

Context:

Key Stage 5 – Our students follow the Edexcel syllabus at A Level where they not only cover the topic areas listed below but also focus on modelling by applying the mathematics they have been taught.

In Key Stage 4, Year 11 have an increased focus on exam preparation. We forensically diagnose strengths & areas that need developing. Our students are then supported to develop their areas that need improving so that they confident as they enter the summer GCSE exams.

Year 10 follow continue the Complete Maths Curriculum with an increased focus on preparation for their GCSEs through regular milestone assessments which a based around GCSE examination material. The stage to which the pupils progress will determine their entry for their GCSE exams.

In Key Stage 3, pupils are working through the Complete Maths Curriculum. The knowledge and skills of each pupil will be assessed and teaching will start from this point. Every pupil will start at the beginning of a Stage and work through the topics in the given order.

More detail about our approach to teaching using the Complete Maths Curriculum is given in the table below.

If you have any questions or would like to discuss our approach further, email mfox@colmers.school.

Key Stage 5

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	1 - 8	9 - 15	16 - 21	22 - 26	26 - 31	32 - 39
13	Algebraic methods. Functions and Graphs Sequences and Series Regression, Correlation & Hypothesis testing Conditional probability Normal Distribution	Binomial Expansion Radians Trigonometric Functions Moments Forces and friction	Trigonometric Functions Parametric Equations Projectiles Application of forces Further Kinematics	Differentiation Integration Numerical Methods Vectors	Exam style practice	
12	Algebra & Functions Data presentation Probability Stats distribution	Coordinate Geometry Trigonometry Stats distribution Hypothesis testing	Trigonometry Further Algebra Differentiation Hypothesis testing	Integration Quantities in Mechanics Kinematics Forces & Newtons laws	Exponentials & Logarithms Vectors 2D Kinematics 2 Sampling	Exam style practice. Begin Y13 syllabus.

Key Stage 4

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	1 - 8	9 - 15	16 - 21	22 - 26	26 - 31	32 - 39
11	Exam Prep 1 Exam 1 Work on areas that need developing, as diagnosed from Exam 1.	Exam Prep 2 & 3 (Winter Mocks) Exam 2 & 3 Work on areas that need developing, as diagnosed from Exam 2 & 3	Work on areas that need developing, as diagnosed from Exam 2 & 3 Weekly exam paper practise Exam Prep 4 & 5 (Spring Mocks)	Exam Prep 4 & 5 (Spring Mocks) Exam 4 & 5 Work on areas that need developing, as diagnosed from Exam 4 & 5.	Final summer preparation – exam style practice.	
10 (Higher)	Stage 9 - Working on areas that need developing from Stage 9 (or previous stage) as diagnosed from previous assessment.	Stage 10 - Proportion, Sequences, Probability.	Stage 10 - Numbers and Accuracy (bounds) Linear Algebra.	Stage 10 – Functions. Circles. Trigonometry. Measures and Units. Quadratic Equations.	11 – Rates of Change. Further Sequences. Grouped Data. Trends. Combining Transformations.	Stage 11 – Vectors. 3D Shapes. Inequalities. Proof. Advanced Area and Volume.
10 (Foundation)	Stage 9 – Arithmetic with Fractions, Expressions and Formulae Stage 8 – Arithmetical Operations with Decimals and Negatives, Linear Equations with Unknowns no Both Sides	Stage 9 – Angles and Polygons. Sample Spaces to Calculate Theoretical Probabilities. Ratio and Percentage Change. Stage 8 – Parallel, Alternate and Corresponding, Sets and Unions, Percentages	Stage 9 – Rearranging and Solving Linear Equations. Geometrical Relationships and Pythagoras’ Theorem. Central Tendency and Spread. Stage 8 – Sequences and Relationships, Symmetries and Constructions	Stage 9 – Mathematical Models. Using Graphs to Solve Equations. Stage 8 – Using Averages, Range and Relationships to Describe Data, Multiples Factors and Primes	Stage 9 – Pythagoras’ Theorem and Trigonometry. Standard Form and the Number System. Stage 8 – Linear Equations: Graphically and Algebraically, Accuracy with Perimeter, Area and Volume. Dividing Quantities into Ratios.	Stage 9 – Geometric Sequences. Compound Units. Mathematical Relationships. Stage 8 – Algebraic Expressions. Translations, Rotations and Reflections. Diagrams and Constructions.

