



Government of **Western Australia**  
School Curriculum and Standards Authority

# SCIENCE IN PRACTICE

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General course  
Year 12 syllabus

## **Acknowledgement of Country**

Kaya. The School Curriculum and Standards Authority (the Authority) acknowledges that our offices are on Whadjuk Noongar boodjar and that we deliver our services on the country of many traditional custodians and language groups throughout Western Australia. The Authority acknowledges the traditional custodians throughout Western Australia and their continuing connection to land, waters and community. We offer our respect to Elders past and present.

## **Important information**

This syllabus is effective from 1 January 2025.

Users of this syllabus are responsible for checking its currency.

Syllabuses are formally reviewed by the School Curriculum and Standards Authority (the Authority) on a cyclical basis, typically every five years.

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## Rationale

Science is a dynamic and collaborative human activity that uses distinctive ways of valuing, thinking and working to understand natural phenomena. Science is based on people's aspirations and motivations to follow their curiosity and wonder about the physical, biological and technological world. Scientific knowledge represents the constructs made by people endeavouring to explain their observations of the world around them. Scientific explanations are built in different ways as people pursue intuitive and imaginative ideas, respond in a rational way to hunches, guesses and chance events, challenge attitudes of the time, and generate a range of solutions to problems, building on existing scientific knowledge.

The ever growing importance of science in our daily lives demands a population that has sufficient knowledge and understanding to follow science and scientific debates with interest, and to engage with the issues science and technology pose, for both themselves and for society as a whole. The Science in Practice General course encourages students to be questioning, reflective and critical thinkers about scientific issues, enabling them to make informed decisions about questions that directly affect their lives and the lives of others.

Science in Practice is a course grounded in the belief that science is, in essence, a practical activity. From this stems the view that conceptual understandings in science derive from a need to find solutions to real problems in the first instance. The inquiring scientist may then take these understandings and apply them in a new context, often quite removed from their original field. This course seeks to reflect this creative element of science as inquiry. It should involve students in research that develops a variety of skills, including the use of appropriate technology and an array of diverse methods of investigation. This course enables them to investigate science issues in the context of the world around them, and encourages student collaboration and cooperation with community members employed in scientific pursuits. It requires students to be creative, intellectually honest, to evaluate arguments with scepticism, and to conduct their investigations in ways that are safe, ethical, fair and respectful of others.

The Science in Practice General course is inclusive and aims to appeal to students with a wide variety of backgrounds, interests and career aspirations.

## Course aims

The Science in Practice General course enables students to:

- use the scientific method for a variety of investigations to demonstrate knowledge of the natural and technological world
- demonstrate knowledge of the workplace health and safety requirements and practices while working safely in the laboratory or the field
- understand that science is a human activity involving the application of knowledge to solve problems and make informed decisions that impact on people and the environment
- understand relationships within and between living and physical systems by integrating concepts of energy and the structure and nature of matter.

## Organisation

This course is organised into a Year 11 syllabus and a Year 12 syllabus. The concepts, ideas and associated skills in the course are similar for each unit; however, the cognitive complexity of the syllabus content should increase from Year 11 to Year 12.

### Structure of the syllabus

The syllabus is divided into two units, each of one semester duration. Each unit should integrate at least two of the science disciplines – Biology, Chemistry, Earth Science and Physics, with a minimum of three different science disciplines integrated into the pair of units.

Each unit could be taught in different contexts or one context could be taught over the year. Contexts covered in Year 11 may be studied again in Year 12 as long as the context specific content being covered is different and the cognitive complexity of the syllabus content has increased.

