City of Rochester School
Maths Curriculum

Maths Curriculum

Key Stage 1 – 4

(including Functional Skills)

Intent

- At City of Rochester school our intent for mathematics is to teach a rich, balanced and progressive curriculum using Maths to reason, problem solve and develop fluent conceptual understanding in each area.
- We aim to deliver a curriculum which allows children to be a part of creative and engaging lessons that will give them a range of opportunities to explore mathematics following a mastery curriculum approach.
- We give each pupil a chance to believe in themselves as mathematicians and develop the power of resilience and perseverance when faced with mathematical challenges.
- We recognise that mathematics underpins much of our daily lives and therefore is of paramount importance in order that children aspire and become successful in the next stages of their learning.
- Our curriculum aims to engage all children and entitles them to the same quality of teaching and learning opportunities, striving to achieve their potential, as they belong to our school community.
- We make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.
- The Board of Trustees which comprises experts in SEN and in particular ASD, have been actively involved in curriculum design. This means that the curriculum is fit for purpose for children with special educational needs. A large part of the curriculum is experiential as it is important for children on the autism spectrum to be able to make cohesive links that are not abstract. A fully immersive experience is required. Examples include through World Book Day, author and poet visits and a range of trips and visits which enrich and complement children's learning.
- There is a projected flightpath for students at City of Rochester School, including an early entry Pearson qualification, Functional skills at Level 1 followed by 2, and an overall objective of achieving GCSE Success sitting the Edexcel paper.
- The experiential curriculum allows for a rich understanding in Mathematics through the application of Mathematical theory in a practical and enriching environment.

Implementation

- Teachers use careful questions to draw out children's discussions and their reasoning. The class teacher then leads children through strategies for solving the problem, including those already discussed.
- Independent work provides the means for all children to develop their fluency further, before progressing to more complex related problems.
- Mathematical topics are taught in blocks, to enable the achievement of 'mastery' over time.
- Children are taught through clear modelling and have the opportunity to develop their knowledge and understanding of mathematical concepts. The mastery approach incorporates using objects, pictures, words and numbers to help children explore and demonstrate mathematical ideas, enrich their learning experience and deepen understanding at all levels.
- A love of maths is encouraged throughout school via links with others subjects, applying an ever growing range of skills with growing independence.
- Staff have access to a bespoke and whole school training programme which enables them to meet the individual needs of pupils in relation to their diagnosis of ASD and other co-morbidities together with subject specific/curriculum training. Examples include: Understanding Autism, how the developing brain works, visits to other schools to observe and learn from best practice, subject specific training, memberships and participation in subject associations, participating in curriculum meetings, access to on-line resources – for example Mathsframe.
- Quality Assurance activities include: half-termly book monitoring, learning walks, formal and informal lesson observations, including peer to peer observations, pupil surveys and curriculum team meetings.

Impact

- Children 'have a go' and choose the equipment they need to help them to learn along with the strategies they think are best suited to each problem. Children are developing skills in being articulate and are able to verbally, pictorially and in written form reason well.
- The school has a supportive ethos and our approaches support the children in developing their collaborative and independent skills, as well as empathy and the need to recognise the achievement of others.
- Attainment is measured using SIMS Primary. Instead of giving every child a level at the end of each year, SIMS Primary is designed for continuous use. Teachers record the small steps pupils make and use these steps to build a bigger picture of the pupils' learning and achievements.
- When recording information, it isn't a case of what each pupil can or can't do. The system consists of seven steps leading to the achievement of a skill.
- Children also take Access online Maths tests at the end of each term to asses children's progress and identify gaps in learning.
- Regular feedback is sought from pupils through the School Council (half-termly), pupil surveys, (termly), parent surveys (annually), staff surveys (annually)
- Confidence, Resilience and Success are core values at City of Rochester School. This means that the acquisition of social skills and personal development are of paramount importance to our pupils to life beyond school. Impact is therefore demonstrated through social and linguistic development which the school evidences through case studies.
- Pupils have significant barriers to learning which the school works hard to help pupils overcome. This means that the school works with a wide variety of partners such as medical professionals, curriculum partners, parents/carers, education professionals and the wider community to promote pupils engagement in learning.
- Students should graduate from the school with qualifications including the OCR entry level certificate, Functional skills level 1 as well as level 2, and ultimately a GCSE qualification.
- The school scheme of work follows the overall Oxford University Press scheme. Primary makes use of the White Rose scheme of work and the Hamilton trust resources. Secondary follows the Oxford University Press flight path.

Statutory Guidance – Maths

The national curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

Links To Other Subjects

Maths skills are consolidated and enhanced when pupils have opportunities to apply and develop them across the curriculum. Poor maths skills hold back pupils' progress and can lower their self-esteem. Improving these skills can be tackled on a whole school basis by ensuring mathematical skills are used across the curriculum so that pupils become confident at tackling maths in any context.

We make links between Maths and other subjects through:

- English - Spelling mathematical vocabulary correctly and using it in the correct context; Mastery of maths is advanced by children being able to explain their mathematical thinking to others and to justify methods and conclusions.

- Design and Technology - Reading Scales; Measuring ingredients and working out proportions; Using ratios in recipes; Being able to measure things accurately is an important skill in both D&T and mathematics.

- Computing - Angles and direction which can be drawn and measured using floor robots and apps too; Information can be represented in Excel and calculations using formula can be done on the data here too; Logic is used in programming as is problem solving.

Other links can be made through – Geography, Art Music, PE and Science.

Curriculum Overview

* Our curriculum is designed with our children in mind but is subject to change. Units may be moved around to suit children's interests, current affairs and to make better use of resources. If this happens staff ensure that there is breadth and balance across the year to ensure coverage.

KS1

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 1	Number: Place Value (Within 10), Addition and Subtraction (within 10)	Geometry: Shape Number: Place Value (within 20)	Number: Addition and Subtraction (within 20), Place Value (within 50) (multiples of 2,5,10 included)	Measurement: Length and Height, Weight and Volume	Number: Multiplication and Division, Fractions Geometry: Position and Direction	Number: Place Value (within 100) Measurement: Money, Time
Year 2	Number: Place Value, Addition and Subtraction	Number: Addition and Subtraction, Multiplication and Division Measurement: Money	Number: Multiplication and Division Statistics Geometry: Properties of Shape	Number: Fractions Measurement: Length and Height	Geometry: Position and Direction Problem Solving and Efficient Methods Measurement: Time	Measurement: Mass, Capacity and Temperature Investigations