Key Stage 3

Below is the journey that a student would take through their three years in KS3 if they made a years progress in each academic year. Classes and/or individual students may make faster progress through the curriculum and as a result will move through the curriculum at a faster pace. Key milestones are given for each year group which we would expect all students to achieve in the given term.

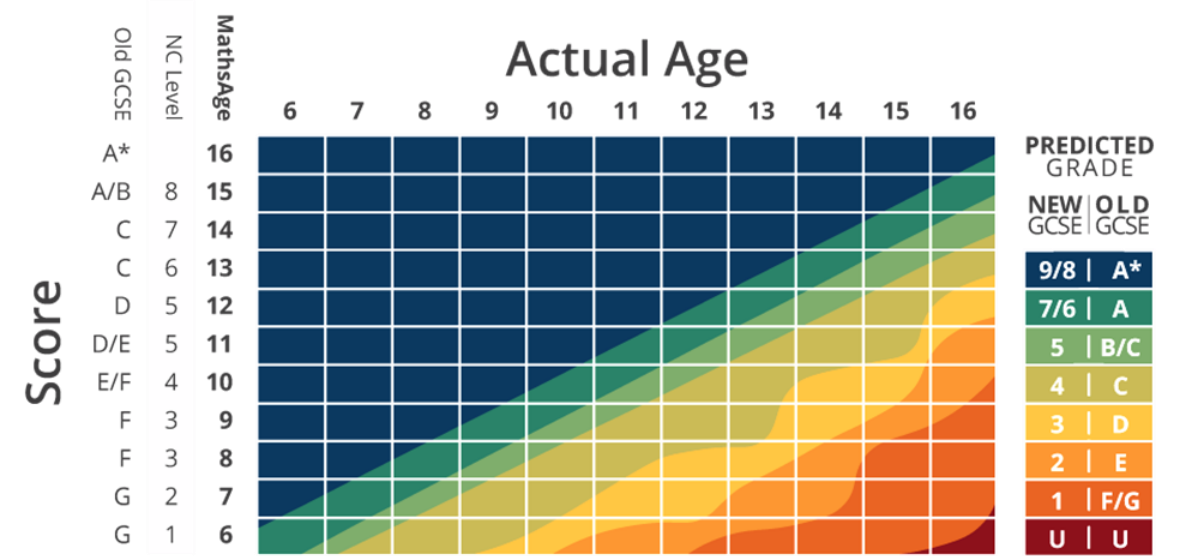
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	1 - 8	9 - 15	16 - 21	22 - 26	26 - 31	32 - 39
YEAR 9 KEY MILESTONES	Number: To use the four operations, fractions and powers. Geometry: To solve angle problems in polygons.	Algebra: To manipulate expressions maintaining equivalence Statistics: To understand probability.	Algebra: To solve problems involving sequences Statistics: To use measures of central tendency and spread.	Algebra: To understand and describe linear functions. Statistics: To use stem and leaf and frequency polygons	Number: To use standard form to represent big and small numbers. Geometry: To find missing lengths in shapes.	Algebra: To solve equations graphically and algebraically. Measures: To use compound units.
9	Stage 9 – Arithmetic with Fractions, Expressions and Formulae Stage 8 – Arithmetical Operations with Decimals and Negatives, Linear Equations with Unknowns no Both Sides Stage 7 – Working with Place Value, Introducing Algebra, Lines and Angles,	Stage 9 – Angles and Polygons. Sample Spaces to Calculate Theoretical Probabilities. Ratio and Percentage Change. Stage 8 – Parallel, Alternate and Corresponding, Sets and Unions, Percentages Stage 7 – The probability Scale, Powers Roots and Rounding,	Stage 9 – Rearranging and Solving Linear Equations. Geometrical Relationships and Pythagoras’ Theorem. Central Tendency and Spread. Stage 8 – Sequences and Relationships, Symmetries and Constructions Stage 7 – Formulae Sequences and Rules, Using Measurements	Stage 9 – Mathematical Models. Using Graphs to Solve Equations. Stage 8 – Using Averages, Range and Relationships to Describe Data, Multiples Factors and Primes Stage 7 – Representing and Interpreting Data, Order of Operations,	Stage 9 – Pythagoras’ Theorem and Trigonometry. Standard Form and the Number System. Stage 8 – Linear Equations: Graphically and Algebraically, Accuracy with Perimeter, Area and Volume. Dividing Quantities into Ratios. Stage 7 - Linear Equations, Properties of Shapes and Solids, Ratio	Stage 9 – Geometric Sequences. Compound Units. Mathematical Relationships. Stage 8 – Algebraic Expressions. Translations, Rotations and Reflections. Diagrams and Constructions. Stage 7 – Graphs of Linear Functions, Congruence and Scale Drawing
YEAR 8 KEY MILESTONES	Number: To be able to find and identify factors, multiples and primes Geometry: To be able to find missing angles in a diagram.	Algebra: To be able to simplify algebraic expressions. Measures: To work with lengths, area and volume in a variety of units.	Number: To be able to calculate with fractions, decimals and percentages. Geometry: To be able to describe translations and reflections.	Algebra: To write expressions to represent different contexts. Statistics: To be able to represent and interpret a variety of data.	Number: To work confidently with ratio Statistics: To work with measures of central tendency.	Algebra: To describe linear functions in a range of contexts. Measures: To convert between a range of units.
