Amino Labs kits Ontario Grade 11-12 Alignments

Grade 11- College/University Preparation (SBI3U1/C)

D3.2	explain the concepts of DNA, genes, chromosomes, alleles, mitosis, and meiosis, and how they account for the transmission of hereditary characteristics according to Mendelian laws of inheritance	Chapter 1: Isolating DNA, the Blueprints of Life: **DNA Extraction Kit** • extract and see real genomic DNA from strawberries using the DNA extraction kit, • assemble a DNA structure utilizing a drag and drop simulator, • discover 'What is DNA?', 'What is DNA's function?', and 'What is DNA made of?', • learn about the history of DNA, its evolution, the road to precisely editing DNA and its future, • understand how DNA can be used in biotechnology to create products, • understand how atoms, molecules, macromolecules (nucleic acid), and nucleotides come into play.
A1.2	select appropriate instruments (e.g., sampling instruments, a microscope, a stethoscope, dissection instruments) and materials (e.g., dichotomous keys, computer simulations, plant cuttings), and identify appropriate methods, techniques, and procedures, for each inquiry	Chapter 2 - Safety & setting up your space • learn about the 4 Biosafety levels & how to stay safe & responsible during your biotechnology science projects, • discover the rules & regulations in biotechnology, • set up your lab - What type of laboratory equipment is necessary? What kind of locations can be used for a safe & responsible biotechnology lab, • learn how to inactivate your biotechnology science experiments and clean up your laboratory, • download a laboratory safety checklist, a biosafety poster, and a biosecurity poster, • understand the ethics, lab safety & best practices surrounding genetic engineering and biotechnology.
A1.4	apply knowledge and understanding of safe laboratory practices and procedures when planning investigations by correctly interpreting Workplace Hazardous Materials Information System (WHMIS) symbols; by using appropriate techniques for handling and storing laboratory equipment and materials and disposing of laboratory and biological materials (e.g., preserved specimens); and by using appropriate personal protection	
D1.1	analyse, on the basis of research, some of the social and ethical implications of research in genetics and genomics	
D1.2	evaluate, on the basis of research, the importance of some recent contributions to knowledge, techniques, and technologies related to genetic processes	
C1.1	assess some of the effects, both beneficial and harmful, of microorganisms in the environment (e.g., decomposers break down waste, E. coli in water systems poses a severe risk to human health)	Chapter 3: Growing E. coli cells: **Canvas kit** • grow colorful, friendly lab-strain of bacteria and use it to make bioart in a virtual simulator and then in real-life using the Canvas kit (optional hands-on), • learn the difference between safe laboratory E. coli vs. 'bad' E. coli and its history, • learn 'What is a cell?' • tour the cell structure using the Cells as (micro) factories analogy - a comparison between factories and cells. • discover the role of macromolecules: carbs, lipids, proteins
C1.2	analyse ethical issues related to the use of microorganisms in biotechnology (e.g., with respect to the use of bacterial insecticides, the patenting of modified microorganisms)	
C2.1	use appropriate terminology related to microbiology, including, but not limited to: fission, conjugation, phage, dormancy, morphology, mycelium, spore, pathogen, and plasmid.	
C2.3	prepare a laboratory culture of microorganisms (e.g., acidophilus) on agar, using proper aseptic techniques	
C2.4	investigate the effect of antibacterial agents on different bacterial cultures (e.g., the effects of antibacterial soap or mouthwash on a bacterial culture)	
C2.5	investigate and analyse the conditions (e.g., optimal temperature) needed by microorganisms for growth	

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Grade 12 - Grade 12, University Preparation (SBI4U)