KS2

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 3	Number: Place Value, Addition and Subtraction	Number: Addition and Subtraction, Multiplication and Division	Number: Multiplication and Division Statistics Measurement: Money	Measurement: Length and Perimeter Number: Fractions	Number: Fractions Measurement: Time	Geometry: Properties of Shape Measurement: Mass and Capacity
Year 4	Number: Place Value, Addition and Subtraction	Measurement: Length and Perimeter Number: Multiplication and Division	Number: Multiplication and Division, Fractions Measurement: Area	Number: Fractions, Decimals	Number: Decimals Measurement: Money, Time	Statistics Geometry: Properties of Shapes, Position and Direction
Year 5	Number: Place Value, Addition and Subtraction	Number: Multiplication and Division Measurement: Perimeter and Area	Number: Multiplication and Division, Fractions	Number: Fractions, Decimals and Percentages	Number: Decimals Geometry: Properties of Shape	Geometry: Position and Direction Measurement: Converting Units, Volume
Year 6	Number: Place Value, Addition, Subtraction, Multiplication and Division	Number: Fractions Geometry: Position and Direction	Number: Decimals, Percentages, Algebra	Measurement: Converting Units, Perimeter, Area and Volume Number: Ratio	Geometry: Position and Direction Problem Solving Statistics	Investigations

KS3

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 7	Algebraic Thinking	Place Value and Proportion	Applications of Number	Directed Number and Fractional Thinking	Lines and Angles	Reasoning with Number
Year 8	Proportional Reasoning	Representations	Algebraic Techniques	Developing Number	Developing Geometry	Reasoning with Data
Year 9	Reasoning with Algebra	Constructing in 2 and 3 Dimensions	Reasoning with Number	Reasoning with Geometry	Reasoning with Proportion	Representations

KS4

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 10	Similarity	Developing Algebra	Geometry	Proportions and Proportional Change	Delving into Data	Using Number
Year 11	Graphs	Algebra	Reasoning	Revision and Communication	Revision	Exams

Detailed Curriculum Map

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 1	Number: Place Value (Within 10), Addition and Subtraction (within 10)	Geometry: Shape Number: Place Value (within 20)	Number: Addition and Subtraction (within 20), Place Value (within 50) (multiples of 2,5,10 included)	Measurement: Length and Height, Weight and Volume	Number: Multiplication and Division, Fractions Geometry: Position and Direction	Number: Place Value (within 100) Measurement: Money, Time
Learning Objectives Covered	Number: Place Value Count to **ten**, forwards and backwards, beginning with 0 or 1, or from any given number. Count, read and write numbers to **10** in numerals and words. Given a number, identify one more or one less. Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least. Number: Addition and Subtraction Represent and use number bonds and related subtraction facts **within 10** Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs. Add and subtract one digit numbers **to 10**, including zero. Solve one step problems that involve addition and subtraction, using concrete objects and pictorial representations and missing number problems.	Geometry: Shape Recognise and name common 2-D shapes, including: (for example, rectangles (including squares), circles and triangles) Recognise and name common 3-D shapes, including: (for example, cuboids (including cubes), pyramids and spheres.) Number: Place Value Count to **twenty**, forwards and backwards, beginning with 0 or 1, from any given number. Count, read and write numbers to **20** in numerals and words. Given a number, identify one more or one less. Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least. Number: Place Value Count to **twenty**, forwards and backwards, beginning with 0 or 1, from any given number. Count, read and write numbers to **20** in numerals and words. Given a number, identify one more or one less. Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least.	Number: Addition and Subtraction Represent and use number bonds and related subtraction facts within 20 Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs. Add and subtract one-digit and two-digit numbers to 20, including zero. Solve one step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7= ☐ – 9 Place Value Count to **50** forwards and backwards, beginning with 0 or 1, or from any number. Count, read and write numbers to 50 in numerals. Given a number, identify one more or one less. Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least. **Count in multiples of twos, fives and tens.**	Measurement: Length and Height Measure and begin to record lengths and heights. **Compare, describe and solve practical problems for: lengths and heights (for example, long/short, longer/shorter, tall/short,** double/half) Measurement: Weight and Volume Measure and begin to record mass/weight, capacity and volume. **Compare, describe and solve practical problems for mass/weight: [for example, heavy/light, heavier than, lighter than]; capacity and volume [for example, full/empty, more than, less than,** half, half full, quarter]	Number: Multiplication and Division Count in multiples of twos, fives and tens. Solve one step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. Number: Fractions Recognise, find and name a half as one of two equal parts of an object, shape or quantity. Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity. **Compare, describe and solve practical problems for: lengths and heights (for example,** long/short, longer/shorter, tall/short, **double/half) Compare, describe and solve practical problems for: mass/weight [for example,** heavy/light, heavier than, lighter than]; capacity and volume [for example, full/empty, more than, less than, **half, half full, quarter]** Geometry: position and direction Describe position, direction and movement, including whole, half, quarter and three quarter turns	Number: Place Value Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number. Count, read and write numbers to 100 in numerals. Given a number, identify one more and one less. Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than, most, least. Measurement: Money Recognise and know the value of different denominations of coins and notes. Measurement: Time Sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening. Recognise and use language relating to dates, including days of the week, weeks, months and years. Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times. Compare, describe and solve practical problems for time [for example, quicker, slower, earlier, later] Measure and begin to record time (hours, minutes, seconds)

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 2	Number: Place Value, Addition and Subtraction	Number: Addition and Subtraction, Multiplication and Division Measurement: Money	Number: Multiplication and Division Statistics Geometry: Properties of Shape	Number: Fractions Measurement: Length and Height	Geometry: Position and Direction Problem Solving and Efficient Methods Measurement: Time	Measurement: Mass, Capacity and Temperature Investigations
Learning Objectives Covered	Number – Place Value Read and write numbers to at least 100 in numerals and in words. Recognise the place value of each digit in a two digit number (tens, ones) Identify, represent and estimate numbers using different representations including the number line. Compare and order numbers from 0 up to 100; use <, > and = signs. Use place value and number facts to solve problems. Count in steps of 2, 3 and 5 from 0, and in tens from any number, forward and backward. Number – Addition and Subtraction Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100. Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers; adding three one-digit numbers. Show that the addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot. Solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures; applying their increasing knowledge of mental and written methods. Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	Measurement: Money Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value. Find different combinations of coins that equal the same amounts of money. Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change. Multiplication and Division Recall and use multiplication and division facts for the 2, 5 and 10 times tables, including recognising odd and even numbers. Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) sign. Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in contexts. Show that the multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.	Multiplication and Division Recall and use multiplication and division facts for the 2, 5 and 10 times tables, including recognising odd and even numbers. Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs. Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in contexts. Show that the multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot. Statistics Interpret and construct simple pictograms, tally charts, block diagrams and simple tables. Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity. Ask and answer questions about totalling and comparing categorical data. Geometry- properties of shape Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line. Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces. Identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid.] Compare and sort common 2-D and 3-D shapes and everyday objects.	Number – fractions Recognise, find, name and write fractions 13, 14, 24 and 34 of a length, shape, set of objects or quantity. Write simple fractions for example, 12 of 6 = 3 and recognise the equivalence of 24 and 12. Measurement: length and height Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels Compare and order lengths, mass, volume/capacity and record the results using >, < and =	Position and Direction Use mathematical vocabulary to describe position, direction and movement including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise). Order and arrange combinations of mathematical objects in patterns and sequences Problem solving and Efficient methods. Measurement: Time Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times. Know the number of minutes in an hour and the number of hours in a day. Compare and sequence intervals of time.	Measurement: Mass, Capacity and Temperature Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels Compare and order lengths, mass, volume/capacity and record the results using >, < and =

