

Science

(last updated Sandy Deam 7-7-11)

Western Adelaide Region

A guide to support teacher familiarisation of the Australian Curriculum (R-10)



Melbourne Declaration on Educational Goals for Young Australians (2008)



Goal 1: Australian schooling promotes equity and excellence

Goal 2: All young Australians become:

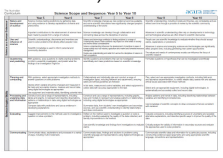
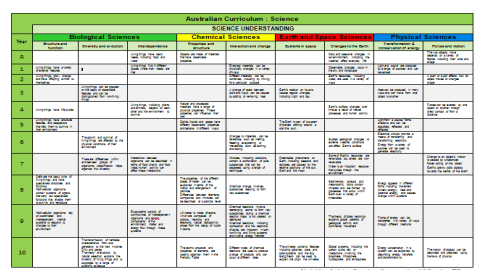
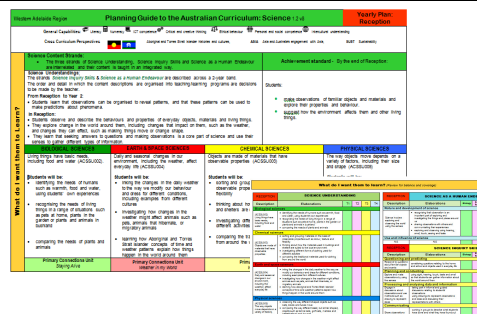
- Successful learners
- Confident and creative individuals
- Active and informed citizens

RESOURCES	<ul style="list-style-type: none"> • Primary Science Connections Resource Units • Western Adelaide Region www.decs.sa.gov.au/westernadelaide • Strategic Directions in Science & Mathematics in Australian Schools www.scimas.sa.edu.au • DECS Science Project Officer: Peter Turnbull peter.turnbull@sa.gov.au Ph 82261603 	<ul style="list-style-type: none"> • Scoutle is a curriculum planning tool that matches quality resources with the Australian Curriculum. It provides access to more than 8,000 digital curriculum resources. www.scoutle.edu.au/ec/p/home • South Australian Primary Science and Mathematics Moodle http://dlb.sa.edu.au/pmssmoodle/ a wealth of resources developed to support the South Australian PMSS workshops
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STRUCTURE	<p>Science has three interrelated strands</p> <ul style="list-style-type: none"> • Science Understanding • Science as a Human Endeavour • Science Inquiry Skills. 	<p>Students are challenged to explore science, its concepts, nature and uses through clearly described inquiry processes.</p> <p>The three strands are interrelated and their content is taught in an integrated way.</p> <p>The order and detail in which the content descriptions are organised into teaching/learning programs are decisions to be made by the teacher. The content is described by year level.</p>
	<p>Science as a Human Endeavour (SHE) strand Science as a Human Endeavour comprises 2 sub-strands</p>	<p>Science Inquiry Skills (SIS) strand. Science Inquiry Skills comprises 5 sub-strands</p>
	<p>1. Nature and development of science: This sub-strand develops an appreciation of the unique nature of science and scientific knowledge, including how current knowledge has developed over time through the actions of many people.</p> <p>2. Use and influence of science: This sub-strand explores how science knowledge and applications affect peoples' lives, including their work, and how science is influenced by society and can be used to inform decisions and actions.</p>	<ol style="list-style-type: none"> 1. Questioning and predicting: Identifying and constructing questions, proposing hypotheses and suggesting possible outcomes. 2. Planning and conducting: Making decisions regarding how to investigate or solve a problem and carrying out an investigation, including the collection of data. 3. Processing and analysing data and information: Representing data in meaningful and useful ways; identifying trends, patterns and relationships in data, and using this evidence to justify conclusions. 4. Evaluating: Considering the quality of available evidence and the merit or significance of a claim, proposition or conclusion with reference to that evidence. 5. Communicating: Conveying information or ideas to others through appropriate representations, text types and modes.

