Government of Western Australia
School Curriculum and Standards Authority

HUMAN BIOLOGY

GENERAL COURSE

Year 11 syllabus

IMPORTANT INFORMATION

This syllabus is effective from 1 January 2015.

Users of this syllabus are responsible for checking its currency.

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

Content

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 11 syllabus is divided into two units, each of one semester duration, which are typically delivered as a pair. The notional time for each unit is 55 class contact hours.

Unit 1 – Healthy body

This unit explores how the human body systems are interrelated to sustain life.

Unit 2 – Reproduction

This unit explores the role of males and females in the process of reproduction.

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 the Human Biology General 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 8th edition 2013* (www.nhmrc.gov.au/guidelines/publications/ea28).

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 8th edition 2013,* in addition to relevant state guidelines.

The *Animal Welfare Act 2002* can be found at www.slp.wa.gov.au. The related animal welfare regulations, along with the licences required for the use and supply of animals, can be downloaded from www.dlg.wa.gov.au

Information regarding the care and use of animals in Western Australian schools and agricultural colleges can be viewed at www.det.wa.edu.au/curriculumsupport/animalethics/detcms/portal/

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 <, >, Δ, ≈
- 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.

Progression from the Year 7–10 curriculum

This syllabus continues to develop student understanding and skills from across the three strands of the Year 7–10 Science curriculum. In the Science Understanding strand, human biology draws on knowledge and understanding from the sub-strand of Biological sciences in Years 7, 8, 9 and 10 and Chemical sciences in Year 10.

In particular, this syllabus continues to develop the key concepts introduced in the Biological Sciences sub-strand, that is, that a diverse range of living things have evolved on Earth over hundreds of millions of years, that living things are interdependent and interact with each other and their environment, and that the form and features of living things are related to the functions their systems perform.

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 Science as a Human Endeavour concepts, 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 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 1 – Healthy body

Unit description

This unit explores how the systems of the human body are interrelated to help sustain functioning to maintain a healthy body.

Cells are the basic structural and functional units of the human body. Materials are exchanged in a variety of ways within and between the internal and external environment to supply inputs and remove outputs for life processes. The respiratory, circulatory, digestive and urinary systems control the exchange and transport around the body of materials required for efficient functioning.

The lifestyle choices we make can have consequences for the optimal functioning of these systems. Humans can intervene to treat dysfunction and influence the quality of life of the individual.

Students investigate the body systems through real or virtual dissections and practical examination of cells, organs and systems. They research contemporary treatments for dysfunctions to the body systems and are encouraged to use ICT to interpret and communicate their 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, including monitoring body functions; use microscopy techniques; and perform real or virtual dissection, safely, competently and methodically for the collection of valid and reliable data
- represent data in meaningful and useful ways; organise and analyse data to identify trends, patterns and relationships; qualitatively describe sources of measurement error, and 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 processes, claims and conclusions by considering the quality of available evidence; and use reasoning to construct scientific arguments
- select, construct and use appropriate representations, including labelled diagrams and images of various cells, tissues and organ systems, 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

- lifestyle choices, including being active or sedentary, the use of drugs and type of diet, can compromise body functioning in the short term and may have long term consequences
- treatment of conditions due to system or organ dysfunction has changed through improvements in early diagnosis and appropriate use of drugs, physical therapy, radiation therapy, and removal and/or replacement of affected parts
- the understanding of the human body at the cellular level has been enhanced with the development of the microscope and associated techniques

Science Understanding

Characteristics of life

- all living things carry out the life processes of respiration, feeding (including digestion and absorption) excretion, movement, reproduction, responding to stimuli and growth
- the cell theory states that all cells arise from other living cells
- cells are separated from their surroundings by the cell membrane, which controls the movement of materials into and out of the cell by:
  - passive processes, including diffusion and osmosis
  - active processes, including active transport, endocytosis
- body cells contain specialised structures with specific functions, including nucleus, mitochondria, ribosomes, lysosomes and cytoplasm
- cellular respiration occurs at different locations within the cell to breakdown compounds aerobically or anaerobically to release useable energy for the cell

Body organisation

- the body has a hierarchical structural organisation of cells, tissues, organs and systems; the functions of the systems are related to life processes

Respiratory system

- the respiratory system is structured to facilitate the exchange of gases between the external environment and the blood
- to be efficient, gas exchange surfaces have to have the following characteristics:
  - large surface area
  - thin
  - moist
  - vascular
- the mechanics of breathing help to maintain the efficient exchange of gases in the lungs
- the function of the respiratory system can be compromised by diseases and conditions that reduce the efficiency of gas exchange