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 3	Number: Place Value, Addition and Subtraction	Number: Addition and Subtraction, Multiplication and Division	Number: Multiplication and Division Statistics Measurement: Money	Measurement: Length and Perimeter Number: Fractions	Number: Fractions Measurement: Time	Geometry: Properties of Shape Measurement: Mass and Capacity
Learning Objectives Covered	Number – Place Value Identify, represent and estimate numbers using different representations. Find 10 or 100 more or less than a given number Recognise the place value of each digit in a three-digit number (hundreds, tens, ones). Compare and order numbers up to 1000 Read and write numbers up to 1000 in numerals and in words. Solve number problems and practical problems involving these ideas. **Count from 0 in multiples of** 4, 8, **50 and 100**	Number – Addition and Subtraction Add and subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three digit number and hundreds. Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction. Estimate the answer to a calculation and use inverse operations to check answers. Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction. Number – Multiplication and Division **Count from 0 in multiples of 4, 8,** 50 and 100 Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables. **Write and calculate mathematical statements for multiplication and division using the multiplication tables they know,** including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods. Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which *n* objects are connected to *m* objectives.	Number – multiplication and division Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables. Write and calculate mathematical statements for multiplication and division using the multiplication tables they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods. Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which *n* objects are connected to *m* objectives. Measurement – money Add and subtract amounts of money to give change, using both £ and p in practical contexts. Statistics Interpret and present data using bar charts, pictograms and tables. Solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.	Measurement – length and perimeter **Measure, compare, add and subtract: lengths (m/cm/mm);** mass (kg/g); volume/capacity (l/ml). Measure the perimeter of simple 2D shapes. Number – fractions Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10 Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators. Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators. Solve problems that involve all of the above.	Number – fractions Recognise and show, using diagrams, equivalent fractions with small denominators. Compare and order unit fractions, and fractions with the same denominators. Add and subtract fractions with the same denominator within one whole [for example, 57 + 17 = 67] Solve problems that involve all of the above. Measurement – time Tell and write the time from an analogue clock, including using Roman numerals from I to XII and 12-hour and 24-hour clocks. Estimate and read time with increasing accuracy to the nearest minute. Record and compare time in terms of seconds, minutes and hours. Use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight. Know the number of seconds in a minute and the number of days in each month, year and leap year. Compare durations of events [for example to calculate the time taken by particular events or tasks].	Geometry – properties of shape Recognise angles as a property of shape or a description of a turn. Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle. Identify horizontal and vertical lines and pairs of perpendicular and parallel lines. Draw 2-D shapes and make 3-D shapes using modelling materials. Recognise 3-D shapes in different orientations and describe them. Measurement – mass and capacity **Measure, compare, add and subtract:** lengths (m/cm/mm); **mass (kg/g); volume/capacity (l/ml).**

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 4	Number: Place Value, Addition and Subtraction	Measurement: Length and Perimeter Number: Multiplication and Division	Number: Multiplication and Division, Fractions Measurement: Area	Number: Fractions, Decimals	Number: Decimals Measurement: Money, Time	Statistics Geometry: Properties of Shapes, Position and Direction
Learning Objectives Covered	Number – Place Value **Count in multiples of** 6, 7, 9. **25 and 1000.** Find 1000 more or less than a given number. Recognise the place value of each digit in a four digit number (thousands, hundreds, tens and ones) Order and compare numbers beyond 1000 Identify, represent and estimate numbers using different representations. Round any number to the nearest 10, 100 or 1000 Solve number and practical problems that involve all of the above and with increasingly large positive numbers. Count backwards through zero to include negative numbers. Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value. Number- Addition and Subtraction Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate. Estimate and use inverse operations to check answers to a calculation. Solve addition and subtraction two step problems in contexts, deciding which operations and methods to use and why.	Measurement: Length and Perimeter Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres Convert between different units of measure [for example, kilometre to metre] Number – Multiplication and Division Recall and use multiplication and division facts for multiplication tables up to 12 × 12. **Count in multiples of 6, 7, 9.** 25 and 1000 Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers. **Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit**, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.	Number – multiplication and division Recall and use multiplication and division facts for multiplication tables up to 12 × 12. Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers. Recognise and use factor pairs and commutativity in mental calculations. Multiply two digit and three digit numbers by a one digit number using formal written layout. Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects. Measurement- Area Find the area of rectilinear shapes by counting squares.	Fractions Recognise and show, using diagrams, families of common equivalent fractions. Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number. Add and subtract fractions with the same denominator. Decimals Recognise and write decimal equivalents of any number of tenths or hundredths. Find the effect of dividing a one or two digit number by 10 or 100, identifying the value of the digits in the answer as ones, tenths and hundredths **Solve simple measure** and money **problems involving fractions and decimals to two decimal places.** Convert between different units of measure [for example, kilometre to metre]	Decimals Compare numbers with the same number of decimal places up to two decimal places. Round decimals with one decimal place to the nearest whole number. Recognise and write decimal equivalents to 14, 12 and 34 Find the effect of dividing a one or two digit number by 10 or 100, identifying the value of the digits in the answer as ones, tenths and hundredths Measurement- Money Estimate, compare and calculate different measures, including money in pounds and pence. Solve simple measure and money problems involving fractions and decimals to two decimal places. Time **Convert between different units of measure [for example,** kilometre to metre; **hour to minute]** Read, write and convert time between analogue and digital 12- and 24-hour clocks. Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.	Statistics Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs. Geometry: Properties of shape Identify acute and obtuse angles and compare and order angles up to two right angles by size. Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes. Identify lines of symmetry in 2-D shapes presented in different orientations. Complete a simple symmetric figure with respect to a specific line of symmetry. Geometry- Position and Direction Describe positions on a 2-D grid as coordinates in the first quadrant. Plot specified points and draw sides to complete a given polygon. Describe movements between positions as translations of a given unit to the left/ right and up/ down.

