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Change Record		
Version	Date	Description
1.1	FGB (Q&P) 3 Nov 16	Minor changes to sections
1.2	20 Nov 2017	Amended various sections; wording, grades 9-1 replace KS3 levels, specifics for form tutors and SL role amended. 9-1 content amended
1.3	October 2018	Amended to accommodate Role of Numeracy coordinator. Further scrutiny of 9-1 content
1.4	September 2019	Amended to reflect return to Maths Department and some change in content and frequency of form time activities
1.5	July 2021	Amended to emphasise the impact of poor numeracy and the importance of all staff having high aspirations for and supporting the numeracy of students across the curriculum. Amended to reduce duplication between responsibilities and for clarity. Updates to parental engagement to include more guidance to staff on how we can support parents.

“Settle College promotes the safeguarding and welfare of children in its care; all policies support the “Child Protection Policy”



MATHS ACROSS THE CURRICULUM

Introduction

Settle College is committed to raising the standards of numeracy of all its students, so that they develop the ability to use numeracy skills effectively and confidently in all areas of the curriculum, and achieve success in future education, employment and adult life.

Each year, too many students nationally leave school without a good GCSE in maths, and their poor numeracy holds them back in other subjects. These pupils are disproportionately drawn from disadvantaged homes, with about half of these students not achieving the expected level in English and maths by age 16. Very often students can lack confidence in basic numeracy skills, which can be readily supported across the curriculum. Positive teacher talk, guidance and support around numeracy is therefore an absolute necessity to ensure social mobility and individual success.

The teaching of numeracy and mathematics is the responsibility of all staff at Settle College and this policy further supports the College's drive for consistency in approaches to Mathematics across the curriculum. Our aim is to raise the achievement of all learners in the College by working together to develop their Mathematical skills by consistent and accurate application across the curriculum. We believe that Mathematics skills can be consolidated and enhanced when students have opportunities to apply and develop them across the curriculum. To improve these skills is a whole college matter.

Responsibilities for numeracy within Settle College

Settle College is committed to:

- Raising the profile of mathematics and numeracy within the College;
- Raising standards of numeracy;
- Making mathematics teaching and numeracy an overt part of every curriculum area.

Settle College will:

- Create a positive and attractive environment which celebrates mathematics
- Emphasise and promote nationally recognised numeracy days and events such as National Pi Day, National Numeracy Day, Ensure that there are activities in the curriculum to allow pupil/students to learn and practise their range of mathematics skills;
- Use and refer to methods in mathematics shared with staff across the curriculum;
- Provide Professional Development on teaching and using mathematics as appropriate.

The College Leadership Team will:

- Support the development and implementation of cross curricular mathematics policy and practice;
- Monitor the effectiveness of cross curricular mathematics strategy in raising standards of achievement;
- Monitor the implementation of the whole College mathematics policy through learning walks and book scrutiny;
- Provide Professional Development opportunities and resources for teachers and associate staff as appropriate to further support their own understanding and practical competency in mathematics.

The Leader of Whole School Mathematics will:

- Work with the Leadership Team to determine a strategy for dealing with mathematics across the curriculum and ensure the effective development of the whole College mathematics policy;
- Monitor the implementation of the whole College mathematics policy with the college Leadership Team;
- Evaluate the effectiveness of the strategy and modify it as necessary;
- Facilitate staff Professional Development on common practices and methods to be adopted across the whole College and provide exemplar materials for use in classroom (posters, PPT slides);
- Work systematically with TAs, Subject Teachers and individual staff;
- Encourage teachers of Mathematics to advise to other staff and subject teachers so that a consistent approach is used across the whole College;



- Raise the profile of mathematics across the whole College;
- Seek opportunities for topics from other subjects to be used in mathematics lessons;
- Ensure publication of mathematical methods to be used consistently across the College as part of a teacher toolkit for all staff;
- Ensure publication of a numeracy booklet for parents of KS3 students starting in Y7 – 'How to help your child at home';
- Ensure staff from other subjects are consulted on updates and requirements;
- Oversee the appointment of maths 'Champions' across each year group to aid the delivery of mathematical content within other subject areas and in form time, in liaison with HOY.

