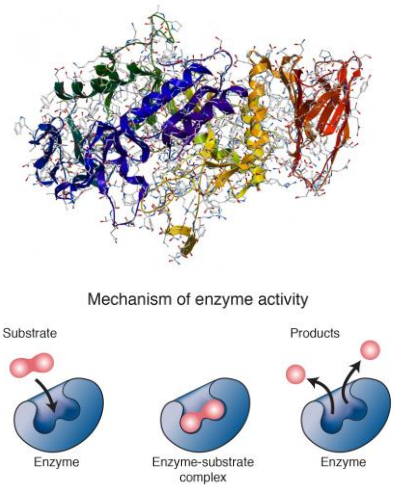
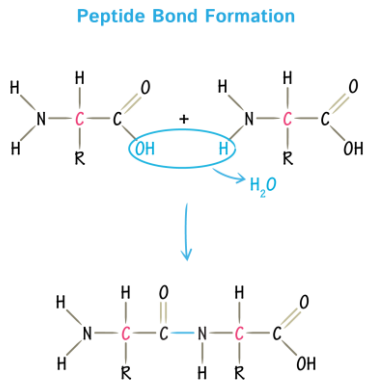
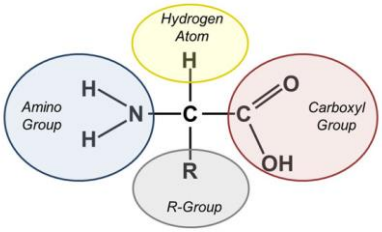
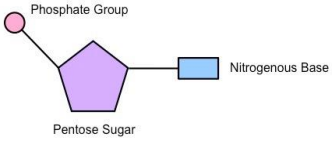
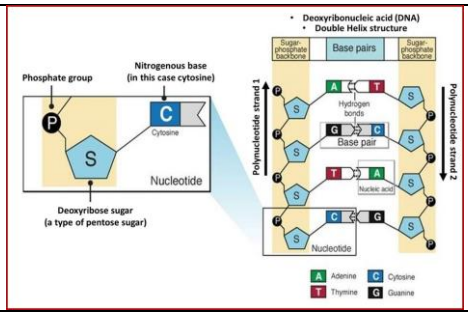
1. How does water make it possible for life to exist on this planet?
2. How are monomer units joined to form polymers in organic compounds?
3. What characteristics do carbohydrates, proteins, lipids, and nucleic acids possess that enable them to function in living organisms and support life?
4. How does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

