

SCIENCE

ELECTIVE SUBJECTS: Across Two Semesters

WHY STUDY SCIENCE?

Science provides an opportunity for students to answer questions about our physical, chemical and biological world and how it functions. In today's technologically advanced society, students are able to access the most up to date facts and evidence, to contest and refine their knowledge, to use inquiry skills and answer many of these scientifically orientated questions.

Science allows individuals and groups to be active citizens in their personal, social and economic lives. Students are able to develop and acquire knowledge, understanding and inquiry skills to question the direction which Science takes in society, the contributions of historical and cultural occurrences, current practices, contemporary issues and how many career choices involve science.

COURSE AIMS:

In particular, students at the College in Science develop:

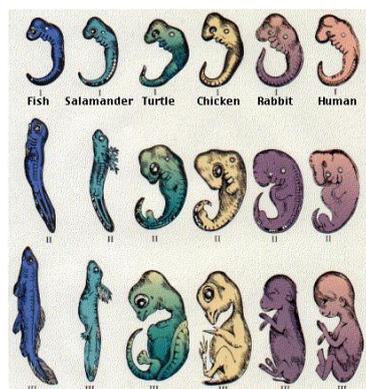
- a solid foundation of the nature of the biological, chemical, physical and earth sciences to prepare and build students with knowledge and skills to transition into senior school science.
- a key understanding of concepts offered in the discreet subjects of Biology, Chemistry and Physics at senior schooling level.
- inquiry skills through questioning, hypothesizing, planning, conducting experiments and investigations (based on ethical principles), collecting and analyzing data, evaluating results and drawing critical evidence-based conclusions. Emphasis will be placed on developing in text referencing skills for all inquiry research.
- an appreciation and understanding of social, cultural and historical factors as they consider the interactions between Science and current social practices.
- 21st century skills including: Literacy, Numeracy, ICT skills, critical and creative thinking skills, effective communication and cooperative skills.
- life skills and a futures perspective as they engage in a range of science activities as informed and active citizens in society.

COURSE ORGANISATION:

The study of Science in Year 10 involves a selection of **one or more elective** subjects that have been developed to address Australian Curriculum requirements and to transition into senior school Science subjects. All units are organised using the **Australian Curriculum Science** and **Senior Science Syllabus**.

Year 10 Units

Semester 1 – SC742 Biology

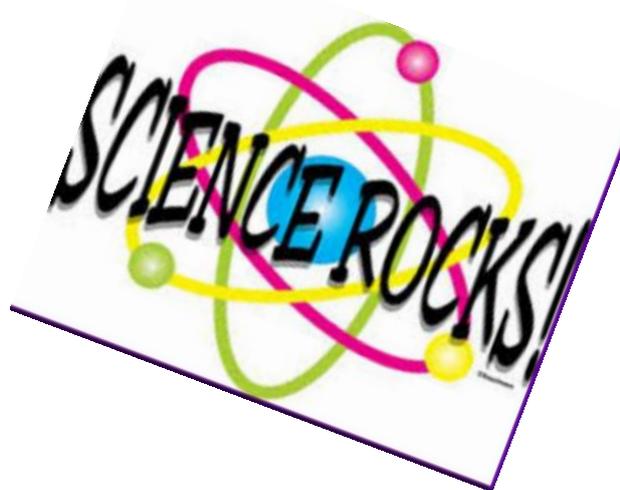


In Semester 1, students will explore ecology and evolution.

Students will explore abiotic and biotic factors, and their interactions, in a variety of ecosystems. Students will analyse the flow of energy through ecosystems and consider the consequences of interrupting this flow. Students will explain how adaptations aid an organism's survival. Human impact on ecosystems will be analysed through a case study.

Students will consider the role of DNA in passing genetic information from generation to generation whilst analysing various sources of variation which accounts for genetic diversity. To evaluate the evidence of evolution, students will dissect rats and toads, analysing how structures of the animals have allowed them to evolve and adapt over time. Scientific theories of fossilisation,

embryology and comparative anatomy will be explored to support analysis and evaluation of origin and diversity of life on Earth.



Inquiry skills: Students will describe and explain ecological and taxonomic concepts, theories, models and systems and their limitations. Students will collect primary and secondary data and research associated with ecosystems and identify biotic and abiotic factors and feeding relationship roles in a given ecosystem. Students will analyse the progression of theories involving the current DNA model, develop questions and hypotheses whilst undertaking laboratory experimentation.

Assessment

Students will complete 2 assessment tasks: a poster presentation on an Australian ecosystem and a comparative analysis essay on the rat and toad.

Semester 2 – SC743 Biology

In Semester 2, students will explore the detailed structure of DNA and discover how it replicates, and how this genetic code is used to produce proteins. They will learn how cells divide through mitosis and meiosis. Students will use the language of inheritance to explain how genes are passed from one generation to another. Punnett squares and pedigree charts will be used to show knowledge of inheritance patterns. Students will appraise the value of the human genome project and explore the ethics of genetic engineering.