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 5	Number: Place Value, Addition and Subtraction Statistics	Number: Multiplication and Division Measurement: Perimeter and Area	Number: Multiplication and Division, Fractions	Number: Fractions, Decimals and Percentages	Number: Decimals Geometry: Properties of Shape	Geometry: Position and Direction Measurement: Converting Units, Volume
Learning Objectives Covered	Number – Place Value Read, write, order and compare numbers to at least 1000000 and determine the value of each digit. Count forwards or backwards in steps of powers of 10 for any given number up to 1000000. Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers including through zero. Round any number up to 1000000 to the nearest 10, 100, 1000, 10000 and 100000 Solve number problems and practical problems that involve all of the above. Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.

Number- Addition and Subtraction Add and subtract numbers mentally with increasingly large numbers. Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy. Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Statistics Solve comparison, sum and difference problems using information presented in a line graph. Complete, read and interpret information in tables including timetables. | Number – multiplication and division Multiply and divide numbers mentally drawing upon known facts. Multiply and divide whole numbers by 10, 100 and 1000. Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. Recognise and use square numbers and cube numbers and the notation for squared (2) and cubed (3) Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes. Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. Establish whether a number up to 100 is prime and recall prime numbers up to 19

Perimeter and Area Measure and calculate the perimeter of composite rectilinear shapes in cm and m. Calculate and compare the area of rectangles (including squares), and including using standard units, cm2, m2 estimate the area of irregular shapes. | Number – Multiplication and Division Multiply and divide numbers mentally drawing upon known facts. Multiply numbers up to 4 digits by a one or two digit number using a formal written method, including long multiplication for 2 digit numbers. Divide numbers up to 4 digits by a one digit number using the formal written method of short division and interpret remainders appropriately for the context. Solve problems involving addition and subtraction, multiplication and division and a combination of these, including understanding the use of the equals sign.

Number: Fractions Compare and order fractions whose denominators are multiples of the same number. Identify, name and write equivalent fractions of a given fraction, represented visually including tenths and hundredths. Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements >1 as a mixed number [for example 25 + 45 = 65 = 1 15] Add and subtract fractions with the same denominator and denominators that are multiples of the same number. Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. Read and write decimal numbers as fractions [for example 0.71 = 71100] Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates. | Number: Decimals and Percentages Read, write, order and compare numbers with up to three decimal places. Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. Round decimals with two decimal places to the nearest whole number and to one decimal place. Solve problems involving number up to three decimal places. Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal. Solve problems which require knowing percentage and decimal equivalents of 12, 14, 15, 25, 45 and those fractions with a denominator of a multiple of 10 or 25. | Number: Decimals Solve problems involving number up to three decimal places. Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000. Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.

Geometry- Properties of Shapes and Angles Identify 3D shapes, including cubes and other cuboids, from 2D representations. Use the properties of rectangles to deduce related facts and find missing lengths and angles. Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles. Draw given angles, and measure them in degrees (o) Identify: angles at a point and one whole turn (total 360o), angles at a point on a straight line and ½ a turn (total 180o) other multiples of 90o | Geometry- position and direction Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.

Measurement- converting units Convert between different units of metric measure [for example, km and m; cm and m; cm and mm; g and kg; l and ml] Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints. Solve problems involving converting between units of time.

Measures Volume Estimate volume [for example using 1cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water] Use all four operations to solve problems involving measure. |

	Term 1	**Term 2**	**Term 3**	**Term 4**	**Term 5**	**Term 6**
Year 6	Number: Place Value, Addition, Subtraction, Multiplication and Division	Number: Fractions Geometry: Position and Direction	Number: Decimals, Percentages, Algebra	Measurement: Converting Units, Perimeter, Area and Volume Number: Ratio	Geometry: Position and Direction Problem Solving Statistics	Investigations
Learning Objectives Covered	Number: Place Value Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit. Round any whole number to a required degree of accuracy. Use negative numbers in context, and calculate intervals across zero. Solve number and practical problems that involve all of the above. Number- addition subtraction, multiplication + division Solve addition and subtraction multi step problems in contexts, deciding which operations and methods to use and why. Multiply multi-digit number up to 4 digits by a 2-digit number using the formal written method of long multiplication. Divide numbers up to 4 digits by a 2-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding as appropriate for the context. Divide numbers up to 4 digits by a 2-digit number using the formal written method of short division, interpreting remainders according to the context. Perform mental calculations, including with mixed operations and large numbers. Identify common factors, common multiples and prime numbers. Use their knowledge of the order of operations to carry out calculations involving the four operations. Solve problems involving addition, subtraction, multiplication and division. Use estimation to check answers to calculations and determine in the context of a problem, an appropriate degree of accuracy.	Fractions Use common factors to simplify fractions; use common multiples to express fractions in the same denomination. Compare and order fractions, including fractions > 1 Generate and describe linear number sequences (with fractions) Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions. Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example 14 x 12 = 18] Divide proper fractions by whole numbers [for example 13 ÷ 2 = 16] Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example 38] Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. Geometry- Position and Direction Describe positions on the full coordinate grid (all four quadrants). Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.	Number: Decimals Identify the value of each digit in numbers given to 3 decimal places and multiply numbers by 10, 100 and 1,000 giving answers up to 3 decimal places. Multiply one-digit numbers with up to 2 decimal places by whole numbers. Use written division methods in cases where the answer has up to 2 decimal places. Solve problems which require answers to be rounded to specified degrees of accuracy. Number: Percentages Solve problems involving the calculation of percentages [for example, of measures and such as 15% of 360] and the use of percentages for comparison. Recall and use equivalences between simple fractions, decimals and percentages including in different contexts. Number: Algebra Use simple formulae Generate and describe linear number sequences. Express missing number problems algebraically. Find pairs of numbers that satisfy an equation with two unknowns. Enumerate possibilities of combinations of two variables.	Measurement Converting Units Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate. Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to 3dp. Convert between miles and kilometres. Measurement: Perimeter, Area and Volume Recognise that shapes with the same areas can have different perimeters and vice versa. Recognise when it is possible to use formulae for area and volume of shapes. Calculate the area of parallelograms and triangles. Calculate, estimate and compare volume of cubes and cuboids using standard units, including cm3, m3 and extending to other units (mm3, km3) Number: Ratio Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts. Solve problems involving similar shapes where the scale factor is known or can be found. Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.	Geometry: Properties of Shapes Draw 2-D shapes using given dimensions and angles. Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals and regular polygons. Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. Statistics Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius. Interpret and construct pie charts and line graphs and use these to solve problems. Calculate the mean as an average.	