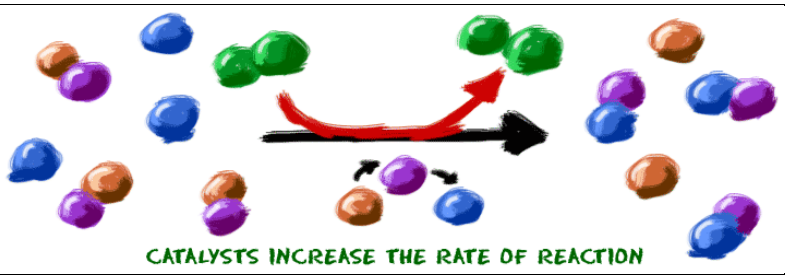
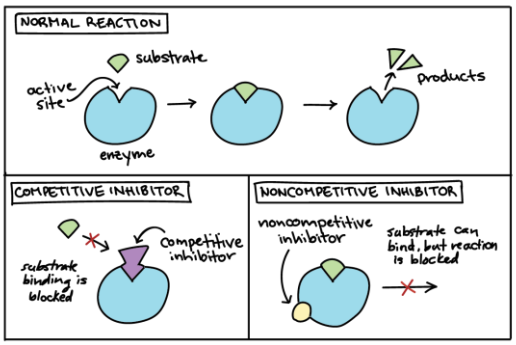
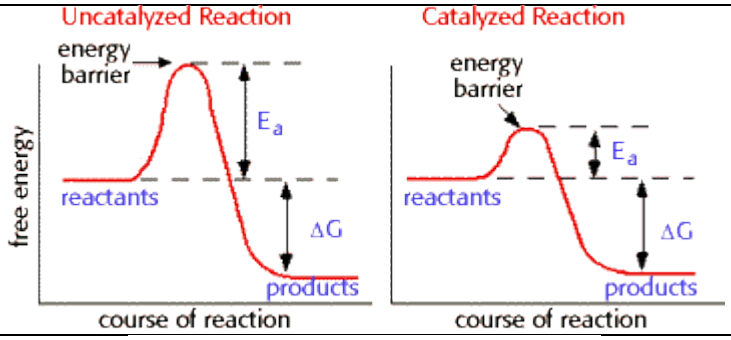
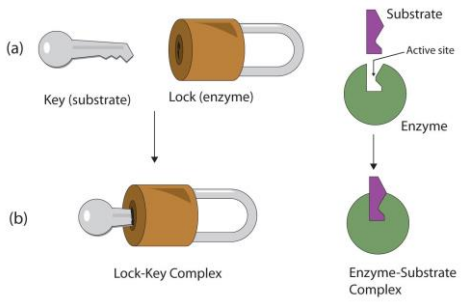
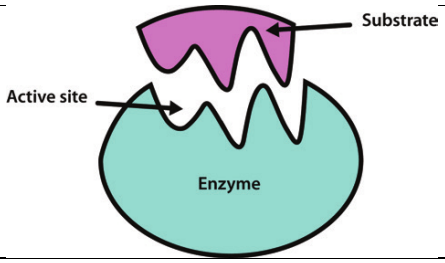
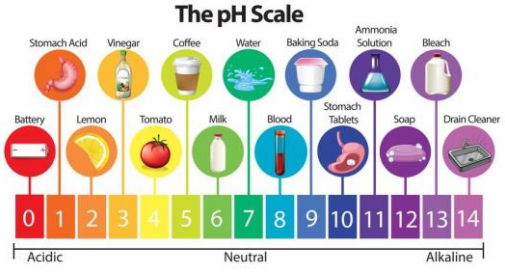
Vocabulary

Word	Definition in your own terms	Example/Picture/What it's Like
monomer	A simple compound whose molecules can join together to make polymers	
polymer	A long molecule consisting of many similar or identical monomers linked together.	
dehydration synthesis (also called: condensation)	A chemical reaction in which two molecules covalently bond to create a larger molecule with the REMOVAL OF WATER	
hydrolysis	A chemical reaction that "lyses", or splits, molecules by the addition of water.	

polar	Water is polar because its structure has one side that is positively charged and one side that is negatively charged.	
adhesion	The ability of water to stick to other surfaces	
cohesion	The ability of water to stick to itself	
capillarity	The ability of water to defy gravity. This allows it to move up as gravity pulls things down. *For example*: water can be absorbed up a root of a plant.	
freezing point	0°C or 32°F, the freezing point allows water molecules to move very slowly	 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.	
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.	

organic vs. inorganic	Organic: a compound that contains carbon Inorganic: non-living compounds that do NOT contain carbon	
fatty acids	The monomer of lipids which can combine with glycerol to make fat.	
saturated vs. unsaturated	**Saturated**: lipids with a straight structure, single bonds, and are solid at room temperature **Unsaturated**: lipids with a "kinked" structure, double bond between two carbons, and are liquid at room temparture.	
phospholipids	A class of lipid that forms a bi-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.	
amino acids	The monomer unit of proteins.	
peptide	Short chains of amino acids jointed together by peptide bonds 2 peptides = dipeptide Polypeptide – many peptides	

enzyme	Proteins that act as a catalyst to speed up chemical reactions in the body. Ex: digestion	
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***.	
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).	
nucleotide	The monomer unit of nucleic acids. A nucleotide is made-up of a sugar, phosphate and a nitrogen base	
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.	

catalyst	A substance that increases the rate of a chemical reaction without itself undergoing any permanent chemical change.	
inhibition / inhibitor	An enzyme **inhibitor** is a molecule that binds to an enzyme and decreases its activity.	
activation energy	The energy required to start a reaction.	
substrate	A <u>molecule</u> (chemical reactant) acted upon by an enzyme. A substrate is loaded into the <u>active site</u> of the enzyme, or the place that allows weak bonds to be formed between the two molecules.	
active site	The site at which the enzyme binds to the substrates and increases their chances of reacting.	
pH	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.	

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.