The Role of Staff:

In order for the cross curricular strategy to be effective, it is important that all staff:

- Understand what mathematics and numeracy are;
- Form tutors will use the fortnightly PPT slide/theme, as well as the maths strand of the website <http://formtimeideas.com/> to actively engage in maths activities during form time, at least once a week
- Are aware of how they can support the delivery of mathematics within their subject, including making use of the appointed maths 'Champions' to lead activities in tutor time and assist during lesson time;
- Challenge any 'can't do' attitude and stigmas students may present, using the 'not yet' school phrasing to positively reinforce the importance of developing numeracy skills to a good level;
- Ensure that mathematical tasks included in their lessons are age and ability appropriate and used accurately;
- Consider mathematics demands in their short and mid-term planning, using the Mathematics methods/toolkit for guidance or seek additional guidance where required;
- Have high aspirations for the success of all students with mathematics, paying particular attention to supporting students who are lacking in confidence with their numeracy or have SEND.
- Reflect systematically on the impact that the use of numerical teaching techniques has on pupil outcomes and attitudes.

The Role of Subject Leaders:

In order that the policy becomes whole College practice, it is important **that** Learning Managers and Subject Leaders ensure that:

- Schemes of work have opportunities for the use of mathematics included and identified;
- Communicate opportunities for use of mathematics within their subject area to the Subject Leader maths, or designate a 'numeracy link' within the subject team to support this;
- Lesson plans include relevant mathematics learning outcomes;
- All staff, particularly new staff, are aware of the Mathematics Policy and its inclusion in the subject area;
- Their subject area has identified relevant mathematical methods from those accessible to staff and teaching staff are aware of and use relevant ICT (websites/software e.g. MyMaths);
- The promotion of Mathematics and support to students with their maths in lessons is included in the regular monitoring of teaching and learning and departmental self-review.

Subject areas will:

Contribute to the raising of Mathematics standards within their curriculum area by:

- Displaying exemplar materials provided in classrooms;
- Displaying examples of mathematics within curriculum-based contexts (e.g. subject specific posters);



Establishing links between Mathematics and other Subject Areas

Mathematical thinking and numeracy occur in subject areas across all key stages within the College, where the application of maths demonstrates its relevance and allow practice of the skills acquired in Mathematics lessons. The ability of students to apply their mathematics in new and unfamiliar contexts is enhanced each time they are given new opportunities to use it in real contexts.

The following guidelines summarise the mathematical skills students, of different abilities, should have.

From Key Stage 2 onwards (see tables below for KS3/KS4)

a. All students should:

- Have a sense of the size of a number and where it fits into the number system;
- Be able to do simple addition, subtraction, multiplication and division using either a mental or written method;
- Make estimates of measurement and be able to identify different units of measurement;
- Have a knowledge of the times tables either by recall or by adding on.
- Know tables 1-10

b. More Able students should:

- Be able to use mental methods to perform calculations involving addition, subtraction, multiplication and division of numbers including simple decimals; use of standard methods (column addition and subtraction, long multiplication or lattice method, long/short division)
- Be able to convert between metric units;
- Have a knowledge of simple equivalent fractions, decimals and percentages ($\frac{1}{2}$, 0.5, 50%, etc.);
- Be able to find a simple percentage of a quantity (10%, 25%, 50% and 100%);
- Be able to perform simple fractions by cancelling common factors;
- Be able to read information from simple diagrams, charts and graphs (bar charts, pictograms and pie charts);
- Make sense of number problems and be able to identify the operations required to solve the problem.
- Confidently use tables 1-10, and squares up to 15^2

c. High ability students should:

- Calculate accurately using a variety of strategies both mental and written methods, including two and three digit numbers and decimals; confidently use column addition and subtraction, long multiplication or lattice method, long/short division
- Be able to identify equivalent fractions, as well as their related decimals and percentages;
- Be able to find the percentage of a quantity with or without a calculator and understand problems involving percentage increase and decrease;
- Explain their methods and reasoning for solving a problem using mathematical language;
- Judge whether their answers are reasonable and have a range of strategies for checking their answers explain and interpret charts, diagrams, graphs and tables.
- Know and use tables 1-10, and squares up to 15^2 , confidently

English

English lessons may provide non-fiction texts in which mathematical information in the form of graphs, tables or charts may need to be interpreted and explained. Students may also use methods of organising information, such as Venn Diagrams and graphs which they learn in maths, when expressing their ideas or understanding, or planning written responses to questions. Mathematics lessons help to develop literacy skills by teaching mathematical vocabulary and technical terms and by requiring learners to read and interpret problems and identify the mathematics necessary to solve the problem. It also requires learners to explain their methods and strategies to others and present their findings and conclusions.

