Bentley High Street Primary School

Mathematics Curriculum 2023-2024

Contents

Curriculum Intent - Aims and Purposes

It is our unwavering intention that all pupils, regardless of their backgrounds, leave Bentley High Street equipped with the best possible understanding of Mathematics to succeed at life and ultimately benefit their chances of employment and benefit families and communities.

It is our intent that:

- Children master and use basic facts to automaticity.
- They develop fluency in the fundamentals of Mathematics.
- All children reason mathematically to a high standard and confidently create complete chains of logical reasoning.
- Children are able to use and apply the correct mathematical vocabulary and fully articulate their thinking.
- Children have a sound understanding of the language and context of mathematics leading to deep understanding of problem-solving contexts.
- Children confidently solve problems from a young age, linking to and applying all areas of mathematics.
- Children are efficient mathematicians – able to metacognitively draw upon and evaluate the best strategies in a given situation.
- Children's long-term memory is developed in Maths to increase chances of success in later life.
- Children develop transferrable skills to use and apply in other curriculum areas.
- Learning in small steps with a clear sequence of learning promotes a keep up not catch-up ethos.
- Children at all stages to discover the beauty that is the cohesiveness of mathematics, how concepts build and how concepts link together – by reviewing prior learning and building on in small steps, noting at every opportunity how things fit into the bigger picture of maths.

Across different phases, this means:

In EYFS to:

- Develop and improve their skills in counting, understanding and using numbers through an in depth look at our basic number system
- Calculate simple addition and subtraction problems and developing their oracy and vocabulary linked to a simple mathematical context
- Develop their vocabulary and acquire a grasp of the foundations of language to describe shapes, spaces, and measure

In KS1 to:

- Develop confidence and mental fluency with whole numbers, counting and place value
- Become competent working with numerals, words and the four operations, including with practical resources
- Develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary
- Know the number bonds to 20 and be precise in using and understanding place value
- Read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1

In LKS2 to:

- Ensure that pupils become increasingly fluent with whole numbers and the 4 operations, including number facts and the concept of place value
- Develop efficient written and mental methods and perform calculations accurately
- Develop their ability to solve a range of problems, including with simple fractions and decimal place value
- Draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them
- Read and spell mathematical vocabulary correctly and confidently, using their growing word-reading knowledge and their knowledge of spelling
- By the end of year 4, have memorised multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work

In UKS2 to:

- Extend their understanding of the number system and place value to include larger integers, developing the connections between multiplication and division with fractions, decimals, percentages and ratio.
- Develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation
- Classify shapes with increasingly complex geometric properties and that learn the vocabulary needed to describe them
- Be fluent in written methods for all 4 operations, including long multiplication and division, and in working with fractions, decimals and percentages
- Read, spell and pronounce mathematical vocabulary correctly

Curriculum Implementation

Subject Content and Organisation Across School

In EYFS:

- Focus upon one number per week to develop fluent counting skills and understanding of number
- Problem solving sessions linked to oracy, language and understanding mathematical contexts
- Activities in provision to reinforce concepts and vocabulary
- White Rose materials used to allow depth and challenge
- Mastering Number Programme for 15 minutes daily to build and embed number sense

Throughout KS1 and KS2:

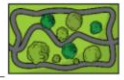
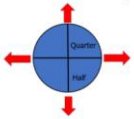
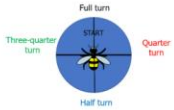
- Arithmetic approach – 15 minutes daily focused on layered objectives and question types per year group throughout KS2
- Mastering Number Programme for 15 minutes daily to build and embed number sense throughout Y1 and for any pupils identified as needing further practise in Y2
- 45-minute Maths lessons daily follow the school curriculum maps which use the White Rose Maths scheme and their order of learning and small steps. This allows for reasoning and problem-solving opportunities to be presented to children throughout all objectives.
- White Rose PowerPoints, worksheets and assessments are used to develop a sequence of learning. This is the core resource. There is a set approach to supplementing these resources based on the needs of pupils. For further fluency practice on specific objectives, Target Your Maths will be used. For further opportunities for problem solving and reasoning, Gareth Metcalfe and NRICH will be used. Towards the end of KS2, Testbase questions will be used in addition to this for problem solving.
- Times table strategy – 15 minutes daily focused upon a times table of the week. This is based on assessment of the children and follows a sequence of learning throughout the week with opportunities for developing understanding, making links, reasoning with patterns, rote learning and assessment. Regular practise is done through Times Table Rock stars and this is promoted in and out of school.
- In Year 5 and 6, only children identified as needing direct teaching of times tables will get 15 minutes daily practise. It is our ambition that all children are fluent in times tables by the end of Year 4.
- Regular problem solving opportunities are woven throughout each sequence of learning to ensure pupils regularly apply taught skills into different contexts
- Learning walls are in place to show key facts, vocabulary and modelled examples linked to the current sequence of learning.
- Catch up interventions (Rapid Maths) take place for children falling behind throughout KS2. This is assessed termly and impact for individual children analysed.
- A lesson structure is in place with allocated time for talk (to develop use of mathematical vocabulary) and deepening learning opportunities (to develop reasoning skills).
- Concrete resources are used throughout teacher modelling and are on accessible trays for pupils to use throughout lessons.
- The use of Kagan 4 structures promotes collaboration and sharing of mathematical language as well as opportunities to develop reasoning skills.
- Post SATS, Year 6 pupils undertake projects linked to budgeting, finance, shopping, planning a holiday and selling a product to equip them with real-life mathematical skills for future learning.

Progression of knowledge

Precise knowledge is identified using the knowledge progression document that outlines the declarative, procedural and conditional knowledge that pupils will encounter in each topic. This looks like this.

Position and Direction

Progression of Knowledge	This unit of learning comes AFTER the fractions sequence of learning in Year 1 so that children have deep knowledge of the concept of a half and a quarter before applying this to half and quarter-turns. It also comes BEFORE the time sequence of learning in Year 1 as it gives children a deep understanding of quarters and halves as a 360 turn so that they can then see this on a clock face and apply this to half and quarter past. During year 3, no new declarative knowledge is acquired but the ability to consolidate and apply the knowledge from Key Stage 1 is practised alongside linking this to the learning of angles. Throughout the rest of Key Stage 2, pupils start to develop their understanding of coordinates on the first quadrant and translation and reflection before moving to all 4 quadrants in Year 6.

	Declarative knowledge 'I know that…'	Procedural knowledge 'I know how…'	Conditional knowledge 'I know when…'
EYFS	Words can be used to describe where things are: **on, next to, over, under, around, through, above, below** We can use **maps** to show where places are 	Respond to positional language in practical situations e.g. when tidying up, put the blocks next to the beads. Begin to use positional language to describe where things are in relation to each other	
Year 1	A **turn** is to rotate about a point.   **Position** is where something is. **Left, right, above, below** and **in between** can be used to describe position. **Direction** is where something is going. **Left, right, forwards** and **backwards** can be used to describe direction.	Describing positions using mathematical language Describing directions using mathematical language Describing movement as turns including full, half, quarter and three-quarter turns	

Teachers then take this to form precise knowledge notes for each lesson. For example:

16.5.23 We will know the value of different coins and notes

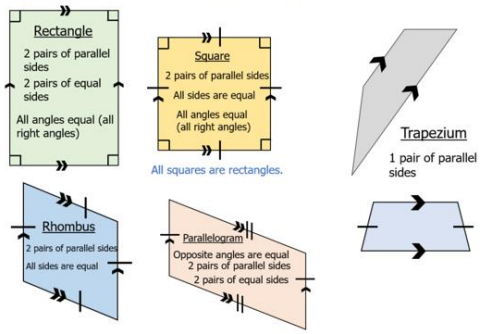
Money is used to buy and pay for things
Money comes in **coins** and **notes** – different ones have different **values**
In England, we use **pounds** and **pence**
These **coins** represent **pence**:

These **coins** represent **pounds**:

These **notes** represent **pounds**:

16.5.23 We will know the properties of quadrilaterals

Quadrilateral = 2D closed shape with 4 straight sides



Mastering Number Programme

Aims:

- Develop fluency in number facts
- Develop number sense – a flexibility with number that employs reasoning about mathematical structure and relationships
- Establish a firm basis in number for KS2
- Make pupils move beyond counting and towards calculating

As a school, we have chosen to implement this programme because:

- Covers a large proportion of new EYFS framework
- Provides developmental progression for much of the ELGs.
- Provides suggestions for continuous provision and small group work.
- Exemplifies good Early Years practice
- Oracy is prioritised and 'talking about Maths' through STEM sentences and verbal reasoning.
- Depth in number is explored.
- CPD for teachers and networking opportunities.
- Links to Numberblocks which children are familiar with from EYFS.
- Good opportunity for retrieval practice.
- Develops spatial awareness and visualisation.
- Some children leave KS1 without fluency in number facts within ten and instead rely on counting in ones or on fingers to add and subtract. This is associated with low attainment in Maths and restrains flexible thinking.
- We believe in the importance of automaticity with facts because it frees the mind to think about concepts – this lends itself to our curriculum design

	Autumn	Spring	Summer
Reception	Pupils will build on previous experiences of number from their home and nursery environments, and further develop their subitising and counting skills. They will explore the composition of numbers within 5. They will begin to compare sets of objects and use the language of comparison. Pupils will: • identify when a set can be subitised and when counting is needed • subitise different arrangements, both unstructured and structured, including using the Hungarian number frame	Pupils will continue to develop their subitising and counting skills and explore the composition of numbers within and beyond 5. They will begin to identify when two sets are equal or unequal and connect two equal groups to doubles. They will begin to connect quantities to numerals. Pupils will: • continue to develop their subitising skills for numbers within and beyond 5, and increasingly connect quantities to numerals • begin to identify missing parts for numbers within 5	Pupils will consolidate their counting skills, counting to larger numbers and developing a wider range of counting strategies. They will secure knowledge of number facts through varied practice. Pupils will: • continue to develop their counting skills, counting larger sets as well as counting actions and sounds • explore a range of representations of numbers, including the 10-frame, and see how doubles can be arranged in a 10-frame • compare quantities and numbers, including sets of objects which have different attributes

	• make different arrangements of numbers within 5 and talk about what they can see, to develop their conceptual subitising skills • spot smaller numbers 'hiding' inside larger numbers • connect quantities and numbers to finger patterns and explore different ways of representing numbers on their fingers • hear and join in with the counting sequence, and connect this to the 'staircase' pattern of the counting numbers, seeing that each number is made of one more than the previous number • develop counting skills and knowledge, including: that the last number in the count tells us 'how many' (cardinality); to be accurate in counting, each thing must be counted once and once only and in any order; the need for 1:1 correspondence; understanding that anything can be counted, including actions and sounds • compare sets of objects by matching • begin to develop the language of 'whole' when talking about objects which have parts	• explore the structure of the numbers 6 and 7 as '5 and a bit' and connect this to finger patterns and the Hungarian number frame • focus on equal and unequal groups when comparing numbers • understand that two equal groups can be called a 'double' and connect this to finger patterns • sort odd and even numbers according to their 'shape' • continue to develop their understanding of the counting sequence and link cardinality and ordinality through the 'staircase' pattern • order numbers and play track games • join in with verbal counts beyond 20, hearing the repeated pattern within the counting numbers	• continue to develop a sense of magnitude, e.g. knowing that 8 is quite a lot more than 2, but 4 is only a little bit more than 2 • begin to generalise about 'one more than' and 'one less than' numbers within 10 • continue to identify when sets can be subitised and when counting is necessary • develop conceptual subitising skills including when using a rekenrek
Year 1	Pupils will have an opportunity to consolidate the Early Learning Goals and continue to explore the composition of numbers within 10, and the position of these numbers in the linear number system. Pupils will: • subitise within 5, including when using a rekenrek, and re-cap the composition of 5 • develop their understanding of the numbers 6 to 9 using the '5 and a bit' structure • compare numbers within 10 and use precise mathematical language when doing so • re-cap the order of numbers within 10 and connect this to '1 more' and '1 less' than a given number • explore the structure of even numbers (including that even numbers can be composed by doubling any number, and can be composed of 2s) • explore the structure of the odd numbers as being composed of 2s and 1 more	Pupils will continue to explore the composition of numbers within 10 and explore addition and subtraction structures and the related language (without the use of symbols). Pupils will: • explore the composition of each of the numbers 7 and 9 • explore the composition of odd and even numbers, seeing that even numbers can be made of two odd or two even parts, and that odd numbers can be composed of one odd part and one even part • identify the number that is two more or two less than a given odd or even number, identifying that two more/ less than an odd number is the next/ previous odd number, and two more/ less than an even number is the next/ previous even number • explore the aggregation and partitioning structures of addition and subtraction through	Pupils will explore the composition of numbers within 20 and their position in the linear number system. They will connect addition and subtraction expressions and equations to 'number stories'). Pupils will: • explore the composition of the numbers 11 to 19 as '10 and a bit' and compare numbers within 20 • connect the composition of the numbers 11 to 19 to their position in the linear number system, including identifying the midpoints of 5, 10 and 15 • compare numbers within 20 • understand how addition and subtraction equations can represent previously explored structures of addition and subtraction (aggregation/ partitioning/ augmentation/ reduction) • practise retrieving previously taught facts and reason about these

	• explore the composition of each of the numbers 6, 8, and 10 • explore number tracks and number lines and identify the differences between them	systematically partitioning and re-combining numbers within 10 and connecting this to the part-part-whole diagram, including using the language of parts and wholes • explore the augmentation and reduction structures of addition and reduction using number stories, including introducing the 'first, then, now' language structure	

Children in Year 1 and Year 2 will only access this programme If they are leaving Early Years not secure with basic number. All children starting Year 1 will be baselined to ensure that only children needing more number experience access this programme.

Key Stage 2 arithmetic strategy

Pupils will spend 30 minutes weekly on arithmetic. Year 5 and 6 children will have an extra session per week. The aim is to equip children with efficient mental and written strategies and the ability to work fluently and precisely.

Pupils will become proficient in the following question types. These question types have been carefully layered to revisit prior learning, prepare for future learning and consolidate what has just been taught in the curriculum. It is up to teachers how they deliver and break down the question types dependent upon the age and level of skill of the cohort as long as the determined question types are covered in the allocated half terms.

Teachers will use assessment precisely and purposefully during these sessions so that pupils needing further guided practice to master the skill do whilst those needing to consolidate and apply also get the opportunity to.

Teachers will show high ambition with arithmetic and from assessment, any pupils showing to have mastered the skill quickly may be given different question types within their year group, multiple question types at a time or activities requiring more cognitive demand. An example of this could be order these 10 mixed questions so that their answers are in descending order.