Circulatory system

- the circulatory system is structured to facilitate the transport of materials to and from exchange surfaces, including the lungs, digestive system and kidneys, and the cells of the body
- the structure of the heart facilitates the efficient flow of blood around the body
- the blood vessels of the circulatory system have specialised structures that provide for efficient distribution and collection of blood around the body
- the blood is made up of plasma and several types of blood cells, each with particular functions that aid in the:
  - transport of materials, including oxygen, nutrients and waste
  - defence against pathogens
- the function of the circulatory system can be compromised by cardiovascular diseases that reduce the efficiency of transport of materials around the body

Digestive system

- the structure of the digestive system facilitates the breakdown of food to compounds that can be readily absorbed into the blood for use in the cells
- mechanical digestion, including the teeth and peristalsis, is required to reduce the size of food pieces and to increase the surface area on which chemical digestion can act
- chemical digestion involves the use of enzymes (amylase, protease and lipase) to chemically break down food for absorption
- materials eliminated from the digestive system include indigestible contents, excess materials and some metabolic wastes
- the function of the digestive system can be compromised by diseases and conditions that reduce the efficiency of digestion or absorption of food

Nutrition and diet

- a healthy diet contains the right balance of foods to provide the correct amount of energy and materials for cellular function; malnutrition occurs if a diet is not balanced and this may lead to a person being overweight or underweight
- the uses of the main nutrient groups required in a healthy diet are:
  - carbohydrates: used as an energy source, for storage and for fibre/roughage
  - proteins: used for growth and repair of tissues and as components of cell structures, hormones and enzymes
  - fats (lipids): used in the formation of cell membranes, as an energy source and a storage material,
  - vitamins and minerals, including calcium and iron, used in many various roles
  - water, the main solvent in the body, which also has many other uses in the body

Urinary system

- the urinary system facilitates the removal of toxic nitrogenous wastes and excess water from the blood
- the urinary system works with other systems and organs, including the digestive system, the skin and lungs, to maintain the correct water balance within the body
- dysfunction of the kidneys may result in death due to accumulation of toxic substances in the blood; treatment using dialysis machines or kidney transplants help to preserve life

Unit 2 – Reproduction

Unit description

This unit explores the role that males and females have in reproduction, including contraception, and the issues of sexually transmitted infections. Students learn about the reproductive systems of males and females and how they are specialised in many different ways to produce differentiated gametes (eggs and sperm) and ensure the chances of fertilisation and implantation are more likely.

The healthy development of the embryo and foetus can be monitored, and technologies available will be presented. Where there are instances of infertility, options available for couples, along with associated risks, will be considered, in addition to lifestyle choices that can affect fertility. Sexually transmitted infections will be researched, and effects, treatments and ways to minimise infection will be examined.

Students apply their knowledge to construct a deoxyribonucleic acid (DNA) model and demonstrate cell division processes. They are encouraged to use ICT to interpret and communicate their findings in a variety of ways.

Unit content

This unit builds on the content covered in Unit 1.

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, 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, including interpreting confidence intervals in secondary data; and use reasoning to construct scientific arguments
- select, use and/or construct appropriate representations, including labelled diagrams, models and flow charts of Deoxyribonucleic acid (DNA) and cell division, 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

- improvements in technology, including ultrasound, have enabled successful monitoring of the developing baby and mother during pregnancy
- improved understanding of the birthing process has resulted in various methods of delivery of the baby
- increased understanding of the effects of smoking and alcohol on the unborn child has resulted in education campaigns highlighting risks
- increased understanding of the risks of unprotected sexual activity and sexually transmitted infections (STIs) has resulted in education campaigns predominantly aimed at adolescents

Science Understanding

Genetic material

- DNA is the genetic material that carries the code for characteristics from one generation to the next and controls the functioning of cells
- chromosomes are made up of large molecules of DNA; a small section of DNA is called a gene which can have different forms that are named alleles

Cell division

- the sequence of events in mitosis ensures that each daughter cell receives a complete set (2N) of chromosomes from the parent cells
- the sequence of events in meiosis produces daughter cells (gametes) with half the number of chromosomes (N) that may be genetically different from each other

Reproductive systems

- the structure and function of the male and female reproductive systems facilitate the production and delivery of gametes to increase the chances of fertilisation occurring; females have additional structures that support the development of the unborn baby
- gamete formation is a continuous processes in males, whereas females have ovarian and menstrual cycles to develop and deliver a single, viable ovum ready for fertilisation
- the menstrual and ovarian cycles are coordinated by hormones, including follicle stimulating hormone (FSH), oestrogen, progesterone and luteinising hormone (LH)

Pregnancy

- fertilisation restores the 2N number of chromosomes by combining gametes, producing an embryo with genes from both parents
- pregnancy will be established only if implantation occurs and the placenta is formed and maintained
- there is a known and predictable sequence of development from the zygote through embryonic stages to foetal development which can be monitored, including the use of ultrasound technology to determine the health of the baby
- both the mother and foetus are affected by environmental factors; maternal lifestyle choices will affect foetal development and ongoing health of the baby

