



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

HUMAN BIOLOGY

GENERAL COURSE

Year 11 | Syllabus Review | Consultation Draft | September 2022

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 a draft for consultation and is not endorsed for use in schools.

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Rationale

In the Human Biology General course, students learn about themselves, by relating the structure of the different body systems to their function and understanding the interdependence of these systems in maintaining life. They explore how personal decisions can affect their body's functions and their quality of life, and how regular health checks can prevent or manage medical problems. Reproduction, growth and development of the unborn baby are studied to develop an understanding of the effects of lifestyle choices. 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. 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 aims

The Human Biology General course enables students to:

- use the scientific method for a variety of investigations to demonstrate knowledge of the natural and technological world
- understand that science is a human activity involving the application of knowledge to solve problems and make informed decisions that impact on themselves and society
- understand how the structure and function of the human body systems maintain a healthy body, support reproduction and provide defence against infectious disease.

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 – Nutritional choices

This unit explores the how the structure and function of cells help to sustain life processes, and the role of the digestive system in providing essential nutrients for the musculoskeletal system. It also explores how the dietary decisions we make can affect the functioning of body cells and our quality of life.

Unit 2 – Reproductive choices

This unit explores the how the male and female reproductive systems are specialised for successful fertilisation and implantation, and the development of the embryo and foetus. It also explores how lifestyle choices can impact personal reproductive health, fertility and the delivery of a healthy baby. Contraceptive methods and assisted reproductive technologies are also explored.

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

The course content is divided into three content areas:

- Scientific Method
- Scientific Literacy
- 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 the procedures and findings, and communicating findings.

Scientific Literacy

Informed participation in society requires knowledge of relevant science concepts and skills, 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 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 context being studied.

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: 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 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 skills and understandings that underpin the three content areas of the course: Scientific Method, 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 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 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 Human Biology 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 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 and Torres Strait Islander 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 Pacific 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.

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 the Scientific Method, 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).

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 any relevant state guidelines.

The Animal Welfare Act 2002 can be found at www.legislation.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.agric.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.

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 make 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 $<$, $>$, Δ , \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.

Unit 1: Nutritional choices

The focus for this unit is on the nutritional choices that we make for the optimal functioning of body cells.

Cells are the basic structural and functional units of the human body. Nutrients are required by cells to sustain life processes. The structures of the digestive system are designed to obtain nutrients which are essential for a functioning musculoskeletal system. Personal dietary decisions can affect the optimal functioning of body cells and quality of life.

Students investigate and model cell processes through practical activities. They explore the digestive and musculoskeletal systems through real and virtual dissections. Students analyse and evaluate various diets against the Australian Dietary Guidelines. They are encouraged to use information and communication technology to gather and interpret data, and communicate their findings in a variety of ways.

Unit content

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

Scientific Method

- research a given topic and construct questions for investigation
- design scientific investigations, including the formulation of investigable questions and/or hypotheses; materials required; selection and/or modification of a procedure to be followed to collect valid and reliable data; identification of safety and ethical considerations
- conduct risk assessments to identify potential hazards and prevent potential incidents and injuries
- use equipment and techniques safely, competently and methodically for the collection of valid and reliable data; use equipment with precision, accuracy and consistency
- represent qualitative and quantitative data in meaningful and useful ways, including the construction of appropriately labelled tables; process quantitative data using appropriate mathematical relationships and units; draw appropriate graphs
- analyse data to identify and describe trends, patterns and relationships, recognition of error and limitations in data
- draw conclusions consistent with the evidence and relevant to the question being investigated; identify further evidence that may be required
- evaluate the investigative procedure, including the relevance, accuracy, validity and reliability of data; 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

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, harmful and/or unintended consequences

Science Understanding

Introduction

- all living things carry out the life processes of respiration, feeding, excretion, movement, reproduction, responding to stimuli and growth
- the body has a hierarchical structural organisation of cells, tissues, organs and systems

