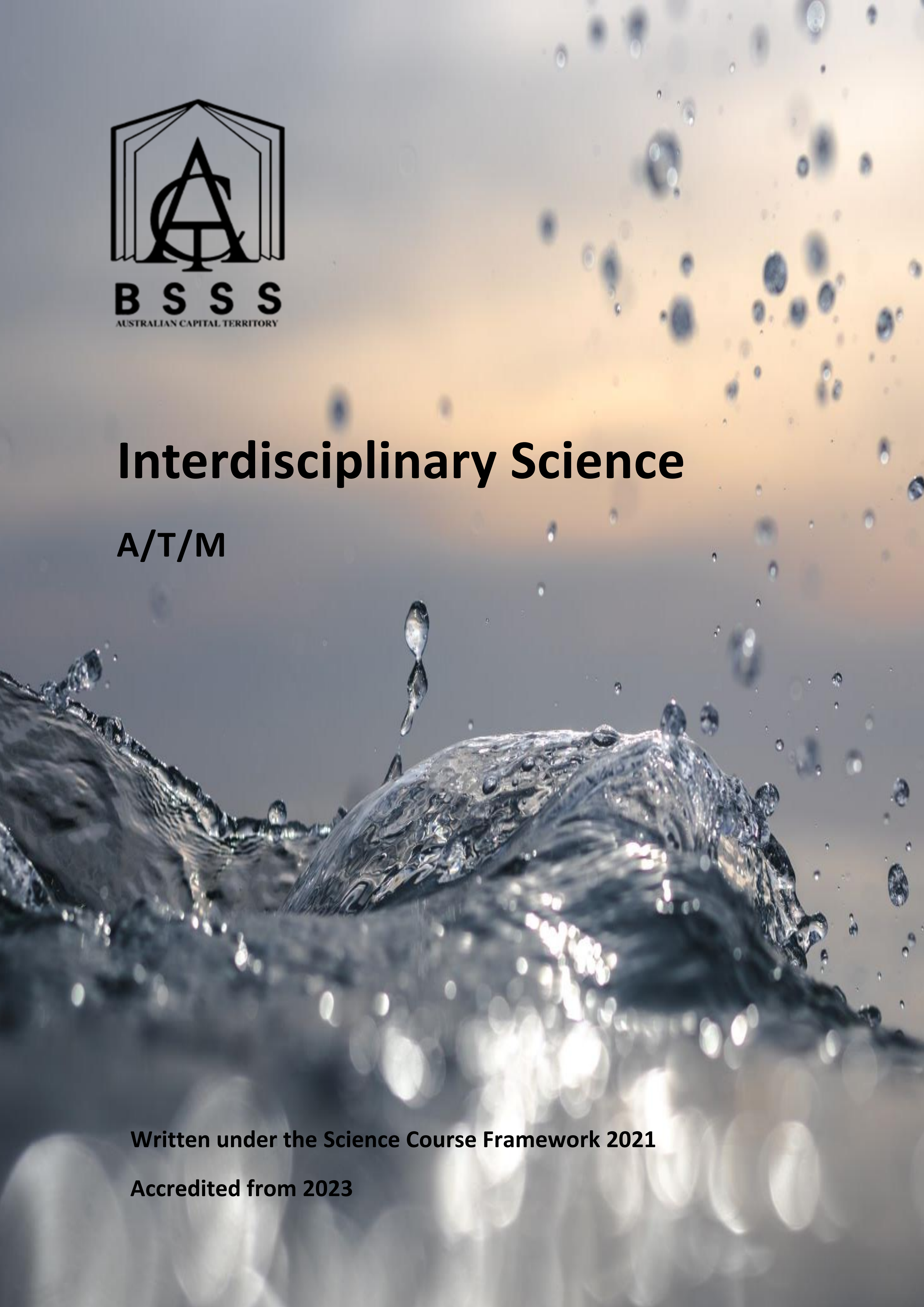

BSSS
AUSTRALIAN CAPITAL TERRITORY

Interdisciplinary Science

A/T/M

Written under the Science Course Framework 2021

Accredited from 2023

Front Cover Art provided by Canberra College student Aidan Giddings

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The ACT Senior Secondary System

The ACT senior secondary system recognises a range of university, vocational or life skills pathways.

The system is based on the premise that teachers are experts in their area: they know their students and community and are thus best placed to develop curriculum and assess students according to their needs and interests. Students have ownership of their learning and are respected as young adults who have a voice.

A defining feature of the system is school-based curriculum and continuous assessment. School-based curriculum provides flexibility for teachers to address students' needs and interests. College teachers have an opportunity to develop courses for implementation across ACT schools. Based on the courses that have been accredited by the BSSS, college teachers are responsible for developing programs of learning. A program of learning is developed by individual colleges to implement the courses and units they are delivering.

Teachers must deliver all content descriptions; however, they do have flexibility to emphasise some content descriptions over others. It is at the discretion of the teacher to select the texts or materials to demonstrate the content descriptions. Teachers can choose to deliver course units in any order and teach additional (not listed) content provided it meets the specific unit goals.

School-based continuous assessment means that students are continually assessed throughout years 11 and 12, with both years contributing equally to senior secondary certification. Teachers and students are positioned to have ownership of senior secondary assessment. The system allows teachers to learn from each other and to refine their judgement and develop expertise.

Senior secondary teachers have the flexibility to assess students in a variety of ways. For example: multimedia presentation, inquiry-based project, test, essay, performance and/or practical demonstration may all have their place. College teachers are responsible for developing assessment instruments with task specific rubrics and providing feedback to students.

The integrity of the ACT Senior Secondary Certificate is upheld by a robust, collaborative, and rigorous structured consensus-based peer reviewed moderation process. System moderation involves all year 11 and 12 teachers from public, non-government and international colleges delivering the ACT Senior Secondary Certificate.

Only students who desire a pathway to university are required to sit a general aptitude test, referred to as the ACT Scaling Test (AST), which moderates student scores across courses and colleges. Students are required to use critical and creative thinking skills across a range of disciplines to solve problems. They are also required to interpret a stimulus and write an extended response.

Senior secondary curriculum makes provision for student-centred teaching approaches, integrated and project-based learning inquiry, formative assessment, and teacher autonomy. ACT Senior Secondary Curriculum makes provision for diverse learners and students with mild to moderate intellectual disabilities, so that all students can achieve an ACT Senior Secondary Certificate.

The ACT Board of Senior Secondary Studies (BSSS) leads senior secondary education. It is responsible for quality assurance in senior secondary curriculum, assessment, and certification. The Board consists of nominees from colleges, professional bodies, universities, industry, parent/carer organisations and unions. The Office of the Board of Senior Secondary Studies (OBSSS) consists of professional and administrative staff who support the Board in achieving its objectives and functions.

ACT Senior Secondary Certificate

Courses of study for the ACT Senior Secondary Certificate:

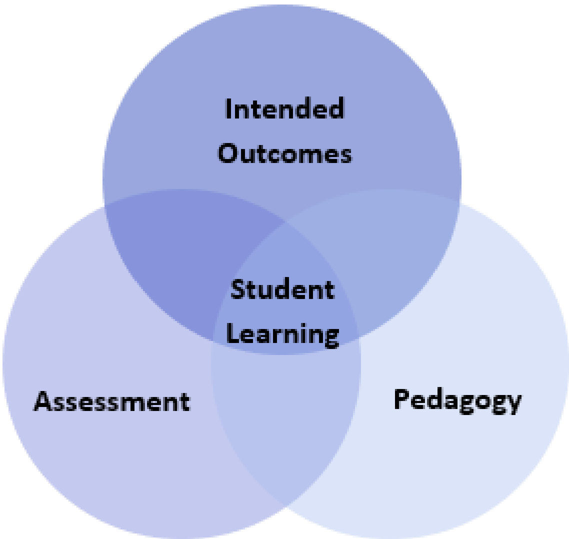
- provide a variety of pathways, to meet different learning needs and encourage students to complete their secondary education
- enable students to develop the essential capabilities for twenty-first century learners
- empower students as active participants in their own learning
- engage students in contemporary issues relevant to their lives
- foster students' intellectual, social, and ethical development
- nurture students' wellbeing, and physical and spiritual development
- enable effective and respectful participation in a diverse society.

Each course of study:

- comprises an integrated and interconnected set of knowledge, skills, behaviours, and dispositions that students develop and use in their learning across the curriculum
- is based on a model of learning that integrates intended student outcomes, pedagogy, and assessment
- outlines teaching strategies which are grounded in learning principles and encompass quality teaching
- promotes intellectual quality, establishes a rich learning environment, and generates relevant connections between learning and life experiences
- provides formal assessment and certification of students' achievements.

Underpinning beliefs

- All students are able to learn.
- Learning is a partnership between students and teachers.
- Teachers are responsible for advancing student learning.



Learning Principles

1. Learning builds on existing knowledge, understandings, and skills.
   (Prior knowledge)
2. When learning is organised around major concepts, principles, and significant real-world issues, within and across disciplines, it helps students make connections and build knowledge structures.
   (Deep knowledge and connectedness)
3. Learning is facilitated when students actively monitor their own learning and consciously develop ways of organising and applying knowledge within and across contexts.
   (Metacognition)
4. Learners' sense of self and motivation to learn affects learning.
   (Self-concept)
5. Learning needs to take place in a context of high expectations.
   (High expectations)
6. Learners learn in different ways and at different rates.
   (Individual differences)
7. Different cultural environments, including the use of language, shape learners' understandings and the way they learn.
   (Socio-cultural effects)
8. Learning is a social and collaborative function as well as an individual one.
   (Collaborative learning)
9. Learning is strengthened when learning outcomes and criteria for judging learning are made explicit and when students receive frequent feedback on their progress.
   (Explicit expectations and feedback)

General Capabilities

All courses of study for the ACT Senior Secondary Certificate should enable students to develop essential capabilities for twenty-first century learners. These 'capabilities' comprise an integrated and interconnected set of knowledge, skills, behaviours, and dispositions that students develop and use in their learning across the curriculum.

The capabilities include:

- literacy
- numeracy
- information and communication technology (ICT)
- critical and creative thinking
- personal and social capability
- ethical understanding
- intercultural understanding

Courses of study for the ACT Senior Secondary Certificate should be both relevant to the lives of students and incorporate the contemporary issues they face. Hence, courses address the following three priorities. These priorities are:

- Aboriginal and Torres Strait Islander histories and cultures
- Asia and Australia's engagement with Asia
- Sustainability

Elaboration of these General Capabilities and priorities is available on the ACARA website at www.australiancurriculum.edu.au.

