DEPARTMENT OF EDUCATION
learners first

Transdisciplinary Projects

Science

Transdisciplinary Science 3

COURSE DOCUMENT

DRAFT

PHASE 3 CONSULTATION

Catholic Education Tasmania

INDEPENDENT SCHOOLS TASMANIA

Years 9 to 12 Learning

Tasmanian Government

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Transdisciplinary Science, 150 hours – Level 3

This course is the Level 3 component of the Transdisciplinary Science program.

Aims

The purpose of Years 9 to 12 Education is to enable all students to achieve their potential through Years 9 to 12 and beyond in further study, training or employment.

Years 9 to 12 Education enables: Personal Empowerment, Cultural Transmission, Preparation for Citizenship and Preparation for Work.

This course supports the principles of Access, Agency, Excellence, Balance, Support and Achievement as part of a range of programs that enables students to access a diverse and highly flexible range of learning opportunities suited to their level of readiness, interests and aspirations.

Courses aligned to the Years 9 to 12 Curriculum Framework belong to one of the five focus areas of Discipline-based Study, Transdisciplinary Projects, Professional Studies, Work-based Learning and Personal Futures.

Transdisciplinary Science Level 3 is a Transdisciplinary Projects course.

Focus Area – Transdisciplinary Projects

Transdisciplinary Projects courses require students to integrate, transfer and reflect on their prior knowledge, skills, attitudes and values in transdisciplinary ways. Students will engage critically and creatively to integrate the learning and ways of working from multiple disciplines. Students will produce outcomes that are only possible through the intersection between disciplines. Students will share the outcomes of Transdisciplinary Projects as appropriate to their methodology, and their exhibition of work will form a major element of their assessment. Students will reflect upon their learning by evaluating their project outputs, the effectiveness of their methodology and the implications of their work on the pre-existing body of knowledge.

Transdisciplinary projects courses have three key features that guide teaching and learning:

- engage and ideate
- connect and apply
- exhibit and reflect.

Figure 1: Transdisciplinary Project Cycle of Learning (adapted from OECD Learning Compass 2030)

In this course learners will do this by:

- drawing on their prior learning and community to engage with an area of inquiry
- identifying, generating and refining their inquiries by considering approaches across disciplines
- practise methodologies that span disciplines of science with others
- iteratively apply and refine these methodologies to their chosen area of inquiry
- reflecting on their learning and inquiries to build their practice and understanding
- showcasing their inquiries and reflections

Rationale

As part of a group of two flexible science components *Transdisciplinary Science* Level 3 provides a powerful platform for learners to develop their capabilities, in particular, to think creatively, work collaboratively, and be innovative.

Learners undertaking *Transdisciplinary Science* Level 3 will apply inquiry-based approaches to design, plan, and undertake investigations on a short term or more extended scale, responding to local or global situations. Both collaboratively and individually, students will employ a scientific approach to collecting, representing, analysing data, and using technological tools effectively. After critically evaluating their procedures or models, students communicate scientifically to draw evidence-based conclusions that may lead to further testing, exploring more effective methods or solutions, or new questions. They will be equipped to navigate, understand and adapt to what we experience as 21st Century learners.

Innovative and critical thinking in the world of science underpins a cohesive understanding of the natural world and the discovery of new ways of doing and thinking. Science is continually refining and expanding knowledge and, as this happens, stimulating new questions for future investigation.

Of the 22 divisions of academic student in the Fields of Research 2007 classification, 10 are scientific and 3 have deep and rich relationships with science. (https://www.abs.gov.au/AUSSTATS/abs@.nsf/Previousproducts/1297.0Main%20Features52008)

In practice, most modern and applied science flows between these divisions and is transdisciplinary once contextualised. Only half of these divisions, which are then further divided into recognisable disciplines, are represented within the current TCE offerings.

Integration of General Capabilities and Cross-Curriculum Priorities

The general capabilities addressed specifically in this course are:

- Critical and creative thinking
- Ethical understanding
- Literacy
- Numeracy
- Personal and social capability

The cross-curriculum priorities are enabled through this course are:

- Aboriginal and Torres Strait Islander Histories and Cultures
- Asia and Australia's Engagement with Asia
- Sustainability

Course Description

Transdisciplinary Science Level 3, together with its Level 2 component, provides an opportunity to inquire deeply into an area of scientific interest within Tasmania. Learners will choose and refine a line of questioning to gain both a breadth and depth of scientific knowledge and practice that is applied in our state. Learners will experience and gain expertise in inquiry processes and how knowledge is created. By coming to an evidence-based understanding through the applied observation and thinking skills in this course learners are prepared for any pathway in the twenty-first century.

