



TCE syllabuses are offered at Senior Secondary 2 (C, B, A), 3 (C, B, A), 4 (C, B, A), and 5 (C). A C syllabus is of 150 hours design time, a B syllabus of 100 hours, an A syllabus of 50 hours, and an S syllabus of 25 hours design time.

THE SYLLABUS DOCUMENT

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LEARNING STATEMENT

Knowledge and understanding of science, scientific literacy and scientific methods are necessary for students to develop the skills to resolve questions about their natural and constructed world.

The purpose of science education is to develop scientific literacy, which is a high priority for all citizens, helping them to be interested in and understand the world around them, to engage in discourse about science, to be sceptical and questioning of claims made by others about scientific matters, to be able to identify questions and draw evidence-based conclusions, and to make informed decisions about the environment and their own health and well-being¹.

Scientifically literate students can therefore describe, explain and predict natural phenomena, and can discuss the validity of their conclusions. This enables them to identify and understand the scientific and technological aspects underlying national and local issues and to form opinions, which are reasoned and informed. It also leads to the proper evaluation of the quality of scientific information on the basis of source and on the methods used to generate it. The study of science raises awareness of the central role that science and technology can play both in encouraging life long learning, and in enabling a student to pursue a career path to this end.

SYLLABUS DESCRIPTION

In this syllabus, students will develop knowledge and understanding of the management and research that allows the sustainable use of Tasmanian resources. This will be acquired through the study of sustainable resource management that integrates three or more following contexts: Agriculture, Marine/Aquaculture, Energy, Forestry and Mining. The analysis of resource management in a balanced and scientific manner using critical thinking skills is an integral aspect of this syllabus.

¹ Status and Quality of Teaching and Learning of Science in Australian Schools a Research Report 2001

SYLLABUS OUTLINE

The syllabus outline describes the fundamental aspects of the syllabus that remain unchanged for the period of accreditation and must be read in conjunction with the Syllabus Supplement. The Syllabus Supplement contains advice to assist teachers delivering the syllabus and can be modified from year to year in response to consensus decisions arrived at in TASSAB Moderation meetings.

The syllabus addresses the following questions:

1. What are the Natural Resources in Tasmania?

- a) What is a resource?
- b) What is the time frame of resource formation?
- c) Why is the resource valued?
- d) What accounts for the distribution of these Tasmanian resources?

2. What is the role of research and innovation in the development and management of natural resources?

- a) How do we undertake sustainable resource management?
- b) What is the role of research institutions in the improvement of management?
- c) What does it mean to work scientifically in researching reserves?
- d) How do research case studies guide management of natural resources?

3. What is the relationship between production and management of a resource?

- a) How has resource use changed through history?
- b) What impact have principles of ecology had on resource production and management?
- c) What key aspects describe the science of resource management?
- d) How is sustainable production maximised?
- e) What is the nature of advances in technology, and to what extent have they led to increased production and changes in management?

4. What scientific applications are used in the processing of natural resources in Tasmania?

- a) To what extent has downstream processing impacted on local industries, and what are the associated aspects?
- b) What is the nature and extent of value-adding with regard to Tasmanian resource industries?
- c) What uses have been and can be made of waste products as a resource?

5 What issues affect resource industries?

- a) What values lie in using Tasmanian resources?
- b) What external influences affect natural resource use?
- c) What are the ethical issues associated with resource management?
- d) What are some of the Issues that raise public debate in:
 - i. agriculture
 - ii. marine resources/aquaculture
 - iii. energy
 - iv. forestry
 - v. mining.
- e) What is the nature of government involvement in sustainable resource management?

RECOMMENDED PATHWAYS

Science of Natural Resources 5 is a pre-tertiary subject. This syllabus is designed for students who have an interest in the sustainable use of Tasmanian resources and would like to understand the science involved in the development and management of resources. The syllabus is an excellent general subject and a useful preparation to undertake tertiary study of science. The Science of Natural Resources is desirable for students planning to undertake careers in Forestry, Agriculture, Mining, Geology and Aquaculture.

