Bio Study Guide Question	 Answer
What is energy?	The ability to do work.
What is potential energy?	Energy that is stored.
What forms does potential energy come in?	1. Gravity 2. Elasticity 3. Chemical
Where is chemical potential energy?	Energy stored in the bonds of molecules?
What is kinetic energy?	Energy of action.
What forms does kinetic energy come in?	1. Motion 2. Sound 3. Light 4. Heat
What can be done to energy?	It can be **transferred** or **transformed**.
What is a calorie?	The amount of energy needed to raise the temp of 1 mL of water 1 degree C.
What is combustion?	Using heat as the energy of activation to start a violent, uncontrolled release of energy. Substances are transformed into CO_2 and H_2O (smoke) and kinetic energy (fire).
What is the energy of activation?	The amount of energy needed to start a chemical reaction.
What is cellular respiration?	A process by which potential energy (chemical potential energy within the bonds of food molecules) is released, in controlled stages, within cells.
What is an ATP molecule?	Adenosine Tri-Phosphate. This molecule is used to store energy within cells.
Where does the energy come from?	It is the chemical potential energy released through the breakdown of food molecules. (Cellular respiration/photosynthesis.)
What is an ATP molecule made of?	A nitrogen base (Adenine), a pentose (Ribose) and 3 phosphates.
Where is the energy?	Within the squiggly, high-energy bonds between the phosphates. (There are 2 of these.)
What is an ADP molecule?	Adenosine Di-Phosphate. ADP has only two phosphates, and half the energy of an ATP.
What is the process that forms ADP molecules?	Dephosphorylation. Energy is released and a phosphate is removed. This energy is used to carry out life processes in the cell.

What is the process that forms ATP molecules?	Rephosphorylation. Energy is added, along with another phosphate, to make the molecule into an ATP again. This energy comes from the breakdown of food molecules.
Where does all energy come from, in the end?	The sun.
What is an AMP molecule?	Adenosine Mono-Phosphate. It contains only one phosphate, no high-energy bonds, and no extra energy.
What do enzymes do?	Lower the energy of activation so chemical reactions can take place more quickly and/or at all.
What are enzymes made of?	Proteins.
What do enzymes act upon?	Substrates. They are very specific- only one substrate substance per enzyme.
What effects enzyme activity?	Temperature and pH level. They don't work at extremes.
What are enzymes?	Biological catalysts.
What is the enzyme-substrate complex?	Enzymes attach to substrate molecules. The "active site" of the enzyme bonds to the substrate, breaks its bonds, and creates the product. Enzyme+substrate=product. The enzyme's active site fits into the substrate- like a lock and key.
What is cell theory?	All living things are made up of cells. Cells are the basic units of structure and function in living things. New cells are produced from existing cells.
Who was Anton van Leeuwenhoek and what did he do?	He was one of the first to use a microscope. He observed pond water and saw tiny organisms in it.
Who was Robert Hooke and what did he do?	He looked at thin plant slices, like cork, under a microscope. He saw that cork was made up of tiny chambers and named these **cells**.
Who was Matthias Schlieden and what did he do?	He concluded that all plants are made of cells.
Who was Theodre Schwan and what did he do?	He concluded that all animals are made of cells.
Who was Rudolf Virchow and what did he do?	He stated, "When a cell exists, there must have been a preexisting cell".
What is an organelle?	Specialized structures that preform important cellular functions.
What is a prokaryote?	A cell that has no nucleus. All bacteria are prokaryotes.
What is an eukaryote?	A cell that contains a nucleus and organelles. Some are singe-celled, but many form

	multicellular organisms. These cells can preform specialized functions.
What is the nucleus?	The center of the cell. It controls cellular activities and contains D/RNA.
What is chromatin?	Granular material spread throughout the nucleus. During cell division, it condensed to from chromosomes (threadlike structures) when a cell divides. Chromatin contains genetic information.
What is the nucleolus?	A small, dense part of the nucleus. It is where ribosomes are produces.
What is the nuclear envelope?	A double-membrane layer around the nucleus. It contains thousands of pores. Materials, as well as RNA, travel through it.
What is the cytoplasm?	The liquid inside the cell membrane. It contains the organelles.
What is the cytoskeleton?	A network of protein that supports the cell, maintains its shape, and helps with movement.
What are cilia and flagella?	Hairlike projections on the cell's surface. They produce force to allow the cell to move through liquid.
What are microtubes?	Hollow tubes of proteins. They have tracks, where organelles move. They are not in plants. During cell division, they separate the chromosomes. Here they are known as centrioles.
What are microfilaments?	Long, thin fibers made of protein. They help the cell move and support it.
What are ribosomes?	Organelles in the cytoplasm, and some are on the rough endoplasmic reticulum. They are very small, and made up of RNA and proteins. They produce proteins using instructions from the nucleus.
What is the endoplasmic reticulum?	An organelle in the cytoplasm. It assembles the cell membrane and is involved in protein synthesis. Ribosomes are on the surface of the rough endoplasmic reticulum. New proteins enter this organelle to be chemically modified. The smooth endoplasmic reticulum collects enzymes to be used for specialized tasks.
What is the gogli apparatus?	An organelle in the cytoplasm. It is a stack of membranes. Synthesized proteins come into it, are attached to lipids and carbs by enzymes, and are sent to their final destinations.
What are lysosomes?	Organelles in the cytoplasm. They are filled with