For example

#### 1. Two units on different contexts

- Each unit integrates two science disciplines, and four different science disciplines are integrated into the pair of units

**Unit 3**  
World of waves  
(Physics and Biology)

**Unit 4**  
Carbon Chemistry  
(Chemistry and Earth Science)

#### 2. Two units on the same theme in different contexts

- Each unit integrates two science disciplines, and three different science disciplines are integrated into the pair of units

**Unit 3**  
Marine Biology  
(Biology and Chemistry)

**Unit 4**  
Marine Ecology  
(Biology and Earth Science)

#### 3. Two units taught concurrently in the same context

- Four different science disciplines are integrated into the pair of units

**Units 3 and 4**  
Forensic Science  
(Chemistry, Physics, Biology and Earth Science)

The notional time for each unit is 55 class contact hours.

## Authority-approved units

Only Authority-approved units can be delivered.

A list of Authority-approved units is published on the Science in Practice General course page at <https://senior-secondary.scsa.wa.edu.au/syllabus-and-support-materials/science/science-in-practice>. Access to these units and the associated support materials requires teachers to login or register for an Extranet account <https://www.scsa.wa.edu.au/extranet/login>.

Schools may develop their own units or modify approved units; however, these will need to be approved by the Authority prior to the commencement of teaching. The process for unit approval is available on the Science in Practice General course page on the Authority website.

## Organisation of content

### Science content areas

The Science in Practice General course develops student learning through four main content areas: Scientific Method, Workplace Health and Safety, Scientific Literacy and Science Understanding. These content areas should be taught in an integrated way. The organisation of the content areas provides an opportunity to integrate content in flexible and meaningful ways.

#### Scientific method

The scientific method involves asking questions about the natural and technological world, preparing a plan to collect, process and interpret data, making conclusions, evaluating procedures and findings, and communicating findings.

#### Workplace health and safety

Knowledge of safety rules and safe working procedures is important to reduce the risk of potential incidents and injuries when participating in science activities.

#### Scientific literacy

Informed participation in society requires knowledge of the relevant science concepts, skills and practice, consideration of ethical implications of science and technological research, and make evidence-based arguments.

#### Science understanding

Science understanding is evident when a person selects and integrates appropriate science concepts, models and theories to explain and predict phenomena, and applies these to unfamiliar situations.

The Science Understanding content in each unit develops students' understanding of the key concepts, models and theories that underpin the context being studied.



## Progression from the Years 7–10 curriculum

This syllabus continues to develop student understanding and skills from across the three strands of the Years 7–10 Science curriculum: Science Inquiry Skills, Science as a Human Endeavour and Science Understanding.

## Representation of the general capabilities

The general capabilities encompass the knowledge, skills, behaviours and dispositions that will assist students to live and work successfully in the twenty-first century. Teachers may find opportunities to incorporate the capabilities into the teaching and learning program for the Science in Practice General course. The general capabilities are not assessed unless they are identified within the specified unit content.

### Literacy

Literacy is important in students' development of skills and understandings that underpin the four content areas of the course: Scientific Method, Workplace Health and Safety, Scientific Literacy and Science Understanding. Students gather, interpret, synthesise and critically analyse information presented in a wide range of genres, modes and representations, including text, flow diagrams, symbols, graphs and tables. They evaluate information sources, and compare and contrast ideas, information and opinions presented within and between texts. They communicate processes and ideas logically and fluently and construct evidence-based arguments, selecting genres and employing appropriate structures and features to communicate for specific purposes and audiences.

### Numeracy

Numeracy is key to students' ability to apply the wide range of skills associated with the Scientific Method content, including making and recording observations, ordering, representing and analysing data, and interpreting trends and relationships. They employ numeracy skills to interpret complex spatial and graphic representations, and to appreciate the ways in which biological and physical systems are structured, interact and change across spatial and temporal scales. They engage in analysis of data, including issues relating to reliability and probability, and they interpret and manipulate mathematical relationships to calculate and predict values.

### Information and communication technology capability

Information and communication technology capability is a key part of this course. Students use a range of strategies to locate, access and evaluate information from multiple digital sources, to collect, analyse and represent data, to model and interpret concepts and relationships, and to communicate and share science ideas, processes and information.