Pathways

- *Transdisciplinary Science* Level 3 has a clear pathway from Australian Curriculum Science F-10 and other TASC Science courses as well as some TASC HaSS, HPE, Technologies and Mathematics courses.
- As the study of all life *Transdisciplinary Science* Level 3 has a clear pathway to large range of tertiary as well as vocational pathways.

Course Requirements

Learners enrolled in this course are required to be able to work responsibly and safely in practical situations.

Providers offering this course will need equipment, materials and a suitable space to carry out the practical component of the course effectively and safely.

This course requires learners to collaborate with others.

Course Structure, Delivery and Progression

Structure

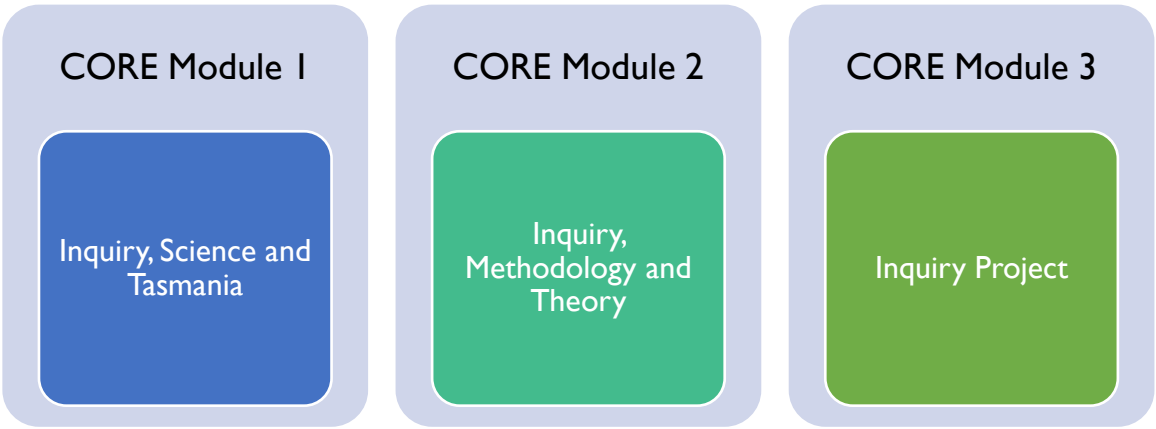
This course consists of three 50-hour modules.

Modules Available

Core Module 1: Inquiry, science and Tasmania

Core Module 2: Inquiry, methodology and theory

Core Module 3: Inquiry project



Delivery

The three modules should be delivered in order 1, 2, 3.

Developmental Progression

Module 1 introduces the learner to key ideas, concepts, skills, knowledge and understanding. Module 2 enables the learner to build upon these key ideas, concepts, skills, knowledge and understanding. Module 3 enables the learner to further build on these key ideas, concepts, skills, knowledge and understanding.

The progression of learning is evidenced through assessment opportunities which provide feedback to promote further learning. A culminating performance of understanding is reflected in the final work requirements.

Module 1 - Inquiry, science and Tasmania

Science is indispensable in Tasmania – now and into our future. Module 1 of *Transdisciplinary Science* Level 3 taps into the extensive fields where science is applied in our state and the prior knowledge of learners to engage with and ideate a focus that is relevant to our community. Learners will discover that in practice science draws from many disciplines. By researching, connecting and iteratively inquiring into this focus learners will begin to understand its place in Tasmania, and the theories, models and methodologies that are key to creating knowledge and feed back into the Tasmanian community.

The application of science though inquiry, reflection and refinement of understanding at every stage is key to this module. Learners should always be prepared to question their work and return to previous work to ensure they build their knowledge. Through this process possible lines of inquiry will emerge to be further refined in Module 2. Learners will have the opportunity to demonstrate their findings and plans though a folio.

Module 1 Learning Outcomes

On successful completion of this module, learners will be able to:

1. analyse and synthesise the interrelationships of the development and applications of science with technology and the values of the broader community
2. apply and synthesise models and theories used to understand science
3. synthesise theory and observations, evaluate and communicate within scientific inquiry
4. work independently and with others to research, design and implement exploratory investigations for scientific inquiry.

Module 1 Content

Within this module learners will discover where science is valued within the Tasmanian context. They will choose one area to investigate, analyse and synthesise in detail to understand the development and limitations of this application of science and its interrelationships with technology and sustainability within Tasmania. They will broadly explore the transdisciplinary nature of this science, the knowledge required and how it is applied. In parallel with this learner will become familiar with and iteratively practice methodologies used in Tasmania for this application of science. Learners will then synthesise their understanding and experience to choose a focus, and plan, for further investigation in Module 2.

