Science Council

Laboratory technician

LEARNING GUIDE

Optional route – Biology

This document contains content knowledge that should be delivered as part of a high quality laboratory technician apprenticeship within the biological sciences.

This document should be used in conjunction with the core.

Topic/Subject	K,S,B linked to	Overview of Coverage	Suggested learning hours
Structure and function of cells and tissues	K4, K16, K21, S6, S7, S11, S17, S19,	Cell theory as an underlying concept, ultrastructure including organelles and similarities/differences between animal and plant cells, specialisation of cells. Differences between prokaryotic and eukaryotic cells	12
Large molecules	K4, K16, K21, S6, S7, S11, S17, S19,	Proteins, carbohydrates and lipids are the three key groups of large molecules: Understanding of structures to understand function related to their properties. How the sequence of bases in the DNA molecule determines the structure of proteins, including enzymes.	12
Exchange and transport mechanisms	K4, K16, K21, S6, S7, S11, S17, S19,	Need for exchange of substances, how/where this takes place, including cellular exchange and transport, factors that affect requirements and give rise to specialised systems.	12
Genetic information and genetics	K4, K16, K21, S6, S7, S11, S17, S19,	Including sequence of bases in DNA molecule relationship to the mechanism of inheritance, variation and relationship between organisms, evolution. Formation of new species. Reproductive isolation. Gene technologies.	10
Microbiology	K4, K16, K21, S6, S7, S11, S17, S19,	Including classification and characteristics of micro-organisms and microscopy techniques. Concept of selection.	5
Immunology	K4, K16, K21, S6, S7, S11, S17, S19,	The nature of infection and its existence in individuals and amongst populations and communities. Examples of infectious diseases and causative agents. Possible causes of infection and routes of transmission. How the body responds to invasion by foreign	12

		substances including phagocytosis and actions of T-cells and B-cells. Understanding of cell mediated immunity and antibody mediated immunity.	
Cell cycle	K4, K16, K21, S6, S7, S11, S17, S19,	Meiosis and Mitosis: stages and phases, knowledge of copying of genetic information and that this is passed to daughter cells. Differences between meiosis and mitosis.	12
Cellular respiration	K4, K16, K21, S6, S7, S11, S17, S19,	Breakdown of glucose and other respiratory substrates to make energy carrying molecules called ATP. How ATP provides source of energy for biological processes.	5
Enzyme and protein structure	K4, K16, K21, S6, S7, S11, S17, S19,	How enzymes catalyse a wide range of intracellular reactions. How mechanism of action and other properties of enzymes are determined by their tertiary structure. The effect of mutation.	12
Pathogens	K4, K16, K21, S6, S7, S11, S17, S19,	Definition of, types of, examples and the diseases they can cause.	5
Classification of biological materials	K4, K16, K21, S6, S7, S11, S17, S19,	Division into four groups according to their molecular structures and the functions they perform.	3