

# SACE Science 2019 Index



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## Subject Code Information:

**Subjects with an A or B in their name:** these subjects are Semester long units that can be studied individually or together to make a full year subject. There is **no** assumption that A has been studied before students can undertake the B option. Some subjects highly recommend both are studied (see course descriptions).

**Subjects with a 1 or a 2 in their name:** these subjects are sequential. Before students can study the 2<sup>nd</sup> option they must undertake the 1<sup>st</sup> option. There **is** an assumption that students know the content of the 1<sup>st</sup> option before they undertake the 2<sup>nd</sup> to enable them to be successful.

**Length:** Semester 1 (10 Credits)  
Semester 2 (10 Credits)

**Assumed knowledge:**

Successful completion of year 10 Science.

**Description:**

In Stage 1 Agriculture, students explore the scientific principles of plant and animal production. They will analyse 'Best Practice' in agricultural enterprises, the role of technology, and the issues around long term sustainability of our natural resources and food production systems. There will be a specific focus on agricultural industries and opportunities in the Riverland region. As Horticultural production is a major driver of the local economy, emphasis will be placed on industries such as almond, grape/wine, citrus and stonefruit, with consideration from growing to marketing the final product.

**Assessment Details**

In Stage 1 Agriculture, students will need to provide evidence of their learning with 4 or 5 assessments each semester. Each assessment will have a weighting of at least 20%. Assessments will include at least one practical investigation and report, at least one assessment with a focus on Science as human endeavour and at least 1 applications task, where students apply their theoretical knowledge to 'real world' situations.

**Future Pathways**

Stage 2 Agriculture

Cert III in Horticultural Production

Cert III in Conservation and Land Management

## Biology A

## Stage 1

**Length:** 1 Semester

**Assumed knowledge:**

Year 10 Science

**Description:**

This course will include a choice of the following topics:

- Topic 1: Cells and Microorganisms

In this topic, students examine the development of the cell theory, the exchange of materials, and processes required for cell survival.

- Topic 4: Biodiversity and Ecosystem Dynamics

In this topic, students investigate diverse ecosystems, exploring the range of biotic and abiotic components to understand the dynamics, diversity, and underlying unity of these systems.

**Assessment Details:**

ASSESSMENT TYPE	WEIGHTING	EXAMPLES
INVESTIGATIONS FOLIO	50%	Design & Completion Practicals Investigation on Science as a Human Endeavour (SHE task)
SKILLS & APPLICATIONS TASKS	50%	Tests Collaborative Studies

**Future:**

Provides background for (but are not *necessary* for) students who intend to study Stage 2 Biology.

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## Biology B

## Stage 1

**Length:** 1 Semester

**Assumed knowledge:**

10 Science Studies (General is accepted however Studies preferred).

**Description:**

This course will include a choice of the following topics:

- Topic 3: Multicellular Organisms

In this topic, students examine the structure and function of various multicellular organisms, which could include the investigation of human, other animal, and/or plant systems.

- Topic 2: Infectious Disease

In this topic, students examine the various agents that can cause infectious diseases, including viral, bacterial, and other parasitic pathogens.

**Assessment Details:**

ASSESSMENT TYPE	WEIGHTING	EXAMPLES
INVESTIGATIONS FOLIO	50%	Design & Completion Practicals Investigation on Science as a Human Endeavour (SHE task)
SKILLS & APPLICATIONS TASKS	50%	Tests Collaborative Studies

**Future:**

Provides background for (but are not *necessary* for) students who intend to study Stage 2 Biology.

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**Length:** 1 Semester – 10 Credits

**Assumed Knowledge:**

Year 10 Science

**Description:**

Students who wish to go on to study Stage 2 Chemistry must choose **both** Stage 1 Chemistry 1 and 2. Chemistry helps people to develop an understanding of the processes that determine the behaviour of matter from the small (atoms, molecules, and ions) to larger quantities. Chemistry is a subject for students who are interested in natural and processed materials, and the ways in which people obtain, manufacture, and use materials in their everyday lives.

