



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

# HUMAN BIOLOGY

GENERAL COURSE

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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 2024.

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

In the Human Biology General course, students learn about themselves, relating the structure of the different body systems to their function and understanding the interdependence of these systems in maintaining life. Reproduction, growth and development of the unborn baby are studied to develop an understanding of the effects of lifestyle choices. Students will engage in activities exploring the coordination of the musculoskeletal, nervous and endocrine systems. They explore the various methods of transmission of diseases and the responses of the human immune system. Students research new discoveries that help increase our understanding of the causes and spread of disease in a modern world.

As a science, the subject matter of this course is founded on systematic inquiry; knowledge and understanding of human biology has been gained by scientific research. However, this knowledge is far from complete and is being modified and expanded as new discoveries and advancements are made. Students develop their understanding of the cumulative and evolving nature of scientific knowledge and the ways in which such knowledge is obtained through scientific investigations. They learn to think critically, to evaluate evidence, to solve problems, and to communicate understandings in scientific ways.

Responsible citizens need to be able to evaluate risks, ethical concerns and benefits to make informed decisions about matters relating to lifestyle and health. Issues, such as diet, medical treatments and the manipulation of fertility are examples in which personal choices have an impact on health and wellbeing. Other topics are often the subject of community debate: obesity, effects of drugs and alcohol use during pregnancy, infectious diseases and hygiene. With an understanding of human biology, students are more able to make better life decisions, and to be more effective contributors to the discussions related to health issues in the community.

An understanding of human biology is valuable for a variety of career paths. The course content deals directly and indirectly with many different occupations in areas, such as social work, medical and paramedical fields, food and hospitality, childcare, sport, science and health education. Appreciation of the range and scope of such professions broadens students' horizons and enables them to make informed choices. This helps to prepare all students, regardless of their background or career aspirations, to take their place as responsible citizens in society.

## Course outcomes

The Human Biology General course is designed to facilitate achievement of the following outcomes.

### Outcome 1 – Science Inquiry Skills

Students investigate questions in human biology, evaluate the impacts of advancements in science and communicate scientific understandings.

In achieving this outcome, students:

- plan and conduct investigations
- analyse data, draw conclusions, evaluate investigation design and findings
- evaluate the impact of advancements in human biology on individuals and society
- communicate understandings of human biology.

### Outcome 2 – Science as a Human Endeavour

Students explore the application of the knowledge and understanding of human biological systems in a wide range of real world contexts.

In achieving this outcome, students:

- understand that knowledge of human biological systems has developed over time and continues to develop with improving technology
- understand how scientists use knowledge of human biological systems in a wide range of applications
- understand how knowledge of human biological systems influences society in local, regional and global contexts.

### Outcome 3 – Science Understanding

Students understand how the structure and function of the human body systems maintain a healthy body, support reproduction, coordinate the body, and provide defence against infectious disease.

In achieving this outcome, students:

- understand structure and function of the body systems
- understand the mechanism of reproduction
- understand how the body maintains coordination of systems
- understand the effect of infectious diseases on humans.

## Organisation

This course is organised into a Year 11 syllabus and a Year 12 syllabus. The cognitive complexity of the syllabus content increases from Year 11 to Year 12.

### Structure of the syllabus

The Year 12 syllabus is divided into two units which are delivered as a pair. The notional time for the pair of units is 110 class contact hours.

#### Unit 3 – Coordination

This unit explores bones, muscles, nerves and hormones and how they maintain the body to act in a coordinated manner.

#### Unit 4 – Infectious disease

This unit explores the causes and spread of disease and how humans respond to invading pathogens.

Each unit includes:

- a unit description – a short description of the focus of the unit
- unit content – the content to be taught and learned.

## Organisation of content

### Science strand descriptions

The Human Biology General course has three interrelated strands: Science Inquiry Skills, Science as a Human Endeavour and Science Understanding which build on students' learning in the Year 7–10 Science curriculum. The three strands of this course should be taught in an integrated way. The content descriptions for Science Inquiry Skills, Science as a Human Endeavour and Science Understanding have been written so that this integration is possible in each unit.

#### Science Inquiry Skills

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

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

Through the Human Biology General course, students will continue to develop their science inquiry skills, building on the skills acquired in the Year 7–10 Science curriculum. Each unit provides specific skills to be taught. These specific skills align with the Science Understanding and Science as a Human Endeavour content of the unit.

### Science as a Human Endeavour

Science concepts, models and theories are reviewed as their predictions and explanations are continually re-assessed through new evidence, often through the application of new technologies. This review process involves a diverse range of scientists working within an increasingly global community of practice.

