

SCIENCE

CONSULTATION CURRICULUM

Scope and sequence 7–10

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YEAR 7 TO YEAR 10

Science	Year 7	Year 8	Year 9	Year 10
Achievement standard				
	<p>By the end of Year 7 students explain how biological diversity is ordered and organised. They represent flows of matter and energy in ecosystems and predict the effect of environmental changes. They model cycles in the Earth-sun-moon system and explain the effects of these cycles on Earth phenomena. They represent and explain the effects of forces acting on objects. They use particle theory to explain the physical properties of substances and design and explain processes to separate substances. Students describe the factors that result in scientific knowledge changing over time. They examine scientific responses to contemporary issues and describe the role of science communication.</p> <p>Students plan and conduct safe, reproducible investigations to test relationships or aspects of scientific models. They recognise ethical issues and identify key intercultural considerations for specific field locations or use of secondary data. They use equipment to generate and record data with precision. They construct representations to organise and process data and information. They analyse data and information to identify patterns, trends and relationships. They identify possible sources of error in methods and identify conflicting evidence and unanswered questions when analysing conclusions and claims. They identify evidence to support their conclusions and construct arguments to support or dispute claims. They select and use text features to achieve their purpose when communicating their ideas, findings and arguments to specific audiences.</p>	<p>By the end of Year 8 students explain the role of specialised cell structures and organelles in cellular function and analyse the relationship between structure and function at organ and body system levels. They apply an understanding of forces, energy and the theory of plate tectonics to explain patterns of change in the geosphere. They compare processes of electricity generation and represent transfer and transformation of energy in simple systems. They represent and classify different types of matter and distinguish between physical and chemical change. Students explain how social, cultural and technological factors can influence development and application of scientific knowledge. They analyse scientific responses to contemporary issues and examine the importance of science communication.</p> <p>Students plan and conduct safe, reproducible investigations to test relationships or explore models. They consider ethical issues and describe any intercultural considerations for specific field locations or use of secondary data. They select and use appropriate equipment to generate and record data with precision. They select and construct appropriate representations to organise and process data and information. They analyse data and information to identify patterns, trends, relationships and anomalies. They identify assumptions and sources of error when analysing methods and identify conflicting evidence or unanswered questions when analysing conclusions and claims. They construct evidence-based arguments to support conclusions or evaluate claims. They select and use language and text features to achieve their purpose when communicating their ideas, findings and arguments to specific audiences.</p>	<p>By the end of Year 9 students explain how body systems provide a coordinated response to stimuli. They examine how the processes of sexual and asexual reproduction enable survival of the species. They examine how interactions within and between Earth's spheres affect the carbon cycle. They explain energy conservation in simple systems and apply wave and particle models to describe energy transfer. They explain observable chemical processes in terms of changes in atomic structure, atomic rearrangement, mass and energy. Students explain the role of publication in validating scientific knowledge and describe the relationship between science, technologies and engineering. They examine key factors that influence interactions between science and society.</p> <p>Students plan and conduct safe, reproducible investigations to test or identify relationships or explore models. They examine ethical and intercultural considerations when acquiring or using primary and secondary data. They select and use equipment to generate and record repeatable data. They select and construct appropriate representations to organise, process and summarise data and information. They analyse and connect data and information to identify and explain patterns, trends, relationships and anomalies. They analyse methods for assumptions and sources of error and evaluate the validity of conclusions and claims. They construct logical, evidence-based arguments to support conclusions or evaluate claims. They select and use content, language and text features to achieve their purpose when communicating their ideas, findings and arguments to specific audiences.</p>	<p>By the end of Year 10 students explain the processes that underpin heredity and genetic diversity and describe the evidence supporting the theory of evolution by natural selection. They sequence key events in the origin and evolution of the universe and describe the supporting evidence for the big bang theory. They examine patterns of global climate change and identify causal factors. They explain how Newton's laws describe and predict motion of objects in a system. They explain patterns and trends in the periodic table and predict the products of reactions and the effect of changing reactant and reaction conditions. Students explain the processes through which scientific knowledge is validated and examine the relationship between science, technology and engineering. They analyse key factors that influence interactions between science and society.</p> <p>Students plan and conduct safe, valid and reproducible investigations to test relationships or develop explanatory models. They explain ethical and intercultural considerations when acquiring or using primary and secondary data. They select and use equipment efficiently to generate and record repeatable data. They select and use effective representations to organise, process and summarise data and information. They analyse and connect a variety of data and information to identify patterns, trends, relationships and anomalies. They assess the validity and reproducibility of methods, and the validity of conclusions and claims. They construct logical arguments based on a variety of evidence to support conclusions and evaluate claims. They select and use content, language and text features effectively to achieve their purpose when communicating their ideas, findings and arguments to diverse audiences.</p>