This course includes the following topics:

- Topic 1: Materials and their Atoms
- Topic 2: Combinations of Atoms
- Topic 3: Molecules

**Assessment Details:**

ASSESSMENT TYPE	WEIGHTING	EXAMPLES
INVESTIGATIONS FOLIO	40%	Design & Completion Practicals Investigation on Science as a Human Endeavour
SKILLS & APPLICATIONS TASKS	60%	Assignments & Tests

**Future:**

Provides necessary background for students who intend to study Stage 2 Chemistry which then opens a pathway to a number of university courses and associated careers in areas such as: Biotechnology, Engineering, Environmental Studies, Medicine, Nursing, Science, Soil Science.

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**Length:** 1 Semester – 10 Credits

**Assumed Knowledge:**

Year 10 Science

**Description:**

Students who wish to go on to study Stage 2 Chemistry must choose **both** Stage 1 Chemistry 1 and 2. Chemistry helps people to develop an understanding of the processes that determine the behaviour of matter from the small (atoms, molecules, and ions) to larger quantities. Chemistry is a subject for students who are interested in natural and processed materials, and the ways in which people obtain, manufacture, and use materials in their everyday lives.

This course includes the following topics:

- Topic 4: Mixtures and Solutions
- Topic 5: Acid and Bases
- Topic 6: Redox Reactions

**Assessment Details:**

ASSESSMENT TYPE	WEIGHTING	EXAMPLES
INVESTIGATIONS FOLIO	40%	Design & Completion Practicals Investigation on Science as a Human Endeavour
SKILLS & APPLICATIONS TASKS	60%	Assignments & Tests

**Future:**

Provides necessary background for students who intend to study Stage 2 Chemistry which then opens a pathway to a number of university courses and associated careers in areas such as: Biotechnology, Engineering, Environmental Studies, Medicine, Nursing, Science, Soil Science.

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**Length:** 2 semesters (20 credits)

**Note:** Stage 1 Students will study the Stage 2 Nutrition Course. This is a 20 credit, 2 semester unit. It will be offered to students every two years so that they may study it at Stage 1 or at Stage 2. It will next be offered in 2020.

**Assumed knowledge:**

Year 10 Science

**Description:**

Students investigate up-to-date scientific information on the role of nutrients in the body as well as social and environmental issues in nutrition. They explore the links between food, health, and diet-related diseases, and have the opportunity to examine factors that influence food choices and reflect on local, national, Indigenous, and global concerns and associated issues.

Students investigate methods of food production and distribution that affect the quantity and quality of food, and consider the ways in which these methods and associated technologies influence the health of individuals and communities. The study of nutrition assists students to reinforce or modify their own diets and lifestyle habits to maximise their health outcomes.

Nutrition is a 2-unit subject. It consists of four compulsory core topics and two option topics, of which students study *one*.

There are 4 compulsory topics as well as a choice of two option topics. These are:

**Compulsory Core Topics:**

- Core Topic 1: The Fundamentals of Human Nutrition
- Core Topic 2: Diet, Lifestyle, and Health
- Core Topic 3: Food Selection and Dietary Evaluation
- Core Topic 4: Food, Nutrition, and the Consumer.

**Option Topics:**

This section of the course gives opportunities for curriculum negotiation. Teachers should choose *one* of the following option topics in consultation with students:

- Option Topic 1: Global Nutrition and Ecological Sustainability
- Option Topic 2: Global Hunger

**Assessment Details:**

School-based Assessment (70%)

Assessment Type 1: Investigations Folio (30%)

Students undertake at least two practical investigations and one investigation with a focus on Science as a human endeavour to include in the folio.