ASSESSMENT

Criterion-based assessment is a form of outcomes assessment which identifies the extent of student achievement at an appropriate end-point of study. Although assessment in the classroom is continuous, much of it is formative, and is done to help students identify what they need to do to attain the maximum benefit from their study of the syllabus. Therefore, assessment for summative TCE reporting should focus on what both teacher and student understand to reflect end-point achievement.

The primary audience for assessment is the student and the teacher, but may also include parents when appropriate.

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

A 't' notation must be used where a student demonstrates any achievement against a criterion less than the standard specified for the 'C' rating. The 't' notation sits outside the continuum of ratings that ascend through the levels of difficulty of TCE generic or subject-specific criteria, and is thus not described in syllabus standards.

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

Schools offering this syllabus must participate in the moderation process through attendance at meetings and completion of the moderation requirements determined by the State Moderation Committee. Further information on moderation, as well as on assessment, is available in the TCE Manual or on the website at www.tassab.tased.edu.au.

Internal assessment of all criteria will be made by the school. Schools will report the student's rating for each criterion to the Tasmanian Secondary Assessment Board.

The Tasmanian Secondary Assessment Board will supervise the external assessment of designated criteria (*). The ratings obtained from the external assessments will be used in addition to those provided from the school to determine the final award.

EXTERNAL ASSESSMENT REQUIREMENTS

The external assessment of this syllabus focuses on the assessment of criteria 4, 6, 7, 8 and 10. TASSAB approved graphics and scientific calculators will be permitted in external assessments.

CRITERIA

The assessment for Science of Natural Resources Senior Secondary 5C will be based on the degree to which the student can:

1. select and use technologies;
2. collect and categorise information;
3. plan, organise and complete activities;
- 4.* develop and evaluate experiments;
5. communicate ideas and information;
- 6.* demonstrate knowledge and understanding of the impact of science on society and the environment;
- 7.* demonstrate knowledge and understanding of scientific ideas relevant to the resource and its development;
- 8.* analyse, interpret and draw conclusions;
9. demonstrate knowledge and understanding of the impacts of technology on the management and use of the resource;
- 10.* demonstrate knowledge and understanding of the science of resource management.

* = externally assessed criteria

AWARD REQUIREMENTS

The final award will be determined by the Tasmanian Secondary Assessment Board from the 15 ratings (10 ratings from the internal assessment and 5 ratings from the external assessment).

The minimum requirements for an award in Science of Natural Resources Senior Secondary 5C are as follows:

EXCEPTIONAL ACHIEVEMENT (EA)

13 'A', 2 'B' ratings (4 'A', 1 'B' from external assessment)

HIGH ACHIEVEMENT (HA)

6 'A', 7 'B', 2 'C' ratings (2 'A', 2 'B', 1 'C' from external assessment).

COMMENDABLE ACHIEVEMENT (CA)

9 'B', 5 'C' ratings (2 'B', 2 'C' from external assessment).

SATISFACTORY ACHIEVEMENT (SA)

12 'C' ratings (3 'C' from external assessment).

PRELIMINARY ACHIEVEMENT (PA)

7 'C' ratings.

A student 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.

ACCREDITATION

The accreditation period for this syllabus is 1st January 2004 – 31st December 2008.

VERSION HISTORY

Version 1	Accredited syllabus
Version 2	Amendments to level 5 TCE generic criteria

T A S M A N I A N
S E C O N D A R Y
A S S E S S M E N T
B O A R D

Science of
Natural Resources

Senior Secondary 5C



CRITERIA STANDARDS

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Note:

Each criterion has standards described at the appropriate level(s) of difficulty. Each set of standards has three sub-sets of outcomes (descriptors) distinguished by the ratings, C, B or A. Symbols beside each descriptor enable descriptors to be tracked through levels. Collectively, the descriptors define the requirements for achievement of the rating. Teachers need to exercise judgement to ensure that the standards have been met.

