

Key Stage 2

Kirkby Woodhouse Primary School



Maths Curriculum
September 2021 (V4 - Revised July 2022)

Purpose of study

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

Aims

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.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

Maths at Kirkby Woodhouse School

At Kirkby Woodhouse School, we teach maths for an hour each day following the National Curriculum. We use a variety of stimuli such as games, quizzes, investigations and challenges to excite and motivate the children. Pupils are always encouraged to 'have a go' and 'try', knowing that they are working in an environment where it is safe to test out ideas and make mistakes. We focus on using and applying through teaching mathematical concepts in calculation and application through inspirational investigations and problem solving. Arithmetic maths skills are embedded in lessons and focused on throughout each lesson. Children are encouraged to develop their own efficient methods and to share these with others.

During lessons, pupils record their work in a variety of ways, including written methods and pictorially; as well as using white boards and cameras. Children are encouraged to use manipulatives to represent their ideas in a concrete way before expressing ideas in an abstract manner. They have practical 'hands on' experiences while being sufficiently supported and extended. Pupils have the opportunity to work individually, in pairs and small groups, discussing their work with reasoning and questioning. Flexible grouping during some lessons allows children to be supported or challenged accordingly.

The curriculum is organised across KS2 as a 'Challenge Ladder' scheme, which is used to assess each individual's starting point. A variety of resources are used to teach year group objectives and children are further assessed against the ladder to indicate progress. This gives high challenge across the year group objectives with opportunities to revisit previous years to 'Zap Gaps'. Equally, children are given the opportunity to work at greater depth to embed knowledge from their year group objectives. Grouped topic areas are rounded off with a 'Solve It' activity aimed at application and reasoning.

Long Term Maths Planning

Each maths block is organised in a similar way to the White Rose Maths planning. Some blocks are in a slightly different order to allow prioritisation over ‘number – based’ topics first. The objectives for each year group’s curriculum are organised into ‘**Ladder**’ topics and ‘**discrete**’ topics. Both topic blocks of work integrate with the three main areas of the curriculum, which are:

1. Fluency
2. Mathematical Reasoning
3. Problem Solving

In KS2, the order of maths topics is as follows:

- Those topics in the first table relate to a specific Maths Ladder.
- The **number-based ladders** will be taught from September through to February Half Term.
- The remaining ladders, plus the **discrete topics**, will be taught afterwards in an order appropriate for each class (see planning timetables: p8-11).

Maths Ladders

MATHS LADDER TOPIC	YEAR 3	YEAR 4	YEAR 5	YEAR 6	NOTES
Counting	YES	YES	YES	YES	
Numbers	YES	YES	NO	NO	
What’s it Worth?	YES	YES	NO	NO	In Yr5 and 6, use the ‘What’s it Worth?’ ladder as revision, linked to mental starters etc.
Ordering	YES	YES	YES	YES	
Rounding	NO	YES	YES	YES	
Digits Move!	NO	NO	YES	YES	
Addition	YES	YES	YES	YES	
Subtraction	YES	YES	YES	YES	
Multiplication	YES	YES	YES	YES	
Division	YES	YES	YES	YES	In Yr6, after the four rules of number have been taught, children will have a problem solving activity involving mixed operations within different problem solving concepts. This will also link to their applying skills and retention of strategies.
Balance It	NO	NO	YES	YES	
Fractions – Ladder 1	YES <i>Ladder 1</i>	YES <i>Ladder 1</i>	YES <i>Ladder 2</i>	YES <i>Ladder 2</i>	If needed, children can access Ladder 2 (Yr5/6 version) or vice versa.
Percentages	NO	NO	YES	YES	
Perimeter	YES	YES	YES	YES	
Area	NO	YES	YES	YES	
Money	YES	YES	NO	NO	
Time	YES	YES	YES	NO	
2D Shape	YES	YES	YES	YES	
3D Shape	NO	NO	YES	YES	Although there isn’t a ladder for 3D shape for Years 3 and 4 – in Year 3 the making of 3D shape models needs to be taught as a discrete topic.
Angles	YES	YES	YES	YES	

Discrete Topics

These **discrete topics** will be taught by teachers in the order specified on the year group plan:

DISCRETE TOPIC	YEAR 3	YEAR 4	YEAR 5	YEAR 6	NOTES
Roman Numerals	NO	YES	YES	NO	
Symmetry	NO	YES	YES	NO	
Reflection	NO	NO	YES	YES	
Translation	NO	YES	YES	YES	Year 6 also need to include teaching scaling within translation.
Coordinates		YES	NO	YES	
Statistics (Handling Data)	YES	YES	YES	YES	
Measuring Length, Weight and Capacity	YES	YES	YES	YES	In all KS2 year groups, this needs to include units and their conversions. In Year 5, this needs to include problem solving with measures as well as work on imperial measurement.
Volume	NO	NO	YES	YES	
Number Vocabulary Factors, multiples, square numbers, cube and prime numbers	NO	NO	YES	YES	
BIDMAS	NO	NO	NO	YES	
Ratio and Proportion	NO	NO	NO	YES	White Rose block links closely to scaling.
Radius, Circumference and Diameter	NO	NO	NO	YES	
Algebra	NO	NO	NO	YES	Linked to Year 6 problem solving projects post SATs and working with a number of variables.

KS2 Approach to Teaching Maths

MATHS LADDER / CHALLENGE APPROACH

The approach to maths at Kirkby Woodhouse school broadly follows that of Focus Education. This is an objective-based curriculum, and it also aligns closely with White Rose Maths.

Maths is taught in topics across KS2 with objectives grouped into topic areas (e.g. relating to addition or fractions). Teachers should use the planning timetables (p8-11) as a guide to how long to spend on each topic area. The amount of time given to a topic will depend upon the level of knowledge and understanding the children have at the start of each topic. For example, children may be much more confident with addition than with division. Therefore, a shorter 'revision' block may take place for addition, whereas more time may be spent looking at the weaker subject areas such as division. Teachers will use children's individual assessment at the start of each topic, the ongoing learning/progress in lessons and their professional judgement to judge the length of time for each topic as appropriate for their class. 'Zap the Gap' (ZTG) and guided group work will also take place during lessons or as an intervention group to support/challenge individuals or groups of children as appropriate to their needs.

All 'Ladder' Topics will commence with a ladder assessment to judge children's prior knowledge. For Year 3/4, these can be inserted into the maths book and Year 5/6 will use these as an assessment book. Teachers then use a range of resources (Target Your Maths, White Rose, Third Space, Abacus, games, interactive tasks, group and individual work) to differentiate tasks based on the starting points for children in their class. During the past few years, children have responded well to this being called 'Maths Challenges' and they should be encouraged to take responsibility for progressing through the objectives. In all cases, children should be taught the year group objectives relevant to their year group, even if work is then differentiated down to address missing knowledge. As the topic area is taught,

teachers use the ladder assessment to mark achievement across the objectives. This will form ongoing formative assessment for maths.

All ladders associated with '**number**' are taught from September until just after Christmas, before moving onto the other areas of maths.

Maths ladders are specifically designed to be used as a teacher assessment tool and to allow children to understand the objectives that they are working on. The objectives on ladders are not hierarchical in order, however, the objectives are ordered in year group occurrence. Each challenge/target should relate to a rung on the ladder so children can see where their start target is and where they can aim to achieve beyond this. Each challenge/target on the maths ladder relates to a separate curriculum objective.

Throughout each topic, children are involved in self-assessing their learning/progress and challenging themselves to climb further up the ladder, achieving their target and even going 'beyond expectations' by aiming for high challenge. High challenge is achieved by broadening out the objective with A, B & C activities rather than progressing to the next rung of the ladder. If the ladder in the book is then used to mark for assessment, this can be used to identify any gaps or interventions. Teachers must ensure the following:

- All objectives within their own year group include A and B activities and if appropriate, C activities (this is differentiation).
- Any objectives outside of the year group can include one activity, intended as a catch up or intervention.
- Children must be taught the objectives for their own year group, even though they may be completing challenges from below their own year group.
- Every classroom must display the maths ladder for the topic on which they are working. This allows teachers and children to make reference to them in lessons.
- Children are expected to record the topic title and the challenge number in their maths books, e.g. 'Subtraction – Challenge 4'. The children know that each challenge/target relates to rungs on the maths ladder and which ones they are aiming to achieve.

The stars on the maths ladders are where children, when working on that challenge, will broaden their knowledge by working on a range of SATs style questions and/or word problems (Test Base or Third Space) where they need to apply their knowledge and strategies from that particular topic. This is to ensure that children don't just climb the ladder without broadening their knowledge and having the opportunity to apply their skills in different contexts.

