GRACEMOUNT HIGH SCHOOL

DEPARTMENT OF MATHEMATICS

S5–S6 COURSE CHOICE BOOKLET

Contents

Pupils are once again working on topics appropriate to their ability and building up skills for the relevant S4 course.

Pupils will learn to
- apply their numeracy skills in real life contexts
- increase their algebraic skills
- use reasoning skills in real life contexts
- interpret statistical data
- apply their knowledge of 2 and 3-dimensional shape in real life contexts
- most pupils will also learn how to use basic trigonometry

Assessments will be in early October, December and March. Formative assessment will be used as appropriate in the classroom. Pupils should expect regular homework throughout S3 in addition to any classwork that needs to be completed at home.

Progression from S4 will be into the appropriate S5 and S6, or S5 will be into the appropriate S6 course in mathematics

- National 4 + National 5 Numeracy
- Personal Finance Level 5 + National 5 Mathematics Expressions And Formula Unit
- National 5 Application Mathematics
- National 5 Mathematics
- Higher
- Advanced Higher

What themes or topics you will study in this subject?

National 4 Mathematics

This course consists of three mandatory units, each worth 6 SCQF credit points and an added value unit worth another 6 SCQF points.

The units are:
- expressions and formulae
- relationships
- numeracy

Course Aims

Mathematics | Expressions & Formulae
The general aim of this unit is to develop skills linked to mathematical expressions and formulae. These include the manipulation of abstract terms, the simplification of expressions and the evaluation of formulae. The outcomes cover aspects of number, algebra, geometry and reasoning.

Mathematics | Relationships
The general aim of this unit is to develop skills linked to mathematical relationships. These include solving and manipulating equations, working with graphs and carrying out calculations on the lengths and angles of shapes. The outcomes cover aspects of algebra, geometry, trigonometry and reasoning.

Numeracy
The general aim of this unit is to develop learners' numerical and information handling skills to solve straightforward, real-life problems involving number, money, time and measurement. As learners tackle real-life problems, they will decide what numeracy skills to use and how to apply these skills to an appropriate level of accuracy. Learners will also interpret graphical data and use their knowledge and understanding of probability to identify solutions to straightforward real-life problems involving money, time and measurement. Learners will use their solutions to make and explain decisions.

More information is available here: https://www.sqa.org.uk/sqa/47417.html

Skills for Learning, Life and Work

Communication: active listening, giving & receiving feedback, presenting
Employability: managing resources and time, teamwork
Leadership: extending the thinking of others, offering encouragement

Learning: remembering, understanding, applying, analysing, evaluating, information handling, investigating or, problem solving

Assessment
Each of the three mandatory units has an assessment in which pupils must demonstrate competency. There will be one re-assessment opportunity per assessment.
In addition, the added value unit at the end of the course is another assessment, consisting of two parts: Part 1 is a non-calculator paper lasting 20 minutes assessing mathematical operational skills. Part 2 is a calculator allowed paper lasting 40 minutes and includes reasoning questions.

All assessments in this course are internally assessed in accordance with SQA guidelines. The course is graded on a pass/fail basis.

Homework
- pupils will be expected to work independently to complete work started
- homework to assist pupils' preparation for assessment will also be given.
- regular formal homework will be given, covering each topic in the course.

Progression
- pupils who successfully pass this course are strongly recommended to progress onto Personal Finance with National 5 Expression and Formulae in S5.
- National 5 Application Mathematics or National 5 Mathematics are also a possibility in S5
- skills developed in this course could also support progression into skills for work courses, national pro gression awards, national certificate group awards and employment.

Personal Finance with National 5 Expressions and Formulae:

This course is only delivered in s5/6.

Pupils will study towards the SQA personal finance award at SCQF levels 5. This award will develop knowledge and skills to cope confidently and effectively with the types of financial matters individuals are likely to encounter. From student loans, to pensions, the awards will prepare learners for financial decision making and managing personal finances throughout their lives.

The awards cover a range of topics, including calculating and comparing costs; household budgeting; different forms of borrowing; tax and national insurance; credit cards; bank accounts; exchange rates, interest and inflation rates.

Course structure
The Personal Finance award at SCQF level 5 consists of two mandatory units
- money management
- understanding money

Course assessment
All assessments in these courses are internally assessed in accordance with SQA guidelines. These courses are graded on a pass/fail basis.
Assessment for personal finance is internal and must be completed using the SQA online assessment tool, SOLAR. Pupils must pass each unit to achieve the award.