Musculoskeletal system

- the support and movement of the body is facilitated by the five functions of the skeletal system (support, movement, protection, production of blood cells, storage of minerals) and the macroscopic structure of the long bone
- the location and structure of joints in the skeleton (fixed, slightly movable, freely movable) allow for a range of movement
- skeletal muscles work in groups around joints to bring about flexion and extension
- damage caused by many sporting injuries is due to movements beyond the capabilities of the musculoskeletal system
- treatment of sporting injuries can be by basic first aid and medication, or surgery

Digestive system

- nutrients (carbohydrates, proteins, lipids, vitamins, minerals and water) are compounds in foods essential to life and health that provide energy, the building blocks for repair and growth, and substances necessary to regulate chemical processes.
- the structures of the digestive system facilitate the breakdown of food to compounds that can be readily absorbed into the blood for use by cells
- mechanical digestion 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; enzymes have optimal pH and temperature ranges
- absorption from the small and large intestine involves the transport of materials (diffusion, osmosis and active transport) into the blood and lymph
- 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

Dietary decisions

- the *Australian Dietary Guidelines* and the *Australian Guide to Healthy Eating* provide advice for health and wellbeing
- food labels assist with informed food purchases, healthier eating choices and protect public health and safety
- dietary choices can be influenced by various factors including food intolerances, food allergies, health, ethical values and sociocultural factors

Unit 2: Reproductive choices

The focus for this unit is on the reproductive choices that people make for personal reproductive health and the delivery of a healthy baby.

Offspring show features of both parents which result from new chromosomal combinations. Reproductive systems are specialised to produce differentiated gametes and ensure the chances of successful fertilisation and implantation. The healthy development of the embryo and foetus can be monitored and options are available for the safe delivery of the baby. Lifestyle choices can impact an individual's sexual health and their fertility may require the use of reproductive technologies.

Students apply their knowledge to construct a DNA model and demonstrate cell division processes. They analyse and evaluate the various contraceptive methods, assisted reproductive technologies and delivery methods in terms of risks, effectiveness and personal circumstances. Students are encouraged to use information and communication technology to interpret data and communicate their findings in a variety of ways.

Unit content

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

Scientific Method

- research a given topic and construct questions for investigation
- design scientific investigations, including the formulation of investigable questions and/or hypotheses; materials required; selection and/or modification of a procedure to be followed to collect valid and reliable data; identification of safety and ethical considerations
- conduct risk assessments to identify potential hazards and prevent potential incidents and injuries
- use equipment and techniques safely, competently and methodically for the collection of valid and reliable data; use equipment with precision, accuracy and consistency
- represent qualitative and quantitative data in meaningful and useful ways, including the construction of appropriately labelled tables; process quantitative data using appropriate mathematical relationships and units; draw appropriate graphs
- analyse data to identify and describe trends, patterns and relationships, recognition of error and limitations in data
- draw conclusions consistent with the evidence and relevant to the question being investigated; identify further evidence that may be required
- evaluate the investigative procedure, including the relevance, accuracy, validity and reliability of data; 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

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, harmful and/or unintended consequences

Science understanding

Cell reproduction

- chromosomes are made up of large molecules of DNA found in the cell nucleus
- DNA has a double helix structure that is made up of nucleotides with complementary base pairing
- genes are units of inheritance and are responsible for carrying genetic information from one generation to the next
- mitosis produces diploid cells for the purpose of growth and repair and meiosis produces haploid cells for the purpose of gamete production (names and specific details of stages not required)

Reproductive systems

- the production and delivery of gametes is facilitated by the structures of the male and female reproductive systems; females have additional structures that support the development of the unborn baby
- the male reproductive hormones follicle stimulating hormone (FSH), luteinising hormone (LH) and testosterone have a role in the production and maturation of sperm
- the female reproductive hormones follicle stimulating hormone (FSH) and luteinising hormone (LH) have a role in the production, maturation and release of ova; oestrogen and progesterone have a role in preparing the uterus for implantation after fertilisation (detailed menstrual and ovarian cycle not required)
- sexually transmitted infections (STIs) can be prevented through safe sex methods and, if left untreated, can lead to serious health consequences