Literacy

Literacy is important in students' development of Science Inquiry Skills and their understanding of content presented through the Science Understanding and Science as a Human Endeavour strands. Students gather, interpret, synthesise, and critically analyse information presented in a wide range of genres, modes, and representations (including text, flow diagrams, symbols, graphs and tables). They evaluate information sources and compare and contrast ideas, information and opinions presented within and between texts. They communicate processes and ideas logically and fluently and structure evidence-based arguments, selecting genres and employing appropriate structures and features to communicate for specific purposes and audiences. They evaluate popular science texts and social media for its scientific validity.

Numeracy

Numeracy is key to students' ability to apply a wide range of Science Inquiry Skills, including making and recording observations; ordering, representing, and analysing data; and interpreting trends and relationships, such as using statistical mathematics. They employ numeracy skills to interpret complex spatial and graphic representations, and to appreciate the ways in which physical, biological and chemical systems are structured, interact and change across spatial and temporal scales. Students engage in analysis of data, including issues relating to reliability and probability, and they interpret and manipulate mathematical relationships to calculate and predict values. They employ software to model, represent, organise, and analyse data.

Information and Communication Technology (ICT) Capability

ICT capability is a key part of Science Inquiry Skills. Students use a range of strategies to locate, access and evaluate information from multiple digital sources; to collect, analyse and represent data; to model and interpret concepts and relationships; and to communicate and share science ideas, processes, and information. Through exploration of Science as a Human Endeavour concepts, students assess the impact of ICT on the development of science and the application of science in society, particularly with regard to collating, storing, managing, and analysing large data sets. They use ICT in simulations and in research.

Critical and Creative Thinking

Critical and creative thinking is particularly important in the science inquiry process. Science inquiry requires the ability to construct, review and revise questions and hypotheses about increasingly complex and abstract scenarios and to design related investigation methods. Students interpret and evaluate data; interrogate, select, and cross-reference evidence; and analyse processes, interpretations, conclusions and claims for validity and reliability, including reflecting on their own processes and conclusions. Science is a creative endeavour and students devise innovative solutions to problems, predict possibilities, envisage consequences, and speculate on possible outcomes as they develop Science Understanding and Science Inquiry Skills. They also appreciate the role of critical and creative individuals and the central importance of critique and review in the development and innovative application of science.

Personal and Social Capability

Personal and social capability is integral to a wide range of activities in Interdisciplinary Science, as students develop and practise skills of communication, teamwork, decision-making, initiative-taking and self-discipline with increasing confidence and sophistication. In particular, students develop skills in both independent and collaborative investigation; they employ self-management skills to plan effectively, follow procedures efficiently and work safely; and they use collaboration skills to conduct investigations, share research and discuss ideas. In considering aspects of Science as a Human Endeavour, students also recognise the role of their own beliefs and attitudes in their response to science issues and applications, consider the perspectives of others, and gauge how science can affect people's lives. In reflecting on their work, students identify areas of strength and areas for growth. They develop a self-reflective practice that will assist them in growing and improving in all areas of life.

Ethical Understanding

Ethical understanding is a vital part of Interdisciplinary Science inquiry. Students evaluate the ethics of experimental science, codes of practice, and the use of scientific information and science applications. They explore what integrity means in science, and they understand, critically analyse, and apply ethical guidelines in their investigations. They consider the implications of their investigations on others, the environment and living organisms. They use scientific information to evaluate the claims and actions of others and to inform ethical decisions about a range of social, environmental, and personal issues and applications of science.

Intercultural Understanding

Intercultural understanding is fundamental to understanding aspects of Science as a Human Endeavour, as students appreciate the contributions of diverse cultures to developing science understanding and the challenges of working in culturally diverse collaborations. They develop awareness that raising some debates within culturally diverse groups requires cultural sensitivity, and they demonstrate open-mindedness to the positions of others. Students also develop an understanding that cultural factors affect the ways in which science influences and is influenced by society.

Cross-Curriculum Priorities

While the significance of the cross-curriculum priorities for Interdisciplinary Science varies, there are specific opportunities for teachers to select contexts that incorporate the key concepts from each priority.

Aboriginal and Torres Strait Islander Histories and Cultures

Through an investigation of contexts that draw on Aboriginal and Torres Strait Islander histories and cultures students could investigate the importance of Aboriginal and Torres Strait Islander Peoples' knowledge in developing a richer understanding of the Australian environment, and the reverence Aboriginal and Torres Strait Islander Peoples' place on particular species. Students could develop an appreciation of the unique Australian biota and its interactions, the impacts of Aboriginal and Torres Strait Islander Peoples on their environments and the ways in which the Australian landscape has changed over tens of thousands of years. They could examine the ways in which Aboriginal and Torres Strait Islander knowledge of ecosystems has developed over time and the spiritual significance of Country/Place. Students could look at the physics in development of aboriginal tools and the astronomy understanding that underpinned knowledge of navigation and the seasons.

Asia and Australia's Engagement with Asia

Contexts that draw on Asian scientific research and development and collaborative endeavours in the Asia Pacific region provide an opportunity for students to investigate Asia and Australia's engagement with Asia. Students could explore the diverse scientific environments of the Asia region and develop an appreciation that interaction between human activity and these environments continues to influence the region, including Australia, and has significance for the rest of the world. By examining developments in all disciplines of science and their application, students could appreciate that the Asia region plays an important role in scientific research and development, including through collaboration with Australian scientists, in such areas as medicine, natural resource management, biosecurity and food security.

Sustainability

The sustainability cross-curriculum priority is explicitly addressed in the Interdisciplinary Science curriculum. The Sustainability priority provides the opportunity for students to develop an appreciation of the necessity of acting for a more sustainable future and so address the ongoing capacity of Earth to maintain all life and meet the needs of the present without compromising the needs of future generations. Actions that support more sustainable patterns of living require consideration of environmental, social, cultural, and economic systems and their interdependence.

Students appreciate that science provides the basis for decision making in many areas of society and that these decisions can impact the Earth system. They understand the importance of using science to predict possible effects of human and other activity, and to develop management plans or alternative technologies, drawing on the disciplines of Interdisciplinary Science that provide for a more sustainable future.

Interdisciplinary Science
A/T/M

Rationale

Interdisciplinary Science A/T/M engages students in investigating the complex relationships between systems and domains of science inherent to investigating phenomena and problems in the world today. They develop the scientific, mathematical, and technological skills to engage with the study of contemporary interdisciplinary science topics and develop an understanding of problems confronting society.

Provision for development of integrated courses is important for developing quality curriculum that prepares students for life and work in the 21st Century. According to Masters (2016), solutions to societal challenges and the nature of work are becoming increasingly cross-disciplinary. Masters (2015) advocates that integrated curriculum enables students to apply deep understandings of key disciplinary concepts and principles to real-world problems. They promote creativity and the ability to develop innovative solutions to entirely new problems. As such this course focuses on the collaborative solution of real, complex problems.

In bringing together often siloed domains of knowledge, students pursue understanding and a depth of analysis uninhibited by disciplinary boundaries by acquiring the skills and knowledge necessary to solve problems. This has a range of benefits for student development of skills in scientific analysis as well as 21st century work and life skills. Higher order thinking is facilitated through the opportunities to inquire freely, think critically, use deductive and inductive reasoning, think creatively, and reason using analogy and synthetic thinking. Students gain deep understanding through the analysis of complex systems as they are, rather than limited by the boundaries of disciplines.

Students develop communication and interpersonal skills in undertaking meaningful collaborative projects to solve problems. They understand the challenges of producing and disseminating reliable scientific knowledge in often heavily contested policy spaces. They learn to address the challenges of applying contemporary research findings and recommendations in contexts characterised by evolving scientific understanding, tradition, economic pressures, and policy conflict.

This course develops the scientific literacy necessary to understanding the world around them and engage meaningfully as citizens in the significant policy debates that will shape our future. It allows students to pursue areas of interest and satisfy their curiosity. For those students interested in a career in science, it will prepare students for further study in a range of areas, and potentially work in a growing economic sector. For those not interested in a career in science, the capacity for critical and creative thought, IT skills, literacy and numeracy will be valued as preparation for any career goal.

Goals

This course should develop students':

- sense of wonder and curiosity about nature and an appreciation of how scientific knowledge can be used to address contemporary issues
- understanding of the theories and models used to describe, explain, and make predictions about systems, structures, and properties to provide a reliable basis for action
- understanding that scientific knowledge is developing over time, is being used in a variety of contexts; and influences, and is continuing to be influenced by, historical, social, economic, cultural, and ethical considerations and new discoveries understanding that Science is experimental and has developed through independent and collaborative research, and has significant impacts on society and implications for decision making

- ability to design and conduct a variety of field and laboratory investigations involving collection and critical analysis of data, and interpretation of evidence
- ability to critically evaluate scientific concepts, interpretations and claims in order to solve problems and generate informed, considered, and ethical conclusions
- ability to communicate scientific understanding, findings, arguments, and conclusions using appropriate representations, modes, and genres.

Unit Titles

- Interdisciplinary Systems
- Modelling Systems
- Interdisciplinary Solutions
- Contemporary Innovations in Science
- Independent Study

Organisation of Content

Interdisciplinary Systems

Students investigate the interdisciplinarity of systems in the area of study, and the intersection of different scientific domains. They bring together scientific knowledge gained in disciplinary studies and apply to contexts and situations in their world from the area of study. They inquire into the theories, principles and processes of the identified systems using the skills, knowledge, and methods of a range of relevant scientific domains. Students draw on understanding derived from different scientific domains to draw conclusions and make recommendations.

Modelling Systems

Students investigate how to model systems using and discovering mathematics, IT and the scientific principles of the systems being studied. Students learn to define problems, including graphical approaches, and develop questions that can be addressed by science using modelling. Students apply models to understand system behaviour, and how systems respond to transient events and long-term trends. They develop an understanding of the strengths and weaknesses of models and how to communicate findings honestly, clearly, and persuasively to generate understanding in the general community.

Interdisciplinary Solutions

Students investigate examples and case studies of interdisciplinary problem solving in the area of study. They investigate problems in the identified area of study and use interdisciplinary knowledge, understanding and skills to find solutions to problems. They investigate how systems are intentionally manipulated and unintentionally affected by human activity. They evaluate the sustainability of use and impact and possible alternative solutions.

Contemporary Innovations in Science

Students investigate new discoveries and methodologies related to the area of study. They investigate interdisciplinary applications and possibilities raised by new findings in sub-disciplines. They draw links between findings in different sub-disciplines and their broader applications in addressing problems in society and within the area of study.

Independent Study

An Independent Study unit has an important place in senior secondary courses. It is a valuable pedagogical approach that empowers students to make decisions about their own learning. An Independent Study unit can be proposed by an individual student for their own independent study and negotiated with their teacher. The program of learning for an Independent Study unit must meet the unit goals and content descriptions as they appear in the course.

