

Biology



Yr 7/8 JSO exam syllabus (Biology)

<p>Australian Curriculum Content Descriptor (V9)</p> <p>investigate the role of classification in ordering and organising the diversity of life on Earth and use and develop classification tools including dichotomous keys (AC9S7U01)</p>	<p>Elaboration of core concepts:</p> <p>Students:</p> <ol style="list-style-type: none"> i. Describing and explaining similarities and differences of particular features within and between groups of organisms. ii. Using and evaluating a dichotomous key to classify organisms into groups and groups within groups. iii. Classifying species using scientific conventions from the Linnean hierarchical classification system, such as kingdom, phylum, class, order, family, genus, species and analysing changes using specific examples. iv. Evaluating the reasons for and approaches to classifying living things, such as identification, communication changes in technology. v. Describing how biological classification has changed over time through improvements in microscopy and evaluating its impact on approaches to classification. vi. Using provided dichotomous keys to identify organisms. vii. Investigating First Nations Australians' systems of classifying living things and 	<p>Content presentation:</p> <ul style="list-style-type: none"> • Khan Academy – nomenclature and taxonomy, videos readings and questions. • Eco sapiens – Intro to taxonomy video, including subspecies and tribe additions. • Cognito – Linnean classification summary, binomial naming & evolutionary trees video • Crash Course – overview of each kingdom and changing nature of classification video. • Amoeba sisters – Using dichotomous keys • Australianstogether.org - First Nations' Australians classification systems • Australianstogether.org - Indigenous Australians' classification systems. handout (find a finch). <p>Consolidation of content:</p> <ul style="list-style-type: none"> • Go to scottle.edu.au, student login and enter the pin CJHVUS. Complete all activities (adaptations and biodiversity). • Khan Academy Phylogenetic tree activity. Watch videos and complete questions. • Khan Academy biological classification questions.
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	<p>analysing similarities and differences between these systems and other models such as the Linnean system.</p>	<ul style="list-style-type: none"> Amoeba sisters Dichotomous key handout.
<p>use models, including food webs, to represent matter and energy flow in ecosystems and predict the impact of changing abiotic and biotic factors on populations (AC9S7U02)</p>	<p>Elaboration of core concepts: Students:</p> <ol style="list-style-type: none"> Analysing different types of food webs to show feeding relationships between organisms in an ecosystem, including the role of microorganisms and factors such as competition, trophic cascades, bottom-up and top-down control. Modelling how energy flows into and out of an ecosystem via the pathways of food webs, including representations of trophic levels such as pyramids of biomass. Predicting the effects on local ecosystems when living things such pollinators or predators are removed from or die out in an area and evaluating the impact of changing numbers of specific organisms, such as apex predators, on an ecosystem. Evaluating using evidence and examples, the impact of events such as seasonal changes, destruction of habitat or introduction of a species impact abiotic and biotic factors and cause changes to populations. 	<p>Content presentation:</p> <ul style="list-style-type: none"> Khan Academy food chains and webs readings and videos Fuseschool – Food chains and webs, including interdependency and trophic levels. Professor Dave – food webs, grazing & detrital food chains, trophic levels & cascades. Amoeba sisters – food chains, energy pyramids, energy loss and changes Indigenous Australians knowledge of food webs. teacher handout TedEd – invasive species examples, and implications. Invasives.org – Indigenous concerns about invasive species (reading) Kimberley Land Council - Indigenous fire management (reading) Ngarrngga – A history of Indigenous fire management, including comparing different approaches (reading)