In addition to the topics covered through the maths ladder approach, there are a number of **discrete topics**. These are taught in an order chosen by individual teachers and will come after the ladders have been taught. These may be taught as a whole class mini project or through cross-curricular links. Teachers ensure that they refer to the programme of study objectives from the curriculum for their year group to maintain differentiation for the learning needs of all children. For high challenge for our more able/gifted and talented pupils, teachers will make opportunities and will plan activities to broaden their understanding and applying skills.

ASSESSMENT

Initial assessment will take place by children completing a maths ladder for the topic area. This will highlight starting points and gaps in addition to children requiring further challenge. As children complete work, the ladder assessment should be used as a working, formative assessment record.

Children will be assessed summatively using NFER test (Y3-5) and past SATs papers (Y6) at the end of each term.

LESSON STARTER ACTIVITIES

Throughout the year, starter activities should be varied to ensure inclusion of *RtP* and *Number Fact Fluency*, *Reasoning*, *Times tables* and *Arithmetic* activities.

ARITHMETIC

Children will be taught arithmetic routinely as part of morning work or starter activities. Arithmetic may be used for revisiting strategies/learning from a previous topic; recapping work from the current topic; times table work etc. Teachers respond to the needs of their class. Teachers will make reference to this on their weekly timetable or in their Planning Journal and consider using a maths journal to record work.

READY TO PROGRESS (RtP)

The NCETM have produced a wide number of objectives to be taught to each year group in KS2 aimed at ensuring that children are equipped with skills to take them forward to the next year group. We have used these during Covid recovery, and they have proved to be very successful across the key stage. We will continue to use the RtP materials and methods routinely across maths lessons. The expectation is that RtP will be used as one of the morning activities and teachers will carefully select the RtP suitable for the positioning of the curriculum. The thinking behind this is to use the RtP as a revisit of key concepts close to the point of teaching. RtP should take place for 15 minutes at the beginning of at least 1 maths lessons each week. RtP lessons lend very well towards whole group activities and therefore may not always be recorded in books. Teachers should ensure that a minimum of 1 lesson from each block is recorded in maths journals and clearly labelled as RtP. After a year reviewing the materials, it has been deemed that some lessons are not useful and therefore, teachers need to carefully select the content relevant to their class.

REASONING AND TIMES TABLES

One day each week, maths can be dedicated to a split times tables session and reasoning. It is suggested that this should be your allocated iPad day (to make use of TTRS, Topmarks etc) but this time should also be used to teach times tables strategies. The other half can be used for a mixed reasoning response and could utilise Third Space resources (Rapid Reasoning).

NUMBER FACT FLUENCY

One day each week, children should undertake activities to encourage number fact fluency. This follows from the training with Jane Gill (East Midland Primary Maths Specialist.) It is suggested to establish a routine for each day of the week using the themes similar to those from the training (Resources in Maths Curriculum Folder).

EXAMPLE WEEKLY TIMETABLE

	Monday	Tuesday	Wednesday	Thursday	Friday
Starter Activity	Daily Arithmetic X - + ÷	RtP (e.g. 3NPV-2)	Number Fact Fluency (e.g. Pattern Spotting)	Times Tables TTRS (e.g. – strategies for 7s)	Rapid Reasoning
Main Teaching Activity	Multiplication Ladder	Multiplication Challenges	Multiplication Challenges	Rapid Reasoning Week 3 – Day 2	Multiplication Challenges

Year 3 – Long Term Plan

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Assessments	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter
	Number: Place Value Counting / Numbers What's it Worth Ordering / Rounding				Number: Addition and Subtraction Addition Subtraction Mixed Problems				Number: Multiplication and Division Multiplication Division			
Spring	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter
	Number: Multiplication and Division Multiplication Division Mixed Problems			Number: Fractions Fractions 1		Measurement: Money and Time Money Time			Geometry: Properties of Shape Angles 2D Shape 3D Shape			Consolidation
Summer	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter
	Number: Fractions Fractions 1 cont.			Measurement: Length & Perimeter Measuring Perimeter			Statistics Statistics		Measurement: Mass and Capacity Mass Capacity			Consolidation

