

## HOMEOSTASIS

Topic
Feedback Systems – homeostasis, positive feedback loops, negative feedback loops, receptors, integrators, effectors
Regulating Blood Sugar – feedback diagram, diabetes, antagonistic hormones, insulin, glucagon <b>Dry Lab - Blood Sugar</b>
The Kidneys – urinary system structures, 5 functions of kidneys, kidney structures and function
<b>Dissection of kidney- activity</b>
The Nephron – structure/function of all the parts of the nephron
Urine Formation – 4 steps (filtration, reabsorption, tubular secretion, excretion) and how counter-current flow of urine to blood ensures maximum water reabsorption
Water Balance: Blood osmotic pressure and ADH (solute concentrations) and Blood pressure (blood volume) and aldosterone
The Nervous System – structures and functions - sympathetic, parasympathetic, somatic, autonomic, and the Reflex Arc, sensory nerve, interneuron, motor nerve
The Structure of the Neuron
lesson-Nerve Impulse or Action Potential – how information travels along a neuron (nerve cell)
<a href="#">14 ACTION POTENTIAL WS .doc</a>
The Synapse – how information travels from one neuron to the next

## BIOCHEMISTRY

<b>Introduction to Biochemistry</b> atoms, valence electrons, 4 models of atoms (electron, space filling, structural, molecular), covalent molecules, ionic compounds, organic molecules, 3 intramolecular bonds (covalent, polar covalent, ionic), electronegativity, 2 intermolecular bonds (hydrogen, van der Waals), bond energy
<b>Types of Reactions and Functional Groups</b> , Water's special properties, 4 types of reactions (dehydration synthesis, hydrolysis, neutralization, redox), 6 functional groups, (hydroxyl, carbonyl, carboxyl, amino, phosphate, sulfhydryl), monomers and polymers
<b>Carbohydrates</b> , monosaccharide, disaccharide, polysaccharide, isomer, glycogen, cellulose, $\alpha$ and $\beta$ glycosidic bond
<b>Lipids</b> , fatty acid, glycerol, triglyceride, saturated, unsaturated, phospholipid, cholesterol, steroids, hydrophilic, hydrophobic, ester bond
<b>Proteins</b> , 3 main types, amino acids, R groups, polar, non-polar, peptide bond, polypeptide, primary, pleated or helix secondary structure, tertiary and quaternary structure, 4 protein functions (transport, enzymes, recognition, signaling)
<b>Nucleic Acids</b> , DNA, RNA, nucleotide, nitrogen bases, hydrogen bonds.
<b>Fluid Mosaic Model of the Cell Membrane</b> , phospholipid bilayer, integral and peripheral proteins, glycolipid, glycoprotein, 3 factors affecting fluidity (temperature, bond types, tail length), 4 protein functions (transport, enzymes, recognition, signaling)
<b>Enzyme Function</b> , active site, substrate, normal activation energy, catalyzed activation energy, coenzymes, cofactors, effects of temperature, pH, enzyme and substrate concentration on enzymes
<b>Inhibition of Enzymes</b> , competitive inhibition, non-competitive inhibition, inhibitor, allosteric site, biochemical pathways.
<b>Osmosis and Diffusion</b> , solute, solvent, concentration: <b>Homeostasis, isotonic, hypotonic, hypertonic</b>
Transport of Materials Across Cell Membranes A) <i>Passive Transport</i> , channel and carrier proteins B) <i>Active Transport</i> , Na <sup>+</sup> /K <sup>+</sup> pump C) <i>Bulk Membrane Transport</i> , exocytosis, endocytosis, pinocytosis

## GENETICS

Topic
Nucleic acids and nucleotides Homework: <a href="#">01 Nucleic Acid Comparison V4</a>
DNA structure and composition, DNA coiling, semi-conservative replication
DNA Replication Initiation, elongation, termination
The Central Dogma, the triplet hypothesis, DNA → transcription → RNA → translation → protein
Protein Synthesis Step 1 – Transcription <b>-assignment in class- HAND IN</b> <a href="#">05 Protein Synthesis Diagram activity pg 1.doc</a> <a href="#">05_protein_synthesis_diagram_activity_pg2.jpg</a>
Protein Synthesis Step 2 – Translation
Genes, Genome, Introns, Exons, Splicing
Biotech part 1: Restriction Endonucleases, PCR, Gel Electrophoresis
Biotechnology Part 2 - Recombinant DNA, plasmids
Mutations classwork
Operons and Transcriptional control in Prokaryotes
2-Transcriptional Control in Eukaryotes