



Science Years 7–10

Syllabus Mapping Grids

The templates for mapping syllabus outcomes and content have been provided to assist teachers in evaluating existing and planning new teaching–learning programs for the *Science Years 7–10 Syllabus* (November 2003).

Stage 4 Scope and Sequence

Stage 4 Outcome		A student: Unit	Year 7				Year 8					
			1	2	3	4	1	2	3	4	5	
Prescribed Focus Area	4.1	identifies historical examples of how scientific knowledge has changed people's understanding of the world										
	4.2	uses examples to illustrate how models, theories and laws contribute to an understanding of phenomena										
	4.3	identifies areas of everyday life that have been affected by scientific developments										
	4.4	identifies choices made by people with regard to scientific developments										
	4.5	describes areas of current scientific research										
Domain: Knowledge and Understanding	4.6	identifies and describes energy changes and the action of forces in common situations										
	4.7	describes observed properties of substances using scientific models and theories										
	4.8	describes features of living things										
	4.9	describes the dynamic structure of Earth and its relationship to other parts of our solar system and the universe										
	4.10	identifies factors affecting survival of organisms in an ecosystem										
	4.11	identifies where resources are found, and describes ways in which they are used by humans										
	4.12	identifies, using examples, common simple devices and explains why they are used										
Domain: Skills	4.13	clarifies the purpose of an investigation and, with guidance, produces a plan to investigate a problem										
	4.14	follows a sequence of instructions to undertake a first-hand investigation										
	4.15	uses given criteria to gather first-hand data										
	4.16	accesses information from identified secondary sources										
	4.17	evaluates the relevance of data and information										
	4.18	with guidance, presents information to an audience to achieve a particular purpose										
	4.19	draws conclusions based on information available										
	4.20	uses an identified strategy to solve problems										
	4.21	uses creativity and imagination to suggest plausible solutions to familiar problems										
	4.22	undertakes a variety of individual and team tasks with guidance										
Domain: Values and Attitudes	4/5.23	demonstrates confidence and a willingness to make decisions and to take responsible actions										
	4/5.24	respects differing viewpoints on science issues and is honest, fair and ethical										
	4/5.25	recognises the relevance and importance of lifelong learning and acknowledges the continued impact of science in many aspects of everyday life										
	4/5.26	recognises the role of science in providing information about issues being considered and in increasing understanding of the world around them										
	4/5.27	acknowledges their responsibility to conserve, protect and maintain the environment for the future										

Stage 5 Scope and Sequence

Stage 5 Outcome		A student:	Unit	Year 9				Year 10			
				1	2	3	4	1	2	3	4
Prescribed Focus Area	5.1	explains how social factors influence the development and acceptance of scientific ideas									
	5.2	describes the processes that are applied to test and validate models, theories and laws									
	5.3	evaluates the impact of applications of science on society and the environment									
	5.4	discusses scientific evidence supporting different viewpoints									
	5.5	analyses how current research might affect people's lives									
Domain: Knowledge and Understanding	5.6	applies models, theories and laws to situations involving energy, force and motion									
	5.7	relates properties of elements, compounds and mixtures to scientific models, theories and laws									
	5.8	relates the structure and function of living things to models, theories and laws									
	5.9	relates the development of the universe and the dynamic structure of Earth to models, theories and laws and the influence of time									
	5.10	assesses human impacts on the interaction of biotic and abiotic features of the environment									
	5.11	analyses the impact of human resource use on the biosphere to evaluate methods of conserving, protecting and maintaining Earth's resources									
	5.12	relates the interactions involved in using some common technologies to their underlying scientific principles									
Domain: Skills	5.13	identifies a problem and independently produces an appropriate investigation plan									
	5.14	undertakes first-hand investigations independently with safety and competence									
	5.15	gathers first-hand data accurately									
	5.16	accesses information from a wide variety of secondary sources									
	5.17	explains trends, patterns and relationships in data and/or information from a variety of sources									
	5.18	selects and uses appropriate forms of communication to present information to an audience									
	5.19	uses critical thinking skills in evaluating information and drawing conclusions									
	5.20	selects and uses appropriate strategies to solve problems									
	5.21	uses creativity and imagination in the analysis of problems and the development of possible solutions									
	5.22	plans, implements and evaluates the effectiveness of a variety of tasks independently and as a team member									
Domain: Values and Attitudes	4/5.23	demonstrates confidence and a willingness to make decisions and to take responsible actions									
	4/5.24	respects differing viewpoints on science issues and is honest, fair and ethical									
	4/5.25	recognises the relevance and importance of lifelong learning and acknowledge the continued impact of science in many aspects of everyday life									
	4/5.26	recognises the role of science in providing information about issues being considered and in increasing understanding of the world around them									
	4/5.27	acknowledges their responsibility to conserve, protect and maintain the environment for the future									

