Content of *Mathematics Explained for Primary Teachers, 4th edition.*	Welsh Department for Children, Education, Lifelong Learning and Skills (2008) *Framework for Children's Learning for 3 to 7-year-olds in Wales, Mathematical Development.*	Welsh Department for Children, Education, Lifelong Learning and Skills (2008) *Mathematics in the National Curriculum for Wales, Key Stage 2 Programme of Study.*	Welsh Department for Children, Education, Lifelong Learning and Skills (2008) *Mathematics in the National Curriculum for Wales, Level Descriptions (Levels 1–5).*
Chapter 2: Mathematics in the primary curriculum • the different kinds of reason for teaching mathematics in the primary school; • the contribution of mathematics to everyday life and society; • the contribution of mathematics to other areas of the curriculum; • the contribution of mathematics to the learner's intellectual development; • the importance of mathematics in promoting enjoyment of learning; • how mathematics is important as a distinctive form of knowledge; • how the essential content of the primary curriculum in England is not just about knowledge and skills but also about using and applying mathematics; • the various components of using and applying mathematics in the primary curriculum in England; • the relationship of numeracy to mathematical understanding.	**Mathematical Development** • children enjoy using and applying mathematics in practical tasks, in real-life problems, and within mathematics itself **Children should be given opportunities to:** • develop an interest in numbers	**Mathematics at KS2** • learners continue to develop positive attitudes towards mathematics and extend their mathematical thinking by solving mathematical problems, communicating and reasoning mathematically using contexts from across the whole range of mathematics, across the curriculum and as applied to real-life problems **Developing thinking** • learners develop their thinking across the curriculum through the processes of planning, developing and reflecting • in mathematics, learners ask questions, explore alternative ideas and make links with previous learning in order to develop strategies to solve problems	**Level 1** • use mathematics as an integral part of classroom activities

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Chapter 3: Learning how to learn mathematics	Mathematical development	Pupils should be given opportunities to:	Level 1
• the fundamental importance of children in primary schools learning how to learn mathematics; • the connections model for understanding number and number operations; • the processes of recognizing equivalences and identifying transformations; • the process of classification.	• children develop their skills, knowledge and understanding of mathematics through oral, practical and play activities • they develop their use and understanding of mathematical language in context, through communicating/talking about their work **Children should be given opportunities to:** • understand number and number notation • understand and use measure • understand and use money • understand and use the properties of shapes • understand and use the properties of position and movement • develop their mathematical language across the range of mathematics, and use it in their role play and in communicating/ talking to adults about their work • sort and classify sets of objects using one or more criteria • recognise similarities and differences of 2-D and 3-D shapes	• use correct mathematical language, notation, symbols and conventions to talk about or to represent their work to others • understand number and number notation • understand and use measures • understand and use money • understand and use the properties of shapes • understand and use the properties of position and movement • understand and use probability	• represent their work with objects or pictures and discuss it • sort and classify objects, demonstrating the criterion they have used **Level 2** • talk about their work using familiar mathematical language, and represent it using symbols and simple diagrams **Level 3** • use and interpret mathematical symbols and diagrams **Level 5** • describe situations mathematically using symbols, words and diagrams
Chapter 4: Key processes in mathematical reasoning • generalization; • conjecturing and checking;		**Developing thinking** • learners gather, select, organise and use information, and identify patterns and relationships	**Level 2** • recognise sequences of numbers