Questions covered will include the following styles:

Year 2					
Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Number bonds to 10 M Inverse bonds to 10 M Number bonds to 20 M Inverse bonds to 20 M one more than 58 M one less than 72 M 2 + 5 M 9 – 3 M 5 + 10 + 5 18 – 6 M	80 – 10 M ? + 8 = 12 ? = 19 – 5 100 – 2 M 33 + 10 M 41 – 10 M 30 + 50 8 + ? + 4 = 17	10 x 4 5 + 32 M 5 x 6 22 + 22 68 + 20 M 64 – 11 39 – 20 M 60 + ? = 89 ? + 25 = 57 ? – 50 = 50 84 - ? = 32	98 + 4 84 + 17 W 14 ÷ 2 M 54 – 8 62 – 54 W 40 ÷ 10 23 + 37 100 - ? = 52 M ¼ of 8 BM ½ of 90 2/4 of 36	Consolidation and gap filling dependent upon cohort	
Year 3					
20 – 7 M ? + 11 = 20 30 + ? = 100 M ? = 40 + 70 M 654 + 10 M ? = 836 – 100 M 200 + 20 + 5 = M	3 x 4 M 24 ÷ 8 M 50 ÷ 10 M 50 x 3 400 ÷ 100 372 + 300 M 451 - ? = 251	Revisit from autumn term 200 + 20 + 5 = M 6 + 8 + 5 M 235 + 7 742 – 30 M 372 + 300 M	Revisit from autumn term 20 – 7 M ? + 11 = 20 30 + ? = 100 M ? = 40 + 70 M	6 ÷ 10 ¼ of 24 BM 2/5 of 35 BM 2/5 + 1/5 M 6/7 – 2/7 M	Consolidation and gap filling dependent upon cohort

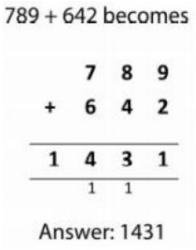
6 + 8 + 5 235 + 7 742 – 30 M ? + 50 = 389 146 = 100 + ? + 6 Questions link to prior year group and autumn term direct teaching.	? + 21 = 59 342 + 49 W 783 – 231 W 30 x 2 M Questions link to prior year group and autumn term 2 direct teaching.	451 - ? = 251 ? + 21 = 59 342 + 49 W 783 – 231 W 30 x 2 M 45 x4 60 x 8	654 + 10 M ? = 836 – 100 M 3 x 4 M 24 ÷ 8 M 50 ÷ 10 50 x 3 400 ÷ 100	Questions link summer term direct teaching.	
Year 4					
400 + 20 M 38 + 30 M 8 x 11 M 341 = 300 + ? + 1 M 7 x 6 M Counting in 50s M 4000 + 200 + 30 + 7 = M 6 x 25 3000 ÷ 1000 315 + 39 W 1/3 + 1/3 M 100 – 22 M 7/8 – 3/8 M 12 ÷ 3 M	2671 – 1000 M ? + 1000 = 3085 M 461 + 38 W 4 x 6 M 7831 – 4420 W 9/10 – 3/10 M 5839 – ? = 589 W 4738 + 4829 W 16 ÷ 4 M Counting in 25s M 783 + 23 W 2/8 + 3/8 M	300 + 20 + 6 M 4573 – 172 W 25 x 4 50 x 5 2 x 5 x 4 30 x 4 200 x 6 7 x 0 M 32 x 1 M 52 ÷ 1 M 9 x 11 M Counting in 0.1s M	22 x 3 W 127 x 4 W 600 ÷ 3 1440 ÷ 12 72 ÷ 3 W 41 x 10 12 x 100 540 ÷ 10	6/10 – 2/10 M 2/3 + 2/3 M ? – 4/5 = 3/5 M 3/10 of 40 BM 36.9 + 34.5 W 45.99 – 23.45 W 35 ÷ 10 4.2 ÷ 10 28 ÷ 100 4.5 x 100 Counting in quarters M 3 x 4 x 2	Consolidation and gap filling dependent upon cohort
Year 5					
300 + 34 M 5000 + 50 M ? = 374 + 45 325 = 300 + ? + 5 M ? + 8 = 350 30,000 + 500 + 12 = M 432 – 29 3235 + 1999 M 54.25 + 3.79 W 45632 + ? = 67384 W ? – 4726 = 27362 W	45 x 3 W 300 x 6 M 3 x 2 x 8 M 6^2 M 213 x 6 W 5^3 13 x 45 W 36 ÷ 3 M 120 ÷ 4 M 1735 ÷ 5 W 251 x 34 W	13 x 45 W 36 ÷ 3 M 120 ÷ 4 M 1735 ÷ 5 W 251 x 34 W 2631 x 6 W 3 – 0.6 0.251 x 1000 45 ÷ 100 3/5 + 3/5 M ½ - 1/8	1 ½ - 1/6 2715 x 45 W 1/5 x 4 2 ¼ x 3 6528 ÷ 4 W 5/7 of 490 BM ? + 8 = 350 30,000 + 500 + 12 = M 432 – 29 3 x 2 x 8 M 6^2 M	Consolidation and gap filling dependent upon cohort	

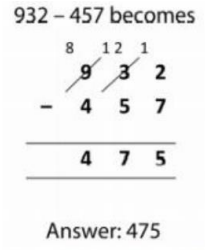
12462 – 2300 M	2631 x 6 W	1 ½ - 1/6	213 x 6 W 5^3	
Year 6				
6155 + 501 + 649 W ? = 6000 + 90 M ? = 8275 + 82 W 826 = 800 + ? + 6 M ? + 5 = 341 10 + ? = 302 2400 ÷ 2 M 9 x 421 W 5.87 + 3.123 W 180 ÷ 3 M 120 ÷ 12 M 213 x 0 M	6 x 10 x 11 M 791÷ 7 W ? = 87-65 602 - ? = 594 1210 ÷ 11 25.34 x 10 M 60 ÷ (30 – 24) 3^3 101 x 1000 M 20% of 3000	7 – 2.25 0.9 ÷ 100 M 9 – 1.9 1 3/7 - 4/7 1/5+ 3/4 1 1/5+2 1/10 836 x 27 W 3468 x 62 W 888 ÷ 37 W 7/12 of 852 BM	35% of 320 8/9- 1/4 51% of 900 2/3 ÷3 2 1/2 - 3/4 36% of 450 13/4 x 10 5/6 x 540 8051 ÷ 83 W 10 – 2 ¼ 6 + 4 ÷ 2	Consolidation and gap filling dependent upon cohort

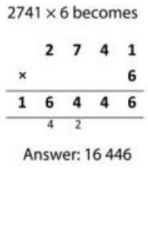
M = mental methods to be encouraged – children may use informal jottings at first when learning to move towards working mentally

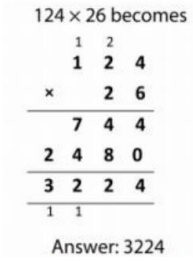
W = written methods as per calculation policy

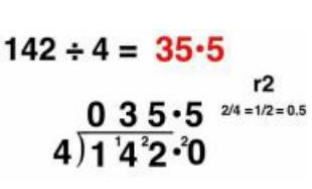
BM = bar model

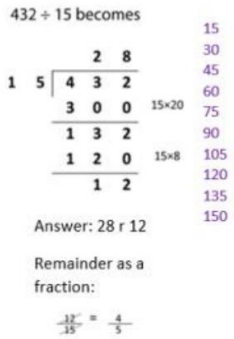


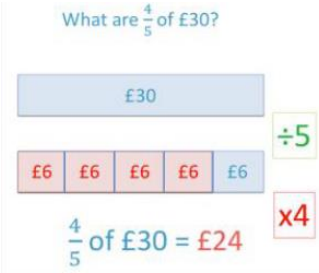












Other questions would be informal jottings and workings

Teachers will be equipped with detailed diagnostics to ensure that progression through this is meticulously tracked for each pupil and that any pupils who may fall behind are identified quickly and extra practice is swiftly given.

Diagnostics will exemplify the methods for each calculation linked to the calculation policy and question types that pupils should become proficient in.

Here is an example:

Arithmetic formative assessment

Year 6

Autumn

Question type	Method or strategy	Assessment notes (children not met and misconceptions identified) Children to be considered to have achieved fluency if they can do this independently, with more than 5 accurate examples at a speed in line with the KS2 arithmetic test (1 minute per question)
Addition and subtraction of whole numbers Question types to include: • Numbers up to 7 digits • Adding more than 2 numbers 6155 + 501 + 649 • Adding numbers with different amounts of digits 5634 – 348 = • Questions presented with equals sign at the front ? = 8275 + 82	Column method 789 + 642 becomes $\begin{array}{r} 7\ 8\ 9 \\ +\ 6\ 4\ 2 \\ \hline 1\ 4\ 3\ 1 \\ 1\ \ 1\ \ \ \end{array}$ Answer: 1431 932 – 457 becomes $\begin{array}{r} 8\ \ 12\ \ 1 \\ \cancel{9}\ \cancel{3}\ 2 \\ -\ 4\ 5\ 7 \\ \hline 4\ 7\ 5 \end{array}$ Answer: 475 Encourage children to look for number bonds and near doubles to enable automatic totalling of columns and not finger counting It is expected that children will be working in the abstract by Year 6 with this method but if they are not yet secure, modelling exchange should be done using base ten equipment	
Adding mentally using place value Question types to include: • Numbers up to 7 digits • Recombining	Mental recombining using place value Identification of place value columns and partitioning	

Key Stage 2 Times table strategy

Pupils in Y3 and Y4 will spend 15 minutes daily on times tables

Year 3 Times Table Strategy

Pupils will over learn the fact that 1 x anything will be that number as it is one group of that number

Children to engage in 15 minutes daily practice being taught times tables and conceptual understanding.
Weekly testing will be on these facts and 1 and 10 times table.

Pupils will regularly practise and consolidate the 10 x table from year 2

x	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Once you know these...

...you don't need to learn these...

This leaves 36 facts to learn in year 3!

6 per term

Because...

Pupils will spend the first few weeks of year 3 times table sessions exploring commutativity with the tables that they know from year 2. Once they are secure that a x b = b x a, this will halve the number of times table facts needing to be learnt!

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
2 x 2 = 4	5 x 2 = 10	6 x 4 = 24	5 x 7 = 35	5 x 8 = 40	4 x 9 = 36
2 x 3 = 6	5 x 3 = 15	6 x 5 = 30	6 x 7 = 42	6 x 8 = 48	5 x 9 = 45
3 x 3 = 9	5 x 4 = 20	6 x 6 = 36	7 x 7 = 49	7 x 8 = 56	6 x 9 = 54
4 x 2 = 8	5 x 5 = 25	2 x 7 = 14	2 x 8 = 16	8 x 8 = 64	7 x 9 = 63
4 x 3 = 12	2 x 6 = 12	3 x 7 = 21	3 x 8 = 24	2 x 9 = 18	8 x 9 = 72
4 x 4 = 16	3 x 6 = 18	4 x 7 = 28	4 x 8 = 32	3 x 9 = 27	9 x 9 = 81

Facts per half term to be tested weekly, including corresponding fact families, displayed in classrooms, on the school website and sent home to parents

This strategy is underpinned by weekly assessments designed to regularly test the learn facts, layered with previously learnt facts.

The aim being that pupils leave Y3 fluent with all facts up to 10 x 10

BENTLEY HIGH STREET PRIMARY

TIMES TABLE MASTERS

Year 3
Autumn 1

Weekly assessments – 4 minutes

This term you will:

- Recap the 1 and 10 times tables
- Explore commutativity
- Learn 6 new facts

Autumn 1

2 x 2 = 4
2 x 3 = 6
3 x 3 = 9
4 x 2 = 8
4 x 3 = 12
4 x 4 = 16

You will know:

1 x 1 = 1	1 x 10 = 10
2 x 1 = 2	2 x 10 = 20
3 x 1 = 3	3 x 10 = 30
4 x 1 = 4	4 x 10 = 40
5 x 1 = 5	5 x 10 = 50
6 x 1 = 6	6 x 10 = 60
7 x 1 = 7	7 x 10 = 70
8 x 1 = 8	8 x 10 = 80
9 x 1 = 9	9 x 10 = 90
10 x 1 = 10	10 x 10 = 100

Any number multiplied by 1 will be that number.

It is one lot or group of that number.

So one group of 5 would be 5

Any whole number multiplied by 10 will move up a place value column and a place holder (0) will go in the empty final column

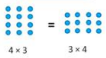
Commutativity means that the order that you calculate a multiplication doesn't matter.

3 x 2 = 2 x 3

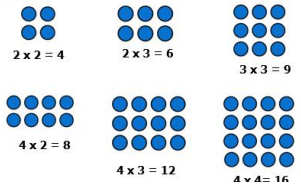
2 groups of 3 would be the same as 3 groups of 2

Factor x factor = product

No matter what the order



New facts:



Week 5 1 and 10 times tables with new facts	
10 x 2 =	2 x 4 =
3 x 3 =	3 x 10 =
10 x 9 =	2 x 3 =
3 x 1 =	3 x 4 =
2 x 2 =	1 x 4 =
8 x 10 =	10 x 4 =
1 x 2 =	3 x 3 =
4 x 2 =	5 x 1 =
4 x 4 =	6 x 10 =
2 x 3 =	2 x 2 =
7 x 1 =	1 x 9 =
4 x 3 =	4 x 2 =
5 x 10 =	4 x 4 =
1 x 8 =	3 x 2 =
2 x 4 =	4 x 3 =
4 x 4 =	1 x 10 =
2 x 2 =	3 x 3 =
3 x 4 =	4 x 4 =
6 x 1 =	10 x 10 =
3 x 2 =	2 x 2 =
Facts I need to learn:	

Week 6 1 and 10 times tables with new facts	
4 x 3 =	4 x 4 =
10 x 8 =	3 x 3 =
1 x 4 =	4 x 2 =
2 x 2 =	7 x 1 =
10 x 5 =	3 x 4 =
2 x 4 =	10 x 9 =
4 x 4 =	2 x 3 =
3 x 2 =	1 x 10 =
4 x 10 =	6 x 10 =
3 x 3 =	2 x 2 =
10 x 7 =	1 x 8 =
4 x 3 =	1 x 10 =
10 x 2 =	4 x 4 =
6 x 1 =	9 x 1 =
2 x 2 =	3 x 4 =
4 x 2 =	2 x 4 =
1 x 5 =	3 x 3 =
2 x 3 =	3 x 10 =
3 x 1 =	10 x 10 =
4 x 4 =	3 x 2 =
Facts I need to learn:	

Year 4

Pupils will spend 15 minutes daily on times tables. They will spend Autumn 1 securing times tables from Y2 and Y3 in preparation for direct teaching of the 6,7,9,11 and 12 times tables in Autumn 2. This means that spring term will be spent recapping and practising all taught times tables with a focus of one or two per week.

Pupils will start each time table with a start and end paper assessment focusing upon rapid recall from TTRS. These will be used for target setting and to monitor own learning. Monthly assessment points will closely monitor pupils' precise gaps. Summer term will focus on random and rapid recall in preparation for the MTC at the end of this year.

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Recapping 5 and 10 TT Recapping 2, 4 and 8 TT Recapping 3 times table	Recapping 3 TT Direct teaching of 6 TT Direct teaching of 9 TT Direct teaching of 7 TT Direct teaching of 11 TT Direct teaching of 12 TT	Recapping 2, 4 and 8 TT Recapping of 3, 6 and 9	Recapping of 7 TT Recapping of 11TT Recapping of 12 TT Recap of any other times table needed by cohort.	Focus on random and rapid recall of all times tables in preparation for the MTC	Consolidation and gap filling dependent upon cohort

Regular testing including an assessment point on the 'soundcheck' function of times table rock stars will take place with the results of informing focus of targeted teaching.

For pupils who do not have automatic recall of all facts by the MTC, fluency in facts up to 9 x 9 should be prioritised as important for progression into Year 5 as they are required for formal written multiplication and division. The 36 multiplication facts required for formal written multiplication are:

2×2							
3×2	3×3						
4×2	4×3	4×4					
5×2	5×3	5×4	5×5				
6×2	6×3	6×4	6×5	6×6			
7×2	7×3	7×4	7×5	7×6	7×7		
8×2	8×3	8×4	8×5	8×6	8×7	8×8	
9×2	9×3	9×4	9×5	9×6	9×7	9×8	9×9

Year 5 and Year 6

Throughout Y5 and Y6, any children who scored less than 20 in the Y4 MTC will have 15 minutes daily times table teaching as intervention until they are proficient. Focus is upon fluency, speed and accuracy. This will focus upon the facts up to 9 x 9 which form the basis of written methods for multiplication and division needed for the Y5 and Y6 calculation curriculum. Children will be assessed to see which precise facts they do not know and learning will be personalised to ensure rapid catch up. Children will be regularly tested until they reach a level of fluency.

F1 Mathematics curriculum overview

- One number per week mapped in for focus and depth – to explore the cardinality of that number daily. Complimented by Numberblocks.
- Numbers are repeated per term for overlearning and repetition. Children will be able to go more into depth each term as they revisit.
- Consolidation weeks mapped in to allow for pupils to go over taught content and gaps to be addressed based on assessments.