Stage 4 Content Mapping Grid – outcomes and essential content

		Unit	1	2	3	4	1	2	3	4	5
4.1 A student identifies historical examples of how scientific knowledge has changed people's understanding of the world											
4/5.1	Students learn about the history of science										
	Students learn to:										
a)	identify some of the ideas from different cultures (including those of Aboriginal and other Indigenous people) that have contributed to science throughout history										
b)	describe some models and theories that have been considered in science and then been modified or rejected as a result of available evidence										
c)	discuss examples where societal, religious or ethical values have had an impact on scientific developments										
d)	describe historical cases where developments in science have led to the development of new technologies										
e)	describe historical cases where developments or improvements in technology have transformed science										
4.2 A student uses examples to illustrate how models, theories and laws contribute to an understanding of phenomena											
4/5.2	Students learn about the nature and practice of science										
	Students learn to:										
a)	evaluate the role of creativity, curiosity, objectivity and logical reasoning in describing phenomena, carrying out investigations and in the devising and testing of hypotheses										
b)	distinguish between scientific argument and economic or legal argument										
c)	apply scientific processes to test the validity of ideas and theories										
d)	describe how an idea can gain acceptance in the scientific community as either theory or law										
e)	use examples which show that scientists isolate a set of observations, identify trends and patterns and construct hypotheses or models to explain these										
f)	give examples that demonstrate the benefits and limitations of using models										
g)	identify that the nature of observations made depends upon the understanding that the observer brings to the situation										
4.3 A student identifies areas of everyday life that have been affected by scientific developments											
4/5.3	Students learn about the applications and uses of science										
	Students learn to:										
a)	identify and describe examples of scientific concepts and principles that have been used in technological developments (including Australian examples)										
b)	discuss, using examples, the positive and negative impacts of applications of recent developments in science										
c)	identify and describe examples where technological advances have impacted on science										
d)	give reasons why society should support scientific research										
4.4 A student identifies choices made by people with regard to scientific developments											
4/5.4	Students learn about the implications of science for society and the environment										
	Students learn to:										
a)	discuss viewpoints about some issues with a major scientific component										
b)	give examples to show that different cultures or groups within a society (including Aboriginal and other Indigenous people) may use or weight criteria differently to make a decision about an issue involving a major scientific component										
c)	identify choices that need to be or have been made when considering whether to use particular scientific advances										
d)	discuss the place of social and ethical considerations in scientific practice and in applications of science										
4.5 A student describes areas of current scientific research											
4/5.5	Students learn about current issues, research and developments in science										
	Students learn to:										
a)	describe some recent scientific contributions made by male and female scientists, including Australians, and discuss the effect of their contributions										
b)	evaluate the potential impact of some issues raised in the mass media that require some scientific understanding										