- the sequence of events in the birth process prepare the offspring and mother for delivery; complications can arise due to the positioning of the placenta and umbilical cord
- infant development proceeds in a known sequence with specific patterns and milestones that can be used to monitor the health of the baby

Reproductive technologies

- contraception methods include the use of hormones to control the menstrual and ovarian cycles, and ways of preventing fertilisation or implantation
- infertility treatments use assisted reproductive technologies, including in vitro fertilisation-embryo transfer (IVF-ET), gamete intrafallopian transfer (GIFT), zygote intrafallopian transfer (ZIFT), and frozen embryo transfer (FET) which involve the manipulation of reproductive hormones
- parental, embryonic and foetal testing can be done to detect a range of conditions that will affect fertility and detect anomalies in foetal development and genetic content

Sexually transmitted infections (STIs)

- STIs are transmitted via sexual contact or contact with infected body fluids
- STIs can be caused by bacteria, viruses, fungi or parasites, with each having specific symptoms that may not be apparent for some time after infection
- not all STIs are curable and many are notifiable diseases

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 11 syllabus and the weighting for each assessment type.

Assessment table – Year 11

Type of assessment	Weighting
Science inquiry Science inquiry involves identifying and posing questions; planning, conducting and reflecting on investigations; processing, analysing and interpreting data; and communicating findings. Students evaluate claims, investigate ideas, solve problems, reason, draw valid conclusions, and/or develop evidence-based arguments. **Science inquiry: Practical** 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. **Science inquiry: Investigation** Investigations are more extensive activities, which can include experimental testing; conducting surveys; and/or comprehensive scientific reports**.**	40%
Extended response 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. Assessment can 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.	20%
Test 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.	40%

Teachers are required to use the assessment table to develop an assessment outline for the pair of units (or for a single unit where only one is being studied).

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 twice. In the assessment outline where a single unit is being studied, each assessment type must be included at least once.

The set of assessment tasks must provide a representative sampling of the content for Unit 1 and Unit 2.

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

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 (or for a unit where only one unit is being studied). 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 11 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

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 11

A	**Understanding and applying concepts** Applies concepts to describe structures and systems and explains processes, in detail, using appropriate scientific language and conventions. Presents clear and logical arguments that are supported by evidence. Interprets, compares and evaluates scientific information to support various points of view. Accurately interprets data and diagrams.
	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 controlled variables with specific detail. Organises data logically and presents it in a range of forms, including appropriate graphs and tables to show patterns and relationships. Accurately performs calculations. Analyses experimental data to describe trends and explains these using relevant scientific concepts. Uses evidence to make and justify conclusions that relate to the hypothesis. Explains any inconsistencies in data and suggests ways to improve the design of an investigation.
B	**Understanding and applying concepts** Applies concepts to describe structures and systems and briefly explains processes using scientific language and conventions. Presents arguments or statements that are not always well supported by evidence. Interprets and compares scientific information to support a point of view. Interprets most data and diagrams correctly.
	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 detail. Presents data in a range of forms, including appropriate graphs, tables and charts to show patterns and relationships. Performs calculations which may contain minor errors. Describes trends and briefly explains these using relevant scientific concepts. Uses evidence to make conclusions that relate to the hypothesis. Recognises inconsistencies in data and makes general suggestions to improve the design of an investigation.
C	**Understanding and applying concepts** Describes concepts using some scientific language and conventions. Provides representations which lack detail. Presents statements of ideas, with some development of an argument. Selects some scientific information to support a point of view but includes some irrelevant or incorrect information. Interprets some data and diagrams correctly.
	Science inquiry skills With guidance, formulates a hypothesis, that includes dependent and independent variables, within a context that has been provided. Plans an investigation to collect appropriate data. Inconsistently identifies some controlled variables. Presents data using basic tables and graphs. Completes simple calculations which may contain errors. Describes trends in the data and draws simple conclusions that may not be linked back to the hypothesis. Describes difficulties experienced in conducting the investigation and suggests general improvements.

D	**Understanding and applying concepts** Describes concepts using everyday language with frequent errors in the use of conventions. Presents responses which are often incomplete. Presents statements of ideas, but with limited development of an argument. Selects inappropriate scientific information to support a point of view. Includes several inaccuracies in the interpretation of data and diagrams.
	Science inquiry skills Describes difficulties experienced in conducting the investigation and suggests general improvements. Follows a provided experimental procedure to collect data. Confuses variables. Presents data using basic tables and graphs that are incomplete or contain errors. Omits calculations or performs calculations which contain errors. Identifies trends in data incorrectly or overlooks trends. Offers simple conclusions that are not supported by data or not related to the hypothesis. Identifies difficulties experienced in conducting the investigation.

E	Does not meet the requirements of a D grade and/or has completed insufficient assessment tasks to be assigned a higher grade.