

BENCHMARK	LEVEL OF UNDERSTANDING (REGULAR COURSE)	PRE-AP/IB PREP LEVEL OF UNDERSTANDING
9.4.1.1.2: Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.		<ul style="list-style-type: none"> -More specific information at the organ level on digestive, transport, gas exchange, nervous -Design an experiment related to one of these systems
9.4.1.2.2: Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.		<ul style="list-style-type: none"> -1^o, 2^o, 3^o, 4^o Protein structure -Induced fit vs. Lock and Key -Molecular structure of amino acids -Dehydration synthesis, hydrolysis
9.4.1.2.4: Explain the function and importance of cell organelles for prokaryotic and/or eukaryotic cells as related to the basic cell processes of respiration, photosynthesis, protein synthesis and cell reproduction.	<p>Know reactant & products of reactions</p> <p>Basics of regulating transport in & out of cell</p>	<ul style="list-style-type: none"> -Krebs cycle, Calvin cycle, & electron transport -Nucleus & cell membrane – structures & maintaining homeostasis
9.4.2.1.1: Describe factors that affect the carrying capacity of an ecosystem and relate these to population growth.		<ul style="list-style-type: none"> -Competitive exclusion principle -Use a more complex system to teach benchmark
9.4.2.2.2: Explain how matter and energy is transformed and transferred among organisms in an ecosystem, and how energy is dissipated as heat into the environment.		<ul style="list-style-type: none"> -Thermodynamics -Entropy -Exogonic & Endogonic
9.4.3.1.2: In the context of a monohybrid cross, apply the terms phenotype, genotype, allele,		<p>Add: Dihybrid, sex-linked, types of dominance, polygenic, more crossing over, linkage</p>

homozygous and heterozygous.		
9.4.3.1.3: Describe the process of DNA replication and the role of DNA and RNA in assembling protein molecules.		<ul style="list-style-type: none"> -How structure relates to number of H-bond and overall structure of DNA -Okazaki fragments -Ribosome – movement of tRNA -Transcription & translation & replication, plus enzyme names
9.4.3.2.1: Use concepts from Mendel's Laws of Segregation and Independent Assortment to explain how sorting and recombination (crossing over) of genes during sexual reproduction (meiosis) increases the occurrence of variation in a species.		<ul style="list-style-type: none"> -Gene regions on chromosomes and possibility of separation during crossing over -$2^{23} = 8$ million combinations from 1 human cell
9.4.3.3.2: Use scientific evidence, including the fossil record, homologous structures, and genetic and/or biochemical similarities, to show evolutionary relationships among species.		<ul style="list-style-type: none"> -Types of selection -Speciation
9.4.3.3.4: Explain why genetic variation within a population is essential for evolution to occur.		<ul style="list-style-type: none"> -Allele frequency
9.4.3.3.5: Explain how competition for finite resources and the changing environment promotes natural selection on offspring survival, depending on whether the offspring have characteristics that are advantageous or disadvantageous in the new environment.		<ul style="list-style-type: none"> -Design Natural selection and Hardy-Weinburg labs -Read excerpts from <i>Origin of Species</i> -Critique Peppered Moth case study. -Student's design the lab themselves; they complete more data processing and presentation; they interpret and evaluate primary resources

<p>9.4.4.1.2: Describe the social, economic and ecological risks and benefits of changing a natural ecosystem as a result of human activity.</p>		<ul style="list-style-type: none"> -Population dynamics -S-curve, J-curve -Quantitative vs. Qualitative data in monitoring ecosystems
<p>9.4.4.2.2: Explain how the body produces antibodies to fight disease and how vaccines assist this process.</p>		<ul style="list-style-type: none"> -Emerging diseases -Immune response specific steps -B cells & T cells -AIDS effect of B & T cells
<p>Classification/Taxonomy (can go with ecology or evolution)</p>		<ul style="list-style-type: none"> -Major phyla -Classes for chordata, arthropoda -Domains/Kingdoms -Kingdom, phylum, class, order, family, genus, species