Independent Study units are only available to individual students in Year 12. A student can only study a maximum of one Independent Study unit in each course. Students must have studied at least three standard 1.0 units from this course. An Independent Study unit requires the principal’s written approval. Principal approval can also be sought by a student in Year 12 to enrol concurrently in an Independent Study unit and their third 1.0 unit in this course of study.

Assessment

The identification of criteria within the achievement standards and assessment task types and weightings provides a common and agreed basis for the collection of evidence of student achievement.

Assessment Criteria (the dimensions of quality that teachers look for in evaluating student work) provide a common and agreed basis for judgement of performance against unit and course goals, within and across colleges. Over a course, teachers must use all these criteria to assess students’ performance but are not required to use all criteria on each task. Assessment criteria are to be used holistically on a given task and in determining the unit grade.

Assessment Tasks elicit responses that demonstrate the degree to which students have achieved the goals of a unit based on the assessment criteria. The Common Curriculum Elements (CCE) is a guide to developing assessment tasks that promote a range of thinking skills (see Appendix C). It is highly desirable that assessment tasks engage students in demonstrating higher order thinking.

Rubrics are constructed for individual tasks, informing the assessment criteria relevant for a particular task, and can be used to assess a continuum that indicates levels of student performance against each criterion.

Assessment Criteria

Students will be assessed on the degree to which they demonstrate understanding of:

- concepts, models, and application
- contexts
- inquiry skills.

Assessment Task Types

Suggested tasks Individual tasks may incorporate one or more of the following: • models • commentary • debate • portfolio/journal • field work • investigation • document/source analysis • practical report • role play • research report • test/quiz • seminar/workshop/lecture • poster • response to stimulus • essay • multimedia presentation • creative response • interview • discussion forum • rationale/validation • practical skills
It is recommended that a student conceived investigation be undertaken at least once during a minor and twice during a major. This investigation may either be theoretical or practical, or a combination of both.
Weightings in A/T/M 1.0 and 0.5 Units: No task to be weighted more than 45% for a standard 1.0 unit.

Additional Assessment Information

- For a standard unit (1.0), students must complete a minimum of three assessment tasks and a maximum of five.
- For a half standard unit (0.5), students must complete a minimum of two and a maximum of three assessment tasks.
- Students must experience a variety of task types and different modes of communication to demonstrate the Achievement Standards in both theoretical and practical tasks.
- All Achievement Standards must be demonstrated in standard (1.0) or half-standard (0.5) units.
- Task types need to be selected to address all Achievement Standards within the Concepts, Models & Applications, Contexts, and Inquiry Skills strands across a standard (1.0) or half-standard (0.5) unit.
- For tasks completed in unsupervised conditions, schools need to have mechanisms to uphold academic integrity, for example: student declaration, plagiarism software, oral defence, interview, or other validation tasks.

Achievement Standards

Years 11 and 12 Achievement Standards are written for A/T courses. A single Achievement Standard is written for M courses.

A Year 12 student in any unit is assessed using the Year 12 Achievement Standards. A Year 11 student in any unit is assessed using the Year 11 Achievement Standards. Year 12 Achievement Standards reflect higher expectations of student achievement compared to the Year 11 Achievement Standards. Years 11 and 12 Achievement Standards are differentiated by cognitive demand, the number of dimensions and the depth of inquiry.

An Achievement Standard cannot be used as a rubric for an individual assessment task. Assessment is the responsibility of the college. Student tasks may be assessed using rubrics or marking schemes devised by the college. A teacher may use the Achievement Standards to inform development of rubrics. The verbs used in Achievement Standards may be reflected in the rubric. In the context of combined Years 11 and 12 classes, it is best practice to have a distinct rubric for Years 11 and 12. These rubrics should be available for students prior to completion of an assessment task so that success criteria are clear.

BSSS Achievement Standards for Science A Course – Year 11

	*A student who achieves an **A** grade typically*	*A student who achieves a **B** grade typically*	*A student who achieves a **C** grade typically*	*A student who achieves a **D** grade typically*	*A student who achieves an **E** grade typically*
Concepts, Models & Applications	• analyses the fundamental properties and functions of system components, processes, and interactions, and how they are affected by factors across a range of temporal and spatial scales	• explains the fundamental properties and functions of system components, processes, and interactions, and how they are affected by factors across a range of temporal and spatial scales	• describes the fundamental properties and functions of system components, processes, and interactions, and how they are affected by factors across a range of temporal and spatial scales	• identifies the fundamental properties and functions with some identification of system components and factors that affect processes across a range of temporal and spatial scales	• identifies the fundamental properties and functions with little or no identification of system components, processes, interactions, and contextual scales
	• analyses the nature, functions, limitations and applications of theories and models using evidence, in unfamiliar contexts	• explains the nature, functions, limitations and applications of theories and models using evidence, in familiar contexts	• describes the nature, functions, limitations and applications of theories and models with supporting evidence	• identifies the nature, functions, applications, and some possible limitations of theories and models, with some evidence	• identifies the nature, function of theories and models, with an assertion of a few possible limitations
	• assesses processes and claims, provides a critique based on evidence, and discusses alternatives	• explains processes and claims, provides a critique with reference to evidence, and identifies alternatives	• describes processes and claims, and identifies alternatives with some reference to evidence	• identifies processes and claims, and identifies the need for improvements with some reference to evidence	• identifies processes and the need for some improvements, with little or no reference to evidence
Contexts	• analyses how the practice and applications of science meet needs, make decisions; and is influenced by social, economic, technological, and ethical factors	• explains how the practice and applications of science meet needs, make decisions, and is influenced by social, economic, technological, and ethical factors	• describes how the applications of science meet needs, make decisions, and is influenced by social, economic, technological, and ethical factors	• identifies ways in the applications of science meet needs, and is influenced by some factors	• identifies ways in which the application of science has been used in society to meet needs
Inquiry Skills	• designs, conducts and improves safe, ethical and original inquiries individually and collaboratively, that efficiently collect valid and reliable data in response to a complex question	• designs, conducts, and improves safe, ethical inquiries individually and collaboratively, that collect valid data in response to a complex question	• plans and conducts safe, ethical inquiries individually and collaboratively, that collect valid data in response to a question	• follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data in response to a question with varying success	• follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data with little or no connection to a question
	• analyses causal and correlational relationships, anomalies, reliability and validity of data and representations, and analyses errors	• explains causal and correlational relationships, anomalies, reliability and validity of data and representations, and explains errors	• describes relationships in data sets, reliability and validity of data and representations, and describes common errors	• identifies trends and anomalies in data and representations, with general comments about errors	• identifies trends in data and representations, with little or no reference to anomalies and errors
	• reflects with insight on their own thinking and learning and evaluates planning, time management and use of appropriate strategies to work independently and collaboratively	• reflects on their own thinking and analyses planning, time management, use of appropriate strategies to work independently and collaboratively	• reflects on their own thinking and explains planning, time management, use of appropriate strategies to work independently and collaboratively	• reflects on their own thinking with some reference to planning, time management, use of appropriate strategies to work independently and collaboratively	• reflects on their own thinking with little or no reference to planning, time management, use of appropriate strategies to work independently and collaboratively
	• communicates concisely, effectively, and accurately, demonstrating scientific literacy in a range of modes, styles, representations, and genres for specific audiences and purposes, with appropriate evidence and accurate referencing	• communicates clearly and accurately, demonstrating scientific literacy in a range of modes, styles, representations and genres for specific audiences and purposes, with appropriate evidence and accurate referencing	• communicates accurately demonstrating scientific literacy, in a range of modes, styles, representations, and genres for specific purposes, with appropriate evidence and mostly consistent referencing	• communicates demonstrating some scientific literacy, in a range of modes, representations, and genres with some evidence and inconsistent referencing	• communicates demonstrating limited scientific literacy, in a range of modes and representations, with inconsistent and inaccurate referencing

BSSS Achievement Standards for Science T Course – Year 11

	*A student who achieves an **A** grade typically*	*A student who achieves a **B** grade typically*	*A student who achieves a **C** grade typically*	*A student who achieves a **D** grade typically*	*A student who achieves an **E** grade typically*
Concepts, Models & Applications	• critically analyses the fundamental properties and functions of system components, processes and interactions, and the effects of factors across a range of scales • evaluates the nature, functions, limitations and applications of theories and models using evidence, in unfamiliar contexts • analyses evidence with reference to models and/or theories, and develops evidence-based conclusions and evaluates limitations	• analyses the fundamental properties and functions of system components, processes and interactions, and the effects of factors across a range of scales • analyses the nature, functions, limitations and applications of theories and models using evidence, in familiar contexts • assesses evidence with reference to models and/or theories, and develops evidence-based conclusions and discusses limitations	• explains the fundamental properties and functions of system components, processes and interactions and the effects of factors across a range of scales • explains the nature, functions, limitations and applications of theories and models using evidence, in familiar contexts • explains evidence with reference to models and/or theories, and develops evidence-based conclusions and identifies limitations	• describes the fundamental properties and functions, and with some description of system components, processes and interactions, and the effects of factors across a range of scales • describes the nature, functions, limitations and applications of theories and models with supporting evidence • describes evidence, and develops conclusions with some reference to models and/or theories	• identifies the fundamental properties and functions of system and identifies components, processes and interactions, and the effects of factors across a range of scales • identifies the nature, functions, applications, and some possible limitations of theories and models, with some evidence • identifies evidence, and asserts conclusions with little or no reference to models and/or theories
Contexts	• critically analyses epistemology, role of peer review, collaboration, and technology in developing knowledge • critically analyses the influence of social, economic, ethical, and cultural factors on Science	• analyses epistemology, role of peer review and technology in developing knowledge • analyses the influence of social, economic, ethical, and cultural factors on Science	• explain epistemology, role of peer review and technology in developing knowledge • explains the influence of social, economic, ethical, and cultural factors on Science	• describes the role of peer review in developing knowledge • describes the influence of social, economic, ethical, and cultural factors on Science	• identifies that scientific knowledge has changed over time • identifies the influence of social, economic, ethical, and cultural factors on Science
Inquiry Skills	• designs, conducts and improves safe, ethical and original inquiries individually and collaboratively, that collect valid, reliable data in response to a complex question • analyses causal and correlational relationships, anomalies, reliability and validity of data and representations, and analyses errors • analyses processes and claims, and provides a critique based on evidence, and critically analyses alternatives • reflects with insight on own thinking and that of others, and evaluates planning, time management, and use of appropriate work strategies to work independently and collaboratively • communicates concisely, effectively, and accurately, demonstrating scientific literacy in a range of modes, styles, representations, and genres for specific audiences and purposes, with appropriate evidence and accurate referencing	• designs, conducts, and improves safe, ethical inquiries individually and collaboratively, that collect valid, reliable data in response to a question • analyses causal and correlational relationships, anomalies, reliability and validity of data and representations, and discusses errors • assesses processes and claims, and provides a critique with reference to evidence, and analyses alternatives • reflects on their own thinking and analyses planning, time management, use of appropriate work strategies to work independently and collaboratively • communicates clearly and accurately, demonstrating scientific literacy in a range of modes, styles, representations and genres for specific audiences and purposes, with appropriate evidence and accurate referencing	• plans and conducts safe, ethical inquiries individually and collaboratively, that collect valid data in response to a familiar question • explains causal and correlational relationships, anomalies, reliability and validity of data and representations, and cites common errors • explains processes and claims, and identifies alternatives with reference to reliable evidence • reflects on their own thinking and explains planning, time management, use of appropriate work strategies to work independently and collaboratively • communicates accurately demonstrating scientific literacy, in a range of modes, styles, representations, and genres for specific purposes, with appropriate evidence and mostly consistent referencing	• follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data in response to a simple question with varying success • describes trends, relationships, and anomalies in data, identifies anomalies, and some possible sources of error • describes processes and claims, and identifies the need for improvements with some reference to evidence • reflects on their own thinking, with reference to planning and the use of appropriate work strategies to work independently and collaboratively • communicates demonstrating some scientific literacy, in a range of modes, representations, and genres with some evidence and inconsistent referencing	• follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data with little or no connection to a question • identifies trends and relationships in data, with little or no reference to sources of error • identifies processes and the need for some improvements, with little or no reference to evidence • reflects on their own thinking with little or no reference to planning, time management, and use of work strategies to work independently and collaboratively • communicates demonstrating limited scientific literacy, in a range of modes and representations, with inconsistent and inaccurate referencing

