

Australian Curriculum: Science — Year 10

Year level plan-2023

CURRICULUM	SEMESTER 1		SEMESTER 2	
	Term 1	Term 2	Term 3	Term 4
Unit name	Biology: Evolution & Genetics	Physics: Forces & Motion	Chemistry: Matter & Reactions	Global Systems & the Universe
Unit description	<p>In this unit students will develop an understanding of how the diversity of life on Earth can be explained by the theory of evolution by natural selection. They will review models and mechanisms that have been developed and refined over time by a range of scientists to explain evolution and evaluate the evidence that supports these. Students will assess representations of how the Earth's biological diversity has branched out from a single origin. Students will critically analyse the validity of evolutionary evidence found in secondary sources and communicate their understanding of the theories and processes of evolution using scientific language, conventions and representations.</p> <p>Students will explore genetics, heredity and evolution. They will examine the relationship between DNA, genes and the physical characteristics of an organism. Students will analyse monohybrid crosses and use patterns and trends to predict genotypes and phenotypes of offspring. They will construct pedigrees to track heritable traits through generations. Students will examine the cause and effect of mutations on individuals and their offspring. They will explore genetic diseases.</p>	<p>In this unit students will investigate the impact of forces and energy on the motion of objects. Students will use the Laws of Motion and the Conservation of Energy to predict, describe and explain the consequences of the rapid changes in the forces and energy acting during collisions. They will calculate and use velocity and acceleration data to make predictions about motion scenarios.</p> <p>Students explore and apply Newton's Three Laws of Motion to predict, describe and calculate the effect of forces on the motion of objects. They plan and conduct a range of investigations, involving the formulation of hypothesis, assessment of risks and selection and use of appropriate methods, including the use of digital technologies, to collect and analyse reliable data. Students will draw conclusions using their knowledge of Newton's Three Laws, identify sources of uncertainty and describe ways to alter experimental methods to improve data quality.</p>	<p>In this unit, students will collect and analyse data to identify patterns in atomic structure and the properties of elements and explain how these relate to the organisation of the Periodic Table. They use scientific knowledge of an atom's electron arrangement to predict the formation of ions, and make predictions and draw conclusions from experimental data about the products of chemical reactions. Students will examine how scientific understanding of the atomic model has been refined over time and explain the role of technology in advancing this model.</p> <p>They will explore the factors that affect reaction rates through observation and experimentation. Students will plan, conduct, evaluate and report on an investigation into reaction rate of a chemical process. They will examine different types of reactions and consider the usefulness of the products. Students will consider how the development of useful products and chemical processes, particularly polymers and pharmaceuticals, have been driven by societal needs, and the impact this has had on society and the environment. They will explore how traditional knowledge has led to the development of new pharmaceuticals.</p>	<p>In this unit, students will explore how the Earth is composed of four interacting and dynamic spheres, within which the global systems and cycles operate. They will consider how matter cycles within and between these spheres, such as in the carbon cycle and the water cycle, and use scientific knowledge to evaluate how humans have influenced these systems, resulting in change. Students will conduct reliable and fair fieldwork investigations to collect, analyse and evaluate data related to carbon emissions produced by traffic. Students will analyse approaches used to minimise carbon emissions. They will also consider whether ethical decision making in relation to the environment could improve the state of the planet.</p> <p>Students will understand that the universe is made of a variety of features, including galaxies, stars and solar systems, and the Big Bang theory can be used to explain the origin of the universe. They will recognise that theories are revised and scientific ideas change over time, as new evidence is gathered. They will examine different types of star lifecycles and investigate the contributions that technology has made to increased knowledge of stars over time. Students will understand that light from stars provides information about composition and relative motions of galaxies.</p>

ASSESSMENT		SEMESTER 1			SEMESTER 2		
		Term 1		Term 2	Term 3		Term 4
		Evolution	Genetics	Energy of Motion	Chemistry	Reaction Rates	Global Changes
Range and balance of summative assessment conventions	Technique	Investigation	Examination	Examination	Examination	Experimental Investigation	Examination
	Type of text	Information report	Short answer & Factorial explanation	Short answer & Descriptive report	Short answer & Procedure	Scientific report	Short answer
	Mode	Written Report & Multimodal	Written	Written	Written	Written & Practical Demonstration	Written
	Conditions	- Class time-2wk - Individual - 600-800 words	- 2x 60mins +10min perusal - Short response - Exam conditions	- 60mins +10min perusal - Short response - Exam conditions	- 2x 60mins + 10min perusal - Short response - Exam conditions	- Class time-3wk - Individual - 600-800 words	- 60mins +10min perusal - Short response - Exam conditions

Aspects of the achievement standard

analyse how the periodic table organises elements and use it to make predictions about the properties of elements				✓		
explain how chemical reactions are used to produce particular products and how different factors influence the rate of reactions				✓	✓	
explain the concept of energy conservation and represent energy transfer and transformation within systems			✓			
apply relationships between force, mass and acceleration to predict changes in the motion of objects.			✓			
describe and analyse interactions and cycles within and between Earth's spheres						✓
evaluate the evidence for scientific theories that explain the origin of the universe and the diversity of life on Earth		✓				✓
explain the processes that underpin heredity and evolution	✓	✓				
analyse how the models and theories they use have developed over time and discuss the factors that prompted their review		✓				✓
develop questions and hypotheses					✓	
independently design and improve appropriate methods of investigation, including field work and laboratory experimentation				✓	✓	

explain how they have considered reliability, safety, fairness and ethical actions in their methods and identify where digital technologies can be used to enhance the quality of data					✓	
when analysing data, selecting evidence and developing and justifying conclusions, they identify alternative explanations for findings and explain any sources of uncertainty			✓	✓	✓	
evaluate the validity and reliability of claims made in secondary sources with reference to currently held scientific views, the quality of the methodology and the evidence cited	✓				✓	
construct evidence-based arguments	✓	✓	✓	✓	✓	
select appropriate representations and text types to communicate science ideas for specific purposes.	✓	✓	✓	✓	✓	✓

Term 1

Term 2

Term 3

Term 4



indicates opportunities that summative assessments provide for students to demonstrate evidence against aspects of the achievement standard