The descriptors indicate progress and achievement and may be used by students as well as by teachers. The items have symbols to match the meaning of the descriptors across ratings and levels.

Within the descriptors the items presented in bold print indicate precisely where the outcomes specified in one rating are more difficult than in the one that precedes it. Where (**) is shown in the descriptors, it indicates that a word or phrase has been omitted from the previous rating to add to the difficulty of the rating. Where they are included, teacher notes at the bottom of the descriptors highlight these changes.

In the generic criteria, the wording of the stem determines where each level is more demanding than the level that precedes it. The words in standard font are common to all generic criteria at corresponding levels and ratings. The words in italics are those that describe attributes unique to a generic criterion.

A Syllabus Supplement in a separate document, provides suggested tasks, examples of activities and ratings and other materials agreed to by teachers to support the delivery of the syllabus. They exist as a guide to assessment for teachers. Although all wording of syllabus documents must remain unaltered for the period of the syllabus accreditation, changes and additions can be made to add to and modify tasks and examples of activities in the Syllabus Supplement to support teachers delivering syllabuses, and to reflect the recommendations emanating from moderation meetings.

SENIOR SECONDARY 5 DESCRIPTORS

CRITERION 1 SELECT AND USE TECHNOLOGIES

Rating 'C'	Rating 'B'	Rating 'A'
<p>In familiar and unfamiliar settings, and without recourse to teacher guidance and supervision, a person can:</p> <ul style="list-style-type: none"> ☆ consider, select and use <i>technologies to develop ideas and designs carefully, responsibly and imaginatively;</i> ➔ identify changed conditions and adapt <i>the selection and use of technologies</i> to respond constructively to major changes; ▲ evaluate effectiveness and appropriateness of selected and adapted <i>technologies</i> in specific contexts; ○ demonstrate improvement in <i>application of technologies</i> in most aspects identified for attention in previous evaluations; ● where appropriate, respond to requests for advice to assist others to select and use appropriate technologies. 	<p>In familiar and unfamiliar settings, and without recourse to teacher guidance and supervision, a person can:</p> <ul style="list-style-type: none"> ☆ consider, select and appropriately use, <i>technologies to develop ideas and designs carefully, responsibly and imaginatively;</i> ➔ identify changed conditions and adapt <i>the selection and use of technologies</i> to respond constructively and creatively to major changes; ▲ evaluate effectiveness and appropriateness of selected and adapted <i>technologies</i> in specific contexts; ○ demonstrate improvement in <i>application of technologies</i> in all aspects identified for attention in previous evaluations; ● where appropriate, guide others <i>to select and use appropriate technologies.</i> 	<p>In familiar and unfamiliar settings, and without recourse to teacher guidance and supervision, a person can:</p> <ul style="list-style-type: none"> ☆ consider, select and competently use <i>technologies to develop ideas and designs carefully, responsibly and imaginatively;</i> ➔ identify changed conditions and adapt <i>the selection and use of technologies</i> to respond constructively and fully to major changes; ▲ evaluate effectiveness and appropriateness of selected and adapted <i>technologies</i> in specific contexts; ○ demonstrate command of technologies in all aspects identified for attention in previous evaluations; ● where appropriate, facilitate the processes enabling others <i>to select and use appropriate technologies.</i>

