

NSW Stage 6 Biology

EP Curriculum Map

Senior Biology: Year 11

Module 1: Cells as the basis of life

Cell Structure

Content Descriptor	Lesson Names
investigate different cellular structures, including but not limited to: <ul style="list-style-type: none"> - examining a variety of prokaryotic and eukaryotic cells (ACSBL032, ACSBL048) - describe a range of technologies that are used to determine a cell's structure and function 	<ul style="list-style-type: none"> • Prokaryotic Cells • Eukaryotic Cells • Prokaryotic vs. Eukaryotic Cells • Cell Survival • Cell Organelles • History of Microscopes • Electron Micrographs • Cell Membrane Structure • Bacterial Cell Structure • Animal Cell Structure • Plant Cell Structure • Fungal Cell Structure
investigate a variety of prokaryotic and eukaryotic cell structures, including but not limited to: <ul style="list-style-type: none"> - drawing scaled diagrams of a variety of cells(ACSBL035) - comparing and contrasting different cell organelles and arrangements - modelling the structure and function of the fluid mosaic model of the cell membrane(ACSBL045) 	<ul style="list-style-type: none"> • Cell Membrane Structure • Cell Organelles

Cell Function

Content Descriptor	Lesson Names
investigate the way in which materials can move into and out of cells, including but not limited to: <ul style="list-style-type: none"> - conducting a practical investigation modelling diffusion and osmosis(ACSBL046) - examining the roles of active transport, endocytosis and exocytosis(ACSBL046) - relating the exchange of materials across membranes to the surface-area-to-volume ratio, concentration 	<ul style="list-style-type: none"> • Passive Transport - Diffusion • Passive Transport - Osmosis • Passive Transport - Facilitated Diffusion • Active Transport • Diffusion Experiments • Osmosis Experiments • Cell Size • Surface Area to Volume Ratio Investigation

gradients and characteristics of the materials being exchanged(ACSBL047)	
investigate cell requirements, including but not limited to: - suitable forms of energy, including light energy and chemical energy in complex molecules(ACSBL044) - matter, including gases, simple nutrients and ions - removal of wastes(ACSBL044)	<ul style="list-style-type: none"> ● Introduction to Metabolism ● Anaerobic Respiration ● Aerobic Respiration
investigate the biochemical processes of photosynthesis, cell respiration and the removal of cellular products and wastes in eukaryotic cells(ACSBL049, ACSBL050, ACSBL052, ACSBL053)	<ul style="list-style-type: none"> ● Introduction to Metabolism ● Anaerobic Respiration ● Aerobic Respiration ● Photosynthesis ● Light Reactions of Photosynthesis ● Factors Affecting the Rate of Photosynthesis ● Photosynthesis vs Cellular Respiration
conduct a practical investigation to model the action of enzymes in cells	<ul style="list-style-type: none"> ● Internal Membranes ● Introducing Enzymes ● Enzyme Structure ● Factors Affecting Enzymes ● Examples of Enzyme Reactions
investigate the effects of the environment on enzyme activity through the collection of primary or secondary data(ACSBL050, ACSBL051)	<ul style="list-style-type: none"> ● Factors Affecting Enzymes Investigation

Module 2: Organisation of living things

Organisation of Cells

Content Descriptor	Lesson Names
compare the differences between unicellular, colonial and multicellular organisms by: - investigating structures at the level of the cell and organelle - relating structure of cells and cell specialisation to function	<ul style="list-style-type: none"> ● Unicellular & Multicellular Organisms ● Fungal Cell Structure ● Animal Cell Structure ● Bacterial Cell Structure ● Plant Cell Structure
investigate the structure and function of tissues, organs and systems and relate those functions to cell differentiation and specialisation(ACSBL055)	<ul style="list-style-type: none"> ● Hierarchy of Organisation ● Cells, Tissues and Organs ● Stem Cells and Differentiation
justify the hierarchical structural organisation of organelles, cells, tissues, organs, systems and organisms(ACSBL054)	<ul style="list-style-type: none"> ● Hierarchy of Organisation ● Cells, Tissues and Organs

