



Higher Physics — draft Course rationale and summary

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Course rationale

Background

All new and revised National Courses reflect Curriculum for Excellence values, purposes and principles. They offer flexibility, provide time for learning, more focus on skills and applying learning, and more scope for personalisation and choice.

In this Course, and its component Units, there will be an emphasis on skills development and the application of those skills. Assessment approaches will be proportionate, fit for purpose and will promote best practice, enabling learners to achieve the highest standards they can.

This Course provides learners with opportunities to continue to acquire and develop the attributes and capabilities of the four capacities, as well as skills for learning, skills for life and skills for work.

All Courses provide opportunities for learners to develop breadth, challenge and application, but the focus and balance of the assessment will be appropriate for the subject area.

Relationship between the Course and Curriculum for Excellence values, purposes and principles

Through learning in physics, learners develop their interest in and understanding of the world. They engage in a wide range of investigative tasks, which allows them to develop important skills to become creative, inventive and enterprising, in a world where the skills and knowledge developed by physics are needed across all sectors of society.

Physics Courses should encourage resilience, which leads to becoming a confident individual. Successful learners in physics think creatively, analyse and solve problems. Physics can produce responsible citizens, through studying the impact it makes on their lives, on the environment, and on society.

Higher Physics allows learners to understand and investigate the world in an engaging and enjoyable way. It develops learners' ability to think analytically, creatively and independently, and to make reasoned evaluations. The Course provides opportunities for learners to acquire and apply knowledge, to evaluate environmental and scientific issues, to consider risk, and to make informed decisions. This can lead to learners developing an informed and ethical view of complex issues. Learners will develop skills in communication, collaborative working and leadership, and apply critical thinking in new and unfamiliar contexts to solve problems.

Purpose and aims of the Course

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.

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 enquiry.

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 main aims of this Course are for learners to:

- ◆ develop scientific and analytical thinking skills in a physics context
- ◆ develop an understanding of the role of physics in scientific issues
- ◆ develop problem solving skills in a physics context
- ◆ acquire and apply a deep knowledge and understanding of concepts in physics
- ◆ develop understanding of the applications of physics in society

The Course gives learners a deeper insight into the structure of the subject and aims to reinforce and extend the learner's knowledge and understanding of the concepts of physics. It also aims to develop learners' skills in making critical and evaluative comment.

Advances in physics mean that our view of what is possible is continually being updated. This Course allows learners to deepen their understanding of the processes behind scientific advances and thus promotes awareness that physics involves interaction between theory and practice.

The Course will therefore enable learners to become scientifically literate citizens who will recognise the impact physics makes on their lives, on the environment and on society, and be able to appreciate topical scientific debate. Learners will develop skills for learning beyond Higher and for employment.

Information about typical learners who might do the Course

The Course is suitable for learners who are secure in their attainment of Physics (National 5) or an equivalent qualification. The Course may be suitable for those wishing to study physics for the first time.

This Course has practical and experiential learning opportunities, with a strong skills-based approach to learning. It takes account of the needs of all learners, and provides sufficient flexibility to enable learners to achieve in different ways.

The Course will provide opportunities for learners to develop knowledge and skills in physics, including those that directly relate to everyday life. The development of thinking skills, inquiry and investigative skills, and problem solving and practical skills are fundamental to the Course.

The Course or its components may provide progression to:

- ◆ Advanced Higher Physics
- ◆ Higher in another science subject
- ◆ National Certificate Group Awards
- ◆ HNC, HND or degree in a physics course or a related area
- ◆ employment

Course summary

Course title: Higher Physics

SCQF level 6 (24 SCQF credit points)

Course outline

Mandatory Units

Physics: Our Dynamic Universe (Higher)	(6 SCQF credit points)
Physics: Particles and Waves (Higher)	(6 SCQF credit points)
Physics: Electricity and Research (Higher)	(6 SCQF credit points)

Course assessment

(6 SCQF credit points)

This Course includes six SCQF credit points for 40 additional programmed hours to allow preparation for Course assessment. The Course assessment covers the added value of the Course. Further information on the Course assessment is provided in the Assessment section.

