Shape of ACT Senior Secondary Curriculum

Interdisciplinary Science A/T/M

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1. PURPOSE

1.1 The *Shape of ACT Senior Secondary Curriculum: Interdisciplinary Science* will guide the writing of the *Interdisciplinary Science A/T/M* course.

1.1 This paper has been prepared following consultation with the following academic staff from the School of Science, UNSW Canberra at the Australian Defence Force Academy:
Dr Leesa Sidhu, Deputy Head of School (Education) and Senior Lecturer in Mathematics and Statistics,
Dr Clair Stark, Lecturer in Physics and Oceanography,
Dr Adrian Garrido Sanchis, Lecturer in Chemistry.

1.2 The paper should be read in conjunction with The Shape of the ACT Senior Secondary Curriculum located at:
http://www.bsss.act.edu.au/curriculum/bsss_course_development_consultation

2. INTRODUCTION

2.1 The *Interdisciplinary Science A/T/M* course will be the basis of planning, teaching, learning and assessment in ACT senior secondary schools. This proposed course will include studies currently undertaken under the aegis of *Flight, Forestry, Interdisciplinary Science* and *Oceanography*

3. BACKGROUND

3.1 The ACT Board of Senior Secondary Studies has reviewed the *Flight, Forestry, Interdisciplinary Science* and *Oceanography* courses in the five-year course development cycle of improvement and renewal. The integration of these courses will facilitate broader communities of learning to discuss assessment, pedagogy, and student learning in these areas.

3.2 All courses under development are required to meet Board design specifications and to align with Board requirements for the senior secondary curriculum. These specifications align with ACARA course design specifications and provide teachers with flexibility to plan, teach and assess according to the needs and interests of their students.

3.3 The *Interdisciplinary Science A/T/M* course is to be developed under the Science Framework. Found at: https://www.bsss.act.edu.au/act_senior_secondary_system/curriculum/frameworks

The rationale for this framework describes Science:

> *The study of Science is the unveiling of the mysteries of the universe in order to make sense of nature in all its wonder and complexity. Through knowledge, observation, questioning, experimentation, discussion, critical analysis and creative thinking in a scientific context, students develop their investigative, analytical and communication skills while cultivating an appreciation of the natural world.*
>
> *Scientific processes test current understandings and are continually re-evaluated. Students are challenged to examine and reconsider their understanding of scientific concepts, inquiry methods and phenomena. Students apply their knowledge of science to solve problems, make evidence-based decisions and engage in public debate about contemporary issues from a scientific perspective. The study of science explores ways in which scientists work collaboratively and individually in a range of integrated fields to increase understanding of an ever-expanding body of scientific knowledge. They examine strategies proposed to address major scientific challenges now and in the future in local, national, and global contexts.*
>
> *Studying senior secondary Science provides students with a suite of cognitive social skills and understandings that are valuable to a wide range of further study pathways and careers. Studying Science will enable students to become citizens who are more knowledgeable about the world around them and who have the critical skills to evaluate issues and make informed decisions.* (page 3)

3.4 All courses based on this Framework 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 has developed over time, is used in a variety of contexts; and influences, and is influenced by, historical, social, economic, cultural, and ethical considerations
- 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.

3.5 Concepts from the Science Framework (page 3) build on ACARA's F-10 Science curriculum:

Concepts and Knowledge

Courses developed under the Science Framework provide details of specific knowledge skills and understanding relevant to the learning area. While this content will differ according to the particular course, all content will be chosen to enable students to work towards the achievement of the common and agreed goals of the Framework.

Overview

Science has three interrelated strands: Science Inquiry Skills, Science as a Human Endeavour, and Science Understanding. In the practice of science, the three strands are closely integrated: the work of scientists reflects the nature and development of science, is built around scientific inquiry, and seeks to respond to and influence society. Students' experiences of school science should mirror this multifaceted view of science. To achieve this, the three strands of the *Australian Curriculum: Science* should be taught in an integrated way. The content descriptions for Science Inquiry Skills, Science as a Human Endeavour and Science Understanding have been written so that this integration is possible in each unit.