The application of science may provide great benefits to individuals, the community and the environment, but may also pose risks and have unintended consequences. As an ever-evolving body of knowledge, science frequently informs public debate, but is not always able to provide definitive answers.

### 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 those concepts, models and theories to new situations.

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

### 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 Human Biology General course

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

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
- comprehend and use the symbols/notations  $<$ ,  $>$ ,  $\Delta$ ,  $\approx$
- translate information between graphical and numerical 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 and median
- interpret the slope of a linear graph.

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

### Numeracy

Numeracy is key to students' ability to apply a wide range of Science Inquiry Skills, including making and recording observations; ordering, representing and analysing data; and interpreting trends and relationships. They employ numeracy skills to interpret complex spatial and graphic representations, and to appreciate the ways in which human biological 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 (ICT) capability is a key part of Science Inquiry Skills. Students use a range of strategies to locate, access and evaluate information from multiple digital sources; to collect, analyse and represent data; to model and interpret concepts and relationships; and to communicate and share science ideas, processes and information. Through exploration of the Science as a Human Endeavour concept, students assess the impact of ICT on the development of science and the application of science in society, particularly with regard to collating, storing, managing and analysing large data sets.

### Critical and creative thinking

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

## Personal and social capability

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

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

## Representation of the cross-curriculum priorities

The cross-curriculum priorities address the 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 Human Biology 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 health issues of modern Aboriginal and Torres Strait Islander Peoples. Students could examine the ways in which the settlement of Australia by Europeans has impacted on the health and well-being of Aboriginal communities through the introduction of foreign diseases and disorders.

### **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 examine the important role played by people of the Asia region in such areas as medicine, biomechanics and biotechnology. They could consider collaborative projects between Australian and Asian scientists and the contribution these make to scientific knowledge.

### **Sustainability**

The Sustainability cross-curriculum priority is not explicitly addressed in the Human Biology General course. The Human Biology General course provides authentic contexts for exploring, investigating and understanding the function and interactions of human body systems across a range of spatial and temporal scales. By investigating the relationships between the systems and system components of the human body, and how systems respond to change, students develop an appreciation for the interconnectedness of the human body to the biosphere, hydrosphere and atmosphere.

Students appreciate that the study of the Human Biology General course provides the basis for decision making in many areas of society and that these decisions can affect the Earth system. They understand the importance of using science to predict possible effects of an altered environment on the human body, and to develop management plans or alternative technologies that minimise these effects and provide for a more sustainable future.

## Unit 3 – Coordination

### Unit description

This unit explores bones, muscles, nerves and hormones and how they maintain the body to act in a coordinated manner.

The structure and function of the musculoskeletal system provides for human movement, balance and growth as the result of coordinated actions. This is brought about by the interaction of the musculoskeletal system with the nervous and endocrine systems. Conditions affecting these systems, such as sporting injuries, hearing and vision defects, can result in a decrease or loss of function.

Students investigate the musculoskeletal, nervous and endocrine systems through dissections and practical examination of reflexes, vision, hearing and skin sensitivity. They are encouraged to interpret and communicate their findings in a variety of ways.

### Unit content

An understanding of the Year 11 content is assumed knowledge for students in Year 12. It is recommended that students studying Unit 3 and Unit 4 have completed Unit 1 and Unit 2.

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

### Science Inquiry Skills

- identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes
- design investigations, including the procedure(s) to be followed, the materials required, and the type and amount of primary and/or secondary data to be collected; conduct risk assessments; and consider research ethics, including animal ethics
- conduct investigations including real or virtual dissections, investigating reaction time and hearing and eyesight tests, safely, competently and methodically, for the collection of valid and reliable data
- represent data in meaningful and useful ways, including the use of mean and median, range and probability; organise and analyse data to identify trends, patterns and relationships; discuss the ways in which measurement error, instrumental accuracy, the nature of the procedure and the sample size may influence uncertainty and limitations in data; and select, synthesise and use evidence to make and justify conclusions
- interpret a range of scientific and media texts, and evaluate models, processes, claims and conclusions by considering the quality of available evidence; and use reasoning to construct scientific arguments
- select, use and/or construct appropriate representations, to communicate conceptual understanding, solve problems and make predictions
- communicate to specific audiences, and for specific purposes, using appropriate language, nomenclature, genres and modes, including scientific reports

### Science as a Human Endeavour

- skeletal damage caused by many sporting injuries are due to movements beyond the capabilities of the bones and joints, and treatment can be by basic first aid and medication, or radical surgery
- dysfunctions of the nervous and/or the muscular systems can be debilitating to affected individuals, and ongoing research needs to occur to discover causes and/or improved treatment
- hormone replacement therapies can be used for the treatment of endocrine disorders to help improve the quality of life of affected individuals
- increased understanding of the central nervous system and muscle coordination have led to innovations in the treatment of injuries