Year 4 – Long Term Plan

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Assessments	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter
	Number: Place Value Counting / Numbers What's it Worth Ordering Rounding					Number: Addition and Subtraction Addition Subtraction Mixed Problems			Number: Multiplication and Division Multiplication Division			Consolidation
Spring	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter
	Number: Multiplication and Division Multiplication Division Mixed Problems			Number: Fractions Fractions 1				Number: Decimals Fractions 1			Measurement: Area and Perimeter Area / Perimeter	Consolidation
Summer	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter
	Measurement: Mass and Capacity Mass Capacity		Measurement: Time and Money Time Money				Geometry: Properties of Shape 2D Shape		Geometry: Properties of Shape Angles		Statistics Statistics	Consolidation

Year 5 – Long Term Plan

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Assessments	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter
	Number: Place Value Counting Ordering / Rounding Digits Move				Number: Addition and Subtraction Addition Subtraction Mixed Problems			Number: Multiplication and Division Multiplication Division Mixed Problems				Consolidation
Spring	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter
	Number Balance It	Number: Fractions Fractions 2			Number: Decimals & Percentages Decimals Percentages			Measurement: Area and Perimeter Area / Perimeter		Measurement: Time Time	Discrete: Roman Numerals / Vocabulary	Consolidation
Summer	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter
	Geometry: Properties of Shape 2D Shape 3D Shape		Geometry: Properties of Shape Angles		Measurement: Mass and Capacity Mass Capacity Volume		Geometry: Position and Direction Symmetry Reflection Translation		Statistics Statistics		Consolidation	Consolidation


Year 6 – Long Term Plan

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	
Autumn	Assessments	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	
	Number: Place Value Counting Ordering / Rounding Digits Move			Number: Addition and Subtraction Addition Subtraction Mixed Problems			Number: Multiplication and Division Multiplication Division Mixed Problems / BIDMAS			Number Balance It Christmas Maths Application of X - + ÷		Consolidation	
Spring	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	
	Number: Fractions Fractions 2			Number: Decimals & Percentages Decimals Percentages			Number: Algebra Algebra		Statistics: Pictograms, Bar, Line and Pie Charts		Measurement: Perimeter / Area Area Perimeter		Discrete: Roman Numerals / Vocabulary
Summer	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	Daily Starter	
	Geometry: Properties of Shape 2D Shape 3D Shape Circles		Geometry: Properties of Shape Angles Sym / Ref / Trans		Measurement: Mass and Capacity Mass Capacity Volume		SATS		Consolidation Revision Subjects for Boosters: Ratio / Proportion BIDMAS Roman Numerals				

KS2 Programmes of Study

The pages below contain all objectives relevant to each year group from the National Curriculum programmes of study.

The table will make an explicit link to the ladder and challenge number where each of the objectives are assessed and subsequently, teaching will be sequenced, and work will be set.

Objectives marked with a  should be treated as reasoning tasks and can be part of varied reasoning tasks (Third Space – Rapid reasoning) or Solve It activities. They will be consolidation activities for the teaching of that particular block.

Some objectives do not make reference to a ladder or challenge number. These are discrete topics and will be taught using a range a resources available.

Year 3 programme of study



Number – number and place value

Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number <i>(KPI)</i>	Counting	C1, C2
Recognise the place value of each digit in a three-digit number (hundreds, tens, ones) <i>(KPI)</i>	What's it worth	C3
Compare and order numbers up to 1000	Ordering	C3
Identify, represent and estimate numbers using different representations	Numbers	C1, C2, C3
Read and write numbers up to 1000 in numerals and in words	Numbers	C4
Solve number problems and practical problems involving these ideas <i>(KPI)</i>	Numbers / Counting / What's it worth, Ordering (Star / Solve IT)	★

Number – addition and subtraction

Add and subtract numbers mentally, including: <ul style="list-style-type: none"> A three-digit number and ones <i>(KPI)</i> A three-digit number and tens <i>(KPI)</i> A three-digit number and hundreds <i>(KPI)</i> 	Addition / Subtraction	C2, C3
Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction	Addition / Subtraction	C4
Estimate the answer to a calculation and use inverse operations to check answers	Addition / Subtraction	C5
Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction	Addition / Subtraction (Star / Solve IT)	★