Science Inquiry Skills

Science inquiry involves identifying and posing questions; planning, conducting, and reflecting on investigations; processing, analysing, and interpreting data; and communicating findings. This strand is concerned with evaluating claims, investigating ideas, solving problems, reasoning, drawing valid conclusions, and developing evidence-based arguments.

Science investigations are activities in which ideas, predictions or hypotheses are tested and conclusions are drawn in response to a question or problem. Investigations can involve a range of activities, including experimental testing, field work, locating and using information sources, conducting surveys, and using modelling and simulations. The investigation design will depend on the context and subject of the investigation.

In science investigations, the collection and analysis of data to provide evidence plays a major role. This can involve collecting or extracting information and reorganising data in the form of tables, graphs, flow charts, diagrams, prose, keys, spreadsheets and databases and previously published information and results. The analysis of data to identify and select evidence, and the communication of findings, involve the selection, construction and use of specific representations, including mathematical relationships, symbols, and diagrams.

Generic inquiry skills are described below and will be explicitly taught and assessed in each unit. In addition, each unit provides more specific skills to be taught within the generic science inquiry skills; these specific skills align with the Science Understanding and Science as a Human Endeavour content of the unit.

The generic science inquiry skills are:

- identifying, researching, and constructing questions for investigation; proposing hypotheses; and predicting possible outcomes
- designing investigations, including the procedure/s to be followed, the materials required and the type and amount of primary and/or secondary data to be collected; conducting risk assessments; and considering ethical research
- conducting investigations, including using equipment and techniques safely, competently, and methodically for the collection of valid and reliable data
- representing data in meaningful and useful ways; organising and analysing data to identify trends, patterns, and relationships; recognising error, uncertainty, and limitations in data; and selecting, synthesising, and using evidence to construct and justify conclusions
- interpreting scientific and media texts and evaluating processes, claims and conclusions by considering the quality of available evidence; and using reasoning to construct scientific arguments
- selecting, constructing, and using appropriate representations to communicate understanding, solve problems and make predictions
- communicating to specific audiences and for specific purposes using appropriate language, nomenclature, genres, and modes.

Courses developed under this Framework may incorporate an extended scientific investigation.

Science as a Human Endeavour

The use and influence of science is shaped by interactions between science and a wide range of social, economic, ethical, and cultural factors. Scientific knowledge is continually reviewed, and this review process involves a diverse range of scientists working within an increasingly global community of practice and can involve the use of international conventions and activities such as peer review.

Through science, we seek to improve our understanding and explanations of the natural world. The Science as a Human Endeavour strand highlights the development of science as a unique way of knowing and doing and explores the use and influence of science in society.

Science Understanding

The Science Understanding content in each unit develops students' understanding of the key concepts, models and theories that underpin the subject, and of the strengths and limitations of different models and theories for explaining and predicting complex phenomena.

Science understanding is evident when a person selects and integrates appropriate science concepts, models, and theories to explain and predict phenomena, and applies those concepts, models, and theories to new situations. Models in science can include diagrams, physical replicas, mathematical representations, word-based analogies (including laws and principles) and computer simulations.

Science Understanding should be developed through the selection of contexts that have relevance to and are engaging for students.

3.6 All courses of study for the ACT Senior Secondary Certificate should enable students to develop essential capabilities for twenty-first century learners. The Australian Curriculum General Capabilities comprise an integrated and interconnected set of knowledge, skills, behaviours, and dispositions that students develop and use in their learning across the curriculum. While developing all capabilities, in particular, the *Interdisciplinary Science A/T/M* course will engage with the capabilities of Creative and Critical Thinking and Numeracy, as well as the Cross Curriculum Perspective of Sustainability.

The General Capability of Critical and Creative Thinking will be developed by Interdisciplinary Science through their critical examination of theories, inquiry methodologies, data, and arguments.