Nutrient and Gas Requirements

Content Descriptor	Lesson Names
<p>investigate the structure of autotrophs through the examination of a variety of materials, for example:(ACSBL035</p> <ul style="list-style-type: none"> - dissected plant materials(ACSBL032) - microscopic structures - using a range of imaging technologies to determine plant structure 	<ul style="list-style-type: none"> ● Plant Systems ● Leaf Structure and Photosynthesis ● Plant Systems
<p>investigate the function of structures in a plant, including but not limited to:</p> <ul style="list-style-type: none"> - tracing the development and movement of the products of photosynthesis(ACSBL059, ACSBL060) 	<ul style="list-style-type: none"> ● Leaf Structure and Photosynthesis
<p>investigate the gas exchange structures in animals and plants through the collection of primary and secondary data and information, for example:(ACSBL032, ACSBL056)</p> <ul style="list-style-type: none"> - microscopic structures: alveoli in mammals and leaf structure in plants - macroscopic structures: respiratory systems in a range of animals 	<ul style="list-style-type: none"> ● Introduction to Respiration ● Breathing ● Gas Exchange ● Gas Exchange in Plants ● Gas Exchange in Fish ● Transpiration ● Translocation ● Plant Systems ● Leaf Structure and Photosynthesis
<p>interpret a range of secondary-sourced information to evaluate processes, claims and conclusions that have led scientists to develop hypotheses, theories and models about the structure and function of plants, including but not limited to:(ACSBL034)</p> <ul style="list-style-type: none"> - photosynthesis - transpiration-cohesion-tension theory 	<ul style="list-style-type: none"> ● Leaf Structure and Photosynthesis ● Plant Systems
<p>trace the digestion of foods in a mammalian digestive system, including:</p> <ul style="list-style-type: none"> - physical digestion - chemical digestion - absorption of nutrients, minerals and water - elimination of solid waste 	<ul style="list-style-type: none"> ● Digestive System Overview ● Mouth and Oesophagus ● Stomach and Small Intestine ● Large Intestine and Rectum ● Comparing Digestion in Other Animals ● Digestive Enzymes ● Absorption of Nutrients ● Introduction to Excretory Systems ● Nitrogenous Waste ● Excretory Organs ● The Nephron
<p>compare the nutrient and gas requirements of autotrophs and heterotrophs</p>	<ul style="list-style-type: none"> ● Photosynthesis vs Cellular Respiration

Transport

Content Descriptor	Lesson Names
investigate transport systems in animals and plants by comparing structures and components using physical and digital models, including but not limited to:(ACSBL032, ACSBL058, ACSBL059, ACSBL060) - macroscopic structures in plants and animals - microscopic samples of blood, the cardiovascular system and plant vascular systems	<ul style="list-style-type: none"> ● Introduction to the Circulatory System ● Heart ● Blood Vessels ● Xylem and Phloem Structure ● Blood
investigate the exchange of gases between the internal and external environments of plants and animals	<ul style="list-style-type: none"> ● Gas Exchange ● Gas Exchange in Plants ● Gas Exchange in Fish
compare the structures and function of transport systems in animals and plants, including but not limited to:(ACSBL033) - vascular systems in plants and animals - open and closed transport systems in animals	<ul style="list-style-type: none"> ● Introduction to the Circulatory System ● Xylem and Phloem Structure ● Transpiration ● Translocation
compare the changes in the composition of the transport medium as it moves around an organism	<ul style="list-style-type: none"> ● Blood ● Translocation

Module 3: Biological diversity

Effects of the Environment on Organisms

Content Descriptor	Lesson Names
predict the effects of selection pressures on organisms in ecosystems, including:(ACSBL026, ACSBL090) - biotic factors - abiotic factors	<ul style="list-style-type: none"> ● Factors Affecting Biodiversity ● Measuring Biodiversity ● Biomes ● Ecosystems ● Abiotic Factors ● Biotic Factors and Competition ● Adaptations ● Symbiosis
investigate changes in a population of organisms due to selection pressures over time, for example:(ACSBL002, ACSBL094) - cane toads in Australia - prickly pear distribution in Australia	<ul style="list-style-type: none"> ● Cane Toads as an Introduced Species