More information about the personal finance award is available here: https://www.sqa.org.uk/sqa/79416.html

National 5 mathematics

There are 3 Units in this course:

- Mathematics: Expressions & Formulae
- Mathematics: Relationships
- Mathematics: Applications

Course aims

- motivate and challenge pupils by enabling them to select and apply mathematical techniques in a vari ety of mathematical and real-life situations
- develop confidence in the subject and a positive attitude towards further study in mathematics
- develop skills in the manipulation of abstract terms in order to solve problems and to generalise
- allow pupils to interpret, communicate and manage information in mathematical form; skills which are vital to scientific and technological research and development
- develop the pupil's skills in using mathematical language and to explore mathematical ideas
- develop skills relevant to learning, life and work in an engaging and enjoyable way

Course structure

Mathematics: Expressions & Formulae
The general aim of this Unit is to develop skills linked to mathematical expressions and formulae. These include the manipulation of abstract terms, the simplification of expressions and the evaluation of formulae. The Outcomes cover aspects of number, algebra, geometry and reasoning.

Mathematics: Relationships
The general aim of this Unit is to develop skills linked to mathematical relationships. These include solving and manipulating equations, working with graphs and carrying out calculations on the lengths and angles of shapes. The Outcomes cover aspects of algebra, geometry, trigonometry and reasoning.

Mathematics: Applications
The general aim of this Unit is to develop skills linked to applications of mathematics. These include using trigonometry, geometry, number processes and statistics within real-life contexts. The Outcomes cover aspects of these skills and also skills in reasoning.

More information is available here: https://www.sqa.org.uk/sqa/47419.html

External assessment

Paper 1 is a Non-calculator paper allowing candidates to demonstrate skills and understanding from across the course. Paper 2 is a calculator allowed covering the same skills as paper 1 but allowing more opportunity for application of skills. The external assessment will provide the basis for grading the course award (A, B, C, D).

Homework

- pupils will be expected to work independently to complete work started in class on occasion.
- regular formal homework will be given, covering each topic in the course.
- homework to assist pupils' preparation for assessment will also be given.

Progression

- pupils who achieve a grade A, B or C in this course can progress onto higher mathematics.
- skills developed in this course can also support progression into skills for work courses, national pro gression awards, national certificate group awards and employment

The National 5 Applications of Mathematics :

The National 5 Applications of Mathematics course explores the applications of mathematical techniques and skills in everyday situations, including financial matters, statistics, and measurement. The skills, knowledge and understanding in the course also support learning in other curriculum areas, such as technology, health and wellbeing, science, and social.

The purpose of the National 5 Applications of Mathematics course is to motivate and challenge candidates by enabling them to think through real-life situations involving mathematics and to form a plan of action based on logic. The mathematical skills within this course are underpinned by numeracy, and designed to develop candidates' mathematical reasoning skills in areas relevant to learning, life and work.

The course aims to:

- motivate and challenge candidates by enabling them to select and apply mathematical techniques in a variety of real-life situations
- develop the ability to analyse real-life problems or situations with some complex features involving mathematics
- develop confidence in the subject and a positive attitude towards the use of mathematics in real-life situations
- develop the ability to select, apply, combine and adapt mathematical operational skills to new and unfamiliar situations in life and work to an appropriate degree of accuracy
- develop the ability to use mathematical reasoning skills to generalise, build arguments, draw logical conclusions, assess risk, and make informed decisions
- develop the ability to use a range of mathematical skills to analyse, interpret and present a range of information
- develop the ability to communicate mathematical information in a variety of forms
- develop the ability to think creatively and in abstract ways

Course Structure

The National 5 Application of Mathematics consists of three mandatory units

Numeracy
Geometry and Measures
Finance and Statistics

External Assessments
Paper 1 (non-calculator) (45 marks) The purpose of this question paper is to allow candidates to demonstrate the application of mathematical skills, knowledge and understanding from across the course. A calculator cannot be used. This question paper gives candidates an opportunity to demonstrate an understanding of a range of mathematical skills and to select, apply and combine them to perform calculations. Candidates also have opportunities to demonstrate skills in interpreting and presenting information. This question paper has 45 marks out of a total of 110 marks. It consists of short-answer and extended-response questions, most of which are in context.

Paper 2 (65 marks) The purpose of this question paper is to allow candidates to demonstrate the application of mathematical skills, knowledge and understanding from across the course. A calculator may be used. This question paper gives candidates an opportunity to interpret and analyse real-life problems or situations, select appropriate strategies, carry out calculations and draw valid conclusions or justify decisions. This question paper has 65 marks out of a total of 110 marks. It consists of short-answer questions, extended-response questions and case studies, most of which are in context.

The External Assessment will provide the basis for grading the course award (A,B,C,D)

Higher Mathematics

The CfE Higher Mathematics course follows on from National 5 Mathematics and offers a rich and stimulating variety of material. Pupils cover a wide range of mathematical techniques which, whilst being interesting in their own right; also, provide the necessary grounding for many areas of future study.

