

**Dare, Connect, Learn.**

William Ruthven

Pathways

2022

**VCE Course Selection**

**Handbook**

**Units 3 & 4**



**WILLIAM RUTHVEN  
SECONDARY COLLEGE**



## Principal's Message

To our current and future Senior School students;



It is with a sense of privilege that I welcome you to your senior years of secondary education. This is what you have been working towards and I look forward to continuing to support you on your individual journeys into your adult lives.

Please take the time to read through your options, speak with your teachers, the College career advisor and your families to choose a pathway that suits you. We are here to support you to make good, sustainable decisions so that you can experience success.

Whichever pathway you choose my advice is to always stay interested and motivated. You will learn a lot in your senior years of education, some of that will happen in the classroom but you will also learn a lot about who you are and the kind of adult you want to be. Know that we are always here to support you.

Andrew Elborough  
Principal

## Core Values



**Leadership:** Encouraging all students to see themselves as self-motivated, independent learners in all aspects of their lives. Encouraging all students to seek wonder and inquire into the world around them.



**Excellence:** All members of the college community pursue excellence and take responsibility for learning and achieving their full potential.



**Acceptance:** All members of the College community value diversity as a strength and cultivate an openness of mind. All members work collaboratively in teams and develop the skills to solve new problems. Acceptance also builds an encouraging a safe, orderly learning environment based around positive relationships.



**Respect:** All members of the College community cultivate mutual respect, responsibility, integrity and respect for learning.

## Key Contacts

**Brett Ormrod**

brett.ormrod@education.vic.gov.au

Senior School Leader



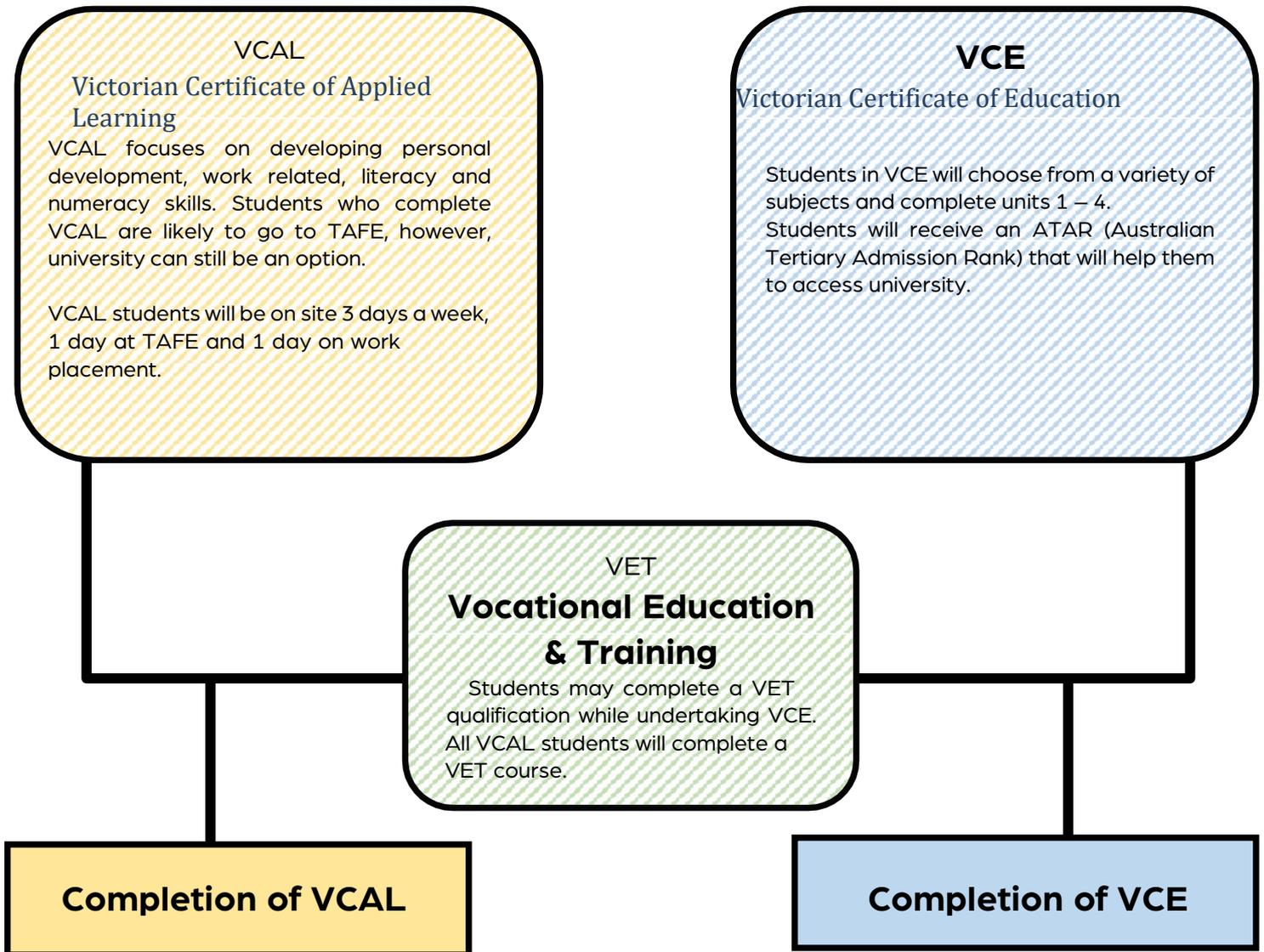
**Glenn Esnouf**

glenn.esnouf@education.vic.gov.au

Assistant Principal



# Dare, Connect, Learn.



**Employment/Traineeship/Apprenticeship**

**TAFE**  
Qualifications include; Certificate, Diploma, Advanced Diploma

**University**  
Please note that university is accessible to students who complete VCAL however, most courses require an ATAR score.

## Success in VCE

---

At William Ruthven Secondary College there are 2 main ways students usually achieve success;

Option A: Complete a Unit 1&2 subject in year 10, a Unit 3&4 subject in year 11 with 5 Unit 1&2 subjects, and finally complete 5 unit 3&4 subjects in year 12.

	Year 10	Year 11	Year 12
Unit 1&2	1 subject	5 subjects	
Unit 3&4		1 subject	5 subjects

Option B: Complete 6 Unit 1 & 2 subjects in year 11 and 5 or 6 Unit 1&2 subjects in year 12.