BSSS Achievement Standards for Science A Course – Year 12

	*A student who achieves an **A** grade typically*	*A student who achieves a **B** grade typically*	*A student who achieves a **C** grade typically*	*A student who achieves a **D** grade typically*	*A student who achieves an **E** grade typically*
Concepts, Models & Applications	• analyses the fundamental properties and functions of system components, processes and interactions, and the effects of factors across a range of scales	• explains the fundamental properties and functions of system components, processes and interactions, and the effects of factors across a range of scales	• describes the fundamental properties and functions of system components, processes and interactions, and the effects of factors across a range of scales	• describes the fundamental properties and functions of system components, processes and interactions, and the effects of one or more factors	• identifies the fundamental properties and functions of system components, processes and interactions, and the effects of factors
	• analyse the nature, functions, limitations and applications of theories and models using evidence, in unfamiliar contexts	• explains the nature, functions, limitations and applications of theories and models using evidence, in familiar contexts	• describes the nature, functions, limitations and applications of theories and models using evidence, in familiar contexts	• describes the nature, functions, limitations and applications of theories and models with supporting evidence	• identifies the nature, functions, applications, and some limitations of theories and models with some evidence
	• assesses evidence with reference to models and/or theories, and develops evidence-based conclusions and evaluates limitations	• explains evidence with reference to models and/or theories, and develops evidence-based conclusions and discusses limitations	• describes evidence with reference to models and/or theories, and develops evidence-based conclusions and identifies limitations	• describes evidence, and develops conclusions with some reference to models and/or theories	• identifies evidence, and asserts conclusions with little or no reference to models and/or theories
Contexts	• analyses epistemology, role of peer review, collaboration, and technology in developing knowledge	• explains epistemology, role of peer review and technology in developing knowledge	• describes epistemology, role of peer review and technology in developing knowledge	• describes role of peer review and technology in developing knowledge	• identifies that scientific knowledge has changed over time
	• analyses the influence of social, economic, ethical, and cultural factors on Science	• explains the influence of social, economic, ethical, and cultural factors on Science	• describes the influence of social, economic, ethical, and cultural factors on Science	• describes the influence of social, economic, ethical, and cultural factors on Science	• identifies the influence of social, economic, ethical, and cultural factors on Science
Inquiry Skills	• designs, conducts and improves safe, ethical and original inquiries individually and collaboratively, that collect valid, reliable data in response to a complex question	• designs, conducts, and improves safe, ethical inquiries individually and collaboratively, that collect valid, reliable data in response to a question	• plans and conducts safe, ethical inquiries individually and collaboratively, that collect valid data in response to a familiar question	• follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data in response to a simple question with varying success	• follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data with little or no connection to a question
	• analyses causal and correlational relationships, anomalies, reliability and validity of data and representations, and analyses errors	• analyses causal and correlational relationships, anomalies, reliability and validity of data and representations, and discusses errors	• describes causal and correlational relationships, anomalies, reliability and validity of data and representations, and cites common errors	• describes trends, relationships, and anomalies in data, identifies anomalies, and some possible sources of error	• identifies trends and relationships in data, with little or no reference to sources of error
	• analyses processes and claims, and provides a critique based on evidence, and analyses alternatives	• explains processes and claims, and provides a critique with reference to evidence, and proposes alternatives	• describes processes and claims, and identifies alternatives with reference to reliable evidence	• describes processes and claims, and identifies the need for improvements with some reference to evidence	• identifies processes and the need for some improvements, with little or no reference to evidence
	• reflects with insight on own thinking and that of others and, evaluates planning, time management and use of appropriate independent and collaborative work strategies	• reflects on their own thinking and analyses planning, time management, and use of appropriate independent and collaborative work strategies	• reflects on their own thinking and explains planning, time management, and use of appropriate independent and collaborative work strategies	• reflects on their own thinking, with reference to planning and the use of appropriate independent and collaborative work strategies	• reflects on their own thinking with little or no reference to planning, time management, and use of appropriate independent and collaborative work strategies
	• communicates concisely, effectively, and accurately, demonstrating scientific literacy in a range of modes, styles, representations, and genres for specific audiences and purposes, with appropriate evidence and accurate referencing	• communicates clearly and accurately, demonstrating scientific literacy in a range of modes, styles, representations and genres for specific audiences and purposes, with appropriate evidence and accurate referencing	• communicates accurately demonstrating scientific literacy, in a range of modes, styles, representations, and genres for specific purposes, with appropriate evidence and mostly consistent referencing	• communicates demonstrating some scientific literacy, in a range of modes, representations, and genres with some evidence and inconsistent referencing	• communicates demonstrating limited scientific literacy, in a range of modes and representations, with inconsistent and inaccurate referencing

BSSS Achievement Standards for Science T Course – Year 12

	*A student who achieves an **A** grade typically*	*A student who achieves a **B** grade typically*	*A student who achieves a **C** grade typically*	*A student who achieves a **D** grade typically*	*A student who achieves an **E** grade typically*
Concepts, Models & Applications	• critically analyses the properties and functions of system components, processes and interactions, and the interplay and effects of factors across a range of scales	• analyses the properties and functions of system components, processes and interactions, and the interplay and effects of factors across a range of scales	• explains the fundamental properties and functions of system components, processes and interactions, and the effects of factors across a range of scales	• describes the fundamental properties and functions of system components, processes and interactions, and the effects of one or more factors	• identifies the fundamental properties and functions of system components, processes and interactions, and some affective factors
	• evaluates applications, limitations, and predictions of theories and models to explain systems and create solutions, with evidence, in unfamiliar contexts	• analyses applications, limitations, and predictions of theories and models to explain systems and create plausible solutions, with evidence in familiar contexts	• explains applications, limitations, and predictions of theories and models to explain systems and create plausible solutions in familiar contexts	• describes the nature, functions, limitations and applications of theories and models to create solutions to problems with supporting evidence	• identifies the nature, functions, limitations and applications of theories and models, and suggest solutions to problems with supporting evidence
	• evaluates evidence with reference to critical analysis of models and/or theories, and develops evidence-based conclusions and evaluates limitations	• analyses evidence with reference to models and/or theories, and develops evidence-based conclusions and discusses limitations	• describes evidence with reference to models and/or theories, and develops evidence-based conclusions and identifies limitations	• describes evidence, and develops conclusions with some reference to models and/or theories	• identifies evidence, and asserts conclusions with little or no reference to models and/or theories
Contexts	• critically analyses epistemology, role of peer review, collaboration, and technology in developing knowledge	• analyses epistemology, role of peer review and technology in developing knowledge	• explains epistemology, role of peer review and technology in developing knowledge	• describes role of peer review and technology in developing knowledge	• identifies that scientific knowledge has changed over time
	• critically analyses the influence of social, economic, ethical, and cultural factors on Science	• analyses the influence of social, economic, ethical, and cultural factors on Science	• explains the influence of social, economic, ethical, and cultural factors on Science	• describes the influence of social, economic, ethical, and cultural factors on Science	• identifies the influence of social, economic, ethical, and cultural factors on Science
Inquiry Skills	• designs, conducts and improves safe, ethical and original inquiries individually and collaboratively, that collect valid, reliable data in response to a complex question	• designs, conducts, and improves safe, ethical inquiries individually and collaboratively, that collect valid, reliable data in response to a question	• plans and conducts safe, ethical inquiries individually and collaboratively, that collect valid data in response to a familiar question	• follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data in response to a simple question with varying success	• follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data with little or no connection to a question
	• critically analyses cause and correlation, anomalies, reliability and validity of data and representations, and critically analyses errors	• analyses cause and correlation, anomalies, reliability and validity of data and representations, and analyses errors	• describes causal and correlational relationships, anomalies, reliability and validity of data and representations, and discusses common errors	• describes trends, relationships, and anomalies in data, identifies anomalies, and cites sources of error	• identifies trends and relationships in data with reference to sources of error
	• evaluates processes and claims, and provides a critique based on evidence, and critically analyses alternatives	• explains processes and claims, and provides a critique with reference to evidence, and analyses alternatives	• describes processes and claims, and identifies alternatives with reference to reliable evidence	• describes processes and claims, and identifies the need for improvements with some reference to evidence	• identifies processes and the need for some improvements, with little or no reference to evidence
	• reflects with insight on own thinking and that of others, evaluates planning, time management, and use of appropriate independent and collaborative work strategies	• reflects on their own thinking and analyses planning, time management, and use of appropriate independent and collaborative work strategies	• reflects on their own thinking and explains planning, time management, and use of appropriate independent and collaborative work strategies	• reflects on their own thinking, with reference to planning and the use of appropriate independent and collaborative work strategies	• reflects on their own thinking with little or no reference to planning, time management, and use of appropriate independent and collaborative work strategies
	• communicates concisely, effectively, and accurately, with scientific literacy in a range of modes, representations, and genres for specific audiences and purposes, and accurate referencing	• communicates clearly and accurately, with scientific literacy in a range of modes, representations and genres for specific audiences and purposes, and accurate referencing	• communicates accurately demonstrating scientific literacy, in a range of modes, representations, and genres for specific purposes, and mostly consistent referencing	• communicates demonstrating some scientific literacy, in a range of modes, representations, and genres with some evidence and inconsistent referencing	• communicates demonstrating limited scientific literacy, in a range of modes and representations, with inconsistent and inaccurate referencing

