

SCIENCE – MANDATORY

In Stage 5 Science, students formulate questions or hypotheses to be investigated scientifically. They apply scientific understanding and critical thinking skills to suggest possible solutions to identified problems. Individually and collaboratively they plan and undertake a range of types of first-hand investigations to accurately collect data using appropriate units, assessing risk and considering ethical issues associated with the method. They design and conduct controlled experiments to collect valid and reliable first-hand data.

Students analyse and evaluate data and information from first-hand investigations to draw conclusions consistent with the evidence, identifying sources of uncertainty and possible alternative explanations for findings. They assess the validity and reliability of claims made in secondary sources. They evaluate the methods and strategies they and others use and ways in which the quality of data could be improved, including the appropriate use of digital technologies. They communicate science ideas for specific purposes and construct evidence-based arguments using appropriate scientific language, conventions and representations.

Students apply models, theories and laws to explain phenomena and situations involving energy, force and motion. They explain the concept of energy conservation, by describing energy transfers and transformations within systems. Students describe changing ideas about the structure of the Earth, origins of the universe and the diversity of life on the Earth to illustrate how models, theories and laws are refined over time by the scientific community as new evidence becomes available. They describe situations where advances in scientific understanding may depend on developments in technology, and that technological advances are frequently linked to scientific discoveries.

Students explain how scientific understanding has contributed to knowledge about global patterns of geological activity and interactions between global systems. They analyse interactions between components and processes within biological systems and their responses to external changes. They use scientific evidence to assess whether claims, explanations and predictions are supported and can be used to evaluate predictions and inform decisions related to contemporary issues.

Students explain the organisation of the periodic table, chemical reactions and natural radioactivity in terms of atoms. They describe how different factors influence the rate of chemical reactions and the importance of a range of types of chemical reactions in the production of substances. By the end of Stage 5 students describe how the values and needs of contemporary society can influence the focus of scientific research and technological development in a variety of areas, including efficiency of use of electricity and non-renewable energy sources, the development of new materials, biotechnology, and plant, animal and human health. They outline examples of where the applications of the advances of science, emerging sciences and technologies significantly affect people's lives, including generating new career opportunities.