Strand	Sub-strand	Content description			
		<i>Students learn to:</i>			
Science understanding	Biological sciences	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)	investigate how cells are the basic units of living things, the differences between plant and animal cells, and the function of specialised cell structures and organelles (AC9S8U01)	investigate how a body system regulates and coordinates the body's response to stimuli and the role of positive and negative feedback mechanisms (AC9S9U01)	investigate the role of meiosis and mitosis and the function of chromosomes, DNA and genes in heredity and explain and predict patterns of Mendelian inheritance (AC9S10U01)
		investigate how models, including food webs and biomass pyramids, represent matter and energy flow in ecosystems and predict the impact of changing abiotic and biotic factors on populations (AC9S7U02)	investigate 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)	investigate how the processes of sexual and asexual reproduction in animals and plants enable survival of the species (AC9S9U02)	investigate how the theory of evolution by natural selection explains past and present diversity and analyse the scientific evidence supporting the theory (AC9S10U02)
	Earth and space sciences	investigate how cyclic changes in the relative positions of the Earth, sun and moon can be modelled and explain how these cycles cause eclipses and influence predictable phenomena on Earth, including seasons and tides (AC9S7U03)	investigate the role of energy and forces in tectonic activity, including formation of geological features at divergent, convergent and transform plate boundaries, and describe the scientific evidence for the theory of plate tectonics (AC9S8U03)	investigate how key processes in the carbon cycle, including combustion, photosynthesis and respiration, rely on interactions between the biosphere, geosphere, hydrosphere and atmosphere (AC9S9U03)	investigate how the big bang theory models the origin and evolution of the universe, including the formation of stars and galaxies, and analyse the supporting evidence for the theory (AC9S10U03)
					investigate how models of energy flow between the biosphere, geosphere, hydrosphere and atmosphere describe patterns of global climate change and predict future changes (AC9S10U04)
	Physical sciences	investigate and represent balanced and unbalanced forces, including gravitational force, acting on objects, and relate changes in an object's motion to its mass and the magnitude and direction of forces acting on it (AC9S7U04)	investigate how different types of energy are classified as kinetic or potential energy and represent energy transfer and transformations in simple systems (AC9S8U04)	investigate how wave and particle models describe energy transfer through different mediums and examine the usefulness of each model for explaining phenomena (AC9S9U04)	investigate Newton's laws of motion and quantitatively analyse the relationship between force, mass and acceleration of objects (AC9S10U05)
			investigate processes of electricity generation from a non-renewable and a renewable source, including examining energy transfers and transformations (AC9S8U05)	investigate how energy transfers and transformations in physical systems demonstrate the law of conservation of energy and analyse system efficiency in terms of energy inputs and outputs (AC9S9U05)	
	Chemical sciences	investigate how particle theory describes the arrangement of particles in a substance, including the motion of and attraction between particles, and relate this to the properties of the substance (AC9S7U05)	investigate how matter can be classified as elements, compounds and mixtures, and compare different representations of these, including 2-dimensional and 3-dimensional models, symbols and formulas (AC9S8U06)	investigate how the discovery of protons, neutrons and electrons influenced the model of the atom and how natural radioactive decay results in stable atoms (AC9S9U06)	investigate how the Bohr model of the atom explains the structure and properties of atoms and relates to their organisation in the periodic table (AC9S10U06)
		investigate how particles in pure substances and mixtures can be modelled and how differences in the properties of substances can be used to separate mixtures (AC9S7U06)	investigate the differences between physical and chemical changes and identify indicators of energy change in chemical reactions (AC9S8U07)	investigate how the rearrangement of atoms in chemical reactions can be modelled using a range of representations, including word and simple balanced chemical equations, and use these to demonstrate the law of conservation of mass (AC9S9U07)	investigate synthesis, decomposition and displacement reactions, predict their products, and examine the factors that affect reaction rates (AC9S10U07)
	Science as a human endeavour	Nature and development of science	investigate how new evidence or different perspectives can lead to changes in scientific knowledge (AC9S8H01)		investigate how scientific knowledge is validated, including the role of publication and peer review (AC9S10H01)
			investigate how cultural perspectives and worldviews influence the development of scientific knowledge (AC9S8H02)		investigate how advances in technologies enable advances in science, and how science has contributed to developments in technologies and engineering (AC9S10H02)