Achievement Standards for Science M Course – Years 11 and 12

	*A student who achieves an **A** grade typically*	*A student who achieves a **B** grade typically*	*A student who achieves a **C** grade typically*	*A student who achieves a **D** grade typically*	*A student who achieves an **E** grade typically*
Concepts, Models & Applications	• describes the properties and functions of system components and processes with independence • describes system components and processes with some reference to how they are affected by factors with independence	• describes the properties and functions of system components, processes, and interactions with assistance • describes system components, processes, and interactions with some reference to how they are affected by factors with assistance	• identifies the properties and functions of system components, processes, and interactions with independence • identifies system components, processes, and interactions with independence	• identifies the properties and functions of system components, processes, and interactions with assistance • identifies system components, processes, and interactions with assistance	• identifies the properties and functions of system components, processes, and interactions with direct instruction • identifies system components, processes, and interactions with direct instruction
Contexts	• describes the impact of science on an aspect of society with independence	• describes the impact of science on an aspect of society with some independence	• identifies the impact of science on an aspect of society with independence	• identifies the impact of science on an aspect of society with assistance	• identifies the impact of science on an aspect of society with direct instruction
Inquiry Skills	• plans and conducts investigations in response to a question or problem with independence • draws evidence-based conclusions from investigations with independence • reflects on own thinking and learning in science with independence • communicates findings effectively with independence	• plans and conducts investigations in response to a question or problem with some independence • draws evidence-based conclusions from investigations with some independence • reflects on own thinking and learning in science with some independence • communicates findings effectively with some independence	• plans and conducts investigations in response to a question or problem with assistance • draws evidence-based conclusions from investigations with assistance • reflects on own thinking and learning in science with assistance • communicates findings with assistance	• plans and conducts investigations in response to a question or problem with repeated cueing • draws evidence-based conclusions from investigations with repeated cueing • reflects on own thinking and learning in science with repeated cueing • communicates findings with repeated cueing	• follows a procedure to conduct investigations to collect data with direct instruction • draws evidence-based conclusions from investigations with direct instruction • reflects on own thinking and learning in science with direct instruction • communicates findings with direct instruction

Interdisciplinary Systems — Value: 1.0

Interdisciplinary Systems a — **Value 0.5**

Interdisciplinary Systems b — **Value 0.5**

Unit Description

In this unit, students investigate the interdisciplinarity of systems in the area of study, and the intersection of different scientific domains. They bring together scientific knowledge gained in disciplinary studies and apply to contexts and situations in their world from the area of study. Students inquire into the theories, principles and processes of the identified systems using the skills, knowledge, and methods of a range of relevant scientific domains. They draw on understanding derived from different scientific domains to draw conclusions and make recommendations.

Specific Unit Goals

This unit should enable students to:

A Course	T Course	M Course
• analyse the relevant theories, principles, and processes of the identified interdisciplinary systems	• synthesise the relevant theories, principles, and processes of the identified interdisciplinary systems	• describe relevant interdisciplinary systems
• analyse familiar and unfamiliar problems from the chosen interdisciplinary study	• evaluate familiar and unfamiliar problems from the chosen interdisciplinary study	• use evidence to solve interdisciplinary science problems
• create solutions to interdisciplinary problems	• create solutions to interdisciplinary problems	

Content Descriptions

All knowledge, understanding and skills below must be delivered:

A Course	T Course	M Course
Concepts, Models and Applications		
• analyse the relevant theories, principles and processes of the identified interdisciplinary systems and apply knowledge, and methods of a range of relevant scientific domains, for example, oceanic energy systems, forest ecosystems, aerodynamic engineering	• synthesise the relevant theories, principles and processes of the identified interdisciplinary systems and apply knowledge, and methods of a range of relevant scientific domains, for example, oceanic energy systems, forest ecosystems, aerodynamic engineering	• describe relevant interdisciplinary systems
• apply relevant scientific knowledge gained in disciplinary studies to familiar and unfamiliar problems from the chosen interdisciplinary study, for example, acids and bases; lift, drag thrust and weight	• apply relevant scientific knowledge gained in disciplinary studies to evaluate familiar and unfamiliar problems from the chosen interdisciplinary study, for example: acids and bases; lift, drag thrust and weight	• use evidence to solve interdisciplinary science problems

A Course	T Course	M Course
• create solutions to interdisciplinary problems using identified concepts, models, and applications, for example: sea walls and coastal erosion; psyllid insects and eucalypt die back; torque and gyroscopic effects on rotary-wing craft	• create solutions to interdisciplinary problems using identified concepts, models, and applications, for example: sea walls and coastal erosion; psyllid insects and eucalypt die back; torque and gyroscopic effects on rotary-wing craft	
Science as Human Endeavour		
• analyse a range of scientific and media texts to evaluate processes, claims and conclusions by considering the quality of available evidence, for example, peer review versus popular claims • analyse the influence of social, economic, geographic, cultural, environmental, and ethical considerations on interdisciplinary contexts, for example, climate change debates • apply current and emerging technologies and plausible or innovative applications for investigations of interdisciplinary scientific context and/or applications of findings, for example, satellite imagery, drones	• critically analyse a range of scientific and media texts to evaluate processes, claims and conclusions by considering the quality of available evidence, for example, peer review versus popular claims • critically analyse the influence of social, economic, geographic, cultural, environmental, and ethical considerations on interdisciplinary contexts, for example, climate change debates • evaluate current and emerging technologies and plausible or innovative applications for investigations of interdisciplinary scientific context and/or applications of findings, for example, satellite imagery, drones	• identify reliable sources of information about science • use new technologies to complete studies in science
Inquiry Skills		
• apply mathematical processes and skills to critically analyse and represent concepts, case studies and applications, for example, statistics, spreadsheets, producing and interpreting graphs; Equi-Time Points and Point of No Return (ETP's and PNR's) to flight planning tasks; trophic diagrams in ecosystems	• apply mathematical processes and skills to critically analyse and represent concepts, case studies and applications, for example, statistics, spreadsheets, producing and interpreting graphs; Equi-Time Points and Point of No Return (ETP's and PNR's) to flight planning tasks; trophic diagrams in ecosystems	• use numeracy skills to describe interdisciplinary systems

A Course	T Course	M Course
• analyse data, representations, and possible claims to identify causal and correlational relationships, anomalies, reliability and validity and sources of error • design and conduct ethical and safe investigations in response to questions that collect valid, reliable data and identifying alternative processes, for example: model experiments from the Royal Society of Chemists; transect expeditions; USGS data and coral reef studies; climb, cruise, and descent performance for specific aircraft • communicate demonstrating scientific literacy to specific audiences and purposes using appropriate metalanguage, genres, and modes • apply strategies to work both independently and collaboratively to develop solutions	• evaluate data, representations, and possible claims to identify causal and correlational relationships, anomalies, reliability and validity and sources of error • design and conduct ethical and safe investigations in response to complex questions that collect valid, reliable data and evaluate alternative processes, for example: model experiments from the Royal Society of Chemists; transect expeditions; USGS data and coral reef studies; climb, cruise, and descent performance for specific aircraft • communicate demonstrating scientific literacy to specific audiences and purposes using appropriate metalanguage, genres, and modes • apply strategies to work both independently and collaboratively to develop solutions	• plan and conducts an investigation to answer a question • use communication skills to share ideas in science
Reflection		
• reflect on own thinking and analyse planning, time management, and use of appropriate work strategies	• reflect on own thinking and evaluate planning, time management, use of appropriate work strategies	• reflect on own thinking planning, time management, and use of appropriate work strategies

A guide to reading and implementing content descriptions

Content descriptions specify the knowledge, understanding and skills that students are expected to learn and that teachers are expected to teach. Teachers are required to develop a program of learning that allows students to demonstrate all the content descriptions. The lens which the teacher uses to demonstrate the content descriptions may be either guided through provision of electives within each unit or determined by the teacher when developing their program of learning. A program of learning is what a college provides to implement the course for a subject. It is at the discretion of the teacher to emphasise some content descriptions over others. The teacher may teach additional (not listed) content provided it meets the specific unit goals. This will be informed by the student needs and interests.

Assessment

Refer to pages 9-11.

Modelling Systems — Value: 1.0

Modelling Systems a — **Value 0.5**

Modelling Systems b — **Value 0.5**

Unit Description

In this unit, students investigate how to model systems applying and discovering mathematics, IT and the scientific principles of the systems being studied. They learn to define problems, including graphical approaches, and develop questions that can be addressed by science using modelling. Students apply models to understand system behaviour, and how systems respond to transient events and long-term trends. They develop an understanding of the strengths and weaknesses of models and how to communicate findings honestly, clearly, and persuasively to generate understanding in the general community.

Specific Unit Goals

This unit should enable students to:

A Course	T Course	M Course
• apply mathematics, IT, and relevant scientific principles to model the systems being studied	• apply mathematics, IT, and relevant scientific principles to model the systems being studied	• illustrate relevant interdisciplinary systems
• analyse how systems respond to transient events and long-term trends in familiar and unfamiliar problems	• evaluate how systems respond to transient events and long-term trends in familiar and unfamiliar problems	• use numerical evidence to describe interdisciplinary problems and systems
• create models, interpretations, or graphic representations of existing models	• create models, interpretations, or graphic representations of existing models	

Content Descriptions

All knowledge, understanding and skills below must be delivered:

A Course	T Course	M Course
Concepts, Models and Applications		
• apply mathematics, IT, and relevant scientific principles to model the systems being studied and apply graphical approaches, for example, currents, El Nino modelling, nutrient cycling, biogeochemical cycling, climate, Bernoulli's Theorem, vector problems	• apply mathematics, IT, and relevant scientific principles to model the systems being studied and apply graphical approaches, for example, currents, El Nino modelling, nutrient cycling, biogeochemical cycling, climate, Bernoulli's Theorem, vector problems	• illustrate relevant interdisciplinary systems