Key Knowledge

Within science that is valued, applied or researched in the Tasmanian context learners will investigate, analyse and synthesise where:

Science as a human endeavour

- theories have been refined or replaced as new evidence, models or theories have emerged
- there are opportunities to refine theories or gather more data

- technology has assisted in greater understanding
- social, economic, cultural or environmental sustainability is impacted in Tasmania.

Science understanding

- the specialist knowledge required involves more than one scientific discipline
- the theories and concepts that need to be referenced
- different methodologies and specific terminology are used.

Key skills

Science Inquiry Skills

Within science that is valued in the Tasmanian context learners will:

Design and implementation of inquiry

- identify, research and construct questions for investigation and analysis
- design and conduct exploratory investigations to collect valid and reliable primary data that include procedures, risk assessment and ethical considerations
- explore ways to usefully organise, synthesise and represent data and information.

Evaluation of inquiry

- analyse the limitations of primary and secondary data and how they can be addressed
- research and analyse processes, claims and conclusions within a field of science
- draw valid and reasoned conclusions through analysing the inter-relationships of data, theories and models
- evaluate processes, data and conclusions to inform further investigation.

Module 1 Work Requirements

The work requirements of a course are processes, products or performances that provide a significant demonstration of achievement that is measurable against the course's standards. Work requirements need not be the sole form of assessment for a module.

This module includes one (1) investigation work requirement (Inquiry in the Tasmanian context)

See Appendix 3 for summary of Work Requirement specifications for this course.

Module 1 Assessment

This module will assess criteria 1, 2, 3, 4.

Module 2 - Inquiry, methodology and theory

To understand science in Tasmania the national context needs to be investigated. Module 2 of *Transdisciplinary Science* Level 3 will provide an opportunity to engage more deeply with their chosen focus. By researching, connecting and iteratively inquiring into this focus learners will begin to ideate towards an extended inquiry question. By applying theories, models and methodologies they will be able to make the connections to begin to prepare and support their extended inquiry.

Targeted application of science though inquiry, reflection and refinement of understanding at every stage is key to this module. Learners should always be prepared to question their work and return to previous work to ensure they are able to build their knowledge. Through this process questions for inquiry will emerge to be with one question to be chosen for Module 3. Learners will have the opportunity to demonstrate their findings and plans though a folio.

Module 2 Learning Outcomes

On successful completion of this module, learners will be able to:

1. analyse and synthesise the interrelationships of the development and applications of science with technology and the values of the broader community
2. apply and synthesise models and theories used to understand science
3. synthesise theory and observations, evaluate and communicate within scientific inquiry
5. work independently and with others to research, design and implement investigations to prepare for and/or support an extended scientific inquiry.

Module 2 Content

Within this module learners will investigate, analyse and synthesise within the national context for their chosen focus and further inquire into the development and limitations of this focus and its interrelationships with technology and sustainability within Australia. They will investigate, analyse and synthesise the transdisciplinary nature of this focus, the knowledge required and how it is applied. In parallel with this, learners will become familiar with, practise, evaluate and iteratively refine methodologies to be used in their extended investigation in Module 3. Learners will then synthesise their understanding and experience to create a detailed plan for their extended investigation in Module 3.

Key Knowledge

Within a chosen scientific focus learners will investigate, analyse and synthesise where:

Science as a human endeavour

- theories of interest have been refined or replaced as new evidence, models or theories has emerged
- there are opportunities to refine theories or gather more data
- technology has assisted in greater understanding
- social, economic, cultural or environmental sustainability is impacted in Australia
- where there is collaboration within Australia.

Science understanding

- the specialist knowledge required involves more than one scientific discipline
- the detailed theories and concepts being applied (including mathematical modelling)
- different methodologies and specific terminology are used.

Key skills

Science inquiry skills

Within a chosen scientific focus learners will engage in investigations to develop and support an extended inquiry:

Design and implementation of inquiry

- identify, research and construct questions for investigation and analysis
- design and conduct exploratory investigations to collect valid and reliable primary data that include procedures, risk assessment and ethical considerations
- explore ways to usefully organise, synthesise and represent data and information.

Evaluation of inquiry

- analyse the limitations of primary and secondary data and how they can be addressed
- research and analyse processes, claims and conclusions within a field of science
- draw valid and reasoned conclusions through analysing the inter-relationships of data, theories and models
- evaluate processes, data and conclusions to inform further investigation.

Module 2 Work Requirements

The work requirements of a course are processes, products or performances that provide a significant demonstration of achievement that is measurable against the course's standards. Work requirements need not be the sole form of assessment for a module.

This module includes one (1) investigation work requirement (Applying methodology and specialist knowledge)

See Appendix 3 for summary of Work Requirement specifications for this course.

Module 2 Assessment

This module will assess criteria 1, 2, 3, 5.