Number – multiplication and division

Recall and use multiplication and division facts for the: <ul style="list-style-type: none"> 3 x tables <i>(KPI)</i> 4 x tables <i>(KPI)</i> 8 x tables <i>(KPI)</i> 	Multiplication / Division	C1
Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods <i>(KPI)</i>	Multiplication / Division	C2
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 objects	Multiplication / Division (Star / Solve IT)	★

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 (KPI)	Fractions L1	C2
Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators (KPI)	Fractions L1	C3
Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators	Fractions L1	C1–C3
Recognise and show, using diagrams, equivalent fractions with small denominators (KPI)	Fractions L1	C1–C3
Add and subtract fractions with the same denominator within one whole [for example, $\frac{1}{7} + \frac{5}{7} = \frac{6}{7}$]	Fractions L1	C6
Compare and order unit fractions, and fractions with the same denominators	Fractions L1	C4
Solve problems that involve all of the above	Fractions L1 (Star / Solve IT)	★

Measurement

Measure, compare, add and subtract: <ul style="list-style-type: none"> Lengths (m/cm/mm) (KPI) Mass (kg/g) (KPI) Volume/capacity (l/ml) (KPI) 	Discrete	N/A
Measure the perimeter of simple 2-D shapes	Measuring perimeter	C1
Add and subtract amounts of money to give change, using both £ and p in practical contexts (KPI)	Money	C1-3
Tell and write the time from: <ul style="list-style-type: none"> An analogue clock and 12-hour and 24-hour clocks (KPI) An analogue including using Roman numerals from I to XII 	Time	C1-4
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	Time	C1-5
Know the number of seconds in a minute and the number of days in each month, year and leap year	Time	C1-6
Compare durations of events [for example to calculate the time taken by particular events or tasks]	Time	C6

Geometry – properties of shapes

Draw 2-D shapes and make 3-D shapes using modelling materials Recognise 3-D shapes in different orientations and describe them	2D Shape / 3D Discrete	C1
Recognise angles as a property of shape or a description of a turn	2D Shape	C2
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 (<i>KPI</i>)	Angles	C1-3
Identify horizontal and vertical lines and pairs of perpendicular and parallel lines	2D Shape	C3-4

Statistics

Interpret and present data using bar charts, pictograms and tables (<i>KPI</i>)	Discrete	N/A
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	Discrete	N/A

Year 4 programme of study



Number – number and place value

Count in multiples of 6, 7, 9, 25 and 1000 (KPI)	Counting	C3
Find 1000 more or less than a given number	Counting	C4
Count backwards through zero to include negative numbers (KPI)	Counting	C5
Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)	What's it worth	C5
Order and compare numbers beyond 1000 (KPI)	Ordering	C4
Identify, represent and estimate numbers using different representations	Numbers	C1, C2, C3
Round any number to the nearest 10, 100 or 1000 (KPI)	Rounding	C1-C4
Solve number and practical problems that involve all of the above and with increasingly large positive numbers	Numbers / Counting / What's it worth / Ordering / Rounding (Star / Solve IT)	☆
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	Discrete	N/A

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	Addition / Subtraction	C6
Estimate and use inverse operations to check answers to a calculation	Addition / Subtraction	C5
Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why (KPI)	Addition / Subtraction (Star / Solve IT)	☆

Number – multiplication and division

Recall multiplication and division facts for multiplication tables up to 12×12 (KPI)	Multiplication / Division	C3
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	Mental strategies / Starters	N/A
Recognise and use factor pairs and commutativity in mental calculations	Multiplication / Division	C4
Multiply two-digit and three-digit numbers by a one-digit number using formal written layout	Multiplication / Division	C5

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	Multiplication / Division (Star / Solve IT)	☆
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Number – fractions

Recognise and show, using diagrams, families of common equivalent fractions <i>(KPI)</i>	Fractions L1	C7
Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten <i>(KPI)</i>	Fractions L1	C8
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	Fractions L1 (Star / Solve IT)	☆
Add and subtract fractions with the same denominator	Fractions L1	C6
Recognise and write decimal equivalents of any number of tenths or hundredths	Fractions L1	C7
Recognise and write decimal equivalents to $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$	Fractions L1	C7
Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths	Fractions L1	C8
Round decimals with one decimal place to the nearest whole number <i>(KPI)</i>	Rounding	C7
Compare numbers with the same number of decimal places up to two decimal places	Ordering	C7
Solve simple measure and money problems involving fractions and decimals to two decimal places <i>(KPI)</i>	Fractions L1 (Star / Solve IT)	☆