• the language of generalization; • counter-examples and special cases; • hypothesis and inductive reasoning; • explaining, convincing, proving and deductive reasoning; • thinking creatively in mathematics.		• they predict outcomes, make and test hypotheses, reason mathematically when investigating, and analyse and interpret mathematical information • they describe what they have learned, reflect on their work by evaluating their results in line with the original problem, and justify their conclusions and generalizations **Developing communication** • when solving problems, learners present their findings and reasoning orally and in writing, using symbols, diagrams, tables and graphs as appropriate **Pupils should be given opportunities to:** • investigate patterns and relationships • recognise, and generalise in words, patterns that arise in numerical, spatial or practical situations • explain strategies, methods, choices and conclusions to others in a variety of ways – verbally, graphically, using informal written methods • investigate and generalise repeating patterns and relationships; search for pattern in their own results • make and investigate mathematical hypotheses, predictions and conjectures	**Level 3** • talk about and explain their work • find particular examples that satisfy a general statement **Level 4** • search for a solution by trying out ideas of their own **Level 5** • draw their own conclusions, explaining their reasoning • make general statements of their own, based on available evidence

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Chapter 5: Modelling and problem solving	Children should be given opportunities to:	Developing number	Level 3
• three approaches to calculations: algorithms, adhocorithms and calculators; • the key process of mathematical modelling; • the contribution of electronic calculators to this process; • interpreting answers obtained on calculators; • problem solving.	• develop a variety of mental and written strategies of computation • estimate solutions to calculations; check their answers in various ways • interpret solutions to calculations within the context of the given problem • select and use appropriate mathematical ideas, equipment and materials to solve practical problems • identify, collect and organise information in purposeful contexts • develop a variety of mathematical approaches and strategies	• in mathematics, learners use their number skills throughout the programme of study when solving problems in a variety of practical and relevant contexts and when investigating within mathematics itself **Pupils should be given opportunities to:** • check results and interpret solutions to calculations, including calculator displays; check against the context of the problem that solutions are reasonable • select and use the appropriate mathematics, materials, units of measure and resources to solve problems in a variety of contexts • identify, obtain and process information needed to carry out the work • develop their own mathematical strategies and ideas and consider those of others • find approximate solutions to, and use the four operations to solve, problems involving money • understand a calculator display in relation to money, e.g. that a display of 21.4 (pounds) means £21.40 • try different approaches; use a variety of strategies, sequences of operation and methods of calculating	• organise their work, check results, and try different approaches **Level 4** • develop their own strategies for solving problems, and present information and results systematically **Level 5** • identify and obtain information to solve problems, and check whether their results are sensible in the context of the problem

Chapter 6: Number and place value	Children should be given opportunities to:	Pupils should be given opportunities to:	Level 1
• the difference between numerals and numbers; • the cardinal and ordinal aspects of number; • natural numbers and integers • rational, irrational and real numbers • the Hindu-Arabic system of numeration and the principles of place value; • some contrasts with numeration systems from other cultures; • digits and powers of ten; • two ways of demonstrating place value with materials; • how the number line supports understanding of place value; • the role of zero as a place holder; • the extension of the place-value principle to tenths, hundredths, thousandths; • the decimal point as a separator in the contexts of money and measurement; and • locating numbers written in decimal notation on a number line.	• recognise that some numbers/ numerals will have personal meaning/significance to them and others • use number names accurately, matching the symbol to the sound • count, read, write, compare and order numbers, and appreciate the conservation of number • use numbers naturally in their play and daily activities, including number rhymes, songs, stories and counting activities from Wales and around the world • experiment with numbers, and observe numbers and patterns in the environment and everyday life • match pairs of objects in practical contexts, leading to an understanding of one-to-one correspondence • understand money and develop an awareness of the use of money and its value, initially through role play	• count, read, write and order whole numbers • understand place value in relation to the position of digits • identify negative numbers and decimals on a number line • deepen their understanding of one-to-one correspondence • know and use the conventional way to record money	• count, order, add and subtract numbers when solving problems involving up to 10 objects, and can read and write the numbers involved • count on and back in steps of different sizes and from different numbers • are aware of the value of different coins **Level 2** • count sets of objects reliably • order numbers up to 100 **Level 3** • use decimal notation in recording money
Chapter 7: Addition and subtraction structures • two different structures of real-life problems modelled by addition; • the situations in which children will meet these structures; • the commutative law of addition;	**Children should be given opportunities to:** • begin to understand the relationships between addition and subtraction • recognise, sort and use coins; find totals, and give change	**Pupils should be given opportunities to:** • explore the inverse relationships of addition and subtraction • use the relationships between the four operations, including inverses	**Level 2** • choose the appropriate operation when solving addition or subtraction problems