	enzymes, and break down food molecules, as well as “retired” organelles.
What are vacuoles?	Organelles in the cytoplasm. They are sacklike, and store materials. Many cells have a central vacuole filled with liquid. In plants, the pressure from vacuoles supports the plant.
What are vesicles?	Small, transport vacuoles.
What are chloroplasts?	Organelles in plant cytoplasm. They are two envelope membranes containing large sacks of photosynthetic membranes and the green pigment chlorophyll. They convert sunlight into food energy through photosynthesis.
What are mitochondria?	Organelles in the cytoplasm. They are two envelope membranes- the inner one is folded. They release engird from food, making the high energy compounds used for growth, development, and movement.
What is organelle DNA?	Important genetic information contained within the mitochondria and the chloroplasts. (It is passed down in the ovum's cytoplasm.)
What was Lynn Margulis's hypothesis?	That organelles have DNA because they were once prokaryotes and developed a relationship with eukaryotes, eventually becoming part of them.
What is the cell membrane?	A lipid bilayer that supports and protects cells. It has pores and is selectively permeable; it regulates what leaves and enters the cell.
What is the cell wall?	A layer around the cell membrane in plant cells, as well as nearly all prokaryotes, algae, and fungi. It supports and protects the cell and is made of carbs and proteins. It allows substances through.
What is passive transport?	The movement of substances from low to high concentration. This does not use energy.
What is active transport?	The movement of substances from low to high concentration, using energy.
What must cells be surrounded by?	Liquid.
What is diffusion?	The movement of substances through a selectively permeable membrane, from high to low concentration, without energy.
What is osmosis?	The movement of water molecules through a selectively permeable membrane, from high to low concentration, without energy.
What is isotonic?	A substance in equilibrium- just right. It does not

	need more or less water.
What is a hypertonic solution?	A solution with too much strength. It is concentrated.
What is a hypertonic solution?	A solution with too little strength. It is dilute.
What is osmotic pressure?	Pressure on the hypertonic side of a selectively permeable solution. It is harmful to cells, because they can burst if too much water comes in. Cells are always hypertonic to fresh water, because they cytoplasm contains molecules in solution, so the only cells that come in contact with fresh water are protected by cell walls.
What is facilitated diffusion?	The movement of molecules which cannot cross the cell membrane (lipid bilayer) through protein channels in the membrane, from high to low concentration, without energy.
What is active transport?	The movement of molecules from low to high concentration through a selectively permeable membrane, using energy.
What is endocytosis?	The movement of molecules into the cell. The cell membrane stretches out to engulf molecules, then breaks loose to form vesicles.
What is phagocytosis?	The engulfment of molecules. For example, white blood cells do this to bacteria, then their lysosomes break them down.
What is exocytosis?	The movement of large molecules out of the cell. A vesicle fuses with the cell membrane, and its contents are secreted.
What is a contractile vacuole?	A vacuole that constantly pumps out excess water in single celled organisms.
What are radiating channels?	Channels that suck water into cells.
What are unicellular organisms?	Bacteria, algae, yeasts, and fungi.
What are colonial organisms?	Unicellular organisms attached to one another. They have few specialized structures.
What are multicellular organisms?	Organisms with interdependent, specialized cells.
What are the levels of organization in multicellular organisms?	1. Cells 2. Tissues 3. Organs 4. Organ systems
What are tissues?	Groups of cells with the same function.
What are the main types of animal tissues?	1. Muscle 2. Epithelial (skin; surface covering) 3. Nervous

	4. Connective (bone, blood, cartilage, lymph)
What are organs?	Groups of tissue that work together. They don't have to be the same type.
What are organ systems?	Groups of organs that work together. The human body has 11.

Structure	Prokaryote	Eukaryotes	
		Animals	Plants
Cell membrane	Yes	Yes	Yes
Cell wall	Yes	No	Yes
Nucleus	No	Yes	Yes
Ribosomes	Yes	Yes	Yes
Endoplasmic reticulum	No	Yes	Yes
Golgi Apparatus	No	Yes	Yes
Lysososomes	No	Yes	Yes
Vacuoles	No	Small/none	Yes
Mitochondria	No	Yes	Yes
Chloroplasts	No	No	Yes
Cytoskeleton	No	Yes	Yes