SENIOR SECONDARY 5 DESCRIPTORS

CRITERION 2 COLLECT AND CATEGORISE INFORMATION

Rating 'C'	Rating 'B'	Rating 'A'
<p>In familiar and unfamiliar settings, and without recourse to teacher guidance and supervision, a person can:</p> <ul style="list-style-type: none"> ☆ consider, select, and use <i>methods to collect and categorise specific, current and detailed information</i>; ➔ identify changed conditions and adapt use of <i>collected information</i> to respond constructively to major changes; ▲ evaluate effectiveness of <i>collected adapted information and the appropriateness of the categories to which it is assigned</i> in specific contexts; ○ demonstrate improvement in <i>collecting and categorising strategies</i> in most aspects identified for attention in previous evaluations; ● where appropriate, respond to requests for advice to assist others to collect and categorise information. 	<p>In familiar and unfamiliar settings, and without recourse to teacher guidance and supervision, a person can:</p> <ul style="list-style-type: none"> ☆ consider, select, and appropriately use <i>methods to collect and categorise specific, current and detailed information</i>; ➔ identify changed conditions and adapt use of <i>collected information</i> to respond constructively and creatively to major changes; ▲ evaluate effectiveness of selected and adapted information and the appropriateness of the categories to which it is assigned in specific contexts; ○ demonstrate improvement of <i>collecting and categorising strategies</i> in all aspects identified for attention in previous evaluations; ● where appropriate, guide others <i>to collect and categorise information.</i> 	<p>In familiar and unfamiliar settings, and without recourse to teacher guidance and supervision, a person can:</p> <ul style="list-style-type: none"> ☆ consider, select, and competently use <i>methods to collect and categorise specific, current and comprehensive information</i>; ➔ identify changed conditions and adapt use of <i>collected information</i> to respond constructively and fully to major changes; ▲ evaluate effectiveness of <i>selected and adapted information and the appropriateness of the categories to which it is assigned</i> in specific contexts; ○ demonstrate command of <i>collecting and categorising strategies</i> in all aspects identified for attention in previous evaluations; ● where appropriate, facilitate the processes enabling others <i>to collect and categorise information.</i>

SENIOR SECONDARY 5 DESCRIPTORS

CRITERION 3 PLAN, ORGANISE AND COMPLETE ACTIVITIES

Rating 'C'	Rating 'B'	Rating 'A'
<p>In familiar and unfamiliar settings, and without recourse to teacher guidance and supervision, a person can:</p> <p>☆ set targets, consider, select and use <i>strategies to achieve them, and responsibly manage activities within proposed times</i>;</p> <p>➔ identify changed conditions and adapt <i>plans and actions</i> to respond constructively to major changes;</p> <p>▲ evaluate appropriateness of selected targets and the effectiveness of selected <i>plans devised and adapted to complete activities</i> in specific contexts;</p> <p>○ demonstrate improvement in <i>planning and completion strategies</i> in most aspects identified for attention in previous evaluations;</p> <p>● where appropriate, respond to requests for advice to assist others to plan and complete activities.</p>	<p>In familiar and unfamiliar settings, and without recourse to teacher guidance and supervision, a person can:</p> <p>☆ <i>set targets</i>, consider, select and appropriately use <i>strategies to achieve them, and responsibly manage activities within proposed times</i>;</p> <p>➔ identify changed conditions and adapt <i>plans and actions</i> to respond constructively and creatively to major changes;</p> <p>▲ evaluate appropriateness of selected <i>targets</i> and the effectiveness of selected <i>plans devised and adapted to complete activities</i> in specific contexts;</p> <p>○ demonstrate improvement of <i>planning and completion strategies</i> in all aspects identified for attention in previous evaluations;</p> <p>● where appropriate, guide others <i>to plan and complete activities.</i></p>	<p>In familiar and unfamiliar settings, and without recourse to teacher guidance and supervision, a person can:</p> <p>☆ <i>set targets</i>, consider, select and competently use <i>strategies to achieve them, and capably and responsibly manage activities within proposed times</i>;</p> <p>➔ identify changed conditions and adapt <i>plans and actions</i> to respond constructively and fully to major changes;</p> <p>▲ evaluate appropriateness of selected <i>targets</i> and the effectiveness of selected <i>plans devised and adapted to complete activities</i> in specific contexts;</p> <p>○ demonstrate command of <i>planning and completion strategies</i> in all aspects identified for attention in previous evaluations;</p> <p>● where appropriate, facilitate the processes enabling others <i>to plan and complete activities.</i></p>

