

Year 10 Science

Achievement

By the end of Year 10, students analyse how the periodic table organises elements and use it to make predictions about the properties of elements. They explain the processes that underpin heredity and evolution. They 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. They apply relationships between force, mass and acceleration to predict changes in the motion of objects. Students describe and analyse interactions and cycles within and between Earth's spheres. They evaluate the evidence for scientific theories that explain the origin of the universe and the diversity of life on Earth. 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. When analysing data, selecting evidence and developing and justifying conclusions, they identify alternative explanations for findings and explain any sources of uncertainty. Students 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. They construct evidence-based arguments and select appropriate representations and text types to communicate science ideas for specific purposes.

Assessment Criteria

An overall level of achievement in this subject is determined by the teacher's on-balance judgment of the evidence presented in students' summative assessment across the following:

- **Science Understanding** Biological Sciences, Chemical Sciences, Earth and Space Sciences, Physical Sciences.
- **Science as a Human Endeavour** Nature and development of science, Use and influence of science.
- **Science Inquiry Skills** Questioning and predicting, Planning and conducting, Processing and analysing data and information, Evaluating, Communicating.

Delivery (mode, time requirements, lessons)

Students have access to a one hour scheduled lesson and a one hour tutorial each week. Lessons are delivered via Collaborate and teleconferencing. Students are also expected to undertake independent study to complete tasks and assessment in accordance with the Work Rate Calendar. Course materials can be accessed in Blackboard.

Student Requirements

Computer, access to internet, email, printer, scanner, telephone or headset with microphone, exercise book, stationery and the science kit.

Year 10 Science (Semester 1)

		Units and Learning Experiences, Summative Assessment, Criteria Assessed, Approximate timing/due date of summative assessment
Semester 1	Term 1	<p>Physics Unit: Moving along In this unit, 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 formulation of hypotheses, assessment of risks and selection and use of appropriate methods. Students will draw conclusions using their knowledge of Newton's three laws of motion, identify sources of uncertainty and describe ways to alter experimental methods to improve data quality.</p>
		<p>Physics Unit: Energy of motion In this unit students will investigate the impact of forces and energy on the motion of objects. They use the laws of Motion and Conservation of Energy to predict, describe and explain the consequences of the rapid changes in forces and energy acting during collisions. Students will evaluate the effectiveness of safety features to minimise the impact of collisions. They will use their scientific understanding to design a device and investigate the effectiveness of this design to minimise the consequences of impact.</p>
		<p>Summative assessment, criteria assessed, approximate timing/due date:</p> <ul style="list-style-type: none"> • Student Experiment
	Term 2	<p>Chemistry Unit: Chemistry isn't magic Students will identify patterns in atomic structure that allow prediction of the products of chemical reactions and are reflected by 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>Chemistry Unit: Chemical reactions matter In this unit, students will explore the factors that affect reaction rates through observation and experimentation. They will plan, conduct, evaluate and report upon an investigation into the reaction rate of a chemical process. Students will consider how the development of useful products and chemical processes such as polymers and pharmaceuticals have been driven by societal needs, and the impact this has had on society and the environment.</p>
<p>Summative assessment, criteria assessed, approximate timing/due date:</p> <ul style="list-style-type: none"> • End of Semester Exam 		

Year 10 Science (Semester 2)

		Units and Learning Experiences, Summative Assessment, Criteria Assessed, Approximate timing/due date of summative assessment
Semester 2	Term 3	<p>Biology Unit: Life blueprints Students will explore genetics and heredity. They will examine the differences 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 investigate DNA and explore genetic diseases. Students will track heritable conditions on pedigrees and debate the ethical issues surrounding genetic testing. They will analyse monohybrid multi-generation crosses and predict the genotypes and phenotypes of offspring.</p>
		<p>Biology Unit: Life evolves Students build on knowledge of genetics and inheritance gained in Unit 1. They develop an understanding of how the diversity of life of 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 the 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.</p>
		<p>Summative assessment, criteria assessed, approximate timing/due date:</p> <ul style="list-style-type: none"> • Research Investigation.
	Term 4	<p>Earth and Space Unit: Global systems 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 the carbon cycle and the water cycle, and use scientific knowledge to evaluate how humans have influenced these systems. Students will design and conduct reliable and fair fieldwork investigations to collect, analyse and evaluate data related to carbon emissions produced by traffic and the potential of carbon offsetting from trees.</p>
		<p>Earth and Space Unit: The universe In this unit, students explore features of the universe and how the Big Bang theory is used to explain the formation of the universe. They will consider how theories have changed over time in line with technological advances and are continuing to be refined. They will see how secondary data is analysed to describe astronomical phenomena.</p>
		<p>Summative assessment, criteria assessed, approximate timing/due date:</p> <ul style="list-style-type: none"> • End of Unit Exam

Disclaimer All of the above information is accurate at the time of publication