8	Stage 8 – Arithmetical Operations with Decimals and Negatives, Linear Equations with Unknowns no Both Sides Stage 7 – Working with Place Value, Introducing Algebra, Lines and Angles, Stage 6 – Working with Place Value, Multiplication and Division,	Stage 8 – Parallel, Alternate and Corresponding, Sets and Unions, Percentages Stage 7 – The probability Scale, Powers Roots and Rounding, Stage 6 – Using Factors, Multiples and Primes to work with Fractions. Perimeter, Area and Volume	Stage 8 – Sequences and Relationships, Symmetries and Constructions Stage 7 – Formulae Sequences and Rules, Using Measurements Stage 6 Arithmetical Operations, Translations and Reflections	Stage 8 – Using Averages, Range and Relationships to Describe Data, Multiples Factors and Primes Stage 7 – Representing and Interpreting Data, Order of Operations, Stage 6 – Fractions, Decimals and Percentages, Number Problems and Equations.	Stage 8 – Linear Equations: Graphically and Algebraically, Accuracy with Perimeter, Area and Volume. Dividing Quantities into Ratios. Stage 7 - Linear Equations, Properties of Shapes and Solids, Ratio Stage 6 – Converting Measures, Accuracy and Proportion, Pie Charts and the Mean	Stage 8 – Algebraic Expressions. Translations, Rotations and Reflections. Diagrams and Constructions. Stage 7 – Graphs of Linear Functions, Congruence and Scale Drawing Stage 6 – Formulae and Sequences, Dimensions and Scale, Angles, Shapes and Solids.
YEAR 7 KEY MILESTONES	Number: To understand the importance of place value. Statistics: To be able to present and interpret data in a variety of formats.	Algebra: To be able to find missing numbers in expressions. Geometry and Measures: To be able to measure and draw angles.	Number: To use the four operations including order of operations. Statistics: To use information from graphs, tables and timetables.	Algebra: To be able to use simple algebraic notation. Geometry and Measures: To be able to reflect and translate shapes.	Number: To know common fraction, decimal and percentage equivalents. Measures: To be able to find area and perimeter of simple shapes.	Algebra: To substitute values into formula Geometry: To be able to describe the properties of 2D and 3D shapes.
7	Stage 7 – Working with Place Value, Introducing Algebra, Lines and Angles, Stage 6 – Working with Place Value, Multiplication and Division, Stage 5 - Large and Negative Numbers, Angles,	Stage 7 – The probability Scale, Powers Roots and Rounding, Stage 6 – Using Factors, Multiples and Primes to work with Fractions Perimeter, Area and Volume Stage 5 – Decimals Equivalence and Rounding, Addition and Subtraction,	Stage 7 – Formulae Sequences and Rules, Using Measurements Stage 6 Arithmetical Operations, Translations and Reflections Stage 5 – Reflection and Translation, Primes, Factors, Squares and Cubes. Multiplication	Stage 7 – Representing and Interpreting Data, Order of Operations, Stage 6 – Fractions, Decimals and Percentages, Number Problems and Equations. Stage 5 - Solving Problems Using the Four Operations, Using Information from Graphs, Tables and Timetables.	Stage 7 - Linear Equations, Properties of Shapes and Solids, Ratio Stage 6 – Converting Measures, Accuracy and Proportion, Pie Charts and the Mean Stage 5 – Solving Problems with Measures and Time, Solving Problems with Fractions	Stage 7 – Graphs of Linear Functions, Congruence and Scale Drawing Stage 6 – Formulae and Sequences, Dimensions and Scale, Angles, Shapes and Solids. Stage 5 – Metric Measurements in Shapes, Fractions and their Decimal and Percentage Equivalents, Identifying Shapes