SENIOR SECONDARY 5 DESCRIPTORS

CRITERION 4 DEVELOP AND EVALUATE EXPERIMENTS

Rating 'C'	Rating 'B'	Rating 'A'
<p>In familiar and unfamiliar contexts, without recourse to teacher supervision and guidance, the student can;</p> <ul style="list-style-type: none"> ● using an appropriate format, develop a relevant testable concept; ☆ design an experiment to test a concept using accepted elements of experimental design to demonstrate understanding of how they influence outcomes; ➔ identify constraints including relevant safety and ethical issues which influence methodology and choice of equipment in experiments; ▲ provide evidence from experiments to support conclusions that clearly relate to the concept; ○ predict results related to observed outcomes and evaluate the experiment. 	<p>In familiar and unfamiliar contexts, without recourse to teacher supervision and guidance, the student can;</p> <ul style="list-style-type: none"> ● using an appropriate format, develop a relevant testable concept; ☆ design an experiment to test a concept using accepted elements of experimental design to demonstrate understanding of how they influence outcomes; ➔ explain constraints including relevant safety and ethical issues which influence methodology and choice of equipment in experiments; ▲ provide evidence from experiments to validate conclusions that clearly relate to the concept; ○ predict results related to observed outcomes, evaluate the experiment including recommendations for follow-up experiments. 	<p>In familiar and unfamiliar contexts, without recourse to teacher supervision and guidance, the student can;</p> <ul style="list-style-type: none"> ● using an appropriate format, develop a relevant testable concept; ☆ design an experiment to test a concept using accepted elements of experimental design to demonstrate comprehensive understanding of how they influence outcomes; ➔ explain constraints including relevant safety and ethical issues and adopt alternative methodologies and equipment where appropriate; ▲ provide evidence from experiments to validate conclusions that clearly and rationally relate to the concept; ○ predict results related to observed outcomes, evaluate the experiment including recommendations for follow-up experiments.

SENIOR SECONDARY 5 DESCRIPTORS

CRITERION 5 COMMUNICATE IDEAS AND INFORMATION

Rating 'C'	Rating 'B'	Rating 'A'
<p>In familiar and unfamiliar settings, and without recourse to teacher guidance and supervision, a person can:</p> <ul style="list-style-type: none"> ☆ consider, select and use <i>methods and styles to communicate ideas and information clearly, accurately, responsibly and precisely;</i> ➔ identify changed conditions and adapt <i>communication</i> to respond constructively to major changes; ▲ evaluate effectiveness and appropriateness of selected and adapted <i>communication</i> in specific contexts; ○ demonstrate improvement in <i>communication</i> in most aspects identified for attention in previous evaluations; ● where appropriate, respond to requests for advice to assist others to communicate effectively. 	<p>In familiar and unfamiliar settings, and without recourse to teacher guidance and supervision, a person can:</p> <ul style="list-style-type: none"> ☆ consider, select and appropriately use <i>methods and styles to communicate ideas and information clearly, accurately, responsibly and precisely;</i> ➔ identify changed conditions and adapt <i>communication</i> to respond constructively and creatively to major changes; ▲ evaluate effectiveness and appropriateness of selected and adapted <i>communication</i> in specific contexts; ○ demonstrate improvement in <i>communication</i> in all aspects identified for attention in previous evaluations; ● where appropriate, guide others <i>to communicate effectively.</i> 	<p>In familiar and unfamiliar settings, and without recourse to teacher guidance and supervision, a person can:</p> <ul style="list-style-type: none"> ☆ consider, select and competently use <i>methods and styles to communicate ideas and information clearly, accurately, responsibly, precisely, and comprehensively;</i> ➔ identify changed conditions and adapt <i>communication</i> to respond constructively, and fully to major changes; ▲ evaluate effectiveness and appropriateness of selected and adapted <i>communication</i> in specific contexts; ○ demonstrate command of communication in all aspects identified for attention in previous evaluations; ● where appropriate, facilitate the processes enabling others <i>to communicate effectively.</i>

