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Semester 1 Biology Mid-Term Exam Review Guide

Resources to help you study include your **text book, interactive notebooks, calendars, labs, lectures and assignments**. This review guide is to only help you organize your thoughts. The exam includes but not limit to all the concepts on this review guide.

Concept 1: Introduction to Biology

- Lab safety
- Lab equipment
- Proper lab attire
- Scientific method
 - Steps involved
 - Independent variable
 - Dependent variable
 - Constant
- Data
 - Be able to interpret data from a chart, graph, or table

Concept 2: Characteristics of Living Things

- What is Biology?
- Characteristics of Life
- Levels of Organization
- Properties of Water
 - Adhesion versus cohesion
 - Polarity
 - Versatile solvent
 - Hydrogen bonding
 - Expands during freezing
 - Evaporative cooling etc
- pH scale/ pH testing
 - Acids
 - Bases
 - Neutral
 - Buffer

Concept 3: Chemistry of Life/ Biochemistry

- State of Matter
 - Solids, liquids, gases
- Atoms
 - Basic unit of life
 - Outside nucleus
 - Electrons – negative
 - Inside nucleus
 - Protons - positive
 - Neutrons – no charge
 - Solutes, solvents, and solutions
- Chemical compounds, bonds, & reactions

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- Products and reactants
- What happens at equilibrium?
- Activation energy- exothermic/ endothermic
- Enzymes/ Catalysts
- Molecules of Life/ Macromolecules/ Organic Chemistry/ Organic Molecules Testing
 - Carbohydrates (Sugars & Starches)
 - Polysaccharide
 - Monosaccharide
 - Glycosidic Bonds
 - Proteins (Polypeptides)
 - Building blocks are amino acids
 - Central Dogma Theory
 - Protein Synthesis
 - Peptide Bonds
 - Lipids
 - Fats, oils, and cholesterol
 - Ester Linkages
 - Saturated/ Unsaturated Fats
 - Nucleic acids
 - DNA and RNA

Concept 4: Cell Structure and Function

- Microscopy
- Cell Theory
 - 3 major principles
- Prokaryotes vs. Eukaryotes
 - Characteristics of each
 - Similarities and differences
- Cell Membrane
 - Phospholipid bilayer
 - Fluid mosaic model
 - Homeostasis
 - Selective permeability
 - Concentration gradient
- Cellular Transport
 - Diffusion and Osmosis
 - Passive transport (no ATP required)
 - Osmosis
 - Diffusion
 - Facilitated diffusion
 - Types of solutions/ tonicity
 - Isotonic
 - Hypotonic
 - Hypertonic
 - Plasmolysis/ cytolysis
 - Active Transport (ATP required)
 - Transport pumps
 - Endocytosis
 - Phagocytosis
 - Pinocytosis

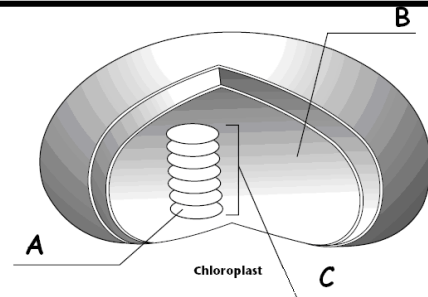
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- Exocytosis
- Vesicles
- Cell Organelles – structure and function
 - Nucleus
 - Cytoplasm
 - Endoplasmic reticulum
 - Golgi apparatus
 - Mitochondria
 - Lysosomes
 - Ribosomes
 - Chloroplasts
 - Cytoskeleton
 - Flagella
 - Cilia etc.....
- Plant cells vs. Animal cells
 - Characteristics of each
 - Similarities & differences
- Cellular Energy
 - Photosynthesis
 - Photosynthesis and cellular respiration are of critical importance to living things because they form a cycle by which energy enters and moves through the living world. Photosynthesis is performed by plants, algae, and cyanobacteria. **The chemical equation for photosynthesis is:**

Use the letters in the diagram to the left to identify the following parts:

- _____ stroma
- _____ thylakoid
- _____ granum



Use terms from the word bank to fill in the chart comparing and contrasting the light-dependent reactions and the Calvin Cycle. (You can use them more than once!)

in stroma	O ₂	CO ₂	in thylakoid membrane	ATP
Requires light	H ₂ O	Doesn't require light	Sugar (glucose)	
	LIGHT-DEPENDENT REACTIONS		CALVIN CYCLE	
LOCATION				
REACTANTS				
PRODUCTS				
LIGHT				

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○ Cellular Respiration & Fermentation

- Respiration takes place in all living cells—not just animal cells. The chemical equation that describes cellular respiration is:

- _____ 1. _____ is the first step in cellular respiration that begins releasing energy stored in glucose.
- A. Alcoholic fermentation B. Lactic acid fermentation
C. Glycolysis D. Electron transport chain
- _____ 2. If oxygen is NOT present, glycolysis is followed by _____.
- A. Krebs cycle B. fermentation
- _____ 3. Name the 3 carbon molecule produced when glucose is broken in half during glycolysis.
- A. pyruvic acid B. lactic acid
C. Acetyl-CoA D. citric acid
- _____ 4. Since fermentation does not require oxygen it is said to be _____.
- A. aerobic B. anaerobic
- _____ 5. Which of the following shows the correct sequence during cellular respiration?
- A. Electron transport chain → glycolysis → Krebs cycle
B. Glycolysis → Electron transport chain → Krebs cycle
C. Krebs cycle → Electron transport chain → glycolysis
D. Glycolysis → Krebs cycle → Electron transport chain
- _____ 6. Because cellular respiration requires oxygen it is said to be _____.
- A. aerobic B. anaerobic
- _____ 7. How many total ATP molecules are produced by 1 molecule of glucose completing cellular respiration?
- A. 2 B. 6 C. 24 D. 36
- _____ 8. Which stage of cellular respiration produces the most ATP?
- A. glycolysis B. Krebs cycle
C. Electron transport D. Acetyl-CoA charging