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		• recognise situations to which the different operations apply • explore features of numbers, including number bonds	**Level 5** • check their solutions by applying inverse operations …
Chapter 8: Mental strategies for addition and subtraction • the associative law for addition; • counting forwards and backwards in ones, tens, hundreds; • addition and subtraction on a hundred square; • using multiples of 10 and 100 as stepping stones; • addition and subtraction on an empty number line; • front-end addition and subtraction; • compensation in addition and subtraction calculations; • the correct use of the symbol for 'equals'; • using multiples of 5 in additions and subtractions; • relating additions and subtractions to doubles; • using 'friendly' numbers.	**Children should be given opportunities to:** • devise and refine informal, personal methods of recording mental calculations, gradually moving to using words and symbols in number sentences • calculate in a variety of ways • begin to develop their mental calculation strategies during counting and grouping activities, games and through day-to-day classroom activities • progress from counting on or back in steps, to mental mathematics involving (addition and subtraction) with small numbers, using their own methods to record their calculations	**Pupils should be given opportunities to:** • use their prior knowledge to find mathematical facts that they have not learned, and to solve numerical problems • use flexible and effective methods of computation and recording • use a variety of mental methods of computation	**Level 2** • use mental recall of number facts to 10 to add or subtract larger numbers • use mental calculation strategies to solve number, money and measure problems **Level 3** • develop further mental strategies for adding and subtracting numbers with at least two digits **Level 4** • use a variety of mental … methods for computation
Chapter 9: Written methods for addition and subtraction • a variety of ways of introducing column addition and subtraction; • the idea of 'carrying' in the formal addition algorithm; • the decomposition method for doing subtraction calculations;		**Pupils should be given opportunities to:** • devise and refine their own ways of recording • develop a variety of … written strategies of computation. • extend informal written methods to non-calculator methods	**Level 4** • use a variety of … written methods for computation

• the equal additions method for subtraction; • how the two methods differ and why decomposition is preferred; • the problem with zeros in the top number in a subtraction calculation; • the constant difference method for subtraction.			
Chapter 10: Multiplication and division structures • two different structures of real-life problems modelled by multiplication; • the contexts in which children will meet these multiplication structures; • the commutative law of multiplication; • the idea of a rectangular array associated with multiplication; • three different structures of real-life problems modelled by division; • the contexts in which children will meet these division structures.	**Children should be given opportunities to:** • begin to understand the relationships … between multiplication and division, and between halving and doubling	**Pupils should be given opportunities to:** • explore the inverse relationships of multiplication and division • use the relationships between the four operations, including inverses • recognise situations to which the different operations apply • explore features of numbers, including number bonds	**Level 5** • check their solutions by applying inverse operations
Chapter 11: Mental strategies for multiplication and division • the commutative, associative, distributive laws of multiplication; • quotient, dividend and divisor; • the distributive laws of division; • how these laws are used in multiplication and division calculation strategies;	**Children should be given opportunities to:** • progress … to mental mathematics involving (multiplication and division) with small numbers, using their own methods to record their calculations	**Pupils should be given opportunities to:** • use their prior knowledge to find mathematical facts that they have not learned, and to solve numerical problems • use flexible and effective methods of computation and recording	**Level 3** • use mental recall of the 2, 3, 4, 5 and 10 multiplication tables in solving whole-number problems involving multiplication and division