Assessment Type 2: Skills and Applications Tasks (40%)

External Assessment (30%)

Assessment Type 3: Examination (30%)

Students undertake one 2-hour written examination

**Future:**

The knowledge, skills, and attitudes that students gain from this subject will enhance their general life experience and their vocational opportunities. Nutrition offers pathways to a range of tertiary and vocational certificate courses. Possible career pathways include, but are not limited to, Childcare, Community Health Work, Dietetics, Fitness leadership, Food Technology, Health Science, Hospitality, Naturopathy, Nursing, Nutrition Research, Small Business, Sports Science, and Teaching.

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**Length:** 1 Semester – 10 Credits

**Assumed knowledge:**

Year 10 Science and Year 10 Mathematics.

**Description:**

Students who wish to go on to study Stage 2 Physics must choose **both** Stage 1 Physics 1 and 2.

Physics helps people to understand the world around them. It is a subject for students who are interested in the fundamental processes of nature. The study of Physics provides an understanding of the processes that determine the behaviour of systems, from the very small (atoms and nuclei) to the very large (solar system and universe).

Topics presented in this course are:

- Topic 1: Linear Motion and Forces
- Topic 2: Electricity
- Topic 3: Heat

**Assessment Details:**

<b>ASSESSMENT TYPE</b>	<b>WEIGHTING</b>	<b>EXAMPLES</b>
FOLIO	50%	Completion Practical Science as a Human Endeavour Research Task
SKILLS & APPLICATIONS TASKS	50%	Linear Motion and Forces Test Electricity and Heat Test

**Future:**

Stage 1 Physics A and B provide necessary background for students who intend to study Stage 2 Physics. Physics also provides a pathway to a number of university courses, and associated careers in areas such as: Applied Science, Architecture, Computing, Dentistry, Electrical and Mechanical Engineering, Medicine, Physiotherapy, Science.

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**Length:** 1 Semester – 10 Credits

**Assumed knowledge:**

Year 10 Science and Year 10 Mathematics.

**Description:**

Students who wish to go on to study Stage 2 Physics must choose **both** Stage 1 Physics 1 and 2.

Physics helps people to understand the world around them. It is a subject for students who are interested in the fundamental processes of nature. The study of Physics provides an understanding of the processes that determine the behaviour of systems, from the very small (atoms and nuclei) to the very large (solar system and universe).

Topics presented in this course are:

- Topic 4: Energy and Momentum
- Topic 5: Waves
- Topic 6: Nuclear Models and Radioactivity

**Assessment Details:**

ASSESSMENT TYPE	WEIGHTING	EXAMPLES
FOLIO	50%	Completion Practical Science as a Human Endeavour Research Task
SKILLS & APPLICATIONS TASKS	50%	Energy and Momentum Test Waves and Nuclear Models Test

**Future:**

Stage 1 Physics A and B provide necessary background for students who intend to study Stage 2 Physics. Physics also provides a pathway to a number of university courses, and associated careers in areas such as: Applied Science, Architecture, Computing, Dentistry, Electrical and Mechanical Engineering, Medicine, Physiotherapy, Science.

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**Length:** Semester 1 (10 Credits)  
Semester 2 (10 Credits)

**Assumed knowledge:**

Year 10 Science.

**Description:**

Psychology aims to describe and explain both the universality of human experience and individual and cultural diversity. It does this through the systematic study of behaviour, the processes that underlie it, and the factors that influence it. Through such study, students come to better understand themselves and their social worlds.

Compulsory Topic

*Introduction to Psychology*

Option Topics (2 are studied)

- *Social Behaviour*
- *Intelligence*
- *Cognition*
- *Brain and Behaviour*
- *Human Psychological Development*
- *Emotion*
- *Negotiated Topic (this may expand an existing topic or introduce a new area of study).*

**Assessment Details:**

<b>ASSESSMENT TYPE</b>	<b>WEIGHTING</b>	<b>EXAMPLES</b>
INVESTIGATIONS FOLIO	40%	Group Investigation Issues Investigation
SKILLS & APPLICATIONS TASKS	60%	Assignments & Tests

**Future:**

Stage 1 Psychology background for students who intend to study Stage 2 Psychology but is not a pre-requisite. Psychology also provides a pathway to a number of university courses, and associated careers in areas such as: practicing Psychologist, Economics and Commerce, Law, Criminology, Linguistics, Social Work, Anthropology, Political Science, Neuroscience and Management, among others.