Adaptations

Content Descriptor	Lesson Names
--------------------	--------------

investigate, through secondary sources, the observations and collection of data that were obtained by Charles Darwin to support the Theory of Evolution by Natural Selection, for example: <ul style="list-style-type: none"> - finches of the Galapagos Islands - Australian flora and fauna 	<i>Further development planned.</i>
conduct practical investigations, individually or in teams, or use secondary sources to examine the adaptations of organisms that increase their ability to survive in their environment, including: <ul style="list-style-type: none"> - structural adaptations - physiological adaptations - behavioural adaptations 	<ul style="list-style-type: none"> ● Adaptations ● Adapting for Survival ● Survival of the Mutants

Theory of Evolution by Natural Selection

Content Descriptor	Lesson Names
explain biological diversity in terms of the Theory of Evolution by Natural Selection by examining the changes in and diversification of life since it first appeared on the Earth(ACSBL088)	<ul style="list-style-type: none"> ● Darwin's Theory of Evolution ● Co-Evolution and Parallel Evolution ● Evolution on Earth ● Phenotypic Selection ● Microevolutionary Change Mechanisms ● Natural Selection ● Types of Coevolution ● Rate of Evolutionary Change ● Geological Time
analyse how an accumulation of microevolutionary changes can drive evolutionary changes and speciation over time, for example:(ACSBL034, ACSBL093) <ul style="list-style-type: none"> - evolution of the horse - evolution of the platypus 	<ul style="list-style-type: none"> ● Comparative Studies
explain, using examples, how Darwin and Wallace's Theory of Evolution by Natural Selection accounts for: <ul style="list-style-type: none"> - convergent evolution - divergent evolution 	<ul style="list-style-type: none"> ● Convergent and Divergent Evolution ● Darwin's Theory of Evolution ● Patterns of Diversification
explain how punctuated equilibrium is different from the gradual process of natural selection	<ul style="list-style-type: none"> ● Rate of Evolutionary Change ● Microevolutionary Change Mechanisms

Evolution – the Evidence

Content Descriptor	Lesson Names
investigate, using secondary sources, evidence in support of Darwin and Wallace's Theory of Evolution by Natural Selection, including but not limited to: <ul style="list-style-type: none"> - biochemical evidence, comparative anatomy, 	<ul style="list-style-type: none"> ● Comparative Studies ● The Ancestor of All Things ● The Biodiversity Gradient ● The Wallace Line

comparative embryology and biogeography(ACSBL089) - techniques used to date fossils and the evidence produced	<ul style="list-style-type: none"> ● Back to the Sea: Cetacean Evolution ● Evidence from Living Species ● Fossils and the Fossil Record ● Geographical Distribution
explain modern-day examples that demonstrate evolutionary change, for example: - the cane toad - antibiotic-resistant strains of bacteria	<ul style="list-style-type: none"> ● Superbugs are the Real Super Villains ● Mimicry ● Sexual Selection

Module 4: Ecosystem dynamics

Population Dynamics

Content Descriptor	Lesson Names
investigate and determine relationships between biotic and abiotic factors in an ecosystem, including:(ACSBL019) - the impact of abiotic factors(ACSBL021, ACSBL022, ACSBL025) - the impact of biotic factors, including predation, competition and symbiotic relationships(ACSBL024) - the ecological niches occupied by species(ACSBL023) - predicting consequences for populations in ecosystems due to predation, competition, symbiosis and disease(ACSBL019, ACSBL020) - measuring populations of organisms using sampling techniques(ACSBL003, ACSBL015)	<ul style="list-style-type: none"> ● Introduction to Functioning Ecosystems ● Adaptations, Humans and Succession ● Conservation of Keystone Species ● Succession ● Ecological Niches ● Ecological Relationships ● Food Chains and Food Webs ● Keystone Species ● The Carbon Cycle ● The Nitrogen Cycle ● The Water Cycle
explain a recent extinction event	<ul style="list-style-type: none"> ● Extinction