Science

A large part of the Science curriculum requires the application of mathematical skills. Every part of scientific enquiry (including Working Scientifically at Key Stage 3) requires some mathematical skills. This involves classifying, counting, measuring, calculating, estimating and recording in charts, tables or graphs. It also involves the use of mathematical equations and formulae, where the learners have to use and manipulate



various formulae. Science provides the learners with many opportunities to apply mathematical skills in real life contexts.

Art, Design and Technology

All of these areas rely quite heavily on the learner being able to measure and use spatial skills and the properties of shapes including the use of symmetry and tessellations. Designs may require enlarging or reducing and the use of ratios and proportions may be required in the context of modifying recipes. Both metric and imperial measurements and conversions may be taught and used. The need for plans in D&T requires students to be able to produce scale drawings and be able to draw 2D and 3D shapes and elevations as well as scale work.

Business Studies

Mathematics is an important part of all Business Studies and Economics courses. Learners use mathematics in both the creation and interpretation of graphs, charts and tables. Percentages are widely used in data comparisons. Learners need to be able to calculate using mental calculations, but they also need to be confident in the use of a calculator. Skills of analysis are involved when looking at primary and secondary data and in the scrutiny of questionnaire results. Learners also use Excel spread sheets.

ICT

Learners will be able to use skills of collecting, classifying and representing data by using data handling software and produce graphs and tables and interpret their results. They may use computer models and simulations that will require their ability to manipulate numbers and identify patterns and relationships. When using programming software, they require arithmetic skill and algebraic understanding to structure, store and manipulate data successfully in their applications. Computational thought is central to the algorithm and programming element of the curriculum which has a strong emphasis on problem solving and logic. The Data and data representation strand of the Computing curriculum requires arithmetic skill to convert to and be able to manipulate different number systems (binary and hex). In addition, programs may require the manipulation of numbers and a knowledge of mathematical methods to enable them to function i.e. work out the area of a circle.

The key to making the most of these opportunities is to identify the mathematical possibilities across the curriculum at the planning stages. Students' attention should also be drawn to the links between subjects both in mathematics lessons and when using mathematical skills in other areas of the curriculum.

History and Geography

In History and Geography learners may collect data by measuring or counting and record results in the form of charts, tables or graphs. They will also need to interpret data presented in the form of charts or graphs. Historical ideas require an understanding of time and time lines similar to the number line. Map skills require the understanding of coordinates and ideas of angles, directions, position, scale and ratios, height, length movement.

Modern Foreign Languages (MFL)

Learners use mathematics in MFL when learning to tell the time, calculating café bills, handling money, working on days and dates and doing simple arithmetic calculations involving addition, subtraction and multiplication. Work in MFL offers some learners the additional opportunity they need to grasp the fundamentals of number work.

Physical Education

Mathematics is a vital part of PE. Students use maths to calculate with time, speed and space. They need to interpret data (averages, ranking) to be able to analyse improvement in progress and achievement through their performance. Coaches and officials within PE also use data and percentages to support the decision making that affects students' progress and achievement. Most able students will be able to use calculations to analyse acceleration and deceleration. Some students will also be able to use advanced maths such as



trajectories to improve their performance. Students will also be able to use graphs and excel spread sheets to scrutinise progress and achievement.

All subjects

Assessment results and targets will often be placed in a numerical context, such as percentages or grade boundaries, which require scaling and a sense of ratio or proportion.

See tables over for KS3/KS4 Foundation (cross curricular content):

Opportunities for Parental engagement

We recognise the importance of parental engagement and consequently feel that parental engagement strategies are crucial to embedding a culture change around the learning and application of numeracy across all curriculum areas.

