Physics

Science is vital to everyday life, and allows us to understand and shape the world in which we live and influence its future. Scientists play a key role in meeting society's needs in areas such as medicine, energy, industry, material development, the environment and sustainability. As the importance and application of science continues to grow and develop, more trained scientists will be required. It is also important that everyone has an informed view of science. The National 3 / 4 Course is practical and experiential, and develops scientific understanding of issues relating to physics. It aims to generate interest and enthusiasm in physics, and to enable learners to develop confidence in recognising and communicating ideas on scientific phenomena. Learners will develop the ability to solve problems and establish relationships in physics by acquiring a broad knowledge base, practical skills and basic mathematical skills.

The purpose of the National 5 Course is to develop learners' interest and enthusiasm for physics in a range of contexts. The skills of scientific inquiry and investigation are developed, throughout the Course, by investigating the applications of physics. This will enable learners to become scientifically literate citizens, able to review the science-based claims they will meet. Physics gives learners an insight into the underlying nature of our world and its place in the universe. From the sources of the power we use, to the exploration of space, it covers a range of applications of the relationships that have been discovered through experiment and calculation, including those used in modern technology. An experimental and investigative approach is used to develop knowledge and understanding of physics concepts.

The purpose of the Higher Course is to develop learners' curiosity, interest and enthusiasm for physics in a range of contexts. The skills of scientific inquiry and investigation are developed throughout the Course. The relevance of physics is highlighted by the study of the applications of physics in everyday contexts. This will enable learners to become scientifically literate citizens, able to review the science-based claims they will meet. Due to the interdisciplinary nature of science, learners benefit from studying Physics along with other subjects from the sciences, technologies, and mathematics curriculum areas. The Course develops scientific understanding of issues relating to physics. It will enable learners to gain an in-depth knowledge of concepts in physics, and to develop confidence in the skills of scientific inquiry. Learners will develop ability in describing and interpreting physical phenomena using mathematical skills, and will practice scientific methods of investigation from which general relationships are derived and explored.

The Advanced Higher Physics Course has been designed to articulate with and provide progression from the Higher Physics Course. Through a deeper insight into the structure of the subject, the Course aims to provide an opportunity for reinforcing and extending the candidate's knowledge and understanding of the concepts of physics and developing the candidate's skills in investigative practical work.

Physics N3/4	
Requirements	This course is offered to all pupils in S4, S5 or S6. No prior knowledge is required
Course Content	The course consists of three units of approximately the same length: • Waves and Radiation • Energy and Electricity • Dynamics and Space
Assessment	Pupils are required to complete: • An end of unit assessment for each unit studied. • A short report relating to one of the units covered, describing the application of Physics in a particular area and its effect on Society. • A practical investigation and a written report, which is internally assessed. • A research assignment. Candidates must pass all internal assessments (written and practical) to be awarded a National 4 Physics pass.
Progression / Next Steps	A pass in this course will allow progression into other Science subjects at National 4 level. A pass in National 4 Physics may also provide opportunity for progression into National 5 Laboratory Skills. Pupils may wish to discuss relevant work experience/placements with Faculty staff and their Guidance Teacher.

Physics N5	
Requirements	This course is offered to all pupils in S4, S5 or S6. Pupils are expected to have completed the S3 Physics course and achieved Level 4.
Course Content	The course consists of six units of approximately the same length: • Dynamics • Space • Electricity • Properties of Matter • Waves • Radiation Each unit builds upon and extends the fundamental concepts of Physics introduced in S3 Physics.
Assessment	Pupils are required to complete: • A practical investigation and a written report, which is internally assessed. • An externally assessed research assignment. This counts as 20% of the final grade awarded. • The SQA's written external exam is 2.5 hours long. This counts as 80% of the final grade awarded Candidates must pass the SQA exam to be awarded a National 5 Physics pass.
Progression / Next Steps	The National 5 Physics course will enable the learner to develop a range of skills which will assist them in a place of work or with further study of the subject, at Higher level for example. These skills include developing and applying knowledge and understanding of physics, understanding the role of physics in scientific issues and relevant applications of physics, including the impact these could make on society and the environment, developing scientific inquiry and investigative skills, scientific analytical thinking skills in a physics context, Understanding use of technology, equipment and materials, safely, in practical scientific activities, developing planning skills, problem solving skills, understanding of scientific literacy in everyday contexts, ability to communicate ideas and issues and to make scientifically informed choices. A good pass in National 5 Physics could support an application for an engineering based apprenticeship (eg OGTAP or industry recognised training course).