Past Ecosystems

Content Descriptor	Lesson Names
analyse palaeontological and geological evidence that can be used to provide evidence for past changes in ecosystems, including but not limited to: - Aboriginal rock paintings - rock structure and formation - ice core drilling	<ul style="list-style-type: none"> ● Australian Fossils
investigate and analyse past and present technologies that have been used to determine evidence for past changes, for example:(ACSBL005) - radiometric dating - gas analysis	<ul style="list-style-type: none"> ● Evidence of Australia's Changing Environment ● Examining Past Climate ● Computer Modelling and the Environment
analyse evidence that present-day organisms have	<ul style="list-style-type: none"> ● Succession

<p>evolved from organisms in the past by examining and interpreting a range of secondary sources to evaluate processes, claims and conclusions relating to the evolution of organisms in Australia, for example:(ACSBL005, ACSBL027)</p> <ul style="list-style-type: none"> - small mammals - sclerophyll plants 	<ul style="list-style-type: none"> ● Changes to Australia's Biota
<p>investigate the reasons for changes in past ecosystems, by:</p> <ul style="list-style-type: none"> - interpreting a range of secondary sources to develop an understanding of the changes in biotic and abiotic factors over short and long periods of time(ACSBL025, ACSBL026) - evaluating hypotheses that account for identified trends(ACSBL001) 	<ul style="list-style-type: none"> ● Australian Fossils ● Changes to Australia's Biota ● Charles Darwin in Australia ● Evidence of Australia's Changing Environment ● Examining Past Climate ● Past Ecosystems I: A Brief History of the Earth ● Past Ecosystems II: Evidence

Future Ecosystems

Content Descriptor	Lesson Names
<p>investigate practices used to restore damaged ecosystems, Country or Place, for example:</p> <ul style="list-style-type: none"> - mining sites - land degradation from agricultural practices 	<ul style="list-style-type: none"> ● Different Perspectives on Mining ● Human Impacts on Forest Biomes ● Human Impacts on Marine Biomes ● Human Impacts on Land ● Human Impacts on Wetlands
<p>investigate the reasons for changes in past ecosystems, by:</p> <ul style="list-style-type: none"> - interpreting a range of secondary sources to develop an understanding of the changes in biotic and abiotic factors over short and long periods of time(ACSBL025, ACSBL026) - evaluating hypotheses that account for identified trends(ACSBL001) 	<ul style="list-style-type: none"> ● Human Influences on Climate ● If Climate Change is Real, How Come...? ● It's Getting Hot in Here ● The Enhanced Greenhouse Effect ● The Greenhouse Effect

Senior Biology: Year 12

Module 5: Heredity

Reproduction

Content Descriptor	Lesson Names
analyse the features of fertilisation, implantation and hormonal control of pregnancy and birth in mammals(ACSBL075)	<ul style="list-style-type: none"> • Puberty • Sexual Reproduction in Animals • Male Reproduction • Female Reproduction • Pregnancy • Birth • Gametes and Fertilisation • Hormonal Control of the Reproductive System
explain the mechanisms of reproduction that ensure the continuity of a species, by analysing sexual and asexual methods of reproduction in a variety of organisms, including but not limited to: <ul style="list-style-type: none"> - animals: advantages of external and internal fertilisation - plants: asexual and sexual reproduction - fungi: budding, spores - bacteria: binary fission(ACSBL075) - protists: binary fission, budding 	<ul style="list-style-type: none"> • Asexual and Sexual Reproduction • Sexual Reproduction in Animals • Asexual Reproduction in Animals • Internal and External Fertilisation • Embryo and Young Survival after Birth • Sexual Reproduction in Plants • Pollination • Asexual Reproduction in Plants • Seed Dispersal & Germination • Cell Division in Bacteria • Protists and Fungi
evaluate the impact of scientific knowledge on the manipulation of plant and animal reproduction in agriculture(ACSBL074)	<ul style="list-style-type: none"> • Transgenesis: Food Production • Artificial Insemination & Selective Breeding