As part of our engagement with parents, all staff will encourage and guide parents in how they can support the development of their child's numeracy and learning mathematics, using a variety of strategies;

- By referring to the numeracy booklet provided to parents of KS3 students starting in Y7 - 'How to help your child at home'. This describes the crucial role of the relationship between parents and college in supporting students' learning, and specifically guidance as to how parents can support their child with numeracy. It also suggests that parents who wish to improve their own numeracy might find useful the national numeracy challenge online tool.
- At parents' evenings and parental link meetings, taking the opportunity to reinforce the general messages about being positive about maths, even if they don't feel confident about it themselves, and also that parents can support their child by just asking them to 'speak aloud' to explain their methods when attempting mathematical problems.
- By describing to parents how they support the child's numeracy in the classroom and so being an exemplar of the specific support that child needs.
- Through the nature of the materials and the conversations of parents' evenings comprising the presentation and discussion of much quantitative data.



Maths Skills across the curriculum	Up to/incl. grade 1-2	Up to/incl. grade 3	Up to/incl. up to grade 4	grade 4/5
Have a sense of the size of a number and where it fits into the number system	Place value, ordering and rounding <ul style="list-style-type: none"> Recognise and extend number sequences. Estimate by approximating (round to nearest 10, 100 or 1000). 	Place value, ordering and rounding <ul style="list-style-type: none"> Compare and order decimals; know that when comparing measurements they must be in the same units. Round positive whole numbers to the nearest 10, 100 or 1000 and decimals to the nearest whole number or one decimal place. 	Place value, ordering and rounding <ul style="list-style-type: none"> Round decimals to the nearest whole number or to one or two decimal places or to significant figures Integers, powers and roots <ul style="list-style-type: none"> Use squares, positive and negative square roots, cubes and cube roots, and index notation for small positive integer powers. Use basic index laws 	Place value, ordering and rounding <ul style="list-style-type: none"> Multiply and divide by any integer power of 10. Estimate complex calculations efficiently using 1 s.f. <i>Understand upper and lower bounds; round numbers to three decimal places and a given number of significant figures.</i> <i>Write numbers in standard form and perform calculations with them.</i> Integers, powers and roots. <ul style="list-style-type: none"> Use all index laws apart from fractional indices, basic surds
Recall mathematical facts confidently Calculate accurately and efficiently , both mentally and with pencil and paper, drawing on a range of calculation strategies	Calculations with whole numbers and decimals <ul style="list-style-type: none"> Understand and use the relationships between the four operations, and the principles of the arithmetic laws. Use brackets. Add and subtract two two-digit numbers mentally. Use column addition and subtraction of numbers involving decimals. Know multiplication facts to 10×10, and quickly derive associated division facts. Multiply a two-digit number by a single-digit number mentally. 	Calculations with whole numbers and decimals <ul style="list-style-type: none"> Know and use the order of operations, including brackets. Use standard column procedures to add and subtract whole numbers and decimals with up to two places. Multiply and divide three-digit by two-digit whole numbers; extend to multiplying and dividing decimals with one or two places by single-digit whole numbers. 	Calculations with whole numbers and decimals <ul style="list-style-type: none"> Use the order of operations, including brackets, with more complex calculations. Use standard column procedures for multiplication and division of integers and decimals; understand where to position the decimal point by considering equivalent calculations. 	Calculations with whole numbers and decimals <ul style="list-style-type: none"> Understand the effects of multiplying and dividing by numbers between 0 and 1.
calculate using fractions, decimals and percentages and use proportional reasoning to simplify and solve problems	Fractions, decimals, percentages, ratio and proportion <ul style="list-style-type: none"> Reduce a fraction to its simplest form by cancelling common factors. Use a fraction as an 'operator' to find fractions of numbers or quantities. Order a mixed set of numbers or measurements with up to three decimal places. Understand percentage as the number of parts in every 100. Find simple percentages of small whole-number quantities. 	Fractions, decimals, percentages, ratio and proportion <ul style="list-style-type: none"> Simplify fractions by cancelling all common factors. Recognise the equivalence of percentages, fractions and decimals. Calculate simple percentages and fractions of quantities. Use ratio notation, reduce a ratio to its simplest form, and divide a quantity into two parts in a given ratio. Solve simple problems about ratio and proportion using informal strategies. 	Fractions, decimals, percentages, ratio and proportion <ul style="list-style-type: none"> Add and subtract fractions by writing them with a common denominator; calculate fractions of quantities. Calculate percentages and find the outcome of a given percentage increase or decrease. Reduce a ratio expressed in different units to its simplest form; divide a quantity into two or more parts in a given ratio. Use the unitary method to solve simple word problems involving ratio and direct proportion. 	Fractions, decimals, percentages, ratio and proportion <ul style="list-style-type: none"> Add, subtract, multiply and divide fractions; cancel common factors before multiplying or dividing. Compare two ratios; interpret and use ratio in a range of contexts. Use proportional reasoning to solve a problem, choosing the correct numbers to take as 100%, or as a whole. Calculate with repeated proportional/percentage change and reverse percentages Use standard notation and calculate with direct and inverse proportion