Rationale:

All students follow a mastery approach to their learning. We fundamentally believe that the key to learning a new idea is the underpinning knowledge that makes it possible to do so. Therefore, before starting to teach a new idea we first assess whether students have understood the prerequisite ideas for this new idea; if they haven't, then we rectify this before commencing the new learning. We baseline test new students to see where their mathematical learning starts to break down and then start teaching from that point. Our teaching platform, [Complete Mathematics](#) will always generate a Maths Age for each student after every assessment, whether a low-stakes weekly quiz or a longer, more formal test.

Maths Age is a way of allowing everyone involved – teachers, students and parents – to have a clear picture of where the student is right now and where the student is heading. This will become more and more accurate as the student provides more and more evidence. If a student has followed a mastery approach from Year 1 then their Maths Age should be close to their actual age. If not, then the Maths Age in most classes will be below their actual age and it is our ambition to close this gap. However, one of the fundamental principles of mastery is that “effort matters” and that the “determined student” will be able to achieve success. Students will need to actively engage with their learning and show resilience if this is to happen. As you can see from the flight path, a student whose maths age is consistently the same as their actual age should achieve the very highest grades at GCSE. A fully interactive version of the whole of the school level mathematics curriculum, from Year 1 to Year 13, can be found on our [Complete Mathematics platform](#). Classes will start at the stage most suited to their current understanding, regardless of which key stage they are.

As we mentioned earlier, if a student has followed a mastery approach from Year 1 then their Maths Age should be close to their actual age. This document lists the work which could have been covered at a particular Key Stage. In practice, the Maths Age in most classes will be **below** their actual age and it is our ambition to **close this gap**.



Stage	5	6	7	8	9	10	11
Maths Age	10	11	12	13	14	15	16

Order of Topics:

Stage 5

- 5.1 - Large and Negative Numbers in Different Formats
- 5.2 - Drawing, Measuring and Estimating Angles
- 5.3 - Decimals, Equivalence and Rounding
- 5.4 - Addition and Subtraction
- 5.5 - Reflection and Translation
- 5.6 - Primes, Factors, Squares and Cubes
- 5.7 - Long Multiplication
- 5.8 - Solving Problems Using the Four Operations
- 5.9 - Using Information from Graphs, Tables and Timetables
- 5.10 - Solving Problems with Measures and Time
- 5.11 - Solving Problems with Fractions
- 5.12 - Metric Measurements in Shapes
- 5.13 - Fractions and their Decimal and Percentage Equivalents
- 5.14 - Identifying Shapes

Stage 6

- 6.1 - Place Value
- 6.2 - Multiplication and Division
- 6.3 - Using Factors, Multiples and Primes to work with Fractions
- 6.4 - Perimeter, Area and Volume
- 6.5 - Arithmetical Operations
- 6.6 - Translations and Reflections
- 6.7 - Fractions, Decimals and Percentages
- 6.8 - Number Problems and Equations
- 6.9 - Converting Measures
- 6.10 - Accuracy and Proportion
- 6.11 - Pie Charts and the Mean
- 6.12 - Formulae and Sequences
- 6.13 - Dimensions and Scale

Stage 7

- 7.1 - Working with Place Value
- 7.2 - Introducing Algebra
- 7.3 - Lines and Angles
- 7.4 - The Probability Scale
- 7.5 - Powers, Roots and Rounding
- 7.6 - Formulae, Sequences and Rules
- 7.7 - Using Measurement
- 7.6 - Formulae, Sequences and Rules
- 7.7 - Using Measurements
- 7.8 - Representing and Interpreting Data
- 7.9 - Order of Operations
- 7.10 - Linear Equations
- 7.11 - Properties of Shapes and Solids
- 7.12 - Ratio
- 7.13 - Graphs of Linear Functions
- 7.14 - Congruence and Scale Drawing