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 7	Algebraic Thinking	Place Value and Proportion	Applications of Number	Directed Number and Fractional Thinking	Lines and Angles	Reasoning with Number
Learning Objectives Covered	Describe and continue sequences in diagram and number forms, both linear and non linear Using single function machines and series of two function machines with numbers bar models and letters Forming and substituting into expressions, including generating sequences Representing functions graphically Understanding equality and fact families Forming and solving one-step equations Understanding equivalence Collecting like terms	Describe and continue sequences in diagram and number forms, both linear and non-linear Integer place value up to one billion Decimal place values to hundredths Working out and using number lines Comparing and ordering numbers The range and the median Rounding to positive powers of ten and to one significant figure Representing tenths and hundredths of diagram and number lines Interchanging between fractions, decimals and percentages for multiples of tenths and quarters Interpreting pie charts Equivalent fractions Converting between any fraction, decimal and percentage	Use formal methods of addition with integers and decimals Solve problems in the context of perimeter, money and frequency trees and tables Solve problems in the context of perimeter, money and frequency tree's and tables Multiplying by 10, 100, and 1000 Unit conversions Formal methods of multiplication and division HCF and LCM Areas of triangles, rectangles and parallelograms Finding the mean Finding fractions and percentages of amounts Solving two-step equations (with and without a calculator) Introducing to the order of operations	Ordering directed numbers with and without context Revisit four operations to include directed number Order of operations Representing tenths and hundredths on diagrams and number lines Adding and subtracting fractions with a common denominator, including with answers above one Revisit equivalent fractions Adding and subtracting fractions with simple different denominators e.g quarters / eights, thirds/sixths Mixed questions e.g ¾ + 0.2	Drawing and measuring lines and angles using ruler and protractor Understanding and using notation for line sand angles Understand parallel and perpendicular Recognise types of triangle, quadrilateral and other polygons Drawing and interpreting pie charts Calculating using angles at a point, angles on a straight line and vertically opposite angles Calculating missing angles in triangles and quadrilaterals	Mental arithmetic strategies Using known facts to derive other facts, including algebraic expressions Understanding and using set notation Venn diagrams Probability of a single event Types of number, including prime factorisation Powers and roots Using counter examples

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 8	Proportional Reasoning	Representations	Algebraic Techniques	Developing Number	Developing Geometry	Reasoning with Data
Learning Objectives Covered	Understanding ratio and its link to multiplication Circumference of a circle Use ratio notation Reduce ratios to simplest form Solve ratio problems Use scale factors, linking to ratio solve simple direct proportion problems Scale diagrams and maps Multiplying and diving a fraction by an integer Multiplying and diving a fraction by a fraction	Plotting and interpreting straight line graphs Equations of lines parallel to the axes Model situation by translating them into expressions, formulae and graphs Scatter graphs and correlation Designing and using one and two way tables Listing outcomes Using simple space diagrams Using tables	Multiplying out single brackets Forming and using expressions, formulae and identities Forming and solving equations and inequalities with and without brackets Using more complex rules e.g. with brackets and squared terms Writing expressions with powers	Revisit fraction, decimals and percentage equivalence One number as a percentage of another Conversation between numbers in ordinary and standard form Comparing numbers in standard form Developing mental strategies Measures and units Estimation, including rounding to a given number of decimal places Revisit order of operations	Review Y7 angles rules Parallel lines and angles Revisit geometric notation Angles in special quadrilaterals Angles in a polygon Review area of shapes covered in year 7 Area of trapezium Area of a circle and parts of a circle Using significant figures Area of compound shapes Line symmetry in polygons and other shapes Reflections of shapes in horizontal, vertical and diagonal lines	Collecting data Interpreting statistical diagrams Dual bar charts Constructing and interpreting pie charts Median and mean revisited including finding the total Mean for grouped data The mode Choosing the appropriate average Revisit finding the range Comparing distributions

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 9	Reasoning with Algebra	Constructing in 2 and 3 Dimensions	Reasoning with Number	Reasoning with Geometry	Reasoning with Proportion	Representations
Learning Objectives Covered	Interpret straight line graphs Find and use the equation of a straight line Compare to linear sequences and finding the rule for the nth term Revisit and extend to equations and inequalities with unknowns on both sides Use all previous contexts: angles, probability, area etc. Test conjunctures in a wide range of context e.g sums and products of odd and even numbers, is a given number in a sequence? are these lines parallel? What would happen if?	Understand the language of faces, edges and vertices Know the name of common prisms and non-prisms Identify 2D shapes and 3D shapes Work out the volume and surface area of cuboids and cylinders Work out the volume of any prism Work out missing lengths given area and/or volume Construct 3D shapes from nets, and construct the net of a given 3D shape Construct and use scale drawings Construct perpendiculars and bisectors Understand congruency Exploring congruency via construction	Revisit types of number Revisit fraction arithmetic Extend knowledge of HCF and LCM Revisit standard form Revisit percentage increase and decrease Use percentages over 100% Find percentage changes Use multipliers in a variety of contexts Explore financial mathematics including: bills and bank statements, interest, unit pricing	Revisit angles rules, including within special quadrilaterals Find angles using algebraic methods Use chains of reasoning to evaluate angles Identify the order of rotational symmetry of a shape Find the results of rotating a shape Translate points and shapes by a given vector Understand variance and invariance in the context of transformations Identify the hypotenuse of right-angled triangle Determine whether a triangle is right-angled Calculate missing sides in right-angled triangles	Enlarge shapes by a positive scale factor, including from a given point Calculate the lengths of missing sides in similar shapes Direct proportion problems and graphs Conversion graphs Solving ratio problems given the whole or a part Simple inverse proportion Work with speed, distance and time Solve problems involving density Work with compound units	Revisit date charts and graphs including bivariate data Revisit alternative representations of sequences Revisit frequency trees and other representations e.g. tables Revisit converting between standard and ordinary form Create and interpret tables and timetables Solve inequalities on number lines, including error intervals Criticise misleading graphs Represent word problems in a variety of forms (graphs, tables, expressions) Interpret graphs of any form (Exponential, pricewise, reading from quadratics) Probability of two or more events, including tree diagrams

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 10	Similarity	Developing Algebra	Geometry	Proportions and Proportional Change	Delving into Data	Using Number
Learning Objectives Covered	Understand the difference between congruence and similarity Enlarge a shape about a given point, understand and use similarity Find missing sides in similar shapes including pairs of similar triangles Understand and use the corrections for a pair of congruent triangles Understand trigonometric ratios Work out missing lengths and angles in right-angled triangles Know and use the exact values of key angles	Form and solve equations and inequalities in a variety of contexts, including with unknows on both sides Represent solutions to inequalities on a number line Represent solutions to equations graphically Form and solve a pair of linear simultaneous equations graphically Form and solve a pair of linear simultaneous equations algebraically	Review KS3 angles rules Understand use bearings Review area and circumference Name parts of a circle and perform related calculations Find areas and volumes related to circles including cylinder, cone, sphere etc. Understand vector notation Vector arithmetic Vectors and translations	Use ratios, including with mixed units Fractions in ratios Fractions from ratios Convert fractions, decimals and percentages Find percentages and percentage of changes Find one number as a percentage of another Calculate simple and compound interest Evaluate exponential change e.g. depreciation	Understand sampling including possible limitations Construct and interpret tables and line graphs for time series data Understand and represent with grouped data Understand and identify correlation Use lines of best fit, understand the dangers of extrapolation Construct and interpret frequency polygons Evaluate measures of location and dispersion Use statistical diagrams and measures to compare distributions	Use four operations with integers (positive and negative, decimals and fractions with and without context) Work with exact answers Evaluate calculations involving percentages Use factors, multiples, primes and prime factorisation Recognise arithmetic and geometric sequences Recognise and use other sequences Work out powers and roots Use the rules of indices Calculate with standard index form