<p>Use calculators appropriately and efficiently and select from the display the number of figures appropriate to the context of a calculation.</p>	<p>Calculator methods</p> <ul style="list-style-type: none"> Develop calculator skills and use a calculator effectively. 	<p>Calculator methods</p> <ul style="list-style-type: none"> Carry out calculations with more than one step using brackets and the memory; use the square root and sign change keys. Enter numbers and interpret the display in different contexts (decimals, percentages, money, metric measures). 	<p>Calculator methods</p> <ul style="list-style-type: none"> Carry out more difficult calculations effectively and efficiently using the function keys for sign change, powers, roots and fractions; use brackets and the memory. Enter numbers and interpret the display (negative numbers, fractions, decimals, percentages, money, metric measures, time). 	<p>Calculator methods</p> <ul style="list-style-type: none"> Use a calculator efficiently and appropriately to perform complex calculations with numbers of any size, knowing not to round during intermediate steps of a calculation. Use the constant π and sign change keys, function keys for powers, roots and fractions, brackets and the memory.
<p>Use simple formulae and substitute numbers in them</p>	<p>Reasoning and generalising</p> <ul style="list-style-type: none"> Develop from explaining a generalised relationship in words to expressing it in a formula, using letters as symbols. 	<p>Equations, formulae and identities</p> <ul style="list-style-type: none"> Use simple formulae; substitute positive integers into simple linear expressions and formulae and, in simple cases, derive a formula. 	<p>Equations, formulae and identities</p> <ul style="list-style-type: none"> Use formulae; substitute integers into simple formulae, including examples that lead to an equation to solve. Recognise and identify identities, formulas, equations Use function notation 	<p>Equations, formulae and identities</p> <ul style="list-style-type: none"> Use more complex formulae; substitute numbers into expressions and formulae; derive a formula and change its subject. Solve equations with fractions, with unknown on both sides of '=' sign and with brackets Solve Simultaneous Equations, incl setting up from real life scenarios Solve identities, find inverse and composite functions
<p>Measure and estimate measurements, choosing suitable units and reading numbers correctly from a range of meters, dials and scales</p>	<p>Measures</p> <ul style="list-style-type: none"> Use, read and write standard metric units. Convert smaller to larger units, and vice versa. Know rough equivalents between common metric and imperial units. Record estimates and readings from scales to a suitable degree of accuracy. 	<p>Measures and mensuration</p> <ul style="list-style-type: none"> Measure, estimate, calculate and solve problems involving length, area, mass, capacity and angle. Read and interpret scales on a range of measuring instruments. Convert one metric unit to another (e.g. g to kg). 	<p>Measures and mensuration</p> <ul style="list-style-type: none"> Measure, estimate, calculate and solve problems involving length, area, volume, capacity, mass, angle and bearings. Know rough metric equivalents of imperial measures in daily use (feet, miles, pounds, pints, gallons). 	<p>Measures and mensuration</p> <ul style="list-style-type: none"> Measure, estimate, calculate and solve problems in a variety of contexts. Convert between area measures (mm^2 to cm^2, cm^2 to m^2, and vice versa). Recognise that measurements given to the nearest whole unit may be inaccurate by up to one half of the unit in either direction.
<p>Calculate simple perimeters, areas and volumes, recognising the degree of accuracy that can be achieved</p>	<p>Measures</p> <ul style="list-style-type: none"> Calculate the perimeter and area of simple compound shapes that can be split into rectangles. 	<p>Measures and mensuration</p> <ul style="list-style-type: none"> Use the formula for the area of a rectangle; calculate the perimeter and area of shapes made from rectangles. Calculate the surface area of cubes and cuboids. 	<p>Measures and mensuration</p> <ul style="list-style-type: none"> Use formulae for the area of a triangle, parallelogram and trapezium. Use the formula for the volume of a cuboid. 	<p>Measures and mensuration</p> <ul style="list-style-type: none"> Use the formulae for the circumference and area of a circle, and for arc length and sector area Calculate the surface area and volume of right prisms.