A Course	T Course	M Course
• analyse how systems respond to transient events and long-term trends in familiar and unfamiliar problems to develop questions that can be addressed by science using modelling, for example, modelling species populations, significance in statistics, extrapolations from data, meteorology • create models, interpretations, or graphic representations of existing models	• evaluate how systems respond to transient events and long-term trends in familiar and unfamiliar problems to develop questions that can be addressed by science using modelling, for example, modelling species populations, significance in statistics, extrapolations from data, meteorology • create models, interpretations, or graphic representations of existing models	• use numerical evidence to describe interdisciplinary problems and systems
Science as Human Endeavour		
• analyse a range of scientific and media texts to evaluate processes, claims and conclusions using modelling and graphical representation by considering the quality of available evidence, for example, peer review versus popular claims, the validity of popular debate around climate change models, weather reports • analyse the influence of social, economic, geographic, cultural, environmental, or ethical considerations on modelling interdisciplinary science, for example, axiomatic assumptions, carbon offset modelling, flag ship species, safe and legal flight paths • analyse current and emerging technologies and plausible or innovative applications for modelling and graphically representing interdisciplinary science for example, computer modelling, animated graphics, hydrophone data	• critically analyse a range of scientific and media texts to evaluate processes, claims and conclusions using modelling and graphical representation by considering the quality of available evidence, for example, peer review versus popular claims, the validity of popular debate around climate change models, weather reports • critically analyse the influence of social, economic, geographic, cultural, environmental, and ethical considerations on modelling interdisciplinary science, for example, axiomatic assumptions, carbon offset modelling, flagship species, safe and legal flight paths • evaluate current and emerging technologies and plausible or innovative applications for modelling and graphically representing interdisciplinary science for example, computer modelling, animated graphics, flight simulators, hydrophones data	• identify reliable sources of information about science • use new technologies to complete studies in science

A Course	T Course	M Course
Inquiry Skills		
• apply mathematical processes and skills to analyse and represent concepts, case studies and applications, for example: acoustic telemetry data, SD EBV/ SA EBV, chi squared, T-Tests, mean and standard deviation, variance; vector algebra to calculate the effects of wind, modelling • analyse data, representations, and possible claims to identify causal and correlational relationships, anomalies, reliability and validity and sources of error • design and conduct ethical and safe investigations in response to questions that collect valid, reliable data and evaluate alternative processes, for example, MATLAB, Vernier, video trapping data processing • communicate demonstrating scientific literacy to specific audiences and purposes using appropriate metalanguage, genres, and modes • apply strategies to work both independently and collaboratively to develop solutions	• apply mathematical processes and skills to critically analyse and represent concepts, case studies and applications, for example, acoustic telemetry data, SD EBV/ SA EBV, chi squared, T- Tests, mean and standard deviation, variance; vector algebra to calculate the effects of wind • evaluate data, representations, and possible claims to identify causal and correlational relationships, anomalies, reliability and validity and sources of error • design and conduct ethical and safe investigations in response to complex questions that collect valid, reliable data and evaluate alternative processes, for example, MATLAB, Vernier, video trapping data processing • communicate demonstrating scientific literacy to specific audiences and purposes using appropriate metalanguage, genres, and modes • apply strategies to work both independently and collaboratively to develop solutions	• use numeracy skills to describe interdisciplinary systems • plans and conducts an investigation to answer a question • use communication skills to share ideas in science
Reflection		
• reflect on own thinking and analyse planning, time management, and use of appropriate work strategies	• reflect on own thinking and evaluate planning, time management, and use of appropriate work strategies	• reflect on own thinking, planning, time management, and use of appropriate work strategies

A guide to reading and implementing content descriptions

Content descriptions specify the knowledge, understanding and skills that students are expected to learn and that teachers are expected to teach. Teachers are required to develop a program of learning that allows students to demonstrate all the content descriptions. The lens which the teacher uses to demonstrate the content descriptions may be either guided through provision of electives within each unit or determined by the teacher when developing their program of learning.

A program of learning is what a college provides to implement the course for a subject. It is at the discretion of the teacher to emphasise some content descriptions over others. The teacher may teach additional (not listed) content provided it meets the specific unit goals. This will be informed by the student needs and interests.

Assessment

Refer to pages 9-11.

Interdisciplinary Solutions — Value: 1.0

Interdisciplinary Solutions a — **Value 0.5**

Interdisciplinary Solutions b — **Value 0.5**

Unit Description

In this unit, students investigate case studies of interdisciplinary problem solving in the area of study. They investigate problems in the identified area of study and use interdisciplinary knowledge, understanding and skills to find solutions to problems. Students investigate how systems are intentionally manipulated and unintentionally affected by human activity. They evaluate the sustainability of use and impact and possible alternative solutions.

Specific Unit Goals

This unit should enable students to:

A Course	T Course	M Course
• analyse case studies of interdisciplinary problem solving in the area of study • analyse familiar and unfamiliar problems in the identified area of study • create interdisciplinary solutions in familiar and unfamiliar contexts	• evaluate case studies of interdisciplinary problem solving in the area of study • critically analyse familiar and unfamiliar problems in the identified area of study • create interdisciplinary solutions in familiar and unfamiliar contexts	• describe possible solutions to problems in interdisciplinary science • use evidence to describe possible solutions to problems

Content Descriptions

All knowledge, understanding and skills below must be delivered:

A Course	T Course	M Course
Concepts, Models and Applications		
• analyse case studies of interdisciplinary problem solving in the area of study, for example, ocean acidification, flash flooding, salinity; stress, arousal, and fatigue in flight safety	• evaluate case studies of interdisciplinary problem solving in the area of study, for example, ocean acidification, flash flooding, salinity; stress, arousal, and fatigue in flight safety	• describe possible solutions to problems in interdisciplinary science
• analyse familiar and unfamiliar problems in the identified area of study and use interdisciplinary knowledge, understanding and skills to find solutions to problems, for example, melting icecaps; Boyle’s Law to the relationship between density, temperature, and pressure for an ideal gas	• critically analyse familiar and unfamiliar problems in the identified area of study and use interdisciplinary knowledge, understanding and skills to find solutions to problems, for example, melting icecaps; Boyle’s Law to the relationship between density, temperature, and pressure for an ideal gas	• use evidence to describe possible solutions to problems

A Course	T Course	M Course
• create interdisciplinary solutions in familiar and unfamiliar contexts, for example, fish farming and eutrophication, impact of shipping, sound pollution and cetaceans; structure of the atmosphere and the effect on the temperature gradient; kelp carbon farming	• create interdisciplinary solutions in familiar and unfamiliar contexts, for example, fish farming and eutrophication, impact of shipping, sound pollution and cetaceans; structure of the atmosphere and the effect on the temperature gradient; kelp carbon farming	
Science as Human Endeavour		
• analyse a range of scientific and media texts to evaluate solutions by considering the quality of available evidence, for example, peer review versus popular claims • analyse the influence of social, economic, geographic, cultural, environmental, or ethical considerations on possible solutions, for example, eco-tourism and greenwashing; effects of drugs and medications on aircrew • analyse current and emerging technologies and plausible or innovative applications for creating solutions, for example: carbon sequestration, wave/tide generated electricity, managing fish resources	• critically analyse a range of scientific and media texts to evaluate solutions by considering the quality of available evidence, for example, peer review versus popular claims • critically analyse the influence of social, economic, geographic, cultural, environmental, and ethical considerations on possible solutions, for example, eco-tourism and greenwashing; effects of drugs and medications on aircrew • evaluate current and emerging technologies and plausible or innovative applications for creating solutions, for example: carbon sequestration, wave/tide generated electricity, managing fish resources, flight simulator software VR	• identify reliable sources of information about science • use new technologies to complete studies in science
Inquiry Skills		
• apply mathematical processes and skills to critically analyse and represent concepts, case studies and applications for example: database creation; Shannon Index and species abundance; make predictions concerning aircraft performance	• apply mathematical processes and skills to critically analyse and represent concepts, case studies and applications for example: database creation; Shannon Index and species abundance; make predictions concerning aircraft performance	• use numeracy skills to describe interdisciplinary systems

A Course	T Course	M Course
• analyse data, representations, and possible claims to identify causal and correlational relationships, anomalies, reliability and validity and sources of error	• evaluate data, representations, and possible claims to identify causal and correlational relationships, anomalies, reliability and validity and sources of error	
• design and conduct ethical and safe investigations in response to questions that collect valid, reliable data and evaluate alternative processes, for example: the Australian Academy of Science exemplars; localised action research; Civil Aviation Authority regulations	• design and conduct ethical and safe investigations in response to complex questions that collect valid, reliable data and evaluate alternative processes, for example, the Australian Academy of Science exemplars; localised action research; Civil Aviation Authority regulations	• plans and conducts an investigation to answer a question
• communicate demonstrating scientific literacy to specific audiences and purposes using appropriate metalanguage, genres, and modes	• communicate demonstrating scientific literacy to specific audiences and purposes using appropriate metalanguage, genres, and modes	• use communication skills to share ideas in science
• apply strategies to work both independently and collaboratively to develop solutions	• apply strategies to work both independently and collaboratively to develop solutions	
Reflection		
• reflect on own thinking and analyse planning, time management, and use of appropriate work strategies	• reflect on own thinking and evaluate planning, time management, and use of appropriate work strategies	• reflect on own thinking, planning, time management, and use of appropriate work strategies

A guide to reading and implementing content descriptions

Content descriptions specify the knowledge, understanding and skills that students are expected to learn and that teachers are expected to teach. Teachers are required to develop a program of learning that allows students to demonstrate all the content descriptions. The lens which the teacher uses to demonstrate the content descriptions may be either guided through provision of electives within each unit or determined by the teacher when developing their program of learning.

A program of learning is what a college provides to implement the course for a subject. It is at the discretion of the teacher to emphasise some content descriptions over others. The teacher may teach additional (not listed) content provided it meets the specific unit goals. This will be informed by the student needs and interests.

Assessment

Refer to pages 9-11.

Contemporary Innovations in Science — Value: 1.0

Contemporary Innovations in Science a — **Value 0.5**

Contemporary Innovations in Science b — **Value 0.5**

Unit Description

In this unit, students investigate new discoveries and methodologies related to the area of study. They investigate interdisciplinary applications and possibilities raised by new findings in sub-disciplines. Students draw links between findings in different sub-disciplines and their broader applications in addressing problems in society and within the area of study.