Number of the week	1	2	3	4	Consolidation week
Autumn 1 Mathematics coverage	Getting to know you – Baselines	White Rose Just like me - Match and sort Make comparisons between objects relating to size, length, weight and capacity. Talk about and identifies the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs' etc.	White Rose Just like me – Making comparisons Make comparisons between objects relating to size, length, weight and capacity.	White Rose Just like me – Exploring patterns Talk about and identifies the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs' etc. Extend and create ABAB patterns – stick, leaf, stick, leaf. Notice and correct an error in a repeating pattern. Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then...	Consolidation week

Number a week	5	6	7	8	9	10	Consolidation week
Autumn 2 Maths coverages	It's me 123! – Representing 1, 2 & 3 Comparing 1, 2 & 3 Fast recognition of up to 3 objects, without having to count them individually ('subitising'). Recite numbers past 5. Say one number for each item in order: 1,2,3,4,5. Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle'). Show 'finger numbers' up to 5. Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5.	It's me 123! Composition of 1,2 & 3 Fast recognition of up to 3 objects, without having to count them individually ('subitising'). Recite numbers past 5. Say one number for each item in order: 1,2,3,4,5. Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle'). Show 'finger numbers' up to 5. Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5.	It's me 123! Circles and triangles Positional language Talk about and explore 2D and 3D shapes (for example, circles, rectangles, triangles and cuboids) using informal and mathematical language: 'sides', 'corners'; 'straight', 'flat', 'round'. Understand position through words alone – for example, "The bag is under the table," – with no pointing.	Light and dark Representing numbers to 5 One more and less Say one number for each item in order: 1,2,3,4,5. Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle'). Show 'finger numbers' up to 5. Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5. Experiment with their own symbols and marks as well as numerals. Solve real world mathematical problems with numbers up to 5. Compare quantities using language: 'more than', 'fewer than'.	Light and dark Representing numbers to 5 One more and less Say one number for each item in order: 1,2,3,4,5. Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle'). Show 'finger numbers' up to 5. Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5. Experiment with their own symbols and marks as well as numerals. Solve real world mathematical problems with numbers up to 5. Compare quantities using language: 'more than', 'fewer than'.	Light and dark Shapes with 4 sides Time Talk about and explore 2D and 3D shapes (for example, circles, rectangles, triangles and cuboids) using informal and mathematical language: 'sides', 'corners'; 'straight', 'flat', 'round'. Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then...	Consolidation week

Number a week	1	2	3	4	5	Consolidation week
Spring 1 Maths coverage	Alive at 5! <u>Introducing zero</u> <u>Comparing numbers to 5</u> Compare quantities using language: 'more than', 'fewer than'. Say one number for each item in order: 1,2,3,4,5. Show 'finger numbers' up to 5. Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5.	Alive at 5! <u>Composition of 4 and 5</u> Say one number for each item in order: 1,2,3,4,5. Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle').	Alive at 5! <u>Comparing Capacity</u> <u>Comparing Mass</u> Make comparisons between objects relating to size, length, weight and capacity.	Growing 6,7,8 <u>Numbers 6,7 and 8</u> <u>Making pairs</u> Recite numbers past 5. Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle').	Growing 6,7,8 <u>Combining 2 groups</u> Solve real world mathematical problems with numbers up to 5. Compare quantities using language: 'more than', 'fewer than'. <u>Length and Height</u> <u>Time</u> Make comparisons between objects relating to size, length, weight and capacity Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then...'	Consolidation week

Number a week	6	7	8	9	10	Consolidation week
Spring 2 Maths coverage	Building 9 and 10 <u>Introducing 9 and 10</u> Recite numbers past 5.	Building 9 and 10 <u>Comparing numbers to 10.</u> Compare quantities using language: 'more than', 'fewer than'.	Building 9 and 10 <u>Bonds to 10</u> Recite numbers past 5. Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle').	Building 9 and 10 <u>3-D shapes</u> Talk about and explore 2D and 3D shapes (for example, circles, rectangles, triangles and cuboids) using informal and mathematical language: 'sides', 'corners'; 'straight', 'flat', 'round'. Select shapes appropriately: flat surfaces for building, a triangular prism for a roof, etc. Combine shapes to make new ones – an arch, a bigger triangle, etc. <u>Pattern</u> Talk about and identify the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs', etc. Extend and create ABAB patterns – stick, leaf, stick, leaf. Notice and correct an error in a repeating pattern.	Consolidation	Consolidation week

Number a week	1	2	3	4	Consolidation week
Summer 1 Maths coverage	<u>To 5 and beyond (up to 10)</u> <u>Building numbers to 10</u> Develop fast recognition of up to 3 objects, without having to count them individually ('subitising'). Recite numbers past 5. Say one number for each item in order: 1,2,3,4,5. Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle'). Show 'finger numbers' up to 5. Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5. Compare quantities using language: 'more than', 'fewer than'.	<u>To 5 and beyond (up to 10)</u> <u>Counting patterns to 10</u> Develop fast recognition of up to 3 objects, without having to count them individually ('subitising'). Recite numbers past 5. Say one number for each item in order: 1,2,3,4,5. Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle'). Show 'finger numbers' up to 5. Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5.	<u>To 5 and beyond (up to 10)</u> <u>Spatial reasoning</u> Talk about and explore 2D and 3D shapes (for example, circles, rectangles, triangles and cuboids) using informal and mathematical language: 'sides', 'corners'; 'straight', 'flat', 'round'. Understand position through words alone – for example, "The bag is under the table," – with no pointing. Select shapes appropriately: flat surfaces for building, a triangular prism for a roof, etc. Combine shapes to make new ones – an arch, a bigger triangle, etc.	<u>First, Then, Now</u> <u>Adding More/ Take away</u> Experiment with their own symbols and marks as well as numerals. Solve real world mathematical problems with numbers up to 5. Compare quantities using language: 'more than', 'fewer than'.	Consolidation week

Number a week	5	6	7	8	9	10	Consolidation week
Summer 2 Maths coverage	<u>Find my Pattern</u> <u>Doubling</u> Solve real world mathematical problems with numbers up to 5. Compare quantities using language: 'more than', 'fewer than'. Show 'finger numbers' up to 5.	<u>Find my pattern</u> <u>Sharing and grouping</u> Solve real world mathematical problems with numbers up to 5. Compare quantities using language: 'more than', 'fewer than'. Develop fast recognition of up to 3 objects, without having to count them individually ('subitising'). Recite numbers past 5. Say one number for each item in order: 1,2,3,4,5. Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle').	<u>Find my pattern</u> <u>Even and Odd</u> Solve real world mathematical problems with numbers up to 5. Compare quantities using language: 'more than', 'fewer than'. Develop fast recognition of up to 3 objects, without having to count them individually ('subitising'). Recite numbers past 5. Say one number for each item in order: 1,2,3,4,5. Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle').	<u>Find my pattern</u> <u>Spatial reasoning</u> Understand position through words alone – for example, "The bag is under the table," – with no pointing. Describe a familiar route. Discuss routes and locations, using words like 'in front of' and 'behind'	<u>On the move</u> <u>Deepening understanding</u> Solve real world mathematical problems with numbers up to 5.	<u>On the move</u> <u>Patterns and relationships</u> <u>Spatial reasoning</u> Compare quantities using language: 'more than', 'fewer than'. Talk about and identify the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs', etc. Extend and create ABAB patterns – stick, leaf, stick, leaf. Notice and correct an error in a repeating pattern.	Consolidation week

F2 Mathematics curriculum overview

- One number per week mapped in for focus and depth – to explore the cardinality of that number daily. Complimented by Numberblocks.
- Numbers are repeated per term for overlearning and repetition. Children will be able to go more into depth each term as they revisit.
- Review weeks mapped in to allow for pupils to go over taught content and gaps to be addressed based on assessments.
- Mastering Number Programme from the NCETM also runs daily for 15 minutes with a focus on basic number sense.

Number a week	1	1	2	3	4	5	REVIEW WEEK
Autumn 1 Maths coverage	White Rose – Getting to know you BASELINES	White Rose – Getting to know you BASELINES	White Rose – Getting to know you BASELINES	White Rose Just like me - Match and sort *3- 4 statements* *Make comparisons between objects relating to size, length, weight and capacity.* *Talk about and identifies the patterns around them.* *For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs' etc.*	White Rose Just like me – Making comparisons *3- 4 statements* *Make comparisons between objects relating to size, length, weight and capacity.*	White Rose Just like me – Exploring patterns *3- 4 statements* *Talk about and identifies the patterns around them.* *For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs' etc.* *Extend and create ABAB patterns – stick, leaf, stick, leaf.* *Notice and correct an error in a repeating pattern.* *Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then...*	Review week

Number a week	6	7	8	9	10	11	REVIEW WEEK
Autumn 2 Maths coverage	It's me 1,2,3 - Representing 1,2,3 Comparing 1,2,3 Count objects, actions and sounds. Subitise. Link the number symbol (numeral) with its cardinal number value.	It's me 1,2,3 - Composition of 1,2,3 Count objects, actions and sounds. Subitise. Link the number symbol (numeral) with its cardinal number value.	It's me 1,2,3 - Circles and triangles/ Spacial Awareness Select, rotate and manipulate shapes in order to develop spatial reasoning skills. Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can.	Light and dark Representing numbers to 5 One more and less • Compare numbers. • Understand the 'one more than/one less than' relationship between consecutive numbers. • Explore the composition of numbers to 10	Light and dark Representing numbers to 5 One more and less • Compare numbers. • Understand the 'one more than/one less than' relationship between consecutive numbers. • Explore the composition of numbers to 10 .	Light and dark Shapes with 4 sides Time Select, rotate and manipulate shapes to develop spatial reasoning skills. Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then...' 3-4 statement (no mention in reception) so need to refer to digging deeper.	Review week

Number a week	12	13	14	15	16	Review week
Spring 1 Maths coverage	Alive at 5! Introducing zero Comparing numbers to 5 Subitise. Count objects, actions and sounds. Link the number symbol (numeral) with its cardinal number value. Compare numbers.	Alive at 5! Composition of 4 and 5 Subitise. Count objects, actions and sounds. Link the number symbol (numeral) with its cardinal number value. Compare numbers.	Alive at 5! Comparing Capacity Comparing Mass Compare length, weight and capacity.	Growing 6,7,8 Numbers 6,7 and 8 Making pairs Combining 2 groups Subitise. Explore the composition of numbers to 10.	Growing 6,7,8 Growing 6,7,8 Length and Height Time Subitise. Explore the composition of numbers to 10.	REVIEW WEEK

	Understand the 'one more than/one less than' relationship between consecutive numbers Automatically recall number bonds for numbers 0–5	Understand the 'one more than/one less than' relationship between consecutive numbers		Count objects, actions and sounds. Link the number symbol (numeral) with its cardinal number value. Compare numbers. Understand the 'one more than/one less than' relationship between consecutive numbers	Count objects, actions and sounds. Link the number symbol (numeral) with its cardinal number value. Compare numbers. Understand the 'one more than/one less than' relationship between consecutive numbers Compare length, weight and capacity.	

Number a week	17	18	19	20	CONSOLIDATION	REVIEW WEEK
Spring 2 Maths coverage	<u>Building 9 and 10</u> <u>Introducing 9 and 10</u> Link the number symbol (numeral) with its cardinal number value. Automatically recall number bonds for numbers 0–5 and some to 10. Explore the composition of numbers to 10 Compare numbers.	<u>Building 9 and 10</u> <u>Comparing numbers to 10.</u> Link the number symbol (numeral) with its cardinal number value. Automatically recall number bonds for numbers 0–5 and some to 10. Explore the composition of numbers to 10 Compare numbers.	<u>Building 9 and 10</u> <u>Bonds to 10</u> Link the number symbol (numeral) with its cardinal number value. Automatically recall number bonds for numbers 0–5 and some to 10. Explore the composition of numbers to 10 Compare numbers.	<u>Building 9 and 10</u> <u>3-D shapes</u> <u>Pattern</u> Select, rotate and manipulate shapes to develop spatial reasoning skills. Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can. Continue, copy and create repeating patterns.	Consolidation	REVIEW WEEK

Number a week	1/2	3 4	5 6	7 8	REVIEW WEEK
Summer 1 Maths coverage	<u>To 20 and beyond</u> <u>Building numbers beyond 10</u> Link the number symbol (numeral) with its cardinal number value. Count beyond ten Compare numbers.	<u>To 20 and beyond</u> <u>Counting patterns beyond 10</u> Link the number symbol (numeral) with its cardinal number value. Count beyond ten Compare numbers.	<u>To 20 and beyond</u> <u>Spatial reasoning</u> Select, rotate and manipulate shapes to develop spatial reasoning skills.	<u>First, Then, Now</u> <u>Adding More</u> <u>Takeaway</u> Understand the 'one more than/one less than' relationship between consecutive numbers. Compare numbers. Link the number symbol (numeral) with its cardinal number value. Subitise.	REVIEW WEEK

Number a week	9 10	11 12	13 14	15 16	17 18	19 20	REVIEW WEEK
Summer 2 Maths coverage	<u>Find my Pattern</u> <u>Doubling</u> Subitise. Compare numbers. Understand the 'one more than/one less than' relationship between consecutive numbers. Explore the composition of numbers to 10	<u>Find my pattern</u> <u>Sharing and grouping</u> Subitise. Compare numbers. Understand the 'one more than/one less than' relationship between consecutive numbers. Explore the composition of numbers to 10	<u>Find my pattern</u> <u>Even and Odd</u> Subitise. Compare numbers. Understand the 'one more than/one less than' relationship between consecutive numbers. Explore the composition of numbers to 10	<u>Find my pattern</u> <u>Spatial reasoning</u> Select, rotate and manipulate shapes to develop spatial reasoning skills. Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can.	On the move Deepening understanding	<u>On the move</u> <u>Patterns and relationships</u> <u>Spatial reasoning</u> Select, rotate and manipulate shapes to develop spatial reasoning skills. Compose and decompose shapes so that children recognise a	REVIEW WEEK

						shape can have other shapes within it, just as numbers can. Continue, copy and create repeating patterns.	