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• some prerequisite skills for being efficient in mental multiplication and division calculations; • how factors can be used to simplify multiplications; • how doubling can be used as an ad hoc approach to multiplication; • the use of ad hoc additions and subtractions in multiplication and division; • the constant ratio method for a division calculation.		• develop a variety of mental … strategies of computation • multiply and divide numbers by 10 and 100	**Level 4** • use their understanding of place value to multiply and divide whole numbers by 10 and 100 • use a variety of mental … methods for computation, including recall of multiplication facts up to 10 x 10
Chapter 12: Written methods for multiplication and division **Level 4** • the long multiplication algorithm; • a simpler method for multiplication using areas of rectangles; • the grid method for multiplication; • the difficulty of understanding long division; • the ad hoc subtraction method of doing division calculations; • the algorithm known as short division.		**Pupils should be given opportunities to:** • devise and refine their own ways of recording • develop a variety of … written strategies of computation • extend informal written methods to non-calculator methods	**Level 4** • use a variety of … written methods for computation, including recall of multiplication facts up to 10 x 10 **Level 5** • use their understanding of place value to multiply and divide whole numbers …
Chapter 13: Remainders and rounding • the different interpretations required for the results of division calculations done on a calculator and those done by methods which produce a remainder;		**Pupils should be given opportunities to:** • round answers to calculations to an appropriate degree of accuracy	**Level 3** • use place value in numbers up to 1000 to make approximations

• the relationship between the answer with a remainder and the calculator answer; • the way in which the context determines whether to round a result up or down; • the idea of rounding to the nearest something; • how to give answers to so many decimal places or significant figures			• solve whole-number problems involving … division, including those giving rise to remainders
Chapter 14: Multiples, factors and primes • multiples, including lowest common multiple; • some ways of spotting multiples of various numbers; • digital sums and digital roots; • factors, including highest common factor; • the transitive property of multiples and factors; • prime numbers and composite (rectangular) numbers.		**Pupils should be given opportunities to:** • explore features of numbers, including … factors, multiples, even and odd numbers, primes	
Chapter 15: Squares, cubes and number shapes • square numbers; • cube numbers; • square roots and cube roots; • the trial and improvement method for finding square roots and cube roots using a calculator; • use of the inequality signs (>, <) for recording 'greater than', 'less than' and 'lies between';		**Pupils should be given opportunities to:** • explore features of numbers, including … squares and square roots, and sequences of whole numbers	

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• the relationship between sequences of geometric patterns and sets of numbers; • triangle numbers; • the theorem of Pythagoras.			
Chapter 16: Integers, positive and negative • how to make sense of negative numbers; • situations in the contexts of temperatures and bank balances that are modelled by the addition and subtraction of positive and negative numbers; • how to enter negative numbers on a basic calculator.		**Pupils should be given opportunities to:** • use negative numbers in the context of temperature	**Level 3** • recognise negative numbers in the context of temperature **Level 5** • order, add and subtract negative numbers
Chapter 17: Fractions and ratios • four different meanings of the fraction notation: a part of a unit, a part of a set, a division, and a ratio; • some of the traditional language of fractions; • the important idea of equivalent fractions; • equivalent ratios and their use in scale drawings and maps; • simplifying fractions and ratios by cancelling; • how to compare two simple fractions; • how to add and subtract simple fractions; • how to find a simple fraction of a quantity.		**Pupils should be given opportunities to:** • use fractions … to estimate, describe and compare proportions of a whole • calculate fractions … of quantities • understand and use scale in simple maps and drawings	**Level 2** • identify and use halves and quarters in practical situations **Level 4** • use simple fractions … to describe approximate parts of a whole **Level 5** • calculate fractional … parts of quantities and measurements • read scales on maps and plans