CONTENT	<p align="center">Science Understanding (SU) strand The Science Understanding strand comprises 4 sub-strands</p>			
	<p align="center">Chemical sciences</p>	<p align="center">Biological sciences</p>	<p align="center">Earth and space sciences</p>	<p align="center">Physical sciences</p>
	<p>Understanding.... the composition and behaviour of substances</p>	<p>Understanding.... living things</p>	<p>understanding ... Earth's dynamic structure and its place in the cosmos</p>	<p>Understanding.... the nature of forces & motion and matter & energy</p>
	<p>The key concepts developed within this sub-strand are that:</p> <ul style="list-style-type: none"> • the chemical and physical properties of substances are determined by their structure at an atomic scale • that substances change and new substances are produced by rearranging atoms through atomic interactions and energy transfer. <p>In this sub-strand students,</p> <ul style="list-style-type: none"> • classify substances • explore physical changes such as changes of state and dissolving • investigate how chemical reactions result in the production of new substances. • recognise that all substances consist of atoms. • explore the relationship between the way in which atoms are arranged and the properties of substances, and the effect of energy transfers on these arrangements. 	<p>The key concepts developed within this sub-strand are that:</p> <ul style="list-style-type: none"> • a diverse range of living things have evolved on Earth over hundreds of millions of years • living things are interdependent and interact with each other and their environment • the form and features of living things are related to the functions that their body systems perform. <p>In this sub-strand students,</p> <ul style="list-style-type: none"> • investigate living things and their interdependence and interactions within ecosystems. • explore their life cycles, body systems, structural adaptations and behaviours. • are introduced to the cell as the basic unit of life and the processes that are central to its function. 	<p>The key concepts developed within this sub-strand are that:</p> <ul style="list-style-type: none"> • Earth is part of a solar system that is part of a larger universe. • Earth is subject to change within and on its surface, over a range of timescales as a result of natural processes and human use of resources. <p>In this sub-strand students,</p> <ul style="list-style-type: none"> • view Earth as part of a solar system, which is part of a galaxy, which is one of many in the universe. • explore how changes on Earth, such as day and night and the seasons relate to Earth's rotation and its orbit around the sun. • investigate the processes that result in change to Earth's surface, recognising that Earth has evolved over 4.5 billion years. • explore the ways in which humans use resources from the Earth and appreciate the influence of human activity on the surface of the Earth and the atmosphere. 	<p>The two key concepts developed within this sub-strand are that:</p> <ul style="list-style-type: none"> • forces affect the behaviour of objects • that energy can be transferred and transformed from one form to another. <p>In this sub-strand students,</p> <ul style="list-style-type: none"> • gain an understanding of how an object's motion is influenced by a range of forces such as friction, magnetism, gravity and electrostatic forces. • develop an understanding of the concept of energy and how energy transfer is associated with phenomena involving motion, heat, sound, light and electricity. • appreciate that concepts of force, motion, matter and energy apply to systems ranging in scale from atoms to the universe itself.

The **Science Inquiry Skills** and **Science as a Human Endeavour** strands are described across a two-year 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 year level to ensure that these two strands are addressed over the two-year period.

