

# Physics

## General senior subject – PHY (possible 4 QCE credits)



Physics provides opportunities for students to engage with classical and modern understandings of the universe.

Students learn about the fundamental concepts of thermodynamics, electricity and nuclear processes; and about the concepts and theories that predict and describe the linear motion of objects. Further, they explore how scientists explain some phenomena using an understanding of waves. They engage with the concept of gravitational and electromagnetic fields, and the relevant forces associated with them. They study modern physics theories and models that, despite being counterintuitive, are fundamental to our understanding of many common observable phenomena.

Students develop appreciation of the contribution physics makes to society: understanding that diverse natural phenomena may be explained, analysed and predicted using concepts, models and theories that provide a reliable basis for action; and that matter and energy interact in physical systems across a range of scales. They understand how models and theories are refined, and new ones developed in physics; investigate phenomena and solve problems; collect and analyse data; and interpret evidence. Students use accurate and precise measurement, valid and reliable evidence, and scepticism and intellectual rigour to evaluate claims; and communicate physics understanding, findings, arguments and conclusions using appropriate representations, modes and genres.

Students learn and apply aspects of the knowledge and skills of the discipline (thinking, experimentation, problem-solving and research skills), understand how it works and how it may impact society.

### Pathways

A course of study in Physics can establish a basis for further education and employment in the fields of science, engineering, medicine and technology.

### Objectives

By the conclusion of the course of study, students will:

- describe and explain scientific concepts, theories, models and systems and their limitations
- apply understanding of scientific concepts, theories, models and systems within their limitations
- analyse evidence
- interpret evidence
- investigate phenomena
- evaluate processes, claims and conclusions
- communicate understandings, findings, arguments and conclusions.

## Structure

Unit 1	Unit 2	Unit 3	Unit 4
<b>Thermal, nuclear and electrical physics</b> <ul style="list-style-type: none"> <li>• Heating processes</li> <li>• Ionising radiation and nuclear reactions</li> <li>• Electrical circuits</li> </ul>	<b>Linear motion and waves</b> <ul style="list-style-type: none"> <li>• Linear motion and force</li> <li>• Waves</li> </ul>	<b>Gravity and electromagnetism</b> <ul style="list-style-type: none"> <li>• Gravity and motion</li> <li>• Electromagnetism</li> </ul>	<b>Revolutions in modern physics</b> <ul style="list-style-type: none"> <li>• Special relativity</li> <li>• Quantum theory</li> <li>• The Standard Model</li> </ul>

## Assessment

In Units 1 and 2 students will complete formative assessment items including a data test, a student experiment and a research investigation.

In Units 3 and 4 students complete four summative assessments. The results from each of the assessments are added together to provide a subject score out of 100. Students will also receive an overall subject result (A–E).

### Summative assessments

Unit 3		Unit 4	
Summative internal assessment 1 (IA1): • Data test	10%	Summative internal assessment 3 (IA3): • Research investigation	20%
Summative internal assessment 2 (IA2): • Student experiment	20%		
Summative external assessment (EA): 50% • Examination			

### Additional Requirements

Study Requirements	Special Requirements
<p>This is a General subject and as such requires a significant commitment of time and energy to complete the course successfully. This includes:</p> <ul style="list-style-type: none"> <li>• Three lessons per week face to face teaching.</li> <li>• Individual/study group/tutorial sessions 1-2 hours per week.</li> </ul> <p>Students may be required to complete experimental work in their own time in order to complete their assessment.</p>	<p>Students must have access to the internet at home or at a local library. Students must also be able to borrow texts from the school library at all times.</p> <p>Due to the large amount of technologically based assessment and classwork it is recommended that students are participants in the College's BYOx program.</p>