Chapter 18: Calculations with decimals		Pupils should be given opportunities to:	Level 4
- the procedures for addition and subtraction with decimal numbers; - the contexts that might give rise to the need for calculations with decimals; - checking the reasonableness of answers by making estimates, using approximations; - multiplication and division of a decimal number by an integer, in real-life contexts; - the results of repeatedly multiplying or dividing decimal numbers by 10; - how to deal with the multiplication of two decimals; - some simple examples of division involving decimals; - converting fractions to decimals and vice versa; - recurring decimals; - scientific notation.		- estimate solutions to calculations; use alternative strategies to check the accuracy of answers - use decimals in the context of money and measures	- add and subtract decimals to two places - check their results are reasonable by considering the context or the size of the numbers **Level 5** - use their understanding of place value to multiply and divide … decimals - check their solutions by … estimating using approximations
Chapter 19: Proportions and percentages		**Pupils should be given opportunities to:**	**Level 4**
- how to solve simple proportion problems; - the meaning of *per cent*; - the use of percentages to express proportions of a quantity or of a set; - ad hoc and calculator methods for evaluating percentages;		- use … percentages to estimate, describe and compare proportions of a whole - calculate … percentages of quantities	- use simple … percentages to describe approximate parts of a whole **Level 5** - calculate … percentage parts of quantities and measurements

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• the usefulness of percentages for comparing proportions; • equivalences between fractions, decimals and percentages; • the meaning of percentages greater than 100; • how to calculate a percentage of a given quantity or number, using ad hoc and calculator methods; • percentage increases and decreases.			
Chapter 20: Algebra • the nature of algebraic thinking and the central idea of making generalizations; • the difference in the meaning of letters used as abbreviations in arithmetic and as used in algebra; • the idea of a letter representing a variable; • some other differences between arithmetic thinking and algebraic thinking; • precedence of operators; • ways of introducing children to the idea of a letter as a variable; • the important role played by tabulation; • the ideas of sequential and global generalization; • independent and dependent variables; • the meaning of the word 'mapping' in an algebraic context; • using spreadsheets for trial and improvement and budgeting.	**Children should be given opportunities to:** • investigate patterns and relationships • explore patterns in number tables and sequences • recognise patterns, sequences and relationships through practical activities and discussion • investigate repeating patterns and relationships and make simple predictions	**Pupils should be given opportunities to:** • develop early ideas of algebra and mathematical structure by exploring number sequences and relationships; explain and predict subsequent terms	**Level 1** • they recognise, use and make repeating patterns. **Level 4** • recognise and describe number patterns and relationships and use simple formulae expressed in words **Level 5** • construct and use simple formulae involving one or two operations

Chapter 21: Coordinates and linear relationships		Pupils should be given opportunities to:	Level 4
• how the coordinate system enables us to specify location in a plane; • axis, *x*-coordinate and *y*-coordinate, origin; • the meaning of 'quadrant' in the context of coordinates; • the difference between the coordinate system for labelling points in a plane and other systems which label spaces; • how to plot an algebraic relationship as a graph; • linear relationships, including those where one variable is directly proportional to another; • how coordinates can be used to investigate geometric Level 4 • properties.		• use positive co-ordinates to specify location • be aware of other currencies	• use and interpret co-ordinates in the first quadrant • construct and interpret simple line graphs **Level 5** • use co-ordinates in all four quadrants • read scales on graphs
Chapter 22: Measurement	**Children should be given opportunities to:**	**Pupils should be given opportunities to:**	**Level 1**
• the distinction between mass and weight; • the distinction between volume and capacity; • two aspects of the concept of time: time interval and recorded time; • the role of comparison and ordering as a foundation for measurement; • the principle of transitivity in the context of measurement; • some principles of inequalities, using the signs < and >;	• estimate the size of a measure • understand and use measures • compare and order two or more objects in terms of mass or length/height by direct observation, and for capacity and volume by filling or emptying containers • use uniform non-standard units for comparison, and see the need for standard units of measure; use standard metric units of length, mass and capacity	• appreciate the continuous nature of measures, and that measurement is approximate • estimate measures, and measure to an appropriate degree of accuracy in a range of contexts • choose appropriate standard units of length, mass, volume and capacity, temperature, area and time • understand the relationships between units, and convert one metric unit to another	• they measure and order objects using direct comparison, and order events **Level 2** • use everyday non-standard and standard units to measure length and mass **Level 3** • use standard units of length, capacity, mass and time

