Hanover Central High School

Biology

***Final Exam Topic List—1st Semester***

***General Information:*** The final exam will be given on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It will consist

of 100+ multiple choice or matching questions, on topics from Chapters 1-5, 13-16. \* Note that this review packet does not contain questions/topics for Chapters 5. You have just tested on this material and can use your recent study guides for this section. Questions will require students to ***know and apply*** ***information*** about the topics listed below. Some questions may require students to interpret a diagram or graph and relate it to specific topics that have been studied in order to select the best answer. Additional questions may require students to interpret given laboratory data. Students are also expected to ***know the vocabulary from each chapter***, as these terms will be used within questions.

***Directions:*** Take notes for each topic in the space provided below…this may include a written description or a labeled picture. Pretend that the topics listed are questions. For example, the first topic listed is really asking you…what is the study of biology?

***Chapter 1***

The study of Biology

Properties of Life

The relationship between the following terms:

species & reproduction

growth & development

stimulus & response

adaptation & evolution

Major differences between the evolutionary theories of Darwin and Lamarck

Current Uses and Applications of Biology

The general order of Scientific Processes/Methods

Parts of a well designed, controlled experiment:

Hypothesis

Control group

Experimental group

Independent variable

Dependent variable

The relationship between a hypothesis, theory, and scientific law

Qualitative and Quantitative Data

Functions of parts of a light microscope (use the diagram on page R8 in your text to help you review the microscope parts you have used in class)

Differences between low and high power objectives in relation to… (pg R10)

Strength of magnification

Area viewed

Depth viewed

Relative speed of an organism

Computation of the total magnification of the eye piece and an objective lens.

Types of microscopes:

Light microscope

Compound light microscope

Electron microscopes (transmission and scanning)

Scanning tunneling microscope

***Chapter 2: Chemistry of Life***

Basic structure of an atom—nucleus (protons & neutrons) and electron cloud (electrons in energy

levels)

Atomic number vs. atomic mass

Valence electrons – know how to determine the number of valence electrons for groups 1A – 8A on the periodic table

Elements and compounds

Mixtures and solutions

Acids and bases – their definitions and relation to the pH scale

Types of Bonds…how they are formed and examples of each kind

Ionic bond

Covalent bond

Hydrogen bond

The difference between ions and isotopes

What is a polar molecule

Water:

why it is a polar molecule

The unique properties of water

why it is so important to living systems

Structure of a carbon atom, its ability to form bonds and organic compounds

The relationship between the following terms – polymer, dehydration synthesis, hydrolysis

The subunits (monomers) of the following biomolecules:

|  |  |  |  |
| --- | --- | --- | --- |
| Organic Molecule | Monomer | Examples of | What they do/ Functions |
| Carbohydrate |  |  |  |
| Lipid |  |  |  |
| Protein |  |  |  |
| Nucleic Acid |  |  |  |

The structure of an amino acid (carboxyl group, amino group, R group/variable group)

The relationship between the type and sequence of amino acids and the formation of different proteins

Activation Energy

The function of enzymes/catalysts

The two writing methods for including catalysts in chemical equations

Factors that affect enzyme activity

The lock and key nature of enzyme-substrate complexes

**Chapter 3: Cell Structure**

Contributions of van Leewenhoek, Hooke, Schleiden, Schwann and Virchow to understanding the basic nature of cells

The SI system (pg R5)

Basic metric units for length, volume, mass, time and temperature

Parts of the Cell Theory

Limitations to cell size

Differences between prokaryotic and eukaryotic cells

Selective permeability of the plasma membrane

Functions of the four types of membrane proteins

Structure of and major parts of the plasma membrane, including phospholipids, cholesterol, membrane proteins, and hydrophilic/hydrophobic areas

The **function** and **structure** of the following cell structures…be able to identify them on a diagram:

Cell wall

Centrioles

Chloroplast

Chromatin

Endoplasmic reticulum

Golgi apparatus/complex

Mitochondrion

Nucleus

Nucleolus

Nuclear membrane/envelope

Plasma membrane

Ribosome

Vacuole

Cytoplasm

Cytoskeleton

lysosome

cilia

flagella

Differences between plant and animal cells

Advantage of folded membranes within cellular organelles

*Passive Transport:*

What is Diffusion:

How does it rely on Concentration gradients

Relationship between diffusion and osmosis

How a concentration gradient determines the direction of osmosis:

Isotonic solution

Hypertonic solution

Hypotonic solution

Differences between the following types of water: tap water, distilled water, and salt water

Facilitated diffusion (ion channels)

*Active Transport:*

Carrier proteins (membrane pumps)

Endocytosis (pinocytosis and phagocytosis)

Exocystosis

Signal Molecules

***.***

***Chapter 4:Photosynthesis and Cellular Respiration***

The relationship between the sun and food chains

Contributions of the following scientists to our understanding of cellular energy: Jan van Helmont, Joseph Priestley, Jan Ingenhousz, Melvin Calvin, Hans Krebs

Structure of ATP

Formation and break down of ATP

Structure of a chloroplast: stroma, grana, thylakoid membranes, chlorophyll

Relationship of light and various pigments—color absorption/reflection

*Photosynthesis:*

Light dependent reactions, electron transport chain (ETC)

Location of electron transport chains

Function of the 1st ETC

Function of ATP synthetase

Hydrolysis

Function of the 2nd ETC

Light independent reactions, Calvin cycle

Why they are called the dark reactions

Location of the dark reactions

How the Calvin cycle involves CO2, RuBP, PGA, PGAL, ATP, and NADPH

General equation of photosynthesis

Factors that affect photosynthesis

*Cellular respiration:*

Glycolysis…where does it occur, what does it break down, what are the resulting products

Location of the Krebs cycle

How the Krebs cycle involves Acetyl-CoA, oxaloacetic acid, citric acid, CO2, NADH, FADH2 and ATP

The location of electron transport chains in cellular respiration

The role of oxygen in electron transport chains

Anaerobic vs. aerobic respiration

Identify whether the following are aerobic or anaerobic:

Glycolysis, Krebs cycle, electron transport chain, fermentation

The relationship between fermentation and glycolysis

Differences between the two types of fermentation

General equation for aerobic cellular respiration

What does the term “oxidative phosphorylation” refer to during the breakdown of glucose?

Amount of net ATP acquired from each part of respiration:

Aerobic respiration

Glycolysis

Krebs Cycle

ETC

Fermentation

General comparison of photosynthesis and cellular respiration

Chapter 13-16

1. What is biodiversity?
2. What is succession?
3. What are some examples of pioneer species?
4. What is the difference between a food chain and a food web?

5. What are 1st order consumers, 2nd order consumers, and 3rd order consumers?

6. To what trophic level do producers belong? Herbivores?

7. How much energy is passed along to higher trophic levels?

8. What is an energy pyramid?

9. What is biomass?

10. What is the relationship between the amount of food required to support an organism compared to the mass of the organism?

11. What are the important processes in the carbon cycle?

1. What processes are important in the water cycle?
2. In what type of plant is nitrogen fixing bacteria found directly on their roots?
3. What kinds of organisms are decomposers…what do they do?
4. Place the following levels of organization in order from smallest to largest…

ecosystem, biosphere, organism, community, population

1. What is a habitat?

17. What is an ecological niche?

18. Identify and explain the three types of symbiosis.

19. What is a biome?

20. What factors affect the formation of the terrestrial biomes?

21. What are some examples of aquatic biomes?

21. Where are toxic materials most concentrated in a food chain?

* 1. What is this phenomenon called?

22. What is the greenhouse effect? What gases contribute to this?

23. How is acid rain formed?

24. What is destroying the ozone layer?