Pregnancy

- fertilisation combines the male and female gametes producing a zygote with genes from both parents and pregnancy will be established if implantation occurs
- embryonic and foetal development have a known and predictable sequence of events
- the placenta has an important role in the provision of nutrients to and removal of wastes from the developing baby
- the unborn baby can be monitored utilising a variety of techniques, including ultrasound and blood tests
- parental, embryonic and foetal testing can be done to detect a range of genetic and chromosomal abnormalities through the examination of karyotypes and DNA profiles
- maternal lifestyle choices, including the use of drugs, alcohol and smoking, will affect the developing baby and ongoing health of the child

- the sequence of events in the birth process prepare the baby and mother for delivery
- various methods of delivery of the baby are available

Reproductive technologies

- contraceptive methods or devices are used to prevent fertilisation or implantation
- there are a variety of infertility treatments which help overcome infertility problems; each has its limitations, risks and benefits

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 table below provides details of the assessment types and their weighting for the Human Biology General Year 11 syllabus.

Summative assessments in this course must:

- be limited in number to eight tasks
- allow for the assessment of each assessment type once for each unit
- 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 11

Type of assessment	Weighting
<p>Investigation (minimum of 10 hours in class per unit)</p> <p>One investigation should be conducted in each unit and each investigation should have equal weighting.</p> <p>An investigation follows the scientific method, where students select and/or modify one or more practical activities in order to investigate a specific question through the collection and analysis of primary data.</p> <p>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.</p> <p>Planning, safety and group contributions could be monitored via student logbooks/journals, responses to reflection questions, teacher observations and/or peer assessment.</p>	40%
<p>Project (minimum of 5 hours in class per unit)</p> <p>One project should be conducted in each unit and each project should have equal weighting.</p> <p>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.</p> <p>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>Practical assessment (maximum of 1 hour in class per unit)</p> <p>One practical assessment should be conducted in each unit and each practical assessment should have equal weighting.</p> <p>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.</p> <p>Students will demonstrate their ability to manipulate apparatus, take accurate readings and work safely.</p>	10%
<p>Supervised written assessment (maximum of 1 hour in class per unit)</p> <p>One supervised written assessment should be conducted in each unit and each supervised written assessment should have equal weighting.</p> <p>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.</p> <p>Items may include:</p> <ul style="list-style-type: none"> • Short answer questions requiring students to provide single word, sentence or short paragraph responses; construct, use, interpret or analyse secondary data, graphs, tables or diagrams; and/or perform mathematical calculations. • Extended answer questions 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. 	20%

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).

Reporting

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

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

The grade descriptions for the Human Biology General Year 11 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.

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 11*

A

Scientific Method

- Formulates questions and hypotheses that can be tested.
- Selects and/or modifies procedures to provide a clear and logical plan to collect valid and reliable data.
- Assesses risks to identify potential hazards and prevent potential incidents and injuries.
- Manages risk to ensure the safe use of equipment and techniques.
- Uses equipment and techniques with precision, accuracy and consistency to collect valid and reliable data.
- Organises data logically and presents it in a range of forms, including appropriate graphs and tables, to show patterns and relationships.
- Accurately solves calculations, showing working and expressing answers using correct units.
- Analyses experimental data to describe patterns and relationships and explains these using relevant scientific concepts.
- Uses evidence to make and justify conclusions that related to the question or hypothesis being tested.
- Evaluates the procedure, explaining the relevance, accuracy, validity and reliability of data; and suggests ways to improve the design of an investigation.
- Acts safely and works highly effectively in both individual and group contexts.
- Communicates information and concepts logically, using correct scientific language, conventions and representations.