Mastering Number Programme

15 minutes daily – objectives covered

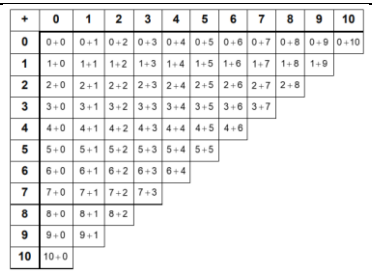
Autumn	Spring	Summer
Pupils will build on previous experiences of number from their home and nursery environments, and further develop their subitising and counting skills. They will explore the composition of numbers within 5. They will begin to compare sets of objects and use the language of comparison. Pupils will: • identify when a set can be subitised and when counting is needed • subitise different arrangements, both unstructured and structured, including using the Hungarian number frame • make different arrangements of numbers within 5 and talk about what they can see, to develop their conceptual subitising skills • spot smaller numbers 'hiding' inside larger numbers • connect quantities and numbers to finger patterns and explore different ways of representing numbers on their fingers	Pupils will continue to develop their subitising and counting skills and explore the composition of numbers within and beyond 5. They will begin to identify when two sets are equal or unequal and connect two equal groups to doubles. They will begin to connect quantities to numerals. Pupils will: • continue to develop their subitising skills for numbers within and beyond 5, and increasingly connect quantities to numerals • begin to identify missing parts for numbers within 5 • explore the structure of the numbers 6 and 7 as '5 and a bit' and connect this to finger patterns and the Hungarian number frame • focus on equal and unequal groups when comparing numbers • understand that two equal groups can be called a 'double' and connect this to finger patterns	Pupils will consolidate their counting skills, counting to larger numbers and developing a wider range of counting strategies. They will secure knowledge of number facts through varied practice. Pupils will: • continue to develop their counting skills, counting larger sets as well as counting actions and sounds • explore a range of representations of numbers, including the 10-frame, and see how doubles can be arranged in a 10-frame • compare quantities and numbers, including sets of objects which have different attributes • continue to develop a sense of magnitude, e.g. knowing that 8 is quite a lot more than 2, but 4 is only a little bit more than 2 • begin to generalise about 'one more than' and 'one less than' numbers within 10

• hear and join in with the counting sequence, and connect this to the 'staircase' pattern of the counting numbers, seeing that each number is made of one more than the previous number • develop counting skills and knowledge, including: that the last number in the count tells us 'how many' (cardinality); to be accurate in counting, each thing must be counted once and once only and in any order; the need for 1:1 correspondence; understanding that anything can be counted, including actions and sounds • compare sets of objects by matching • begin to develop the language of 'whole' when talking about objects which have parts	• sort odd and even numbers according to their 'shape' • continue to develop their understanding of the counting sequence and link cardinality and ordinality through the 'staircase' pattern • order numbers and play track games • join in with verbal counts beyond 20, hearing the repeated pattern within the counting numbers	• continue to identify when sets can be subitised and when counting is necessary • develop conceptual subitising skills including when using a rekenrek

Mathematics Curriculum – Year 1

Autumn 1:

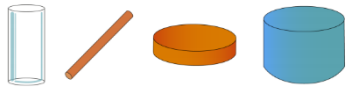
Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3	Place Value up to 10	Objectives from the national curriculum: • count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number (just up to 10 at this stage) • count, read and write numbers to 100 in numerals; (just up to 10 at this stage) • given a number, identify 1 more and 1 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 • read and write numbers from 1 to 20 in numerals and words (just up to 10 at this stage) Learning Sequence: • Sorting and counting objects • Counting objects from a larger group • Representing objects • Recognising numbers as words • Count on from any number • 1 more • Count back from any number • 1 less • Comparing groups • Fewer, more, same • Less than, greater than, equal to • Comparing numbers • Ordering objects and numbers • The number line	<u>Key concepts and facts</u> The concept of a number representing a value. This value increases as you go up the number line and decreases as you go down the number line. <u>Vocabulary</u> Names of numbers More than, greater, larger, bigger, Greatest/ Most/ biggest/ largest Less than, fewer, smaller, Least/fewest/smallest Equal to, the same amount as, as many as Ten, ones, digit	Children will be secure counting orally to ten from EYFS and be able to represent and decompose these numbers. They will have experience of one more and one less from EYFS This is th first time that they will be introduced to official symbols, such as < and >, but should use their understanding of language such as greater than, less than, bigger than, smaller than when comparing and ordering numbers
4	Addition and subtraction up to 10	Objectives from the national curriculum: • read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs • represent and use number bonds and related subtraction facts within 20 (just within 10 for now)	<u>Key concepts and facts</u> Pupils should know all 66 addition facts within 10. This is reduced when pupils recognise that 3 + 2 and 2 + 3 will give the same answer.	Children will be able to add and subtract within 10 using concrete resources and pictorial methods and should use this as a basis to formal recording.

5 6 7		• add and subtract one-digit and two-digit numbers to 20, including zero (just within 10 for now) • solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = – 9. Learning Sequence: • part-whole model • writing number sentences • fact families – addition facts • number bonds within 10 • systematic number bonds to 10 • number bonds to 10 • addition – adding together • addition – adding more • addition problems • finding a part • subtraction – find a part • fact families – the eight facts • subtraction – take away/cross out • take away • subtraction on a number line • add or subtract 1 or 2	 Pupils should understand composition and how numbers can be partitioned in many ways. Exploring different ways that a number can be partitioned and put back together again helps pupils to understand that addition and subtraction are inverse operations. <u>Vocabulary</u> One more, one less Count on, count back, One hundred Number bonds/ number facts Addition facts/ subtraction facts Fact family Add, subtract More, less, Plus, minus, total, sum Difference between, Equal, equal to	

+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8		
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7			
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6				
5	5+0	5+1	5+2	5+3	5+4	5+5					
6	6+0	6+1	6+2	6+3	6+4						
7	7+0	7+1	7+2	7+3							
8	8+0	8+1	8+2								
9	9+0	9+1									
10	10+0										

Autumn 2:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2	Place Value within 20	Objectives from the national curriculum: • count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number (up to 20 at this stage) • count, read and write numbers to 100 in numerals; (up to 20 at this stage) • given a number, identify 1 more and 1 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 • read and write numbers from 1 to 20 in numerals and words Learning Sequence: • Counting forwards and backwards and writing numbers to 20 in numerals and words • Numbers from 11 – 20 • Tens and ones • One more and one less • Comparing groups • Comparing numbers • Ordering groups • Ordering numbers	<u>Key concepts and facts</u> Concept of place value in the simplest form – tens and ones grouping. Children will require a lot of practice with names of the 'teens' numbers as they do not follow the structure of the number system. <u>Vocabulary</u> Names of numbers (up to 100 orally and up to 20 in reading and writing) More than, greater, larger, bigger, Greatest/ Most/ biggest/ largest Less than, fewer, smaller, Least/fewest/smallest Equal to, the same amount as, as many as Tens, ones, digit	Pupils will be able to count to 20 fluently from EYFS and should recap this before writing in numerals and words. They will be familiar with one more and one less, comparing and ordering numbers from previous learning.
3 4 5	Addition and subtraction within 20	Objectives from the national curriculum: • read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs • represent and use number bonds and related subtraction facts within 20 • 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. Learning Sequence: • adding by counting on • find and make number bonds • add by making 10 • subtraction – not crossing 10 • subtraction – crossing 10 • subtraction – crossing 10 further practice • related facts • comparing number sentences	<u>Key concepts and facts</u> The concept of 'a ten' being ten ones and that when adding and subtracting numbers, you may need to cross the ten. <u>Vocabulary</u> One more, one less Count on, count back, One hundred Number bonds/ number facts Addition facts/ subtraction facts Fact family Add, subtract More, less, Plus, minus, total, sum Difference between, Equal, equal to	Pupils should recap methods for addition and subtraction from autumn 1 before moving on to apply this within 20.

6 7 8	Geometry	Objectives from the national curriculum: Recognise and name common 2-D and 3-D shapes, including: • 2-D shapes [for example, rectangles (including squares), circles and triangles] • 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]. Learning Sequence: • Recognise and name 3D shapes • Sort 3D shapes • Recognise and name 2D shapes • Sort 2D shapes • Patterns with 3D and 2D shapes	<u>Key concepts and facts</u> Pupils need to be able to recognise common shapes when they are presented in a variety of orientations and sizes and relative proportions. Pupils should be able to describe, using informal language (for example, "long and thin"), the differences between non-similar examples of the same shapes, and recognise that these are still examples of the given shape.  Figure 35: non-similar cylinders <u>Vocabulary</u> 2-D shape (polygon) - Rectangle, square, circle, triangle 3-D shape - Cuboid, cube, cone, cylinder, pyramid, sphere, pattern flat, curved, straight, round, corner, point, face, side, edge	Pupils will be able to recognise a range of simple 2D and 3D shapes from EYFS

<u>Spring 1:</u>

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3	Multiplication and division	Objectives from the national curriculum: • 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. Learning Sequence: • revisit counting in 2s • revising counting in 5s • counting in 10s • making equal groups • adding equal groups • making arrays • making doubles • make equal groups – grouping • make equal groups – sharing	<u>Key concepts and facts</u> Concept of unitisation and how one group can represent many. Children need to understand equal groups and that to multiply and divide, groups must be equal. <u>Vocabulary</u> Grouping, sharing, multiply, divide, double, half, array	Children will be aware of some doubling and halving as well as groups and simple sharing from EYFS

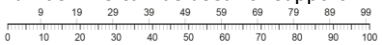
4 5	Place value within 50	Objectives from the national curriculum: • count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number (up to 50 at this stage) • count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s • given a number, identify 1 more and 1 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 Learning Sequence: • numbers to 50 • tens and ones • representing numbers to 50 • one more and one less • comparing objects to 50 • comparing numbers to 50 • ordering numbers to 50 • counting in 2s • counting in 5s	<u>Key concepts and facts</u> Pupils must be able to count in multiples of 2, 5 and 10 by the end of year 1 so that they are ready to progress to multiplication involving groups of 2, 5 and 10 in year 2. Forwards and backwards counting practice should include: • reciting just the number names (for example, "ten, twenty, thirty…"), without the support of visual representations • counting with the support of visual representations and gestural patterns, for example pupils can point to numerals on a number line or 100 square, or tap out the numbers on a Gattegno chart • starting the forwards counting sequence with numbers other than 2, 5 or 10 <u>Vocabulary</u> Names of numbers (up to 100 orally and up to 20 in reading and writing) More than, greater, larger, bigger, Greatest/ Most/ biggest/ largest Less than, fewer, smaller, Least/fewest/smallest Equal to, the same amount as, as many as Tens, ones, digit	Pupils should recap numbers to 20 before moving on to numbers to 50. They should draw upon the structures in the number system by relating 1, 2, 3, 4 to 31, 32, 33, 34 when reading numbers and counting. Children will be aware of the concept of one more and one less, and comparing and ordering and will now apply this to larger numbers.

Spring 2:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2	Fractions	Objectives from the national curriculum: • 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. Learning Sequence: • find a half • find a half • find a quarter • find a quarter	Key concepts and facts Concept of a part and a whole and that a whole can be broke down and represented in equal parts. Vocabulary Part, Equal, Whole Half, halves, Quarters, Fraction,	Pupils will not have formally experienced fractions through the mathematics curriculum but may be aware of something being 'half full' from measurements in EYFS
3 4	Geometry – position and direction	Objectives from the national curriculum: • describe position, direction and movement, including whole, half, quarter and three quarter turns. Learning Sequence: • describing turns • describing position • describing position applied	Key concepts and facts That a turn can be described and represented mathematically Vocabulary Movement, Top, middle, bottom, On top of, In front of Above, Between, Around, Near, Close, Far Up, Down, Inside, Outside, Forwards, Backwards, Left, Right Half turn, Quarter turn, Three-quarters turn Straight, Line, Clockwise	Children will be aware of some language relating to simple position and direction from EYFS such as up down, above, between, near etc.
5 6	Time	Objectives from the national curriculum: Compare, describe and solve practical problems for: • time [for example, quicker, slower, earlier, later] Measure and begin to record the following: • time (hours, minutes, seconds) • 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.	Key concepts and facts Concept of before and after and positioning in time and chronology. That a clock will represent and show time through moving hands. Vocabulary Day, week, month, season, year, leap year Weekend, fortnight Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday January, February, March, April, May, June, July, August, September, October, November, December	Pupils will have some experience of time related language from EYFS such as before, after and names of days

		Learning Sequence: • before and after • dates • time to the hour • time to the half hour • writing time • comparing time	Before, after, next, first, today, yesterday, tomorrow, morning, afternoon, evening Clock Hand, Hour, minute, o'clock, half past, quicker, slower, earlier, later	

Summer 1:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3 4	Place value within 100	Objectives from the national curriculum: • 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 1 more and 1 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 Learning Sequence: • counting forwards and backwards within 100 • partitioning numbers • comparing numbers • ordering numbers • one more and one less	<u>Key concepts and facts</u> Counting provides a good opportunity to link number names to numerals, and to the position of numbers in the linear number system. Practice should include: • reciting number names, without the support of visual representations, to allow pupils to focus on and develop fluency in the verbal patterns • counting with the support of visual representations and gestural patterns, for example pupils can point to numerals on a 100 square or number line, or tap out the numbers on a Gattegno chart • starting the counting sequence with numbers other than 1 or 100 When counting backwards, pupils often find it challenging to identify which number they should say after they have said a multiple of 10. A partially marked number line can be used for support.  <u>Vocabulary</u> Names of numbers (up to 100 orally and up to 20 in reading and writing) More than, greater, larger, bigger, Greatest/ Most/ biggest/ largest Less than, fewer, smaller, Least/fewest/smallest Equal to, the same amount as, as many as Hundreds, Tens, ones, digit	Children will understand partitioning numbers and comparing and ordering to 50 and they will now apply this to bigger numbers. They will be secure with the concept of one more and one less.

5 6	Money	Objectives from the national curriculum: Measure and begin to record the following: • recognise and know the value of different denominations of coins and notes Learning Sequence: • recognising coins • recognising notes • counting in coins	<u>Key concepts and facts</u> Concept of unitisation how one coin or note can represent more than one. <u>Vocabulary</u> Coin, Note, pound, pence, value	Pupils will have had exposure to money through play but not formally been taught the coins or values.

<u>Summer 2:</u>

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2	Mass and Volume	Objectives from the national curriculum: 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] Measure and begin to record the following: • mass/weight • capacity and volume Learning Sequence: • introducing weight and mass • measuring mass • comparing mass • introducing capacity and volume • measuring capacity • measuring volume	<u>Key concepts and facts</u> Children will understand the concept of mass and weight as how heavy something is and start to understand that this can be measured. They will extend their understanding of measurements by exploring capacity and volume as how much space is taken up. <u>Vocabulary</u> Measure, Mass, weight Capacity, volume Heavy, light, heavier, lighter, Full, empty, half full, More than, less than Double, half	Children will be aware of language of heavier, heaviest, lighter, lightest from EYFS
3 4	Length and height	Objectives from the national curriculum: Compare, describe and solve practical problems for: • lengths and heights [for example, long/short, longer/shorter, tall/short, double/half] Measure and begin to record the following: • lengths and heights Learning Sequence: • comparing lengths and heights	<u>Key concepts and facts</u> Concept of length being a way to measure how tall or long something is. Children start with non-standard units to ensure they understand the concept of measurement and then progress to standard measurements. <u>Vocabulary</u> Measure Length, height, distance	Children will be aware of simple language relating to length and height from EYFS such as: longer, shorter, taller, smaller, shortest, longest etc.

		• measuring lengths • measuring heights	Long, short, longer, shorter, tall, taller Double, half, ruler	
5	Post-assessment gap filling dependent upon Summer term assessments Ensuring secure on all place value and four operations for Year 2			
6				
7				

Mastering Number Programme

15 minutes daily – objectives covered

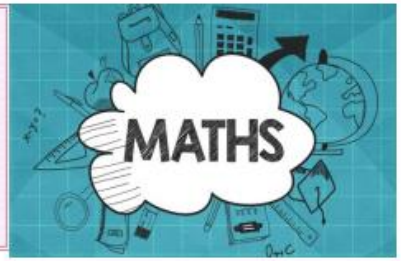
Autumn	Spring	Summer
Pupils will have an opportunity to consolidate the Early Learning Goals and continue to explore the composition of numbers within 10, and the position of these numbers in the linear number system. Pupils will: • subitise within 5, including when using a rekenrek, and re-cap the composition of 5 • develop their understanding of the numbers 6 to 9 using the '5 and a bit' structure • compare numbers within 10 and use precise mathematical language when doing so • re-cap the order of numbers within 10 and connect this to '1 more' and '1 less' than a given number • explore the structure of even numbers (including that even numbers can be composed by doubling any number, and can be composed of 2s) • explore the structure of the odd numbers as being composed of 2s and 1 more • explore the composition of each of the numbers 6, 8, and 10 • explore number tracks and number lines and identify the differences between them	Pupils will continue to explore the composition of numbers within 10 and explore addition and subtraction structures and the related language (without the use of symbols). Pupils will: • explore the composition of each of the numbers 7 and 9 • explore the composition of odd and even numbers, seeing that even numbers can be made of two odd or two even parts, and that odd numbers can be composed of one odd part and one even part • identify the number that is two more or two less than a given odd or even number, identifying that two more/ less than an odd number is the next/ previous odd number, and two more/ less than an even number is the next/ previous even number • explore the aggregation and partitioning structures of addition and subtraction through systematically partitioning and re-combining numbers within 10 and connecting this to the part-part-whole diagram, including using the language of parts and wholes • explore the augmentation and reduction structures of addition and reduction using	Pupils will explore the composition of numbers within 20 and their position in the linear number system. They will connect addition and subtraction expressions and equations to 'number stories'). Pupils will: • explore the composition of the numbers 11 to 19 as '10 and a bit' and compare numbers within 20 • connect the composition of the numbers 11 to 19 to their position in the linear number system, including identifying the midpoints of 5, 10 and 15 • compare numbers within 20 • understand how addition and subtraction equations can represent previously explored structures of addition and subtraction (aggregation/ partitioning/ augmentation/ reduction) • practise retrieving previously taught facts and reason about these

	number stories, including introducing the 'first, then, now' language structure	

Vocabulary:

Number and place value	Addition and subtraction	Multiplication and division	Fractions	Geometry	Measures
Names of numbers (up to 100 orally and up to 20 in reading and writing) More than, greater, larger, bigger, Greatest/ Most/ biggest/ largest Less than, fewer, smaller, Least/fewest/smallest Equal to, the same amount as, as many as Hundreds, Tens, ones, digit	One more, one less Count on, count back, One hundred Number bonds/ number facts Addition facts/ subtraction facts Fact family Add, subtract More, less, Plus, minus, total, sum Difference between, Equal, equal to	Grouping, sharing, multiply, divide, double, half, array	Part, Equal, Whole Half, halves, Quarters, Fraction,	**Shape:** 2-D shape (polygon) - Rectangle, square, circle, triangle 3-D shape - Cuboid, cube, cone, cylinder, pyramid, sphere, pattern flat, curved, straight, round, corner, point, face, side, edge **<u>Position and Direction</u>** Movement, Top, middle, bottom, On top of, In front of Above, Between, Around, Near, Close, Far Up, Down, Inside, Outside, Forwards, Backwards, Left, Right Half turn, Quarter turn, Three-quarters turn Straight, Line, Clockwise	**Length** Measure Length, height, distance Long, short, longer, shorter, tall, taller Double, half, ruler **Money** Coin, Note, pound, pence, value **Time** Day, week, month, season, year, leap year Weekend, fortnight Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday January, February, March, April, May, June, July, August, September, October, November, December Before, after, next, first, today, yesterday, tomorrow, morning, afternoon, evening Clock Hand, Hour, minute, o'clock, half past, quicker, slower, earlier, later **Weight and volume** Measure, Mass, weight Capacity, volume Heavy, light, heavier, lighter, Full, empty, half full, More than, less than Double, half

Key facts:



Stuff you need to know

YEAR 1

Count to 100

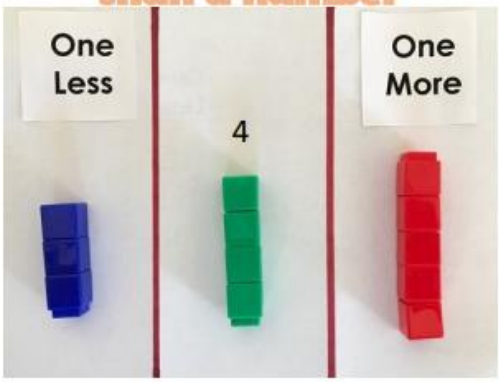
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Can you count forwards and backwards? Can you start from any number? Can you read and write the numbers?

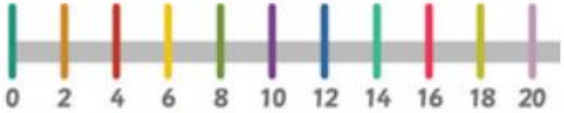
Read and write numbers 1-20 in words

1	one	11	eleven
2	two	12	twelve
3	three	13	thirteen
4	four	14	fourteen
5	five	15	fifteen
6	six	16	sixteen
7	seven	17	seventeen
8	eight	18	eighteen
9	nine	19	nineteen
10	ten	20	twenty

Find one more or one less than a number

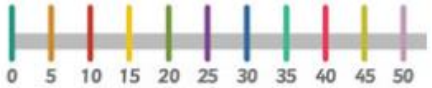


Count in 2s

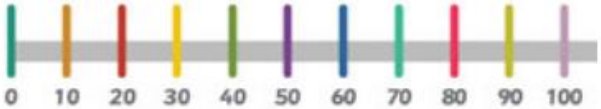


You could try counting things that come in 2s— like shoes, socks or pennies

Count in 5s

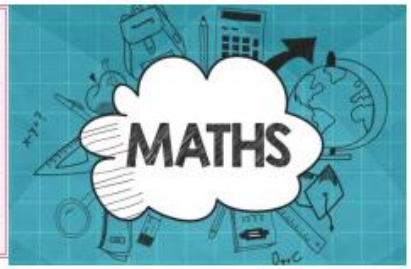


Count in 10s



Words to know and use:

Equal to, more than, less than, fewer, most, least



Stuff you need to know

YEAR 1

Number bonds to 10

10 = 1+9 2+8 3+7 4+6

5+5 6+4 7+3 8+2 9+1

Number bonds to 20

	1 + 19		19 + 1
	2 + 18		18 + 2
	3 + 17		17 + 3
	4 + 16		16 + 4
	5 + 15		15 + 5
	6 + 14		14 + 6
	7 + 13		13 + 7
	8 + 12		12 + 8
	9 + 11		11 + 9
	10 + 10		10 + 10

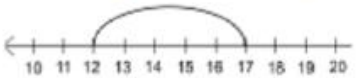
Understand these symbols

add subtract equals

Add numbers to 20 by counting on

4 + 3 = 7

Using objects



12 + 5 = 17

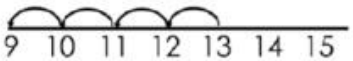
using a number line

3 + 2 = 5

using pictures

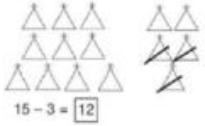
Subtract numbers to 20 by counting back

Using objects



13—4 = 9

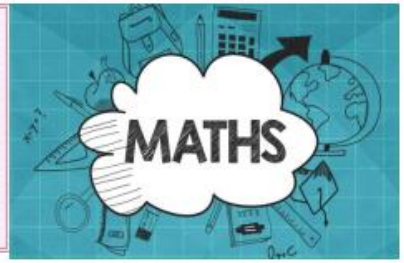
Using a number line



15—3 = 12

using pictures

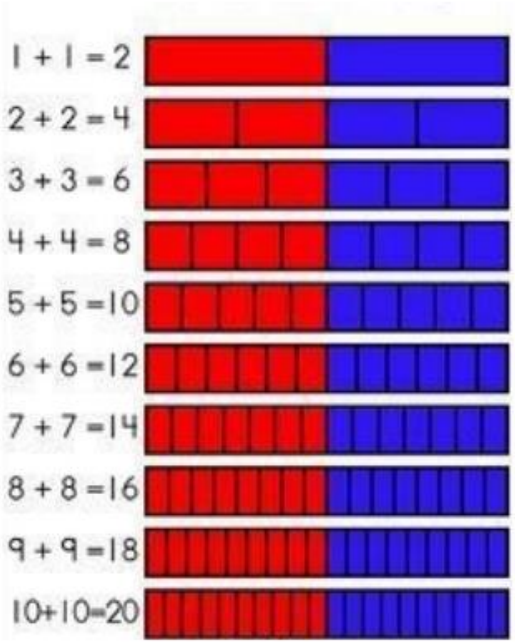
4—2 = 2



Stuff you need to know

YEAR 1

Doubles and Halves



Multiply by grouping or using arrays

5 groups of 2

4 groups of 5

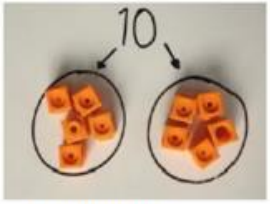
Arrays are setting out the groups in rows to make them easier to count

4 lots of 5

3 lots of 5

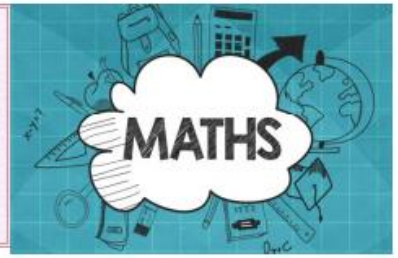
Children don't need to know the symbols for multiply and divide at this stage—just understand how it works.

Dividing by sharing equally



10 shared by 2

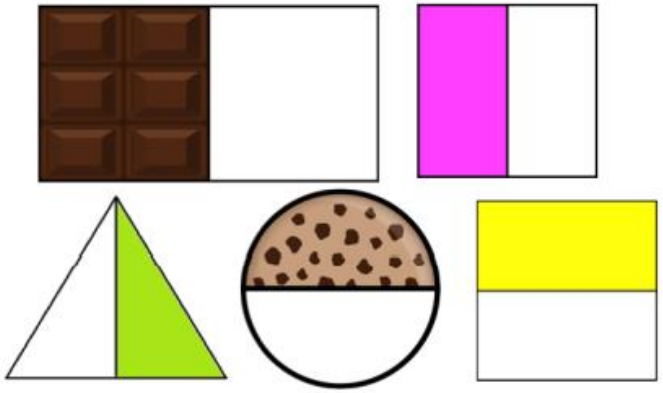
share the muffins equally onto the plates

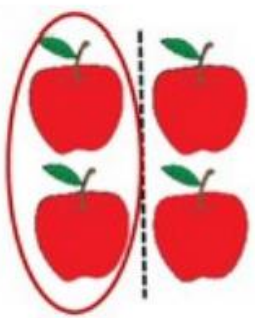


Fractions you need to know

YEAR 1

Recognise a half as one of two equal parts

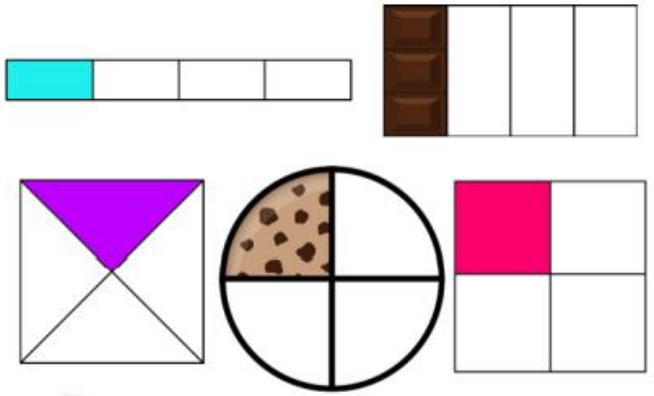




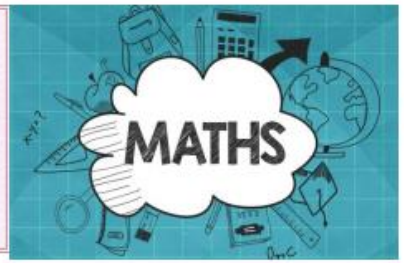
$\frac{1}{2}$

Why not try finding a half and a quarter of different things around the home? Biscuits, cake, play-do, half a cup and more.

Recognise a quarter as one of four equal parts



$\frac{1}{4}$



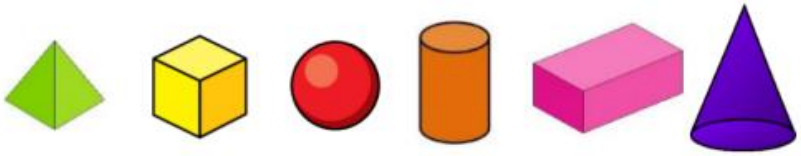
Shapes you need to know

YEAR 1

2D

Square Rectangle Triangle Circle

3D

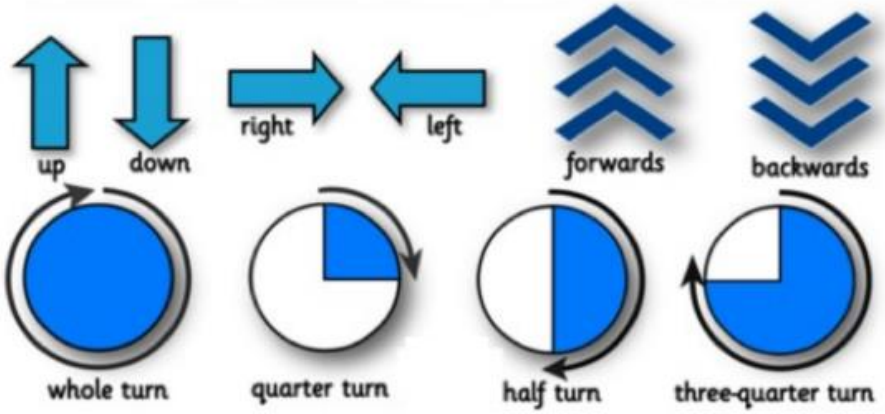


Pyramid Cube Sphere Cylinder Cuboid Cone

Why not see which shapes you can find around your home?

See if you can take a teddy or toy and practise moving it left, right and turning it using these position words.

Position words



Stuff you need to know

YEAR 1

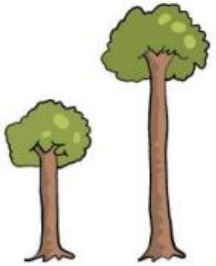
Telling the time

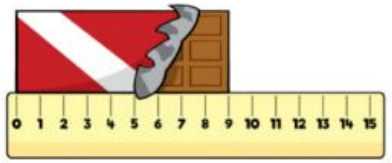
o'clock

Half Past

Know days and months

Know words to describe different measures





Measure using a ruler

The best way to learn measures is by doing it practically. Pouring water, comparing twigs, sorting coins. Practising the language is important.

Know coins and notes

Mathematics Curriculum – Year 2

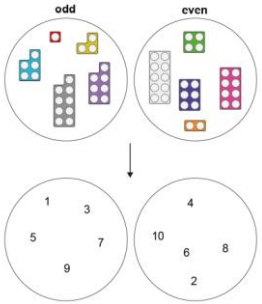
Autumn 1:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3 4	Place Value	Objectives from the national curriculum: • count in steps of 2, 3, and 5 from 0, and in 10s from any number, forward and backward • recognise the place value of each digit in a two-digit number (10s, 1s) • identify, represent and estimate numbers using different representations, including the number line • compare and order numbers from 0 up to 100; use <, > and = signs • read and write numbers to at least 100 in numerals and in words • use place value and number facts to solve problems Learning sequence: • numbers to 20 • count objects to 100 by making 10s • recognise tens and ones • use a place value chart • partition numbers to 100 • write numbers to 100 in words • flexibly partition numbers to 100 • write numbers to 100 in expanded form • 10s on the number line to 100 • 10s and 1s on the number line to 100 • Estimate numbers on a number line • Compare objects • Compare numbers • Order objects and numbers • Count in 2s 5s and 10s • Count in 3s	<u>Key concepts and facts</u> Pupils will build understanding of the concept of place value and tens and ones. Pupils should recognise that 42, for example, can be composed either of 42 ones, or of 4 tens and 2 ones. They should be able to group objects into tens, with some left over ones, to count efficiently and to demonstrate an understanding of the number. Pupils need to be capable of identifying the total quantity in different representations of groups of ten and additional ones. Within these representations the relative positions of the tens and the ones should be varied. <u>Vocabulary</u> Place value, digit(s), hundreds, tens, ones, zero, estimate, number line, multiple, more, less, greater than, less than, equal to, Represent, Partition, Exchange, Value, Order, Pattern, Sequence, Predict, Rule, place holder, odd, even, names of all numbers up to 100 (read and write).	Children will have counted to 100 in Year 1 and have a secure understanding of tens and ones to start to apply this to these numbers Children will be secure in counting orally to 100 and will now apply this to reading and writing numbers Children will have counted in 2s, 5s and 10s in year 1 Children will be aware of the symbols < > and =

5
6
7
	Addition and Subtraction	Objectives from the national curriculum:
		• 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
		• 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 1s
		  • a two-digit number and 10s
		  • 2 two-digit numbers
		  • adding 3 one-digit numbers
		• show that addition of 2 numbers can be done in any order (commutative) and subtraction of 1 number from another cannot
		• recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems
		
		Learning sequence:
		  • Bonds to 10
		  • Fact families – addition and subtraction bonds within 20
		  • Related facts
		  • Bonds to 100 (tens)
		  • Add and subtract 1s
		  • Add by making 10
		  • Add three 1-digit numbers
		  • Add to the next 10
		  • Add across a 10
		  • Subtract across 10
		  • Subtract from a 10
		  • Subtract a 1-digit number from a 2 –digit number (across a ten)
		  • 10 more, 10 less
		  • Add and subtract 10s
		  • Add two 2 digit numbers (not across a 10)
		  • Add two 2 digit numbers (across a 10)
		  • Subtract two 2-digit numbers (not across a 10)
		  • Subtract two 2-digit numbers (across a 10)
		  • Mixed addition and subtraction
		  • Compare number sentences
		  • Missing number problems
			<u>Key concepts and facts</u>
			Pupils need to be able to solve problems with missing addends using known number facts or calculation strategies, for example: 19 + ? = 25. Pupils need to be able to recognise problems about difference, and relate them to subtraction.
			