SENIOR SECONDARY 5 DESCRIPTORS

CRITERION 6 DEMONSTRATE KNOWLEDGE AND UNDERSTANDING OF THE IMPACT OF SCIENCE ON SOCIETY AND THE ENVIRONMENT

Rating 'C'	Rating 'B'	Rating 'A'
<p>In familiar and unfamiliar contexts, without recourse to teacher supervision and guidance, the student can:</p> <ul style="list-style-type: none"> ● demonstrate detailed understanding of the components of an issue and (**) present a balanced discussion; ☆ form reasoned conclusions using relevant selected evidence; ➔ describe tensions between ethical, social, cultural, economic and political influences and comment on their impacts on decisions; ▲ demonstrate understanding of the link between scientific decision making and historical context. 	<p>In familiar and unfamiliar contexts, without recourse to teacher supervision and guidance, the student can:</p> <ul style="list-style-type: none"> ● demonstrate detailed understanding of the components of an issue and present a logical, balanced discussion; ☆ form reasoned and logical conclusions using relevant selected evidence; ➔ clearly describe tensions between ethical, social, cultural, economic and political influences and comment on their impacts on decisions; ▲ demonstrate understanding the complexities of the link between scientific decision making and historical contexts. 	<p>In familiar and unfamiliar contexts, without recourse to teacher supervision and guidance, the student can:</p> <ul style="list-style-type: none"> ● demonstrate detailed understanding of the components of the issue and present a logical, concise and balanced discussion; ☆ form reasoned and logical conclusions using relevant selected evidence; ➔ clearly describe tensions and connections between ethical, social, cultural, economic and political influences and comment on their impacts on decisions; ▲ demonstrate understanding of the complexities of the link between scientific decision making and historical contexts from a range of perspectives.

SENIOR SECONDARY 5 DESCRIPTORS

CRITERION 7 DEMONSTRATE KNOWLEDGE AND UNDERSTANDING OF SCIENTIFIC IDEAS RELEVANT TO THE RESOURCE AND ITS DEVELOPMENT

Rating 'C'	Rating 'B'	Rating 'A'
<p>In familiar and unfamiliar contexts and without recourse to teacher supervision and guidance a student can:</p> <ul style="list-style-type: none"> ● demonstrate an extensive knowledge and detailed understanding of scientific concepts; ☆ clearly identify and logically describe the application of scientific concepts to the development of resources; ➔ identify relevant scientific research and describe in detail the impact that it has on the development of resources. 	<p>In familiar and unfamiliar contexts and without recourse to teacher supervision and guidance a student can:</p> <ul style="list-style-type: none"> ● demonstrate an extensive knowledge and a balanced, detailed understanding of scientific concepts; ☆ clearly identify and logically and concisely describe the application of scientific concepts to the development of resources; ➔ identify relevant scientific research and comprehensively describe the impact that it has on the development of resources. 	<p>In familiar and unfamiliar contexts and without recourse to teacher supervision and guidance a student can:</p> <ul style="list-style-type: none"> ● demonstrate an extensive knowledge and a balanced, comprehensive understanding of scientific concepts; ☆ clearly identify and logically, concisely and comprehensively describe the application of scientific concepts to the development of resources; ➔ identify relevant scientific research, and comprehensively describe and prioritise the impact that it has on the development of resources.

