


The Australian Curriculum

Subjects	Science
Year levels	Year 10

Year 10 Content Descriptions

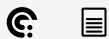
Science Understanding

Biological sciences

Transmission of heritable characteristics from one generation to the next involves DNA and genes
([ACSSU184 - Scootle](#) )

Elaborations

describing the role of DNA as the blueprint for controlling the characteristics of organisms



using models and diagrams to represent the relationship between DNA, genes and chromosomes



recognising that genetic information passed on to offspring is from both parents by meiosis and fertilisation



representing patterns of inheritance of a simple dominant/recessive characteristic through generations of a family




predicting simple ratios of offspring genotypes and phenotypes in crosses involving dominant/recessive gene pairs or in genes that are sex-linked



describing mutations as changes in DNA or chromosomes and outlining the factors that contribute to causing mutations



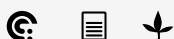
The theory of evolution by natural selection explains the diversity of living things and is supported by a range of scientific evidence ([ACSSU185 - Scootle](#) )

Elaborations

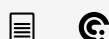
outlining processes involved in natural selection including variation, isolation and selection



describing biodiversity as a function of evolution



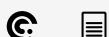
investigating changes caused by natural selection in a particular population as a result of a specified selection pressure such as artificial selection in breeding for desired characteristics



relating genetic characteristics to survival and reproductive rates



evaluating and interpreting evidence for evolution, including the fossil record, chemical and anatomical similarities, and geographical distribution of species



Chemical sciences

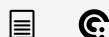
The atomic structure and properties of elements are used to organise them in the Periodic [Table](#) (ACSSU186 - Scootle [↗](#))

Elaborations

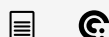
recognising that elements in the same group of the periodic table have similar properties



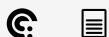
describing the structure of atoms in terms of electron shells



explaining how the electronic structure of an atom determines its position in the periodic table and its properties



investigating the chemical activity of metals

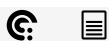


Different types of chemical reactions are used to produce a range of products and can occur at different rates (ACSSU187 - Scootle [↗](#))

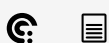


Elaborations

investigating how chemistry can be used to produce a range of useful substances such as fuels, metals and pharmaceuticals



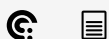
predicting the products of different types of simple chemical reactions




using word or symbol equations to represent chemical reactions



investigating the effect of a range of factors, such as temperature and catalysts, on the rate of chemical reactions

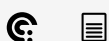


Earth and space sciences

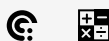
The universe contains features including galaxies, stars and solar systems, and the Big Bang theory can be used to explain the origin of the universe ([ACSSU188 - Scootle](#) )

Elaborations

identifying the evidence supporting the Big Bang theory, such as Edwin Hubble's observations and the detection of microwave radiation




recognising that the age of the universe can be derived using knowledge of the Big Bang theory



describing how the evolution of the universe, including the formation of galaxies and stars, has continued since the Big Bang



Global systems, including the carbon cycle, rely on interactions involving the biosphere, lithosphere, hydrosphere and atmosphere ([ACSSU189 - Scootle](#) )

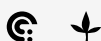


Elaborations

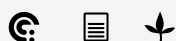
investigating how human activity affects global systems



modelling a cycle, such as the water, carbon, nitrogen or phosphorus cycle within the biosphere



explaining the causes and effects of the greenhouse effect



investigating the effect of climate change on sea levels and biodiversity



considering the long-term effects of loss of biodiversity




investigating currently occurring changes to permafrost and sea ice and the impacts of these changes



examining the factors that drive the deep ocean currents, their role in regulating global climate, and their effects on marine life



Physical sciences

Energy conservation in a [system](#) can be explained by describing energy transfers and transformations ([ACSSU190 - Scootle](#) )

Elaborations

recognising that the Law of Conservation of Energy explains that total energy is maintained in energy transfer and transformation



recognising that in energy transfer and transformation, a variety of processes can occur, so that the usable energy is reduced and the system is not 100% efficient




comparing energy changes in interactions such as car crashes, pendulums, lifting and dropping



using models to describe how energy is transferred and transformed within systems



The motion of objects can be described and predicted using the laws of physics ([ACSSU229 - Scootle](#) )

Elaborations

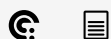
gathering data to analyse everyday motions produced by forces, such as measurements of distance and time, speed, force, mass and acceleration



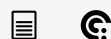
recognising that a stationary object, or a moving object with constant motion, has balanced forces acting on it



using Newton's Second Law to predict how a force affects the movement of an object




recognising and applying Newton's Third Law to describe the effect of interactions between two objects



Science as a Human Endeavour

Nature and development of science

Scientific understanding, including models and theories, is contestable and is refined over time through a process of review by the scientific community ([ACSHE191 - Scootle](#) )

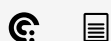


Elaborations

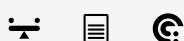
considering the role of different sources of evidence including biochemical, anatomical and fossil evidence for evolution by natural selection



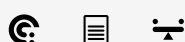
investigating the development of the Watson and Crick double helix model for the structure of DNA



investigating the history and impact of developments in genetic knowledge



investigating the development of the periodic table and how this was dependent on experimental evidence at the time




considering the role of science in identifying and explaining the causes of climate change



recognising that Australian scientists such as Brian Schmidt and Penny Sackett are involved in the exploration and study of the universe



Advances in scientific understanding often rely on technological advances and are often linked to scientific discoveries ([ACSHE192 - Scootle](#) )

Elaborations

recognising that the development of fast computers has made possible the analysis of DNA sequencing, radio astronomy signals and other data