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• conservation of length, mass and liquid volume; • non-standard and standard units; • the idea that all measurement is approximate; • the difference between a ratio scale and an interval scale; • SI and other metric units of length, mass and time, including the use of prefixes; • the importance of estimation and the use of reference items; • imperial units still in use and their relationship to metric Key Stage 1 units.	• choose units and measuring equipment appropriate to a relevant measuring task; • read a scale with some accuracy • recognise the time of day in relation to regular daily activities; understand the passage of time in relation to daily activities and life events • know and order days of the week, the months and seasons of the year • sequence two or more familiar events • gradually read the time to the quarter hour on an analogue clock, and relate this to digital time	• read times on analogue and digital clocks • use timetables and convert between the 12- and 24-hour clocks • calculate time differences • know the rough metric equivalents of imperial units still in daily use • interpret numbers on scales and read scales to an increasing degree of accuracy	**Level 4** • choose and use suitable units and instruments, reading, with appropriate accuracy, numbers on a range of measuring instruments **Level 5** • convert one metric unit to another • know the rough metric equivalents of imperial units in daily use • make sensible estimates of a range of everyday measures
Chapter 23: Angle • the dynamic and static views of angle; • comparison and ordering of angles; • the use of turns and fractions of a turn for measuring angle; • degrees; • acute, right, obtuse, straight, reflex angles; • the sum of the angles in a triangle, a quadrilateral, and so on.	**Children should be given opportunities to:** • begin to understand angle as a measure of turn, and recognise whole, half and quarter turns	**Pupils should be given opportunities to:** • draw and measure angles • use right angles, fractions of a turn and degrees to measure rotation	**Level 2** • recognise half-turns and quarter-turns and right angles in turns **Level 5** • measure and draw angles to the nearest degree
Chapter 24: Transformations and symmetry • transformation, equivalence and congruence in the context of shape;	**Children should be given opportunities to:** • understand and use the properties of position and movement	**Pupils should be given opportunities to:** • visualise and describe shapes, movements, transformations • understand the congruence of 2-D shapes	**Level 1** • use everyday language to compare and to describe positions … of shapes

• translation, reflection and rotation as types of congruence; • scaling up and down by a scale factor in the context of shape; • similar shapes; • reflective and rotational symmetry for two-dimensional shapes.	• develop an awareness of position and movement during their own physical activities • follow instructions and give directions for simple movements • fit together and move shapes and solids in various ways • recognise translations and rotations as movements, and combine them in simple ways	• recognise reflective and rotational symmetries of 2-D shapes • identify properties of position and movement, and use these to classify shapes	**Level 2** • distinguish between straight and turning movements **Level 4** • draw common 2-D shapes in different orientations on grids • reflect simple shapes in a mirror line **Level 5** • recognise, identify and describe all the symmetries of 2-D shapes
Chapter 25: Classifying shapes • the importance of classification as a process for making sense of the shapes in the world around us; • polygons, including the meaning of 'regular polygon'; • different kinds of triangles; • different kinds of quadrilaterals; • tessellations; • polyhedra, including the meaning of 'regular polyhedron'; • various three-dimensional shapes, including prisms and pyramids; • reflective symmetry applied to three-dimensional shapes.	**Children should be given opportunities to:** • play with shapes, make models and pictures • recognise shapes in their environments • understand and use the properties of shapes • know the names of more common 3-D and 2-D shapes • make increasingly more complex or accurate models and patterns of shapes • sort shapes according to one or more criteria	**Pupils should be given opportunities to:** • make 2-D and 3-D shapes and patterns with increasing accuracy • name and classify 2-D shapes according to side and angle properties • know and use the properties of 2-D (polygon) and common 3-D (polyhedron) shapes	**Level 1** • they use everyday language to compare and to describe … properties of regular shapes **Level 3** • classify shapes in various ways **Level 4** • use their knowledge of shape to make 3-D mathematical models
Chapter 26: Perimeter, area and volume • the concepts of area and perimeter;		**Pupils should be given opportunities to:** • find perimeters of simple shapes • find areas and volumes by counting and other practical methods	**Level 4** • find perimeters of shapes • find areas by counting squares • find volumes by counting cubes