Cell Replication

Content Descriptor	Lesson Names
assess the effect of the cell replication processes on the continuity of species(ACSBL084)	<ul style="list-style-type: none"> • DNA Replication • Mitosis • Meiosis
model the processes involved in cell replication, including but not limited to: <ul style="list-style-type: none"> - mitosis and meiosis (ACSBL075) - DNA replication using the Watson and Crick DNA model, including nucleotide composition, pairing and bonding(ACSBL076, ACSBL077) 	<ul style="list-style-type: none"> • Basics of DNA • Mitosis • Discovering the Double Helix • Meiosis • Structure of DNA • Mitosis vs. Meiosis • Nitrogenous Bases

	<ul style="list-style-type: none"> • DNA Replication • Spermatogenesis • Oogenesis
--	---

DNA and Polypeptide Synthesis

Content Descriptor	Lesson Names
model the process of polypeptide synthesis, including:(ACSBL079) <ul style="list-style-type: none"> - transcription and translation - assessing the importance of mRNA and tRNA in transcription and translation(ACSBL079) - analysing the function and importance of polypeptide synthesis(ACSBL080) - assessing how genes and environment affect phenotypic expression(ACSBL081) 	<ul style="list-style-type: none"> • Genes • Protein Synthesis • Regulating Gene Expression • Proteins
construct appropriate representations to model and compare the forms in which DNA exists in eukaryotes and prokaryotes(ACSBL076)	<ul style="list-style-type: none"> • Basics of DNA
investigate the structure and function of proteins in living things	<ul style="list-style-type: none"> • Protein Synthesis • Regulating Gene Expression • Proteins

Genetic Variation

Content Descriptor	Lesson Names
model the formation of new combinations of genotypes produced during meiosis, including but not limited to: <ul style="list-style-type: none"> - interpreting examples of autosomal, sex-linkage, co-dominance, incomplete dominance and multiple alleles(ACSBL085) - constructing and interpreting information and data from pedigrees and Punnett squares 	<ul style="list-style-type: none"> • Inheriting Alleles and Punnett Squares • Making Punnett Squares • Monohybrid Inheritance • Incomplete and Codominance • Pedigree Charts • Sex Linkage • Sex Linkage, Punnett Squares and Pedigrees • Polygenic Inheritance
conduct practical investigations to predict variations in the genotype of offspring by modelling meiosis, including the crossing over of homologous chromosomes, fertilisation and mutations(ACSBL084)	<ul style="list-style-type: none"> • Meiosis • Gametes and Fertilisation
collect, record and present data to represent frequencies of characteristics in a population, in order to identify trends, patterns, relationships and limitations in data, for example: <ul style="list-style-type: none"> - examining frequency data - analysing single nucleotide polymorphism (SNP) 	<ul style="list-style-type: none"> • Genomics

Inheritance Patterns in a Population

Content Descriptor	Lesson Names
investigate the use of technologies to determine inheritance patterns in a population using, for example:(ACSBL064, ACSBL085) - DNA sequencing and profiling(ACSBL086)	<ul style="list-style-type: none"> • DNA Sequencing • DNA Profiling
investigate the use of data analysis from a large-scale collaborative project to identify trends, patterns and relationships, for example:(ACSBL064, ACSBL073) - the use of population genetics data in conservation management - population genetics studies used to determine the inheritance of a disease or disorder - population genetics relating to human evolution	<ul style="list-style-type: none"> • Genomics

Module 6: Genetic change

Mutation

Content Descriptor	Lesson Names
explain how a range of mutagens operate, including but not limited to:Information and communication technology capability - electromagnetic radiation sources - chemicals - naturally occurring mutagens	<ul style="list-style-type: none"> • Mutations • Mutagens
compare the causes, processes and effects of different types of mutation, including but not limited to: - point mutation - chromosomal mutation	<ul style="list-style-type: none"> • Genetic Disease • Phenotype and Survival
distinguish between somatic mutations and germ-line mutations and their effect on an organism(ACSBL082, ACSBL083)	<ul style="list-style-type: none"> • Phenotype and Survival
assess the significance of 'coding' and 'non-coding' DNA segments in the process of mutation(ACSBL078)	<ul style="list-style-type: none"> • Mutations
investigate the causes of genetic variation relating to the processes of fertilisation, meiosis and mutation(ACSBL078)	
evaluate the effect of mutation, gene flow and genetic drift on the gene pool of populations(ACSBL091, ACSBL092)	<ul style="list-style-type: none"> • Gene Flow and Allele Frequency • Meiosis • Mutations