Scientific Literacy

- Constructs clear and logical evidence-based arguments to evaluate impacts and claims.
- Identifies and explains issues and evaluates scientific impacts.

Science Understanding

- Accurately explains structures, systems and processes.
- Explains concepts using appropriate scientific language, conventions and representations.
- 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.

B

Scientific Method

- Formulates questions and hypotheses that can be tested.
- Selects and/or modifies procedures to provide a clear plan that lacks some detail, to collect valid and reliable data.
- Assesses risks to identify potential hazards and prevent potential incidents and injuries.
- Manages risk to ensure the safe use of equipment and techniques.
- Uses equipment and techniques 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.
- 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.
- Acts safely and works effectively in both individual and group contexts.
- Communicates information and concepts using scientific language, conventions and representations.

Scientific Literacy

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

Science Understanding

- Explains structures, systems and processes.
- 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.
- Selects and/or modifies procedures that can be followed to collect appropriate data.
- Manages risk to ensure the safe use of equipment and techniques.
- Uses equipment and techniques 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.
- Acts safely and works with a degree of effectiveness in both individual and group contexts.
- Communicates information and concepts using some scientific language and representations, makes some errors in the use of conventions.

Scientific Literacy

- Attempts to construct evidence-based arguments to evaluate 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.

D**Scientific Method**

- With support modifies a procedure to collect appropriate data.
- Follows directions for the safe use of equipment and techniques.
- When working without support, presents data that is unclear, insufficient and lacks appropriate processing.
- When working without support, calculations contain many errors or are not attempted.
- Incorrectly or overlooks patterns and relationships.
- Offers simple conclusions not supported by evidence.
- Identifies difficulties experienced in conducting an investigation.
- Acts safely most of the time.
- Works with limited effectiveness in individual and group contexts.
- Communicates information and concepts using everyday language and simple representations.

Scientific Literacy

- With support, including scaffolding, attempts to construct evidence-based arguments to evaluate impacts and claims.
- Identifies issues and scientific impacts.

Science Understanding

- Identifies structures, systems and processes.
- Describes concepts using everyday language and simple representations.
- Incorrectly or inconsistently applies scientific concepts and models to describe processes.

E

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

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



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

HUMAN BIOLOGY

GENERAL COURSE

Year 12 | Syllabus Review | Consultation Draft | September 2022

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 a draft for consultation and is not endorsed for use in schools.

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.

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Rationale

In the Human Biology General course, students learn about themselves, by relating the structure of the different body systems to their function and understanding the interdependence of these systems in maintaining life. They explore how personal decisions can affect their body's function and their quality of life, and how regular health checks can prevent or manage medical problems. Reproduction, growth and development of the unborn baby are studied to develop an understanding of the effects of lifestyle choices. 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. 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 aims

The Human Biology General course enables students to:

- demonstrate knowledge of the natural and technological world, using the scientific method for a variety of investigations
- understand that science is a human activity involving the application of to solve problems and make informed decisions that impact on themselves and society
- understand how the structure and function of the human body systems maintain a healthy body, support reproduction and provide defence against infectious disease.



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 – Preventing and managing medical problems

This unit explores circulatory, respiratory and urinary systems, and how they facilitate the exchange, transport and removal of materials for efficient body functioning. It also explores the importance of regular health checks to prevent or manage medical problems.

Unit 4 – Preventing and controlling infectious diseases

This unit explores the causes and spread of disease and how humans respond to invading pathogens. It also explores the importance of coordinated community and global responses for the prevention and control of infectious disease transmission.

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

The course content is divided into three content areas:

- Scientific Method
- Scientific Literacy
- 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 the procedures and findings, and communicating findings.

Scientific Literacy

Informed participation in society requires knowledge of relevant science concepts and skills, 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 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 context being studied.

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 skills and understandings that underpin the three content areas of the course: Scientific Method, 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 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 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 Human Biology 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 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 and Torres Strait Islander 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 Pacific 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.

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 the Scientific Method, 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).