4.7 A student describes observed properties of substances using scientific models and theories										
4.7.1	Students learn about the particle model of matter									
	Students learn to:									
a)	describe the behaviour of matter in terms of particles that are continuously moving and interacting									
b)	describe expansion and contraction of materials in terms of a simple particle model									
c)	relate an increase or decrease in the amount of energy possessed by particles to changes in particle movement									
4.7.2	Students learn about properties of solids, liquids and gases									
	Students learn to:									
a)	relate to properties of solids, liquids and gases to the particle model of matter									
b)	describe the physical changes that occur during observations of evaporation, condensation, boiling, melting and freezing									
c)	explain density in term of a simple particle model									
d)	explain the changes in pressure of gases in terms of increases or decreases in frequency of particle collisions									
4.7.3	Students learn about change of state									
	Students learn to:									
a)	relate changes of state to the motion of particles as energy is removed or added									
b)	relate energy transfers in melting and freezing, condensation, evaporation and boiling to the particle model									
4.7.4	Students learn about elements									
	Students learn to:									
a)	classify elements as metals or non-metals according to their common characteristics									
b)	identify internationally recognised symbols for common elements									
4.7.5	Students learn about mixtures									
	Students learn to:									
a)	identify some common mixtures									
b)	identify, using examples, the importance of water as a solvent									
c)	describe aqueous mixtures in terms of solute, solvent and solution									
d)	identify situations where the processes of filtration, sedimentation, sieving, distillation, chromatography, evaporation, condensation, crystallisation and magnetic attraction are appropriate to separate components of a mixture									
4.7.6	Students learn about compounds and reactions									
	Students learn to:									
a)	distinguish between elements and compounds									
b)	identify when a chemical reaction is taking place by observing changes in temperature, the appearance of a new substance or the disappearance of an original substance									
c)	distinguish between compounds and mixtures									
4.8 A student describes features of living things										
4.8.1	Students learn about cell theory									
	Students learn to:									
a)	identify that living things are made of cells									
b)	identify and describe the functions of the nucleus, cytoplasm, cell membrane, cell wall, chloroplast									
c)	identify that substances move into and out of cells									
d)	distinguish between unicellular and multicellular organisms									
4.8.2	Students learn about classification									
	Students learn to:									
a)	classify living things according to structural features and identify that they have patterns of similarities and differences									
b)	identify a range of plants and animals using simple keys									

4.10 A student identifies factors affecting survival of organisms in an ecosystem										
4.10	Students learn about ecosystems									
	Students learn to:									
a)	describe some adaptations of living things to factors in their environment									
b)	describe, using examples of food chains and food webs from Australian ecosystems, how producers, consumers and decomposers are related									
c)	describe the roles of photosynthesis and respiration in ecosystems									
d)	discuss some effects of bushfires, drought and flood on Australian ecosystems									
4.11 A student identifies where resources are found, and describes ways in which they are used by humans										
4.11	Students learn about natural resources									
	Students learn to:									
a)	distinguish between natural and made resources									
b)	give examples of resources from living things and resources extracted from the air, Earth and oceans									
c)	identify fossil fuels and describe some of their uses									
d)	identify renewable and non-renewable sources of energy									
4.12 A student identifies, using examples, common simple devices and explains why they are used										
4.12	A student learns about technology									
	Students learn to:									
a)	identify technologies that make tasks easier or more convenient									
b)	identify a variety of energy transformations in everyday devices involving electrical, sound, light and/or heat energy									
4.13 A student clarifies the purpose of an investigation and, with guidance, produces a plan to investigate a problem										
4/5.13.1	Students learn about identifying data sources									
	Students learn to:									
a)	describe a problem and develop an hypothesis or question that can be tested or researched									
b)	propose possible sources of data and/or information relevant to the investigation									
c)	identify what type of information or data need to be collected									
d)	justify why particular types of data or information are to be collected									
e)	identify the appropriate units to be used in collecting data									
f)	recommend the use of an appropriate technology or strategy for collecting data or gathering information									
g)	formulate a means of recording the data to be gathered or the information to be collected									
4/5.13.2 Students learn about planning first-hand investigations										
	Students learn to:									
a)	identify variables that need to be held constant if reliable first-hand data is to be collected									
b)	specify the dependent and independent variables when planning controlled experiments									
c)	describe a logical procedure for undertaking a simple or controlled experiment to collect valid first-hand data									
d)	establish an appropriate timeline for an investigation									
4/5.13.3 Students learn about choosing equipment or resources										
	Students learn to:									
a)	identify advantages and limitations of using particular laboratory and field equipment for a specific task									
b)	select appropriate equipment (including safety equipment) and/or resources to perform the task									
c)	describe ways to reduce the risk to themselves and others when working in the laboratory or field									
4.14 A student follows a sequence of instructions to undertake a first-hand investigation										
4/5.14	Students learn about performing first-hand investigations									
	Students learn to:									
a)	follow the planned procedure when performing an investigation									
b)	use time and resources effectively									
c)	safely and effectively construct, assemble and manipulate identified equipment									
d)	record data using the appropriate units									

