

SCIENCE

Victorian Curriculum Strands at Level 10:

The Science discipline has two interrelated strands, each with their own sub-strands:

Science Understanding

- **Science has a human endeavour**
 - Scientific understanding, including models and theories, are contestable and are refined over time through a process of review by the scientific community.
 - Advances in scientific understanding often rely on development in technology and technological advances are often linked to scientific discoveries.
 - The values and needs of contemporary society can influence the focus of scientific research.
- **Biological Sciences**
 - Multicellular organisms rely on coordinated and interdependent internal systems to respond to changes to their environment
 - An animal's response to a stimulus is coordinated by its central nervous system (brain and spinal cord); neurons transmit electrical impulses and are connected by synapses
 - The transmission of heritable characteristics from one generation to the next involving DNA.
 - The theory of evolution by natural selection explains the diversity of living things and is supported by a range of scientific evidence
 - Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems
- **Chemical Sciences**
 - All matter is made of atoms which are composed of protons, neutrons and electrons; natural radioactivity arises from the decay of nuclei in atoms
 - The atomic structure and properties of elements are used to organise them in the periodic table
 - Chemical reactions involve rearranging atoms to form new substances; during a chemical reaction mass is not created or destroyed
 - Different types of chemical reactions are used to produce a range of products and can occur at different rates; chemical reactions may be represented by balanced chemical equations.
 - Chemical reactions, including combustion and the reactions of acids, are important in both non-living and living systems and involve energy transfer.
- **Earth and Space Sciences**
 - The theory of plate tectonics explains global patterns of geological activity and continental movement.
 - Global systems, including the carbon cycle, rely on interactions involving the atmosphere, biosphere, hydrosphere and lithosphere
 - The Universe contains features including galaxies, stars and

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solar systems; the Big Bang theory can be used to explain the origin of the Universe

- **Physical Sciences**
 - Electric circuits can be designed for diverse purposes using different components; the operation of circuits can be explained by the concepts of voltage and current
 - The interaction of magnets can be explained by a field model; magnets are used in the generation of electricity and the operation of motors
 - Energy flow in Earth's atmosphere can be explained by the processes of heat transfer
 - The description and explanation of the motion of objects involves the interaction of forces and the exchange of energy and can be described and predicted using the laws of physics.

Science Inquiry Skills

- **Questioning and predicting**
 - Formulate questions or hypotheses that can be investigated scientifically, including identification of independent, dependent and controlled variables.
- **Planning and conducting**
 - Independently plan, select and use appropriate investigation types, including fieldwork and laboratory experimentation, to collect reliable data, assess risk and address ethical issues associated with these investigation types.
 - Select and use appropriate equipment and technologies to systematically collect and record accurate and reliable data, and use repeat trials to improve accuracy, precision and reliability.
- **Recording and processing**
 - Construct and use a range of representations, including graphs, keys, models and formulas, to record and summarise data from students' own investigations and secondary sources, to represent qualitative and quantitative patterns or relationships, and distinguish between discrete and continuous data.
- **Analysing and evaluating**
 - Analyse patterns and trends in data, including describing relationships between variables, identifying inconsistencies in data and sources of uncertainty, and drawing conclusions that are consistent with evidence.
 - Use knowledge of scientific concepts to evaluate investigation conclusions, including assessing the approaches used to solve problems, critically analysing the validity of information obtained from primary and secondary sources, suggesting possible alternative explanations and describing specific ways to improve the quality of data.
- **Communicating**
 - Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations.

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CORE SCIENCE ONE SEMESTER

***ALL Year 10 students must study Core Science.
Students intending to study VCE Science MUST also complete a Year 10 Science Elective.***

Learning Focus:

Year 10 Core Science will focus on scientific literacy and the application of science to everyday life.

Students will examine the scientific evidence for the change in climatic conditions worldwide, explore things that may contribute to this change and how scientific developments can mitigate the effect of human activity on Earth's Climate. Students will explore the physics of motion from the perspective of Car safety and things that can contribute to surviving an accident. Students will continue their learning about diseases from year 9 by looking at the current pandemic as well as other diseases that may commonly affect the students' age group and look at how information about diseases is communicated through various media.