> *In the Australian Curriculum, students develop capability in critical and creative thinking as they learn to generate and evaluate knowledge, clarify concepts and ideas, seek possibilities, consider alternatives, and solve problems. Critical and creative thinking involves students thinking broadly and deeply using skills, behaviours, and dispositions such as reason, logic, resourcefulness, imagination, and innovation in all learning areas at school and in their lives beyond school.*
> *https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities/critical-and-creative-thinking/*

The General Capability of Numeracy will be developed by Interdisciplinary Science through their application of mathematical and logical methodologies to data, and arguments.

> *students become numerate as they develop the knowledge and skills to use mathematics confidently across other learning areas at school and in their lives more broadly. Numeracy encompasses the knowledge, skills, behaviours, and dispositions that students need to use mathematics in a wide range of situations. It involves students recognising and understanding the role of mathematics in the world and having the dispositions and capacities to use mathematical knowledge and skills purposefully*
> *https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities/numeracy/*

4. THE CONTEXT OF THE ACT

4.1 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.

4.2 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.

4.3 In consideration of the ACT context, and in response to contemporary research and literature, an *Interdisciplinary Science* course should include:

- a student-centred pedagogical approach
- the Science Framework and Achievement Standards
- an interdisciplinary approach to understanding chosen areas of study and how different scientific domains can converge in areas of study
- the educational needs of young people with respect to understanding the scientific complexity of an area of study and how different systems intersect in key areas of human activity
- skills to assist in decision-making, based on scientific evidence and reasoning in solving problems in Interdisciplinary Science
- knowledge of software, digital systems and innovations in equipment and technology used to quantify, define, and resolve problems in Interdisciplinary Science
- skills in the techniques, equipment, and processes for conducting experimentation and inquiry in Interdisciplinary Science
- awareness of local, national, and global issues, and future trends

5. AIMS OF THE INTERDISCIPLINARY SCIENCE CURRICULUM

The proposed *Interdisciplinary Science A/T/M* course aims to study Science as a domain that is changing, innovative and a producer of knowledge, understanding and skills that are vital to an ethical and sustainable world. According to the US National Academies of Sciences, "Interdisciplinary research is a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice." (2004) Further the US National Science Foundation (NSF) notes that: "NSF has long recognized the value of interdisciplinary research in pushing fields forward and accelerating scientific discovery. Important research ideas often transcend the scope of a single discipline or program. NSF also understands that the integration of research and education through interdisciplinary training prepares a workforce that undertakes scientific challenges in innovative ways." (NSF, 2021) Students who study *Interdisciplinary Science* will be engaging in a contemporary methodology and important and innovative areas of study. This is a course that engages with a wide range of topics of interest to students and allows teachers to write programs that engage students in exploring topics of interest.

Interdisciplinary Science, in exploring complex phenomena at the intersection of different domains of Science, engages with a broad scope of scientific knowledge and methodologies to understand the complex and interrelated systems in areas such as Oceanography, Forestry, Flight, and others. In bringing together often siloed domains of knowledge, students pursue understanding and a depth of analysis uninhibited by disciplinary boundaries. This has a range of benefits for student development of skills in scientific analysis as well as 21st century work and life skills. As Hye Sun You argues, "interdisciplinary teaching facilitates higher order thinking by students (Newell, 1998, 2002), which include freedom of inquiry, critical thinking, deductive reasoning, reasoning by analogy, and synthetic thinking through integrated education." (You, H.S. 2017, p. 67) Indeed, You cites research that indicates the enhanced capacity of students in interdisciplinary science courses to transfer learning, "the interconnected knowledge allows them to apply students to new situations and further allows them to learn in a more efficient manner (Ivanitskaya, Clark, Montgomery, & Primeau, 2002). This is the ultimate goal in interdisciplinary science education." (You, 2017, p. 68) Students gain deep understanding through the analysis of complex systems as they are, rather than limited by the boundaries of disciplines.

