

Exam #1 Study Guide

Use your book as a reference if you don't understand something, or better yet, ask me!

Introduction to Biology

What are life's levels of organization? Know which categories are smaller in scale and larger in scale!

What are the main functions of DNA?

What is energy?

What is metabolism?

What are producers, consumers, decomposers? Be able to give examples of each!

How much energy can producers get from the sun? How much energy goes between organisms? Be able to do a problem!!!

Why is energy flow considered a one-way flow? Can the same be said for nutrients?

What is homeostasis? Make sure you understand this concept!

Who was Linneaus? What did he do? How do you write a scientific name?

What is the 3-domain classification scheme?

What are the differences between Eukarya, Archaea, and Bacteria? Which one is eukaryotic? Which are prokaryotic? What do those terms mean? Which organisms are simpler and which are more complex? What are some examples of eukaryotes?

What is the 6-kingdom classification scheme?

How do you classify organisms from the least specific to the most specific? Know in order: Domain, Kingdom, Phylum, Class, Order, Family, Genus, Species.

What is a mutation?

What is an adaptive trait? What is evolution? What is natural selection?

What is the scientific method? What are its different steps?

What's a control group? What's an experimental group? What's a variable?

How do you limit sampling error?

What's a scientific theory?

Chemistry

What are the 4 most common elements in living organisms?

What are atoms? Protons? Electrons? Neutrons? Where are they located? What makes up the atomic mass? What's the atomic number?

What's an isotope?

How many electrons are in each shell?

What are ionic, covalent, and hydrogen bonds? Which one is the weakest? What's an example of each?

What's an ion?

What's a molecule?

What's the difference between a polar and nonpolar covalent bond? Which one does a water molecule have? What bond holds multiple water molecules together?

What are some important properties of water?

What do hydrophilic and hydrophobic mean?

What's the pH scale? What are acids and bases? What's neutral? What do the different numbers on the scale refer to? What are salts?

Biological Molecules of Life

What are the 4 biological molecules? What's their monomers? What's their polymers?

What's the "interesting fact" about each? How can you identify each one? What are they made of?

What are condensation reactions? What are hydrolysis reactions?

What's starch and glycogen and cellulose?

What are the different groups of substances that are lipids? What's special about sterols?

What are the functions of proteins?

What's a peptide bond?

What are primary, secondary, tertiary, and quaternary structures of a protein?

What is denaturation?

What are some nucleotide functions? What are some important examples of nucleotides and nucleic acids?

Cells

What the smallest unit of life?

What are the structures found in all cells?

What's the difference between prokaryotic and eukaryotic cells?

What did Hooke do?

What's the cell theory?

What's the lipid bilayer? What's it made of? Why is it said to possess a fluid mosaic organization? What does it mean that it's selectively permeable? What are the two parts of the phospholipids? What's the significance of the two parts in regards to their interactions with water?

What are the different types of proteins associated with the cell membrane?

What's a concentration gradient? How do molecules move in response to this gradient?

What's diffusion? What's passive transport? What's active transport? What's exocytosis? What's endocytosis? What's facilitated diffusion?

What's osmosis?

What does hypertonic, hypotonic, and isotonic mean? What happens to cells placed in solutions with different tonicities?

What are the major parts of the prokaryotic cell? Of the 3 domains, which is the simplest? Which is the most advanced?

What's the nucleus and what's its function? What are the components of the nucleus? What are their functions?

What's the endomembrane system? What composes it? What are the functions of each component?

What are mitochondria and chloroplasts? What are their functions?

What are the 3 elements of the cytoskeleton?

What are flagella, cilia, and false feet?
What's a cell wall? Where is it found?

What are the 3 cell junctions in animal cells? What's plasmodesmata? Where are they found?

ENERGY

What do the 1st and 2nd law of thermodynamics state?

What is energy? What is entropy?

What's the pathway of energy? What about nutrients?

What are endergonic and exergonic reactions?

What is ATP? What is the ADP/ATP cycle?

What are oxidation-reduction reactions? What does oxidation and reduction mean?

What are electron transfer chains? Why are they more efficient than a non-stepwise method?

What are enzymes? What do they do? What are the 4 features of enzymes?

What's activation energy?

Photosynthesis

What are photons?

What are the wavelengths of visible light? Which have more energy?

What are pigments? Where are they located? What is the main photosynthetic pigment?

What are accessory pigments?

What are autotrophs? What are heterotrophs?

How are the processes of aerobic respiration and photosynthesis linked?

What's the chemical formula of photosynthesis?

What are the two stages of photosynthesis? What happens during each stage/what is produced/released/etc.?

What's another name for the second stage of photosynthesis?

In what organelle does photosynthesis occur?

Where do the light-dependent reactions occur? What about the light-independent reactions?

What are photosystems? What are the 2 types of photosystems? Why are they named what they are?

Why is it called the non-cyclic pathway?

How is ATP formed in photosynthesis? Which stage does this occur?

How does glucose get formed? How does the Calvin-Benson cycle work?

What are the storage forms of carbohydrates in animals and plants?

CELLULAR RESPIRATION

What happens in glycolysis? Where does it occur?

Where does aerobic respiration occur? How many ATP are produced in total from one molecule of glucose?

What are the 3 stages of aerobic respiration?

What are the products from each stage of aerobic respiration? How many carbons in pyruvate?

How many ATP are produced at each stage?

How many NADH/FADH₂ are produced at each stage?
When is carbon dioxide released?

What is the final electron acceptor?

What are the 2 stages of glycolysis? How many ATP? How many NADH?

Where does the second stage of aerobic respiration occur? What happens to pyruvate before it enters the Krebs cycle? What happens during acetyl-CoA formation? How many ATP? How many NADH? How many FADH₂ are produced in the second stage?

What's the total amount of reduced coenzymes from the first two stages?

Where do these reduced coenzymes go? What's this stage called?

What combines with acetyl co-A (how many carbons?) to make the next compound? (how many carbons?)

What travels along with the electrons? What is the significance of this in regards to the gradient?

How is ATP produced? How does this gradient cause this? What do those ions have to travel through?

What does anaerobic mean? How are anaerobic pathways different from aerobic pathways?

What are the two different kinds of fermentation pathways? How much ATP is produced from each? What's the end product from each?

How are photosynthesis and aerobic respiration linked?