	Year 11	Year 12
Unit 1&2	6 subjects	
Unit 3&4		5 subjects

## Minimum Requirements

---

- 16 Units in total (4 x Unit 3&4 sequences)
- English or EAL Units 1 – 4

## Assessment

---

<b>SAC</b> School Assessed Coursework	<b>SAT</b> School Assessed Task	<b>GAT</b> General Achievement Test	<b>Exams</b>
All subjects will have SACs	Some subjects have SATs (usually in the form of a folio)	Units 3&4 only	Units 3&4 only
Assessed by the teacher		Assessed by VCAA Examiners	
These take place throughout the year and you will receive a calendar each term of your SAC dates.		Held in June	Held at the end of the year

**SAC/SAT Scores + Exam (and sometimes GAT) = ATAR**

## Vocational Education and Training (VET)

- VET can be done alongside VCE
- Usually a 2 year course that you begin in year 11
- At the end of the course you will have your VCE and also a nationally recognised vocational qualification

Where do I go for a VET course?

There are different places you can go for VET. Usually based at a TAFE. Northern College of the Arts and Technology (NCAT), Kangan Institute and Peter Lalor Vocational College are places students commonly go to for VET. There are many locations though.

When do I go?

Each year the VET Handbook publishes course, days and times. You will usually miss out on a half or whole day at school. This can be a challenge. It is up to you to catch up on any missed classwork to make sure you don't fall behind. Your classroom teacher will help you figure out a strategy to support you to not fall behind.

What are the benefits of completing a VET course?

- Can help prepare you for the workforce
- If you have a clear plan for what you would like to do in your career it is the starting point to achieving this
- **Some** VET courses can contribute to your ATAR

## Subject Selection & Prerequisite Subject

When choosing your subjects you need to think ahead. Have a look at websites to find out if there are any prerequisite subjects for the course you want to do when you finish school.

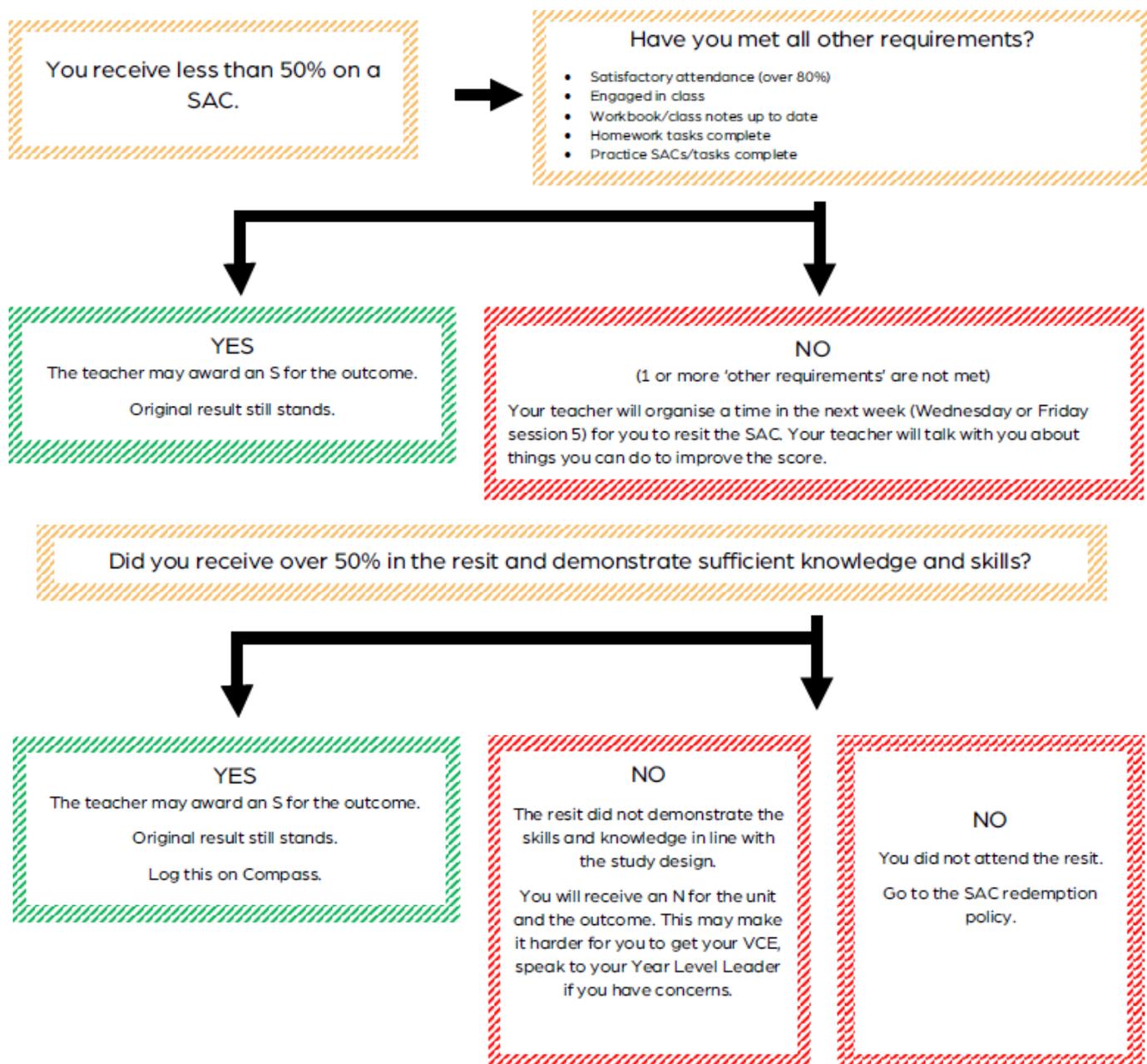
- All courses require that you do English, EAL or Literature.
- Some courses require a science and/or math subject.
- Some courses require a folio interview, if you are interested in a course that needs a folio you will need to do an arts subject.