Module 3 - Inquiry project

All science has global traditions and inter-relationships – learners will explore these to inform their chosen inquiry. Module 3 of *Transdisciplinary Science* Level 3 will provide an opportunity to inquire deeply into a question developed through Modules 1 and 2. By researching, connecting and iteratively inquiring into this question learners will build their understanding. By applying theories, models and methodologies they will be able to make the connections required to come to valid and supported conclusions.

As with previous modules – specific application of science though inquiry, reflection and refinement of understanding at every stage is key. Learners should always be prepared to question their work and return to previous work to ensure they are able to build their knowledge. Through this process possible answers to the inquiry question will crystalise and be discussed. Learners will have the opportunity to demonstrate their findings though a folio, a poster and a presentation.

Module 3 Learning Outcomes

On successful completion of this module, learners will be able to:

1. analyse and synthesise the interrelationships of the development and applications of science with technology and the values of the broader community
2. apply and synthesise models and theories used to understand science
3. synthesise theory and observations, evaluate and communicate within scientific inquiry
6. work independently and with others to research, design and implement investigations to complete an extended scientific inquiry.

Module 3 Content

Within this module learners will investigate, analyse and synthesise within the international context of their chosen investigation. They will inquire into the development and limitations specific to their extended investigation and its interrelationships with technology and sustainability globally. They will investigate and synthesise transdisciplinary knowledge required, and how it is applied. In parallel with this, learners will become familiar with, practise, evaluate and refine methodologies as they are used in

their extended investigation. Learners will then synthesise their understanding and experience to produce a poster and a folio that represents their work and what they have found.

Key Knowledge

Within a scientific inquiry learners will investigate, analyse and synthesise where:

Science as a human endeavour

- theories of interest have been refined or replaced as new evidence, models or theories has emerged
- there are opportunities to refine theories or gather more data
- technology has assisted in greater understanding
- social, economic, cultural or environmental sustainability is impacted in Australia
- where there is international collaboration.

Science understanding

- the specialist knowledge required involves more than one scientific discipline
- the detailed theories and concepts that are being applied (including mathematical modelling)
- different methodologies and specific terminology are used.

Key skills

Science inquiry skills

Within a scientific inquiry learners will engage in one or more related investigations:

Design and implementation of inquiry

- identify, research and construct questions for investigation and analysis
- design and conduct exploratory investigations to collect valid and reliable primary data that include procedures, risk assessment and ethical considerations
- explore ways to usefully organise, synthesise and represent data and information.

Evaluation of inquiry

- analyse the limitations of primary and secondary data and how they can be addressed
- research and analyse processes, claims and conclusions within a field of science
- draw valid and reasoned conclusions through analysing the inter-relationships of data, theories and models
- evaluate processes, data and conclusions to inform further investigation.

Module 3 Work Requirements

The work requirements of a course are processes, products or performances that provide a significant demonstration of achievement that is measurable against the course's standards. Work requirements need not be the sole form of assessment for a module.

This module includes one (1) folio and one (1) product work requirement (Inquiry Folio and Inquiry Poster)

See Appendix 3 for summary of Work Requirement specifications for this course.

Module 3 Assessment

This module will assess criteria 1, 2, 3, 6.

Assessment

Criterion-based assessment is a form of outcomes assessment that identifies the extent of learner achievement at an appropriate end-point of study. Although assessment – as part of the learning program – is continuous, much of it is formative, and is done to help learners identify what they need to do to attain the maximum benefit from their study of the course. Therefore, assessment for summative reporting to TASC will focus on what both teacher and learner understand to reflect end-point achievement.

The standard of achievement each learner attains on each criterion is recorded as a rating 'A', 'B', or 'C', according to the outcomes specified in the standards section of the course.

A 't' notation must be used where a learner demonstrates any achievement against a criterion less than the standard specified for the 'C' rating.

A 'z' notation is to be used where a learner provides no evidence of achievement at all.

Internal assessment of all criteria will be made by the provider. Providers will report the learner's rating for each criterion to TASC.

TASC will supervise the external assessment of designated criteria which will be indicated by an asterisk (*). The ratings obtained from the external assessments will be used in addition to internal ratings from the provider to determine the final award.

Criteria

	Module 1	Module 2	Module 3	Notes
Criteria Assessed	1,2,3,4	1,2,3,5	1,2,3,6	Three common in all modules and one focus criterion per module.

The assessment for *Transdisciplinary Science* Level 3 will be based on the degree to which the learner can:

1. analyse and synthesise the interrelationships of the development and applications of science*
2. apply and synthesise models and theories used to understand science*
3. synthesise, evaluate and communicate within scientific inquiry*
4. research, design and implement exploratory investigations individually and with others
5. research, design and implement investigations individually and with others
6. research, design and implement an extended scientific inquiry individually and with others

*denotes criteria that are both internally and externally assessed.