### Science Understanding

#### Skeletal system

- the support and movement of the body is facilitated by the structure and function of the bones and joints in the skeletal system
- the location and structure of joints in the skeleton allow for a range of movement
- the structure and development of long bones provide for strength, growth and repair

#### Muscular system

- locomotion and balance is facilitated by the structure and actions of the skeletal muscles
- skeletal muscles work in groups around joints to bring about the desired action, while maintaining stability of the joint and providing strength to the action
- the structure of muscles allow for small movements at cellular level to combine to produce large, strong movements used in walking, balance and arm movements

#### Nervous system

- the nervous system enables us to respond to external changes. Information from receptors passes along nerves to the brain where the brain coordinates the response
- the structures of the brain facilitate coordination of responses, including the central nervous system (brain, cerebellum, cerebrum, brainstem and spinal cord) and the peripheral nervous system
- the central nervous system is protected by bone, meninges and cerebrospinal fluid
- receptors detect stimuli which include light, sound, changes in position, chemicals, touch, pressure, pain and temperature
- the structure of the eye, ear and receptors in the skin allow the body to react to changes in the external environment
- reflex actions are automatic and rapid, which involve sensory neurons, interneurons and motor neurons
- the nervous system and the musculoskeletal system interact to provide coordinated actions of the body for walking and balance

**Endocrine system**

- many processes within the body are coordinated by hormones, which are secreted by glands and are transported to their target organs in the blood
- hormone action can be via negative feedback to maintain internal conditions within tolerance limits; stimulus receptor, modulator, effector, response and feedback, are components of a feedback loop
- the endocrine glands of the body include hypothalamus, pituitary, adrenal gland, pancreas, thyroid, pineal and parathyroid glands, testes, ovaries and placenta
- thyroxine, cortisol, growth hormone and, to a lesser extent, adrenaline, all play a role in the regulation of metabolism

## Unit 4 – Infectious disease

### Unit description

This unit explores the causes and spread of disease and how humans respond to invading pathogens. Disease is caused by various pathogens that are transmitted between individuals and populations in many different ways.

Prevention of transmission of disease can be achieved by adopting good hygiene practices at a personal, domestic and workplace level. The body responds naturally to disease in several ways. These actions of the body can be assisted by the use of medications, such as antibiotics, and the use of vaccines.

Improvement in technology and transportation has resulted in humans becoming less geographically isolated, resulting in the transmission of disease becoming an increasing global issue. The frequency of particular diseases in geographical areas is dependent upon population density and standards of sanitation and health services.

Students investigate transmission of diseases using second-hand data from a historical perspective and recent global incidences. They consider how data is used to inform personal decisions and community responses related to disease prevention and control. They are encouraged to use ICT to interpret and communicate findings in a variety of ways.

### Unit content

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

#### Science Inquiry Skills

- identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes
- design investigations, including the procedure(s) to be followed, the materials required, and the type and amount of primary and/or secondary data to be collected; conduct risk assessments; and consider research ethics, including animal ethics
- conduct investigations safely, competently and methodically for the collection of valid and reliable data
- represent data in meaningful and useful ways, including the use of mean and median; organise and analyse data to identify trends, patterns and relationships; discuss the ways in which measurement error, instrumental accuracy, the nature of the procedure and the sample size may influence uncertainty and limitations in data; and select, synthesise and use evidence to make and justify conclusions
- interpret a range of scientific and media texts, and evaluate models, processes, claims and conclusions by considering the quality of available evidence, including interpreting confidence intervals in secondary data; and use reasoning to construct scientific arguments
- select, use and/or construct appropriate representations, to communicate conceptual understanding, solve problems and make predictions
- communicate to specific audiences, and for specific purposes, using appropriate language, nomenclature, genres and modes, including scientific reports



## Science as a Human Endeavour

- the development of the microscope was important in linking specific pathogens to specific diseases, which then allowed for the appropriate treatment or preventative measures to be used, including antiseptics, antibiotics, quarantine measures and improved hygiene for water and food, which have reduced the impacts of myths and misconceptions around disease and its transmission
- use and misuse of medicinal treatments against pathogens can cause the development of multi-resistant bacteria that increase risks associated with the infection
- international collaboration is often required when responding to global issues of disease transmission, such as severe acute respiratory syndrome (SARS) and bird flu, and reducing the impact of foreign disease on isolated populations
- the introduction of foreign bacteria and viruses to isolated communities may have a more severe affect than in the outside world
- the 'hygiene hypothesis' proposes that the increase in allergy disorders in modern society, is a consequence of decreased exposure to infection in early childhood