**For information on entry into tertiary courses and prerequisites please go to the VTAC Website:**

**<https://www.vtac.edu.au/>**

# Dare, Connect, Learn.

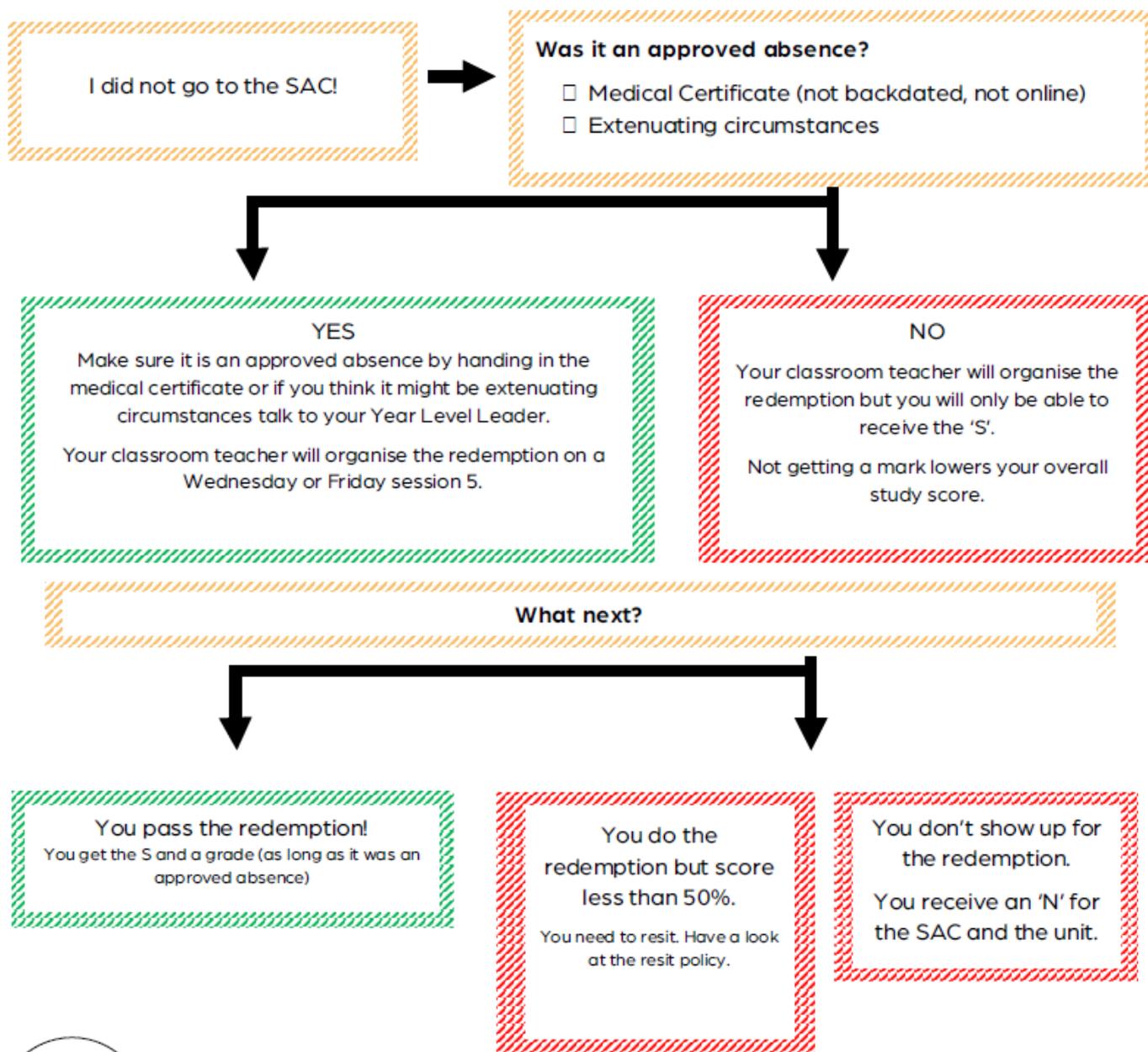
## Scoring below 50% on a SAC or SAT



Always have a conversation if you are concerned about your VCE and results. VCE can be stressful, speak to your teachers, Year Level Leader, Senior School Leader and wellbeing team about things we can do to support you through your VCE.

# Dare, Connect, Learn.

## Failure to attend a SAC or submit a SAT



If you are worried or feeling stressed organise a catch up with your Year Level Leader, Senior School Leader, classroom teacher, wellbeing staff or anyone you feel you can talk to about managing stress and coming up with a plan.

You are allowed 1 redemption per subject, per semester. If you need to have a second redemption we will have a meeting with your parents or carers before it is approved.

## Subjects offered in 2022

Please note that this is dependent on student enrolments. If a subject is not offered in 2022 that you would like to take part in you may still be able to enrol through Virtual Schools Victoria.

### Health & Physical Education

- Health & Human Development
- Outdoor & Environmental Studies
  - Units 1&2
- Physical Education

### Humanities

- History
  - Units 1&2 Twentieth Century

### Mathematics

- General Maths
- Further Maths
- Maths Methods

### Science

- Biology
- Chemistry
- Psychology
- Physics

### English

- English
- EAL

### Business & Economics

- Business Management
- Legal Studies

### Technologies

- Food Studies
  - Units 1&2
- Computing
  - Units 1&2 Applied Computing
  - Units 3&4 Software Development

### Visual Arts

- Studio Art
- Visual Communication & Design
  - Units 1&2

## Subject descriptions

---

The remainder of this booklet contains descriptions of the units, from which Year 12 students may select for 2022.

These descriptions outline the outcomes and assessments required to satisfy the Victorian Certificate of Education (VCE) as prescribed by the Victorian Curriculum and Assessment Authority (VCAA).

There is also an outline of the levels and assessments of the Victorian Certificate of Applied Learning (VCAL), which is also prescribed by the VCAA.

Please read the information carefully and ask for explanations where required.

There are no easy options in the year 12 program. At William Ruthven Secondary College, we strive to provide the best educational and vocational pathways for our students. We encourage all students to choose subjects that will help them to achieve their goals and of course we expect them to do their best.

Please contact the school if you would like any help with understanding the contents of this booklet.

## Victorian Certificate of Applied Learning

VCAL is a vocational option for year 12 students giving them practical work related experience, as well as developing literacy, numeracy and personal skills important for life and work.

VCAL is a recognised qualification and is suited to students interested in going on to training at TAFE, doing apprenticeships or getting a job or traineeship after completing school.

Most students going into Year 12 will be attempting the Senior Certificate.

However, the certificate level will be determined by their progress throughout the year.

Students must select units from the following strands:

- Literacy and Numeracy
- Industry Specific skills
- Work Related Skills
- Personal Development Skills

### Assessment

Students must provide evidence that learning outcomes have been met as outlined in the VCAL assessment guidelines.

VCAL gives students the opportunity to pursue a career in a "hands on" area and has the flexibility to enable them to tailor a course for their individual needs.