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	<p>v. Investigating with examples, First Nations Australians’ responses and specific concerns relating to invasive species and their effect on food webs that many communities are a part of, and depend on, for produce and medicine.</p> <p>vi. Describing different First Nations Australians’ fire management practices including how these practices have changed over tens of thousands of years and evaluating the impact of these practices on the distribution of flora and fauna in most regions of Australia.</p>	<p>Check your understanding:</p> <ul style="list-style-type: none"> • Complete the activity on this website (PBS learning food chains and food webs) • Khan Academy food chains and webs. Watch videos and complete questions. • GTANSW.org – cultural burning, reading and consolidation activities • Australianstogether.org - Indigenous Australians fire management teacher handout (incl questions)
<p>recognise cells as the basic units of living things, compare plant and animal cells, and describe the functions of specialised cell structures and organelles (AC9S8U01)</p>	<p>Elaboration of core concepts: Students:</p> <p>i. Explore cells using videos and animations to compare size and scale in different types of cells.</p> <p>ii. Describing the structure and function (including basic molecular chemistry of <u>some components</u>) of organelles in cells including the nucleus, <u>cell membrane</u>, <u>cell wall</u>, cytoplasm, endoplasmic reticulum, ribosomes, mitochondria, chloroplasts and vacuoles.</p> <p>iii. Examining a variety of cells, including single-celled organisms, using a virtual light</p>	<p>Content presentation:</p> <ul style="list-style-type: none"> • Ibiblio – virtual cell. • Bozeman science – tour of the cell, including organelles and function. • Crash course – history of microscopy and cell theory + a tour of the cell. • Bionetwork – interactive microscope • Cognito – comparing certain cell types, plant, animal and prokaryotic cells • Amoeba sisters - Structure and function of the cell membrane. • Marsha Moore - structure and function of the cell wall. • Khan Academy cell structure and function. Watch videos and complete questions.

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	<p>microscope and building capacity to use all settings on a microscope to identify cells.</p> <p>iv. Comparing the similarities and differences of plant cells and animal cells and represented using physical models.</p> <p>v. Designing models of cells to represent different types of cells.</p> <p>vi. Describing the development of microscopy over time and evaluating how each development has contributed to the ongoing understanding of cell structure.</p>	<p>Check your understanding:</p> <ul style="list-style-type: none"> • Go to scootle.edu.au, student login and enter the pin MXSWAV. Complete all activities (cell structure and function). • Khan Academy cell structure and function. complete questions. • UKRI – build your own cells and cell quiz. • Rosalind Franklin Institute – make an edible cell model
<p>analyse the relationship between structure and function of cells, tissues and organs in a plant and an animal organ system and explain how these systems enable survival of the individual (AC9S8U02)</p>	<p>Elaboration of core concepts: Students:</p> <p>i. Use virtual animations and representations of organ systems to understand how organs are positioned within the body in relation to other structures.</p> <p>ii. Describing and comparing the structure and function of similar and different components of plant and an animal cell, including analysing how structures are well suited to their function.</p> <p>iii. Examining and comparing different specialised cells and tissues involved in structure and function of particular organs in</p>	<p>Content presentation:</p> <ul style="list-style-type: none"> • Khan academy – tissues, organs and organ systems (reading). • Cognito – levels of organisation: cells, tissues organs and organ systems. • BSCS.org - virtual microscope of different tissue types. • Amoeba sisters - Structure and function of the cell membrane. • Marsha Moore - structure and function of the cell wall. • Fuseschool – specialised cells. • Healthdirect.gov – blood cell disorders (reading).

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	<p>an organ system. Analysing how cell and tissue structure is well suited to function.</p> <p>iv. Describing the structure of each organ in a system, analysing how structure enables its function and relating its function to the overall function of the system.</p> <p>v. Investigating specific cellular / tissue disorders and analysing how they can affect how an organ functions.</p> <p>vi. Analyse the importance of research into artificial organs and how they function to mimic or augments the function of real organs, including the role of Australian researchers.</p>	<ul style="list-style-type: none">• Thescientist.com - Artificial organs research• Data – Australian artificial organs market analysis• University of Sydney – tissue engineering <p>Check your understanding:</p> <ul style="list-style-type: none">• Go to scottle.edu.au, student login and enter the pin OROQUB. Complete all activities (organs and organ systems).• Organ systems interactive. Follow the prompts.
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Yr 9/10 JSO exam syllabus (Biology)