### Critical and creative thinking

Critical and creative thinking is particularly important in the science inquiry process. Science inquiry requires the ability to construct, review and revise questions and hypotheses about increasingly complex and abstract scenarios and to design related investigation methods. Students interpret and evaluate data, interrogate, select and cross-reference evidence, and analyse processes,

interpretations, conclusions and claims for validity and reliability, including reflecting on their own processes and conclusions. Science is a creative endeavour and students devise innovative solutions to problems, predict possibilities, envisage consequences and speculate on possible outcomes as they develop their skills and understanding of the course content. They also appreciate the role of critical and creative individuals and the central importance of critique and review in the development and innovative application of science.

### **Personal and social capability**

Personal and social capability is integral to a wide range of activities in the Science in Practice General course as students develop and practise skills of communication, teamwork, decision-making, initiative-taking and self-discipline with increasing confidence and sophistication. In particular, students develop skills in both independent and collaborative investigation, they employ self-management skills to plan effectively, follow procedures efficiently and work safely, and they use collaboration skills to conduct investigations, share research and discuss ideas. Students also recognise the role of their own beliefs and attitudes in their response to science issues and applications, consider the perspectives of others, and gauge how science can affect people's lives.

### **Ethical understanding**

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

### **Intercultural understanding**

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

## Representation of the cross-curriculum priorities

The cross-curriculum priorities address contemporary issues which students face in a globalised world. Teachers may find opportunities to incorporate the priorities into the teaching and learning program for the Science in Practice General course. The cross-curriculum priorities are not assessed unless they are identified within the specified unit content.

### Aboriginal and Torres Strait Islander histories and cultures

Contexts that draw on Aboriginal and Torres Strait Islander histories and cultures provide opportunities for students to recognise the importance of Aboriginal and Torres Strait Islander Peoples' knowledge in developing a richer understanding of the Australian environment. Students could develop an appreciation of the unique Australian biota and its interactions, the impacts of Aboriginal and Torres Strait Islander Peoples on their environments and the ways in which the Australian landscape has changed over tens of thousands of years. They could examine the ways in which Aboriginal and Torres Strait Islander Peoples' knowledge of ecosystems has developed over time and the spiritual significance of Country/Place.

### Asia and Australia's engagement with Asia

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

### Sustainability

The Sustainability cross-curriculum priority could provide authentic contexts for exploring, investigating and understanding the function and interactions of systems across a range of spatial and temporal scales. By investigating the relationships between systems and system components, and how systems respond to change, students develop an appreciation for the interconnectedness of the Earth system. Students appreciate that science provides the basis for decision making in many areas of society and that these decisions can impact on the Earth system. They understand the importance of using science to predict possible effects of human and other activity, and to develop plans, or alternative technologies, that minimise these effects and provide for a more sustainable future.

### Safety

Science learning experiences may involve the use of potentially hazardous substances and/or hazardous equipment. It is the responsibility of the school to ensure that duty of care is exercised in relation to the health and safety of all students and that school practices meet the requirements of the *Work Health and Safety Act 2011*, in addition to relevant state or territory health and safety guidelines.

## Animal ethics

Through a consideration of research ethics as part of Science Inquiry Skills, students will examine their own ethical position, draw on ethical perspectives when designing investigation methods, and ensure that any activities that impact on living organisms comply with the *Australian code of practice for the care and use of animals for scientific purposes* ([www.nhmrc.gov.au](http://www.nhmrc.gov.au)).

Any teaching activities that involve the care and use of, or interaction with, animals must comply with the *Australian code of practice for the care and use of animals for scientific purposes*, in addition to relevant State guidelines.

## Mathematical skills expected of students studying the Science in Practice General course

The Science in Practice General course requires students to use the mathematical skills they have developed through the Years 7–10 Mathematics curriculum, in addition to the numeracy skills they have developed through the Science Inquiry Skills strand of the Years 7–10 Science curriculum.

The scientific method content requires students 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 take measurements using appropriate units to an appropriate degree of accuracy.