<p>Understand and use measures of time and speed, and rates such as £ per hour or miles per litre</p>	<p>Measures</p> <ul style="list-style-type: none"> • Appreciate different times around the world. • Solve problems using time. 	<p>Measures and mensuration</p> <ul style="list-style-type: none"> • Measure, estimate, calculate and solve problems involving time. <p>Sequences, functions and graphs</p> <ul style="list-style-type: none"> • Begin to plot and interpret the graphs of simple linear functions arising from real-life situations. 	<p>Measures and mensuration</p> <ul style="list-style-type: none"> • Measure, estimate, calculate and solve problems involving time. <p>Sequences, functions and graphs</p> <ul style="list-style-type: none"> • Plot the graphs of linear functions arising from real-life problems; discuss and interpret graphs arising from real situations. • Understand and use $y = mx + c$ format, find the gradient of a line 	<p>Measures and mensuration</p> <ul style="list-style-type: none"> • <i>Understand and use measures of speed, and other compound measures such as density and pressure.</i> • <i>Solve problems involving constant or average rates of change.</i> <p>Sequences, functions and graphs</p> <ul style="list-style-type: none"> • Plot graphs of functions arising from real-life problems; interpret graphs arising from real situations, including distance-time graphs. • Work with parallel and perpendicular lines in $y=mx+c$ format
<p>Draw plane figures to given specifications and appreciate the concept of scale in geometrical drawings and maps</p>	<p>Construction</p> <ul style="list-style-type: none"> • Measure and draw lines to nearest mm. • Measure and draw acute and obtuse angles to the nearest degree. <p>Coordinates</p> <ul style="list-style-type: none"> • Read and plot coordinates in all four quadrants. <p>Transformations</p> <ul style="list-style-type: none"> • Recognise where a shape will be after: reflection; two translations; a rotation of 90° about one of its vertices. 	<p>Construction</p> <ul style="list-style-type: none"> • Use a ruler and protractor to measure and draw lines to the nearest millimetre and angles to the nearest degree. <p>Coordinates</p> <ul style="list-style-type: none"> • Use coordinates in all four quadrants. <p>Transformations</p> <ul style="list-style-type: none"> • Recognise reflection symmetry and rotation symmetry in 2-D shapes. • Recognise translations of 2-D shapes. 	<p>Construction</p> <ul style="list-style-type: none"> • Use straight edge and compasses to construct: the mid-point and perpendicular bisector of a line segment; the bisector of an angle; the perpendicular from a point to a line; the perpendicular from a point on a line. Apply to loci <p>Lines, angles and shapes</p> <ul style="list-style-type: none"> • Begin to use plans and elevations <p>Transformations</p> <ul style="list-style-type: none"> • Enlarge 2-D shapes, given a centre of enlargement and a positive whole-number scale factor. • Make simple scale drawings. 	<p>Construction</p> <ul style="list-style-type: none"> • Use straight edge and compasses to construct triangles. <p>Lines, angles and shapes</p> <ul style="list-style-type: none"> • Analyse 3-D shapes through 2-D projections, including plans and elevations. <p>Transformations</p> <ul style="list-style-type: none"> • Identify and use scale factor of an Enlargement, incl fractional and negative s.f. • Use and interpret maps and scale drawings. <p>Understand/use Congruency and Similarity</p>
<p>Understand the difference between the mean, median and mode and the purpose for which each is used</p>	<p>Handling data</p> <ul style="list-style-type: none"> • begin to find the median and mean of a set of data. • find the mode and range of a set of data 	<p>Handling data</p> <ul style="list-style-type: none"> • For small sets of discrete data: find the mode, median and range, and the modal class for grouped data; calculate the mean, using a calculator for a larger number of items. • Compare two simple distributions using the range and one of the mode, median or mean. 	<p>Handling data</p> <ul style="list-style-type: none"> • Calculate statistics, including with a calculator; recognise when it is appropriate to use the range, mean, median and mode, for grouped data, the modal class; calculate a mean using an assumed mean; construct and use stem-and-leaf diagrams. • compare two distributions using the range and one or more of the mode, median and mean. 	<p>Handling data</p> <ul style="list-style-type: none"> • <i>find the median and quartiles for large datasets.</i> • compare two or more distributions and make inferences, using the shape of the distributions, the range of data and appropriate statistics.