## Science Understanding

### Disease

- infectious disease is caused by invasion of a pathogen, and can be transmitted from one host to another
- pathogens include bacteria, viruses, fungi, parasites, and are the causes of common diseases, including Ross River disease, influenza, food poisoning, tinea and malaria
- the transmission and spread of infectious disease is facilitated by local, regional and global movement of individuals
- pathogens have adaptations that facilitate their entry into the body and transmission between hosts; transmission occurs by various mechanisms, including through:
  - direct and indirect contact
  - contaminated food and water
  - disease-specific vectors, including airborne transmission
- preventing the transmission of disease includes strategies of quarantine, immunisation and disruption of pathogen life cycle
- hygiene practices by individuals in work places, especially in places of food preparation and in hospitals, affect the transmission of disease

### Vaccines and immunology

- inherent responses in humans target pathogens, including through the inflammatory response, which involves the actions and components of the circulatory system
- responses to specific antigens include the production of antibodies and memory cells for short-term and long-term immunity (details of T and B cells are not required)
- modern medicines which assist in reducing the rate of infection, or the severity of the infection, include antiseptics, antivirals and antibiotics

- immunity to specific diseases is acquired as a result of natural exposure to the pathogen, or through the use of vaccines to produce memory cells

### **Community and global health**

- standards of hygiene, including sanitation of water, waste treatment and the presence of pathogens and disease vectors, varies between global communities; travel warnings provide information to help reduce risk of infection
- population density and movement patterns influence the transmission of disease
- social behaviour is an important factor in the transmission, spread and persistence of sexually transmitted infections

## School-based assessment

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

Teachers design school-based assessment tasks to meet the needs of students. The table below provides details of the assessment types for the Human Biology General Year 12 syllabus and the weighting for each assessment type.

**Assessment table – Year 12**

Type of assessment	Weighting
<p><b>Science inquiry</b></p> <p>Science inquiry involves identifying and posing questions; planning, conducting and reflecting on investigations; processing, analysing and interpreting data; and communicating findings. It is concerned with evaluating claims, investigating ideas, solving problems, reasoning, drawing valid conclusions, and/or developing evidence-based arguments.</p> <p>Students must complete at least one investigation over the pair of units.</p> <p><b>Practical</b></p> <p>Practical work can involve a range of activities, such as practical tests; modelling and simulations; qualitative and/or quantitative analysis of second-hand data; and/or brief summaries of practical activities.</p> <p><b>Investigation</b></p> <p>Investigations are more extensive activities, which can include experimental testing; conducting surveys; and/or comprehensive scientific reports.</p>	30%
<p><b>Extended response</b></p> <p>Tasks requiring an extended response can involve selecting and integrating appropriate science concepts, models and theories to explain and predict phenomena, and applying those concepts, models and theories to new situations; interpreting scientific and/or media texts and evaluating processes, claims and conclusions by considering the quality of available evidence; and using reasoning to construct scientific arguments.</p> <p>Assessment may take the form of answers to specific questions based on individual research; exercises requiring analysis; and interpretation and evaluation of information in scientific journals, media texts and/or advertising.</p>	20%
<p><b>Test</b></p> <p>Tests typically consist of multiple choice questions and questions requiring short and extended answers. They should be designed so that students can apply their understanding and skills in Human Biology to analyse, interpret, solve problems and construct scientific arguments.</p>	35%
<p><b>Externally set task</b></p> <p>A written task or item or set of items of 50 minutes duration developed by the School Curriculum and Standards Authority and administered by the school.</p>	15%

Teachers are required to 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).

In the assessment outline for the pair of units, each assessment type must be included at least once over the year/pair of units. The externally set task occurs in Term 2.

The set of assessment tasks must provide a representative sampling of the content for Unit 3 and Unit 4.

Appropriate strategies should be used to authenticate student achievement for tasks that have been completed out of class or as part of a group.

## Externally set task

All students enrolled in the Human Biology General 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

Time	50 minutes
Format	Written
	Conducted under invigilated conditions
	Typically between two and six questions/items
Content	The Authority informs schools during Term 3 of the previous year of the Unit 3 syllabus content on which the task will be based

Refer to the *WACE Manual* for further information.