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
- comprehend and use the symbols/notations  $<$ ,  $>$ ,  $\Delta$ ,  $\approx$
- translate information between graphical, numerical and algebraic forms
- distinguish between discrete and continuous data and 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 range
- interpret the slope of a linear graph.

## Units 3 and 4

Units should integrate concepts, ideas and associated skills from each content area and use a contextual approach that utilises learning experiences from aspects of at least two of the science disciplines – Biology, Chemistry, Earth Science and Physics, with a minimum of three different science disciplines integrated across the pair of units. Units of work developed through contexts enable students to identify science in their world and understand the importance of science in their lives.

Units of work should allow students to explore, investigate and model processes through practical activities. Students should also be encouraged to use information and communication technology to gather and interpret data, and communicate their findings in a variety of ways.

The context used to teach the syllabus content should engage students, have local real-life application, and be relevant to students' everyday life. The context should form a framework that enables students to actively engage in inquiry-based learning and further develop their understanding of scientific concepts.

Each unit could be taught in different contexts or one context could be taught over the year. Contexts covered in Year 11 may be studied again in Year 12 as long as the context-specific content being covered is different and the cognitive complexity of the syllabus content has increased.

Only Authority-approved units can be delivered. A list of Authority-approved units is published on the Science in Practice General course page at <https://senior-secondary.scsa.wa.edu.au/syllabus-and-support-materials/science/science-in-practice>. Schools may develop their own units or modify approved units; however, these will need to be approved by the Authority prior to the commencement of teaching.

### Unit 3 content

This unit includes the knowledge, understandings and skills described below.

#### Scientific method

- identify a topic for investigation; research and construct questions for investigation
- determine the appropriate methodology for investigations
- design scientific investigations, including the formulation of investigable questions and/or hypotheses, materials required, procedure to be followed to collect valid and reliable data, and identification of safety and ethical considerations
- select appropriate equipment and techniques to safely, competently and methodically collect valid and reliable data, and use equipment with precision, accuracy and consistency
- represent qualitative and quantitative data in meaningful and useful ways, including the construction of appropriately labelled tables, processing of quantitative data using appropriate mathematical relationships and units, and drawing of appropriate graphs
- analyse data to identify and describe trends, patterns and relationships, including the use of appropriate mathematical techniques, and recognise errors and limitations in data

- draw conclusions consistent with the evidence and relevant to the question being investigated, identify further evidence that may be required, and recognise limitations of conclusions
- evaluate the investigative procedure, including the relevance, accuracy, validity and reliability of data, and suggest improvements
- communicate information and ideas in a variety of ways using scientific conventions and terminology, including the selection and presentation of data and ideas to convey meaning to selected audiences in written, oral and multimedia formats

### **Workplace health and safety**

- use and apply workplace health and safety documents, including safety data sheets (SDS), and other relevant documents, such as standard operating procedures (SOP), when performing activities
- select and use appropriate scientific and technological equipment safely to gather data and information
- conduct risk assessments to identify potential hazards and prevent potential incidents and injuries

### **Scientific literacy**

- distinguish between opinion, anecdote and evidence, and scientific and non-scientific ideas
- use reasoning to construct scientific arguments, and to draw and justify conclusions consistent with the evidence and relevant to the question under investigation
- identify examples of where the application of scientific knowledge may have beneficial and/or harmful and/or unintended consequences
- use scientific knowledge to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability

### **Science understanding\***

The Science understanding content is context specific. Students should be able to communicate knowledge and understanding of scientific concepts, using appropriate terms, conventions and representations.

- \* The science concepts, conventions and representations are context specific and should be specified for each unit as part of the unit-development process for approval.

## Unit 4 content

This unit includes the knowledge, understandings and skills described below.