Specific Unit Goals

This unit should enable students to:

A Course	T Course	M Course
• analyse new discoveries and methodologies related to the area of interdisciplinary study	• evaluate new discoveries and methodologies related to the area of interdisciplinary study	• describe innovations in interdisciplinary science
• analyse interdisciplinary applications and possibilities raised by new findings in branches of science	• evaluate interdisciplinary applications and possibilities raised by new findings in branches of science	
• create solutions to interdisciplinary problems using recent innovations in science	• create solutions to interdisciplinary problems using recent innovations in science	• describe innovations in interdisciplinary science

Content Descriptions

All knowledge, understanding and skills below must be delivered:

A Course	T Course	M Course
Concepts, Models and Applications		
• analyse new discoveries and methodologies related to the area of study and apply to familiar and unfamiliar problems, for example: analysing ecosystems with sound, atmospheric DNA sampling to assess biodiversity, green jet fuel, anti-torque configurations	• evaluate new discoveries and methodologies related to the area of study and apply to familiar and unfamiliar problems, for example: analysing ecosystems with sound, atmospheric DNA sampling to assess biodiversity, green jet fuel, anti-torque configurations	• describe innovations in interdisciplinary science
• analyse interdisciplinary applications and possibilities raised by new findings in branches of science, for example: forest fungal networks, insect population declines; properties of electromagnetic radiation	• evaluate interdisciplinary applications and possibilities raised by new findings in branches of science, for example: forest fungal networks, insect population declines; properties of electromagnetic radiation	

A Course	T Course	M Course
• create solutions to interdisciplinary problems using recent innovations in science, for example: Artificial Intelligence, citizen science projects, navigation systems	• create solutions to interdisciplinary problems using recent innovations in science, for example: Artificial Intelligence, citizen science projects, navigation systems	• describe innovations in interdisciplinary science
Science as Human Endeavour		
• analyse a range of scientific and media texts to evaluate solutions by considering the quality of available evidence, for example peer review versus popular claims, social media, and misinformation • analyse the influence of social, economic, geographic, cultural, environmental, or ethical considerations on contemporary innovations, for example: online carbon footprint, urban agriculture, sonic booms • analyse current and emerging technologies, innovative applications, and insights, for example: Bench Tools, Fluorescence Spectra Viewer, PCalc, Lab.Hacks, QuickChem, Leafsnap,	• critically analyse a range of scientific and media texts to evaluate solutions by considering the quality of available evidence, for example peer review versus popular claims, social media, and misinformation • critically analyse the influence of social, economic, geographic, cultural, environmental, and ethical considerations on contemporary innovations, for example: online carbon footprint, urban agriculture, sonic booms • evaluate current and emerging technologies, innovative applications, and insights, for example: Bench Tools, Fluorescence Spectra Viewer, PCalc, Lab.Hacks, QuickChem, Leafsnap,	• identify reliable sources of information about science • use new technologies to complete studies in science
Inquiry Skills		
• apply mathematical processes and skills to critically analyse and represent concepts, case studies and applications for example: database creation, aircraft speed calculations, sociodemographic population assessment methods • analyse data, representations, and possible claims to identify causal and correlational relationships, anomalies, reliability and validity and sources of error	• apply mathematical processes and skills to critically analyse and represent concepts, case studies and applications for example: database creation, aircraft speed calculations, sociodemographic population assessment methods • evaluate data, representations, and possible claims to identify causal and correlational relationships, anomalies, reliability and validity and sources of error	• use numeracy skills to describe interdisciplinary systems

A Course	T Course	M Course
• design and conduct ethical and safe investigations in response to questions that collect valid, reliable data and evaluate alternative processes, for example, the Australian Academy of Science, function of the circulatory and respiratory systems, the ear, and the eye • communicate demonstrating scientific literacy to specific audiences and purposes using appropriate metalanguage, genres, and modes • apply strategies to work both independently and collaboratively to develop solutions	• design and conduct ethical and safe investigations in response to complex questions that collect valid, reliable data and evaluate alternative processes, for example, the Australian Academy of Science, function of the circulatory and respiratory systems, the ear, and the eye • communicate demonstrating scientific literacy to specific audiences and purposes using appropriate metalanguage, genres, and modes • apply strategies to work both independently and collaboratively to develop solutions	• plans and conducts an investigation to answer a question • use communication skills to share ideas in science
Reflection		
• reflect on own thinking and analyse planning, time management, and use of appropriate work strategies	• reflect on own thinking and evaluate planning, time management, and use of appropriate work strategies	• reflect on own thinking, planning, time management, and use of appropriate work strategies

A guide to reading and implementing content descriptions

Content descriptions specify the knowledge, understanding and skills that students are expected to learn and that teachers are expected to teach. Teachers are required to develop a program of learning that allows students to demonstrate all the content descriptions. The lens which the teacher uses to demonstrate the content descriptions may be either guided through provision of electives within each unit or determined by the teacher when developing their program of learning.

A program of learning is what a college provides to implement the course for a subject. It is at the discretion of the teacher to emphasise some content descriptions over others. The teacher may teach additional (not listed) content provided it meets the specific unit goals. This will be informed by the student needs and interests.

Assessment

Refer to pages 9-11.

Independent Study — Value 1.0

Independent Study a — Value 0.5

Independent Study b — Value 0.5

Prerequisites

Independent Study units are only available to individual students in Year 12. A student can only study a maximum of one Independent Study unit in each course. Students must have studied at least three standard 1.0 units from this course. An Independent Study unit requires the principal's written approval. Principal approval can also be sought by a student in Year 12 to enrol concurrently in an Independent Study unit and their third 1.0 unit in this course of study.

Unit Description

An Independent Study unit has an important place in senior secondary courses. It is a valuable pedagogical approach that empowers students to make decisions about their own learning. An Independent Study unit can be proposed by an individual student for their own independent study and negotiated with their teacher. The program of learning for an Independent Study unit must meet the unit goals and content descriptions as they appear in the course.

Specific Unit Goals

This unit should enable students to:

A Course	T Course	M Course
• analyse the relevant theories, principles, and processes of the area of study and apply to solving familiar and unfamiliar problems	• analyse the relevant theories, principles, and processes of the area of study and apply to solving familiar and unfamiliar problems	• describe relevant ideas in the chosen area of study
• analyse the utility of interdisciplinary approaches in the area of study	• evaluate the utility of interdisciplinary approaches in the area of study	
• create solutions to interdisciplinary problems	• create solutions to interdisciplinary problems	• use evidence to describe possible solutions in the chosen area of study

Content Descriptions

All knowledge, understanding and skills below must be delivered:

A Course	T Course	M Course
Concepts, Models and Applications		
• analyse the relevant theories, principles, and processes of the area of study and apply to solving familiar and unfamiliar problems • analyse the effectiveness of interdisciplinary approaches in the area of study to solving familiar and unfamiliar problems	• analyse the relevant theories, principles, and processes of the area of study and apply to solving familiar and unfamiliar problems • evaluate the effectiveness of interdisciplinary approaches in the area of study to solving familiar and unfamiliar problems	• describe relevant ideas in the chosen area of study

A Course	T Course	M Course
• create solutions to interdisciplinary problems	• create solutions to interdisciplinary problems	• use evidence to describe possible solutions in the chosen area of study
Science as Human Endeavour		
• analyse a range of scientific and media texts to evaluate solutions by considering the quality of available evidence, for example peer review versus popular claims, social media, and misinformation • analyse the influence of social, economic, geographic, cultural, environmental, or ethical considerations on contemporary innovations, for example, online carbon footprint, urban agriculture • analyse current and emerging technologies, innovative applications, and insights, for example: apps	• analyse a range of scientific and media texts to evaluate solutions by considering the quality of available evidence, for example peer review versus popular claims, social media, and misinformation • analyse the influence of social, economic, geographic, cultural, environmental, or ethical considerations on contemporary innovations, for example, online carbon footprint, urban agriculture • analyse current and emerging technologies, innovative applications, and insights, for example: apps	• use scientific and media texts to identify processes, claims or conclusions by considering the quality of available evidence • describe the impact of contextual considerations that affect the chosen area of study • describe current and emerging technologies or innovative applications for these technologies in the chosen area of study
Inquiry Skills		
• apply mathematical processes and skills to critically analyse and represent concepts, case studies and applications for example: database creation • analyse data, representations, and possible claims to identify causal and correlational relationships, anomalies, reliability and validity and sources of error	• apply mathematical processes and skills to critically analyse and represent concepts, case studies and applications for example: database creation • analyse data, representations, and possible claims to identify causal and correlational relationships, anomalies, reliability and validity and sources of error	• use mathematical operations to solve problems • interpret data and representations to identify relationships
• design and conduct ethical and safe investigations in response to questions that collect valid, reliable data and evaluate alternative processes, for example, the Australian Academy of Science	• design and conduct ethical and safe investigations in response to questions that collect valid, reliable data and evaluate alternative processes, for example, the Australian Academy of Science	• conduct scientific investigations using contemporary technology

A Course	T Course	M Course
• communicate demonstrating scientific literacy to specific audiences and purposes using appropriate metalanguage, genres, and modes • apply strategies to work both independently and collaboratively to develop solutions	• communicate demonstrating scientific literacy to specific audiences and purposes using appropriate metalanguage, genres, and modes • apply strategies to work both independently and collaboratively to develop solutions	• communicate ideas demonstrating scientific literacy using appropriate language • apply strategies to work both independently and collaboratively to develop solutions
Reflection		
• reflect on own thinking and analyse planning, time management, and use of appropriate work strategies	• reflect on own thinking and analyse planning, time management, and use of appropriate work strategies	• reflect on own thinking and analyse planning, time management, and use of appropriate work strategies

A guide to reading and implementing content descriptions

Content descriptions specify the knowledge, understanding and skills that students are expected to learn and that teachers are expected to teach. Teachers are required to develop a program of learning that allows students to demonstrate all the content descriptions. The lens which the teacher uses to demonstrate the content descriptions may be either guided through provision of electives within each unit or determined by the teacher when developing their program of learning.

A program of learning is what a college provides to implement the course for a subject. It is at the discretion of the teacher to emphasise some content descriptions over others. The teacher may teach additional (not listed) content provided it meets the specific unit goals. This will be informed by the student needs and interests.

Assessment

Refer to pages 9-11.

Appendix A – Implementation Guidelines

Available course patterns

A standard 1.0 value unit is delivered over at least 55 hours. To be awarded a course, students must complete at least the minimum units over the whole minor or major course.

Course	Number of standard units to meet course requirements
Minor	Minimum of 2 units
Major	Minimum of 3.5 units

Units in this course can be delivered in any order.

Prerequisites for the course or units within the course

Students must have studied at least three standard 1.0 units from this course in order to access the Independent Study unit. An Independent Study unit requires the principal's written approval. Principal approval can also be sought by a student in Year 12 to enrol concurrently in an Independent Study unit and their third 1.0 unit in this course of study.

Arrangements for students continuing study in this course

Students who studied the previous course may undertake any units in this course provided there is no duplication of content.

Duplication of Content Rules

Students cannot be given credit towards the requirements for a Senior Secondary Certificate for a unit that significantly duplicates content in a unit studied in another course. The responsibility for preventing undesirable overlap of content studied by a student, rests with the principal and the teacher delivering the course. Students will only be given credit for covering the content once.

Guidelines for Delivery

Program of Learning

A program of learning is what a school provides to implement the course for a subject. This meets the requirements for context, scope and sequence set out in the Board endorsed course. Students follow programs of learning in a college as part of their senior secondary studies. The detail, design, and layout of a program of learning are a college decision.