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 any relevant state guidelines.

The Animal Welfare Act 2002 can be found at www.legislation.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.agric.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.

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 make 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 $<$, $>$, Δ , \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.

Unit 3: Preventing and managing medical problems

The focus of this unit is on personal health and explores the importance of regular health checks to prevent or manage medical problems.

The circulatory, respiratory and urinary systems facilitate the exchange, transport and removal of materials for efficient body functioning. Regular health checks can assess the risk of future medical issues and monitor current medical problems for the development of individual treatment plans in order to improve quality of life.

Students investigate blood pressure, heart rate, blood oxygen levels and lung capacity through practical activities. They explore the circulatory, respiratory and urinary systems through real and virtual dissections. Students analyse data from blood and urine samples to detect anomalies. They are encouraged to use information and communication technology to gather and interpret data, and communicate their findings in a variety of ways.

Unit content

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

Scientific Method

- identify a topic for investigation; research and construct questions for investigation
- design scientific investigations, including the formulation of investigable questions and/or hypotheses; materials required; procedure to be followed to collect valid and reliable data; identification of safety and ethical considerations
- conduct risk assessments to identify potential hazards and prevent potential incidents and injuries
- select appropriate equipment and techniques to safely, competently and methodically collect valid and reliable data; use equipment with precision, accuracy and consistency
- represent qualitative and quantitative data in meaningful and useful ways, including the construction of appropriately labelled tables; process quantitative data using appropriate mathematical relationships and units; draw appropriate graphs
- analyse data to identify and describe trends, patterns and relationships, including the use of appropriate mathematical techniques, recognition of error and limitations in data
- draw conclusions consistent with the evidence and relevant to the question being investigated; identify further evidence that may be required; recognise the limitations of conclusions
- evaluate the investigative procedure, including the relevance, accuracy, validity and reliability of data; 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

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, harmful and/or unintended consequences

Science Understanding

Circulatory system

- the transport of materials around the body is facilitated by the structures of the circulatory system
- the structure of the heart facilitates the efficient flow of blood around the body
- the blood vessels have specialised structures that enable efficient distribution of blood around the body
- the blood is made up of plasma, blood cells (red and white) and platelets, each with particular functions
- the function of the circulatory system can be compromised by cardiovascular diseases

Respiratory system

- exchange of gases between the external environment and the blood is facilitated by the structures of the respiratory system
- 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

Urinary system

- the removal of excess water, metabolic wastes and toxins from the blood is facilitated by the structures of the urinary system (details of filtration, reabsorption and secretion processes not required)
- dysfunction of the kidneys may result in serious illness due to accumulation of toxic substances in the blood

Health checks

- the purpose of regular health checks is to check for current or emerging medical concerns, assess the risk of future medical issues and prompt the maintenance of a healthy lifestyle
- undertaking regular health checks assists in the early detection of medical problems and increases the chances for effective treatment
- measuring blood pressure and heart rate and blood tests provide information about circulatory system health
- spirometry, pulse oximetry and the use of stethoscopes provide information about respiratory system health
- urinalysis is a set of screening tests that help diagnose conditions such as urinary tract infections, kidney disorders and diabetes
- diagnosis of a medical problem leads to the development of individual treatment plans

Unit 4: Preventing and controlling infectious diseases

The focus of this unit is on the immune system's response to infection and explores the importance of coordinated community and global responses for the prevention and control of infectious disease transmission.

Infectious diseases are caused by pathogens that are transmitted between individuals. The immune system coordinates different level of responses when encountering pathogens, and can be assisted with the use of medications and antimicrobials. There are many factors that contribute to the spread of infectious disease that need to be considered in order to predict, monitor and manage outbreaks.

Students investigate hygiene practices and disease transmission using practical activities or simulations. They explore the transmission of diseases using second-hand data from a historical perspective and recent epidemics and pandemics. They consider how data is used to inform decisions related to disease prevention and control. They are encouraged to use information and communication technology to gather and interpret data, and communicate their findings in a variety of ways.