Biotechnology

Content Descriptor	Lesson Names
<p>investigate the uses and applications of biotechnology (past, present and future), including:(ACSBL087)</p> <ul style="list-style-type: none"> - analysing the social implications and ethical uses of biotechnology, including plant and animal examples - researching future directions of the use of biotechnology - evaluating the potential benefits for society of research using genetic technologies - evaluating the changes to the Earth's biodiversity due to genetic techniques 	<ul style="list-style-type: none"> ● Plant Cloning ● The Ethics of Genetics ● Social and Ethical Implications of Biotechnology ● Biotechnological Techniques ● Enzymes in Biotechnology ● Recombinant DNA ● DNA Sequencing ● Gel Electrophoresis ● DNA Profiling & Forensics ● DNA Fingerprinting: Thirsty Thievery

Genetic Technologies

Content Descriptor	Lesson Names
<p>compare the processes and outcomes of reproductive technologies, including but not limited to:</p> <ul style="list-style-type: none"> - artificial insemination - artificial pollination <p>investigate the uses and advantages of current genetic technologies that induce genetic change</p>	<ul style="list-style-type: none"> ● Artificial Insemination & Selective Breeding
<p>investigate and assess the effectiveness of cloning, including but not limited to:</p> <ul style="list-style-type: none"> - whole organism cloning - gene cloning 	<ul style="list-style-type: none"> ● Genetically Modified Organisms (GMOs) ● Transgenesis: Food Production ● Artificial Insemination & Selective Breeding
<p>describe techniques and applications used in recombinant DNA technology, for example:</p> <ul style="list-style-type: none"> - the development of transgenic organisms in agricultural and medical applications (ACSBL087) <p>evaluate the benefits of using genetic technologies in agricultural, medical and industrial applications(ACSBL086)</p> <p>evaluate the effect on biodiversity of using biotechnology in agriculture</p> <p>interpret a range of secondary sources to assess the influence of social, economic and cultural contexts on a range of biotechnologies</p>	<ul style="list-style-type: none"> ● Recombinant DNA ● Genetically Modified Organisms ● Genetically Modified Organisms (GMOs) ● Transgenesis: Food Production ● Artificial Insemination & Selective Breeding ● Social and Ethical Implications of Biotechnology ● DNA Profiling & Forensics

Module 7: Infectious disease

Causes of Infectious Disease

Content Descriptor	Lesson Names
<p>describe a variety of infectious diseases caused by pathogens, including microorganisms, macroorganisms and non-cellular pathogens, and collect primary and secondary-sourced data and information relating to disease transmission, including:(ACSBL097, ACSBL098, ACSBL116, ACSBL117)</p> <ul style="list-style-type: none"> - classifying different pathogens that cause disease in plants and animals(ACSBL117) - investigating the transmission of a disease during an epidemic - design and conduct a practical investigation relating to the microbial testing of water or food samples - investigate modes of transmission of infectious diseases, including direct contact, indirect contact and vector transmission 	<ul style="list-style-type: none"> ● Disease Transmission ● Introduction to Infectious Diseases ● Infection From Food ● Infection From Water ● Revision Lesson - Pathogens ● Bacteria ● Spread of Disease ● Viruses ● Case Studies ● Fungi ● Viral Infection: Chickenpox ● Protists ● Parasites ● Parasitic Infection: Malaria ● Prions ● Disease in Animals and Zoonoses ● Infection From Others
<p>investigate the work of Robert Koch and Louis Pasteur, to explain the causes and transmission of infectious diseases, including:</p> <ul style="list-style-type: none"> - Koch's postulates - Pasteur's experiments on microbial contamination 	<ul style="list-style-type: none"> ● Pasteur & Koch
<p>assess the causes and effects of diseases on agricultural production, including but not limited to:</p> <ul style="list-style-type: none"> - plant diseases - animal diseases 	<ul style="list-style-type: none"> ● Plant Immunity and Defence ● Fungi ● Protists ● Prions ● Parasites ● Disease in Animals and Zoonoses
<p>compare the adaptations of different pathogens that facilitate their entry into and transmission between hosts(ACSBL118)</p>	<ul style="list-style-type: none"> ● Revision Lesson - Pathogens ● Bacteria ● Spread of Disease ● Viruses ● Fungi ● Viral Infection: Chickenpox ● Protists ● Parasites ● Parasitic Infection: Malaria ● Prions