Standards

Criterion 1*: analyse and synthesise the interrelationships of the development and applications of science

This criterion is both internally and externally assessed.

Rating C	Rating B	Rating A
describes the role of collaboration and review, and technologies, in the development of scientific theories or models	explains the role of collaboration, debate and review, and technologies, in the development of scientific theories and models	analyses the role of collaboration, debate and review, and technologies, in the development of scientific theories and models
discusses how science has been used to meet needs and inform decision making, and some social, economic or ethical implications of these applications.	explains how science has been used to meet diverse needs and inform decision making; and how these applications are influenced by social, economic and ethical factors.	evaluates how science has been used in concert with other sciences to meet diverse needs and inform decision making; and how these applications are influenced by interacting social, economic and ethical factors.

Criterion 2*: apply and synthesise models and theories used to understand science

This criterion is both internally and externally assessed.

Rating C	Rating B	Rating A
synthesises and describes key aspects of a theory or model used to explain system processes and the phenomena to which they can be applied	synthesises and describes the theories and model/s used to explain systems, some supporting evidence and limitations	synthesises and analyses the theories and model/s used to explain systems, supporting evidence, limitations and assumptions
applies theories or models of systems and processes to explain phenomena, interpret problems and make plausible predictions in some unfamiliar contexts.	applies theories and models of systems and processes to explain phenomena, analyse problems and make plausible predictions in unfamiliar contexts.	applies theories and models of systems and processes to explain phenomena and critically analyse complex problems and make reasoned, plausible predictions in unfamiliar contexts.

Criterion 3*: synthesise, evaluate and communicate within scientific inquiry

This criterion is both internally and externally assessed.

Rating C	Rating B	Rating A
selects data to demonstrate relationships linked to scientific knowledge and provides conclusions based on data	selects appropriate data as evidence, interprets evidence with reference to models and/or theories and provides evidence for conclusions	justifies their selection of data as evidence, analyses evidence with reference to models and/or theories and develops evidence-based conclusions that identify limitations
evaluates processes and claims and suggests improvements or alternatives	evaluates processes and claims; provides a critique with reference to evidence and identifies possible improvements or alternatives	evaluates processes and claims; provides an evidence-based critique and discussion of improvements or alternatives
selects, constructs and uses appropriate representations to describe relationships and solve problems	selects, constructs and uses appropriate representations to describe complex relationships and solve unfamiliar problems	selects, constructs and uses appropriate representations to describe complex relationships and solve complex and unfamiliar problems
communicates clearly in a range of modes, styles and genres for specific purposes.	communicates clearly and accurately in a range of modes, styles and genres for specific audiences and purposes.	communicates effectively and accurately in a range of modes, styles and genres for specific audiences and purposes.

Criterion 4: research, design and implement exploratory investigations individually and with others

This criterion is only internally assessed.

Rating C	Rating B	Rating A
researches for, designs and conducts safe, ethical investigations that collect valid data to explore applications of science	researches for, designs, conducts and improves safe, ethical investigations that collect valid, reliable data to explore applications of science	researches for, designs, conducts and improves safe, ethical investigations that efficiently collect valid, reliable data in to explore applications of science
analyses data, to identify broad relationships, anomalies and sources of error	analyses data sets to identify broad causal and correlational relationships, anomalies and sources of error	analyses data sets to explain broad causal and correlational relationships, the reliability of the data and sources of error
sets personal priorities and manage resources effectively to investigate an application of science	set and adapt personal priorities and manage resources effectively to investigate an application of science	establish personal priorities, manage resources effectively and demonstrate initiative to investigate an area of science
set and apply criteria, within a broad investigation, to complete complex tasks and evaluate the outcomes of individual and group decisions.	develop and apply criteria, within a broad investigation, to complete complex tasks and evaluate the outcomes of individual and group decisions.	develop, apply and adapt criteria, within a broad investigation, to complete complex tasks and evaluate the outcomes of individual and group decisions.

Criterion 5: research, design and implement investigations individually and with others

This criterion is only internally assessed.