**LITERACY SKILLS**



**NUMERACY SKILLS**



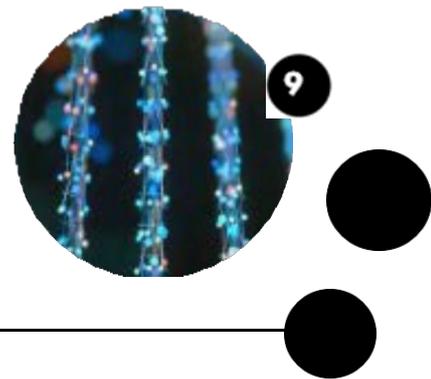
**WORK-RELATED SKILLS**



**INDUSTRY SPECIFIC SKILLS**



**PERSONAL DEVELOPMENT SKILLS**



## Biology

---

### UNIT 3: HOW DO CELLS MAINTAIN LIFE?

In this unit, students investigate the workings of the cell from several perspectives. They explore the importance of the insolubility of the plasma membrane in water and its differential permeability to specific solutes in defining the cell, its internal spaces and the control of the movement of molecules and ions in and out of such spaces. Students consider base pairing specificity, the binding of enzymes and substrates, the response of receptors to signalling molecules and reactions between antigens and antibodies to highlight the importance of molecular interactions based on the complementary nature of specific molecules. Students study the synthesis, structure and function of nucleic acids and proteins as key molecules in cellular processes. They explore the chemistry of cells by examining the nature of biochemical pathways, their components and energy transformations.

Outcome 1: On completion of this unit the student should be able to explain the dynamic nature of the cell in terms of key cellular processes including regulation, photosynthesis and cellular respiration, and analyse factors that affect the rate of biochemical reactions.

Outcome 2: On completion of this unit the students should be able to apply a stimulus-response model to explain how cells communicate with each other, outline human responses to invading pathogens, distinguish between the different ways that immunity may be acquired, and explain how malfunctions of the immune system cause disease.

### UNIT 4: HOW DOES LIFE CHANGE AND RESPOND TO CHALLENGES OVER TIME?

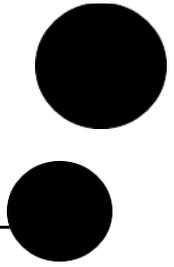
In this unit, students consider the continual change and challenges to which life on Earth has been subjected. They investigate the relatedness between species and the impact of various change events on a population's gene pool. The accumulation of changes over time is considered as a mechanism for biological evolution by natural selection that leads to the rise of new species. Students examine change in life forms using evidence from palaeontology, biogeography, developmental biology and structural morphology. They explore how technological developments in the fields of comparative genomics, molecular homology and bioinformatics have resulted in evidence of change through measurements of relatedness between species. Students examine the structural and cognitive trends in the human fossil record and the interrelationships between human biological and cultural evolution.

Outcome 1: On completion of this unit the student should be able to analyse evidence for evolutionary change, explain how relatedness between species is determined, and elaborate on the consequences of biological change in human evolution.

Outcome 2: On completion of this unit the student should be able to describe how tools and techniques can be used to manipulate DNA, explain how biological knowledge is applied to biotechnical applications, and analyse the interrelationship between scientific knowledge and its applications in society.



**Dare, Connect, Learn.**



# **Business Management**

## UNIT 3: MANAGING A BUSINESS

In this unit students explore the key processes and issues concerned with managing a business efficiently and effectively to achieve the business objectives. Students examine the different types of businesses and their respective objectives. They consider corporate culture, management styles, management skills and the relationship between each of these. Students investigate strategies to manage both staff and business operations to meet objectives.

Students develop an understanding of the complexity of managing businesses and through the use of contemporary business case studies compare perspectives with current practice.

Outcome 1: On completion of this unit the student should be able to discuss the key characteristics of businesses and stakeholders, and analyse the relationship between corporate culture, management styles and management skills.

Outcome 2: On completion of this unit the student should be able to explain theories of motivation and apply them to a range of contexts, and analyse and evaluate strategies related to the management of employees.

Outcome 3: On completion of this unit the student should be able to analyse the relationship between business objectives and operations management, and propose and evaluate strategies to improve the efficiency and effectiveness of business operations.

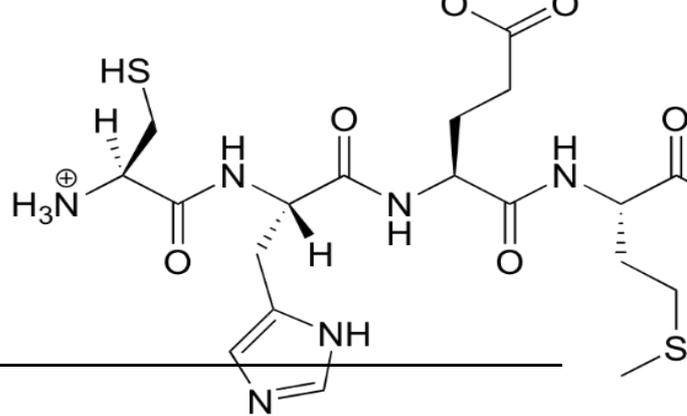
## UNIT 4: TRANSFORMING A BUSINESS

Businesses are under constant pressure to adapt and change to meet their objectives. In this unit students consider the importance of reviewing key performance indicators to determine current performance and the strategic management necessary to position a business for the future. Students study a theoretical model to undertake change, and consider a variety of strategies to manage change in the most efficient and effective way to improve business performance. They investigate the importance of leadership in change management.

Outcome 1: On completion of this unit the student should be able to explain the way business change may come about, use key performance indicators to analyse the performance of a business, discuss the driving and restraining forces for change and evaluate management strategies to position a business for the future.

Outcome 2: On completion of this unit the student should be able to evaluate the effectiveness of a variety of strategies used by managers to implement change and discuss the effect of change on the stakeholders of a business.





## Chemistry

### UNIT 3: HOW CAN CHEMICAL PROCESSES BE DESIGNED TO OPTIMISE EFFICIENCY?

In this unit students explore energy options and the chemical production of materials with reference to efficiencies, renewability and the minimisation of their impact on the environment. Students compare and evaluate different chemical energy resources, including fossil fuels, biofuels, galvanic cells and fuel cells. They investigate the combustion of fuels and the use of stoichiometry to calculate the amounts of reactants involved in the reactions. Students consider the purpose, design and operating principles of galvanic cells, fuel cells and electrolytic cells. In this context they use the electrochemical series to predict and write half and overall redox equations, and apply Faraday's laws to calculate quantities in electrolytic reactions. Students analyse manufacturing processes with reference to factors that influence their reaction rates and extent. They investigate and apply the equilibrium law and Le Chatelier's principle to different reaction systems, including to predict and explain the conditions that will improve the efficiency and percentage yield of chemical processes.