e)	evaluate and modify experimental procedures																		
f)	demonstrate the use of safe and hygienic work practices including the correct use of safety equipment																		
4.15 A student uses given criteria to gather first-hand data																			
4/5.15	Students learn about gathering first-hand information																		
	Students learn to:																		
a)	make and record observations and measurements accurately																		
b)	use independently a range of data collection strategies and technologies such as data loggers																		
4.16 A student accesses information from identified secondary sources																			
4/5.16	Students learn about gathering information from secondary sources																		
	Students learn to:																		
a)	use a range of sources, including databases, CD-ROMs and the internet, to access information																		
b)	use a variety of techniques, such as keywords, skimming and scanning to identify appropriate information																		
c)	extract information from column graphs, histograms, divided bar and sector graphs, line graphs, composite graphs, flow diagrams, other texts and audio/visual resources																		
d)	summarise information from identified oral and written secondary sources																		
4.17 A student evaluates the relevance of data and information																			
4/5.17	Students learn about processing information																		
	Students learn to:																		
a)	collate information from a number of sources																		
b)	distinguish between relevant and irrelevant information																		
c)	check the reliability of gathered data and information by comparing them with observations or information from other sources																		
d)	organise data using a variety of methods including diagrams, tables, spreadsheets and databases																		
e)	critically analyse the accuracy of scientific information presented in mass media																		
f)	identify trends, patterns, relationships and contradictions in data and information																		
g)	apply mathematical concepts and computer based technologies to assist analysis of data and information																		
4.18 A student with guidance, presents information to an audience to achieve a particular purpose																			
4/5.18	Students learn about presenting information																		
	Student learn to:																		
a)	select, and use appropriately, types of texts for different purposes and contexts including a discussion, explanation, procedure, exposition, recount, report, response or experimental record for oral or written presentation																		
b)	select and use an appropriate medium to present data and information																		
c)	select and use an appropriate method to acknowledge sources of information																		
d)	use symbols to express relationships, including mathematical ones, and appropriate units for physical quantities																		
e)	use drawings, diagrams, graphs, tables, databases, spreadsheets and flow charts to show relationships and present information clearly and/or succinctly																		
f)	select and draw the appropriate type of graph (from column graph, histogram, divided bar, sector or line graph) or diagram to convey information and relationships clearly and accurately																		
4.19 A student draws conclusions based on information available																			
4/5.19	Students learn about thinking critically																		
	Students learn to:																		
a)	justify inferences in light of gathered information																		
b)	identify data which supports or discounts an hypothesis, a question being investigated or a proposed solution to a problem																		
c)	predict outcomes and generate plausible explanations directly related to observations made																		
d)	make generalisations in relation to a relevant set of observations or experimental results																		
e)	anticipate and/or respond to problems as they arise in practical situations																		
f)	use models, including mathematical ones, to explain phenomena or make predictions																		
g)	use cause and effect relationships to explain ideas																		

4.20 A student uses an identified strategy to solve problems										
4/5.20	Students learn about problem-solving									
	Students learn to:									
a)	identify the nature of a presented problem									
b)	describe different strategies that could be employed to solve an identified problem									
c)	use identified strategies to develop a range of possible solutions to a particular problem									
d)	evaluate the appropriateness of different strategies for solving an identified problem									
4.21 A student uses creativity and imagination to suggest plausible solutions to familiar problems										
4/5.21	Students learn about the use of creativity and imagination									
	Student learn to:									
a)	seek evidence to support claims									
b)	evaluate evidence for reliability and validity									
c)	produce creative solutions for problems									
d)	propose ideas that demonstrate coherence and logical progression									
e)	apply critical thinking in the consideration of proposals									
f)	formulate cause and effect relationships									
4.22 A student undertakes a variety of individual and team tasks with guidance										
4/5.22.1	Students learn about working individually									
	Students learn to:									
a)	independently plan and conduct investigations, communicate information and understanding and solve problems									
b)	set and work to realistic timelines and goals									
c)	accept responsibility for maintenance of a safe working environment for themselves and others									
d)	evaluate the effectiveness of their performance in completing tasks									
4/5.22.2	Students learn about working in teams									
	Students learn to:									
a)	identify the specific roles needed when working in a team									
b)	match the tasks to the team members according to the requirements of the task and the skills of the individual									
c)	negotiate and allocate individual roles to members of the team									
d)	accept specific roles in a team while planning and conducting investigations, communicating information and understanding and solving problems									
e)	set and work to realistic timelines and goals as a team									
f)	accept personal responsibility for maintenance of a safe working environment for the team									
g)	monitor progress of the team towards completion of the task									
h)	evaluate the process used by the team and effectiveness of the team in completing the task									

