Semester 1 – AP Biology Final

What you need to know!

Unit 1 Evolution

Mechanisms of Evolution:

* Various examples of evidence that support evolution as change of populations over time.
* The difference between structures that are homologous and those that are analogous, and how this relates to evolution.
* The role of adaptations, variation, time, reproductive success, and heritability in evolution.

Evolution of Populations

* Mutations are the only source of new genes.
* The ways in which sexual reproduction produces genetic variation.
* The conditions for Hardy-Weinberg equilibrium.
* How to use the Hardy-Weinberg equation to calculate allele frequencies to test whether a population is evolving.
* What effects genetic drift, migration, or selection may have on a population, and analyze data to justify your predictions

Origin of Species

* The biological concept of species
* What occurs when populations become reproductively isolated from each other.
* Prezygotic and postzygotic barriers that maintain reproductive isolation in populations.
* How allopatric and sympatric speciation are similar and different.
* How a change in chromosome number can lead to sympatric speciation.

History of Life on Earth

* Evidence for endosymbiosis
* How continental drift can explain the current distribution of species (biogeography).
* How to construct a phylogenetic tree that represents processes of biological evolution.

Unit 2 Biochemistry

The Chemistry of Life

* 3 subatomic particles and their significance
* Types of chemical bonds and how they form.
* The importance of hydrogen bonds to the properties of water.
* Properties of water.
* How to interpret the pH scale

Carbon and the Molecular Diversity of life

* The properties of carbon that make it so important
* The roles of dehydration reaction and hydrolysis in organic compounds
* Differences between carbohydrates, proteins, lipids, and nucleic acids.
* Structural levels of proteins and how changes at any level can affect the activity of the protein.

The Energy of Life

* Exergonic reactions release free energy; endergonic reactions store free energy.
* ATP powers cellular work by coupling exergonic reactions to endergonic reactions.
* Enzymes work by lowering the energy of activation.
* Enzymes are specific in the reactions they catalyze because of the molecular shape of their active site.
* Factors that change the shape of the active site of enzymes and how they influence enzyme activity.

Unit 3 The Cell

A Tour of the Cell

* Differences between prokaryotic and eukaryotic cells.
* Structure and function of organelles in both plant and animal cells.
* How internal membranes and organelles contribute to cell functions.
* How cell size and shape affect the overall rate of nutrient intake and waste elimination.

Membrane Structure and Function

* Why membranes are selectively permeable
* The role of phospholipids, proteins, and carbohydrates in membranes.
* How water moves through a cell when placed in isotonic, hypertonic, and hypotonic solutions.

Cell Communication

* The 3 stages of cell communication
* How a receptor protein recognizes signal molecules and starts transduction.
* How a cell signal is amplified by a phosphorylation cascade.
* How a second messenger affects a signal transduction pathway.
* How a cell response in the nucleus turns on genes.

Cellular Respiration will be included in the second semester final. ☺