Indeed, as Tonya Laakko Train and David E Gammon argue, the application of science in the world is often interdisciplinary and as such this course aims to prepare students for practical inquiry and comprehensive understanding of significant phenomena. They note "our society often encounters multiple science disciplines simultaneously in the news (e.g., natural disasters, human health and disease, and technological advances). Science Without Borders, therefore, aims to better prepare students for an interdisciplinary world." (Laakko Train, T, Gammon D.E. 2021, p. 51) Developing a more sustainable world is one such issue, and as White et al argue, sustainability itself is interdisciplinary and requires interdisciplinary solutions. (White, T et al, 2017) Further, the established areas written into this course such as Oceanography, Forestry and Flight show that STEM careers are often interdisciplinary, and students would be well-served by approaching Science from that perspective. This course aims to engage students in investigating contemporary case studies to develop current and relevant skills and knowledge.

Students in *Interdisciplinary Science* will study how to communicate findings clearly and persuasively. They will understand the challenges of science communication in a period characterised by misinformation and the pervasiveness of pseudoscience. In analysing scientific communication strategies and considering applications of scientific innovations in an often anti-intellectual and unwelcoming public policy climate, they develop an understanding of Science as it is practiced and received in the world today.

Students in Interdisciplinary Science will develop their mathematical, numeracy and information literacy skills in interpreting and designing models and statistical representations of data. As Shin et al argue "Modern scientific exploration relies heavily on computational modelling and analysis, which requires that students use computational thinking to understand phenomena." Students in this course will be well-prepared for scientific analysis in this domain.

As such, this *Interdisciplinary Science* course must continually evolve to equip students to engage with the skills, knowledge and understandings required to engage with work and further study in this discipline. The flexibility of this course will allow teachers to redesign programs of learning to keep units contemporary and relevant.

This course provides access to a vital and growing economic sector in STEM and the diverse industries within that category. This course aims to provide students access to meaningful and satisfying careers and well-informed citizenship. This course aims to be a first step toward a rewarding and interesting career in diverse and multifaceted industries.

6. STRUCTURE OF THE INTERDICSIPLINARY SCIENCE CURRICULUM

The *Interdisciplinary Science* course has been reformulated to allow the continuation of programs in Forestry, Flight, Oceanography, as well as a range of other areas of interest to students.

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.

In bringing together often siloed domains of knowledge, students pursue understanding and a depth of analysis uninhibited by disciplinary boundaries. 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.

UNITS

The units have been drafted for discussion as follows:

Uncovering 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.

For example, oceans and climate change, the science of flight, forensic science, comparing ecosystems, soil as a living system

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. *Teachers might consider a range of topics in developing programs of learning for their students. For example, biodiversity models, climate models, nutrient cycling, weather systems and meteorology, bushfire modelling*
Exploring 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. *Teachers might consider a range of topics in developing programs of learning for their students. For example, navigation and flight planning, anthropogenic climate change action, carbon capture in soils, ocean clean up systems*
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. *Teachers might consider a range of topics in developing programs of learning for their students. For example, genetically engineered solutions, regenerative farming and agroforestry, alternate fuels, lidar scanning, satellite data and lidar, regenerating coral reefs*
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. Students must have studied at least **THREE** standard 1.0 units from this course. An Independent Study unit requires the principal's written approval. Independent Study units are only available to individual students in Year 12. Principal approval is also required for a student in Year 12 to enrol concurrently in an Independent unit and the third 1.0 unit in a course of study.

7. CONSIDERATIONS

7.1 Incorporating a futures orientation

Interdisciplinary Science provides students with access to a broad range of complex arenas in the natural world and in human activity. The broad range of threats and challenges that can be studies through an interdisciplinary approach can be highly localised and also global, and students of *Interdisciplinary Science* will learn about how to address challenges on a local and global scale. As such in engaging with the central problems of change and future planning, studies of Interdisciplinary Science engage with the following aim of the ACT Education Directorate:

The imperative to create a futures-oriented curriculum is a major opportunity to lead improved teaching and learning. A futures orientation will include consideration that society will be increasingly complex, with Australians interacting in a global environment needing to know how to learn, adapt, create, communicate, and interpret and use information critically.
(*The Future of Education and Skills Education* 2030, 2018)

7.2 Interdisciplinary Science curriculum

The *Interdisciplinary Science* curriculum has an important place in the ACT senior secondary curriculum. It challenges students to think about, respond to and create solutions to contemporary problems using a broad scientific understanding of the world. Students actively engage in problem solving processes to create solutions that contribute positively to preferred personal, social, ethical, economic, environmental, legal, sustainable, and technological futures.