Assessment:

A range of assessment methods will be used, which may include:

- Practical investigation activities & reports.
- Research and application tasks.
- Tests.
- Scientific Wall Chart communicating findings on a student designed experimental investigation.
- End of semester examination

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ENVIRONMENTAL CHEMISTRY

ONE SEMESTER

ALL Year 10 students must study Core Science.

Students intending to study VCE Science MUST also complete a Year 10 Science Elective. Environmental Chemistry will be a good introduction for any student wishing to study Chemistry or Environmental Science at year 11 and 12

Learning Focus

In Environmental Chemistry, students develop an understanding of the structure, function and diversity of natural ecosystems on this planet and evaluate the impacts of human activities on these systems. They study global systems and investigate the impact of human activities such as the use of renewable and non-renewable energy sources. They look at how these affect systems on a local and global scale which enables them to predict how changes will affect equilibrium within these systems. Students learn to interpret data and differences between primary, secondary and proxy data.

Students will explain how similarities in the chemical behaviour of elements and their compounds and their atomic structures are represented in the way the periodic table has been constructed. They compare the properties of a range of elements representative of the major groups and periods in the periodic table. They use atomic symbols and balanced chemical equations for summarising chemical reactions, including neutralisation and combustion. Students can then apply their knowledge of chemistry to the combustion reaction occurring during the rocket launch and car safety.

Assessment:

A range of assessment methods will be used, which may include:

- Practical investigation activities & reports.
- Research and application tasks.
- Tests.
- Scientific Wall Chart communicating findings on a student designed experimental investigation.
- End of semester examination

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LIFE WITHIN US ONE SEMESTER

**ALL Year 10 students must study Core Science.
Students intending to study VCE Science MUST also complete a Year 10 Science Elective.
Life Within Us will be a good introduction for any student wishing to study Biology or Psychology at Year 11 and 12**

Learning Focus:

In this unit students learn about the concepts of Genetics and the Theory of Evolution. The students learn that the transmission of heritable characteristics from one generation to the next involves DNA and genes. The students will learn how information technology can be applied to different areas of science, for example, DNA sequencing etc.

This unit will also focus on making decisions about science practices and applications, ethical and social implications must be taken into account. The students consider the use of genetic testing for decisions such as genetic counselling, embryo selection, identification of carriers of genetic mutations and the use of this information for personal use or by organisations such as insurance companies or medical facilities.

In Term II students will study human behaviour and mental processes. They will cover three major theories such as psychoanalysis, behaviorism and humanism. Students will compare Psychology to Pseudosciences. Students will also carry out practical tasks involving learning by observation and applying core concepts. Students who show a strong interest in social or biological sciences, psychology, mental health and understanding human behaviour will benefit from this elective.

Assessment:

A range of assessment methods will be used, which may include:

- Practical investigation activities.
- Topic tests on Psychology Research Methods and Genetics.
- End of Semester Examination.

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MISSION TO MARS ONE SEMESTER

ALL Year 10 students must study Core Science.

Students intending to study VCE Science MUST also complete a Year 10 Science Elective.

Mission to Mars will be a good introduction for any student wishing to study Physics at Year 11 and 12

Learning Focus:

In Mission to Mars, students develop an understanding of the universe and why humans may want to explore it. They will study Stars and Planets, and what science can discover about these without travelling to them. Students will explore what might be found on Mars, what this may indicate about the history of Mars as a planet and what it might tell us about the History of Earth. Students will explore the physics of motion through the design construction and launch of a model rocket. Students work as a team and use their problem-solving skills to successfully complete a geological survey of the “Mars” surface at the Victorian Space Science Education Centre. Students wear specially designed spacesuits and act as astronauts, mission controllers and research scientists whilst at the Centre.

A range of assessment methods will be used, which may include:

- Practical investigation activities & reports.
- Research and application tasks.
- Tests.
- Scientific Wall Chart communicating findings on a student designed experimental investigation.
- End of semester examination