CONTENT	<p>ACARA Scope & Sequence (PDF format) <i>Access from the Australian Curriculum Website (Scope & Sequence of 'Science Understanding' at end of document)</i></p> <ul style="list-style-type: none"> 'Curriculum' (tab) Select Science 'F to Year 10' (tab) Download (button) SAVE PDF. 	<p>DECS Primary Science Scope & Sequence sheets R-10</p> <p>Two sheets. Section for each strand (Including sub strands)</p> <ul style="list-style-type: none"> Science as a Human Endeavour Science Inquiry Skills Science Understanding 																																																				
	<p>Knowledge and understanding of the seven general capabilities of Essential tools for learning – literacy, numeracy, critical & creative thinking</p> <p>information and communication technology competence</p> <p>Ways of acting, behaving or learning to live with others – ethical behaviour, personal and social competence, intercultural understanding</p>	<p>Knowledge and understanding of the three cross-curriculum priorities.</p> <ul style="list-style-type: none"> Indigenous perspectives – (Aboriginal and Torres Strait Islander histories and cultures) Asia and Australia's engagement with Asia Commitment to sustainable living 																																																				
PRIMARY CONNECTIONS	<p>Primary Connections (PC) is aligned with the rationale and aims of the Australian Curriculum Science. The PC units are also well aligned with the General Capabilities and the three Current Priorities of the Australian Curriculum. There is significant alignment with the <i>Science as a Human Endeavour</i> (SHE) and <i>Science Inquiry Skills</i> (SIS) strands of the curriculum in all Primary Connections units.</p> <p>An Indigenous Perspective Framework: The PC framework supports teachers to incorporate relevant, contextualised and embedded Indigenous perspectives.</p> <p>PC Science Resource Units: DECS primary schools in the Western Area Region were provided with the books / CDs in 2010. There are 4 units for each year level from Reception to Year 6. Of the current nineteen published units, nine units align directly with the <i>Science Understanding</i> strand. Seven units will require modifications to the content of the unit so that they align correctly. Three units will require major rewriting to include the Science Understanding concepts. Sites requiring new PC resources will need to purchase them. The suggested Primary Connections units are listed under the sub-strands.</p> <p>The SCIMAS project team is developing 4 units for year 7 classes.</p> <p>Primary Connections units should be viewed as one way, but not the only way, of teaching the Australian Curriculum Science.</p>																																																					
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	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #e0e0e0;">Stage / Yr</th> <th style="background-color: #90ee90;">Biological Sciences</th> <th style="background-color: #ff0000;">Earth and Space Sciences</th> <th style="background-color: #ffff00;">Chemical Sciences</th> <th style="background-color: #0000ff;">Physical Sciences</th> </tr> </thead> <tbody> <tr> <td style="background-color: #e0e0e0;">Early Stage 1</td> <td style="background-color: #e0e0e0;">R</td> <td style="background-color: #e0e0e0;">Staying Alive</td> <td style="background-color: #e0e0e0;">Weather in my World</td> <td style="background-color: #e0e0e0;">What's it Made Of?</td> <td style="background-color: #e0e0e0;">On the Move</td> </tr> <tr> <td rowspan="2" style="background-color: #e0e0e0;">Stage 1</td> <td style="background-color: #e0e0e0;">1</td> <td style="background-color: #e0e0e0;">Schoolyard Safari</td> <td style="background-color: #e0e0e0;">NEW - Up, Down and All Around</td> <td style="background-color: #e0e0e0;">Spot the Difference</td> <td style="background-color: #e0e0e0;">Sounds Sensational</td> </tr> <tr> <td style="background-color: #e0e0e0;">2</td> <td style="background-color: #e0e0e0;">NEW - Growing and Changing</td> <td style="background-color: #e0e0e0;">Water Works</td> <td style="background-color: #e0e0e0;">NEW - All Mixed Up</td> <td style="background-color: #e0e0e0;">Push Pull</td> </tr> <tr> <td rowspan="2" style="background-color: #e0e0e0;">Stage 2</td> <td style="background-color: #e0e0e0;">3</td> <td style="background-color: #e0e0e0;">NEW - Feathers, Fur or Scales</td> <td style="background-color: #e0e0e0;">Spinning in Space</td> <td style="background-color: #e0e0e0;">NEW - Runny or Not</td> <td style="background-color: #e0e0e0;">NEW - Heat</td> </tr> <tr> <td style="background-color: #e0e0e0;">4</td> <td style="background-color: #e0e0e0;">Plants in Action</td> <td style="background-color: #e0e0e0;">NEW - Buried in Time</td> <td style="background-color: #e0e0e0;">Material World / Package it Better</td> <td style="background-color: #e0e0e0;">Smooth Moves</td> </tr> <tr> <td rowspan="2" style="background-color: #e0e0e0;">Stage 3</td> <td style="background-color: #e0e0e0;">5</td> <td style="background-color: #e0e0e0;">NEW - Adaptations</td> <td style="background-color: #e0e0e0;">NEW - Earth's Place in Space</td> <td style="background-color: #e0e0e0;">NEW Solids, Liquids and Gases</td> <td style="background-color: #e0e0e0;">Light Fantastic</td> </tr> <tr> <td style="background-color: #e0e0e0;">6</td> <td style="background-color: #e0e0e0;">Marvellous Micro-organisms</td> <td style="background-color: #e0e0e0;">Earthquake Explorers</td> <td style="background-color: #e0e0e0;">Change Detectives</td> <td style="background-color: #e0e0e0;">It's Electrifying NEW Essential Energy</td> </tr> <tr> <td style="background-color: #e0e0e0;">Scimas Units</td> <td style="background-color: #e0e0e0;">7</td> <td style="background-color: #e0e0e0;">As yet un-named (Being written 2011)</td> <td style="background-color: #e0e0e0;">As yet un-named (Being written 2011)</td> <td style="background-color: #e0e0e0;">What's the Solution? (Being written 2011)</td> <td style="background-color: #e0e0e0;">Forced 2? (Being written 2011)</td> </tr> </tbody> </table>				Stage / Yr	Biological Sciences	Earth and Space Sciences	Chemical Sciences	Physical Sciences	Early Stage 1	R	Staying Alive	Weather in my World	What's it Made Of?	On the Move	Stage 1	1	Schoolyard Safari	NEW - Up, Down and All Around	Spot the Difference	Sounds Sensational	2	NEW - Growing and Changing	Water Works	NEW - All Mixed Up	Push Pull	Stage 2	3	NEW - Feathers, Fur or Scales	Spinning in Space	NEW - Runny or Not	NEW - Heat	4	Plants in Action	NEW - Buried in Time	Material World / Package it Better	Smooth Moves	Stage 3	5	NEW - Adaptations	NEW - Earth's Place in Space	NEW Solids, Liquids and Gases	Light Fantastic	6	Marvellous Micro-organisms	Earthquake Explorers	Change Detectives	It's Electrifying NEW Essential Energy	Scimas Units	7	As yet un-named (Being written 2011)	As yet un-named (Being written 2011)	What's the Solution? (Being written 2011)	Forced 2? (Being written 2011)
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<p>The Primary Connections 5Es Inquiry Model The inquiry-oriented teaching and learning model progresses through five phases: Engage, Explore, Explain, Elaborate and Evaluate</p> <p>Time allocation for the teaching of Science. (By the start of 2013)</p> <ul style="list-style-type: none"> Rec to year 2 students: up to 90 minutes / week Year 3 students: minimum of 90 minutes / week Years 4 to 7 students: minimum of 120 minutes / week 																																																						
PLANNING / PEDAGOGY	<p>Plan using a backwards planning process.</p> <ol style="list-style-type: none"> What do I want them to learn? How will I know if they got it? What will we do to get there? 		<p>What do I want them to Learn?</p> <p>Understanding Human Endeavour Inquiry</p>	<p>How will I know if they got it?</p> <p>Collecting the Evidence</p>	<p>What will we do to get there?</p> <p>Designing Learning Tasks</p>																																																	
	<p>The Region is producing 'Planning Guides' for Science for each year level.</p> <p>What do I want them to learn? (Content)</p> <ul style="list-style-type: none"> Content description and elaborations for each 'Science Understanding' substrand. Achievement standards Review for balance and coverage of content descriptors <p>Review Sheets: can be used to cross check for balance and coverage of the content in each strand <i>Science Understanding, Science as a Human Endeavour.</i></p> <p>Use SA TfEL Framework Guide & DVD to further develop effective teaching & learning practices.</p>																																																					
ASSESSMENT / REPORTING	<p>Teachers will need to:</p> <ul style="list-style-type: none"> assess throughout the year and collect the evidence to demonstrate levels of achievement. strive for consistency of assessment and reporting, through moderation and sharing of assessment tasks and recording methods.. assign an A-E grade (or equivalent wording) for the overall content of the Achievement Standard for each specific year level. 																																																					
	<p>Achievement Standards list a number of aspects covered in the year's content. An A-E grading will be required (Sites may choose to use the 'Western Adelaide A-E Guide to Science Achievement Standards') NB These have not yet been validated</p>																																																					