Physics Higher	
Requirements	This course is offered to S5 and S6 Pupils who have a pass in National 5 Physics at either Grade A or Grade B and also a pass in National 5 Mathematics at either Grade A or Grade B.
Course Content	The Higher Physics course consists of mandatory 3 units: • Our Dynamic Universe • Particles and Waves • Electricity Each unit builds upon and extends the fundamental concepts of Physics introduced at National 5.
Assessment	Internal Assessment • At the end of each Unit a written exam will be given. These are important as the candidate must pass each, in addition to the external exam at the end of the course. Candidates who fail to pass a Unit exam are given one resit opportunity. • Students must also complete a practical investigation and produce a written report, which is internally assessed. External Assessment • Research Assignment: The purpose of the assignment is to assess the application of skills of scientific inquiry and related physics knowledge and understanding. This counts as 17% of the final exam. • Exam: The SQA's written external exam is $2^1/_2$ hours long. Candidates must pass all internal assessments (written and practical) and the SQA exam to be awarded a Higher Physics pass.
Progression / Next Steps	At school level a Higher Physics qualifications can be followed by Advanced Higher Physics. Higher Physics is a very desirable qualification for entry into many Higher /Further Education courses and will be an essential entry requirement into any Physics or Engineering course offered by a college or university, as well as those related to medicine, technology or architecture. Higher Physics is a qualification highly regarded by employers as it develops strong problem solving and analytical thinking skills as well as the ability to think independently. A good pass in Higher Physics could support an application for an engineering based apprenticeship (eg OGTAP or industry recognised training course).

Physics Advanced Higher	
Requirements	This course is offered to S6 Pupils who have a pass in Higher Physics with either Grade A or Grade B and also an A or B pass in Higher Mathematics.
Course Content	The course consists of three mandatory units: • Rotational Motion and Astrophysics • Quanta and Waves • Electromagnetism Each unit builds upon and extends the fundamental concepts of Physics introduced in Higher Physics.
Assessment	Internal • Each unit has a written assessment at the end of it. As in Higher Physics, a pupil must pass these, as well as the external written assessment, before they are awarded a grade in the subject. • Practical Abilities will be formally assessed within each unit by testing the students' competence at carrying out and writing a report of a set experimental investigation. External • Research Investigation and Report: An investigation will be marked externally. The investigation report will be required to contain the presentation and analysis of results obtained during the investigation, details of procedure, a conclusion and a critical evaluation. As far as is practicable, the investigation is of the candidate's choosing and design. This counts towards 23% of the final award • Exam Paper The grade awarded for the course will depend on the total marks obtained for the question paper (total 100 marks) and for the investigation (total 30 marks).
Progression / Next Steps	Advanced Higher Physics is a highly desirable qualification. It will provide entry into relevant Higher Education Courses and prepare pupils for their first year at University. For those not choosing Higher Education, Advanced Higher Physics is a qualification highly regarded by employers as it develops high level problem solving skills, strong communication skills, critical thinking skills and the ability to think independently. Advanced Higher Physics is a very good qualification for entry into subsurface courses eg Petroleum/Reservoir Engineering and Geology/Geophysics and also Engineering courses e.g. Civil, Chemical, Mechanical or Electrical Engineering and also Astrophysics.