The program of learning must be documented to show the planned learning activities and experiences that meet the needs of particular groups of students, taking into account their interests, prior knowledge, abilities, and backgrounds. The program of learning is a record of the learning experiences that enable students to achieve the knowledge, understanding and skills of the content descriptions. There is no requirement to submit a program of learning to the OBSSS for approval. The Principal will need to sign off at the end of Year 12 that courses have been delivered as accredited.

Content Descriptions

Are all content descriptions of equal importance? No. It depends on the focus of study. Teachers can customise their program of learning to meet their own students' needs, adding additional content descriptions if desired or emphasising some over others. A teacher must balance student needs with their responsibility to teach all content descriptions. It is mandatory that teachers address all content descriptions and that students engage with all content descriptions.

Half standard 0.5 units

Half standard units appear on the course adoption form but are not explicitly documented in courses. It is at the discretion of the college principal to split a standard 1.0 unit into two half standard 0.5 units. Colleges are required to adopt the half standard 0.5 units. However, colleges are not required to submit explicit documentation outlining their half standard 0.5 units to the BSSS. Colleges must assess students using the half standard 0.5 assessment task weightings outlined in the framework. It is the responsibility of the college principal to ensure that all content is delivered in units approved by the Board.

Moderation

Moderation is a system designed and implemented to:

- provide comparability in the system of school-based assessment
- form the basis for valid and reliable assessment in senior secondary schools
- involve the ACT Board of Senior Secondary Studies and colleges in cooperation and partnership
- maintain the quality of school-based assessment and the credibility, validity, and acceptability of Board certificates.

Moderation commences within individual colleges. Teachers develop assessment programs and instruments, apply assessment criteria, and allocate Unit Grades, according to the relevant Framework. Teachers within course teaching groups conduct consensus discussions to moderate marking or grading of individual assessment instruments and Unit Grade decisions.

The Moderation Model

Moderation within the ACT encompasses structured, consensus-based peer review of Unit Grades for all accredited courses over two Moderation Days. In addition to Moderation Days, there is statistical moderation of course scores, including small group procedures, for T courses.

Moderation by Structured, Consensus-based Peer Review

Consensus-based peer review involves the review of student work against system wide criteria and standards and the validation of Unit Grades. This is done by matching student performance with the criteria and standards outlined in the Achievement Standards, as stated in the Framework. Advice is then given to colleges to assist teachers with, or confirm, their judgments. In addition, feedback is given on the construction of assessment instruments.

Preparation for Structured, Consensus-based Peer Review

Each year, teachers of Year 11 are asked to retain originals or copies of student work completed in Semester 2. Similarly, teachers of a Year 12 class should retain originals or copies of student work completed in Semester 1. Assessment and other documentation required by the Office of the Board of Senior Secondary Studies should also be kept. Year 11 work from Semester 2 of the previous year is presented for review at Moderation Day 1 in March, and Year 12 work from Semester 1 is presented for review at Moderation Day 2 in August.

In the lead up to Moderation Day, a College Course Presentation (comprised of a document folder and a set of student portfolios) is prepared for each A, T and M course/units offered by the school and is sent into the Office of the Board of Senior Secondary Studies.

The College Course Presentation

The package of materials (College Course Presentation) presented by a college for review on Moderation Days in each course area will comprise the following:

- a folder containing supporting documentation as requested by the Office of the Board through memoranda to colleges, including marking schemes and rubrics for each assessment item
- a set of student portfolios containing marked and/or graded written and non-written assessment responses and completed criteria and standards feedback forms. Evidence of all assessment responses on which the Unit Grade decision has been made is to be included in the student review portfolios.

Specific requirements for subject areas and types of evidence to be presented for each Moderation Day will be outlined by the Board Secretariat through the *Requirements for Moderation Memoranda* and Information Papers.

Visual evidence for judgements made about practical performances

It is a requirement that schools' judgements of standards to practical performances (A/T/M) be supported by visual evidence (still photos or video).

The photographic evidence submitted must be drawn from practical skills performed as part of the assessment process.

Teachers should consult the BSSS website for current information regarding all moderation requirements including subject specific and photographic evidence.

Appendix B – Course Developers

Name	College

Appendix C – Common Curriculum Elements

Common curriculum elements assist in the development of high-quality assessment tasks by encouraging breadth and depth and discrimination in levels of achievement.

Organisers	Elements	Examples
create, compose, and apply	apply	ideas and procedures in unfamiliar situations, content, and processes in non-routine settings
	compose	oral, written, and multimodal texts, music, visual images, responses to complex topics, new outcomes
	represent	images, symbols, or signs
	create	creative thinking to identify areas for change, growth, and innovation, recognise opportunities, experiment to achieve innovative solutions, construct objects, imagine alternatives
	manipulate	images, text, data, points of view
analyse, synthesise, and evaluate	justify	arguments, points of view, phenomena, choices
	hypothesise	statement/theory that can be tested by data
	extrapolate	trends, cause/effect, impact of a decision
	predict	data, trends, inferences
	evaluate	text, images, points of view, solutions, phenomenon, graphics
	test	validity of assumptions, ideas, procedures, strategies
	argue	trends, cause/effect, strengths, and weaknesses
	reflect	on strengths and weaknesses
	synthesise	data and knowledge, points of view from several sources
	analyse	text, images, graphs, data, points of view
	examine	data, visual images, arguments, points of view
	investigate	issues, problems
organise, sequence, and explain	sequence	text, data, relationships, arguments, patterns
	visualise	trends, futures, patterns, cause, and effect
	compare/contrast	data, visual images, arguments, points of view
	discuss	issues, data, relationships, choices/options
	interpret	symbols, text, images, graphs
	explain	explicit/implicit assumptions, bias, themes/arguments, cause/effect, strengths/weaknesses
	translate	data, visual images, arguments, points of view
	assess	probabilities, choices/options
	select	main points, words, ideas in text
identify, summarise and plan	reproduce	information, data, words, images, graphics
	respond	data, visual images, arguments, points of view
	relate	events, processes, situations
	demonstrate	probabilities, choices/options
	describe	data, visual images, arguments, points of view
	plan	strategies, ideas in text, arguments
	classify	information, data, words, images
	identify	spatial relationships, patterns, interrelationships
	summarise	main points, words, ideas in text, review, draft and edit

Appendix D – Glossary of Verbs

Verbs	Definition
Analyse	Consider in detail for the purpose of finding meaning or relationships, and identifying patterns, similarities, and differences
Apply	Use, utilise or employ in a particular situation
Argue	Give reasons for or against something
Assess	Make a Judgement about the value of
Classify	Arrange into named categories in order to sort, group or identify
Compare	Estimate, measure or note how things are similar or dissimilar
Compose	The activity that occurs when students produce written, spoken, or visual texts
Contrast	Compare in such a way as to emphasise differences
Create	Bring into existence, to originate
Demonstrate	Give a practical exhibition an explanation
Describe	Give an account of characteristics or features
Discuss	Talk or write about a topic, taking into account different issues or ideas
Evaluate	Examine and judge the merit or significance of something
Examine	Determine the nature or condition of
Explain	Provide additional information that demonstrates understanding of reasoning and /or application
Extrapolate	Infer from what is known
Hypothesise	Put forward a supposition or conjecture to account for certain facts and used as a basis for further investigation by which it may be proved or disproved
Identify	Recognise and name
Interpret	Draw meaning from
Investigate	Planning, inquiry into and drawing conclusions about
Justify	Show how argument or conclusion is right or reasonable
Manipulate	Adapt or change
Plan	Strategize, develop a series of steps, processes
Predict	Suggest what might happen in the future or as a consequence of something
Reflect	The thought process by which students develop an understanding and appreciation of their own learning. This process draws on both cognitive and affective experience
Relate	Tell or report about happenings, events or circumstances
Represent	Use words, images, symbols or signs to convey meaning
Reproduce	Copy or make close imitation
Respond	React to a person or text
Select	Choose in preference to another or others
Sequence	Arrange in order
Summarise	Give a brief statement of the main points
Synthesise	Combine elements (information/ideas/components) into a coherent whole
Test	Examine qualities or abilities
Translate	Express in another language or form, or in simpler terms
Visualise	The ability to decode, interpret, create, question, challenge and evaluate texts that communicate with visual images as well as, or rather than, words

Appendix E – Glossary for ACT Senior Secondary Curriculum

Courses will detail what teachers are expected to teach and students are expected to learn for year 11 and 12. They will describe the knowledge, understanding and skills that students will be expected to develop for each learning area across the years of schooling.

Learning areas are broad areas of the curriculum, including English, mathematics, science, the arts, languages, health, and physical education.

A **subject** is a discrete area of study that is part of a learning area. There may be one or more subjects in a single learning area.

Frameworks are system documents for Years 11 and 12 which provide the basis for the development and accreditation of any course within a designated learning area. In addition, frameworks provide a common basis for assessment, moderation, and reporting of student outcomes in courses based on the framework.

The **course** sets out the requirements for the implementation of a subject. Key elements of a course include the rationale, goals, content descriptions, assessment, and achievement standards as designated by the framework.

BSSS courses will be organised into units. A unit is a distinct focus of study within a course. A standard 1.0 unit is delivered for a minimum of 55 hours generally over one semester.

Core units are foundational units that provide students with the breadth of the subject.

Additional units are avenues of learning that cannot be provided for within the four core 1.0 standard units by an adjustment to the program of learning.

An **Independent Study unit** is a pedagogical approach that empowers students to make decisions about their own learning. Independent Study units can be proposed by a student and negotiated with their teacher but must meet the specific unit goals and content descriptions as they appear in the course.

An **elective** is a lens for demonstrating the content descriptions within a standard 1.0 or half standard 0.5 unit.

A **lens** is a particular focus or viewpoint within a broader study.

Content descriptions refer to the subject-based knowledge, understanding and skills to be taught and learned.

A **program of learning** is what a college develops to implement the course for a subject and to ensure that the content descriptions are taught and learned.

Achievement standards provide an indication of typical performance at five different levels (corresponding to grades A to E) following completion of study of senior secondary course content for units in a subject.

ACT senior secondary system **curriculum** comprises all BSSS approved courses of study.

Appendix F – Course Adoption

Condition of Adoption

The course and units of this course are consistent with the philosophy and goals of the college and the adopting college has the human and physical resources to implement the course.

Adoption Process

Course adoption must be initiated electronically by an email to bssscertification@ed.act.edu.au by the principal or their nominated delegate.

The email will include the **Conditions of Adoption** statement above, and the table below adding the **College** name, and **A** and/or **T** and/or **M** and/or **V** to the **Classification/s** section of the table.

College:	
Course Title:	Interdisciplinary Science
Classification/s:	A T M
Accredited From:	2023
Framework:	Science 2021