**Physical Science Study Guide for Chapter 8—Chemistry in Action**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—chemical change resulting from a collision between atoms and molecules
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—substances that undergo a chemical reaction
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—substances produced by the reaction
	3. Chemical \_\_\_\_\_\_\_\_\_\_\_\_\_\_—an expression that uses chemical symbols to represent a chemical reaction
	4. Law of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of mass—there will always be the same amount of mass after a chemical reaction as before
2. Chemical \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—study of the relationship between chemical reactions and the laws of thermodynamics
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactions—reactions that give off heat; caused by the energy in chemical bonds being converted into heat
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactions—reactions that absorb heat; caused by heat energy being converted into bonds
* \_\_\_\_\_\_\_\_\_\_\_\_ reactions—reactions that occur by themselves, without energy being added to it
1. Chemical \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—having to do with the rate or speed of reactions
	1. Five factors for the rate of a chemical reaction
		1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy—the energy necessary to break old bonds and form new ones
		2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—increasing the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ will normally speed up the reaction (think yeast causing bread to rise)
		3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—increasing concentration normally speeds up a reaction
		4. Surface area—the more finely something is ground the quicker it will react
		5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—a substance that speeds up the rate of a reaction without being affected itself
2. Types of Chemical Reactions
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactions—two things combine to form one new substance
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactions—a substance breaks down into more than one thing
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_ displacement reactions—one element in a compound is replaced by another element
	4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-displacement reactions—two compounds react to create two new compounds
3. Salts, Acids, and Bases
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_—any ionic compound that does not contain a hydrogen or hydroxide ion
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_—substances which produce hydrogen ions (H+) when dissolved in water
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—substances which produce hydroxide ions (OH-) when dissolved in water
	4. The pH scale—a system used to measure the relative strengths of acids and bases
		1. The number 7 is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ on the scale
		2. Any number \_\_\_\_\_\_\_\_ than 7 is acidic--the lower the number the stronger the acid
		3. Any number \_\_\_\_\_\_\_\_ 7 is basic or alkaline--the higher the number the stronger the base
4. Chemistry and Electricity
	1. Redox Reactions
		1. Reduction reaction: atoms \_\_\_\_\_\_\_\_\_\_\_\_ electrons
		2. Oxidation reaction: atoms \_\_\_\_\_\_\_\_\_\_\_ electrons (LEO the lion says GER)
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—any reactions that are caused by an electric current
		1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—a solution that conducts electricity
		2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—a device designed to produce an electrochemical reaction
			1. The two probes in an electrochemical cell: \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
			2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—process of initiating a reaction by running a current through a solution
			3. Electroplating—an electrochemical reaction that forms a thin layer of \_\_\_\_\_\_\_\_\_\_\_\_ on an object
			4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells vs. voltaic cells—electrolytic cell produces a chemical reaction through electrolysis and a voltaic cell produces electricity by a chemical reaction within the cell
			5. Kinds of voltaic cells
				1. \_\_\_\_\_\_\_\_\_\_\_ cell—Leclanche cells or regular batteries; nonrechargeable
				2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells—cells that can be recharged like car batteries
				3. \_\_\_\_\_\_ cells—a cell in which the reactants are continually replenished from an outside source
5. Organic Chemistry—study of compounds containing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	1. Carbon
		1. Carbon forms \_\_\_\_\_\_\_\_\_\_ covalent bonds
		2. Carbon forms compounds of many different \_\_\_\_\_\_\_\_\_\_\_\_\_\_
		3. Carbon may form \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_\_\_ bonds with many different elements
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—many substances contain compounds made of carbon and hydrogen
		1. \_\_\_\_\_\_\_\_\_\_\_\_—hydrocarbons with single bonds
		2. \_\_\_\_\_\_\_\_\_\_\_\_—double bonds
		3. \_\_\_\_\_\_\_\_\_\_\_\_—triple bonds
	3. Soaps—molecules with \_\_\_\_\_\_\_\_\_\_\_\_\_ bonds on one end and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on the other
	4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—long chains of hydrocarbons that make up plastics
6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-the chemistry of life
	1. Types of compounds in the body
		1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—provided most of the energy for the body; composed of hydrogen, carbon, oxygen
			1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—examples include glucose (what plants make through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) and sucrose (table sugar)
			2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—a long chain of sugar molecules
		2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
			1. \_\_\_\_\_\_\_\_\_\_\_
				1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Fats—usually solid at room temperature (e.g. animal fats); more unhealthy than unsaturated fats
				2. Unsaturated Fats—liquid at room temperature (oils); more healthy than saturated fats
			2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
				1. LDL
				2. \_\_\_\_\_\_\_\_\_\_\_ (this is the healthy type of cholesterol)
		3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—compounds that are used to build and maintain living cells; they make up about 50% of the body’s weight
			1. \_\_\_\_\_\_\_\_\_\_\_\_ acids—these are the building blocks of proteins
		4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—chemicals in our cells that contain the genetic material or blueprints for our bodies
			1. \_\_\_\_\_\_\_—found in every cell of our bodies and contains the information for every physical detail
			2. \_\_\_\_\_\_\_—these are “working copies” of the DNA; they are transcribed from the DNA and sent throughout the bodies on various working missions
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—the total process by which the body produces and uses energy from food
		1. Carbohydrates are converted into glucose
		2. Glucose is burned in the cells in a process called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		3. The heat from cellular respiration is used by the cell to produce \_\_\_\_\_\_
		4. ATP powers nearly all of the body’s reactions