AusVELS: ScienceAC - Science as a Human Endeavour - Strands with Sub-strands with Elaborations

Based on Australian Curriculum, Assessment and Reporting Authority (ACARA) materials

Cross-Curriculum Priorities		
Aboriginal and Torres Strait Islander histories and cultures (Cross curriculum priorities in the Australian Curriculum)	Asia and Australia's engagement with Asia (Cross curriculum priorities in the Australian Curriculum)	Sustainability Cross curriculum priorities in the Australian Curriculum)

The Overarching Ideas

There are a number of overarching ideas that represent key aspects of a scientific view of the world and bridge knowledge and understanding across the disciplines of science.

In the Australian Curriculum: Science, six overarching ideas support the coherence and developmental sequence of science knowledge within and across levels. The overarching ideas frame the development of concepts in the Science Understanding strand, support key aspects of the Science Inquiry Skills strand and contribute to developing students' appreciation of the nature of science.

The six overarching ideas that frame the Australian Curriculum: Science are:

Patterns, Order and Organisation **Form and Function** **Stability and Change** **Scale and Measurement** **Matter and Energy** **Systems**

POTENTIAL STUDY UNITS				
THE SENSES	SOLIDS, LIQUIDS, GASES	MINI-BEASTS & HABITATS (Built & Natural)	NATURAL DISASTERS	MATHS & ANGLES
WEATHER / THE ENVIRONMENT	SUSTAINABILITY	SPACE	FORCES	ELECTRICITY / HEAT / ENERGY / LIGHT
		HUMAN BODY		

The Science Inquiry Skills and Science as a Human Endeavour strands are described across a two-level band. In their planning, schools and teachers refer to the expectations outlined in the Achievement Standard and also to the content of the Science Understanding strand for the relevant level to ensure that these two strands are addressed over the two-level period. The three strands of the curriculum are interrelated and their content is taught in an integrated way. The order and detail in which the content descriptions are organised into teaching/learning programs are decisions to be made by the teacher.

	SUB-STRANDS			
Year Level Indicators	**Nature and Development of Science**		**Use and Influence of Science**	
	Content Descriptor	**Elaborations**	**Content Descriptor**	**Elaborations**
Foundation	Science involves exploring and observing the world using the senses (ACSHE013)	* Recognising that observation is an important part of exploring and investigating the things and places around us * Sharing observations with others and communicating their experiences * Exploring and observing using hearing, smell, touch, seeing and taste	N/A	N/A
Foundation Achievement Standard NOTE: The Standards are not divided into Strands or Sub-strands.	By the end of the Foundation level, students describe the properties and behaviour of familiar objects. They suggest how the environment affects them and other living things. Students share and record observations of familiar objects and events.			

