Honors Biology Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
NDHS Per: \_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_

**Fall Semester Exam Study Guide**

**Characteristics of Life:** Know the 6 characteristics of life and examples of each  **Biomolecules:**
 - elements that make them up
 - know functions and examples
 - know how they fit into the nutrient cycles

**Digestive System:** Know organs and functions
 Know where the major biological molecules are digested
**Nutrient Cycles** Know how the nutrient cycles work and flow
 Explain the difference between how matter and energy move through ecosystems
 Terms: Producer, Consumer (Herbivore, omnivore, carnivore), Detrivore (Decomposer), Fixation, Assimilation, Consumption, Decomposition, Nitrification, Denitrification, Erosion, Precipitation, Evapotranspiration, Photosynthesis, Cellular Respiration, Mutualism, Legumes

Review the Biomolecules Lab
Practice Calorie Calculations

**Calorie Calculation Practice Problems: SHOW YOUR WORK!!!**

A sample of food has 8.0 grams of protein, 10.0 grams of fat, and 20.0 grams of carbohydrates with 3 of those being fiber.

1. How many Calories are from the protein?
2. How many Calories are from the fat?
3. How many Calories are from the carbohydrates? (REMEMBER THE FIBER RULE)
4. What is the total Caloric value?
5. What percentage of the Calories comes from the Fat?

**Answers**: 1) 32 Cal 2) 90 Cal 3) 68 Cal 4) 190 Cal 5) 47.4 % Fat

**Cellular Structures:**Review the cell parts and what each does in the cell
**Muscle Contraction and Muscle Cells**Structure of a muscle
Explain how a muscle contracts
**Cell Transport**Structure of the Cell Membrane and how that regulates the transfer of materials into and out of the cell
Types of Transport and how they work: Active, Passive, Diffusion, Osmosis, Facilitated Diffusion
Know what will happen to different types of cells (with walls and without) in various types of solutions. Explain WHY the cell changes.
Bulk Transport: Endocytosis (Phago and Pino), Exocytosis

**Percent Change Calculation Problems:**

Calculating Change in Mass: Change in Mass = New Mass – Original Mass

Calculation % Change in Mass: Percent = Change in Mass X 100
 Original Mass

1. A puppy weighs 1.5 kg when it is born, after three months it weighs 5.5 kg. What is the change in mass and the percent change in mass of the puppy?
2. Another puppy is born (a different type) and it weighs 7.5 kg. After three months it weighs 15.0 kg. What is the change in mass and the percent change in mass of this puppy?
3. Which puppy gained the most mass? Which puppy grew the most? Explain your answer. (HINT the answers are not the same)
4. A 4.0 gram slice of potato is placed in an unknown solution and left to sit for 24 hours. If the potato slice has a mass of 2.0 grams after the 24 hour period, what is the percent change in mass? Was the solution hypertonic, isotonic, or hypotonic? Explain.

**Answers**: 1) 4.0 kg, 267% growth 2) 7.5 kg, 100% growth 3) While the second puppy gained more mass, the first puppy actually grew more. 4) – 50.0% The solution was hypertonic because the potato lost mass which shows that water moved out of the cells into the solution.

**Chemical Reactions**
Parts of Chemical Reaction
Activation Energy of Reaction
Role of Catalysts in Chemical Reactions
Know the parts of an energy diagram for an endothermic and exothermic reaction. Be able to explain why the diagram shows it to be an exothermic or endothermic reaction and anabolic or catabolic.
**Enzymes** - What are they?
Be able to draw an energy diagram for a regular chemical reaction and the same reaction with the presence of an enzyme.
Active Site
Substrate
Factors that Affect Enzyme Reactions:
 Optimal Temperature and pH
 - know normal range of most biological reactions
 Denaturation: What is it? What does it do to proteins and enzymes?
 Enzyme and Substrate Concentrations
**Photosynthesis:**Chloroplast Structure: Know where the different steps of photosynthesis take place in the chloroplast
Photosynthesis Equation: Know where the reactants are consumed and where the products are made in the chloroplast and in which steps of the process

Main Steps of Photosynthesis
Important Participants: NADP+/NADPH, ATP,

**Cellular Respiration:** Equation: Know where each is used in the mitochondria
 Structure of the Mitochondria
Glycolysis and Krebs Cycle, ETC
 Types of Fermentation

**Cardiopulmonary System**Explain the effect of exercise on the cardiopulmonary system and cellular respiration
Cellular Division:
Steps of Mitosis and Meiosis
Diploid vs Haploid
Somatic vs Gamete