Course structure and conditions of award

The Course will develop and extend skills in scientific thinking, set in context and developed through application-led learning.

Learners will acquire knowledge of concepts in physics, relevant to this level of Course, and be able to apply their understanding to real situations. They will develop skills in making informed decisions, and be prepared to make reasoned evaluations on environmental and scientific issues. They will develop investigative and experimental skills in a physics context.

By completing this Course, learners will develop important and relevant skills, attitudes and attributes related to physics, including: scientific and analytical thinking skills in a physics context; an understanding of the role of physics in scientific issues; problem solving skills in a physics context; the ability to apply knowledge and understanding of concepts in physics; and an understanding of relevant applications of physics in society.

Learners will also gain valuable transferable skills for learning, life and work, including those of literacy and numeracy.

The Course has three Units, totalling 18 SCQF credit points, with an additional six SCQF credit points to allow the use of an extended range of learning and teaching approaches, consolidation of learning, integration, and preparation for external assessment.

Units are statements of standards for assessment and not programmes of learning and teaching. They can be delivered in a variety of ways.

Physics: Our Dynamic Universe (Higher)

This Unit develops knowledge, understanding and enquiry skills related to mechanics and astrophysics. It provides opportunities to develop and apply concepts and principles in a wide variety of situations involving forces and motion, as experienced on Earth and from an astronomical perspective. These include gravitation, relativity and the expanding universe.

Physics: Particles and Waves (Higher)

This Unit develops knowledge and understanding and skills in physics related to sub-atomic physics and waves. The Unit offers opportunities for collaborative and independent learning set within familiar and unfamiliar contexts. It provides opportunities to develop and apply concepts and principles in a wide variety of situations involving the study of particle physics and waves, with wave-particle duality as a linking theme.

Physics: Electricity and Research (Higher)

This Unit develops knowledge, understanding and enquiry skills related to electricity. It provides opportunities to develop and apply concepts and principles in a wide variety of situations involving the study of electrical circuits and semiconductors. It will also develop the key skills necessary to undertake

research in physics and demonstrate their relevance to everyday life by exploring the physics behind a topical issue. This offers opportunities for collaborative and independent learning set within the context of evaluation of scientific issues. Candidates will develop skills associated with collecting and synthesising information from a number of different sources. Equipped with knowledge of standard laboratory apparatus, they will plan and undertake a practical investigative work related to the topical issue.

To gain the award of the Course, the learner must pass all the Units as well as the Course assessment. The required Units are shown in the Course outline section. Course assessment will provide the basis for grading attainment in the Course award.

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Assessment

Information about assessment standards for the Course will be included in the *Course Assessment Specification*, which will provide full details including advice on how a learner's overall attainment for the Course will be determined.

Unit assessment

All Units are internally assessed against the requirements shown in Unit specifications.

They will be assessed pass/fail within centres.

SQA will provide rigorous external quality assurance, including external verification, to ensure assessment judgements are consistent and meet national standards.

Exemplification of possible assessment approaches for these Units will be provided in the *National Assessment Resource*.

Course assessment

Courses from National 4 to Advanced Higher include assessment of [added value](#)¹. At National 5, Higher and Advanced Higher, the added value will be assessed in the Course assessment. The added value for the Course must address the key purposes and aims of the Course, as defined in the Course Rationale. It will do this by addressing one or more of breadth, challenge and application

In the Higher Physics Course, added value will focus on:

- ◆ breadth
- ◆ challenge
- ◆ application

Learners will draw on, extend and apply the skills they have learned during the Course. This will be assessed within a [case study](#)² and a [question paper](#)³, requiring demonstration of the breadth of knowledge, skills and understanding acquired from across the Units and how they can be applied in unfamiliar contexts and/or integrated ways.

¹ Definitions can be found here: www.sqa.org.uk/sqa/45528.html

² See link above for definitions.

³ See link above for definitions.