Measurement

Convert between different units of measure [for example, kilometre to metre; hour to minute] <i>(KPI)</i>	Discrete	N/A
Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres	Measuring perimeter	C1-2
Find the area of rectilinear shapes by counting squares	Measuring area	C1-2
Estimate, compare and calculate different measures, including money in pounds and pence	Money	C4
Read, write and convert time between analogue and digital 12- and 24-hour clocks	Time	C7
Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days	Time (Star / Solve IT)	☆

Geometry – properties of shapes

Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes <i>(KPI)</i>	2D Shapes	C3 - 5
Identify acute and obtuse angles and compare and order angles up to two right angles by size	Angles	C4-6
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 <i>(KPI)</i>	Discrete	N/A

Geometry – position and direction

Describe positions on a 2-D grid as coordinates in the first quadrant	Discrete	N/A
Describe movements between positions as translations of a given unit to the left/right and up/down	Discrete	N/A
Plot specified points and draw sides to complete a given polygon (KPI)	Discrete	N/A

Statistics

Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs	Discrete	N/A
Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs (KPI)	Discrete	N/A

Year 5 programme of study



Number – number and place value

Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (<i>KPI</i>)	Ordering	C5
Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000	Counting	C6
Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero (<i>KPI</i>)	Counting	C7
Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000	Rounding	C5, C6
Solve number problems and practical problems that involve all of the above	Ordering / Counting / Rounding (Star / Solve IT)	★
Read Roman numerals to 1000 (M) and recognise years written in Roman numerals	Discrete	N/A

Number – addition and subtraction

Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) (<i>KPI</i>)	Addition / Subtraction	C7
Add and subtract numbers mentally with increasingly large numbers (<i>KPI</i>)	Addition / Subtraction	C8
Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	Addition / Subtraction	C6-8
Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	Addition / Subtraction (Star / Solve IT)	★

Number – multiplication and division

Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers (<i>KPI</i>)	Discrete	N/A
Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers	Discrete	N/A
Establish whether a number up to 100 is prime and recall prime numbers up to 19	Discrete	N/A
Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers	Multiplication	C6
Multiply and divide numbers mentally drawing upon known facts	Multiplication / Division	C7

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	Division	C6
Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	Digits move	C1 – C5
Recognise and use square numbers and cube numbers, and the notation for squared (²) and cubed (³)	Discrete	N/A
Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes (<i>KPI</i>)	Discrete	N/A
Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	Balance it	C1 - 5
Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates (<i>KPI</i>)	Multiplication / Division (Star / Solve IT)	★

Number – fractions (including decimals and percentages)

Compare and order fractions whose denominators are all multiples of the same number (<i>KPI</i>)	Fractions L2	C1
Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths	Fractions L2	C2
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, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5}$ or $1\frac{1}{5}$]	Fractions L2	C3
Add and subtract fractions with the same denominator and denominators that are multiples of the same number	Fractions L2	C4
Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	Fractions L2	C5
Read and write decimal numbers as fractions [for example, $0.71 = \frac{71}{100}$] (<i>KPI</i>)	Fractions L2	C6
Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents	Fractions L2	C6
Round decimals with two decimal places to the nearest whole number and to one decimal place	Rounding	C7
Read, write, order and compare numbers with up to three decimal places (<i>KPI</i>)	Ordering	C7
Solve problems involving number up to three decimal places	Fractions L2 (Star / Solve IT)	★
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	Percentages	C1

Solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25 (KPI)	Percentages	C2
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Measurement

Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) (KPI)	Discrete	N/A
Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints	Discrete	N/A
Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres (KPI)	Measuring perimeter	C3
Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm ²) and square metres (m ²) and estimate the area of irregular shapes (KPI)	Measuring area	C3-4
Estimate volume [for example, using 1 cm ³ blocks to build cuboids (including cubes)] and capacity [for example, using water]	Discrete	N/A
Solve problems involving converting between units of time	Time	C8
Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling	Discrete	N/A