			Pupils will start to understand the concept of inverse
			
			They will continue to apply their growing understanding of the concept of place value when adding and subtracting ones or tens.
			
			Dienes and partitioning diagrams can be used to support pupils as they learn about strategies for carrying out these calculations. To add 2 two-digit numbers, pupils need to combine one-digit addition facts with their understanding of two-digit place value. Pupils should first learn to add 2 multiples of ten and 2 ones before moving on to the addition of 2 two-digit numbers
			
			<u>Vocabulary</u>
			Add, subtract
			Count on, count back, More, less
			Plus, minus, total, sum, Difference, Partition, Bridge, Round, adjust, Inverse
			Number line
			Number facts
			Multiple of ten, exchange
				Children will be aware of the + - and = symbols from year one and what the parts of a number sentence represent
				
				Children will be secure with number bonds and fact families and should review this before applying.
				
				Children will be aware of tens and ones of numbers up to 100 from previous place value unit

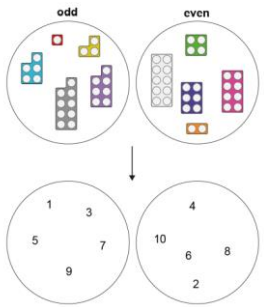
Autumn 2:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3	Addition and Subtraction	Continued – see above		
4 5 6	Geometry	Objectives from the national curriculum: • 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 Learning sequence: • recognising 2D and 3D shapes • counting the sides on 2D shapes • counting the vertices on 2D shapes • drawing 2D shapes • lines of symmetry on shapes • lines of symmetry to complete shapes • sorting 2D shapes • counting faces on 3D shapes • counting edges on 3D shapes • counting vertices on 3D shapes • sorting 3D shapes • making patterns with 2D and 3D shapes	<u>Key concepts and facts</u> Pupils must learn that a polygon is a 2D shape which has only straight sides and then learn to identify a given polygon by counting the number sides (or vertices). Pupils should practise running their finger along each side as they count the sides (or practise touching each vertex as they count the vertices). Later, pupils may mark off the sides or vertices on an image as they count. It is important that they learn to count the sides/vertices accurately, counting each once and only once. Pupils must know that it is the number of sides/vertices that determines the type of polygon, rather than whether the given shape looks like their mental image of a particular polygon. <u>Vocabulary</u> 2-D shape (polygon), Rectangle, Square, Circle, Triangle, Quadrilateral, Circular, Triangular, Rectangular Side, Corner, Line of symmetry, Vertical, horizontal, Reflection, 3-D shape, Cuboid, Cube, Cone, Cylinder, Pyramid, Sphere, Prism Edge, Vertex, Vertices, Face	Pupils will be familiar with the names of common 2D and 3D shapes in different sizes and orientations. From the Year 1 curriculum, they should recognise and name these fluently.

7 8	Multiplication and Division	Objectives from the national curriculum: • recall and use multiplication and division facts for the 2, 5 and 10 multiplication 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 • show that multiplication of 2 numbers can be done in any order (commutative) and division of 1 number by another cannot • solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts Learning sequence: • recognising equal groups • making equal groups • adding equal groups • multiplication sentences using the x symbol • multiplication sentences from pictures • using arrays • making doubles • 2 times table • 5 times table • 10 times table • Making equal groups – sharing • Making equal groups – grouping • Dividing by 2 • Odd and even numbers • Dividing by 5 • Dividing by 10	<u>Key concepts and facts</u> Concept of odd and even numbers should be explored through the structure of these numbers visually  Pupils should start by recognising the concept of multiplication as repeated addition. Pupils must first be able to recognise equal groups. To better understand and identify equal groups, pupils should initially explore both equal and unequal groups. Pupils should then learn to describe equal groups with words. Based on their existing additive knowledge, pupils should be able to represent equal group contexts with repeated addition expressions, for example 5+5+5 . They should then learn to write multiplication expressions to represent the same contexts, for example 3×5 . Pupils must be able to explain how each term in a multiplication expression links to the context it represents. Pupils must also be able to understand equivalence between a repeated addition expression and a multiplication expression: 5+ 5+ 5=3x5. Pupils should then learn to calculate the total number of items <u>Vocabulary</u> Inverse, Operation Multiplication table, Times table, Multiply, Multiplication, Times, Product,	Children will be familiar with the concept of grouping and sharing and that a group should be equal. They will also have some understanding of arrays and doubles from Year 1 Counting in 2s, 5s and 10s should be secure to apply to the times tables

			Repeated addition, lots of, Array, Odd, Even Divide, Division, shared by	

Spring 1:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2	Multiplication and Division	Objectives from the national curriculum: • recall and use multiplication and division facts for the 2, 5 and 10 multiplication 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 • show that multiplication of 2 numbers can be done in any order (commutative) and division of 1 number by another cannot • solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts Learning sequence: • recognising equal groups • making equal groups • adding equal groups • multiplication sentences using the x symbol • multiplication sentences from pictures • using arrays • making doubles • 2 times table • 5 times table • 10 times table • Making equal groups – sharing • Making equal groups – grouping • Dividing by 2 • Odd and even numbers • Dividing by 5 • Dividing by 10	<u>Key concepts and facts</u> Concept of odd and even numbers should be explored through the structure of these numbers visually  Pupils should start by recognising the concept of multiplication as repeated addition. Pupils must first be able to recognise equal groups. To better understand and identify equal groups, pupils should initially explore both equal and unequal groups. Pupils should then learn to describe equal groups with words. Based on their existing additive knowledge, pupils should be able to represent equal group contexts with repeated addition expressions, for example 5+5+5 . They should then learn to write multiplication expressions to represent the same contexts, for example 3×5 . Pupils must be able to	Children will be familiar with the concept of grouping and sharing and that a group should be equal. They will also have some understanding of arrays and doubles from Year 1 Counting in 2s, 5s and 10s should be secure to apply to the times tables

			explain how each term in a multiplication expression links to the context it represents. Pupils must also be able to understand equivalence between a repeated addition expression and a multiplication expression: 5+ 5+ 5=3x5. Pupils should then learn to calculate the total number of items Vocabulary Inverse, Operation Multiplication table, Times table, Multiply, Multiplication, Times, Product, Repeated addition, lots of, Array, Odd, Even Divide, Division, shared by	
3 4	Statistics	Objectives from the national curriculum: • interpret and construct simple pictograms, tally charts, block diagrams and 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 Learning sequence: • Making tally charts • Drawing pictograms 1:1 • Interpreting pictograms 1:1 • Drawing pictograms 2,5 and 10 • Interpreting pictograms 2,5 and 10 • Block diagrams	Key concepts and facts Unitisation and that one object can represent many in a pictogram. Vocabulary Data, Pictogram, Tally, Tally chart, Block diagram, Table, Category,	Children have not previously studied statistics formally in the Mathematics programme of study but will be familiar with a simple tally from informal recording throughout EYFS and Year 1 in Science and Maths. The concept of unitising linked to money could be recapped to introduce a pictogram e.g. a 5p coin represents 5 pennies. This circle represents 5.
5	Geometry – Position and Direction	Objectives from the national curriculum: • order and arrange combinations of mathematical objects in patterns and sequences • 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) Learning sequence: • describe position • describe movement • describe turns • describing movement and turns • making patterns with shapes	Key concepts and facts Patterns and sequences being something that repeats Turns being described mathematically and understanding of clockwise and anti-clockwise Vocabulary Movement, Forwards, Backwards, Left, Right, Right angle Turn - Quarter, Half, Three quarters Rotation, Straight, Line, Clockwise, anticlockwise	From Year 1, pupils will be secure with the language of position and direction, including whole, half, quarter and three-quarter turns. Pupils will have previously connected this to movement on a clock face in year 1

Spring 2:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3	Fractions	Objectives from the national curriculum: • recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity • write simple fractions, for example $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$ Learning sequence: • making equal parts • recognising a half • finding a half • recognising a quarter • finding a quarter • recognising a third • finding a third • non-unit fractions • the equivalence of ½ and 2/4 • finding three quarters • counting in fractions	<u>Key concepts and facts</u> Extending their understanding of the concept of parts and wholes, pupils explore how a whole can be split into any number of equal parts. The concept of equivalence is first explored by recognising the same value of a half and two quarters <u>Vocabulary</u> Part, Equal, Whole Half, halves, Quarter, three quarters, Third Equivalent, Fraction Numerator, Denominator	From the Year 1 curriculum, pupils will be able to recognise, find and name halves and quarters.
4 5	Money	Objectives from the national curriculum: • 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 Learning sequence: • recapping notes and coins • counting money in pence • counting money in pounds (notes and coins) • counting money – notes and coins • selecting money • making the same amount • comparing money • finding the total • finding the difference • finding change • two-step problems	<u>Key concepts and facts</u> Concept of unitisation and how one coin can represent a different amount of money. Understanding that the same amount can be made in different ways and with different combinations. <u>Vocabulary</u> Money, Coin, Change, Note Pound, pence, difference, total, combined, amount	From Year 1, pupils will be familiar with notes and coins. They should review and apply counting in 10s, 5s and 2s to help with combining coins to make amounts

6	Mass, Capacity and Temperature	Objectives from the national curriculum: • choose and use appropriate standard units to estimate and measure mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels • compare and order mass, volume/capacity and record the results using >, < and = Learning sequence: • recapping mass and measuring mass • comparing mass • measuring mass in grams • measuring mass in kilograms • introducing capacity and volume • measuring capacity • comparing volume • millilitres • litres temperature	<u>Key concepts and facts</u> Different units can be used to measure the same thing. Mass and weight are how heavy something is; capacity and volume is how much space something takes up. Concept of temperature measuring how hot or cold something is. <u>Vocabulary</u> Unit, Mass, weight, Gram, kilogram Scale, scales Order, Compare, greater than, less than Temperature, Degrees Celsius, Thermometer Capacity, volume, Litre, millilitre, Container, vessel	This is pupils first time learning temperature but they will be familiar with this term from their study of seasons in Science throughout the year. Children will understand mass and capacity as concepts and will be familiar with associated language from Year 1 e.g. heavy, light, full, empty etc. and some standard measurements

<u>Summer 1:</u>

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1	Mass, capacity and temperature (as above)			
2 3	Length and Height	Objectives from the national curriculum: • choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels • compare and order lengths and record the results using >, < and = Learning sequence: • comparing lengths and heights • measuring lengths • measuring in centimetres • measuring in metres • comparing lengths • ordering lengths • four operations with lengths	<u>Key concepts and facts</u> Pupils explore that the same length can be measured using different units and explore selecting appropriate units of measurement. <u>Vocabulary</u> Unit Length, height, distance, width, breadth, Metre, centimetre Ruler, metre stick, tape measure Order, Compare, greater than, less than	Children will be secure with the concept of length and height as a measurement and will have explored non-standard and standard measurements. They will be secure with language such as shorter, longer, smaller, taller, shortest, longest

4 5 6	Time	Objectives from the national curriculum: • compare and sequence intervals of 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 Learning sequence: • recapping telling time to the hour • recapping telling time to the half hour • o'clock and half past • quarter past and quarter to • telling time to 5 minutes • writing time • hours and days • finding durations of time • comparing durations of time	<u>Key concepts and facts</u> Different durations of time – hours, days, minutes. <u>Vocabulary</u> Time, Hour, minute, second, Day o'clock, Half past, Quarter to, quarter past Clock, Hands,	Children will be secure with sequencing events and the concept of time after learning after, first, today, yesterday, before, after, morning, afternoon, evening etc in Year 1. They will be secure with language relating to dates and days of the week and months of the year. They will be able to tell the time to the hour and half past the hour and be familiar with the layout and hands on an analogue clock face.

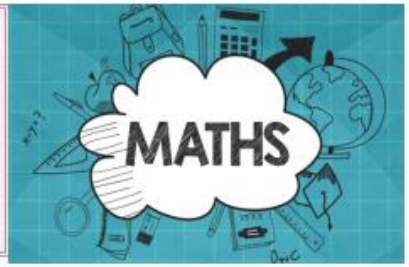
<u>Summer 2:</u>

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3 4 5 6 7	KS1 consolidation and problem solving	Cohort gaps in KS1 curriculum Preparation for KS2		

Vocabulary:

Number and place value	Addition and subtraction	Multiplication and division	Fractions, decimals and percentages	Geometry	Measures	Statistics
Place value, digit(s), hundreds, tens, ones, zero, estimate, number line, multiple, more, less, greater than, less than, equal to, Represent, Partition, Exchange, Value, Order, Pattern, Sequence, Predict, Rule, place holder, odd, even, names of all numbers up to 100 (read and write).	Add, subtract Count on, count back, More, less Plus, minus, total, sum, Difference, Partition, Bridge, Round, adjust, Inverse Number line Number facts Multiple of ten, exchange	Inverse, Operation Multiplication table, Times table, Multiply, Multiplication, Times, Product, Repeated addition, lots of, Array, Odd, Even Divide, Division, shared by	Part, Equal, Whole Half, halves, Quarter, three quarters, Third Equivalent, Fraction Numerator, Denominator	**Shape:** 2-D shape (polygon), Rectangle, Square, Circle, Triangle, Quadrilateral, Circular, Triangular, Rectangular Side, Corner, Line of symmetry, Vertical, horizontal, Reflection, 3-D shape, Cuboid, Cube, Cone, Cylinder, Pyramid, Sphere, Prism Edge, Vertex, Vertices, Face **Position and direction** Movement, Forwards, Backwards, Left, Right, Right angle Turn - Quarter, Half, Three quarters Rotation, Straight, Line, Clockwise, anticlockwise	**Time:** Time, Hour, minute, second, Day o'clock, Half past, Quarter to, quarter past Clock, Hands, **Money:** Money, Coin, Change, Note Pound, pence, difference, total, combined, amount **Length and Mass** Unit Length, height, distance, width, breadth, Metre, centimetre Ruler, metre stick, tape measure Mass, weight, Gram, kilogram Scale, scales Order, Compare, greater than, less than **Capacity and temperature** Temperature, Degrees Celsius, Thermometer Capacity, volume, Litre, millilitre, Container, vessel	Data, Pictogram, Tally, Tally chart Block diagram, Table Category,

Key facts:



Stuff you need to know

Read and write to 100 in numbers and words

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Use these signs

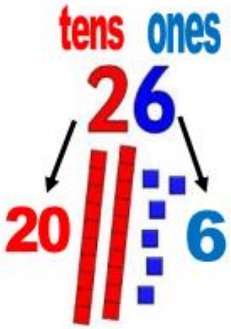
72 > 67

72 is greater than 67

17 < 19

17 is less than 19

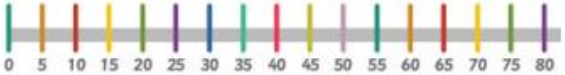
Recognise tens and ones



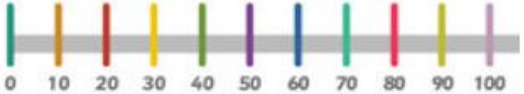
Count in 2s

Count in 3s

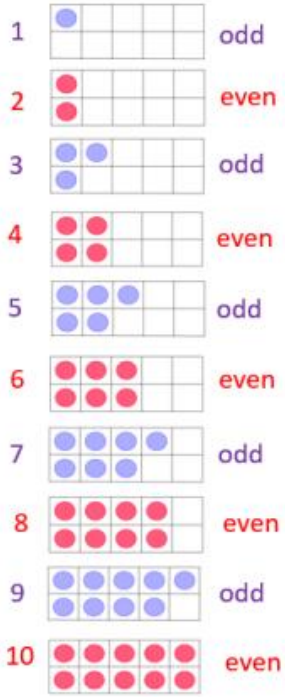
Count in 5s



Count in 10s



Odd and even

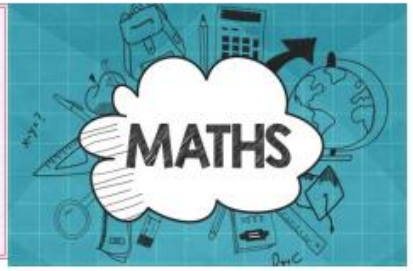


Even Numbers end in

0 2 4 6 8

Odd Numbers end in

1 3 5 7 9



Stuff you need to know

YEAR 2

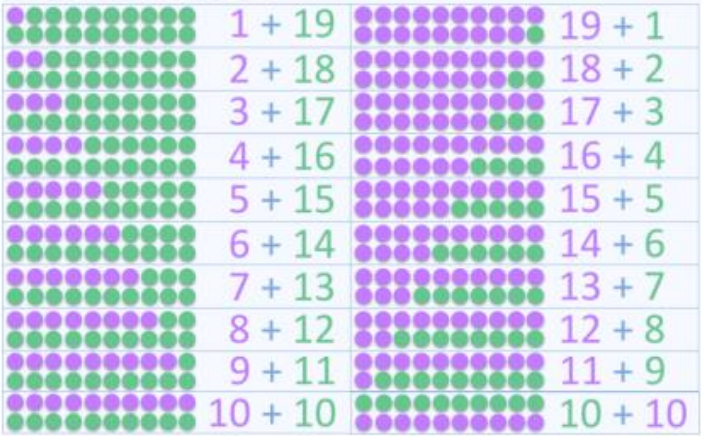
Number bonds and facts

10 = 1+9 2+8 3+7 4+6

5+5 6+4 7+3 8+2 9+1

0+100=100
10+90=100
20+80=100
30+70=100
40+60=100
50+50=100

Number bonds to 20



1 + 19	19 + 1
2 + 18	18 + 2
3 + 17	17 + 3
4 + 16	16 + 4
5 + 15	15 + 5
6 + 14	14 + 6
7 + 13	13 + 7
8 + 12	12 + 8
9 + 11	11 + 9
10 + 10	10 + 10

Understand these symbols

add subtract equals multiply divide

Multiply by grouping or using arrays

5 groups of 2 5 x 2 = 10

4 groups of 5 4 x 5 = 20

Children start to write these using the symbols

Arrays are setting out the groups in rows to make them easier to count

4 lots of 5

4 x 5 = 20

3 lots of 5

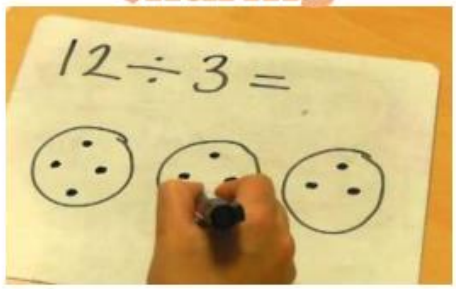
3 x 5 = 15

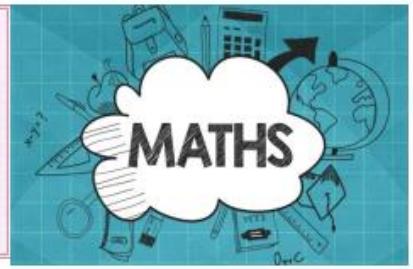
Add three 1-digit numbers

2 + 4 + 1

Understanding that it doesn't matter which order you add numbers in

Dividing by sharing



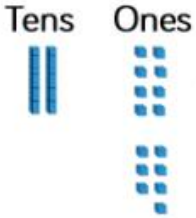


Stuff you need to know

YEAR 2

Children mainly add and subtract using concrete objects, jottings and by using mental strategies. There is a big emphasis upon understanding the tens and the ones and the concept of adding to it or taking away from it. They might start to record their strategies in a method alongside their working.

Adding



$$\begin{array}{r} 2\ 8 \\ +\ \ 7 \\ \hline 3\ 5 \\ \hline 1 \end{array}$$

A 2-digit number and ones

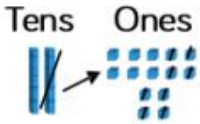
Tens	Ones

$$\begin{array}{r} 2\ 3 \\ +4\ 0 \\ \hline \\ \hline \end{array}$$

A 2-digit number and tens

Tens	Ones

Subtracting



$$\begin{array}{r} {}^{1}\cancel{2}\ {}^{1}4 \\ -\ \ 8 \\ \hline 1\ 6 \\ \hline \end{array}$$

A 2-digit number and ones

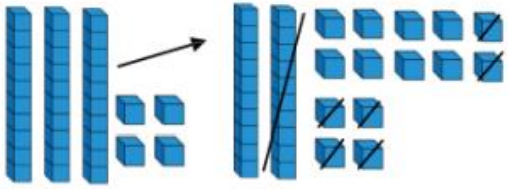
Tens	Ones

$$\begin{array}{r} 5\ 6 \\ -3\ 0 \\ \hline \\ \hline \end{array}$$

Tens	Ones

A 2-digit number and a 2-digit number

Take 16 away from 34

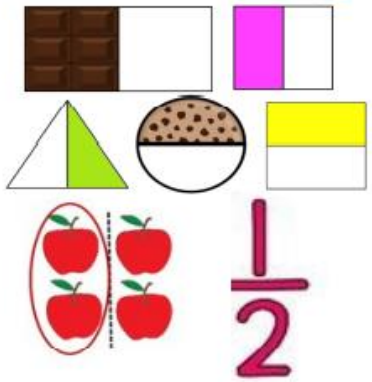


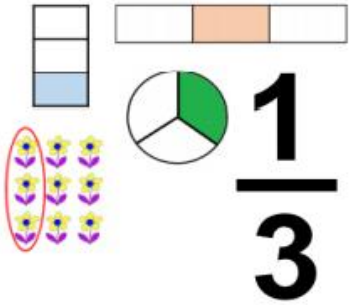
$$\begin{array}{r} {}^{2}\cancel{3}\ {}^{1}4 \\ -1\ 6 \\ \hline 1\ 8 \\ \hline \end{array}$$

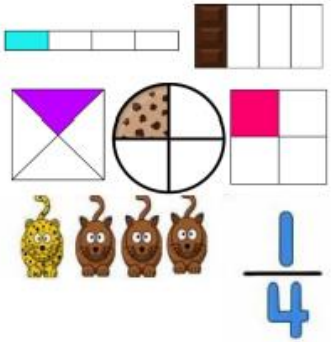
Fractions you need to know

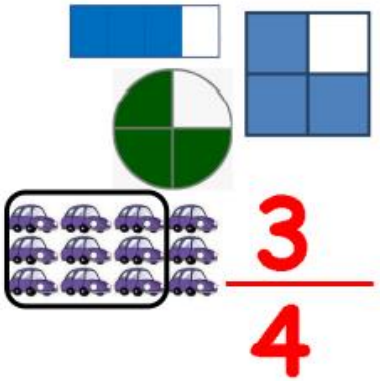
YEAR 2

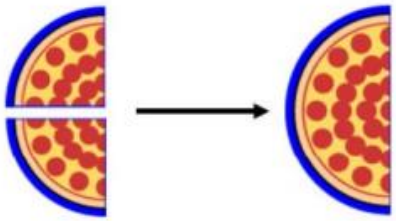
Recognise, find, name and write the following fractions









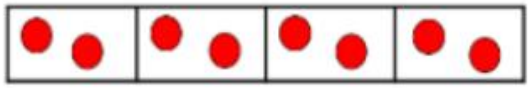


2 quarters is the same amount as 1 half

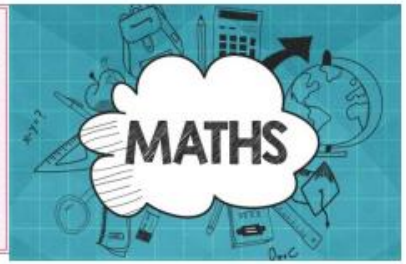
$$\frac{2}{4} = \frac{1}{2}$$

Find simple fractions of amounts

$\frac{1}{4}$ of 8



$\frac{1}{2}$ of 6



Times tables you need to know

YEAR 2

2 times table

1 x 2 = 2
2 x 2 = 4
3 x 2 = 6
4 x 2 = 8
5 x 2 = 10
6 x 2 = 12
7 x 2 = 14
8 x 2 = 16
9 x 2 = 18
10 x 2 = 20
11 x 2 = 22
12 x 2 = 24

5 times table

1 x 5 = 5
2 x 5 = 10
3 x 5 = 15
4 x 5 = 20
5 x 5 = 25
6 x 5 = 30
7 x 5 = 35
8 x 5 = 40
9 x 5 = 45
10 x 5 = 50
11 x 5 = 55
12 x 5 = 60

10 times table

1 x 10 = 10
2 x 10 = 20
3 x 10 = 30
4 x 10 = 40
5 x 10 = 50
6 x 10 = 60
7 x 10 = 70
8 x 10 = 80
9 x 10 = 90
10 x 10 = 100
11 x 10 = 110
12 x 10 = 120

Do you know them inside out, back to front and in a random order? How quickly can you write them down? Can you spot any patterns to help you remember?

Use your times tables to work out inverse division facts by swapping the numbers around

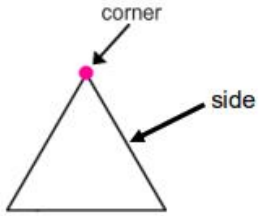
4 x 5 = 20

20 ÷ 5 = 4

20 ÷ 4 = 5

Shapes you need to know

YEAR 2



2D

Can you count the sides and corners of each shape? Can you see any lines of symmetry?


Square

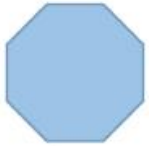

Rectangle


Triangle


Circle

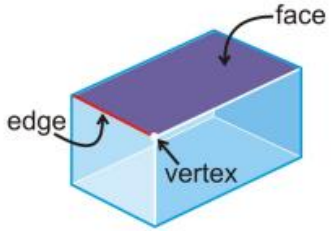

Pentagon


Hexagon


Octagon

Can you count how many faces, edges and vertices each 3D shape has? Can you see any 2D shapes on the faces?

3D




Pyramid


Cube


Sphere

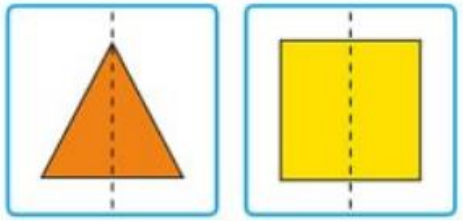

Cylinder


Triangular Prism

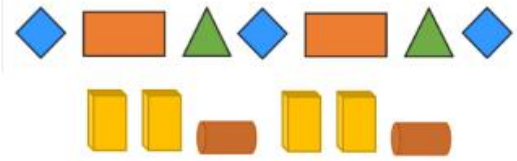

Cuboid


Cone

Lines of symmetry in shapes



Create sequences and patterns with shapes.

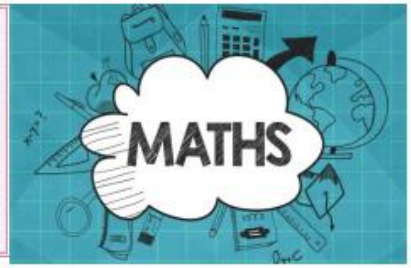


Position language


Up, down, left, right


Quarter turn, half turn, three quarter turn and full turn

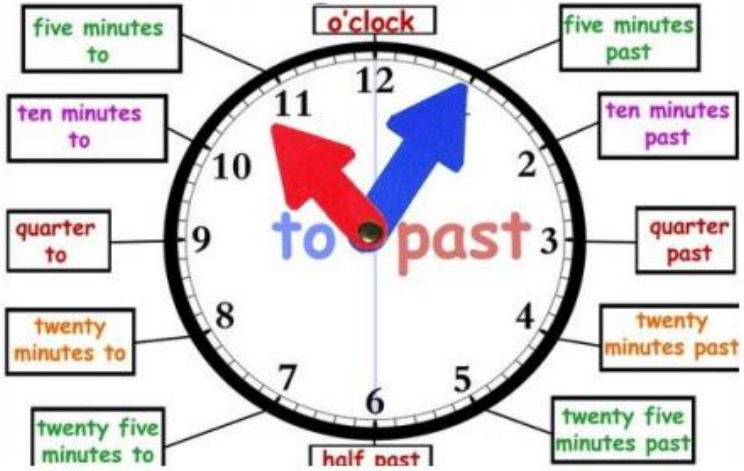

Clockwise Anti-clockwise



Measures you need to know

YEAR 2

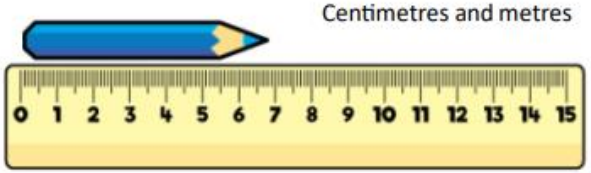
Telling the time to the nearest 5 minutes



60 minutes = 1 hour

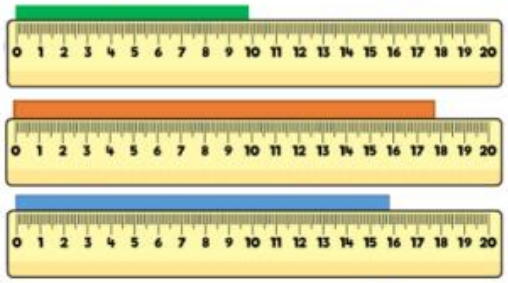
24 hours = 1 day

Measure length



Centimetres and metres

Compare lengths



Using language like shorter, longer, shortest, longest or by using the symbols < > and =

Measure capacity and temperature

In millilitres and litres

In degrees

Measure mass

Grams and kilograms

Know coins and notes

Recognise the £ symbol

Combine coins to make amounts

Two different ways of making 52p

Mathematics Curriculum – Year 3

Autumn 1:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3	Place Value	Objectives from the national curriculum: • Count from 0 in multiples of 4, 8, 50 and 100 (4 and 8 not covered in this unit) • 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 and ones) • Compare and order numbers up to 1000 • Identify, represent and estimate numbers using different representations • Read and write numbers up to 1000 in numerals and in words • Solve number problems and practical problems involving these ideas Learning sequence: • Represent and recap numbers up to 100 • Partition numbers to 100 • Number line to 100 • Hundreds • Represent numbers to 1000 • Partition numbers to 1000 • Flexible partitioning of numbers to 1000 • Understanding hundreds, tens and ones • Finding 1, 10 or 100 more or less than a number • Number line to 1000 • Estimating on a number line to 1000 • Comparing numbers • Ordering numbers • Counting in 50s	<u>Key concepts and facts</u> Growing understanding of the concept of place value extends to hundreds, tens and ones. Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10; apply this to identify and work out how many 10s there are in other three-digit multiples of 10. Pupils need to experience: • what 100 items looks like • making a unit of 1 hundred out of 10 units of 10, for example using 10 bundles of 10 straws to make 100, or using ten 10-value place-value counters <u>Vocabulary</u> Place value, Digit, thousands, Hundreds, Tens, Ones, Estimate, Number line, more, less, Scale, multiple, partition, order, greater than, less than, names of all numbers up to 1000.	Children will be secure with the place value of 2 digit numbers and the concept of tens and ones. Children will be familiar with comparing and ordering and will understand the < > and = signs Children will be secure in counting in multiples of 5 and this should be reviewed before counting in multiples of 50.
4	Addition and subtraction	Objectives from the national curriculum: • Add and subtract numbers mentally, including: A three-digit number and ones A three-digit number and tens A three-digit number and hundreds	<u>Key concepts and facts</u> Before pupils begin work on columnar addition and subtraction, it is essential that pupils have automatic recall of addition and subtraction facts within and across 10. These facts are required	Children will possess a range of mental methods for adding and subtracting numbers within 100. They will be fluent with addition and subtraction facts to 20 and this

5 6 7		• 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 Learning sequence: • Add and subtract 1s • Add and subtract 10s • Add and subtract 100s • Add 1s across a 10 • Add 10s across a 100 • Subtract 1s across a 10 • Subtract 10s across a 100 • Add two numbers (no exchange) • Subtract two numbers (no exchange) • Add two numbers (across a ten) • Add two numbers (across a hundred) • Subtract two numbers (across a ten) • Subtract two numbers (across a hundred) • Add 2 and 3 digit numbers • Subtract a 2 digit number from a 3 digit number • Complements to 100 • Estimate answers • Inverse operations • Problem solving	for calculation within the columns in columnar addition and subtraction. All mental calculation also depend on these facts. Pupils should master columnar addition, including calculations involving regrouping (some columns sum to 10 or more), before learning columnar subtraction. For calculations with more than 2 addends, pupils should add the digits within a column in the most efficient order.  <u>Vocabulary</u> Calculation, Calculate, Addition, Subtraction, Sum, Total, Difference, Minus, Less, place value column, Exchange, Operation, Estimate, Inverse, Operation, partition, digit	should be drawn upon to promote efficiency in calculation. Place value columns from the previous block should be reviewed when introducing the column method Children will have an understanding of the inverse relationship and will now extend this to 3 digit numbers.