Stage 5 Content Mapping Grid – outcomes and essential content

		Unit	1	2	3	4	1	2	3	4
5.1 A student explains how social factors influence the development and acceptance of scientific ideas										
4/5.1	Students learn about the history of science									
	Students learn to:									
a)	identify some of the ideas from different cultures (including those of Aboriginal and other Indigenous people) that have contributed to science throughout history									
b)	describe some models and theories that have been considered in science and then been modified or rejected as a result of available evidence									
c)	discuss examples where societal, religious or ethical values have had an impact on scientific developments									
d)	describe historical cases where developments in science have led to the development of new technologies									
e)	describe historical cases where developments or improvements in technology have transformed science									
5.2 A student describes the processes that are applied to test and validate models, theories and laws										
4/5.2	Students learn about the nature and practice of science									
	Students learn to:									
a)	evaluate the role of creativity, curiosity, objectivity and logical reasoning in describing phenomena, carrying out investigations and in the devising and testing of hypotheses									
b)	distinguish between scientific argument and economic or legal argument									
c)	apply scientific processes to test the validity of ideas and theories									
d)	describe how an idea can gain acceptance in the scientific community as either theory or law									
e)	use examples which show that scientists isolate a set of observations, identify trends and patterns and construct hypotheses or models to explain these									
f)	give examples that demonstrate the benefits and limitations of using models									
g)	identify that the nature of observations made depends upon the understanding that the observer brings to the situation									
5.3 A student evaluates the impact of applications of science on society and the environment										
4/5.3	Students learn about the applications and uses of science									
	Students learn to:									
a)	identify and describe examples of scientific concepts and principles that have been used in technological developments (including Australian examples)									
b)	discuss, using examples, the positive and negative impacts of applications of recent developments in science									
c)	identify and describe examples where technological advances have impacted on science									
d)	give reasons why society should support scientific research									
5.4 A student discusses scientific evidence supporting different viewpoints										
4/5.4	Students learn about the implications of science for society and the environment									
	Students learn to:									
a)	discuss viewpoints about some issues with a major scientific component									
b)	give examples to show that different cultures or groups within a society (including Aboriginal and other Indigenous people) may use or weight criteria differently to make a decision about an issue involving a major scientific component									
c)	identify choices that need to be or have been made when considering whether to use particular scientific advances									
d)	discuss the place of social and ethical considerations in scientific practice and in applications of science									
5.5 A student analyses how current research might affect people's lives										
4/5.5	Students learn about current issues, research and developments in science									
	Students learn to:									
a)	describe some recent scientific contributions made by male and female scientists, including Australians, and discuss the effect of their contributions									
b)	evaluate the potential impact of some issues raised in the mass media that require some scientific understanding									
c)	identify scientific skills that can be useful in a broad range of careers									
d)	identify possible career paths in science									
5.6 A student applies models and laws to situations involving energy, force and motion										
5.6.1	Students learn about the wave model									
	Students learn to:									