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			Level 5
• the ideas of varying the area for a fixed perimeter, and varying the perimeter for a fixed area; • a similar idea with volume and surface area; • ways of investigating areas of parallelograms, triangles and trapeziums; • the units used for measuring area and the relationships between them; • the units used for measuring volume and the relationships between them; • the number π and its relationship to the circumference and diameter of a circle.			• find areas of rectangles and triangles • find volumes of cuboids
Chapter 27: Handling data • sorting data according to various criteria and the use of Venn diagrams and Carroll diagrams; • universal set, subset, complement of a set, intersection of sets; • population, variable, and values of a variable in the context of statistical data; • the four stages of handling data: collecting, organizing, representing, interpreting; • the use of tallying and frequency tables for collecting and organizing data; • the idea of sampling when undertaking a survey of a large population;	**Children should be given opportunities to:** • sort and classify sets of objects using one or more criteria • collect data for a variety of defined purposes and from a variety of sources, including ICT • represent collected data initially using real objects, pictures or diagrams, progressing to a variety of simple charts, graphs, diagrams, tables or databases • interpret information presented in simple graphs or diagrams	**Pupils should be given opportunities to:** • read information from charts, diagrams, graphs and text • present and interpret a wide range of graphs and diagrams that represent data, draw conclusions from this data • recognise that some conclusions can be uncertain or misleading • collect data for a variety of defined purposes, including those that arise from their own questions, and from a variety of sources • use and present data in a variety of ways including tables, pictograms, charts, bar charts, line graphs, diagrams, text and ICT	**Level 2** • sort objects and classify them using more than one criterion • when they have gathered information, record their results in simple lists, tables, diagrams and block graphs **Level 3** • extract and interpret information presented in simple tables and lists, and construct and interpret bar charts and pictograms

• the differences between discrete data, grouped discrete data and continuous data; • the representation of discrete data in block graphs; • the representation of discrete and grouped discrete data in bar charts; • the misleading effect of suppressing zero in a frequency graph; • other ways of representing data: pictograms, pie charts, line graphs and scatter diagrams.			**Level 4** • collect discrete data, group data where appropriate • draw and interpret frequency diagrams and construct and interpret simple line graphs **Level 5** • interpret graphs, diagrams and pie charts
Chapter 28: Comparing sets of data • how two data sets using the same variable can be presented for comparison; • the idea of an average as a representative figure for a set of data; • three measures of average: the mean, the median and the mode; • how to calculate mode, median and mean from a frequency table; • quartiles and the five-number summary of a distribution; • range and inter-quartile range as measures of spread; • box-and-whisker diagrams; • percentiles and deciles; • the concept of average speed.		**Pupils should be given opportunities to:** • calculate and use the mode, median, mean and range of a set of discrete data	**Level 4** • use the mode and median as characteristics of a set of data **Level 5** • use the mean of discrete data and compare two simple distributions

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Chapter 29: Probability		Pupils should be given opportunities to:	Level 4
• the meaning of probability as a measurement applied to events; • some of the language we use to indicate probability subjectively; • the use of a numerical scale from 0 to 100%, or from 0 to 1, for measuring probability; • estimating probability from statistical data; • estimating probability from data obtained by repeating an experiment a large number of times; • estimating probability by using theoretical arguments based on symmetry and equally likely outcomes; • the use of two-way tables for identifying all the possible equally likely outcomes from an experiment involving two independent events; • mutually exclusive events; • rules for combining probabilities for independent and mutually exclusive events; • a simple model for assessing risk.		• use everyday language for early ideas of probability • know that the likelihood of an event lies between impossible and certain	• understand and use simple vocabulary associated with probability **Level 5** • use the probability scale from 0 to 1 • appreciate that different outcomes may result from repeating an experiment