Responses to Pathogens

Content Descriptor	Lesson Names
investigate the response of a named Australian plant to a named pathogen through practical and/or secondary-sourced investigation, for example: <ul style="list-style-type: none"> - fungal pathogens - viral pathogens 	<ul style="list-style-type: none"> • Fungi
analyse responses to the presence of pathogens by assessing the physical and chemical changes that occur in the host animal's cells and tissues(ACSBL119, ACSBL120, ACSBL121, ACSBL122)	<ul style="list-style-type: none"> • Revision Lesson - Pathogens • Bacteria • Spread of Disease • Viruses • Fungi • Viral Infection: Chickenpox • Protists • Parasites • Parasitic Infection: Malaria • Prions

Immunity

Content Descriptor	Lesson Names
investigate and model the innate and adaptive immune systems in the human body(ACSBL119)	<ul style="list-style-type: none"> • Introduction to Immune Responses • Evolution and Adaptation of Infectious Disease • Pathogen Adaptation and Transmission of Infectious Diseases • Innate Immunity • Inflammation • Complement System • Adaptive immune response overview • Cell-Mediated and Antibody-Mediated (Humoral) Immunity
explain how the immune system responds after primary exposure to a pathogen, including innate and acquired immunity	<ul style="list-style-type: none"> • Introduction to Immune Responses • Evolution and Adaptation of Infectious Disease • Pathogen Adaptation and Transmission of Infectious Diseases • Innate Immunity • Inflammation • Complement System • Adaptive immune response overview • Cell-Mediated and Antibody-Mediated (Humoral) Immunity

Prevention, Treatment and Control

Content Descriptor	Lesson Names
investigate and analyse the wide range of interrelated factors involved in limiting local, regional and global spread of a named infectious disease	<ul style="list-style-type: none"> • Managing Pandemics in the Asia Region • Case Studies - Modelling Disease Outbreak and Spread
investigate and assess the effectiveness of pharmaceuticals as treatment strategies for the control of infectious disease, for example: <ul style="list-style-type: none"> - antivirals - antibiotics 	<ul style="list-style-type: none"> • Ancient Medicine • Medieval, Renaissance and Enlightenment-era Medicine • Modern Medicine • Indigenous Medicine in the Northern Hemisphere • Indigenous Medicine in the Southern Hemisphere • Vaccines • Superbugs are the Real Super Villains • Disease Treatment
investigate and evaluate environmental management and quarantine methods used to control an epidemic or pandemic	<ul style="list-style-type: none"> • • Managing Pandemics in the Asia Region • Disease Prevention • Quarantine and Biosecurity
investigate procedures that can be employed to prevent the spread of disease, including but not limited to:(ACSBL124) <ul style="list-style-type: none"> - hygiene practices - quarantine - vaccination, including passive and active immunity(ACSBL100, ACSBL123) - public health campaigns - use of pesticides - genetic engineering 	<ul style="list-style-type: none"> • Quarantine and Biosecurity • Modern Medicine • Vaccines • Indigenous Medicine in the Northern Hemisphere • Indigenous Medicine in the Southern Hemisphere • Superbugs are the Real Super Villains • The Science of Social Distancing
interpret data relating to the incidence and prevalence of infectious disease in populations, for example: <ul style="list-style-type: none"> - mobility of individuals and the portion that are immune or immunised(ACSBL124, ACSBL125) - Malaria or Dengue Fever in South East Asia 	<ul style="list-style-type: none"> • Case Studies - Modelling Disease Outbreak and Spread • Parasitic Infection: Malaria • Viral Infection: Chickenpox
evaluate historical, culturally diverse and current strategies to predict and control the spread of disease(ACSBL125)	<ul style="list-style-type: none"> • Indigenous Medicine in the Northern Hemisphere • Indigenous Medicine in the Southern Hemisphere • Ancient Medicine • Modern Medicine • Medieval, Renaissance and Enlightenment-era Medicine • The Science of Social Distancing • Disease Prevention • Quarantine and Biosecurity • Vaccines