Year Level Indicators	Nature and Development of Science		Use and Influence of Science	
	Content Descriptor	**Elaborations**	**Content Descriptor**	**Elaborations**
Level 1	Science involves **asking questions about, and describing changes in, objects and events** (ACSHE021)	* Jointly constructing questions about the events and features of the local environment with teacher guidance * Recognising that descriptions of what we observe are used by people to help identify change	**People use science in their daily lives, including when caring for their environment and living things** (ACSHE022)	* Considering how science is used in activities such as cooking, fishing, transport, sport, medicine and caring for plants and animals * Considering that technologies used by Aboriginal and Torres Strait Islander people require an understanding of how materials can be used to make tools and weapons, musical instruments, clothing, cosmetics and artworks * Exploring how musical instruments can be used to produce different sounds * Comparing how different light sources are used in daily life * Identifying ways that science knowledge is used in the care of the local environment such as animal habitats, and suggesting changes to parks and gardens to better meet the needs of native animals
Level 1 Achievement Standard NOTE: The Standards are not divided into Strands or Sub-strands.	At Level 1, the student is working towards the Level 2 standard.			
Level 2 Achievement Standard	Science involves asking questions about, and describing changes in, objects and events (ACSHE034)	* Describing everyday events and experiences and changes in our environment using knowledge of science * Suggesting how everyday items work, using knowledge of forces or materials * Identifying and describing sources of water	People use science in their daily lives, including when caring for their environment and living things (ACSHE035)	* Monitoring information about the environment and Earth's resources, such as rainfall, water levels and temperature * Finding out about how Aboriginal and Torres Strait Islander people use science to meet their needs, including food supply * Exploring how different cultures have made inks, pigments and paints by mixing materials * Identifying the ways humans manage and protect resources, such as reducing waste and caring for water supplies * Recognising that many living things rely on resources that may be threatened, and that science understanding can contribute to the preservation of such resources
Level 2 Achievement Standard NOTE: The Standards are not divided into Strands or Sub-strands.	Students describe the effects of interacting with materials and objects. They identify and describe a range of habitats and the different uses of materials and resources. They describe changes to objects, materials, living things and things in their local environment. They describe examples of how people use science in their daily lives. Students pose questions about everyday phenomena and predict outcomes of investigations. They use informal measurements to make and compare observations. They follow instructions to record, sort and represent their observations and communicate their ideas to others.			
Level 3	Science involves **making predictions and describing patterns and relationships** (ACSHE050)	* Making predictions about change and events in our environment * Researching how knowledge of astronomy has been used by some Aboriginal and Torres Strait Islander people * Considering how posing questions helps us plan for the future	Science knowledge helps **people to understand the effect of their actions** (ACSHE051)	* Considering how heating affects materials used in everyday life * Investigating how science helps people such as nurses, doctors, dentists, mechanics and gardeners * Considering how materials including solids and liquids affect the environment in different ways * Deciding what characteristics make a material a pollutant * Researching Aboriginal and Torres Strait Islander people's knowledge of the local natural environment, such as the characteristics of plants and animals
Level 3 Achievement Standard NOTE: The Standards are not divided into Strands or Sub-strands.	At Level 3, the student is working towards the Level 4 standard.			
Level 4	Science involves making predictions and describing patterns and relationships (ACSHE061)	* Exploring ways in which scientists gather evidence for their ideas and develop explanations * Considering how scientific practices such as sorting, classification and estimation are used by Aboriginal and Torres Strait Islander people in everyday life	Science knowledge helps people to understand the effect of their actions (ACSHE062)	* Investigating how a range of people, such as clothing designers, builders or engineers use science to select appropriate materials for their work * Considering methods of waste management and how they can affect the environment * Exploring how science has contributed to a discussion about an issue such as loss of habitat for living things or how human activity has changed the local environment * Considering how to minimise the effects of erosion caused by human activity
Level 4 Achievement Standard NOTE: The Standards are not divided into Strands or Sub-strands.	Students explain the effects of Earth's rotation on its axis. They distinguish between temperature and heat and use examples to illustrate how heat is produced and transferred. They explain how heat is involved in changes of state between solid and liquid. They link the observable properties of materials to their use. They discuss how natural and human processes cause changes to Earth's surface. They use contact and non-contact forces to describe interactions between objects. They describe structural features common to living things and describe relationships that assist the survival of living things. They explain how the key stages in the life cycle of a plant or animal relate to growth and species survival. They describe how they use science investigations to identify patterns and respond to questions. They describe situations where science understanding can influence their own and others' actions. Students follow instructions to identify questions that they can investigate about familiar contexts and predict likely outcomes from these investigations. They discuss ways to conduct investigations and suggest why their methods were fair or not. They safely use equipment to make and record formal measurements and observations. They use provided tables and simple column graphs to organise and identify patterns in data. Students suggest explanations for observations and compare their findings with their predictions. They use diagrams and complete simple reports to communicate their methods and findings.			