a)	identify waves as carriers of energy																			
b)	qualitatively describe features of waves including frequency, wavelength and speed																			
c)	give examples of different types of radiation that make up the electromagnetic spectrum and identify some of their uses																			
5.6.2	Students learn about Newton's Laws – motion																			
	Students learn to:																			
a)	describe qualitatively the relationship between force, mass and acceleration																			
b)	explain qualitatively the relationship between distance, speed and time																			
c)	relate qualitatively acceleration to a change in speed and/or direction as a result of net force																			
d)	analyse qualitatively common situations involving motion in terms of Newton's Laws																			
5.6.3	Students learn about electrical energy																			
	Students learn to:																			
a)	design, construct and draw circuits containing a number of components																			
b)	describe voltage, resistance and current using analogies																			
c)	describe qualitatively the relationship between voltage, resistance and current																			
d)	compare the characteristics and applications of series and parallel circuits																			
5.6.4	Student learn about light energy																			
	Students learn to:																			
a)	distinguish between the absorption, reflection and refraction of light and identify everyday situations where each occurs																			
5.6.5	Students learn about nuclear energy																			
	Students learn to:																			
a)	identify that energy and particles may be released from the nuclei of atoms																			
5.6.6	Students learn about gravitational force																			
	Students learn to:																			
a)	distinguish between the terms 'mass' and 'weight'																			
5.7 A student relates properties of elements, compounds and mixtures to scientific models, theories and laws																				
5.7.1	Students learn about atomic theory																			
	Students learn to:																			
a)	describe features of and the location of protons, neutrons and electrons in the atom																			
b)	distinguish between elements, using information about the numbers of protons, neutrons and electrons																			
c)	describe an appropriate model that has been developed to describe atomic structure																			
5.7.2	Students learn about elements																			
	Students learn to:																			
a)	identify the atom as the smallest unit of an element and distinguish between atoms and molecules																			
b)	describe some relationships between elements using the Periodic Table																			
5.7.3	Students learn about compounds and reactions																			
	Students learn to:																			
a)	identify that a new compound is formed by rearranging atoms rather than creating matter																			
b)	classify compounds into groups based on common chemical characteristics																			
c)	construct word equations from observations and written descriptions of a range of chemical reactions																			
d)	identify a range of common compounds using their common names and chemical formulae																			
e)	qualitatively describe reactants and products in the following chemical reactions:																			
	i. combustion																			
	ii. corrosion																			
	iii. precipitation																			
	iv. acids on metals and acids on carbonates																			
	v. neutralisation																			
	vi. decomposition																			
f)	describe the role of indicators																			

5.8 A student relates the structure and function of living things to models, theories and laws										
5.8.1	Students learn about cell theory									
	Students learn to:									
a)	explain that systems in multicellular organisms serve the needs of cells									
b)	identify the role of cell division in growth, repair and reproduction in multicellular organisms									
5.8.2	Students learn about the Watson-Crick model of DNA									
	Students learn to:									
a)	explain the advantages of DNA replicating exactly									
b)	explain the advantages and disadvantages of DNA mutating									
c)	identify that information is transferred as DNA on chromosomes when cells reproduce themselves									
d)	identify that genes are part of DNA									
e)	identify the role of genes and environmental factors in determining the features of an organism									
5.8.3	Students learn about the theory of evolution and natural selection									
	Students learn to:									
a)	discuss evidence that present-day organisms have evolved from organisms in the distant past									
b)	relate natural selection to the theory of evolution									
5.8.4	Students learn about humans									
	Students learn to:									
a)	describe the role of, and interaction between, coordination systems in maintaining humans as functioning organisms									
b)	describe some responses of body systems to infectious and non-infectious diseases									
c)	relate the organs involved in human reproductive systems to their function									
5.9 A student relates the development of the universe and the dynamic structure of Earth to models, theories and laws and the influence of time										
5.9.1	Students learn about the big bang theory									
	Student learn to:									
a)	discuss current scientific thinking about the origin of the universe									
b)	identify that some types of electromagnetic radiation are used to provide information about the universe									
c)	describe some of the difficulties in obtaining information about the universe									
5.9.2	Students learn about the theory of plate tectonics									
	Students learn to:									
a)	discuss evidence that suggests crustal plates move over time									
5.9.3	Students learn about components of the universe									
	Students learn to:									
a)	relate some major features of the universe to theories about the formation of the universe									
b)	describe some changes that are likely to take place during the life of a star									
5.9.4	Students learn about natural events									
	Students learn to:									
a)	identify that geological history can be interpreted from the formation, by sediments, of horizontal layers in which the oldest are at the base and the youngest at the top									
b)	describe conditions under which fossils form									
c)	relate the fossil record to the ages of Earth and the time over which life has been evolving									
d)	relate movements of Earth's plates to convection currents in the mantle and to gravitational forces									
e)	explain how interactions at plate boundaries may result in earthquakes, volcanic activity and new landforms									
f)	explain some impacts of natural events including cyclones, volcanic eruptions and earthquakes on the atmosphere, hydrosphere, lithosphere and/or biosphere									