Rating C	Rating B	Rating A
researches for, designs and conducts safe, ethical investigations that collect valid data to target and refine the application of theories and methodologies	researches for, designs, conducts and improves safe, ethical investigations that collect valid, reliable data to target and refine the application of theories and methodologies	researches for, designs, conducts and improves safe, ethical investigations that efficiently collect valid, reliable data in response to target and refine the application of theories and methodologies
analyses data to identify relationships, anomalies and sources of error to target and refine the application of theories and methodologies	analyses data sets to identify causal and correlational relationships, anomalies and sources of error to target and refine the application of theories and methodologies	analyses data sets to explain causal and correlational relationships, the reliability of the data and sources of error to target and refine the application of theories and methodologies
sets personal priorities and manage resources effectively to support and prepare for an extended investigation	set and adapt personal priorities and manage resources effectively to support and prepare for an extended investigation	establish personal priorities, manage resources effectively and demonstrate initiative to support and prepare for an extended investigation
set and apply criteria to complete a series of complex tasks and evaluate the outcomes of individual and group decisions.	develop and apply criteria to complete a series of complex tasks and evaluate the outcomes of individual and group decisions.	develop, apply and adapt criteria to complete a series of complex tasks and evaluate the outcomes of individual and group decisions.

Criterion 6: research, design and implement an extended scientific inquiry individually and with others

This criterion is only internally assessed.

Rating C	Rating B	Rating A
researches for, designs and conducts safe, ethical investigations that collect valid data for an extended inquiry	researches for, designs, conducts and improves safe, ethical investigations that collect valid, reliable data for an extended inquiry	researches for, designs, conducts and improves safe, ethical investigations that efficiently collect valid, reliable data for an extended inquiry
analyses data, within an ongoing inquiry, to identify relationships, anomalies and sources of error	analyses data sets, within an ongoing inquiry, to identify causal and correlational relationships, anomalies and sources of error	analyses data sets, within an ongoing inquiry, to explain causal and correlational relationships, the reliability of the data and sources of error
sets personal priorities and manage resources effectively within an extended inquiry	set and adapt personal priorities and manage resources effectively within an extended inquiry	establish personal priorities, manage resources effectively and demonstrate initiative within an extended inquiry
set and apply criteria, within an ongoing inquiry to complete complex tasks and evaluate the outcomes of individual and group decisions.	develop and apply criteria, within an ongoing inquiry, to complete complex tasks and evaluate the outcomes of individual and group decisions.	develop, apply and adapt criteria, within an ongoing inquiry, to complete complex tasks and evaluate the outcomes of individual and group decisions.

Quality Assurance

- This will be determined by TASC at time of accreditation.

Qualifications and Award Requirements

The final award will be determined by the Office of Tasmanian Assessment, Standards and Certification from the 9 ratings (6 ratings from the internal assessment and 3 ratings from the external assessment).

The minimum requirements for an award in *Transdisciplinary Science* Level 3 are as follows:

EXCEPTIONAL ACHIEVEMENT (EA)
8'A' ratings, 1 'B' rating (2 'A' ratings, 1 'B' rating from external assessment)

HIGH ACHIEVEMENT (HA)
4 'A' ratings, 4 'B' ratings, 1 'C' ratings (1 'A' rating, 1 'B' rating and 1 'C' rating from external assessment)

COMMENDABLE ACHIEVEMENT (CA)
4 'B' ratings, 4 'C' ratings (1 'B' ratings, 2 'C' ratings from external assessment)

SATISFACTORY ACHIEVEMENT (SA)
7 'C' ratings (2 'C' ratings from external assessment)

PRELIMINARY ACHIEVEMENT (PA)
5 'C' ratings

A learner who otherwise achieves the ratings for a CA (Commendable Achievement) or SA (Satisfactory Achievement) award but who fails to show any evidence of achievement in one or more criteria ('z' notation) will be issued with a PA (Preliminary Achievement) award.

Course Evaluation

- This will be confirmed by time of accreditation.