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	ELECTRICITY / HEAT / ENERGY / LIGHT	SUSTAINABILITY	SPACE	FORCES

	SUB-STRANDS			
Year Level Indicators	**Nature and Development of Science**		**Use and Influence of Science**	
	Content Descriptor	**Elaborations**	**Content Descriptor**	**Elaborations**
Level 5	Science involves **testing** predictions **by gathering data and using evidence to develop explanations of events and phenomena** (ACSHE081)	* Developing an understanding of the behaviour of light by making observations of its effects * Testing predictions relating to the behaviour of solids, liquids and gases by conducting observational experiments * Researching how scientists were able to develop ideas about the solar system through the gathering of evidence through space exploration	Scientific understandings, **discoveries and inventions are used to solve problems that directly affect peoples' lives** (ACSHE083)	* Investigating how the development of materials such as plastics and synthetic fabrics have led to the production of useful products * Describing how technologies developed to aid space exploration have changed the way people live, work and communicate * Exploring objects and devices that include parts that involve the reflection, absorption or refraction of light such as mirrors, sunglasses and prisms
	Important contributions to the advancement of science have been made by people from a range of cultures (ACSHE082)	* Describing how scientists from a range of cultures have improved our understanding of the solar system, such as Copernicus, Khayyám and Galileo * Researching the different types of scientists who work in teams in space exploration, and Australia's involvement in space exploration * Learning how Aboriginal and Torres Strait Islander people used observation of the night sky to assist with navigation	Scientific knowledge is used to **inform personal and community decisions** (ACSHE217)	* Considering how best to ensure growth of plants * Considering how decisions are made to grow particular plants and crops depending on environmental conditions * Comparing the benefits of using solid, liquid or gaseous fuels to heat a home * Describing the safety aspects of using gases
Level 5 Achievement Standard NOTE: The Standards are not divided into Strands or Sub-strands.	At Level 5, the student is working towards the Level 6 standard.			
Level 6	Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena (ACSHE098)	* Investigating how knowledge about the effects of using the Earth's resources has changed over time * Describing how understanding of the causes and effects of major natural events has changed as new evidence has become available * Investigating the use of electricity, including predicting the effects of changes to electric circuits * Considering how gathering evidence helps scientists to predict the effect of major geological or climatic events	Scientific understandings, discoveries and inventions are used to solve problems that directly affect peoples' lives (ACSHE100)	* Researching the scientific work involved in global disaster alerts and communication, such as cyclone, earthquake and tsunami alerts * Investigating how electrical energy is generated in Australia and around the world * Researching the use of methane generators in Indonesia * Considering how electricity and electrical appliances have changed the way some people live
	Important contributions to the advancement of science have been made by people from a range of cultures (ACSHE099)	* Investigating how people from different cultures have used sustainable sources of energy, for example water and solar power * Exploring institutions and locations where contemporary Australian scientists conduct research on catastrophic natural events * Learning how Aboriginal and Torres Strait Islander knowledge, such as the medicinal and nutritional properties of Australian plants, is being used as part of the evidence base for scientific advances * Investigating the development of earthquake measurements from the Chinese invention of the seismograph in the second century	Scientific knowledge is used to inform personal and community decisions (ACSHE220)	* Considering how personal and community choices influence our use of sustainable sources of energy * Investigating how understanding of catastrophic natural events helps in planning for their early detection and minimising their impact * Recognising that science can inform choices about where people live and how they manage natural disasters * Considering how guidelines help to ensure the safe use of electrical devices * Discussing the use of electricity and the conservation of sources of energy
Level 6 Achievement Standard NOTE: The Standards are not divided into Strands or Sub-strands.	Students compare the properties and behaviours of solids, liquids and gases. They compare observable changes to materials and classify these changes as reversible or irreversible. They explain everyday phenomena associated with the absorption, reflection, refraction and dispersion of light. They compare different ways in which energy can be transformed from one form to another to generate electricity and evaluate their suitability for particular purposes. They construct electrical circuits and distinguish between open and closed circuits. They explain how natural events cause rapid change to Earth's surface and describe the key features of our solar system. They analyse how structural and behavioural adaptations of living things enhance their survival, and predict and describe the effect of environmental changes on individual living things. Students explain how scientific knowledge develops from many people's contributions and how scientific understandings, discoveries and inventions affect peoples' lives. Students follow procedures to develop questions that they can investigate and design investigations into simple cause and effect relationships. When planning experimental methods, they identify variables to be changed and measured in fair tests. They make predictions based on general rules or previous experiences. They identify and manage potential safety risks. They make and record accurate observations as tables, diagrams or descriptions. They organise data into tables and graphs to identify and analyse patterns and relationships. They suggest where improvements to their experimental methods or research could improve the quality of their data. They refer to data when they report findings and communicate their ideas, methods and findings using a range of text types.			

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	SUB-STRANDS			
Year Level Indicators	**Nature and Development of Science**		**Use and Influence of Science**	
	Content Descriptor	**Elaborations**	**Content Descriptor**	**Elaborations**
Level 7	Scientific knowledge **changes as new evidence becomes available, and some scientific discoveries have significantly changed people's understanding of the world** (ACSHE119)	* Investigating how advances in telescopes and space probes have provided new evidence about space * Researching different ideas used in the development of models of the solar system developed by scientists such as Copernicus, Khayyám and Galileo * Researching developments in the understanding of astronomy, such as the predictions of eclipses and the calculation of the length of the solar level by Al-Battani in the tenth century	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** (ACSHE120)	* Relating regulations about wearing seatbelts or safety helmets to knowledge of forces and motion * Considering issues relating to the use and management of water within a community * Considering decisions made in relation to the recycling of grey water and black water * Considering how human activity in the community can have positive and negative effects on the sustainability of ecosystems * Investigating ways to control the spread of the cane toad
	Science knowledge **can develop through collaboration and connecting ideas across the disciplines of science** (ACSHE223)	* Considering how water use and management relies on knowledge from different areas of science, and involves the application of technology * Identifying the contributions of Australian scientists to the study of human impact on environments and to local environmental management projects * Investigating how land management practices of Aboriginal and Torres Strait Islander peoples can help inform sustainable management of the environment * Studying transnational collaborative research in the Antarctic * Recognising that traditional and Western scientific knowledge can be used in combination to care for Country and Place	Science understanding **influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management** (ACSHE121)	* Investigating everyday applications of physical separation techniques such as filtering, sorting waste materials, reducing pollution, extracting products from plants, separating blood products and cleaning up oil spills * Investigating how advances in science and technology have been applied to the treatment of water in industrial and household systems * Investigating how Aboriginal and Torres Strait Islander knowledge is being used to inform scientific decisions, for example care of waterways * Researching the different scientific responses to the rabbit plagues in Australian agricultural areas
			People use understanding and skills from across the disciplines of science in their occupations (ACSHE224)	* Recognising that water management plays a role in areas such as farming, land management and gardening * Investigating how separation techniques are used in the food and wine industries * Considering how seasonal changes affect people in a variety of activities such as farming * Considering how sports scientists apply knowledge of forces in order to improve performance
Level 7 Achievement Standard NOTE: The Standards are not divided into Strands or Sub-strands.	At Level 7, the student is working towards the Level 8 standard.			