




AusVELS: Science_{AC} - Science Understanding - 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	SPACE	ELECTRICITY / HEAT / ENERGY / LIGHT	FORCES	WEATHER / THE ENVIRONMENT
			SUSTAINABILITY	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	Biological Sciences		Chemical Sciences		Earth & Space Sciences		Physical Sciences	
	Content Descriptor	Elaborations	Content Descriptor	Elaborations	Content Descriptor	Elaborations	Content Descriptor	Elaborations
Foundation	Living things have basic needs, including food and water (ACSSU002) 	<ul style="list-style-type: none"> * Identifying the needs of humans such as warmth, food and water, using students' own experiences * Recognising the needs of living things in a range of situations such as pets at home, plants in the garden or plants and animals in bushland * Comparing the needs of plants and animals 	Objects are made of materials that have observable properties (ACSSU003) 	<ul style="list-style-type: none"> * Sorting and grouping materials on the basis of observable properties such as colour, texture and flexibility * Thinking about how the materials used in buildings and shelters are suited to the local environment * Investigating different forms of clothing used for different activities * Comparing the traditional materials used for clothing from around the world 	Daily and seasonal changes in our environment, including the weather, affect everyday life (ACSSU004)   	<ul style="list-style-type: none"> * Linking the changes in the daily weather to the way we modify our behaviour and dress for different conditions, including examples from different cultures * Investigating how changes in the weather might affect animals such as pets, animals that hibernate, or migratory animals * Learning how Aboriginal and Torres Strait Islander concepts of time and weather patterns explain how things happen in the world around them 	The way objects move depends on a variety of factors, including their size and shape (ACSSU005)	<ul style="list-style-type: none"> * Observing the way different shaped objects such as balls, blocks and tubes move * Comparing the way different sized, but similar shaped, objects such as tennis balls, golf balls, marbles and basketballs roll and bounce * Observing how the movement of different living things depends on their size and shape
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.							

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SUB-STRANDS								
Year Level Indicators	Biological Sciences		Chemical Sciences		Earth & Space Sciences		Physical Sciences	
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Level 1	Living things have a variety of external features (ACSSU017)	<ul style="list-style-type: none"> * Recognising common features of animals such as head, legs and wings * Describing the use of animal body parts for particular purposes such as moving and feeding * Identifying common features of plants such as leaves and roots * Describing the use of plant parts for particular purposes such as making food and obtaining water 	Everyday materials can be physically changed in a variety of ways (ACSSU018)	<ul style="list-style-type: none"> * Predicting and comparing how the shapes of objects made from different materials can be physically changed through actions such as bending, stretching and twisting * Exploring how materials such as water, chocolate or play dough change when warmed or cooled 	Observable changes occur in the sky and landscape (ACSSU019)	<ul style="list-style-type: none"> * Exploring the local environment to identify and describe natural, managed and constructed features * Recording short and longer term patterns of events that occur on Earth and in the sky, such as the appearance of the moon and stars at night, the weather and the seasons 	Light and sound are produced by a range of sources and can be sensed (ACSSU020)	<ul style="list-style-type: none"> * Recognising senses are used to learn about the world around us: our eyes to detect light, our ears to detect sound, and touch to feel vibrations * Identifying the sun as a source of light * Recognising that objects can be seen when light from sources is available to illuminate them * Exploring different ways to produce sound using familiar objects and actions such as striking, blowing, scraping and shaking * Comparing sounds made by musical instruments using characteristics such as loudness, pitch and actions used to make the sound
	Living things live in different places where their needs are met (ACSSU211)	<ul style="list-style-type: none"> * Exploring different habitats in the local environment such as the beach, bush and backyard * Recognising that different living things live in different places such as land and water * Exploring what happens when habitats change and some living things can no longer have their needs met 						