The yr 7 & 8 syllabus is assumed knowledge

<p>compare the role of body systems in regulating and coordinating the body's response to a stimulus, and describe the operation of a negative feedback mechanism (AC9S9U01)</p>	<p>Elaboration of core concepts: Students:</p> <ol style="list-style-type: none">i. Exploring the body's observable responses to external stimuli (such as changes in light or temperature, or presence of danger or pathogens) or internal stimuli (such as dehydration or hunger) and comparing this to other organisms (e.g. photo and geotropism in plants).ii. Using diagrams and virtual simulations to explore and represent the exact sequence of activities within cells and between cells & body systems to coordinate a response to specific stimuli.iii. Comparing and contrasting the general role and function of electrical impulses and hormones in the body's responses to external stimuli. Describing specific examples of nervous and endocrine responses respectively, as well as examples of both systems working together.iv. Using virtual simulations to investigate how the process of regulation is	<p>Content presentation:</p> <ul style="list-style-type: none">• NG science – responding to stimuli overview and examples in other organisms.• Amoeba sisters – homeostasis, negative and positive feedback• Bioninja – stimulus response summary and neurones (reading).• Khan Academy - Homeostasis and feedback loops (videos and articles).• Cognito - nervous system and reflex arc• 2-minute classroom – central and peripheral nervous system.• HHMI bio interactive – electrical activity in neurones.• Cognito – endocrine system summary, examples and comparison to nervous system.• Crash Course – nervous and endocrine system general comparison.• Osmosis – sugar control (glucose, insulin, glucagon), diabetes mellitus,• Healthline.com – electrolytes function <p>Extension:</p>
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	<p>monitored and adjusted by connections between the receptor, command centre and effector, including specific responses to particular stimuli.</p> <p>v. Examining the effects of a disorder in a feedback system, including disruptions to the stimulus response model and possible remedies.</p> <p>vi. Explore our understanding of electrolytes and how it has contributed to our understanding of a balanced diet and the development of sports drinks.</p> <p>Extension:</p> <p>i. Exploring somatic and autonomic nervous system, including sympathetic and parasympathetic.</p> <p>ii. Comparing and contrasting classical and operant conditioning.</p>	<ul style="list-style-type: none"> Alila Medical Media – sympathetic vs parasympathetic systems. Cleveland clinic – sympathetic vs parasympathetic systems. TED-ed – classical and operant conditioning. <p>Check your understanding:</p> <ul style="list-style-type: none"> Stimulus response, test your understanding Accelerate learning - Internal and external stimuli, reading and questions Neurones and action potentials PhET animation – follow the prompts Colour vision PhET animation – follow the prompts. Khan Academy stimulus response questions
<p>describe the form and function of reproductive cells and organs in animals and plants, and analyse how the processes of sexual and asexual reproduction enable survival of the species</p>	<p>Elaboration of core concepts: Students:</p> <p>i. Examining individual roles of key components of male and female reproductive organ structures in humans, as well as how they work collectively as a system.</p>	<p>Content presentation:</p> <ul style="list-style-type: none"> Professor Dave – human reproductive system, sex organs, gametes, fertilization, Fuseschool – human gametes, sperm and egg Amoeba sisters – sexual and asexual reproduction, in plants and other organisms.