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 11	Graphs	Algebra	Reasoning	Revision and Communication	Revision	Exams
Learning Objectives Covered	Find and use equations of straight lines Plot and read from quadratic curves Understand and find roots Plot cubic and reciprocal graphs Construct and interpret real-life graphs Reflect shapes in a given line Construct and interpret speed, distance and time graphs Interpret real-life graphs	Expand a single bracket and binomials Factorise into a single bracket Factorise quadratics of the form $x^2 + bx + c$ Solve quadratic equations Simplify complex algebraic expressions Review solving linear equations Change the subject of a formula where the subject appears once Find inputs and outputs Show algebraic expressions are equivalent Solve problems using the kinematics formulae	Review scale and enlargement Work with direct and inverse proportion Calculate with pressure and density Review angle facts, focusing on language of reasons and chains of reasoning Review Pythagoras' theorem and trigonometrical ratios Work with complex indices Review simplification of complex expressions and finding the nth term rule Justify e.g. why a number is/isn't in a given sequence	Revisit transformations of shapes, linking to types of symmetry Perform standard constructions using ruler and protractor or ruler and compasses Work with organised lists Complete and use Venn diagrams Work with plans and elevations Use data to compare distributions Illustrate equivalence Justify answers Use the language of angles rules Use the conditions for congruent triangles..		

Learning Means the World

Primary students at City of Rochester School work on the 'Learning Means the World' framework.

'Learning Means the World' reflects the real world. It is a brave, forward thinking, buzzing, relevant curriculum that promotes independence, creativity and curiosity to help pupils become collaborators, innovators and leaders.

'Learning Means the World' takes an inter-disciplinary approach to learning and puts great emphasis on curriculum depth. It is 'hands-on', 'minds-on' and 'hearts-on' and makes pupil agency a key feature of the curriculum. The thematic approach to teaching and learning is designed to support children's natural curiosity, stimulate their creativity and promote an appetite for, and love of, learning. It offers children the chance to engage in deep learning giving them the time they need to reflect, consolidate and transfer their learning.

Thematic units have a maths links section, covering specific mathematical skills. This is an opportunity for pupils to apply learning through discrete maths lessons into different theme-related contexts. These are linked to other areas of the curriculum, to provide rich learning experiences.

Dimensions — Learning Means The World

CURRICULUM SUBJECTS OVERVIEW
MATHS

Learning Pathways								
Pathfinders	Unity in the Community	Land Ahoy!	Zero to Hero	Come Fly With Me! The Arctic Circle	Happily Ever After	Inter-Nation Media Station	Going Wild	Light Up the World
	Time Position and Direction	Length Shape Number Problems	Fractions Money	Time	Shape Pattern Time	Statistics Time	Number	Length Fractions
Adventurers	Athens v Sparta	Law and Order	A World of Difference	Come Fly With Me! Africa	That's All Folks!	Lightning Speed	Picture Our Planet	Under The Canopy
	Statistics Shape and Angles	Number		Measure Number	Statistics Time	Measure	Number Statistics	Mayan Maths
Navigators	Wars of the World	You're Not Invited	I Have a Dream...	Come Fly With Me! America	Mission Control	A World of Bright Ideas	Full of Beans	Global Warning
	Measure	Roman Numeral Number Problemss	Maths Game Time	Statistics Number	Measure Time	Measure	Statistics Number	Measure

Alternative qualifications

Some students will not be able to fully access the GCSE curriculum. These students will be able to achieve a variety of alternative qualifications.

The other qualification options are the OCR entry level certificate in Maths, functional skills level 1 and functional skills level 2.

Teachers will teach to the relevant specification as per each individuals student's needs.

Pearson Entry Level Certificate

Whole Numbers and Calculation

- Write and order whole numbers up to 20. Interpret different numbering formats, including Roman, Arabic, tally and word. Understand and use the vocabulary associated with the comparison of number such as how many, the same as, more, less, less than, greater than, fewer.
- Write, order and compare whole numbers up to 100. Know the value of each digit in a two-digit number.
- Write, order and compare whole numbers up to 1000. Know the value of each digit in a three-digit number.
- Understand vocabulary associated with numerical calculations such as add, subtract, plus, minus, take away, double, +, − .
- Understand vocabulary associated with numerical calculations such as multiply, times, half, divide, ×, ÷.
- Understand vocabulary associated with numerical calculations such as sum, difference, share, total, twice, triple.
- Use appropriate objects or number line to add single-digit numbers up to 20.
- Add whole numbers up to 100.Add whole numbers up to 1000.
- Use appropriate objects or number line to subtract a single-digit number from a starting value no greater than 20.
- Subtract a single-digit number from an initial value no greater than 100.
- Subtract whole numbers from an initial value no greater than 1000.
- Know and use addition and subtraction as inverse operations.
- Know and use multiplication and division as inverse operations.

Fractions, Percentages and Decimals

- Give a number that is 0.5 more or less than a given single-digit number.
- Give a number that is 0.1 more or less than a single-digit number including where a zero may not be given after the decimal point i.e. 8 − 0.1 = 7.9.
- Add and subtract decimals in context i.e. money, mensuration, etc.
- Recognise half, quarter and three quarters in words, numbers and diagrams. Represent half, quarter and three quarters on diagrams.

- Recognise that two halves, four quarters or ten tenths make one whole and that five tenths and one half are equivalent. Represent equivalence in diagrams.
- Recognise equivalent fractions, including fractional quantities greater than 1. Understand and use mixed fraction and vulgar ('top heavy') fraction notation.
- Calculate one half, one quarter or one tenth of a quantity, where the answer is an integer.
- Calculate thirds, quarters, fifths and tenths of quantities where the answer is an integer. Use fractions in context.
- Order single-digit decimals. Order decimals and fractions.
- Understand percentage is 'number of parts per hundred'. Recognise equivalent fraction, decimal and percentage notation.
- Understand that 100% represents the whole quantity, 50% is equivalent to ½ and 25% is equivalent to ¼. Represent these percentages in diagrams.
- Understand that 10% is equivalent to dividing by ten. Understand that 1% is equivalent to dividing by 100.
- Find 50%, 25% and 10% of two-digit numbers, limited to results which are whole number answers.
- Find 1%, 25%, 50% for three-digit numbers, limited to results which are whole number answers. Find other percentage quantities by combining results.