**Outcome 1:** On completion of this unit the student should be able to compare fuels quantitatively with reference to combustion products and energy outputs, apply knowledge of the electrochemical series to design, construct and test galvanic cells, and evaluate energy resources based on energy efficiency, renewability and environmental impact.

**Outcome 2:** On completion of this unit the student should be able to apply rate and equilibrium principles to predict how the rate and extent of reactions can be optimised, and explain how electrolysis is involved in the production of chemicals and in the recharging of batteries.

### UNIT 4: HOW ARE ORGANIC COMPOUNDS CATEGORISED, ANALYSED AND USED?

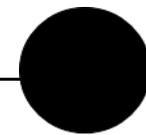
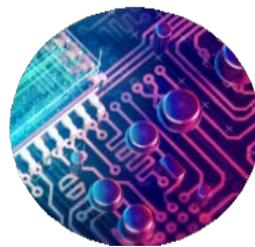
In this unit students investigate the structural features, bonding, typical reactions and uses of the major families of organic compounds. Students study the ways in which organic structures are represented and named. They process data from instrumental analyses of organic compounds to confirm. Students consider the nature of the reactions involved to predict the products of reaction pathways and to design pathways to produce particular compounds from given starting materials. Students investigate key food molecules through an exploration of their chemical structures, the hydrolytic reactions in which they are broken down and the condensation reactions in which they are rebuilt to form new molecules. In this context the role of enzymes and coenzymes in facilitating chemical reactions is explored.

**Outcome 1:** On completion of this unit the student should be able to compare the general structures and reactions of the major organic families of compounds, deduce structures of organic compounds and design reaction pathways for the synthesis of organic molecules.

**Outcome 2:** On completion of this unit the student should be able to distinguish between the chemical structures of key food molecules, analyse the chemical reactions involved in the metabolism of the major components of food and calculate the energy content of food using calorimetry.

**Outcome 3:** On the completion of this unit the student should be able to design and undertake a practical investigation related to energy and/or food, and present methodologies, findings and conclusions in a scientific poster.





## Computing

---

### UNIT 3: INFORMATICS

In Informatics Units 3 and 4 students focus on data, information and information systems. In Unit 3 students consider data and how it is acquired, managed, manipulated and interpreted to meet a range of needs.

#### Outcomes:

Organisations and data management: students investigate the way organisations acquire data using interactive online solutions, such as websites and applications (apps), and consider how users interact with these solutions when conducting online transactions. They examine how relational database management systems (RDBMS) store and manipulate data typically acquired this way. Students use software to create user flow diagrams that depict how users interact with online solutions, and acquire and apply knowledge and skills in the use of an RDBMS to create a solution. Students develop an understanding of the power and risks of using complex data as a basis for decision making.

Data analytics: drawing conclusions: students complete the first part of a project. They frame a hypothesis and then select, acquire and organise data from multiple data sets to confirm or refute this hypothesis. This data is manipulated using tools such as spreadsheets or databases to help analyse and interpret it so that students can form a conclusion regarding their hypothesis. Students take an organised approach to problem solving by preparing project plans and monitoring the progress of the project. The second part of the project is completed in Unit 4.

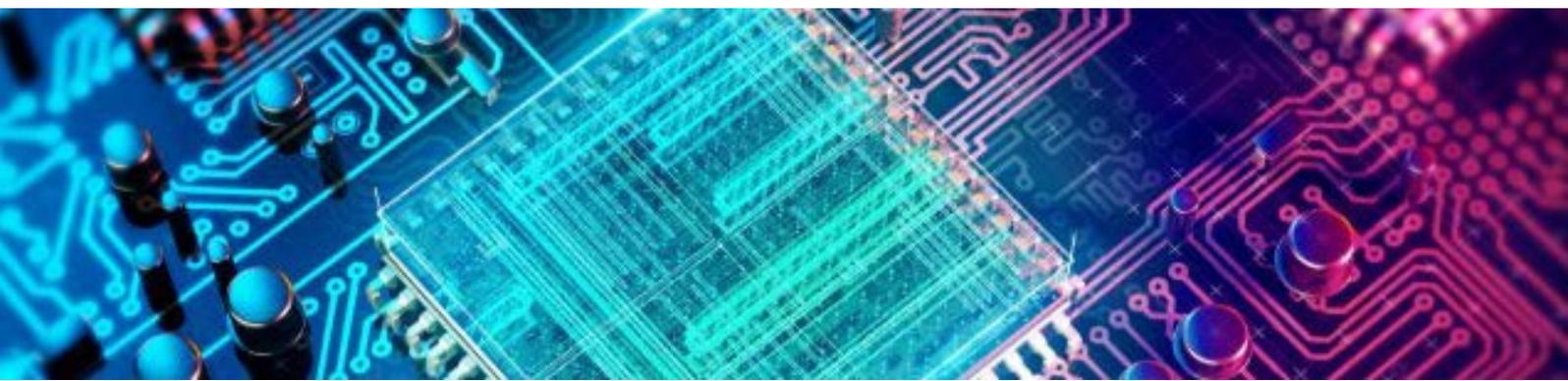
### UNIT 4: INFORMATICS

In this unit students focus on strategies and techniques for manipulating, managing and securing data and information to meet a range of needs.

#### Outcomes:

Data analytics: presenting the findings: students draw on the analysis and conclusion of their hypothesis determined in Unit 3, Outcome 2, and then design, develop and evaluate a multimodal, online solution that effectively communicates the conclusion and findings. The evaluation focuses on the effectiveness of the solution in communicating the conclusion and the reasonableness of the findings. Students use their project plan to monitor their progress and assess the effectiveness of their plan and adjustments in managing the project.

Information management: students explore how different organisations manage the storage and disposal of data and information to minimise threats to the integrity and security of data and information and to optimise the handling of information.





## English/EAL

---

Unit 3: Students focus on understanding the ways in which authors construct meaning with particular attention to the features of texts such as the structure, conventions and language. Students explore the underlying concepts of texts and develop an interpretation. Students also analyse and compare in writing the language and argument used in persuasive texts on current issues.