B2.1	use appropriate terminology related to biochemistry, including, but not limited to: active and passive transport, covalent and ionic bond, allosteric site, substrate, substrate-enzyme complex, and inhibition.	Chapter 1: Isolating DNA, the Blueprints of Life: **DNA Extraction Kit** • extract and see real genomic DNA from strawberries using the DNA extraction kit, • assemble a DNA structure utilizing a drag and drop simulator, • discover 'What is DNA?', 'What is DNA's function?', and 'What is DNA made of?', • learn about the history of DNA, its evolution, the road to precisely editing DNA and its future, • understand how DNA can be used in biotechnology to create products, • understand how atoms, molecules, macromolecules (nucleic acid), and nucleotides come into play.
B2.2	plan and conduct an investigation to demonstrate the movement of substances across a membrane.	
D2.3	conduct an investigation to extract DNA from a specimen of plant or animal protein.	
D3.1	explain the current model of DNA replication, and describe the different repair mechanisms that can correct mistakes in DNA sequencing	
D1.1	analyse, on the basis of research, some of the social, ethical, and legal implications of biotechnology (e.g., the bioengineering of animal species, especially those intended for human consumption; the cultivation of transgenic crops; the patenting of life forms; cloning)	Chapter 2 - Safety & setting up your space • learn about the 4 Biosafety levels & how to stay safe & responsible during your biotechnology science projects, • discover the rules & regulations in biotechnology, • set up your lab - What type of laboratory equipment is necessary? What kind of locations can be used for a safe & responsible biotechnology lab, • learn how to inactivate your biotechnology science experiments and clean up your laboratory, • download a laboratory safety checklist, a biosafety poster, and a biosecurity poster, • understand the ethics, lab safety & best practices surrounding genetic engineering and biotechnology.
D1.2	analyse, on the basis of research, some key aspects of Canadian regulations pertaining to biotechnology (e.g., current or potential legislation for mandatory DNA fingerprinting, human cloning, ownership of a genome, patenting of genetically modified organisms), and compare them to regulations from another jurisdiction	
B2.3	construct and draw three-dimensional molecular models of important biochemical compounds, including carbohydrates, proteins, lipids, and nucleic acids	Chapter 3: Growing E. coli cells: **Canvas kit** • grow colorful, friendly lab-strain of bacteria and use it to make bioart in a virtual simulator and then in real-life using the Canvas kit (optional hands-on), • learn the difference between safe laboratory E. coli vs. 'bad' E. coli and its history, • learn 'What is a cell?' • tour the cell structure using the Cells as (micro) factories analogy - a comparison between factories and cells. • discover the role of macromolecules: carbs, lipids, proteins
B3.1	explain the roles of various organelles, such as lysosomes, vacuoles, mitochondria, internal cell membranes, ribosomes, smooth and rough endoplasmic reticulum, and Golgi bodies, in cellular processes	
B3.2	describe the structure of important biochemical compounds, including carbohydrates, proteins, lipids, and nucleic acids, and explain their function within cells	
B3.3	identify common functional groups within biological molecules (e.g., hydroxyl, carbonyl, carboxyl, amino, phosphate), and explain how they contribute to the function of each molecule	

Amino Labs kits Ontario Grade 11-12 Alignments

D2.1	use appropriate terminology related to molecular genetics, including, but not limited to: polymerase I, II, and III, DNA ligase, helicase, Okazaki fragment, mRNA, rRNA, tRNA, codon, anticodon, translation, transcription, and ribosome subunits	Chapter 4: Genetic Engineering your E. coli cells: **Engineer-it kit** • engineer bacteria (cells) with a pre-made DNA program in a virtual simulator and then in real-life using the Engineer-it kit (optional hands-on), • learn the primary operating environment of a cell, • start understanding how cells read DNA: How do cells know how to start, do and stop reading DNA (transcription), • discover 'What is a gene?' • find out what DNA plasmids are and how to use them in biotechnology.
D2.4	investigate and analyse the cell components involved in the process of protein synthesis, using appropriate laboratory equipment and techniques, or a computer simulation	
D3.1	explain the current model of DNA replication, and describe the different repair mechanisms that can correct mistakes in DNA sequencing	
D3.2	compare the structures and functions of RNA and DNA, and explain their roles in the process of protein synthesis	
D3.3	explain the steps involved in the process of protein synthesis and how genetic expression is controlled in prokaryotes and eukaryotes by regulatory proteins (e.g., the role of operons in prokaryotic cells; the mechanism of gene expression in eukaryotic cells)	
D3.4	explain how mutagens, such as radiation and chemicals, can cause mutations by changing the genetic material in cells (e.g., the mechanisms and effects of point mutations and frameshift mutations)	
D3.5	describe some examples of genetic modification, and explain how it is applied in industry and agriculture (e.g., the processes involved in cloning, or in the sequencing of DNA bases; the processes involved in the manipulation of genetic material and protein synthesis; the development and mechanisms of the polymerization chain reaction)	
D3.6	describe the functions of some of the cell components used in biotechnology (e.g., the roles of plasmids, restriction enzymes, recombinant DNA, and vectors in genetic engineering)	