Use and influence of science	investigate how proposed scientific responses to contemporary issues may impact on society and explore environmental, social and economic considerations (AC9S8H03)	investigate key factors that contribute to science knowledge and practices being adopted more broadly by society (AC9S10H03)	
	investigate the role of science communication in informing individual viewpoints and community policies and regulations (AC9S8H04)	investigate how the values and needs of society influence the focus of scientific research (AC9S10H04)	
Science inquiry	Questioning and predicting	develop investigable questions, observation-based predictions and hypotheses to explore scientific models, identify patterns or test relationships (AC9S8I01)	develop investigable questions, predictions and hypotheses to test relationships or develop explanatory models (AC9S10I01)
		Planning and conducting	plan and conduct reproducible investigations to answer questions and test hypotheses, including identifying assumptions and, as appropriate, recognising and managing risks, considering ethical issues and recognising key considerations regarding heritage sites and artefacts on Country or Place (AC9S8I02)
	select and use equipment to generate and record data with precision, using digital technologies as appropriate (AC9S8I03)		select and use data generation equipment with precision to obtain useful sample sizes and repeatable data, using digital technologies as appropriate (AC9S10I03)
	Processing, modelling and analysing	select, construct and use appropriate representations including tables, graphs, mathematical relationships, and models, to organise and process data and information (AC9S8I04)	select and construct appropriate representations including tables, graphs, descriptive statistics, models and mathematical relationships to organise and process data and information (AC9S10I04)
		analyse data and information to identify patterns, trends, relationships and anomalies (AC9S8I05)	analyse and connect a variety of data and information to identify and explain patterns, trends, relationships and anomalies (AC9S10I05)
	Evaluating	analyse methods, conclusions and claims for assumptions, possible sources of error, conflicting evidence and unanswered questions (AC9S8I06)	assess the validity and reproducibility of methods and evaluate the validity of conclusions and claims, including by identifying conflicting evidence and areas of uncertainty (AC9S10I06)
		construct evidence-based arguments to support conclusions or evaluate claims and consider any ethical issues and cultural protocols associated with using or citing secondary data or information (AC9S8I07)	construct arguments based on a variety of evidence to support conclusions or evaluate claims and consider any ethical issues and cultural protocols associated with accessing, using or citing secondary data or information (AC9S10I07)
	Communicating	create multimodal texts to communicate ideas, findings and arguments for specific purposes and audiences, including selection of appropriate language and text features, using digital technologies as appropriate (AC9S8I08)	create multimodal texts to communicate ideas, findings and arguments effectively for identified purposes and audiences, including selection of appropriate content, language and text features, using digital technologies as appropriate (AC9S10I08)