

# Australian Curriculum: Science — Year 10

CURRICULUM	SEMESTER 1		SEMESTER 2	
	Unit 1	Unit 2	Unit 3	Unit 4
<b>Unit name</b>	Roller Coasters	Genetics	Chemistry	Universe and GAIA
<b>Unit description</b>	<p>In this unit, students will explore and apply Newton's Three Laws of Motion to predict, describe and calculate the effect of forces on the motion of objects. They develop questions and hypotheses, assess risks, and consider accuracy when using a range of methods, including the use of digital technologies, to collect reliable data. Students will analyse data and draw conclusions using their knowledge of Newton's First, Second and Third Laws of Motion. They will explain sources of uncertainty and describe ways to improve experimental methods to improve data quality. 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 Law of Conservation of Energy to predict, describe and explain the consequences of the rapid changes in the forces and energy acting during collisions. They will evaluate vehicle safety features using their knowledge of force and motion. Students will use their understandings to design an energy-absorbing feature and explain the changes in motion using physics concepts and experimental result</p>	<p>In this unit students will build on their knowledge of genetics and inheritance gained in Unit 1. They will develop an understanding of how the diversity of life on Earth can be explained by the theory of evolution by natural selection. Students 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. They will assess representations of how Earth's biological diversity has branched out from a single origin, and consider how technology and scientific knowledge has affected scientific research and people's lives through genetically modified foods. 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. In this unit students will explore genetics and heredity. 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 research genetic diseases and evaluate claims surrounding the genetic testing of humans. They will explore how advances in science and emerging sciences and technologies can significantly affect people's lives, and the interrelationship between science and society.</p>	<p>In this unit students will collect and analyse data to identify patterns in atomic structure and the properties of elements and 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. Many of the understandings in this unit will be applied and assessed at the end of the unit in an exam. In this unit students 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 and issues related to intellectual ownership of the knowledge of these products.</p>	<p>In this unit, students understand that the universe is made up 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 outline the Big Bang theory and review evidence supporting the theory. Students identify the limitations of the Big Bang theory and recognise that theories are revised and scientific ideas change over time, as new evidence is gathered. They examine different types of star lifecycles and investigate the contributions that technology has made to increased knowledge of stars over time. Students understand that light from stars provides information about composition and relative motions of galaxies. They examine information related to theories about the origin and fate of the universe. Students summarise how understandings of the universe have changed through new discoveries due to improved technologies. They develop an understanding of Aboriginal peoples' and Torres Strait Islander peoples' use of astronomical knowledge and link selected spinoffs from space research to everyday applications. Students examine recent developments in astronomy and identify new career opportunities. In this unit students will explore how Earth is composed of four interacting and dynamic 'spheres', within which the global systems and cycles operate. These are the lithosphere, hydrosphere, atmosphere and biosphere. Students 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 flow between these systems. They will design and conduct reliable and fair fieldwork investigations to collect, analyse and evaluate data related to carbon emissions produced by human activity and consider the role of the biosphere in carbon storage. Students will explore approaches used to minimise carbon emissions and methods of sequestering carbon. They will also consider how ethical decision making in relation to global systems could improve the state of the planet.</p>

ASSESSMENT		SEMESTER 1		SEMESTER 2	
		Summative assessment task 1	Summative assessment task 2	Summative assessment task 3	Summative assessment task 4
<b>Range and balance of summative assessment conventions</b>	<b>Technique</b>	Investigation	End of Term Exam	End of Term Exam	Multi Modal Research task on a Term 4 topic investigating Claims
	<b>Type of text</b>	Scientific Report	Short and extended response	Short and extended response	Oral or Written or Designed Multi-Modal presentation
	<b>Mode</b>	Experimenting and Scientific Written Report	Student Response to External Exam Model	Student Response to in class exam	Oral, written report or digital recording
	<b>Conditions</b>	5 weeks - laptops and equipment provided	1 x 70 min lesson	1 x 70 min lesson	5 weeks- laptops provided
<b>Aspects of the achievement standard</b>					
Students analyse how the periodic table organises elements and use it to make predictions about the properties of elements					
Students explain how chemical reactions are used to produce particular products and how different factors influence the rate of reactions					
They explain the concept of energy conservation and represent energy transfer and transformation within systems.					
Students apply relationships between force, mass and acceleration to predict changes in the motion of					



objects.								
They describe and analyse interactions and cycles within and between Earth's spheres.								
Students evaluate the evidence for scientific theories that explain the origin of the universe and the diversity of life on Earth.								
They explain the processes that underpin heredity and evolution.								
Students analyse how the models and theories they use have developed over time and discuss the factors that prompted their review.								
Students develop questions and hypotheses and independently design and improve appropriate methods of investigation, including field work and laboratory experimentation.								
They 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.								
Students analyse data, selecting evidence and developing and justifying conclusions, they identify alternative explanations for findings and explain any sources of uncertainty.								
They 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.								
Students construct evidence-based arguments and select appropriate representations and text types to communicate science ideas for specific purposes.								

Shaded cells indicate opportunities that summative assessments provide for students to demonstrate evidence against all aspects of the achievement standard