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**Length:** 2 Semesters

**Assumed Knowledge:**

Successful completion of a Stage 1 Agriculture A or B is recommended, but not necessary.

**Description:**

Agricultural Studies brings together elements of each of the other four Stage 2 Agriculture subjects with a particular focus on animal production. Students may investigate aspects of management such as the selection of livestock breeds, animal handling, nutrition, control of pests and diseases, housing, record keeping or marketing. Students might have an opportunity to develop and operate a small livestock business at school or home or to conduct a case study of an agricultural business that operates in the local region. Students become familiar with, understand, and assess changes in applied technologies in agricultural production, learn to use and maintain these technologies, and explore new technological developments as they emerge.

The livestock that students may work with could include the poultry, sheep, goats and alpacas at the school farms as well as other livestock such as lamb, poultry, pork and cattle enterprises run by local producers.

**Assessment Details:**

The following assessment types enable students to demonstrate their learning in Stage 2 Agriculture. Students should provide evidence of their learning through eight to ten assessments, including the external assessment component.

*School Assessment (70%)*

- Assessment Type 1: Practical Skills (40%) – at least two practical skills assessments (examples could include: Livestock Monitoring Practical, Nutrition Trial, Disease Control Programme, Case Study, etc.)
- Assessment Type 2: Skills and Applications Tasks (30%) – at least three skills and applications tasks (examples could include: Nutrition Test, Issues Oral, Wool Assessment, etc.)

*External Assessment (30%)*

- Assessment Type 3: Investigation (30%).

**Future:**

Agriculture (Animal Production) will provide a pathway for further studies in Agriculture, Horticulture or Conservation and Land Management. It also provides a pathway for employment in a range of primary industries.

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**Length:** 2 Semesters

**Assumed Knowledge:**

Years 8, 9 & 10 Science and any Science subject at Stage 1.

It is assumed that students have an understanding of the following:

- Atoms, molecules, ions, elements, solutions, the use of molecular formulae, chemical reactions, the properties of solids, liquids, and gases and concentration and pressure.
- The different forms of energy, and the fact that energy can be transformed.
- The use of graphs and tables to record and display data and the ability to data.
- The concepts of mass, volume, surface area, and appropriate units.
- The ability to manipulate laboratory equipment such as microscopes.
- The ability to carry out simple numerical calculations.
- Scientific report writing.

It is also assumed that students have a sufficient level of literacy to cope with the background reading from the textbook and other written material, and with writing short and extended answers for tests and exams.

**Description:**

The study of Biology is constructed around inquiry into and application of understanding the diversity of life as it has evolved, the structure and function of living things, and how they interact with their own and other species and their environments.

**Topics:**

There are 4 compulsory topics for Stage 2 Biology which are:

Topic 1: DNA and Proteins

Topic 2: Cells as the Basis of Life

Topic 3: Homeostasis

Topic 4: Evolution

**Assessment Details:**

*School-based Assessment (70%)*

- Assessment Type 1: Investigations Folio (30%) – two practical investigations and one Science as a Human Endeavour Investigation
- Assessment Type 2: Skills and Applications Tasks (40%) - at least three skills and applications tasks

*External Assessment (30%)*

- Assessment Type 3: Examination (30%).

**Future:**

Biology provides students the opportunity to gain a range of employment and life skills, such as the ability to work collaboratively to produce a successful outcome, and skills in organising and processing information.

This course provides a pathway to further study at a number of university courses and associated careers (e.g. Marine Science, Molecular Biology, Occupational Therapy or Nursing, Science, Winemaking).