SENIOR SECONDARY 5 DESCRIPTORS

CRITERION 8 ANALYSE, INTERPRET AND DRAW CONCLUSIONS

Rating 'C'	Rating 'B'	Rating 'A'
<p>In familiar and unfamiliar contexts and without recourse to teacher supervision and guidance a student can:</p> <ul style="list-style-type: none"> ● analyse data presented in a wide variety of formats; ☆ describe relationships between variables; ➔ draw relevant, detailed, logical conclusions from analysing both first and second hand data; ▲ draw generalisations by analysing data from multiple sources. 	<p>In familiar and unfamiliar contexts and with occasional teacher supervision and guidance a student can:</p> <ul style="list-style-type: none"> ● clearly analyse data presented in a wide variety of formats; ☆ describe relationships between multiple variables; ➔ draw relevant, detailed, logical conclusions from analysing both first and second hand data; ▲ draw generalisations by analysing data from multiple sources. 	<p>In familiar and unfamiliar contexts and without recourse to teacher supervision and guidance a student can:</p> <ul style="list-style-type: none"> ● clearly and concisely analyse data presented in a wide variety of formats; ☆ clearly describe complex relationships between multiple variables; ➔ draw relevant, concise, detailed and logical conclusions from analysing both first and second hand data; ▲ draw generalisations by analysing data from multiple sources and extrapolate.

SENIOR SECONDARY 5 DESCRIPTORS

CRITERION 9 DEMONSTRATE KNOWLEDGE AND UNDERSTANDING OF THE IMPACT OF TECHNOLOGY ON THE MANAGEMENT AND USE OF RESOURCES

Rating 'C'	Rating 'B'	Rating 'A'
<p>In familiar and unfamiliar contexts and without recourse to teacher supervision and guidance a student can:</p> <ul style="list-style-type: none"> ● demonstrate sound knowledge and understanding of technology relevant to the management and use of resources; ☆ demonstrate sound knowledge and understanding of the application of relevant technology in the management and use of resources; ➔ evaluate the impact of technology on resource management and propose workable directions for future management. 	<p>In familiar and unfamiliar contexts and without recourse to teacher supervision and guidance a student can:</p> <ul style="list-style-type: none"> ● demonstrate extensive knowledge and understanding of technology relevant to the management and use of resources; ☆ demonstrate extensive knowledge and understanding of the application of relevant technology in the management and use of resources; ➔ evaluate the impact of technology on resource management and propose imaginative directions for future management. 	<p>In familiar and unfamiliar contexts and without recourse to teacher supervision and guidance a student can:</p> <ul style="list-style-type: none"> ● demonstrate comprehensive knowledge and understanding of technology relevant to the management and use of resources; ☆ demonstrate comprehensive knowledge and understanding of the application of relevant technology in the management and use of resources; ➔ evaluate the impact of technology on resource management and propose imaginative and innovative directions for future management.

SENIOR SECONDARY 5 DESCRIPTORS

CRITERION 10 DEMONSTRATE KNOWLEDGE AND UNDERSTANDING OF THE SCIENCE OF RESOURCE MANAGEMENT

Rating 'C'	Rating 'B'	Rating 'A'
<p>In familiar and unfamiliar contexts and without recourse to teacher supervision and guidance a student can:</p> <ul style="list-style-type: none"> ● demonstrate detailed knowledge and clear understanding of the role of science in resource management; ➔ identify and describe ways in which the management of resources will be influenced by ethical, social, cultural, economic and political factors; ▲ describe ways in which historical context in science may impact on the management of resources; ○ identify, recommend and describe scientific research needed to benefit future management of resources. 	<p>In familiar and unfamiliar contexts and without recourse to teacher supervision and guidance a student can:</p> <ul style="list-style-type: none"> ● demonstrate detailed knowledge and extensive understanding of the role of science in resource management; ➔ identify and describe ways in which the management of resources will be influenced by ethical, social, cultural, economic and political factors; ▲ clearly describe ways in which historical context in science may impact on the management of resources; ○ identify, recommend and describe scientific research needed to benefit future management of resources. 	<p>In familiar and unfamiliar contexts and without recourse to teacher supervision and guidance a student can:</p> <ul style="list-style-type: none"> ● demonstrate detailed knowledge and extensive understanding of the role of science in resource management; ➔ identify and clearly describe ways in which the management of resources will be influenced by ethical, social, cultural, economic and political factors; ▲ comprehensively describe ways in which historical context in science may impact on the management of resources; ○ identify, recommend and justify scientific research needed to benefit future management of resources.