### ASSESSMENT:

An analytical response to a set text

A creative response to a set text

An analysis and comparison of the use of argument and persuasive language in texts

### Unit 4

Students study texts comparatively with a focus on the ways that ideas, issues and themes are handled in each. Consideration of the ways that text features impact on meaning leads students to produce a written comparison of two texts. Students will also deliver a sustained and reasoned point of view on a current issue and provide a written statement of intent articulating decisions made.

### ASSESSMENT:

A detailed comparison of two texts

An oral presentation on an issue accompanied by a written statement of intention

### ENGLISH AS AN ADDITIONAL LANGUAGE

Unit 3: This unit focuses on reading and creating a sustained interpretation of a selected text. In addition, students analyse and compare the ways in which language is used to persuade in texts that present a point of view on a current issue. Students will also develop their listening skills by completing aural tasks.

### ASSESSMENT:

An analytical interpretation of a set text

Short answer responses and note form summaries of persuasive texts and a written analysis and comparison of argument and the use of persuasive language in texts

Listening tasks

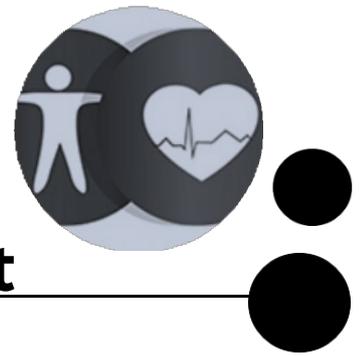
Unit 4: Students compare ideas, issues and themes in two selected texts in order to deepen their understanding of key themes, issues and ideas. Students will craft a persuasive oral presentation with the intent of positioning an audience to share a point of view.

### ASSESSMENT:

A detailed comparison of two texts

An oral presentation on an issue accompanied by a written statement of intention.





## Health and Human Development

### Unit 3: Australia's health in a globalised world

This unit looks at health, wellbeing and illness as multidimensional, dynamic and subject to different interpretations and contexts. Students begin to explore health and wellbeing as a global concept and to take a broader approach to inquiry. As they consider the benefits of optimal health and wellbeing and its importance as an individual and a collective resource, their thinking extends to health as a universal right. Students look at the fundamental conditions required for health improvement, as stated by the World Health Organization (WHO). They use this knowledge as background to their analysis and evaluation of variations in the health status of Australians. Students look at various public health approaches and the interdependence of different models as they research health improvements and evaluate successful programs. While the emphasis is on the Australian health system, the progression of change in public health approaches should be seen within a global context.

Outcome 1: On completion of this unit the student should be able to explain the complex, dynamic and global nature of health and wellbeing, interpret and apply Australia's health status data and analyse variations in health status.

Outcome 2: On completion of this unit the student should be able to explain changes to public health approaches, analyse improvements in population health over time and evaluate health promotion strategies.

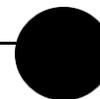
### Unit 4: Health and human development in a global context

This unit examines health and wellbeing, and human development in a global context. Students use data to investigate health status and burden of disease in different countries, exploring factors that contribute to health inequalities between and within countries, including the physical, social and economic conditions in which people live. Students build their understanding of health in a global context through examining changes in burden of disease over time and studying the key concepts of sustainability and human development. They consider the health implications of increased globalisation and worldwide trends relating to climate change, digital technologies, world trade and the mass movement of people. Students also investigate the role of non-government organisations and Australia's overseas aid program. Students evaluate the effectiveness of health initiatives and programs in a global context and reflect on their capacity to take action.

Outcome 1: On completion of this unit the student should be able to analyse similarities and differences in health status and burden of disease globally and the factors that contribute to differences in health and wellbeing.

Outcome 2: On completion of this unit the student should be able to analyse relationships between the SDGs and their role in the promotion of health and human development, and evaluate the effectiveness of global aid programs.





## Legal Studies

---

### Unit 3: Rights and justice

The Victorian justice system, which includes the criminal and civil justice systems, aims to protect the rights of individuals and uphold the principles of justice: fairness, equality and access. In this unit students examine the methods and institutions in the justice system and consider their appropriateness in determining criminal cases and resolving civil disputes. Students consider the Magistrates' Court, County Court and Supreme Court within the Victorian court hierarchy, as well as other Victorian legal institutions and bodies available to assist with cases. Students explore matters such as the rights available to an accused and to victims in the criminal justice system, the roles of the judge, jury, legal practitioners and the parties, and the ability of sanctions and remedies to achieve their purposes. Students investigate the extent to which the principles of justice are upheld in the justice system.

Outcome 1: On completion of this unit the student should be able to explain the rights of the accused and of victims in the criminal justice system, discuss the means used to determine criminal cases and evaluate the ability of the criminal justice system to achieve the principles of justice.

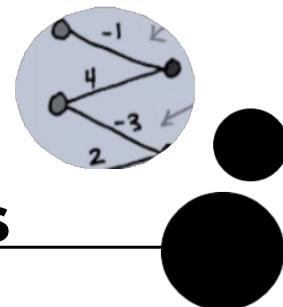
Outcome 2: On completion of this unit the student should be able to analyse the factors to consider when initiating a civil claim, discuss the institutions and methods used to resolve civil disputes and evaluate the ability of the civil justice system to achieve the principles of justice.

### Unit 4: The people and the law

The study of Australia's laws and legal system involves an understanding of institutions that make and reform our laws, and the relationship between the Australian people, the Australian Constitution and law-making bodies. In this unit, students explore how the Australian Constitution establishes the law-making powers of the Commonwealth and state parliaments, and protects the Australian people through structures that act as a check on parliament in law-making. Students develop an understanding of the significance of the High Court in protecting and interpreting the Australian Constitution. They investigate parliament and the courts, and the relationship between the two in law-making, and consider the roles of the individual, the media and law reform bodies in influencing law reform.

Outcome 1: On completion of this unit the student should be able to discuss the significance of High Court cases involving the interpretation of the Australian Constitution and evaluate





## Mathematics: Further Mathematics

UNITS 3 & 4

Assessment – Unit 3

School assessed coursework will contribute 20% of the final assessment.

Assessment – Unit 4

School assessed coursework will contribute 14% of the final assessment.