Aims:

- motivate and challenge learners by enabling them to select and apply mathematical techniques in a variety of mathematical situations
- develop confidence in the subject and a positive attitude towards further study in mathematics and the use of mathematics in employment
- deliver in-depth study of mathematical concepts and the ways in which mathematics describes our world
- allow learners to interpret, communicate and manage information in mathematical form; skills which are vital to scientific and technological research and development
- deepen the learner's skills in using mathematical language and exploring advanced mathematical ideas

Course Description:

The course comprises of three units:

Mathematics | Expressions & Functions
The general aim of this unit is to develop knowledge and skills that involve the manipulation of expressions, the use of vectors and the study of mathematical functions. The outcomes cover aspects of algebra, geometry and trigonometry, and also, skills in mathematical reasoning and modelling.

Mathematics | Relationships & Calculus
The general aim of this unit is to develop knowledge and skills that involve solving equations and to introduce both differential calculus and integral calculus. The outcomes cover aspects of algebra, trigonometry, calculus; also, skills in mathematical reasoning and modelling.

Mathematics | Applications
The general aim of this unit is to develop knowledge and skills that involve geometric applications, applications of sequences and applications of calculus. The outcomes cover aspects of algebra, geometry, calculus, and also skills in mathematical reasoning and modelling.

More information can be found here: https://www.sqa.org.uk/files_ccc/highercoursespecmathematics.pdf

External Assessments
There are two question papers. Paper 1 is non-calculator with 70 marks in 1 hour and 30 minutes. Paper 2 is calculator allowed with 80 marks in 1 hour 45 minutes, comprising of longer questions with topics integrated together. The external assessment will provide the basis for grading the course award (A, B, C, D).

Homework

- Pupils will be expected to work independently to complete work started in class on occasion.
- Regular formal homework will be given, covering each topic in the course.
- Homework to assist pupils' preparation for assessment will also be given.

Progression

Progression on successful completion of this course, the learner could progress to:

Advanced Higher Mathematics

Mathematics has applications in many other subject areas, and skills developed in this course can support progression in other curriculum areas and employment.

Advanced Higher Mathematics

Recommended entry higher grade maths at grade A,B or C

Advanced Higher Mathematic

The course aims to enable pupils to develop skills in selecting and applying complex mathematical techniques in a variety of situations requiring knowledge of Mathematics. The abstract content of the course will greatly benefit pupils who wish to pursue a career in pure mathematics and the more practical aspects of the course will benefit those intending to study any of the many courses which utilise Mathematics. Pupils acquire and apply operational skills necessary for exploring more complex mathematical ideas. In addition, pupils develop mathematical reasoning skills and gain experience in logical thinking and methods of proof.

Course Description: The course comprises of three units:

Methods in algebra and calculus this unit involves:
- applying algebraic skills to partial fractions, applying calculus skills through techniques of differentiation, integration and solving differential equations.

Geometry, proof and system of equations this unit involves:
- applying algebraic skills to matrices, systems of equations and number theory.
- applying algebraic and geometric skills to vectors
- applying geometric skills to complex numbers

Application in algebra and calculus this unit involves:
- applying algebraic skills to the binomial theorem, complex numbers, sequence and series and to summation and mathematical proof
- applying algebraic and calculus skills to properties of functions and also to problems

External assessments

Paper 1 (non-calculator) (35 marks) This question paper allows candidates to demonstrate the application of mathematical skills, knowledge and understanding from across the course. Candidates must not use a calculator. This question paper gives candidates an opportunity to apply numerical, algebraic, geometric, trigonometric, calculus, and reasoning skills specified in the 'Skills, knowledge and understanding for the course assessment' section. This question paper has 35 marks out of a total of 115 marks for the course assessment. It consists of short-answer and extended-response questions.

Paper 2 (80 marks) This question paper assesses mathematical skills. Candidates may use a calculator. This question paper gives candidates an opportunity to apply numerical, algebraic, geometric, trigonometric, calculus, and reasoning skills specified in the 'Skills, knowledge and understanding for the course assessment' section. Using a calculator can facilitate these skills and allow more opportunity for application and reasoning. When solving problems, candidates typically use calculators to perform calculations that are more complex. This question paper has 80 marks out of a total of 115 marks for the course assessment. It consists of short-answer and extended-response questions.

- National 4 + National 5 Numeracy
- Personal Finance Level 5 + National 5 Mathematics Expressions And Formula Unit
- National 5 Application Mathematics
- National 5 Mathematics
- Higher

What careers are available?

There Are A Variety Of Careers Available That Require Mathematics Including:-

Financial/Accountancy/Banking Sectors

Computing/Software Development/Games Sectors

Joiner/Carpenter/Plumber/Motor Vehicle

Architecture/Construction And Engineering Sectors