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	Living things grow, change and have offspring similar to themselves (ACSSU030)	<ul style="list-style-type: none"> * Representing personal growth and changes from birth * Recognising that living things have predictable characteristics at different stages of development * Exploring different characteristics of life stages in animals such as egg, caterpillar and butterfly * Observing that all animals have offspring, usually with two parents 	Different materials can be combined, including by mixing, for a particular purpose (ACSSU031)	<ul style="list-style-type: none"> * Exploring the local environment to observe a variety of materials, and describing ways in which materials are used * Investigating the effects of mixing materials together * Suggesting why different parts of everyday objects such as toys and clothes are made from different materials * Identifying materials such as paper that can be changed and remade or recycled into new products 	Earth's resources, including water, are used in a variety of ways (ACSSU032)	<ul style="list-style-type: none"> * Identifying the Earth's resources including water, soil and minerals, and describing how they are used in the school * Describing how a resource such as water is transferred from its source to its point of use * Considering what might happen to humans if there were a change in a familiar available resource, such as water * Identifying actions at school such as turning off dripping taps, that can conserve resources 	A push or a pull affects how an object moves or changes shape (ACSSU033)	<ul style="list-style-type: none"> * Exploring ways that objects move on land, through water and in the air * Exploring how different strengths of pushes and pulls affect the movement of objects * Identifying toys from different cultures that use the forces of push or pull * Considering the effects of objects being pulled towards the Earth
Level 2 Achievement Standard NOTE: The Standards are not divided into Strands or Sub-strands.	<p>Students describe the effects of interacting with materials and objects.</p> <p>They identify and describe a range of habitats and the different uses of materials and resources.</p> <p>They describe changes to objects, materials, living things and things in their local environment.</p> <p>They describe examples of how people use science in their daily lives.</p> <p>Students pose questions about everyday phenomena and predict outcomes of investigations.</p> <p>They use informal measurements to make and compare observations.</p> <p>They follow instructions to record, sort and represent their observations and communicate their ideas to others.</p>							





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Year Level Indicators	Biological Sciences		Chemical Sciences		Earth & Space Sciences		Physical Sciences	
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Level 3	Living things can be grouped on the basis of observable features and can be distinguished from non-living things (ACSSU044)	<ul style="list-style-type: none"> * Recognising characteristics of living things such as growing, moving, sensitivity and reproducing * Recognising the range of different living things * Sorting living and non-living things based on characteristics * Exploring differences between living, once living and products of living things 	A change of state between solid and liquid can be caused by adding or removing heat (ACSSU046)	<ul style="list-style-type: none"> * Investigating how liquids and solids respond to changes in temperature, for example water changing to ice, or melting chocolate * Exploring how changes from solid to liquid and liquid to solid can help us recycle materials * Predicting the effect of heat on different materials 	Earth's rotation on its axis causes regular changes, including night and day (ACSSU048)	<ul style="list-style-type: none"> * Recognising the sun as a source of light * Constructing sundials and investigating how they work * Describing timescales for the rotation of the Earth * Modelling the relative sizes and movement of the sun, Earth and moon 	Heat can be produced in many ways and can move from one object to another (ACSSU049)	<ul style="list-style-type: none"> * Describing how heat can be produced such as through friction or motion, electricity or chemically (burning) * Identifying changes that occur in everyday situations due to heating and cooling * Exploring how heat can be transferred through conduction * Recognising that we can feel heat and measure its effects using a thermometer
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	Living things have life cycles (ACSSU072)	<ul style="list-style-type: none"> * Making and recording observations of living things as they develop through their life cycles * Describing the stages of life cycles of different living things such as insects, birds, frogs and flowering plants * Comparing life cycles of animals and plants * Recognising that environmental factors can affect life cycles such as fire and seed germination 	Natural and processed materials have a range of physical properties; These properties can influence their use (ACSSU074)	<ul style="list-style-type: none"> * Describing a range of common materials, such as metals or plastics, and their uses * Investigating a particular property across a range of materials * Selecting materials for uses based on their properties * Considering how the properties of materials affect the management of waste or can lead to pollution 	Earth's surface changes over time as a result of natural processes and human activity (ACSSU1075)	<ul style="list-style-type: none"> * Collecting evidence of change from local landforms, rocks or fossils * Exploring a local