Unit content

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

Scientific Method

- identify a topic for investigation; research and construct questions for investigation
- design scientific investigations, including the formulation of investigable questions and/or hypotheses; materials required; procedure to be followed to collect valid and reliable data; identification of safety and ethical considerations
- conduct risk assessments to identify potential hazards and prevent potential incidents and injuries
- select appropriate equipment and techniques to safely, competently and methodically collect valid and reliable data; use equipment with precision, accuracy and consistency
- represent qualitative and quantitative data in meaningful and useful ways, including the construction of appropriately labelled tables; process quantitative data using appropriate mathematical relationships and units; draw appropriate graphs
- analyse data to identify and describe trends, patterns and relationships, including the use of appropriate mathematical techniques, recognition of error and limitations in data
- draw conclusions consistent with the evidence and relevant to the question being investigated; identify further evidence that may be required; recognise the limitations of conclusions
- evaluate the investigative procedure, including the relevance, accuracy, validity and reliability of data; 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

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, harmful and/or unintended consequences

Science Understanding

Infectious disease

- infectious disease is caused by the invasion of a pathogen, including bacteria, viruses, fungi, protozoa and parasites
- transmission of a pathogen from one host to another occurs by various mechanisms, including direct and indirect contact

Immune system

- the first line of defence involves external non-specific biological, chemical and physical barriers to prevent the entry of pathogens
- the second line of defence involves phagocytic cells, including neutrophils and macrophages, and other non-specific responses, including inflammation and fever
- the third line of defence involves specific responses to antigens, including the production of antibodies and memory cells for short-term and long-term immunity (details of B and T cells are not required)
- passive and active immunity can be acquired through natural and artificial means
- antivirals and antibiotics can be used to reduce the rate or severity of infection

Community and global health

- a vaccine prepares the immune system to recognise and fight a pathogen it has not previously been exposed to
- national immunisation programs aim to develop herd immunity in communities
- an individual's decision to participate in immunisation programs can be influenced by the socio-cultural context in which it is considered
- hygiene practices, including social distancing, personal protective equipment (PPE), hand hygiene and the use of antiseptics, assist in limiting the transmission of disease
- contact tracing is a disease control strategy that involves identifying cases and their contacts to interrupt disease transmission
- quarantine separates and restricts the movement of people who may have been exposed to an infectious disease and isolation separates and restricts the movement of people with an infectious disease
- susceptibility of urban areas to epidemics and pandemics of infectious disease can be due to population density, variation in living conditions and healthcare provisions

- the reporting of notifiable diseases enables public health authorities to restrict outbreaks, prevent possible epidemics and inform public health policy
- the transmission and spread of infectious disease is facilitated by local, regional and global movement of individuals, and travel warnings provide information to help reduce risk of infection
- international cooperation and communication are needed to evaluate the risk of the spread of disease, including the emergence of new viral diseases

DRAFT

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 table below provides details of the assessment types and their weighting for the Human Biology 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 for each unit in the unit pair, except the Extended Investigation and Externally Set Task
- 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>Extended investigation (minimum of 15 hours in class over the year)</p> <p>One extended investigation should be conducted over the year.</p> <p>An investigation follows the scientific method, where students develop their own question to investigate through the collection and analysis of primary data.</p> <p>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.</p> <p>Planning, safety and group contributions could be monitored via student logbooks/journals, responses to reflection questions, teacher observations and/or peer assessment.</p>	25%
<p>Project (minimum of 5 hours in class per unit)</p> <p>One project should be conducted in each unit and each project should have equal weighting.</p> <p>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.</p> <p>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>Practical assessment (maximum of 1 hour in class per unit)</p> <p>One practical assessment should be conducted in each unit and each practical assessment should have equal weighting.</p> <p>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.</p> <p>Students will demonstrate their ability to manipulate apparatus, take accurate readings and work safely.</p>	10%
<p>Supervised written assessment (maximum of 1 hour in class per unit)</p> <p>One supervised written assessment should be conducted in each unit and each supervised written assessment should have equal weighting.</p> <p>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.</p> <p>Items may include:</p> <ul style="list-style-type: none"> • Short answer questions 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. • Extended answer questions 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. 	20%
<p>Externally Set Task (50 minutes in class)</p> <p>A written task or item or set of items developed by the School Curriculum and Standards Authority and administered by the school.</p> <p>The emphasis of this task will be on the Scientific Method and Scientific Literacy content, with Unit 3 Science Understanding content providing the context for questions.</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 Human Biology 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
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.