Stage 8

- 8.1 - Arithmetical Operations with Decimals and Negatives
- 8.2 - Linear Equations with Unknowns on Both Sides
- 8.3 - Parallel, Alternate and Corresponding
- 8.4 - Sets and Unions
- 8.5 - Percentages
- 8.6 - Sequences and Relationships
- 8.7 - Symmetries and Constructions
- 8.8 - Using Averages, Range and Relationships to Describe Data
- 8.9 - Multiples, Factors and Primes
- 8.10 - Linear Equations: Graphically and Algebraically
- 8.11 - Accuracy with Perimeter, Area and Volume
- 8.12 - Dividing Quantities into Ratios
- 8.13 - Algebraic Expressions
- 8.14 - Translations, Rotations and Reflections
- 8.15 - Diagrams and Construction

Stage 9

- 9.1 - Arithmetic with Fractions
- 9.2 - Expressions and Formulae
- 9.3 - Angles and Polygons
- 9.4 - Sample Spaces to Calculate Theoretical Probabilities
- 9.5 - Ratio and Percentage Change
- 9.6 - Rearranging and Solving Linear Equations
- 9.7 - Geometrical Relationships and Pythagoras' Theorem
- 9.8 - Central Tendency and Spread
- 9.9 - Mathematical Models
- 9.10 - Using Graphs to Solve Equations
- 9.11 - Pythagoras' Theorem and Trigonometry in Right-Angled Triangles
- 9.12 - Standard Form and the Number System
- 9.13 - Geometric Sequences
- 9.14 - Compound Units
- 9.15 - Mathematical Relationships

Stage 10

- 10.1 - Proportion
- 10.2 - Sequences
- 10.3 - Probability Calculations for More than One Event
- 10.4 - Numbers and Accuracy
- 10.5 - Linear Algebra
- 10.6 - Functions
- 10.7 - Circles
- 10.8 - Trigonometry
- 10.9 - Measures and Units
- 10.10 - Quadratic Equations

Stage 11

- 11.1 - Rates of Change
- 11.2 - Further sequences
- 11.3 - Grouped Frequency Data Representation
- 11.4 - Trends
- 11.5 - Combining Transformations
- 11.6 - Vectors
- 11.7 - 3D Shapes
- 11.8 - Inequalities
- 11.9 - Proof
- 11.10 - Advanced Area and volume



What do we expect each year group to be able to do by the end of each year?	
Year 7	
Number	Understanding the importance of place value Be able to round numbers Use BIDMAS Able to simplify ratio
Algebra	Be able to use simple algebraic notation Know the difference between an expression an equation and a formula Substitute numbers into formulae and expressions Be able to identify a sequence and continue it Solve simple equations Work with coordinates & graph a straight line using a linear function
Geometry	An understanding of lines, angles and polygons Know the properties of quadrilaterals Identify 3D solids Understand the difference between similarity and congruence Be able to produce a drawing to scale Construct a scalene, isosceles and equilateral triangle
Statistics	Understand the probability scale
Year 8	
Number	Formal methods with all 4 operations, including negatives & decimals Find a fraction of a number Find a percentage of a number Be able to find multiples & factors Express a number using prime numbers Divide an amount into a given ratio
Algebra	Solve equations with unknowns on both sides, including the use of brackets Find the n^{th} term of a sequence Use a conversion graph Produce straight line graphs, understanding the gradient & intercept Factorisation of an expression
Geometry	Able to find, giving reasons, angles on parallel lines Perimeter, area & volume of shapes, including circles Introduction to bearings, scale diagrams & maps Able to describe a transformation in terms of reflection, translation, rotation, enlargement Work with similar shapes & scale factors
Statistics	Introduction to venn diagrams Able to find the mean, mode, median of a set of data Introduction to scatter graphs
Year 9	
Number	Four operations with fractions Connecting ratio with fractions Percentage change Very big & very small numbers with standard form