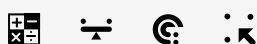
considering how computer modelling has improved knowledge and predictability of phenomena such as climate change and atmospheric pollution




researching examples of major international scientific projects, for example the Large Hadron Collider and the International Space Station



considering how information technology can be applied to different areas of science such as bioinformatics and the Square Kilometre Array



Use and influence of science

People use scientific knowledge to **evaluate** whether they accept claims, explanations or predictions, and advances in science can affect people's lives, including generating new career opportunities ([ACSHE194 - Scootle](#) )

Elaborations

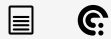
predicting future applications of aspects of nanotechnology on people's lives



describing how science is used in the media to explain a natural event or justify people's actions



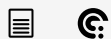
recognising that the study of the universe and the exploration of space involve teams of specialists from the different branches of science, engineering and technology



using knowledge of science to test claims made in advertising



considering how the computing requirements in many areas of modern science depend on people working in the area of information technology



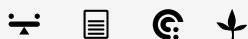
considering the scientific knowledge used in discussions relating to climate change



investigating the applications of gene technologies such as gene therapy and genetic engineering



evaluating claims relating to environmental footprints



recognising that scientific developments in areas such as sustainable transport and low-emissions electrical generation require people working in a range of fields of science, engineering and technology

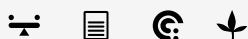


Values and needs of contemporary society can influence the focus of scientific [research \(ACSHE230 - Scootle !\[\]\(4146d17f71dced09c6ad789cacceaa6d_img.jpg\)](#))



Elaborations

investigating technologies associated with the reduction of carbon pollution, such as carbon capture



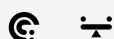
considering innovative energy transfer devices, including those used in transport and communication



investigating the use and control of CFCs based on scientific studies of atmospheric ozone



recognising that financial backing from governments or commercial organisations is required for scientific developments and that this can determine what research is carried out




considering the use of genetic testing for decisions such as genetic counselling, embryo selection, identification of carriers of genetic mutations and the use of this information for personal use or by organisation such as insurance companies or medical facilities



Science Inquiry Skills

Questioning and predicting

Formulate questions or hypotheses that can be investigated scientifically ([AC SIS198 - Scootle](#) )

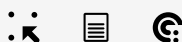


Elaborations

developing hypotheses based on well-developed models and theories



using internet research to identify problems that can be investigated



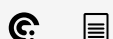
formulating questions that can be investigated within the scope of the classroom or field with available resources



developing ideas from students own or others' investigations and experiences to investigate further




evaluating information from secondary sources as part of the research process



Planning and conducting

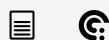
Plan, select and use appropriate [investigation](#) types, including field work and laboratory

experimentation, to collect reliable [data](#); assess risk and address ethical issues associated with these methods ([AC SIS199 - Scootle](#) )



Elaborations

combining research using primary and secondary sources with a student's own experimental investigation



using modelling and simulations, including using digital technology, to investigate situations and events



deciding how much data are needed to produce reliable measurements



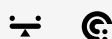
considering possible confounding variables or effects and ensuring these are controlled




identifying the potential hazards of chemicals or biological materials used in experimental investigations



identifying safety risks and impacts on animal welfare and ensuring these are effectively managed within the investigation



Select and use appropriate equipment, including [digital technologies](#), to collect and record [data](#) systematically and accurately ([AC SIS200 - Scootle](#) )

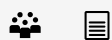


Elaborations

selecting and using probes and data loggers to record information



applying specific skills for the use of scientific instruments



identifying where human error can influence the reliability of data



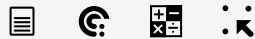
Processing and analysing data and information

Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies ([AC SIS203 - Scootle](#) )



Elaborations

using spreadsheets to present data in tables and graphical forms and to carry out mathematical analyses on data




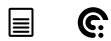
describing sample properties (such as mean, median, range, large gaps visible on a graph) to predict characteristics of the larger population, acknowledging uncertainties and the effects of outliers



exploring relationships between variables using spreadsheets, databases, tables, charts, graphs and statistics



Use knowledge of scientific concepts to draw conclusions that are consistent with evidence ([AC SIS204 - Scootle](#) )



Elaborations


using primary or secondary scientific evidence to support or refute a conclusion



constructing a scientific argument showing how their evidence supports their claim



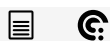
Evaluating

Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data ([AC SIS205 - Scootle](#) )



Elaborations

evaluating the strength of a conclusion that can be inferred from a particular data set



distinguishing between random and systematic errors and how these can affect investigation results



identifying alternative explanations that are also consistent with the evidence

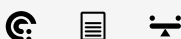


Critically **analyse** the **validity** of information in primary and secondary sources, and **evaluate** the approaches used to solve problems ([AC SIS206 - Scootle](#)



Elaborations

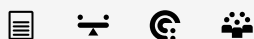
researching the methods used by scientists in studies reported in the media



judging the validity of science-related media reports and how these reports might be interpreted by the public



describing how scientific arguments, as well as ethical, economic and social arguments, are used to make decisions regarding personal and community issues



Communicating

Communicate scientific ideas and information for a particular purpose, including constructing **evidence-based** arguments and using appropriate **scientific language**, conventions and representations ([AC SIS208 - Scootle](#)



Elaborations

using the internet to facilitate collaboration in joint projects and discussions



constructing evidence based arguments and engaging in debate about scientific ideas



presenting results and ideas using formal experimental reports, oral presentations, slide shows, poster presentations and contributing to group discussions



using a range of representations, including mathematical and symbolic forms, to communicate science ideas