Multiples

- Know and use multiplication of numbers up to 10 by 2. Understand and use the term 'double'.
- Know and use multiplication of numbers up to 10 by 3, 4, 5 and 10.
- Know and use multiplication of whole numbers up to 12 × 12, and use this knowledge in multiplication and division problems.
- Recognise the odd and even numbers from 1 to 20.
- Recognise when a two-digit number is divisible by 2, 3, 4, 5 and 10.
- Multiply a whole number by 10. Recognise when any number will give a whole number when divided by 10.
- Understand the index notation for squared and cubed and be able to calculate the results of squared and cubed powers on the numbers 1–5 and 10.

Estimation and Approximation

- Understand and use place value to order 1 significant figure integer numbers up to 100 e.g. order 70, 6, 20.
- Understand and use place value to order 1 significant figure integer numbers up to 1000 e.g. order 400, 7, 50.
- Understand and use place value to order 2 significant figure integer numbers up to 1000 e.g. 580, 120, 91.
- Understand and use place value to order numbers given to 2 decimal places. Use decimal values in real life contexts i.e. money.
- Perform simple calculations where the units of the quantities are whole numbers of hundreds.
- Perform simple calculations where the units of the quantities are whole numbers of thousands or millions.

- Round numbers, less than ten, to the nearest whole number. Use approximations in calculations.
- Round numbers less than 100 to the nearest ten or whole number. Estimate totals using rounded values.
- Round numbers to the nearest whole multiple of ten. Use approximate values to obtain an estimation.
- Use estimation to explain whether a number of items (no more than five) can be bought for £20.
- Estimate approximate total cost and expected change for a number of items (no more than ten) to be bought.
- Estimate approximate cost of a list of multiple items to determine if purchases can be made within a stated budget.

Proportionality

- Solve simple proportion problems by repeated addition of constituent quantities e.g. if 1 cake costs <10p find the cost of 2, 3, and 4 cakes.
- Solve simple proportion problems by doubling constituent parts e.g. adapt a 4 person recipe for 8 people.
- Solve simple proportion problems using systematic analysis e.g. adapt a 2 person recipe for 1 person, 3 people, 20 people, etc.
- Solve simple inverse proportion problems using systematic analysis e.g. if speed doubles then the time taken will halve.

Formulae

- Complete a sequence increasing by 2, given in words, numbers or as a spatial pattern.
- Complete a sequence increasing or decreasing by 2, 3, 5 or 10.
- Complete sequences of increasing or decreasing integers where the common difference is less than 10 or a multiple of 10.
- Substitute positive integers into a formula given in words and calculate answers i.e. average speed is distance travelled divided by time taken.
- Use the terms first, second, third, fourth, fifth including sequencing events.
- Use a simple one-step function machine to determine outputs for given inputs.
- Use a simple two-step function machine to determine outputs for given inputs.

Scales and Graphs

- Read and mark a scale or dial whose divisions represent 1 unit, which are labelled in 1s or 2s (numbers up to 20). Read linear scales in familiar contexts.
- Read and mark a scale or dial whose divisions are labelled and represent 2, 5 or 10 units. Read dial and scales in familiar contexts.
- Read and mark a scale or dial whose divisions are labelled appropriately.
- Work with x- and y-coordinates in positive quadrant.
- Interpret graphs representing a simple sequence or proportional relationship.

- Interpret graphs in real-world contexts e.g. money conversion, cost-time.
- Construct and interpret graphs in real-world contexts e.g. distance-time, money conversion, cost-time.

Shapes and Solids

- Sort and classify shapes using language related to angles and sides e.g. straight, right angle, acute, obtuse, curved, corners, perpendicular, parallel, arc. Know and use names for basic shapes e.g. triangle, rectangle, square, circle.
- Sort and classify polygons by number of sides e.g. triangle, quadrilateral, pentagon, hexagon. Distinguish between different triangles (equilateral, isosceles, right-angled and scalene).
- Distinguish between different quadrilaterals (square, rectangle, kite, trapezium, parallelogram and rhombus).
- Sort and classify solids using language related to angles, edges and faces e.g. straight, right angle, acute, obtuse, curved, corners, perpendicular, parallel.
- Know and use the terms side, edge, corner, square face, rectangular face, triangular face, cube, cuboid, crosssection, pyramid, sphere, cone, cylinder.
- Identify pictures of three-dimensional objects. Identify and sketch nets of cuboids.

Symmetry and Transformations

- Identify lines and draw shapes with single vertical lines of symmetry. Understand the terms symmetry, symmetrical.
- Identify lines and draw shapes which have horizontal and/or vertical lines of symmetry.
- Understand the terms reflection and reflectional symmetry. Recognise simple plane shapes, patterns or pictures that have reflectional symmetry.
- Rotate, reflect and translate simple shapes to form a tessellated pattern.
- Use different polygons to form regular and semi-regular tessellation patterns.
- Draw the reflection of a simple object in a mirror line on squared paper.
- Draw the rotation of a simple object through 90 degrees on squared paper.
- Draw a simple transformation on a coordinate grid: – reflection in horizontal and vertical lines – rotation about (0 , 0) through multiples of 90 degrees –   translations e.g. 3 forward, 5 down.

Units and Measures

- Visually compare lengths, understand and use terms such as longer than, longest, shorter than, shortest.
- Compare weights of common objects including using terms such as heavier than, lighter than, heaviest, lightest.
- Estimate heights, lengths and weights of everyday objects.

