**Biology Fall Final Exam Study Guide KEY**

**Energy**

1. How do organisms in an energy pyramid obtain their energy? **Photosynthesis for producers or consume other organisms**
2. Which level in an energy pyramid has the most available energy? **Producers (bottom)**
3. Define chemical energy, thermal energy, potential energy, kinetic energy,  and mechanical energy.

**Chemical energy: energy in bonds**

**Thermal energy: energy of heat**

**Potential energy: energy of position**

**Kinetic energy: energy of motion**

**Mechanical energy: energy used to do work**

1. What is energy that is given off from a reaction lost to the environment as? **Heat**
2. What is the chemical equation for cellular respiration?

**6 O2 + C6H12O6 → 6CO2 + 6H2O + energy (ATP)**

1. Do plants perform cellular respiration? **YES! Mitochondria**
2. What is the chemical equation for photosynthesis?

**6CO2 + 6H2O + energy (light) → 6 O2 + C6H12O6**

1. What is fermentation? **Respiration without oxygen**
2. What types of organisms perform fermentation? **Fungi, Bacteria**
3. What are the two types of fermentation? **Lactic acid, alcoholic**
4. Which compound that is produced by respiration directly provides us with energy? **36 ATP**

**Enzymes**

1. What is an enzyme?

**Protein that speeds up chemical reaction (catalyst)**

1. How does an enzyme affect a reaction rate?

**Speeds it up**

1. What does an enzyme do to activation energy?

**Lowers it**

1. What are 3 characteristics of an enzyme?

**Shape determined by amino acid sequence, Unchanged in reaction, Specific for reaction**

1. Draw an enzyme-substrate complex.



1. What does temperature do to an enzyme?

**Changes protein (denatures) = decreased or no reaction**

**Proteins**

1. What are the monomers of proteins?

**Amino Acids**

1. How does temperature affect proteins?

**Changes shape (denatures)**

1. Define the 4 structures of a protein. (Primary, Secondary, Tertiary, Quaternary)

**1 = sequence of amino acids, 2 = folding/spirals, 3 = complete protein, 4 = groups of proteins**

1. Which part of an amino acid makes it unique?

**Side chain (R-group)**

1. Draw the structure of an amino acid.



1. What element does a compound need to contain in order for it to be considered organic? **Carbon**
2. What elements are in a protein? **CHNO**

**Carbohydrates**

1. What is the function of a carbohydrate? **Provide energy**
2. What are the monomers of carbohydrates? **monosaccharides**
3. What elements are in a carbohydrate? **CHO**
4. What is a monosaccharide, disaccharide and polysaccharide? Mono: glucose, Di: Lactose, Poly: Starch
5. What is the function of insulin? Glucagon? Glycogen?

**Insulin: opens the cells for glucose (Think: Glucose IN)**

**Glucagon: signals the liver to change glycogen into glucose (Think: Glucose is gone)**

**Glycogen: storage of extra glucose**

**Lipids and Cell Transport**

1. What are the differences between a saturated and unsaturated fatty acid?

**Unsaturated has a fatty acid (bent)**



1. What are the characteristics of a phospholipid?

**Phospholipids consist of a two fatty acids tails (nonpolar, hydrophobic), and a phosphate head (negatively-charged polar, hydrophilic polar).**

1. What are the functions of the cell membrane?

**Regulate what enters and exits the cell, identification, maintain homeostasis**

1. What are the channels that span the membrane made of? **Protein**
2. What are the 3 types of Passive Transport?

**Simple Diffusion, Osmosis, Facilitated Diffusion**

1. What is diffusion? **Movement of molecules from areas of high to low concentration**
2. What is facilitated diffusion?

**Diffusion using a transport protein to allow molecules to pass through the cell membrane.**

1. What is osmosis?

**Movement of water through a semi-permeable membrane**

1. What is active transport?

**Movement of molecules that requires the input of energy (Think: Active Transport Protein = ATP)**

1. Define Endocytosis and Exocytosis?

**Endocytosis – movement of materials into a cell using vesicles formed from the cell membrane**

**Exocytosis – movement of materials out of a cell using vesicles formed from Golgi body**

1. Define hypotonic, hypertonic and isotonic.

**Hypotonic = solution low in solutes so water moves into the cell**

**Hypertonic = solution high in solutes so water moves out of**

**the cell**

**ISOTONIC = solution has same amount of solutes as the cell**

1. Explain what happens to a red blood cell when placed in a hypotonic, hypertonic, and isotonic solution.

