**AUSVELS : Australian SCIENCE Curriculum, F-10:**

There are **three strands** which are to be taught in an integrated way. The order & detail in which content descriptions are organized in to learning programs are decisions to be made by the teacher.

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| **Science Understanding** – content described by year level | **Science as Human Endeavour** – content described in 2 year bands – the main points are the same, with variations in the elaborating examples | **Science Inquiry Skills** – content described in 2 year bands– this is basically the same as for year 7 |
| **Sub strands:**Biological sciencesChemical sciencesEarth and Space sciencesPhysical sciences | **Sub strands:**Nature and development of scienceUse and influence of science | **Sub strands:**Questioning and predictingPlanning and conductingProcessing and analysing data and informationEvaluatingCommunicating |

**Year/Level 8 SCIENCE Students:**

* Are introduced to cells as microscopic structures that explain macroscopic properties of living systems.
* Link form & function at a cellular level & explore the organization of body systems in terms of flows of matter between interdependent organs.
* Explore changes in matter at a particle level, & distinguish between chemical & physical change.
* Begin to classify different forms of energy, & describe the role of energy in causing change in systems, including the role of heat & kinetic energy in the rock cycle.
* Use experimentation to isolate relationships between components in systems & explain these relationships through increasingly complex representations.
* Make predictions & propose explanations, drawing on evidence to support their views.

\*This document intends to assist teachers in their implementation of the Australian curriculum through AUSVELS– it combines description and elaboration statements. Teachers are advised to consult the online documentation to clarify further detail for themselves. The ‘AusVELS’ is the official documentation for Victorian schools.

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| **Science understanding:** | **Science as Human Endeavour:** | **Science Inquiry Skills:** |
| **Biological sciences:**Cells are the basic units of living things and have specialised structures and functions (ACSSU149)* examining a variety of cells using a light microscope, by digital technology or by viewing a simulation
* distinguishing plant cells from animal or fungal cells l identifying structures within cells and describing their function
* recognising that some organisms consist of a single cell
* recognising that cells reproduce via cell division l describing mitosis as cell division for growth and repair

Multi­cellular organisms contain systems of organs that carry out specialised functions that enable them to survive and reproduce (ACSSU150)* identifying the organs and overall function of a system of a multicellular organism in supporting the life processes
* describing the structure of each organ in a system and relating its function to the overall function of the system
* examining the specialised cells and tissues involved in structure and function of particular organs
* comparing similar systems in different organisms such as digestive systems in herbivores and carnivores, respiratory systems in fish and mammals
* distinguishing between asexual and sexual reproduction l comparing reproductive systems of organisms

**Chemical sciences:**The properties of the different states of matter can be explained in terms of the motion and arrangement of particles (ACSSU151)* explaining why a model for the structure of matter is needed
* modelling the arrangement of particles in solids, liquids and

gases* using the particle model to explain observed phenomena linking the energy of particles to temperature changes

Differences between elements, compounds and mixtures can be described at a particle level (ACSSU152)* modelling the arrangement of particles in elements and compounds
* recognising that elements and simple compounds can be represented by symbols and formulas
* locating elements on the periodic table

Chemical change involves substances reacting to form new substances (ACSSU225)* identifying the differences between chemical and physical changes
* identifying evidence that a chemical change has taken place
* investigating simple reactions such as combining elements

 to make a compound* recognising that the chemical properties of a substance, for example its flammability and ability to corrode, will affect its use

**Earth and space sciences:**Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales (ACSSU153)* representing the stages in the formation of igneous, metamorphic and sedimentary rocks, including indications of timescales involved
* identifying a range of common rock types using a key based on observable physical and chemical properties
* recognising that rocks are a collection of different minerals l considering the role of forces and energy in the formation of

 different types of rocks and minerals* recognising that some rocks and minerals, such as ores, provide valuable resources

**Physical sciences:**Energy appears in different forms including movement (kinetic energy), heat and potential energy, and causes change within systems (ACSSU155)* recognising that kinetic energy is the energy possessed by moving bodies
* recognising that potential energy is stored energy, such as gravitational, chemical and elastic energy
* investigating different forms of energy in terms of the effects they cause, such as gravitational potential causing objects to fall and heat energy transferred between materials that have a different temperature
* recognising that heat energy is often produced as a by­ product of energy transfer, such as brakes on a car and light globes
* using flow diagrams to illustrate changes between different forms of energy
 | **Nature & development of Science:**Scientific knowledge changes as new evidence becomes available, and some scientific discoveries have significantly changed people’s understanding of the world (ACSHE134)* investigating developments in the understanding of cells and how this knowledge has impacted on areas such as health and medicine
* discovering how people’s understanding of the nature of matter has changed over time as evidence for particle theory has become available through developments in technology
* considering how the idea of elements has developed over time as knowledge of the nature of matter has improved
* investigating the development of the microscope and the impact it has had on the understanding of cell functions and division