Unit 3 and 4 will also be assessed by two end-of-year examinations, which will contribute

Data analysis

Investigating data distributions

Investigating associations between two variables Investigating and modelling linear

associations Investigating and modelling time series data

Recursion and financial modelling

Depreciation of assets

Compound interest investment and loans Reducing balance loans

Annuities and perpetuities

Compound interest investment with periodic and equal additions to the principal

Any 2 MODULES from 4 MODULES

Matrices

Matrices and their applications Transition matrices

Networks and decision mathematics

Graphs and networks

Exploring and travelling problems

Trees and minimum connector problems Flow problems

Shortest path problems Matching problems

The scheduling problem and critical path analysis

Geometry and measurement

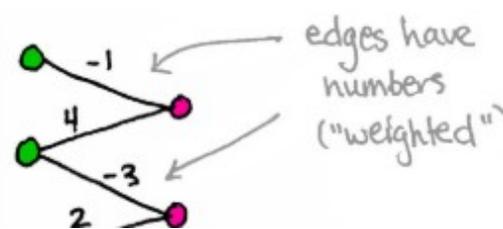
Measurement and trigonometry Spherical geometry

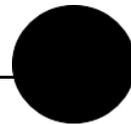
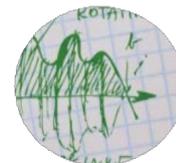
Graphs and relations

Construction and interpretation of graphs Linear programming

M has **three rows** & **two columns** and corresponds to this weighted bipartite graph:

$$M = \begin{bmatrix} -1 & 0 \\ 4 & -3 \end{bmatrix} = \begin{bmatrix} -1 & 0 \\ 4 & -3 \end{bmatrix}$$





## Mathematics: Mathematical Methods

Areas of study

### 1 FUNCTIONS AND GRAPHS

Functions and transformations

### 2 ALGEBRA

Polynomials

Properties of functions

Equations

### 3 CALCULUS

Differentiation

Applications of differentiation

Integration

### 4 STATISTICS AND PROBABILITY

Discrete random variables

Continuous random variables

Statistical inference

Throughout the course, students will be expected to use graphical calculators, spreadsheets or statistical software.

Outcomes

Students must demonstrate that they have fulfilled the requirements leading to achievement of three specified learning outcomes by satisfactorily attempting the school- assessed application task and the two tests.

The application task will involve a problem-solving investigation involving functions and calculus.

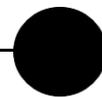
The two tests will consist of a combination of multiple-choice, short answer and extended responses.

Apply mathematical processes, with an emphasis on general cases, in non-routine contexts, and analyse and discuss these applications of mathematics.





## Mathematics: Specialist Mathematics



### 1 FUNCTIONS AND GRAPHS

### 2 ALGEBRA

Rational functions Complex numbers

### 3 CALCULUS

Differential and integral calculus Differential equations Kinematics: rectilinear motion

### 4 VECTORS

Vectors

Vector calculus

### 5 MECHANICS

### 6 PROBABILITY AND STATISTICS

Linear combinations of random variables Sample means

Confidence intervals for means

Hypothesis testing for a population mean with a sample drawn from a normal distribution of known variance or for a large sample

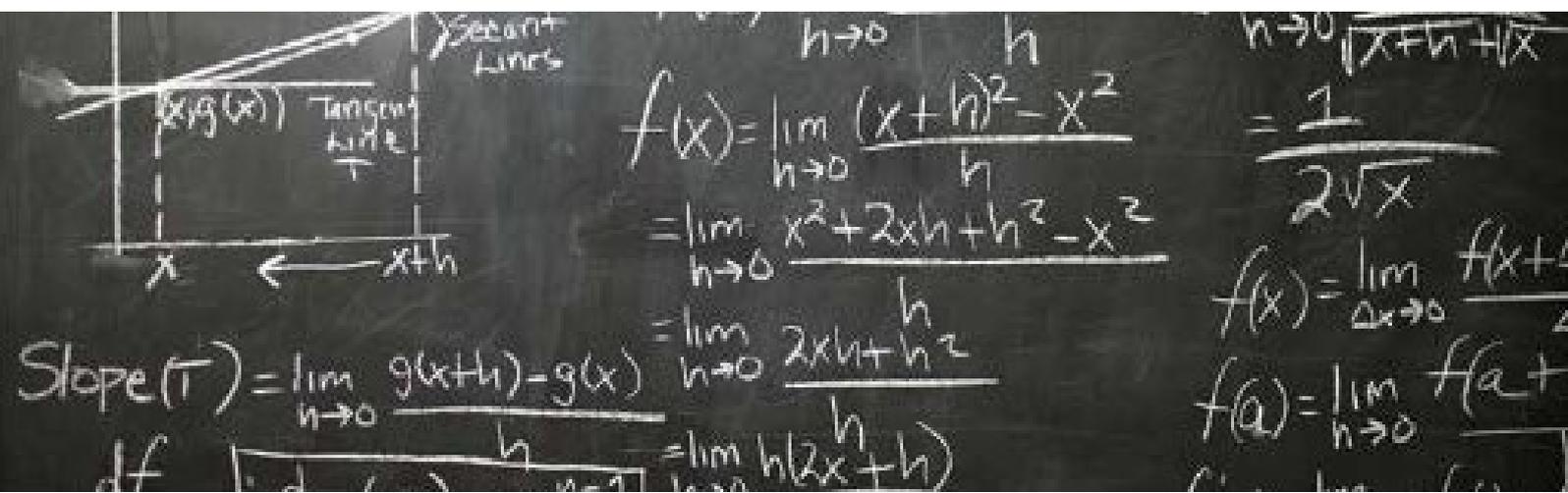
### Outcomes

Students must demonstrate that they have fulfilled the requirements leading to achievement of three specified learning outcomes by satisfactorily attempting the school-assessed application task and the two tests.

The application task will involve a problem-solving investigation involving functions and calculus.

The two tests will consist of a combination of multiple-choice, short answer and extended responses.

Apply mathematical processes, with an emphasis on general cases, in non-routine contexts, and analyse and discuss these applications of mathematics





## Physical Education

### Unit 3: Movement skills and energy for physical activity

This unit introduces students to the biomechanical and skill acquisition principles used to analyse human movement skills and energy production from a physiological perspective. Students use a variety of tools and techniques to analyse movement skills and apply biomechanical and skill acquisition principles to improve and refine movement in physical activity, sport and exercise. They use practical activities to demonstrate how correct application of these principles can lead to improved performance in physical activity and sport. Students investigate the relative contribution and interplay of the three energy systems to performance in physical activity, sport and exercise.

#### Area of Study 1: How are movement skills improved?

Outcome 1: On completion of this unit the student should be able to collect and analyse information from, and participate in, a variety of physical activities to develop and refine movement skills from a coaching perspective.

#### Area of Study 2: How does the body produce energy?

Outcome 2: On completion of this unit the student should be able to use data collected in practical activities to analyse how the major body and energy systems work together to enable movements to occur, and explain the factors causing fatigue and suitable recovery strategies.