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**Length:** 2 Semesters – 20 Credits

**Assumed Knowledge:**

Stage 1 Chemistry 1 **and** 2.

The *Chemistry Stage 2 Curriculum Statement* assumes that students will have completed one **full year's** study of Chemistry at Stage 1.

**Description:**

In their study of Chemistry, students develop and extend their understanding of how the physical world is chemically constructed, the interaction between human activities and the environment, and the use that human beings make of the planet's resources. They explore examples of how scientific understanding is dynamic and develops with new evidence, which may involve the application of new technologies.

The three strands of science to be integrated throughout student learning are:

Science inquiry skills

- Science as a human endeavour
- Science understanding.

There are 4 compulsory topics for Stage 2 Chemistry which are:

- Topic 1: Monitoring the Environment
- Topic 2: Managing Chemical Processes
- Topic 3: Organic and Biological Chemistry
- Topic 4: Managing Resources.

**Assessment Details:**

School-based Assessment (70%)

Assessment Type 1: Investigations Folio (30%)

Students undertake at least two practical investigations and one investigation with a focus on Science as a human endeavour to include in the folio.

Assessment Type 2: Skills and Applications Tasks (40%)

External Assessment (30%)

Assessment Type 3: Examination (30%)

Students undertake one 2-hour written examination

**Future:**

Provides a pathway to a number of university courses and associated careers in areas such as: Biotechnology, Engineering, Environmental Studies, Medicine, Nursing, Science, Soil Science.

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**Length:** 2 Semesters – 20 Credits

**This is a 20 credit, 2 semester unit. It will be offered to students every two years so that they may study it at Stage 1 or at Stage 2. It will next be offered in 2020.**

**Description:**

Students investigate up-to-date scientific information on the role of nutrients in the body as well as social and environmental issues in nutrition. They explore the links between food, health, and diet-related diseases, and have the opportunity to examine factors that influence food choices and reflect on local, national, Indigenous, and global concerns and associated issues.

Students investigate methods of food production and distribution that affect the quantity and quality of food, and consider the ways in which these methods and associated technologies influence the health of individuals and communities. The study of nutrition assists students to reinforce or modify their own diets and lifestyle habits to maximise their health outcomes. Nutrition is a 2-unit subject. It consists of four compulsory core topics and two option topics, of which students study *one*.

There are 4 compulsory topics as well as a choice of two option topics. These are:

**Compulsory Core Topics:**

- Core Topic 1: The Fundamentals of Human Nutrition
- Core Topic 2: Diet, Lifestyle, and Health
- Core Topic 3: Food Selection and Dietary Evaluation
- Core Topic 4: Food, Nutrition, and the Consumer.

**Option Topics:**

This section of the course gives opportunities for curriculum negotiation. Teachers should choose *one* of the following option topics in consultation with students:

- Option Topic 1: Global Nutrition and Ecological Sustainability
- Option Topic 2: Global Hunger

**Assessment Details:**

School-based Assessment (70%)

Assessment Type 1: Investigations Folio (30%)

Students undertake at least two practical investigations and one investigation with a focus on Science as a human endeavour to include in the folio.

Assessment Type 2: Skills and Applications Tasks (40%)

External Assessment (30%)

Assessment Type 3: Examination (30%)

Students undertake one 2-hour written examination

**Future:**

The knowledge, skills, and attitudes that students gain from this subject will enhance their general life experience and their vocational opportunities. Nutrition offers pathways to a range of tertiary and vocational certificate courses. Possible career pathways include, but are not limited to, Childcare, Community Health Work, Dietetics, Fitness leadership, Food Technology, Health Science, Hospitality, Naturopathy, Nursing, Nutrition Research, Small Business, Sports Science, and Teaching.

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**Length:** 2 Semesters – 20 credits

**Assumed Knowledge:**

Stage 1 Physics 1 **and** 2, and Mathematics to a standard to meet the Assumed Knowledge of Mathematics as listed below.