### Scientific method

- identify a topic for investigation; research and construct questions for investigation
- determine the appropriate methodology for investigations
- design scientific investigations, including the formulation of investigable questions and/or hypotheses, materials required, procedure to be followed to collect valid and reliable data, and identification of safety and ethical considerations
- select appropriate equipment and techniques to safely, competently and methodically collect valid and reliable data, and use equipment with precision, accuracy and consistency
- represent qualitative and quantitative data in meaningful and useful ways, including the construction of appropriately labelled tables, processing of quantitative data using appropriate mathematical relationships and units, and drawing of appropriate graphs
- analyse data to identify and describe trends, patterns and relationships, including the use of appropriate mathematical techniques, and recognise errors and limitations in data
- draw conclusions consistent with the evidence and relevant to the question being investigated, identify further evidence that may be required, and recognise limitations of conclusions
- evaluate the investigative procedure, including the relevance, accuracy, validity and reliability of data, and suggest improvements
- communicate information and ideas in a variety of ways using scientific conventions and terminology, including the selection and presentation of data and ideas to convey meaning to selected audiences in written, oral and multimedia formats

### Workplace health and safety

- use and apply workplace health and safety documents, including safety data sheets (SDS), and other relevant documents, such as standard operating procedures (SOP), when performing activities
- select and use appropriate scientific and technological equipment safely to gather data and information
- conduct risk assessments to identify potential hazards and prevent potential incidents and injuries

### Scientific literacy

- distinguish between opinion, anecdote and evidence, and scientific and non-scientific ideas
- use reasoning to construct scientific arguments, and to draw and justify conclusions consistent with the evidence and relevant to the question under investigation

- identify examples of where the application of scientific knowledge may have beneficial and/or harmful and/or unintended consequences
- use scientific knowledge to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability

### **Science understanding\***

The Science understanding content is context specific. Students should be able to communicate knowledge and understanding of scientific concepts, using appropriate terms, conventions and representations.

- |                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>* The science concepts, conventions and representations are context specific and should be specified for each unit as part of the unit-development process for approval.</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



## Assessment

Assessment is an integral part of teaching and learning that at the senior secondary years:

- provides evidence of student achievement
- identifies opportunities for further learning
- connects to the standards described for the course
- contributes to the recognition of student achievement.

Assessment for learning (formative) and assessment of learning (summative) enable teachers to gather evidence to support students and make judgements about student achievement. These are not necessarily discrete approaches and may be used individually or together, and formally or informally.

Formative assessment involves a range of informal and formal assessment procedures used by teachers during the learning process in order to improve student achievement and to guide teaching and learning activities. It often involves qualitative feedback (rather than scores) for both students and teachers, which focuses on the details of specific knowledge and skills that are being learnt.

Summative assessment involves assessment procedures that aim to determine students' learning at a particular time, for example when reporting against the standards, after completion of a unit/s. These assessments should be limited in number and made clear to students through the assessment outline.

Appropriate assessment of student work in this course is underpinned by reference to the set of pre-determined course standards. These standards describe the level of achievement required to achieve each grade, from A to E. Teachers use these standards to determine how well a student has demonstrated their learning.

Where relevant, higher order cognitive skills (e.g. application, analysis, evaluation and synthesis) and the general capabilities should be included in the assessment of student achievement in this course. All assessment should be consistent with the requirements identified in the course assessment table.

Assessment should not generate workload and/or stress that, under fair and reasonable circumstances, would unduly diminish the performance of students.

### School-based assessment

The *Western Australian Certificate of Education (WACE) Manual* contains essential information on principles, policies and procedures for school-based assessment that must be read in conjunction with this syllabus.

School-based assessment involves teachers gathering, describing and quantifying information about student achievement.

Teachers design school-based assessment tasks to meet the needs of students. As outlined in the *WACE Manual*, school-based assessment of student achievement in this course must be based on the Principles of Assessment:

- Assessment is an integral part of teaching and learning

- Assessment should be educative
- Assessment should be fair
- Assessment should be designed to meet its specific purpose/s
- Assessment should lead to informative reporting
- Assessment should lead to school-wide evaluation processes
- Assessment should provide significant data for improvement of teaching practices.