area that has changed as a result of natural processes, such as an eroded gully, sand dunes or river banks * Investigating the characteristics of soils * Considering how different human activities cause erosion of the Earth's surface * Considering the effect of events such as floods and extreme weather on the landscape, both in Australia and in the Asia region 	Forces can be exerted by one object on another through direct contact or from a distance (ACSSU076)	<ul style="list-style-type: none"> * Observing qualitatively how speed is affected by the size of a force * Exploring how non-contact forces are similar to contact forces in terms of objects pushing and pulling another object * Comparing and contrasting the effect of friction on different surfaces, such as tyres and shoes on a range of surfaces * Investigating the effect of forces on the behaviour of an object through actions such as throwing, dropping, bouncing and rolling * Exploring the forces of attraction and repulsion between magnets
Level 4 Achievement Standard NOTE: The Standards are not divided into Strands or Sub-strands.	<p>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.</p> <p>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.</p>							

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SUB-STRANDS									
Year Level Indicators	Biological Sciences			Chemical Sciences		Earth & Space Sciences		Physical Sciences	
	Content Descriptor	Elaborations	Content Descriptor	Elaborations	Content Descriptor	Elaborations	Content Descriptor	Elaborations	
Level 5	Living things have structural features and adaptations that help them to survive in their environment (ACSSU043)	<ul style="list-style-type: none"> * Explaining how particular adaptations help survival such as nocturnal behaviour, silvery coloured leaves of dune plants * Describing and listing adaptations of living things suited for particular Australian environments * Exploring general adaptations for particular environments such as adaptations that aid water conservation in deserts 	Solids, liquids and gases have different observable properties and behave in different ways (ACSSU077)	<ul style="list-style-type: none"> * Recognising that substances exist in different states depending on the temperature * Observing that gases have mass and take up space, demonstrated by using balloons or bubbles * Exploring the way solids, liquids and gases change under different situations such as heating and cooling * Recognising that not all substances can be easily classified on the basis of their observable properties 	The Earth is part of a system of planets orbiting around a star (the sun) (ACSSU078)	<ul style="list-style-type: none"> * Identifying the planets of the solar system and comparing how long they take to orbit the sun * Modelling the relative size of and distance between Earth, other planets in the solar system and the sun * Recognising the role of the sun as a provider of energy for the Earth 	Light from a source forms shadows and can be absorbed, reflected and refracted (ACSSU080)	<ul style="list-style-type: none"> * Drawing simple labelled ray diagrams to show the paths of light from a source to our eyes * Comparing shadows from point and extended light sources such as torches and fluorescent tubes * Classifying materials as transparent, opaque or translucent based on whether light passes through them or is absorbed * Recognising that the colour of an object depends on the properties of the object and the colour of the light source * Exploring the use of mirrors to demonstrate the reflection of light * Recognising the refraction of light at the surfaces of different transparent materials, such as when light 	
Level 5 Achievement Standard	At Level 5, the student is working towards the Level 6 standard.								
NOTE: The Standards are not divided into Strands or Sub-strands.									
Level 6	The growth and survival of living things are affected by the physical conditions of their environment (ACSSU094)	<ul style="list-style-type: none"> * Investigating how changing the physical conditions for plants impacts on their growth and survival such as salt water, use of fertilizers and soil types * Observing the growth of fungi such as yeast and bread mould in different conditions * Researching organisms that live in extreme environments such as Antarctica or a desert * Considering the effects of physical conditions causing migration and hibernation 	Changes to materials can be reversible, such as melting, freezing, evaporating; or irreversible, such as burning and rusting (ACSSU095)	<ul style="list-style-type: none"> * Describing what happens when materials are mixed * Investigating the solubility of common materials in water * Investigating the change in state caused by heating and cooling of a familiar substance * Investigating irreversible changes such as rusting, burning and cooking * Exploring how reversible changes can be used to recycle materials 	Sudden geological changes or extreme weather conditions can affect Earth's surface (ACSSU096)	<ul style="list-style-type: none"> * Investigating major geological events such as earthquakes, volcanic eruptions and tsunamis in Australia, the Asia region and throughout the world * Recognising that earthquakes can cause tsunamis * Describing how people measure significant geological events * Exploring ways that scientific understanding can assist in natural disaster management to minimise both long and short term effects * Considering the effect of drought on living and non-living aspects of the environment 	Electrical circuits provide a means of transferring and transforming electricity (ACSSU097)	<ul style="list-style-type: none"> * Recognising the need for a complete circuit to allow the flow of electricity * Investigating different electrical conductors and insulators * Exploring the features of electrical devices such as switches and light globes 	