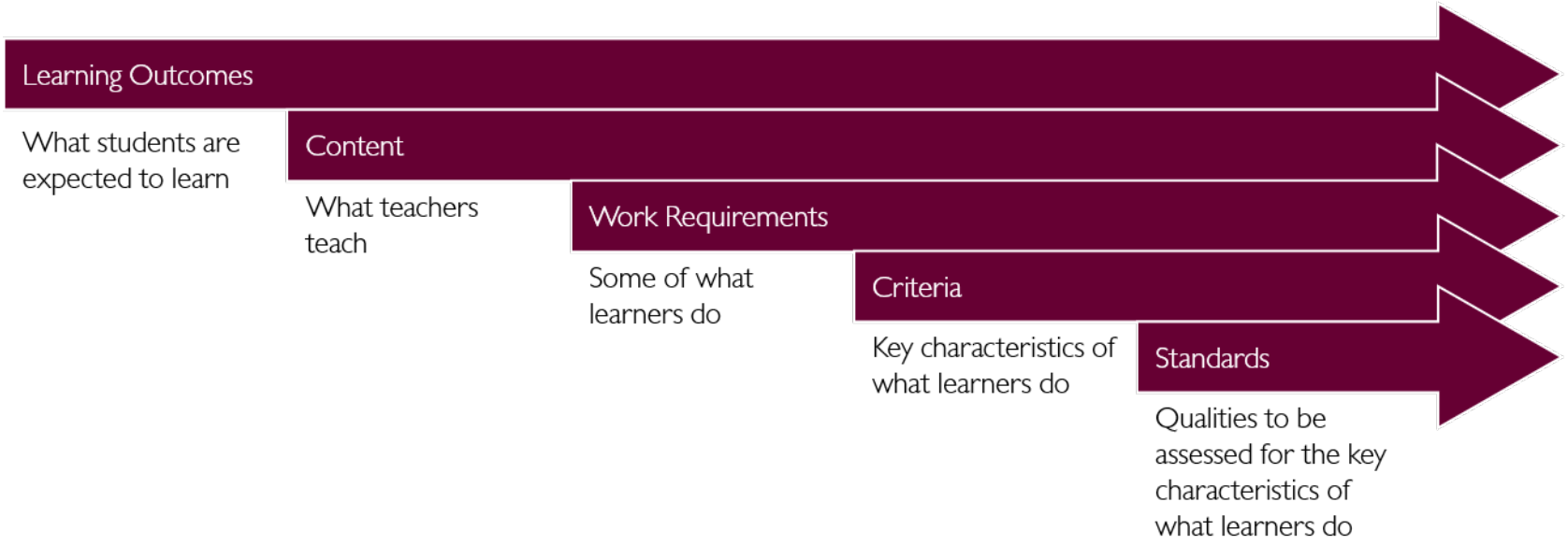
Course Developer

This course has been developed by the Department of Education's Years 9 to 12 Learning Unit in collaboration with Catholic Education Tasmania and Independent Schools Tasmania.

Accreditation and Version History

- Details to be determined by TASC at time of accreditation.

Appendix 1 - Line of Sight



Learning Outcomes	Course Content	Work Requirements	Criteria	Standards	General Capabilities (GC)
1. Analyse and synthesise the interrelationships of the development and applications of science with technology and the values of the broader community.	Module 1, 2, 3	Module 1, 2, 3	C 1	All	GC:
2. Apply and synthesise models and theories used to understand science.	Module 1, 2, 3	Module 1, 2, 3	C 2	All	GC:
3. Synthesise theory and observations, evaluate and communicate within scientific inquiry.	Module 1, 2, 3	Module 1, 2, 3	C 3	All	GC:
4. Work independently and with others to research, design and implement exploratory investigations for scientific inquiry.	Module 1	Module 1	C 4	All	GC:

5. Work independently and with others to research, design and implement investigations to prepare for and/or support an extended scientific inquiry.	Module 2	Module 2	C 5	All	GC: 
6. Work independently and with others to research, design and implement investigations to complete an extended scientific inquiry.	Module 3	Module 3	C 6	All	GC: 

Appendix 2 - Alignment to Curriculum Frameworks

Links to Foundation to Year 10

Progression from the F-10 Australian Curriculum: Science

This course component continues to develop student understanding and skills from across the three strands of the F-10 Australian Curriculum: Science. In the Science Understanding strand, the Biology curriculum draws on knowledge and understanding from across the four sub-strands of Biological, Physical, Chemical, and Earth and Space sciences.

Mathematical skills expected of students studying Transdisciplinary Science

This course component requires students to use the mathematical skills they have developed through the F-10 Australian Curriculum: Mathematics, in addition to the numeracy skills they have developed through the Science Inquiry Skills strand of the Australian Curriculum: Science.

Within the Science Inquiry Skills strand, students are required to gather, represent and analyse numerical data to identify the evidence that forms the basis of scientific arguments, claims or conclusions. In gathering and recording numerical data, students are required to make measurements using appropriate units to an appropriate degree of accuracy.

Students may need to be taught when it is appropriate to join points on a graph and when it is appropriate to use a line of best fit. They may also need to be taught how to construct a straight line that will serve as the line of best fit for a set of data presented graphically.

It is assumed that students will be able to competently:

- perform calculations involving addition, subtraction, multiplication and division of quantities
- perform approximate evaluations of numerical expressions
- express fractions as percentages, and percentages as fractions
- calculate percentages
- recognise and use ratios
- transform decimal notation to power of ten notation
- substitute physical quantities into an equation using consistent units so as to calculate one quantity and check the dimensional consistency of such calculations
- solve simple algebraic equations
- comprehend and use the symbols/notations <,>, Δ, ≈
- translate information between graphical, numerical and algebraic forms
- distinguish between discrete and continuous data then select appropriate forms, variables and scales for constructing graphs
- construct and interpret frequency tables and diagrams, pie charts and histograms
- describe and compare data sets using mean, median and inter-quartile range
- interpret the slope of a linear graph.

