Physics

Units 1-2

In Physics, students gain an appreciation of the laws of nature from the smallest scale of the atomic nucleus to the largest scale, that of the entire universe. The focus is on being able to understand and meaningfully describe the physical world. Physics provides an excellent grounding for a large number of fulfilling careers and is a very suitable subject for inquisitive students who have sound capabilities in analysis.

UNIT 1
The focus of Unit 1 is on how we can explain heat and heat transfer through the particle model as well as light using the wave model. Students will study the laws of thermodynamics and their application to real life situations, including how energy transfers affect long term patterns in climate. In addition, students will also explore the full spectrum of electromagnetic radiation and how light can be used in communication and other applications. Students will also study nuclear physics, including atomic energy, its application in modern society and the viability of nuclear energy as a household energy source. This will then lead into electricity and their real-world applications through the construction of electrical circuits.

LEARNING ACTIVITIES
Discussions of physical phenomena, worksheets, group activities, text questions, practical activities, and participation in an exploratory Physics excursion.

KEY SKILLS REQUIRED
The ability to predict, observe and explain physical events from evidence is most important. This may be expressed through mathematic equations, so mathematical skills in the areas of arithmetic calculations, substitution, transposing and analysing data and graphs are required. It is highly recommended that all Physics students have an accompanying VCE Mathematics subject.

ASSESSED TASKS
Topic tests, practical work, research based report, problem solving tasks and an end of semester written examination.

UNIT 2
The focus of this Unit is the use of experiments and what they reveal about the physical world. We firstly will focus on how motion can be described and explained, in terms of momentum, energy and kinematics. Students then have a choice of studying the physics involved with two separate observations from the physical world. These include studies in the fields of flight, astronomy, nuclear physics, sound, climate change, biomechanics and motion. Students will also develop their practical skills, by planning, executing and reporting on an extended practical investigation.

LEARNING ACTIVITIES
Discussions of physical phenomena, worksheets, group activities, text questions and practical activities.

KEY SKILLS REQUIRED
The ability to predict, observe and explain physical events from evidence is most important. This may be expressed through mathematic equations, so mathematical skills in the areas of arithmetic calculations, substitution, transposing and analysing data in beneficial. Practical and planning skills will also be required and application of the scientific method to a student designed experiment.

ASSESSED TASKS
Topic tests, practical work, an extended practical investigation, research, team-based multimedia presentations and an end of semester written examination

Physics

Units 3-4

Students gain an appreciation of the laws of and explore the concepts of classical and modern physics. Students learn through experimenting, observing, debating and developing theoretical models that describe the phenomena we see. The study of Physics underpins much of the technology found in areas such as electricity, modern science, engineering and industry.

Students need to have satisfactorily completed Unit 1 and 2 Physics prior to studying Units 3 and 4.

UNIT 3
Students study, motion, forces, fields, electro-magnetism and electricity generation. Motion covers basic descriptions on movement, forces, momentum and energy, projection motion and circular motion. In Field and Electromagnetism, students explore the field model and its application to gravity, electrostatics and electro-magnetism. This leads to the topic of Electricity Generation, which includes practical applications of the physics such motors, generators, transformers and the electricity grid.

LEARNING ACTIVITIES
Experimental work including interactive simulation activities, text questions, quizzes, homework sheets and other relevant tasks.

KEY SKILLS REQUIRED
Motion, forces, fields and electro-magnetism skills and knowledge from Units 1 and 2, data interpretation and analysis, ability to use and manipulate formulae and enquiry-based skills.

ASSESSED TASKS
Research based tasks, report based on practical work and tests

UNIT 4
Students explore and understand topics in the realm of modern physics such as the wave-particle model of light, special relativity, and introductory ideas in quantum physics. Students will investigate key experiments and phenomenon such as the Photo-electric Effect, Double Slit Experiment, Spectral Lines and Einstein's thought experiments. Students will design and conduct an extended practical based on their knowledge of motion, fields or light.

LEARNING ACTIVITIES
Experimental work including interactive simulation activities, text questions, quizzes, homework sheets and other relevant tasks.

KEY SKILLS REQUIRED
Knowledge and application of conceptual models of modern physics and waves, light and kinematics knowledge from Unit 1 & 2, data interpretation and analysis. Practical and planning skills will also be required and application of the scientific method to a student designed experiment

ASSESSED TASKS
Tasks could include: a data analysis report, a report based on practical work, test done under test conditions. Students will also complete an end of year written examination.

VCAA ASSESSMENT – The overall Study Score will consist of:
School Assessed Coursework (50%), Written Examination in November (50%)