<p>investigate the contemporary application of Aboriginal protocols in the development of particular medicines and biological materials in Australia and how recognition and protection of Indigenous cultural and intellectual property is important, for example:</p> <ul style="list-style-type: none"> - bush medicine - smoke bush in Western Australia 	<ul style="list-style-type: none"> ● Indigenous Medicine in the Northern Hemisphere ● Indigenous Medicine in the Southern Hemisphere
--	--

Module 8: Non-infectious disease and disorders

Homeostasis

Content Descriptor	Lesson Names
<p>construct and interpret negative feedback loops that show homeostasis by using a range of sources, including but not limited to:(ACSBL101, ACSBL110, ACSBL111)</p> <ul style="list-style-type: none"> - temperature(ACSBL098) - glucose 	<ul style="list-style-type: none"> ● Thermoregulation ● Modelling Human Thermoregulation ● Regulating Blood Glucose Levels
<p>investigate the various mechanisms used by organisms to maintain their internal environment within tolerance limits, including:</p> <ul style="list-style-type: none"> - trends and patterns in behavioural, structural and physiological adaptations in endotherms that assist in maintaining homeostasis(ACSBL099, ACSBL114) - internal coordination systems that allow homeostasis to be maintained, including hormones and neural pathways(ACSBL112, ACSBL113, ACSBL114) - mechanisms in plants that allow water balance to be maintained(ACSBL115) 	<ul style="list-style-type: none"> ● Introduction to Homeostasis ● Maintaining the Internal Environment ● The Endocrine System ● Endocrine System in Action ● Action of Hormones ● Osmoregulation I ● Osmoregulation II ● Passage of Nerve Impulses ● Components of Neural Pathways

Causes and Effects

Content Descriptor	Lesson Names
<p>collect and represent data to show the incidence, prevalence and mortality rates of non-infectious diseases, for example:</p> <ul style="list-style-type: none"> - nutritional diseases - diseases caused by environmental exposure 	<ul style="list-style-type: none"> ● Cancer ● Chromosomal Abnormalities ● What are Diseases?
<p>investigate the causes and effects of non-infectious diseases in humans, including but not limited to:</p> <ul style="list-style-type: none"> - genetic diseases - diseases caused by environmental exposure - nutritional diseases - cancer 	<p><i>Coming April 2021</i></p>



Epidemiology

Content Descriptor	Lesson Names
<p>analyse patterns of non-infectious diseases in populations, including their incidence and prevalence, including but not limited to:</p> <ul style="list-style-type: none">- nutritional diseases- diseases caused by environmental exposure <p>investigate the treatment/management, and possible future directions for further research, of a non-infectious disease using an example from one of the non-infectious diseases categories listed above</p> <p>evaluate the method used in an example of an epidemiological study</p> <p>evaluate, using examples, the benefits of engaging in an epidemiological study</p>	<p><i>Coming April 2021</i></p>

Technologies and Disorders

Content Descriptor	Lesson Names
<p>explain a range of causes of disorders by investigating the structures and functions of the relevant organs, for example:</p> <ul style="list-style-type: none">- hearing loss- visual disorders- loss of kidney function <p>investigate technologies that are used to assist with the effects of a disorder, including but not limited to:(ACSBL100)</p> <ul style="list-style-type: none">- hearing loss: cochlear implants, bone conduction implants, hearing aids- visual disorders: spectacles, laser surgery- loss of kidney function: dialysis	<p><i>Coming April 2021</i></p>