5.10 A student assesses human impacts on the interaction of biotic and abiotic features of the environment										
5.10	Students learn about ecosystems									
	Students learn to:									
a)	distinguish between biotic and abiotic features of the local environment									
b)	describe the importance of cycles of materials in ecosystems									
c)	describe some impacts of human activities on ecosystems									
5.11 A student analyses the impact of human resource use on the biosphere to evaluate methods of conserving, protecting and maintaining Earth's resources										
5.11.1	Students learn about energy resources									
	Students learn to:									
a)	discuss the importance of energy as a resource									
b)	identify properties that make some natural resources economically important and describe their uses									
5.11.2	Students learn about waste from resource use									
	Students learn to:									
a)	relate pollution to contamination by unwanted substances									
b)	identify the excessive use of fossil fuels as a contributing factor to a greenhouse effect									
c)	discuss strategies used to balance human activities and needs in ecosystems with conserving, protecting and maintaining the quality and sustainability of the environment									
5.12 A student relates the interactions involved in using some common technologies to their underlying scientific principles										
5.12	Students learn about technology									
	Students learn to:									
a)	describe some everyday uses and effects of electromagnetic radiation, including applications in communications technology									
b)	discuss the benefits and problems associated with medical and industrial uses of nuclear energy									
c)	describe some benefits and problems of using biotechnology									
d)	describe ways in which technology has increased the variety of made resources									
5.13 A student identifies a problem and independently produces an appropriate investigation plan										
4/5.13.1	Students learn about identifying data sources									
	Students learn to:									
a)	describe a problem and develop an hypothesis or question that can be tested or researched									
b)	propose possible sources of data and/or information relevant to the investigation									
c)	identify what type of information or data need to be collected									
d)	justify why particular types of data or information are to be collected									
e)	identify the appropriate units to be used in collecting data									
f)	recommend the use of an appropriate technology or strategy for collecting data or gathering information									
g)	formulate a means of recording the data to be gathered or the information to be collected									
4/5.13.2	Students learn about planning first-hand investigations									
	Students learn to:									
a)	identify variables that need to be held constant if reliable first-hand data is to be collected									
b)	specify the dependent and independent variables when planning controlled experiments									
c)	describe a logical procedure for undertaking a simple or controlled experiment to collect valid first-hand data									
d)	establish an appropriate timeline for an investigation									
4/5.13.3	Students learn about choosing equipment or resources									
	Students learn to:									
a)	identify advantages and limitations of using particular laboratory and field equipment for a specific task									
b)	select appropriate equipment (including safety equipment) and/or resources to perform the task									
c)	describe ways to reduce the risk to themselves and others when working in the laboratory or field									