Appendix 3 - Work Requirements

Module 1 Work Requirements Specifications

Focus Area: Transdisciplinary Science
Title of Work Requirement: Applying science in Tasmania
Mode /Format: Investigation
Learning Outcomes: 1, 2, 3 and 4

Description:
Learners must complete a laboratory and/or field journal for assessment of criterion 4 and to prepare for the remainder of this Work Requirement.
Learners will outline:
an area where science is applied in Tasmania referring to the key knowledge for Module 1
a focus for further investigation in Module 2 and the reasons for this choice
a summary of what will be investigated and what approaches will be taken in Module 2
Size: 50 Hours
Timing: This is a culminating performance for Module 1
External agencies: Engagement with scientists and their institutions is optional
Relevant Criterion/criteria:

- Criterion 1
- Criterion 2
- Criterion 3
- Criterion 4

Module 2 Work Requirements Specifications

Focus Area: Transdisciplinary Science
Title of Work Requirement: Applying methodology and specialist knowledge
Mode /Format: Investigation
Learning Outcomes: 1, 2, 3 and 5
Description:
Learners must complete a laboratory and/or field journal for assessment of criterion 5 and to prepare for the remainder of this Work Requirement.
Learners will outline:

- The focus of their investigation in the national context referring to the key knowledge for Module 2
- The findings from their investigations in Modules 1 and 2
- Their plans for extended inquiry for Module 3 reasons for this choice referring to their findings in Module 2
- a summary of what will be investigated in Module 3 and the methodologies to be used.

Size: 50 Hours
Timing: This is a culminating performance
External agencies: Engagement with scientists and their institutions is optional
Relevant Criterion/criteria:

- Criterion 1
- Criterion 2
- Criterion 3
- Criterion 5

Module 3 Work Requirements Specifications

Focus Area: Transdisciplinary Science
Title of Work Requirement: Inquiry Poster
Mode /Format: Product
Learning Outcomes: 1, 2, 3
Description:
Utilising an A2 poster format learners will outline:

- The question being investigated in Module 3

- Their major findings with theoretical underpinning the evidence for them
- Opportunities for further investigation with reasoning

Size: 15-minute presentation
Timing: This is a culminating performance
External agencies: Engagement with scientists and their institutions is optional
Relevant Criterion/criteria:

- Criterion 2
- Criterion 3

Relationship to External Assessment: Together with the Inquiry folio this form part of external assessment.

Focus Area: Transdisciplinary Science
Title of Work Requirement: Inquiry Folio
Mode /Format: Folio
Learning Outcomes: 1, 2, 3 and 6
Description:
Learners must complete a laboratory and/or field journal for assessment of criterion 4 and to prepare for the remainder of this Work Requirement.
Learners choose items from all three modules to for a folio, including:

- discussion of the local, national and global contexts for their investigation
- evidence to definitively support each element and claim on their Inquiry Poster.

Size: 40 Hours
Timing: This is a culminating performance
External agencies: Engagement with scientists and their institutions is optional.
Relevant Criterion/criteria:

- Criterion 1
- Criterion 2
- Criterion 3
- Criterion 6

Relationship to External Assessment: Together with the Inquiry poster this form part of external assessment.

Appendix 4 – General Capabilities and Cross-Curriculum Priorities

Learning across the curriculum content, including the cross-curriculum priorities and general capabilities, assists students to achieve the broad learning outcomes defined in the *Alice Springs (Mparntwe) Education Declaration (December 2019).*

General Capabilities:

The general capabilities play a significant role in the Australian Curriculum in equipping young Australians to live and work successfully in the twenty-first century.

In the Australian Curriculum, capability encompasses knowledge, skills, behaviours and dispositions. Students develop capability when they apply knowledge and skills confidently, effectively and appropriately in complex and changing circumstances, in their learning at school and in their lives outside school.

The general capabilities include:

- Critical and creative thinking 
- Ethical understanding 
- Information and communication technology capability 
- Intercultural understanding 
- Literacy 
- Numeracy 
- Personal and social capability 

Cross-Curriculum Priorities:

Cross-curriculum priorities enable students to develop understanding about and address the contemporary issues they face, for their own benefit and for the benefit of Australia as a whole. The priorities provide national, regional and global dimensions which will enrich the curriculum through development of considered and focused content that fits naturally within learning areas. Incorporation of the priorities will encourage conversations between students, teachers and the wider community.

The cross-curriculum priorities include:

- Aboriginal and Torres Strait Islander Histories and Cultures 
- Asia and Australia's Engagement with Asia 
- Sustainability 

Appendix 5 – Glossary

- A central glossary will be added to the final draft of the course for consultation.