**Keystone Vocabulary**

**Biochemistry**

**Atom** – the smallest unit of an element that retains the chemical and physical properties of that element

**Molecule** – the smallest particle of a substance that retains the chemical and physical properties of the substance and is composed of 2 or more atoms held together by a chemical force or bond

**Polar Molecule** – a molecule that has partial charges on it – ex. H2O

**Cohesion** – the intermolecular attraction between like molecules. Surface tension results from the cohesive properties of water.

**Adhesion** – the intermolecular attraction between unlike molecules. Capillary action results from the adhesive of water and the molecules that make up plant cells

**Surface Tension**—the elastic like force existing in the surface of a liquid, caused by asymmetries in the intermolecular forces between surface molecules

**Capillary action**—the movement of a liquid along the surface of a solid caused by the attraction of molecules of the liquid to the molecules of the solid

**Hydrophobic** – Being afraid of water – nonpolar substances are hydrophobic – ex. Oil

**Hydrophilic** – Loving water –polar and charged substances are hydrophilic – ex. NaCl

**Specific Heat** – the measure of the heat energy required to raise 1 gram of a substance by 1 degree Celsius. Water has a **high** specific heat!

**Temperature** – a measure of the average kinetic energy (energy of motion) of particles in a sample of matter. This physical property can determine the rate and extent to which chemical reactions can occur within living systems.

**pH** – the measure of the acidity or alkalinity (basicity) of a solution scaling from 0 (highly acidic) to 14 (highly basic).

**Inorganic molecules** - molecules that are not found in living things; are usually found on the earth and ingested by living things; usually do not contain carbon

**Organic molecules** – molecules found in living things that contains carbon atoms

**Biochemistry** – the study of the chemical reactions occurring in organisms

**Macromolecules**—any polymer with a high molecular mass; large organic molecules

**Biological macromolecules** – a group of large, organic molecules found in living things; e.g. carbohydrates, lipids, proteins, and nucleic acids

**Monomer** – building blocks; simple molecules which can be joined together to form a polymer

**Polymer** – a large molecule that is formed by the joining of several smaller subunits or monomers

**Polymerization** – the process of joining many monomers to form a polymer

**Dehydration synthesis** – the joining of 2 or more monomers to create a larger molecule; a molecule of water is released to create the chemical bond between monomers to form a polymer

**Hydrolysis** – adding water to a molecule to break it down into smaller subunits or monomers (digestion)

**Carbohydrates** – a macromolecule that contains carbon, hydrogen, and oxygen in a 1:2:1 ratio; source of energy for living things. (ex. sugars, starches, cellulose)

**Monosaccharide** – simple sugars with the chemical formula of C6H12O6; immediate energy source; examples are glucose, galactose, and fructose

**Disaccharide** – double sugars made from 2 monosaccharide monomers; needs to be broken down (hydrolysis) into the 2 monomers for use in the body. Examples are sucrose (table sugar), maltose and lactose.

**Polysaccharides** – type of complex carbohydrate made from many monosaccharide monomers; requires breakdown (hydrolysis) for use by body; provides short-term energy storage (~ 24 hours). Examples are starch, glycogen, cellulose, chitin

Identify the function & the type of organism that makes the following polysaccharides:

**Starch**-energy storage; plants

**Glycogen**- energy storage; animals

**Cellulose**-structure (cell walls); plants

**Chitin**-structure (exoskeletons); some animals

**Lipids** – a group of organic compounds composed of carbon, hydrogen, and oxygen, where the H:O ratio is much higher than 2:1; are **insoluble** in water; serve as a long-term energy storage molecule and are a component of cell membranes

**Phospholipid –** specialized lipid that is both hydrophobic and hydrophilic and is used to build biological membranes

**Saturated fat –** all single bonds between the Carbons in the fatty acids; solid at room temperature

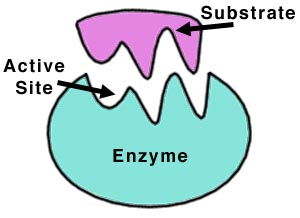
**Polyunsaturated fat –** many double and triple bonds between the Carbons in the fatty acids; liquid at room temperature; these are oils

**Protein** – a biological macromolecule that contains carbon, hydrogen, oxygen, and **nitrogen**; performs a variety of structural and regulatory functions for cells

**Hormones** – a type of protein that regulates chemical reactions in the body

**Catalyst** – a substance that enables a chemical reaction to proceed at a faster rate or under different conditions (e.g. lower temperature) than otherwise possible without being changed by the reaction; are reusable in the body; (hormones and enzymes)

**Enzymes** – a biological catalyst; a type of protein that increases the rate of chemical reaction without being changed by the reaction



**Active site** –a specific region of an enzyme where a substrate binds and the reaction takes place (bonding site)

**Substrate** – the substance acted upon by an enzyme

**Activation energy** – the minimum amount of energy needed for a reaction to proceed: also called energy of activation.

**Denature** – a process which changes the structure of a protein through chemical or physical means (such as a change in pH or temperature) resulting in a non-functioning protein

**Nucleic acids** – a biological macromolecule (DNA or RNA) composed of the elements carbon, hydrogen, oxygen, nitrogen, and phosphorus that carries genetic information

**Nucleotide** – the building blocks of nucleic acids – composed of a 5-carbon sugar, a phosphate group and a nitrogenous base

**Purine** – the nitrogenous bases that include **A**denine and **G**uanine

**Pyrimidine** – the nitrogenous bases that include **T**hymine, Cytosine and **U**racil

**ATP** – Adenosine Tri Phosphate – the energy molecule in all living things