7.3 Equity and opportunity

Interdisciplinary Science A/T/M is inclusive of students' needs and interests. It provides flexibility and choice for teachers and students. The factors that influence these choices include school and community contexts, local community learning opportunities, contemporary and local issues, and available learning resources.

7.4 Connections to other learning areas

The *Interdisciplinary Science* course builds on knowledge, skills and understanding from students' previous studies of Australian Curriculum courses. Students learn about fundamental systems and methodologies from the Science learning areas from 7 -10.

At the senior secondary level, students engage with disciplinary concepts and methods from *Biology, Chemistry, Physics,* and *Mathematics*

7.5 Role of digital technologies

Students and teachers integrate a growing range of online information, tools, and applications. Students will learn about and how to use modelling software. These include digitised online materials such as data sets, books, newspapers, journals, images, GIS imagery, and items from museum collections, as well as other online resources including databases, reference works and indexes to library holdings. Further, video-conferencing technology maybe used to access experts in the field. Furthermore, use of new technological developments such as the use of augmented reality and virtual reality will also be considered.

7.6 Clarity of curriculum

The curriculum is substantial and flexible. It is sufficiently rich and descriptive to guide teachers with limited experience but avoids excessive prescription that would hamper experienced teachers from exercising their skills. The curriculum document is expressed clearly in terms that are accessible to a new teacher, while allowing all teachers to enhance it with their interests and expertise.

7.7 Breadth and depth of study

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.

A program of learning is what a college provides to implement the course for a subject meeting students' needs and interests. It is at the discretion of the teacher to emphasis some content descriptions over others. The teacher may teach additional (not listed) content if it meets the specific unit goals providing that it does not duplicate content in other units.

7.8 The nature of the learner

The courses address the needs of diverse learners through (T), (A) and (M) categories of study.

7.9 General capabilities

Interdisciplinary Science A/T/M develops critical and creative thinking when students explore problems, develop innovative ideas, generate solutions, and evaluate and refine their ideas. They develop personal and social capability, while working collaboratively and developing a range of self-management skills. Students develop numeracy and literacy skills as they process and represent data and findings to scientific and general audiences.

7.10 Cross curriculum perspectives

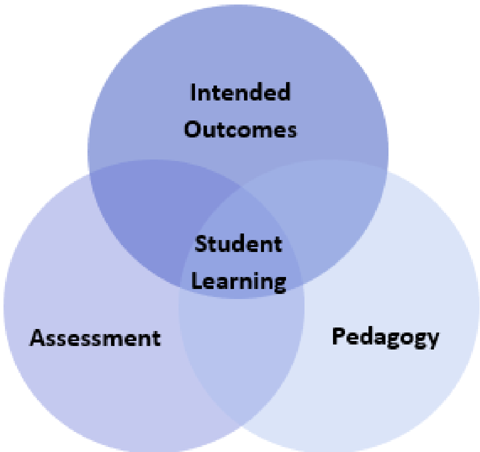
Aboriginal and Torres Strait Islander histories and cultures, Asia and Australia's engagement with Asia, and Sustainability perspectives are represented in the course in ways that are appropriate.

8. PEDAGOGY AND ASSESSMENT

The underpinning beliefs and learning principles for the development of the ACT Board of Senior Secondary School curriculum as are follows:

8.1 Underpinning beliefs

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



8.2 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).

9. CONCLUSION

Interdisciplinary Science A/T/M is to be developed under the Science Framework. The course provides students with a suite of cognitive social skills and understandings that are valuable to a range of further study and career pathways. In learning to solve complex problems in society using a range of scientific domains. They develop a deep understanding of the complex array of systems converging in common problems in society and within specific vocational areas. Studying *Interdisciplinary Science* will enable students to become citizens who are more knowledgeable about the world around them and who have the critical skills to evaluate issues and make informed decisions.

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