Inquiry skills: Students will analyse genetic information, construct punnet squares and pedigree charts to chart inheritance probabilities.

Assessment

Students will complete 3 assessment tasks: an exam on DNA, cell division and protein synthesis, an exam on genetic inheritance and a research task on genetic engineering.

Semester 1 – SC745 Chemistry

Alkali Metals												Noble Gases						
Alkaline Earth												Halogens						
H	Li	Be	Transition Metals										B	C	N	O	F	Ne
Na	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe	
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn	
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Uun	Uuu	Uub							
Lanthanides		Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu			
Actinides		Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr			

In Semester 1, students will explore the structure of the atom, properties of elements and the periodic table in more detail. They will develop an understanding of how atoms bond together to form compound and how these substances are named. They will predict the structure and properties of particles during chemical reactions. Students will develop experimental skills and explore metal reactivity through an experimental investigation and generate a report on their findings. They will consider an environmental issue and present a research investigation.

Inquiry skills: Students analyse the periodic table, predict the products of chemical reactions, pose questions, select and design an experiment using quantitative volumetric techniques to analyse and calculate gas produced in a metal/acid reaction, conduct research and analyse primary and secondary data.

Assessment

Students will complete 3 assessment tasks: an exam on atomic structure and bonding, an experimental investigation into metal reactivity and a research investigation.

Semester 2 – SC746 Chemistry

In Semester 2, students will study aspects of organic chemistry. This involves demonstrating understanding of the structure, properties, production, uses, and importance of carbon and its chemistry. Students will also study the uses of fuels and polymers from ethene and propene, and the effects of combustion products on human health and the environment.

Inquiry skills: Students apply understanding to draw structural formulae, build 3-dimension models and name organic compounds using systematic nomenclature. They will carry out practical techniques including fermentation and distillation, to explore the physical properties of carbon compounds. Physical properties include solubility, density and trends in melting point and boiling point. They will conduct investigations to analyse qualitative and quantitative data and subsequently explain associated trends and findings.

Assessment

Students will complete 3 assessment tasks: a two-part examination on organic chemistry, an environmental issues essay and a practical design investigation to test the effect of temperature on the density of a liquid.

Semester 1 – SC735 Physics

Students will explore the forces that occur in structures and construct various models to test their strength and investigate how the forces are distributed. Through analysis of the motion of various objects, students will ascertain information and use kinematics formulas to uncover the various components of the objects' motion, including displacement, velocity, acceleration. Following this, students will investigate wave motion and its effect on light, sound and heat.

Inquiry skills: Students apply understanding of displacement, velocity, acceleration, force, energy, momentum, reflection, refraction and superposition of waves and their various implications to predict phenomena, solve problems and calculate unknowns.

Assessment

Students will complete 2 assessment tasks: an extended experimental investigation into the design, construction and testing of a model bridge and an end of semester exam on content from the entire semester.

Semester 2 – SC736 Physics



Students will assemble electrical circuits and explore the common concepts associated with electricity. In addition, students will develop an understanding of electromagnetism, electric motors, generators and turbines. Students will construct electronic models to investigate and understand how components (including switches, resistors, diodes, capacitors and relays) within electronics function as a collective to produce a desired outcome.

Inquiry skills: Students apply understanding of electromagnetic concepts, theories, models and systems within the limitations of these. Students will analyse quantitative and qualitative data using various mathematical equations and graphical representations. They will communicate understandings, findings, arguments and conclusions.

Assessment

Students will complete 2 assessment tasks: an extended experimental investigation into designing a renewable energy source that will power a small generator to produce electricity and an end of semester exam on content from the entire semester.

Semester 1 – SC729 Investigating Science



Students will use the scientific method to try and answer some of life's great mysteries. This will be a hands-on class, aimed at developing cross-curriculum and 'life' skills, through a series of scientific investigations.

Inquiry skills: Students will pose questions and formulate hypotheses. They will plan and conduct investigations. Students will collect and analyse primary and secondary data and communicate their findings. They will apply their scientific understanding to broader life experiences.

Assessment

Students will complete a portfolio of work including class work, practical reports and research.

Semester 2 – SC730 Investigating Science

Students will explore the marine environment focussing on mangrove and reef ecosystems; the organisms that live there and the sustainable practices associated with these resources. Students will investigate physical features that allow us to classify aquatic organisms, describe and analyse the impact of human interaction on the Great Barrier Reef including the effects of climate change.

Students will explore the world of forensics. They will be posed a 'whodunnit' problem and, through the discovery of forensic science, solve the mystery.

Inquiry skills: Students will apply understanding of classification and ecological principles to communicate data about the impact of human interaction on various ecosystems. They will use primary and secondary data to analyse ecosystems and evaluate human interactions. Students will use scientific principles and apply these to a forensic science situation.

Assessment

Students will complete a portfolio of work on their marine studies and a report on their studies of forensics.