The *WACE Manual* contains essential information on principles, policies and procedures for school-based assessment that needs to be read in conjunction with this syllabus.

The table below provides details of the assessment types and their weighting for the Science in Practice General Year 12 syllabus.

Summative assessments in this course must:

- be limited in number to eight tasks
- allow for the assessment of each assessment type once over the year/pair of units
- have a minimum value of 5 per cent of the total school assessment mark
- provide a representative sampling of the syllabus content.

Assessment tasks not administered under test or controlled conditions require appropriate authentication processes.

## Assessment table – Year 12

| Type of assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Weighting |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <p><b>Investigation</b> (minimum of 10 hours in class over the year)<br/>One investigation should be conducted for the pair of units.<br/>An investigation follows the scientific method, where students develop their own question to investigate through the collection and analysis of primary data. Students work individually or in groups to plan and conduct the investigation and summarise their findings in a live or virtual poster presentation. Each student will prepare a written report to communicate their findings.<br/>Planning, working safety and group contributions could be monitored via student logbooks/journals, responses to reflection questions, teacher observations and/or peer assessment.</p>                                                                                                                                                                                                                                                                                                                                                       | 25%       |
| <p><b>Project</b> (minimum of 5 hours in class per unit)<br/>One project should be conducted in each unit and each project should have equal weighting.<br/>A project involves students selecting and exploring a recent discovery, innovation or issue related to the context they are studying. Students are required to analyse and synthesise information from at least two different sources to explain the relevant scientific concepts involved, and describe its impact and/or influence on society. Students will communicate their findings in writing (e.g. a scientific article, poster or report) and/or present their findings to a live or virtual audience.</p>                                                                                                                                                                                                                                                                                                                                                                                                         | 30%       |
| <p><b>Practical assessment</b> (maximum of 1 hour in class per unit)<br/>One practical assessment should be conducted in each unit and each practical assessment should have equal weighting.<br/>Practical work helps develop technical and scientific skills, and improves scientific understanding. A practical assessment enables students to demonstrate their skills in the use of apparatus to collect data and model science concepts relevant to the context they are studying.<br/>Students will demonstrate their ability to manipulate apparatus, take accurate readings and work safely.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 10%       |
| <p><b>Supervised written assessment</b> (maximum of 50 minutes in class per unit)<br/>One supervised written assessment should be conducted in each unit and each supervised written assessment should have equal weighting.<br/>A supervised written assessment contains one or more items. The items might be in response to stimulus materials, which may be seen or unseen, or questions which should be unseen prior to the administration of the assessment.<br/>Items may include:</p> <ul style="list-style-type: none"> <li>• <b>Short answer questions</b> requiring students to provide single word, sentence or short paragraph responses; construct, use, interpret or analyse primary or secondary data, graphs, tables or diagrams; and/or perform mathematical calculations.</li> <li>• <b>Extended answer questions</b> requiring students to provide responses making connections, drawing conclusions, constructing arguments, analysing and/or evaluating information. The responses may incorporate labelled diagrams or tables with explanatory notes.</li> </ul> | 20%       |
| <p><b>Externally Set Task</b> (50 minutes in class)<br/>A written task or item or set of items developed by the School Curriculum and Standards Authority and administered by the school.<br/>The emphasis of this task will be on the Scientific Method, Workplace Health and Safety and Scientific Literacy content and may be in a context that is unfamiliar to students.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 15%       |

Teachers must use the assessment table to develop an assessment outline for the pair of units.

The assessment outline must:

- include a set of assessment tasks
- include a general description of each task
- indicate the unit content to be assessed
- indicate a weighting for each task and each assessment type
- include the approximate timing of each task (for example, the week the task is conducted, or the issue and submission dates for an extended task).

## Externally set task

All students enrolled in the Science in Practice Year 12 course will complete the externally set task developed by the Authority. Schools are required to administer this task in Term 2 at a time prescribed by the Authority.