The *Physics Stage 2 Curriculum Statement* assumes that students are familiar with a range of concepts. These concepts are assumed to have formed part of a prior course undertaken by the student.

In addition, a range of Mathematical concepts is assumed which includes Algebra, Trigonometry and Pythagoras.

**Description:**

The study of physics offers opportunities for students to understand and appreciate the natural world. This subject requires the interpretation of physical phenomena through a study of motion in two dimensions, electricity and magnetism, light and matter, and atoms and nuclei. As well as applying knowledge to solve problems, students develop experimental, investigation design, information, and communication skills through practical and other learning activities. Students gather evidence from experiments and research and acquire new knowledge through their own investigations.

Stage 2 Physics is organised into four sections. Each section is divided into four topics. Each topic includes an application.

*Motion in Two Dimensions*

- Projectile Motion
- Uniform Circular Motion
- Gravitation and Satellites
- Momentum in Two Dimensions

*Electricity and Magnetism*

- Electric Fields
- The Motion of Charged Particles in Electric Fields
- Magnetic Fields
- The Motion of Charged Particles in Magnetic Fields

*Light and Matter*

- Electromagnetic Waves
- The Interference of Light
- Photons
- Wave Behaviour of Particles

*Atoms and Nuclei*

- The Structure of the Atom
- The Structure of the Nucleus
- Radioactivity
- Nuclear Fission and Fusion

**Assessment Details:**

Students demonstrate evidence of their learning through the following assessment types:

<i>School-based Assessment</i>	<i>Weighting</i>
Investigations Folio (Information Search, Oral and ICT presentation and practical reports)	40%
Skills and Applications Tasks (Tests)	30%
<i>External Assessment</i>	
Examination (3 hours)	30%

**Future:**

Physics gives students the opportunity to gain a range of employment and life skills, such as the ability to work collaboratively to produce a successful outcome, and skills in organising and processing information.

Physics also provides a pathway to a number of university courses, and associated careers in areas such as: Applied Science, Architecture, Computing, Dentistry, Electrical and Mechanical Engineering, Medicine, Physiotherapy, Science.

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**Length:** 2 Semesters – 20 Credits

**Description:**

This course aims to identify essential principles of Psychology. It provides students an opportunity to develop an understanding of the Scientific and dynamic nature of Psychology and explain the factors that cause psychological differences and similarities between people and give examples of how these factors affect the behaviour of themselves, others, and groups of people. It allows students to analyse the behaviour of themselves, others, and groups of people in different contexts in a way that recognises the values of independence and interdependence. It develops understanding of ethical research by undertaking and evaluating guided investigations as well as making informed decisions about issues, events, and situations in society by applying relevant psychological principles and ethics and by presenting particular points of view, giving examples of the thinking and reasoning behind them.

Psychology is a 2-unit subject. It consists of six topics:

- Introduction to Psychology
- Social Cognition
- Learning
- Personality
- Psychobiology of Altered States of Awareness
- Healthy Minds.

**Assessment Details:**

Assessment in Stage 2 Psychology consists of the following components, weighted as shown:

*School-based assessment (70%)*

- Assessment Type 1: Investigations Folio (30%)
- Assessment Type 2: Skills and Applications Tasks (40%)

*External Assessment (30%)*

- Assessment Type 3: Examination (30%).

Students will provide evidence of their learning through eight to ten assessments, including the external assessment component. Students undertake:

- one individual investigation and at least one group investigation for the investigations folio
- at least four skills and applications tasks
- one examination.

**Future:**

The knowledge, skills, and attitudes that students gain from this subject will enhance their general life experience and their vocational opportunities. Psychology also provides a pathway to a number of university courses, and associated careers in areas such as: practicing Psychologist, Economics and Commerce, Law, Criminology, Linguistics, Social Work, Anthropology, Political Science, Neuroscience and Management, among others.

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