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<p>(AC9S9U02)</p>	<ul style="list-style-type: none"> ii. Explaining how structure and workings of male and female gametes relate to their specific function. iii. Comparing sexual and asexual reproductive strategies in plants and other organisms, including benefits and limitations of each. iv. Exploring how sexual reproduction creates a greater rate of variation among offspring compared with asexual reproduction, as well as the benefits to survival of this variety. v. Examining how the reproductive strategies of specific multicellular organisms are related to their specific needs, their environment and the complexity of the organism vi. Examining how the number of offspring produced by animals is related to the amount of parental care, and how different numbers of offspring can link to different survival strategies of organisms. <p>Extension:</p> <ul style="list-style-type: none"> i. Explore in detail, the specific components of the female and male reproductive systems. 	<ul style="list-style-type: none"> • Crash Course – sexual and asexual reproduction, examples from different organisms and benefits of each. • Complete the learning activities and the questions on the Khan Academy human reproduction module • Complete the learning activities and the questions on the Khan Academy human reproduction readings • NG science – animals and offspring, caring for young <p>Extension:</p> <ul style="list-style-type: none"> • Crash course – a detailed exploration of the female and male reproductive systems. <p>Check your understanding:</p> <ul style="list-style-type: none"> • Complete the questions on the Khan Academy human reproduction module • Male reproductive system animation • Female reproductive system animation
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<p>explain the role of meiosis and mitosis and the function of chromosomes, DNA and genes in heredity and predict patterns of Mendelian inheritance (AC9S10U01)</p>	<p>Elaboration of core concepts: students:</p> <ol style="list-style-type: none">Using models and diagrams to represent the components of an organism's genome, from small to big, including nucleotides, bonds within and between strands, the double helix model of DNA, genes and chromosomes.Explaining how the specific ways by which genetic information is passed on to offspring increases the variation of a species, including random fertilization, recombination and meiosis.Using Mendelian inheritance and Punnett squares to predict the ratio of offspring genotypes and phenotypes in monohybrid crosses involving dominant and recessive alleles, sex linked and autosomal traits, as well as in cases with multiple alleles and codominance.Using pedigree diagrams to show patterns of inheritance of simple dominant and recessive characteristics through multigenerational families as well as interpreting patterns of inheritance from a pedigree diagram.Investigating the immense genetic diversity which is prevalent in First	<p>Content presentation:</p> <ul style="list-style-type: none">Watch the meristem playlist DNA, Genes and Inheritance<ul style="list-style-type: none">DNA structureDNA replicationCell divisionGenes and allelesPatterns of inheritancePunnett squaresPedigreesPedigrees and inheritance patternsChromosomal recombinationEpigenetics (extension)Gene mutationsAmoeba sisters – gene expression (extension)Crash course – gene expression (extension)Fuseschool – genetic disordersFuseschool – the genetic basis of cancerBetter Health Channel – genetic conditionsNational Centre for Indigenous Genomics – what DNA reveals about ancestry. Samples of DNA stored at NCIG and protocols for respective handling of materials.Australian Geographic – immense genetic diversity among Indigenous Australians.Khan Academy – chromosomes and genes readings and videos
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	<p>Nations’ Australians, and the cultural needs which need to be addressed by research groups when investigating this genetic diversity.</p> <p>vi. Exploring environmental and other factors that cause mutations and explaining types of changes which may occur in DNA or chromosomes. Analysing the chances of mutations occurring, the normal control mechanisms within a cell which prevent or eradicate mutations, and the conditions which lead to mutations being hereditary.</p> <p>vii. exploring the role of DNA in cancer or genetic disorders such as haemochromatosis, sickle cell anaemia, cystic fibrosis or Klinefelter syndrome, as well as the mechanisms by which these genetic disorders cause disease.</p> <p>Extension:</p> <ol style="list-style-type: none"> i. Exploring the nature of gene expression. ii. Exploring the nature of epigenetic control and its role in gene expression 	<ul style="list-style-type: none"> • Khan Academy – inheritance unit <p>Check your understanding:</p> <ul style="list-style-type: none"> • Go to scottle.edu.au, student login and enter the pin DFFYKV. Complete all activities - genes and chromosomes basics) • Go to scottle.edu.au, student login and enter the pin YFJQBQ. (Monohybrid cross) • Complete the gene expression essentials PhET simulations
<p>use the theory of evolution by natural selection to explain past and present</p>	<p>Elaboration of core concepts: Students:</p>	<p>Content presentation:</p> <ul style="list-style-type: none"> • Crash course – overview and evidence of evolution.

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<p>diversity and analyse the scientific evidence supporting the theory (AC9S10U02)</p>	<ol style="list-style-type: none">i. Detailing the process of natural selection, and outlining requirements for this process including variation, heredity, competition, isolation and selection of beneficial traits.ii. Analysing evolutionary explanations of variation and biodiversity.iii. Evaluating evidence for the theory of evolution by natural selection, including the fossil record, chemical and anatomical similarities, and geographical distribution of species. Identifying strengths and limitations of each form of evidence, as well as changes over time to this body of evidence.iv. Investigating changes caused by natural selection in a particular population and identifying the specific selection pressures which contributed to these changes.v. Explaining the frequency and occurrence of certain genetic characteristics in terms of survival and reproductive rates in particular environments.vi. Exploring the evolutionary history of First Nations' Australians including the prevalence of a large amount of genetic diversity.	<ul style="list-style-type: none">• Crash course - natural selection overview, variation and heredity.• Crash course – Darwin and natural selection, an evolutionary history (extension)• Khan academy – natural selection (reading)• Fuseschool – evidence for evolution• National Museum of Australia – Evidence of first peoples <p>Check your understanding:</p> <ul style="list-style-type: none">• Complete the natural selection interactive on PhET simulations• Complete the learning activities and the questions on the Khan Academy natural selection module
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	<p>Extension:</p> <ol style="list-style-type: none">i. Explore the history and historical context of the development of natural selection as an explanation for variations as depicted by Charles Darwin and other scientists.	
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