### Externally set task design brief – Year 12

|                |                                                                                                                                                                                                                                                                                                                  |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Time</b>    | 50 minutes                                                                                                                                                                                                                                                                                                       |
| <b>Format</b>  | Written                                                                                                                                                                                                                                                                                                          |
|                | Conducted under invigilated conditions                                                                                                                                                                                                                                                                           |
|                | Typically between two and six questions                                                                                                                                                                                                                                                                          |
| <b>Content</b> | The Authority informs schools during Term 3 of the previous year of the Unit 3 syllabus content on which the task will be based. The emphasis of this task will be on the Scientific Method, Workplace Health and Safety and Scientific Literacy content and may be in a context that is unfamiliar to students. |

Refer to the *WACE Manual* for further information.

## Reporting

Schools report student achievement, underpinned by a set of pre-determined standards, using the following grades:

| Grade    | Interpretation           |
|----------|--------------------------|
| <b>A</b> | Excellent achievement    |
| <b>B</b> | High achievement         |
| <b>C</b> | Satisfactory achievement |
| <b>D</b> | Limited achievement      |
| <b>E</b> | Very low achievement     |

The grade descriptions for the Science in Practice General Year 12 syllabus are provided in Appendix 1. They are used to support the allocation of a grade. They can also be accessed, together with annotated work samples, on the course page of the Authority website at [www.scsa.wa.edu.au](http://www.scsa.wa.edu.au).

To be assigned a grade, a student must have had the opportunity to complete the education program, including the assessment program (unless the school accepts that there are exceptional and justifiable circumstances).

Refer to the *WACE Manual* for further information about the use of a ranked list in the process of assigning grades.

The grade is determined by reference to the standard, not allocated on the basis of a pre-determined range of marks (cut-offs).

## Appendix 1 – Grade descriptions Year 12\*

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A | <p><b>Scientific method</b></p> <ul style="list-style-type: none"> <li>• Formulates questions and hypotheses that can be tested.</li> <li>• Designs a clear and logical plan to collect valid and reliable data.</li> <li>• Selects and uses equipment and techniques safely with precision, accuracy and consistency to collect valid and reliable data.</li> <li>• Organises data logically and presents it in a range of forms, including appropriate graphs and tables, to show patterns and relationships.</li> <li>• Accurately solves calculations, showing working and expressing answers using correct units.</li> <li>• Analyses experimental data, including the identification errors and limitations in data, to describe patterns and relationships and explains these using relevant scientific concepts.</li> <li>• Uses evidence to make and justify conclusions that related to the question or hypothesis being tested and recognises limitation of conclusions.</li> <li>• Evaluates the procedure, explaining the relevance, accuracy, validity and reliability of data, and suggests ways to improve the design of an investigation.</li> <li>• Communicates information and concepts logically, using correct scientific language, conventions and representations.</li> </ul> |
|   | <p><b>Workplace health and safety</b></p> <ul style="list-style-type: none"> <li>• Acts safely and works highly effectively in both individual and group contexts.</li> <li>• Assesses risks to identify potential hazards and prevent potential incidents and injuries.</li> <li>• Manages risks to ensure the safe use of equipment and techniques.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|   | <p><b>Scientific literacy</b></p> <ul style="list-style-type: none"> <li>• Constructs clear and logical evidence-based arguments to evaluate impacts and claims.</li> <li>• Identifies and explains issues and evaluates scientific impacts.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|   | <p><b>Science understanding</b></p> <ul style="list-style-type: none"> <li>• Accurately explains structures, systems and processes.</li> <li>• Explains concepts using appropriate scientific language, conventions and representations.</li> <li>• Applies scientific concepts and models, using supporting examples and diagrams, to explain and link complex processes in a range of situations, including some that are unfamiliar.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## B