Reporting

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

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

The grade descriptions for the Human Biology 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.

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

Scientific Method

- Formulates questions and hypotheses that can be tested.
- Designs a clear and logical plan to collect valid and reliable data.
- Assesses risks to identify potential hazards and prevent potential incidents and injuries.
- Manages risk to ensure the safe use of equipment and techniques.
- Selects and uses equipment and techniques with precision, accuracy and consistency to collect valid and reliable data.
- Organises data logically and presents it in a range of forms, including appropriate graphs and tables, to show patterns and relationships.
- Accurately solves calculations, showing working and expressing answers using correct units.
- Analyses experimental data, including the identification errors and limitations in data, to describe trends, patterns and relationships and explains these using relevant scientific concepts.
- Uses evidence to make and justify conclusions that related to the question or hypothesis being tested, and recognises limitation of conclusions.
- Evaluates the procedure, explaining the relevance, accuracy, validity and reliability of data; and suggests ways to improve the design of an investigation.
- Acts safely and works highly effectively in both individual and group contexts.
- Communicates information and concepts logically, using correct scientific language, conventions and representations.

Scientific Literacy

- Constructs clear and logical evidence-based arguments to evaluate impacts and claims.
- Identifies and explains issues and evaluates scientific impacts.

Science Understanding

- Accurately explains structures, systems and processes.
- Explains concepts using appropriate scientific language, conventions and representations.
- 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.

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.
- Assesses risks to identify potential hazards and prevent potential incidents and injuries.
- Manages risk to ensure the safe use of equipment and techniques.
- Selects and uses equipment and techniques with precision, accuracy and consistency to collect data.
- Presents data in a range of forms, including appropriate graphs and tables, to show trends, 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.
- Acts safely and works effectively in both individual and group contexts.
- Communicates information and concepts using scientific language, conventions and representations.

Scientific Literacy

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

Science Understanding

- Explains structures, systems and processes.
- 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.
- Manages risk to ensure the safe use of equipment and techniques.
- Selects and uses equipment and techniques with some precision, accuracy and consistency to collect data.
- Presents data using basic tables and graphs to show trends, 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.
- Acts safely and works with a degree of effectiveness in both individual and group contexts.
- Communicates information and concepts using some scientific language and representations, makes some errors in the use of conventions.

Scientific Literacy

- Attempts to construct evidence-based arguments to evaluate 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.

D

Scientific Method

- With support modifies a procedure to collect appropriate data.
- Follows directions for the safe use of equipment and techniques.
- When working without support, presents data that is unclear, insufficient and lacks appropriate processing.
- When working without support, calculations contain many errors or are not attempted.
- Incorrectly or overlooks trends, patterns and relationships.
- Offers simple conclusions not supported by evidence.
- Identifies difficulties experienced in conducting an investigation.
- Acts safely most of the time
- Works with limited effectiveness in individual and group contexts.
- Communicates information and concepts using everyday language and simple representations.

Scientific Literacy

- With support, including scaffolding, attempts to construct evidence-based arguments to evaluate impacts and claims.
- Identifies issues and scientific impacts.

Science Understanding

- Identifies structures, systems and processes.
- Describes concepts using everyday language and simple representations.
- Incorrectly or inconsistently applies scientific concepts and models to describe processes.

E

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

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