Science knowledge can develop through collaboration and connecting ideas across the disciplines of science (ACSHE226)* investigating how knowledge of the location and extraction of mineral resources relies on expertise from across the disciplines of science
* considering how advances in technology, combined with scientific understanding of the functioning of body systems, has enabled medical science to replace or repair organs
* researching the use of reproductive technologies and how developments in this field rely on scientific knowledge from different areas of science

**Use & influence of science:**Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations (ACSHE135)* investigating requirements and the design of systems for collecting and recycling household waste
* investigating strategies implemented to maintain part of the local environment, such as bushland, a beach, a lake, a desert or a shoreline
* investigating how energy efficiency can reduce energy consumption
* investigating the development of vehicles over time, including the application of science to contemporary designs of solar­powered vehicles
* discussing ethical issues that arise from organ transplantation

Science understandings influence the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management (ACSHE136) **ã** * describing how technologies have been applied to modern farming techniques to improve yields and sustainability
* investigating how Aboriginal people recognise relationships in ecosystems by burning to promote new growth, attract animals and afford easier hunting and food gathering
* describing the impact of plant cloning techniques (asexual production) in agriculture such as horticulture, fruit production and vineyards
* investigating the role of science in the development of technology important to the economies and communities of the Asia–Pacific regions, for example car manufacture, earthquake prediction and electronic optics

People use understanding and skills from across the disciplines of science in their occupations (ACSHE227)* recognising the role of knowledge of the environment and ecosystems in a number of occupations
* considering how engineers improve energy efficiency of a range of processes
* recognising the role of knowledge of cells and cell divisions in the area of disease treatment and control
* investigating how scientists have created new materials such as synthetic fibres, heat­resistant plastics and pharmaceuticals
 | **Questioning & predicting:**Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge (ACSIS139)* considering whether investigation using available resources is possible when identifying questions or problems to investigate
* recognising that the solution of some questions and problems requires consideration of social, cultural, economic or moral aspects rather than or as well as scientific investigation
* using information and knowledge from their own investigations and secondary sources to predict the expected results from an investigation

**Planning & conducting:**Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed (ACSIS140)* working collaboratively to decide how to best approach an investigation
* identifying any ethical considerations that may apply to the investigation
* taking into consideration all aspects of fair testing, available equipment and safe investigation when planning investigations

In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task (ACSIS141)* using specialised equipment to increase the accuracy of measurement within an investigation
* identifying and explaining the differences between controlled, dependent and independent variables

**Processing & analyzing data & information:**Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate (ACSIS144)* describing measures of central tendency and identifying outliers for quantitative data
* explaining the strengths and limitations of representations such as physical models, diagrams and simulations in terms of the attributes of systems included or not included

Summarise data, from students’ own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions (ACSIS145)* constructing tables, graphs, keys and models to represent relationships and trends in collected data
* drawing conclusions based on a range of evidence including primary and secondary sources

**Evaluating:**Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method (ACSIS146)* suggesting improvements to investigation methods that would improve the accuracy of the data recorded
* discussing investigation methods with others to share ideas about the quality of the inquiry process

Use scientific knowledge and findings from investigations to evaluate claims (ACSIS234)* identifying the scientific evidence available to evaluate claims
* deciding whether or not to accept claims based on scientific evidence
* identifying where science has been used to make claims relating to products and practices

**Communicating:**Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate (ACSIS148)* using digital technologies to construct a range of text types to present science ideas
* Selecting and using appropriate language and representations to communcate science ideas within a specified text type and for a specified audience
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| **Level 8 Achievement Standard:**By the end of Level 8, students compare physical and chemical changes and use the particle model to explain and predict the properties and behaviours of substances. They identify different forms of energy and describe how energy transfers and transformations cause change in simple systems. They compare processes of rock formation, including the time scales involved. They analyse the relationship between structure and function at cell, organ and body system levels. Students examine the different science knowledge used in occupations. They explain how evidence has led to an improved understanding of a scientific idea and describe situations in which scientists collaborated to generate solutions to contemporary problems. Students identify and construct questions and problems that they can investigate scientifically. They consider safety and ethics when planning investigations, including designing field or experimental methods. They identify variables to be changed, measured and controlled. Students construct representations of their data to reveal and analyse patterns and trends, and use these when justifying their conclusions. They explain how modifications to methods could improve the quality of their data and apply their own scientific knowledge and investigation findings to evaluate claims made by others. They use appropriate language and representations to communicate science ideas, methods and findings in a range of text types. |

Cross-curriculum priorities to be included in all learning areas: Aboriginal and Torres Strait Islander histories and cultures (); Asia and Australia’s engagement with Australia (ã ); Sustainability ()

Reference : <http://ausvels.vcaa.vic.edu.au/> This grid is an adaption of the information from the VCAA site to create a visual representation to assist teachers.