Level 6 Achievement Standard	<p>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.</p>								
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SUB-STRANDS								
Year Level Indicators	Biological Sciences		Chemical Sciences		Earth & Space Sciences		Physical Sciences	
	Content Descriptor	Elaborations	Content Descriptor	Elaborations	Content Descriptor	Elaborations	Content Descriptor	Elaborations
Level 7	<p>There are differences within and between groups of organisms; classification helps organise this diversity</p> <p>(ACSSU111)</p> 	<ul style="list-style-type: none"> * Considering the reasons for classifying such as identification and communication * Grouping a variety of organisms on the basis of similarities and differences in particular features * Considering how biological classifications have changed over time * Classifying using hierarchical systems such as kingdom, phylum, class, order, family, genus, species * Using scientific conventions for naming species * Using provided keys to identify organisms surveyed in a local habitat 	<p>Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques</p> <p>(ACSSU113)</p>	<ul style="list-style-type: none"> * Recognising the differences between pure substances and mixtures and identifying examples of each * Identifying the solvent and solute in solutions * Investigating and using a range of physical separation techniques such as filtration, decantation, vaporation, crystallisation, chromatography and distillation * Exploring and comparing separation methods used in the home 	<p>Predictable phenomena on Earth, including seasons and eclipses, are caused by the relative positions of the sun, Earth and the moon</p> <p>(ACSSU115)</p>	<ul style="list-style-type: none"> * Investigating natural phenomena such as lunar and solar eclipses, seasons and phases of the moon * Comparing times for the rotation of Earth, the sun and moon, and comparing the times for the orbits of Earth and the moon * Modelling the relative movements of the Earth, sun and moon and how natural phenomena such as solar and lunar eclipses and phases of the moon occur * Explaining why different regions of the Earth experience different seasonal conditions 	<p>Change to an object's motion is caused by unbalanced forces acting on the object</p> <p>(ACSSU117)</p>	<ul style="list-style-type: none"> * Investigating the effects of applying different forces to familiar objects * Investigating common situations where forces are balanced, such as stationary objects, and unbalanced, such as falling objects * Investigating a simple machine such as lever or pulley system
	<p>Interactions between organisms can be described in terms of food chains and food webs; human activity can affect these interactions</p> <p>(ACSSU112)</p> 	<ul style="list-style-type: none"> * Using food chains to show feeding relationships in a habitat * Constructing and interpreting food webs to show relationships between organisms in an environment * Classifying organisms of an environment according to their position in a food chain * Recognising the role of microorganisms within food chains and food webs * Investigating the effect of human activity on local habitats, such as deforestation, agriculture or the introduction of new species * Exploring how living things can cause changes to their environment and impact other living things, such as the effect of cane toads * Researching specific examples of human activity, such as the use of fire by traditional Aboriginal people and the effects of palm oil harvesting in Sumatra and Borneo 			<p>Some of Earth's resources are renewable, but others are non-renewable</p> <p>(ACSSU116)</p> 	<ul style="list-style-type: none"> * Considering what is meant by the term 'renewable' in relation to the Earth's resources * Considering timescales for regeneration of resources * Comparing renewable and non-renewable energy sources, including how they are used in a range of situations 	<p>Earth's gravity pulls objects towards the centre of the Earth</p> <p>(ACSSU118)</p>	<ul style="list-style-type: none"> * Exploring how gravity affects objects on the surface of Earth * Considering how gravity keeps planets in orbit around the sun
					<p>Water is an important resource that cycles through the environment</p> <p>(ACSSU222)</p> 	<ul style="list-style-type: none"> * Considering the water cycle in terms of changes of state of water * Investigating factors that influence the water cycle in nature * Exploring how human management of water impacts on the water cycle 		
<p>Level 7 Achievement Standard</p> <p>NOTE: The Standards are not divided into Strands or Sub-strands.</p>	<p>At Level 7, the student is working towards the Level 8 standard.</p>							