Algebra	Rearranging formulae Expanding triple brackets Using a graph to solve a quadratic equations & linear equation Geometric sequences
Geometry	Solving angle problems in polygons Use Pythagoras Theorem to find missing sides in right angled triangles Use trigonometry to find missing sides and angles in right angled triangles Work with density, speed & pressure
Statistics	Work with mutually exclusive events & sample space diagrams Estimate the mean from grouped data & be able to produce a frequency polygon Work with stem & leaf diagrams Use box & whisker plots to find the interquartile range
Year 10	
Number	Compound interest & percentage problems (reverse percentage) Sequences involving triangular, square, cubic & Fibonacci Upper & lower bounds Standard form calculations Surds
Algebra	Direct & inverse proportion Simultaneous equations Use iteration to solve equations Modelling problems using straight line graphs Translating functions graphically Solve quadratic equations Understand roots & turning points
Geometry	Comparing lengths, areas & volumes using ratio & scale factors Know the definitions of circle properties Able to use circle theorems & find an equation of a tangent Use the sine & cosine rule to find lengths & angles
Statistics	Use of tree diagrams to find probability of independent events Systematic listing strategies Relative frequency
Year 11	
Number	Quadratic sequences
Algebra	Nth term of quadratic sequences Gradients & rates of change Inequalities – linear & quadratic Construct arguments & proofs with equations & identities Convert a recurring decimal to a fraction
Geometry	Transformations involving fractional & negative scale factors Describe transformations involving combinations of rotations, reflections, translations Construct geometrical proofs Vectors – be able to use the four operations & solve geometrical problems Solve area & volume problems involving spheres, pyramids, cones & composite solids Work with arcs & sectors
Statistics	Interpreting scatter graphs, understanding correlation Inferring characteristics of populations from sample data Working with grouped data, continuous & discrete, through the use of histograms

GCSE Grade Descriptors	
9	To achieve grade 9, students' evidence will show that they have securely met all the statements within the grade 8 descriptor, with stronger performance in most or all aspects of the grade 8 statements.
8	To achieve grade 8, candidates will be able to: • Perform procedures accurately. • Interpret and communicate complex information accurately. • Make deductions and inferences and draw conclusions. • construct substantial chains of reasoning, including convincing arguments and formal proofs. • Generate efficient strategies to solve complex mathematical and nonmathematical problems by translating them into a series of mathematical processes. • Make and use connections, which may not be immediately obvious, between different parts of mathematics. • Interpret results in the context of the given problem. • Critically evaluate methods, arguments, results and the assumptions made.
7	To achieve grade 7, students' evidence will show that they have securely met all the statements within the grade 6 descriptor, with stronger performance in most or all aspects of the grade 6 statements. However, their evidence does not meet the minimum requirements of most of the grade 8 statements.
6	To achieve grade 6, candidates will be able to: • Perform single- and multi-step procedures accurately by recalling, applying and interpreting notation, terminology, facts, definitions and formulae. • Interpret and communicate information accurately. • Make deductions, inferences and draw conclusions. • Construct chains of reasoning, including arguments and basic formal proofs. • Generate strategies to solve mathematical and non-mathematical problems by translating them into a series of mathematical processes. • Make and use connections between different parts of mathematics. • Evaluate methods, results and arguments. • Interpret results in the context of the given problem.
5	To achieve grade 5, candidates will be able to: • Perform routine single- and multi-step procedures effectively by recalling, applying and interpreting notation, terminology, facts, definitions and formulae. • Interpret and communicate information effectively. • Make deductions, inferences and draw conclusions. • Construct chains of reasoning, including arguments. • Generate strategies to solve mathematical and non-mathematical problems by translating them into mathematical processes, realising connections between different parts of mathematics. • Interpret results in the context of the given problem. • Evaluate methods and results.
4	To achieve grade 4, candidates will be able to: • Perform routine single- and multi-step procedures effectively by recalling, applying and interpreting notation, terminology, facts and definitions. • Interpret and communicate information. • Make simple deductions and draw conclusions. • Construct chains of reasoning. • Solve problems by translating mathematical and non-mathematical problems into mathematical processes. • Evaluate methods or results. • Interpret results in the context of the given problem.
3	Characteristics that differentiate a grade 3 from a grade 4: • some interpretation and communication of information only which may be lacking in detail • chains of reasoning are more often constructed for non-mathematical contexts rather than mathematical contexts and may not be complete • correct answers are more likely to occur when the problem translated into processes is non-mathematical rather than mathematical • evaluate a method or result by working out the correct answer rather than by providing a written evaluation • may make errors that impact on the completion of multi-step procedures
2	To achieve grade 2, candidates will be able to: • Recall and use notation, terminology, facts and definitions; perform routine procedures, including some multi-step procedures. • Interpret and communicate basic information; make deductions and use reasoning to obtain results. • Solve problems by translating simple mathematical and nonmathematical problems into mathematical processes. • Provide basic evaluation of methods or results. • Interpret results in the context of the given problem.
1	To achieve a grade 1, students' will show that they have demonstrated engagement with sufficient content, achieved some credit across elements of the specification content and achieved credit in some assessment objectives.