Geometry – properties of shapes

Identify 3-D shapes, including cubes and other cuboids, from 2-D representations	3D shapes	C1-2
Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles	Angles	C5
Draw given angles, and measure them in degrees (°) (KPI)	Angles	C7
Identify: <ul style="list-style-type: none"> Angles at a point and one whole turn (total 360°) Angles at a point on a straight line and $\frac{1}{2}$ a turn (total 180°) Other multiples of 90° 		
Use the properties of rectangles to deduce related facts and find missing lengths and angles	Angles	C8
Distinguish between regular and irregular polygons based on reasoning about equal sides and angles (KPI)	2D shapes	C6

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	Discrete	N/A
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Statistics

Solve comparison, sum and difference problems using information presented in a line graph	Discrete	N/A
Complete, read and interpret information in tables, including timetables (<i>KPI</i>)	Discrete	N/A

Year 6 programme of study



Number – number and place value

Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit	Ordering	C8
Round any whole number to a required degree of accuracy (<i>KPI</i>)	Rounding	C4-C8
Use negative numbers in context, and calculate intervals across zero (<i>KPI</i>)	Counting	C7
Solve number and practical problems that involve all of the above	All ladders (Star / Solve IT)	★

Number – addition and subtraction, multiplication and division

Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication (<i>KPI</i>)	Multiplication	C6
Divide numbers up to 4 digits by a two-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 (<i>KPI</i>)	Division	C6
Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context	Division	C6
Perform mental calculations, including with mixed operations and large numbers	Problem booklet	N/A
Identify common factors, common multiples and prime numbers	Discrete	N/A
Use their knowledge of the order of operations to carry out calculations involving the four operations	Discrete	N/A
Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why (<i>KPI</i>)	Addition / Subtraction (Star / Solve IT)	★
Solve problems involving addition, subtraction, multiplication and division	All + - x ÷ (Star / Solve IT)	★
Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy (<i>KPI</i>)	All + - x ÷	All

Number – fractions (including decimals and percentages)

Use common factors to simplify fractions; use common multiples to express fractions in the same denomination	Fractions L2	C7
Compare and order fractions, including fractions > 1	Fractions L2	C1
Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions	Fractions L2	C8
Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$]	Fractions L2	C9

Divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$]	Fractions L2	C9
Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$]	Fractions L2	C6
Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places	Digits move	C5 - 6
Multiply one-digit numbers with up to two decimal places by whole numbers	Multiplication	C8
Use written division methods in cases where the answer has up to two decimal places (KPI)	Division	C8
Solve problems which require answers to be rounded to specified degrees of accuracy (KPI)	Rounding (Star / Solve IT)	★
Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts (KPI)	Fractions L2	C6

Ratio and proportion

Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts	Discrete	N/A
Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison (KPI)	Percentages	C4 – 6
Solve problems involving similar shapes where the scale factor is known or can be found	Discrete	N/A
Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples (KPI)	Fractions L2 (Star / Solve IT)	★

Algebra

Use simple formulae (KPI)	Y6 problems	N/A
Generate and describe linear number sequences	Y6 problems	N/A
Express missing number problems algebraically	Y6 problems	N/A
Find pairs of numbers that satisfy an equation with two unknowns	Y6 problems	N/A
Enumerate possibilities of combinations of two variables	Y6 problems	N/A

Measurement

Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate	Discrete	N/A
Use, read, write and convert between standard units, converting measurements of length, mass, volume and time	Discrete	N/A

from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places <i>(KPI)</i>		
Convert between miles and kilometres	Discrete	N/A
Recognise that shapes with the same areas can have different perimeters and vice versa	Measuring perimeter	C3-4
Recognise when it is possible to use formulae for area and volume of shapes	Measuring area	C5
Calculate the area of parallelograms and triangles	Measuring area	C6-7
Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3]	Discrete	N/A

Geometry – properties of shapes

Draw 2-D shapes using given dimensions and angles	Angles	C10
Recognise, describe and build simple 3-D shapes, including making nets	3D shape	C3-5
Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons <i>(KPI)</i>	Angles	C8
Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius	Discrete	N/A
Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles	Angles	C9

Geometry – position and direction

Describe positions on the full coordinate grid (all four quadrants) <i>(KPI)</i>	Discrete	N/A
Draw and translate simple shapes on the coordinate plane, and reflect them in the axes	Discrete	N/A

Statistics

Interpret and construct pie charts and line graphs and use these to solve problems <i>(KPI)</i>	Discrete	N/A
Calculate and interpret the mean as an average <i>(KPI)</i>	Discrete	N/A