5.14 A student undertakes first-hand investigations independently with safety and competence									
4/5.14	Students learn about performing first-hand investigations								
	Students learn to:								
a)	follow the planned procedure when performing an investigation								
b)	use time and resources effectively								
c)	safely and effectively construct, assemble and manipulate identified equipment								
d)	record data using the appropriate units								
e)	evaluate and modify experimental procedures								
f)	demonstrate the use of safe and hygienic work practices including the correct use of safety equipment								
5.15 A student gathers first-hand data accurately									
4/5.15	Students learn about gathering first-hand information								
	Students learn to:								
a)	make and record observations and measurements accurately								
b)	use independently a range of data collection strategies and technologies such as data loggers								
5.16 A student accesses information from a wide variety of secondary sources									
4/5.16	Students learn about gathering information from secondary sources								
	Students learn to:								
a)	use a range of sources, including databases, CD-ROMs and the internet, to access information								
b)	use a variety of techniques, such as keywords, skimming and scanning to identify appropriate information								
c)	extract information from column graphs, histograms, divided bar and sector graphs, line graphs, composite graphs, flow diagrams, other texts and audio/visual resources								
d)	summarise information from identified oral and written secondary sources								
5.17 A student explains trends, patterns and relationships in data and/or information from a variety of sources									
4/5.17	Students learn about processing information								
	Students learn to:								
a)	collate information from a number of sources								
b)	distinguish between relevant and irrelevant information								
c)	check the reliability of gathered data and information by comparing them with observations or information from other sources								
d)	organise data using a variety of methods including diagrams, tables, spreadsheets and databases								
e)	critically analyse the accuracy of scientific information presented in mass media								
f)	identify trends, patterns, relationships and contradictions in data and information								
g)	apply mathematical concepts and computer based technologies to assist analysis of data and information								
5.18 A student selects and uses appropriate forms of communication to present information to an audience									
4/5.18	Students learn about presenting information								
	Students learn to:								
a)	select, and use appropriately, types of texts for different purposes and contexts including a discussion, explanation, procedure, exposition, recount, report, response or experimental record for oral or written presentation								
b)	select and use an appropriate medium to present data and information								
c)	select and use an appropriate method to acknowledge sources of information								
d)	use symbols to express relationships, including mathematical ones, and appropriate units for physical quantities								
e)	use drawings, diagrams, graphs, tables, databases, spreadsheets and flow charts to show relationships and present information clearly and/or succinctly								
f)	select and draw the appropriate type of graph (from column graph, histogram, divided bar, sector or line graph) or diagram to convey information and relationships clearly and accurately								
5.19 A student uses critical thinking skills in evaluating information and drawing conclusions									
4/5.19	Students learn about thinking critically								
	Students learn to:								
a)	justify inferences in light of gathered information								
b)	identify data which supports or discounts an hypothesis, a question being investigated or a proposed solution to a problem								
c)	predict outcomes and generate plausible explanations directly related to observations made								
d)	make generalisations in relation to a relevant set of observations or experimental results								

e)	anticipate and/or respond to problems as they arise in practical situations																			
f)	use models, including mathematical ones, to explain phenomena or make predictions																			
g)	use cause and effect relationships to explain ideas																			
5.20 A student selects and uses appropriate strategies to solve problems																				
4/5.20	Students learn about problem-solving																			
	Students learn to:																			
a)	identify the nature of a presented problem																			
b)	describe different strategies that could be employed to solve an identified problem																			
c)	use identified strategies to develop a range of possible solutions to a particular problem																			
d)	evaluate the appropriateness of different strategies for solving an identified problem																			
5.21 A student uses creativity and imagination in the analysis of problems and the development of possible solutions																				
4/5.21	Students learn about the use of creativity and imagination																			
	Students learn to:																			
a)	seek evidence to support claims																			
b)	evaluate evidence for reliability and validity																			
c)	produce creative solutions for problems																			
d)	propose ideas that demonstrate coherence and logical progression																			
e)	apply critical thinking in the consideration of proposals																			
f)	formulate cause and effect relationships																			
5.22 A student plans, implements and evaluates the effectiveness of a variety of tasks independently and as a team member																				
4/5.22.1	Students learn about working individually																			
	Students learn to:																			
a)	independently plan and conduct investigations, communicate information and understanding and solve problems																			
b)	set and work to realistic timelines and goals																			
c)	accept responsibility for maintenance of a safe working environment for themselves and others																			
d)	evaluate the effectiveness of their performance in completing tasks																			
4/5.22.2																				
4/5.22.2	Students learn about working in teams																			
	Students learn to:																			
a)	identify the specific roles needed when working in a team																			
b)	match the tasks to the team members according to the requirements of the task and the skills of the individual																			
c)	negotiate and allocate individual roles to members of the team																			
d)	accept specific roles in a team while planning and conducting investigations, communicating information and understanding and solving problems																			
e)	set and work to realistic timelines and goals as a team																			
f)	accept personal responsibility for maintenance of a safe working environment for the team																			
g)	monitor progress of the team towards completion of the task																			
h)	evaluate the process used by the team and effectiveness of the team in completing the task																			