### Unit 4: Training to improve performance

In this unit students analyse movement skills from a physiological, psychological and sociocultural perspective, and apply relevant training principles and methods to improve performance within physical activity at an individual, club and elite level. Improvements in performance, in particular fitness, depend on the ability of the individual and/ or coach to gain, apply and evaluate knowledge and understanding of training. Students analyse skill frequencies, movement patterns, heart rates and work to rest ratios to determine the requirements of an activity. Students consider the physiological, psychological and sociological requirements of training to design and evaluate an effective training program. Students participate in a variety of training sessions designed to improve or maintain fitness and evaluate the effectiveness of different training methods.

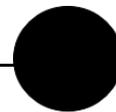
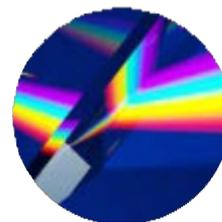
#### Area of Study 1: What are the foundations of an effective training program?

Outcome 1: On completion of this unit the student should be able to analyse data from an activity analysis and fitness tests to determine and assess the fitness components and energy system requirements of the activity.

#### Area of Study 2: How is training implemented effectively to improve fitness?

Outcome 2: On completion of this unit the student should be able to participate in a variety of training methods, and design and evaluate training programs to enhance specific fitness components.





## Physics

---

### UNIT 3: HOW DO FIELDS EXPLAIN MOTION AND ELECTRICITY?

In this unit students explore the importance of energy in explaining and describing the physical world. They examine the production of electricity and its delivery to homes. Students consider the field model as a construct that has enabled an understanding of why objects move when they are not apparently in contact with other objects. Applications of concepts related to fields include the transmission of electricity over large distances and the design and operation of particle accelerators. They explore the interactions, effects and applications of gravitational, electric and magnetic fields. Students use Newton's laws to investigate motion in one and two dimensions, and are introduced to Einstein's theories to explain the motion of very fast objects.

Outcome 1: On completion of this unit the student should be able to analyse gravitational, electric and magnetic fields, and use these to explain the operation of motors and particle accelerators and the orbits of satellites.

Outcome 2: On completion of this unit the student should be able to analyse and evaluate an electricity generation and distribution system.

Outcome 3: On completion of this unit the student should be able to investigate motion and related energy transformations experimentally, analyse motion using Newton's laws of motion and explain the motion of objects moving.

### UNIT 4: HOW CAN TWO CONTRADICTIONARY MODELS EXPLAIN BOTH LIGHT AND MATTER?

A complex interplay exists between theory and experiment in generating models to explain natural phenomena including light. Wave theory has classically been used to explain phenomena related to light; however, continued exploration of light and matter has revealed the particle-like properties of light. On very small scales, light and matter – which initially seem to be quite different – have been observed as having similar properties. In this unit, students explore the use of wave and particle theories to model the properties of light and matter. They examine how the concept of the wave is used to explain the nature of light and explore its limitations in describing light behaviour.

Outcome 1: On completion of this unit the student should be able to apply wave concepts to analyse, interpret and explain the behaviour of light.

Outcome 2: On completion of this unit the student should be able to provide evidence for the nature of light and matter, and analyse the data from experiments that supports this evidence.

Outcome 3: On completion of this unit the student should be able to design and undertake a practical investigation related to waves or fields or motion, and present methodologies, findings and conclusions in a scientific poster.





## Psychology

---

### UNIT 3: HOW DOES EXPERIENCE AFFECT BEHAVIOUR AND MENTAL PROCESSES?

The nervous system influences behaviour and the way people experience the world. In this unit students examine both macro-level and micro-level functioning of the nervous system to explain how the human nervous system enables a person to interact with the world around them. They explore how stress may affect a person's psychological functioning and consider the causes and management of stress. Students investigate how mechanisms of memory and learning lead to the acquisition of knowledge, the development of new capacities and changed behaviours. They consider the limitations and fallibility of memory and how memory can be improved.

Outcome 1: On completion of this unit the student should be able to explain how the structure and function of the human nervous system enables a person to interact with the external world.

Outcome 2: On completion of this unit the student should be able to apply biological and psychological explanations for how new information can be learnt and stored in memory.

### UNIT 4: HOW IS WELLBEING DEVELOPED AND MAINTAINED?

Consciousness and mental health are two of many psychological constructs that can be explored by studying the relationship between the mind, brain and behaviour. In this unit students examine the nature of consciousness and how changes in levels of consciousness can affect mental processes and behaviour. They consider the role of sleep and the impact that sleep disturbances may have on a person's functioning. Students explore the concept of a mental health continuum and apply a biopsychosocial approach, as a scientific model, to analyse mental health and disorder. They use specific phobia to illustrate how the development and management of a mental disorder can be considered as an interaction between biological, psychological and social factors.

Outcome 1: On completion of this unit the student should be able to explain consciousness as a continuum, compare theories about the purpose and nature of sleep, and elaborate on the effects of sleep disruption on a person's functioning.

Outcome 2: On completion of this unit the student should be able to explain the concepts of mental health and mental illness including influences of risk and protective factors, apply a biopsychosocial approach to explain the development and management of specific phobia, and explain the psychological basis of strategies that contribute to mental wellbeing.

Outcome 3: On completion of this unit the student should be able to design and undertake a practical investigation related to mental processes and psychological functioning, and present methodologies, findings and conclusions in a scientific poster.





## Studio Art

---

VCE Studio Arts introduces students to the role and practices of artists in society. Students develop an understanding of the way artists work in a range of cultures and periods of time, the artists' perceptions, beliefs and actions and their relationship with the viewer. Students examine how artists develop their practice and have used materials, techniques and processes to create aesthetic qualities in artworks. They study how artists have developed style and explored their cultural identity in their artwork. Students use this knowledge to inform their own studio practice and to support art making.

### Unit 3

In this unit students focus on the implementation of developmental folio work, leading to the production of a range of potential directions for finished artwork. Students develop and write an exploration proposal to define an area of creative exploration.

Area of Study 1-

Exploration proposal Area

of Study 2-Studio process

Area of Study 3-Artists and studio practices

### Unit 4

In this unit students focus on the planning, production and evaluation required to develop, refine and present artworks that link cohesively according to the ideas resolved in Unit 3. To support the creation of artworks, students present visual and written evaluation that explains why they selected a range of potential directions from Unit 3 to produce at least two finished artworks in Unit 4.