Identify the type of fermentation used in each example.
{Lactic Acid Fermentation or Alcohol Fermentation}

- Yeast uses this to make bread dough rise. _____
- Your muscle cells use this during rapid exercise when oxygen is low. _____
- Bacteria and yeast use this to make beer and wine. _____
- Bacteria use this to make cheese, yogurt, and sour cream. _____

Concept 4: Ecology (Principles, Population etc)

1. What are the levels of ecology from most specific to most general:

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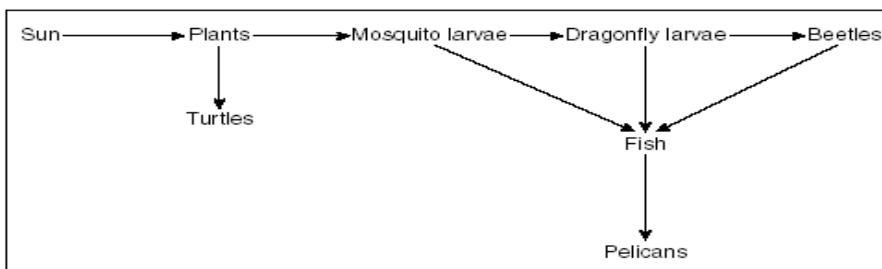
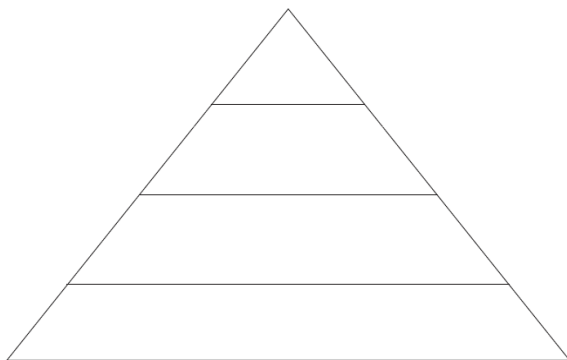
2. The deciduous forest regions are exposed to warm and cold air masses, which cause this area to have four seasons. The average yearly temperature is about 10°C. The areas in which deciduous forests are located get about 750 to 1,500 mm Of precipitation spread fairly evenly throughout the year. Most of the trees are broadleaf trees such as oak, maple, beech, hickory and chestnut. There are also several different kinds of plants like mountain laurel, azaleas and mosses that live on the shady forest floor where only small amounts of sunlight get through.
- List the biotic factors in this ecosystem.
 - List the abiotic factors.
 - Give an example of a population in this ecosystem.
3. Relationships between organisms within ecosystems:
- Food chains and food webs trace the flow of _____ through the ecosystem.
4. In the Amazon Jungle, the cappuccino monkey thrives in the high trees of the Peruvian area of the jungle. In the high trees, it can feed on hazelnuts and scavenge for food along the jungle floor. It also is food for many predators such as jaguars.
- What would be the monkey's habitat? _____
 - What would be the monkey's niche? _____

5. Label the food chain below with the correct trophic level description.

Algae → shrimp → squid → whale

6. What does the 10% rule state? _____
- _____
- _____

7. Label the four tiers of the energy pyramid with the correct trophic level (*producers, primary consumers, secondary consumers, and tertiary consumers*). Be sure to show include arrows to indicate energy loss and energy transfer.



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8. If all of the mosquito larvae are removed from the food web above, which populations will decrease?

9. If the ecosystem above was contaminated with DDT, a harmful chemical, which population would contain the highest *concentration* of DDT? _____

Match the following terms with the correct statement. Each statement may be used only once.

- | | |
|---------------------------|--|
| 1. _____ Heterotroph | A. One organism benefits without harming the other |
| 2. _____ Succession | B. Maintaining a natural balance on earth |
| 3. _____ Ecology | C. Study of organisms and their environment |
| 4. _____ Prey | D. Gradual replacement of one community by another |
| 5. _____ Carnivore | E. A relationship in which both organisms benefit |
| 6. _____ Autotroph | F. Organisms that cannot make their own food |
| 7. _____ Parasitism | G. A relationship in which one organism benefits but harms the other |
| 8. _____ Commensalism | H. Organisms that can make their own food |
| 9. _____ Herbivore | I. An organism that hunts |
| 10. _____ Mutualism | J. Organisms that eats only meat |
| 11. _____ Decomposer | K. Organism that breaks down dead material |
| 12. _____ Omnivore | L. Any biotic factor that restricts distribution of organisms |
| 13. _____ Predator | M. Organism that eats both plant and animals |
| 14. _____ Limiting Factor | N. Organism that is hunted |
| 15. _____ Homeostasis | O. An organism that eats only plants |

Identify the type of symbiotic relationship being described.

A termite has a small protozoan living in its intestine. Termites feed on wood. Although they cannot chemically break down the cellulose in the wood, the protozoans living inside them can.

An orchid is a tropical flower that lives in the branches of trees. By getting higher up into the canopy of the tropical forest, the flower receives more light. The tree it lives in is not affected by the orchid at all.

A tapeworm is a parasite that lives in the intestines of many mammals. It absorbs food that is eaten by the animal. The tapeworm steals food that would normally be available to the animal.

Failure to prepare is preparing to fail. Well done is better than well said. (Benjamin Franklin)