<p>Collect data, discrete and continuous, and draw, interpret and predict from graphs, diagrams, charts and tables</p>	<p>Handling data</p> <ul style="list-style-type: none"> Solve a problem by representing, extracting and interpreting data in tables, graphs, charts and diagrams. 	<p>Handling data</p> <ul style="list-style-type: none"> Collect small sets of data from surveys and experiments. Construct, on paper and using ICT: bar-line graphs; frequency diagrams for grouped discrete data; pie charts. Interpret diagrams and graphs, and draw simple conclusions. 	<p>Handling data</p> <ul style="list-style-type: none"> Collect data by observation, controlled experiment (including data logging), or questionnaire. Construct, on paper and using ICT: pie charts for categorical data; bar charts and frequency diagrams for discrete and continuous data; simple line graphs for time series; simple scatter graphs. Interpret tables, graphs and diagrams for both discrete and continuous data. Understand and use correlation. 	<p>Handling data</p> <ul style="list-style-type: none"> Gather data from specified secondary sources, including printed tables and lists from ICT-based sources; determine sample size; Understand and use effective sampling methods (random, systematic) Construct, on paper and using ICT: scatter graphs; line graphs for time series; <i>lines of best fit</i>. Find the equation of a line of best fit and use extrapolation and interpolation
<p>Have some understanding of the measurement of probability and risk</p>	<p>Probability</p> <ul style="list-style-type: none"> Use the language associated with probability to discuss events, including those with equally likely outcomes. 	<p>Probability</p> <ul style="list-style-type: none"> Use the vocabulary and ideas of probability, drawing on experience. Use the probability scale from 0 to 1. 	<p>Probability</p> <ul style="list-style-type: none"> Use the vocabulary of probability when interpreting the results of an experiment; appreciate that random processes are unpredictable. Know that if the probability of an event occurring is p, then the probability of it not occurring is $1 - p$. Estimate probabilities from experimental data. 	<p>Probability</p> <ul style="list-style-type: none"> Use the vocabulary of probability in interpreting results involving uncertainty and prediction. <i>Understand relative frequency as an estimate of probability and use this to compare outcomes of experiments.</i> Use Venn diagrams, simple set notation Use Tree diagrams, AND (\times) and OR ($+$) rules to calculate with dependent and independent events
<p>Use and apply mathematics to solve problems Explain methods and justify reasoning and conclusions, using correct mathematical terms Judge the reasonableness of solutions and check them when necessary Give results to an appropriate degree of accuracy</p>	<p>Applying mathematics</p> <ul style="list-style-type: none"> Identify and use appropriate operations (including combinations of operations) to solve word problems involving numbers and quantities. Explain methods and reasoning. <p>Checking results</p> <ul style="list-style-type: none"> Check the results of calculations. 	<p>Applying mathematics</p> <ul style="list-style-type: none"> Solve word problems and investigate in a range of contexts. Break a complex calculation into simpler steps, choosing and using appropriate and efficient operations, methods and resources. Explain and justify methods and conclusions, orally and in writing. <p>Checking results</p> <ul style="list-style-type: none"> Check a result by considering whether it is of the right order of magnitude and by working the problem backwards. 	<p>Applying mathematics</p> <ul style="list-style-type: none"> Use logical argument to establish the truth of a statement. Represent problems and interpret solutions in algebraic, geometric or graphical form, using correct notation and appropriate diagrams. Give solutions to an appropriate degree of accuracy in the context of the problem. <p>Checking results</p> <ul style="list-style-type: none"> Check a result by considering whether it is of the right order of magnitude and by working the problem backwards. 	<p>Applying mathematics</p> <ul style="list-style-type: none"> Solve substantial problems by breaking them into simpler tasks, using a range of efficient techniques, methods and resources, including ICT. Give solutions to an appropriate degree of accuracy, <i>recognising limitations on the accuracy of data and measurements.</i> <p>Checking results</p> <ul style="list-style-type: none"> Check results using appropriate methods.