**Scientific method**

- Formulates questions and hypotheses that can be tested.
- Designs a clear plan, that lacks some detail, to collect valid and reliable data.
- Selects and uses equipment and techniques safely with precision, accuracy and consistency to collect data.
- Presents data in a range of forms, including appropriate graphs and tables, to show patterns and relationships.
- Solves calculations showing working and expressing answers using correct units, with only minor errors.
- Describes and briefly explains patterns and relationships using relevant scientific concepts and identifies errors and limitation in the data.
- Uses evidence to make conclusions that related to the question or hypothesis being tested.
- Evaluates the procedure, discussing the relevance, accuracy, validity and reliability of data, and makes general suggestions to improve the design of an investigation.
- Communicates information and concepts using scientific language, conventions and representations.

**Workplace health and safety**

- Acts safely and works effectively in both individual and group contexts.
- Assesses risks to identify potential hazards and prevent potential incidents and injuries.
- Manages risks to ensure the safe use of equipment and techniques.

**Scientific literacy**

- Constructs evidence-based arguments to evaluate and explain impacts and claims.
- Identifies and explains issues and scientific impacts.

**Science understanding**

- Explains concepts using scientific language, conventions and representations.
- Applies scientific concepts and models, using supporting examples and diagrams, to explain and link simple, and some complex, processes.

## C

**Scientific method**

- With guidance, formulates questions and hypotheses that can be tested.
- Designs a plan, or modifies a provided procedure, that can be followed to collect appropriate data.
- Selects and uses equipment and techniques safely with some precision, accuracy and consistency to collect data.
- Presents data using basic tables and graphs to show patterns and relationships.
- Solves calculations with errors and may not show working.
- Describes patterns and relationships in data.
- Draws simple conclusions that may not be linked back to the question or hypothesis being tested.
- Describes difficulties experienced in conducting an investigation and suggests general improvements.
- Communicates information and concepts using some scientific language and representations, making some errors in the use of conventions.

**Workplace health and safety**

- Acts safely and works with a degree of effectiveness in both individual and group contexts.
- Manages risks to ensure the safe use of equipment and techniques.

**Scientific literacy**

- Attempts to construct evidence-based arguments to describe impacts and claims.
- Identifies and describes issues and scientific impacts.

**Science understanding**

- Describes structures, systems and processes in a general way.
- Describes concepts using representations and some scientific language.
- Applies scientific concepts and models, using some supporting examples and diagrams, to describe some processes.



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|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D | <p><b>Scientific method</b></p> <ul style="list-style-type: none"> <li>• With support, modifies a procedure to collect appropriate data.</li> <li>• Follows directions for the safe use of equipment and techniques.</li> <li>• Presents data that is unclear, insufficient and lacks appropriate processing.</li> <li>• Performs calculations that contain many errors or are not attempted.</li> <li>• Incorrectly identifies, or overlooks, patterns and relationships.</li> <li>• Offers simple conclusions not supported by evidence.</li> <li>• Identifies difficulties experienced in conducting an investigation.</li> <li>• Communicates information and concepts using everyday language and simple representations.</li> </ul> |
|   | <p><b>Workplace health and safety</b></p> <ul style="list-style-type: none"> <li>• Acts safely most of the time.</li> <li>• Works with limited effectiveness in individual and group contexts.</li> <li>• Operates equipment and uses techniques safely under direction.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|   | <p><b>Scientific literacy</b></p> <ul style="list-style-type: none"> <li>• Uses scaffolding to attempt to construct evidence-based arguments to identify impacts and claims.</li> <li>• Identifies issues and scientific impacts.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|   | <p><b>Science understanding</b></p> <ul style="list-style-type: none"> <li>• Identifies structures, systems and processes.</li> <li>• Describes concepts using everyday language and simple representations.</li> <li>• Incorrectly or inconsistently applies scientific concepts and models to describe processes.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                            |
| E | <p>Does not meet the requirements of a D grade and/or has completed insufficient assessment tasks to be assigned a higher grade.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

\* These grade descriptions will be reviewed at the end of the second year of implementation of this syllabus.

