Definition/properties of life--cellular organization, metabolism, heredity, etc..


Cells--Basic structure of a eukaryotic cell and function of organelles.

Energy Acquisition—The two laws of thermodynamics. The “Big Picture”. Overall equations for photosynthesis and cellular respiration.

Cell reproduction--Chromosomes: basic structure of chromosomes, homologous chromosomes, sister chromatids, diploid, haploid, karyotype. Mitosis (duplication of genetic material, equal segregation into daughter cells) and meiosis (formation of haploid reproductive cells).

Mendelian Genetics--Important terms: Genotype, allele, dominant, recessive, homozygous, heterozygous, carrier, phenotype. Know how to work with a Punnett square to predict the genotype and phenotype of offspring.

Molecular genetics--The basic structure of DNA and RNA. The base pairing rules for DNA and RNA.

The gene expression pathway: DNA (genes) ---> RNA ---> Protein.

Definitions of transcription and translation. The genetic code (be able to use the table relating codons to amino acids, for example be able to convert a sequence in mRNA to a protein using the table of the genetic code).

Gene Technology

Principles of Gel electrophoresis. Interpretation of gels for paternity testing or diagnosis of genetic disease.


The Hardy-Weinberg equation.

\[ p^2 + 2pq + q^2 = 1 \quad \text{and} \quad p + q = 1 \]

Know the meaning of all the variables and terms of the Hardy-Weinberg equation. Know the assumptions of the Hardy-Weinberg equation (large pop, random mating, no natural selection, etc.). Uses of the Hardy-Weinberg Equation: Identify populations that are undergoing microevolution, and calculating the frequency of the heterozygous genotype in a population given the pop. size and the number of individuals with the recessive trait.

Bring a calculator to the test!