## Grading

Schools report student achievement in terms of the following grades:

Grade	Interpretation
A	Excellent achievement
B	High achievement
C	Satisfactory achievement
D	Limited achievement
E	Very low achievement

The teacher prepares a ranked list and assigns the student a grade for the pair of units. The grade is based on the student's overall performance as judged by reference to a set of pre-determined standards. These standards are defined by grade descriptions and annotated work samples. The grade descriptions for the Human Biology General Year 12 syllabus are provided in Appendix 1. They can also be accessed, together with annotated work samples, through the Guide to Grades link 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.

## Appendix 1 – Grade descriptions Year 12

A

### Understanding and applying concepts

Applies concepts and scientific knowledge to describe structures and systems and explain processes, in detail.

Uses appropriate scientific language, conventions and clearly labelled diagrams to correctly explain concepts.

Selects and assesses the relevance of scientific information from a variety of sources to support a point of view.

Analyses issues and presents clear and logical arguments or reasons which are supported by evidence.

Accurately interprets data, diagrams, charts and graphs.

Accurately solves calculations expressing answers using correct units.

### Science inquiry skills

Formulates a testable hypothesis that clearly states the relationship between dependent and independent variables.

Plans an investigation to collect appropriate data.

Identifies several controlled variables with specific detail.

Provides a clear and logical experimental procedure with sufficient detail to allow the investigation to be repeated by others.

Organises data logically and presents it in a range of forms, including appropriate graphs and tables to show patterns and relationships.

Analyses experimental data to accurately describe trends and uses evidence to make and justify conclusions that relate to the hypothesis.

Evaluates experimental method and makes specific relevant suggestions to improve the design of the investigation.

Communicates information and concepts logically, using correct scientific language, conventions and representations.

B

**Understanding and applying concepts**

Applies concepts and scientific knowledge to describe structures and systems and explain some processes.

Uses scientific language, conventions and labelled diagrams to explain concepts.

Selects scientific information from a variety of sources to support a point of view.

Analyses issues and presents arguments or statements that are sometimes well supported by evidence.

Interprets most data, diagrams, charts and graphs correctly.

Solves calculations with only minor inaccuracies.

**Science inquiry skills**

Formulates a testable hypothesis that states the relationship between dependent and independent variables.

Plans an investigation to collect appropriate data. Identifies some controlled variables without specific detail.

Provides a sequenced experimental procedure that lacks specific detail.

Presents data in a range of forms, including appropriate graphs and tables, and identifies relationships.

Describes trends in the data and uses evidence to make conclusions that relate to the hypothesis.

Evaluates experimental method and makes general suggestions to improve the design of the investigation.

Communicates information and concepts generally using scientific language and representations.

Makes some errors in the use of conventions.

C

**Understanding and applying concepts**

Describes some structures, systems and processes in a general way.

Uses some scientific language, conventions and supporting diagrams to describe concepts.

Selects limited scientific information to support a point of view.

Discusses issues and presents general statements supported by limited evidence.

Interprets some data, diagrams, charts and graphs correctly.

Solves simple calculations with only minor inaccuracies.

**Science inquiry skills**

Formulates a hypothesis, that includes dependent and independent variables, within a context that has been provided.

Plans an investigation to collect appropriate data.

Identifies some controlled variables without detail.

Outlines the main steps in the experimental procedure.

Presents data using basic tables and graphs and identifies simple relationships.

Describes trends in data and draws general conclusions that may not be linked to the hypothesis.

Describes difficulties experienced in conducting the investigation and suggests general improvements.

Communicates information and concepts, without detail, using some scientific language and conventions.

	<p><b>Understanding and applying concepts</b></p> <p>Identifies some structures, systems and processes.</p> <p>Uses everyday language and provides simple diagrams to describe some concepts.</p> <p>Makes little use of evidence to support a point of view.</p> <p>Discusses issues and presents general statements that may include incomplete or incorrect information.</p> <p>Interpretation of data and diagrams contain multiple errors and misconceptions.</p> <p>Calculations may be incomplete or contain multiple errors.</p>
<b>D</b>	<p><b>Science inquiry skills</b></p> <p>Makes a simple prediction for an investigation.</p> <p>May not distinguish between dependent, independent and controlled variables.</p> <p>Follows a provided experimental procedure to collect data.</p> <p>Presents data that may be disorganised and lack appropriate processing.</p> <p>May provide incomplete or incorrect tables and graphs.</p> <p>Identifies some trends in data correctly.</p> <p>Offers simple conclusions that are not always supported by the data.</p> <p>Identifies difficulties experienced in conducting the investigation.</p> <p>Communicates information using everyday language with frequent errors in the use of conventions.</p>
<b>E</b>	<p>Does not meet the requirements of a D grade and/or has completed insufficient assessment tasks to be assigned a higher grade.</p>