- Understand how equipment such as trundle wheels, metre rule, etc. can be used to measure distance.
- Understand that perimeter is the distance around the outside of a shape. Use measuring equipment to find the perimeter of objects.
- Measure the perimeter of rectilinear shapes drawn on cm square grids.
- Use given measurements to calculate perimeter in mm, cm or m as appropriate.
- Understand that area is the space inside a 2D shape and estimate the area of both regular and irregular shapes by counting whole number of squares.
- Calculate area of rectangles drawn on cm square grids.
- Calculate area of rectangles and triangles drawn to scale on square grids.
- Understand and use the terms behind, in front of, above, below, right, left, next to, straight on, turn around.
- Understand and use the terms clockwise and anticlockwise and the idea of quarter turn, half turn and three quarters turn.
- Understand and use the four points of the compass.
- Recognise 90 degree angles in common shapes. Recognise parallel and perpendicular lines in common shapes.
- Estimate size of an angle about a point up to 90 degrees.
- Recognise angles greater than, equal to, and less than 90 degrees in shapes. Measure acute angles to the nearest 10 degrees using a protractor.
- Know and use the terms acute, obtuse and reflex to describe angles. Measure angles to +/– 2 degrees.
- Use a ruler to draw right-angled triangles and rectangles of given side lengths on squared paper.
- Use a ruler and protractor to draw and measure triangles accurately: • side, angle, side • angle, side, angle.
- Use a ruler and protractor to draw and measure polygons, up to hexagons.
- Recognise British coins in everyday use. Know that £1 is 100p, £2 is 200p, etc. Order collection of coins.
- Select coins equivalent to an amount of money up to £1. Give change from £1.
- Use £ and p notation. Select coins equivalent to an amount of money up to £5. Order collection of coins and notes. Give change from £5.
- Select coins and notes equivalent to an amount of money up to £20. Give change from £20.
- Solve problems involving multiplication or division of money by a whole number no greater than 10.
- Know and use the fact that there are 60 minutes in an hour to find the end time for a planned activity starting at a given time.
- Find start or end times for a planned time period. Calculate the duration given the start and end times.
- Know and use time conversion facts to solve time problems e.g. 24 hours = 1 day, 60 minutes = 1 hour, 60 seconds = 1 minute.
- Use language associated with time e.g. morning, afternoon, evening, night.
- Understand and use am/pm method of stating time.
- Understand and use 12 and 24-hour clock notation. Convert between 12 and 24-hour clock notation.
- Read and write time for digital clocks (in hours and in fifteen minute intervals). Understand and use common time phrases such as quarter past ten, half past three, quarter to five, etc.
- Read and write time for digital and analogue clocks (in hours and in fifteen minute intervals).
- Read and write time for digital and analogue clocks (in hours and in five minute intervals).

- Know and use basic calendar facts (e.g. days in a week, months in a year and seasons), including common abbreviations.
- Use a calendar to solve problems. Read and use simple travel timetables and other common two-way tables.
- Read scales showing temperatures from zero.
- Compare positive integer temperatures. Read scales showing temperatures above and below zero and compare temperatures.

Lists and Outcomes

- Sort and classify objects using a single criterion defined using everyday language.
- Use a two-circle Venn diagram to sort and classify numeric and graphic data by two criteria.
- Use systematic listing strategies to identify different outcomes of two combined events i.e. rolling two dice.
- Use systematic listing strategies to identify different outcomes of three combined events i.e. drink, meal, dessert.
- Tally objects using recognised notation. Understand and complete a tally chart including numerical frequency.
- Extract information from a frequency table.
- Complete or extract information from lists with a maximum of two columns or two rows.
- Complete or extract information from printed lists with more than two columns or rows.

Averages and Trends

- Construct and interpret a bar graph, using a frequency scale in 1s or 2s.
- Construct and interpret a bar graph, using a frequency scale in 5s or 10s.
- Construct and interpret a bar graph, using a frequency scale in 50s or 100s.
- Draw and interpret a pictogram with scale in 1s or 2s.
- Draw and interpret a pictogram with scale in multiples of 2, 4, 5 or 10.
- Draw and interpret pictograms.12.02a
- Order small list of numbers (up to ten numbers) to determine most common value (mode) and range of values (biggest–smallest).
- Order small list of numbers (up to ten numbers) to identify middle value (median).
- Find mode, median, mean and range of a small list of numbers (up to ten numbers) [formulae to be given].
- Interpret most common category from a frequency diagram, including bar charts, pictograms and pie charts.
- Understand and use range as the difference between the biggest and smallest recorded values on an appropriate frequency diagram.
- Understand and use median as the middle item in a cumulative count of items using an appropriate frequency diagram.
- Plot scatter graphs for pairs of data values. Interpret given lines of best fit for points on a given scatter graph.
- Draw and interpret trends on scatter graphs using terms increase or decrease and positive or negative.

Functional Skills Level 1

Content area: Using numbers and the number system – whole numbers

- Read, write, order and compare numbers up to 20,
- Use whole numbers to count up to 20 items, including zero,
- Add numbers which total up to 20, and subtract numbers from numbers up to 20,
- Recognise and interpret the symbols +, – and = appropriately

Content area: Using common measures, shape and space

- Recognise coins and notes and write them in numbers with the correct symbols (£ & p), where these involve numbers up to 20,
- Read 12-hour digital and analogue clocks in hours,
- Know the number of days in a week, months and seasons in a year; be able to name and sequence,
- Describe and make comparisons in words between measures of items including size, length, width, height, weight and capacity,
- Identify and recognise common 2-D and 3-D shapes, including circle, cube, rectangle (including square) and triangle,
- Use everyday positional vocabulary to describe position and direction, including left, right, in front, behind, under and above

Content area: Handing information and data

- Read numerical information from lists,
- Sort and classify objects using a single criterion,
- Read and draw simple charts and diagrams, including a tally chart, block diagram/graph

Functional Skills Level 2

Content area: Using numbers and the number system – whole numbers, fractions and decimals

- Count reliably up to 100 items,
- Read, write, order and compare numbers up to 200,
- Recognise and sequence odd and even numbers up to 100,
- Recognise and interpret the symbols +, –, ×, ÷ and = appropriately,
- Add and subtract two-digit numbers,
- Multiply whole numbers in the range 0 × 0 to 12 × 12 (times tables),
- Know the number of hours in a day and weeks in a year; be able to name and sequence,
- Divide two-digit whole numbers by single-digit whole numbers and express remainders,
- Approximate by rounding to the nearest 10, and use this rounded answer to check results,
- Recognise simple fractions (halves, quarters and tenths) of whole numbers and shapes,
- Read, write and use decimals to one decimal place

Content area: Using common measures, shape and space

- Calculate money with pence up to one pound and in whole pounds of multiple items and write with the correct symbols (£ or p),
- Read and record time in common date formats and read time displayed on analogue clocks in hours, half hours and quarter hours, and understand hours from a 24-hour digital clock,
- Use metric measures of length, including millimetres, centimetres, metres and kilometres,
- Use measures of weight, including grams and kilograms,
- Use measures of capacity, including millilitres and litres,
- Read and compare positive temperatures,
- Read and use simple scales to the nearest labelled division,
- Recognise and name 2-D and 3-D shapes, including pentagons, hexagons, cylinders, cuboids, pyramids and spheres,
- Describe the properties of common 2-D and 3-D shapes, including numbers of sides, corners, edges, faces, angles and base,
- Use appropriate positional vocabulary to describe position and direction, including between, inside, outside, middle, below, on top, forwards and backwards

Content area: Handing information and data

- Extract information from lists, tables, diagrams and bar charts,
- Make numerical comparisons from bar charts,
- Sort and classify objects using two criteria,
- Take information from one format and represent the information in another format, including use of bar charts