Autumn 2:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2	Addition and subtra	Two further weeks on the above objectives		
3 4 5 6 7 8	Multiplication and division	Objectives from the national curriculum: • 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 that they know, including two-digit numbers times on-digit numbers, using mental and progressing to formal written methods • Solve problems involving missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects Learning sequence: • Understanding multiplication as equal groups • Use arrays • Multiples of 2 • Multiples of 5 and 10 • Sharing and grouping • Multiplying by 3 • Dividing by 3 • The three times table • Multiplying by 4 • Dividing by 4 • The 4 times table • Multiplying by 8 • Dividing by 8 • The 8 times table • Comparing and consolidating the 2,4 and 8 times tables • Comparing statements using multiplication and division facts • Working out related facts e.g. 3 x 30 • Multiplying 2-digits by 1-digit – concrete and mentally • Multiplying 2-digits by 1-digit – progressing to formal written methods • Dividing 2-digits by 1-digit – by partitioning tens and ones and sharing • Dividing 2-digits by 1 digit – by partitioning using times tables and sharing • Scaling • Exploring how many ways – systematically listing possible combinations results from 2 groups of objects	<u>Key concepts and facts</u> While pupils are learning the individual multiplication tables, they should also learn that: • the factors can be written in either order and the product remains the same (for example, we can write 3 4 12 × = or 4 3 12 × = to represent the third fact in the 4 multiplication table) • the products within each multiplication table are multiples of the corresponding number, and be able to recognise multiples (for example, pupils should recognise that 64 is a multiple of 8, but that 68 is not) • adjacent multiples in, for example, the 8 multiplication table, have a difference of 8 Pupils should also learn that the commutative property allows them to use their known facts to solve problems <u>Vocabulary</u> Calculation, Calculate, Multiplication table, Times table, Multiply, Multiplication, Times, Product, Commutative, Divide, Division, Inverse, Operation, Estimate, scale, shared equally, array	Children will have previously learnt multiplication and division facts for the 2, 5 and 10 times tables. They will have an understanding of equal groups, the multiplication symbol and arrays that they should review before building upon. They should link new times tables with previous times tables They should use learnt times table facts to master related facts They should apply knowledge of grouping and sharing from previous years.

Spring 1:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3	Length and Perimeter	Objectives from the national curriculum: • Measure, compare, add and subtract: lengths (m/cm/mm) • Measure the perimeter of simple 2-D shapes Learning sequence: • Measuring length • Measuring length in metres • Equivalent lengths – m and cm • Equivalent lengths – mm and cm • Comparing lengths • Adding lengths • Subtracting lengths • Understanding perimeter • Measuring perimeter • Calculating perimeter	Key concepts and facts Understanding equivalence as a length can be represented with different units of measurement but it is still the same length. The concept of perimeter being the length around the outside of a 2D shape. Vocabulary Length, distance, Mass, Volume, Capacity, Metre, centimetre, millimetre, Kilogram, gram, Litre, millilitre, Perimeter,	Children will be familiar with standard units of measurement and how to measure using them They will be familiar with comparing and ordering simple lengths and the associated vocabulary. This is the first time that children have come across perimeter but should use and apply their knowledge of shapes and measurements to achieve understanding of this.
4 5	Statistics	Objectives from the national curriculum: • Interpret and present data using bar charts, pictograms and tables • Solve one-step and two-step questions using information presented in scaled bar charts and pictograms and tables Learning sequence: • Interpreting data in pictograms • Drawing pictograms • Understanding pictograms – one-step and two-step questions • Bar charts interpreting – using and understanding simple scales • Bar charts presenting • Interpreting tables • One-step and two-step questions with data presented in many contexts	Key concepts and facts Scales can go up in different intervals – and children can identify a scale by working out the distance divided by the gaps. Vocabulary Data, Pictogram, Symbol, Key, Tally, Bar chart, Table, Total, Compare, Axis, scale	Children will have understanding of a pictogram and their layout. They will be familiar with simple bar charts and should revisit their layout before starting to interpret these.

Spring 2:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3 4 5 6	Fractions	Objectives from the national curriculum: • 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, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators • Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators • Recognise and show, using diagrams, equivalent fractions with small denominators • Add and subtract fractions with the same denominator within one whole • Compare and order unit fractions, and fractions with same denominators • Solve problems that involve all of the above Learning sequence: • Understanding fractions as equal parts • Recognising and recapping halves, quarters and thirds • Unit and non-unit fractions – how to write them • Equivalent fractions • Comparing fractions – unit fractions • Comparing fractions – non-unit fractions • Ordering fractions • Adding fractions • Subtracting fractions • Understanding and counting in tenths	<u>Key concepts and facts</u> Concept of parts and a whole - Pupils should learn that when a whole is divided into equal parts, fraction notation can be used to describe the size of each equal part relative to the whole. Because it is the size of a part relative to the whole which determines the value of a fraction, it is important that pupils talk about, and identify, both the whole and the part from the start of their work on fractions. They should not begin, for example, by talking about '1 out of 3 parts' without reference to a whole. A clear understanding of unit fractions is the foundation for all future fractions concepts. Pupils should spend sufficient time working with unit fractions to achieve mastery before moving on to non-unit fractions. Pupils should learn that a non-unit fraction is made up of a quantity of unit fractions. They should practise using unitising language to describe, for example, 5 eighths as 5 one eighths (here, we are unitising in eighths). To add and subtract fractions, pupils must already understand that non-unit fractions are repeated additions of unit fractions, for example, three-eighths is 3 one-eighths. In other words, pupils must have begun to unitise with unit fractions in the same way that they learnt to unitise, for example, in tens (30 is 3 tens). Addition and subtraction of fractions with the same denominator then follows logically: just as pupils learnt that 3 tens plus 2 tens is 5 tens, they can reason that 3 one-eighths plus 2 one-eighths is equal to 5 one eighths.	Children should already be able to recognise halves, quarters and thirds and be able to write simple fractions. They should review this and build upon it when being introduced to other fractions. Children will be able to calculate simple fractions of amounts. They will understand the equivalence of 2/4 and ½ and should use this as the basis to explore other equivalent fractions.

			<u>Vocabulary</u> Fraction, Unit fraction, Non-unit fraction, Numerator, Denominator, Equivalent, Compare, Greater than, less than, Tenth, one whole, names of a range of fractions	

<u>Summer 1:</u>

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3	Geometry	Objectives from the national curriculum: • Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them • 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 hour 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 Learning sequence: • Turns and angles • Right angles in shapes • Comparing angles • Horizontal and vertical lines • Parallel and perpendicular lines • Recognise and describe 2D shapes • Drawing shapes accurately • Recognise and describe 3D shapes • Make 3D shapes	<u>Key concepts and facts</u> Concept of an angle being where two straight lines meet. Pupils should recognise that a right angle is the 'amount of turn' between 2 lines, and is independent of the length of those lines. Parallel lines are always the same distance apart. They will never meet no matter how far we extend them. Perpendicular lines are at right angles to each other. <u>Vocabulary</u> Horizontal, Vertical, Perpendicular, Parallel, Face, Edge, Vertex (Vertices), Cube, Cuboid, Prism, Cylinder, Pyramid, Cone, Sphere, Square, Rectangle, Triangle, Circle, Polygon, Hexagon, Pentagon, Octagon, Decagon, symmetry, symmetrical, angle, turn, degrees, right angle, acute, obtuse, clockwise, anti-clockwise, quarter turn, half turn, three-quarter turn.	Children will be able to recognise a variety of 2D and 3D shapes in different sizes and orientations. They will be secure with language to describe shapes, such as: sides, edges, faces and vertices. They will have an understanding of lines in a shape as sides and angles as vertices but and should review this before learning the types of lines and being introduced to the concept of an angle.
4	Money	Objectives from the national curriculum: • Add and subtract amounts of money to give change, using both £ and p in practical contexts Learning sequence: • Counting money and making different amounts • Pounds and pence • Converting pounds and pence	<u>Key concepts and facts</u> Calculating complements to 100 is an important skill for calculating how much change is due when paying for an item. When pupils calculate complements (the amount needed to complete a	At this stage, they will use money in pounds and pence and not decimal notation – this will be introduced in Year 4. Children will be aware of all coin and note denominations and be

5		• Adding money • Subtracting money • Giving change • Problem solving with money	total), a common error is to end up with a total that is too large: • When calculating complements to 100, pupils typically make an extra 'unit' of 10, making 110 instead of 100. It is important for pupils to spend time specifically learning about calculating complements, including the risk of creating 'extra units'. This should begin in year 3, with calculating complements to 100 <u>Vocabulary</u> Money, Coin, Change, Note, pound, pence, decimal,	able to find different combinations of coins that make the same value. They will draw upon methods of addition and subtraction. They will be aware of giving change in simple contexts
6				

Summer 2:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2	Mass and Capacity	Objectives from the national curriculum: • Measure, compare, add and subtract: mass (kg/g); volume/capacity (l/ml) Learning sequence: • Measuring mass in g • Measuring mass in kg • Comparing mass • Adding and subtracting mass • Measuring capacity in ml • Measuring capacity in l • Comparing capacity • Adding and subtracting capacity	Key concepts and facts By the end of year 3, pupils must be able to divide 100 into 2, 4, 5 or 10 equal parts. This is important because these are the intervals commonly found on measuring instruments and graph scales. Vocabulary Mass, weight, volume, capacity, grams, kilograms, litres, millilitres	Children will be aware of standard units of measuring mass and capacity and can apply methods of addition and subtraction. They will be secure with the language for comparing measures.
3 4 5 6 7	Time	Objectives from the national curriculum: • Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12 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, am/pm, 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 Learning sequence: • Understanding seconds and minutes • Understanding minutes and hours • Understanding hours and days • Understanding days and months • Understanding months and years • Recap telling the time to the nearest 5 minutes • Telling the time to the nearest minute – *this step may need up to and over a week to secure for all learners whilst tasks promoting depth are provided for children who are secure.* • Telling the time on a roman numeral clock • Using am and pm • 24 hour clock • Finding the duration • Comparing the duration • Start and end times	Key concepts and facts Different measurements of time: days, months, years, weeks, hours, minutes, seconds Concept of am and pm and this relating to the 24 hour clock. Vocabulary Analogue, 12-hour, 24-hour, o'clock, Morning, Afternoon, Noon, am, pm, Midnight, Second, Minute, Hour, Day, Week, Month, Year, Leap year, Roman Numeral	Children will be able to tell and write the time to five minute intervals and be secure with o'clock, half past and quarter to/past They will be able to recall simple facts such as number of minutes in an hour and hours in a day

Vocabulary:

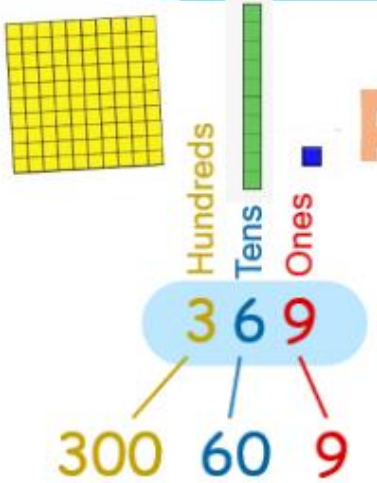
Number and place value	Addition and subtraction	Multiplication and division	Fractions and decimals	Geometry	Measures	Statistics
Place value, Digit, thousands, Hundreds, Tens, Ones, Estimate, Number line, more, less, Scale, multiple, partition, order, greater than, less than, names of all numbers up to 1000.	Calculation, Calculate, Addition, Subtraction, Sum, Total, Difference, Minus, Less, place value column, Exchange, Operation, Estimate, Inverse, Operation, partition, digit	Calculation, Calculate, Multiplication table, Times table, Multiply, Multiplication, Times, Product, Commutative, Divide, Division, Inverse, Operation, Estimate, scale, shared equally, array	Fraction, Unit fraction, Non-unit fraction, Numerator, Denominator, Equivalent, Compare, Greater than, less than, Tenth, one whole, names of a range of fractions	Horizontal, Vertical, Perpendicular, Parallel, Face, Edge, Vertex (Vertices), Cube, Cuboid, Prism, Cylinder, Pyramid, Cone, Sphere, Square, Rectangle, Triangle, Circle, Polygon, Hexagon, Pentagon, Octagon, Decagon, symmetry, symmetrical, angle, turn, degrees, right angle, acute, obtuse, clockwise, anti-clockwise, quarter turn, half turn, three-quarter turn.	Money, Coin, Change, Note, pound, pence, decimal, Length, distance, Mass, Volume, Capacity, Metre, centimetre, millimetre, Kilogram, gram, Litre, millilitre, Perimeter, Analogue, 12-hour, 24-hour, o'clock, Morning, Afternoon, Noon, am, pm, Midnight, Second, Minute, Hour, Day, Week, Month, Year, Leap year, Roman Numeral	Data, Pictogram, Symbol, Key, Tally, Bar chart, Table, Total, Compare, Axis, scale

Key facts:

Stuff you need to know

YEAR 3

Place value and counting



Finding 10 or 100 more or less than a number

H	T	O
3	4	2

Find one hundred less – take one away from the hundreds column

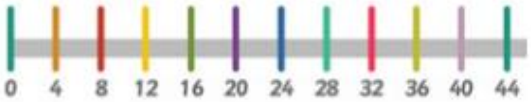
H	T	O
2	4	2

Find one hundred more – add one into the hundreds column

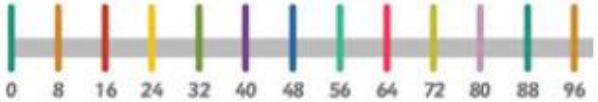
Find ten less – take one away from the tens column

Find ten more – add one into the tens column

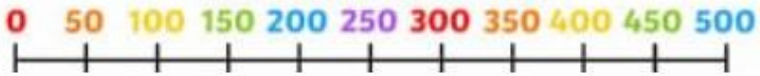
Counting in 4s



Counting in 8s



Counting in 50s

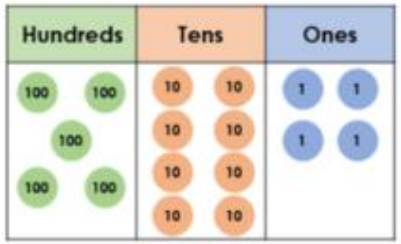


Ordering numbers

H	T	O
6	3	5
2	7	9
5	6	4

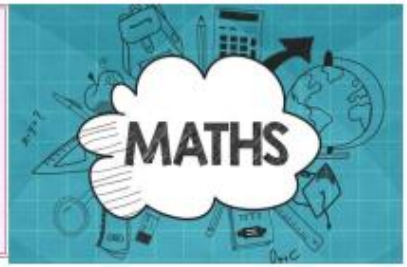
Children will be encouraged to put them in a place value grid so they can compare and decide which is biggest.

Add and Subtract mentally



- A 3-digit number and ones—add or take away from the ones column
- A 3-digit number and tens—add or take away from the tens column
- A 3-digit number and hundreds—add or take away form the hundreds column

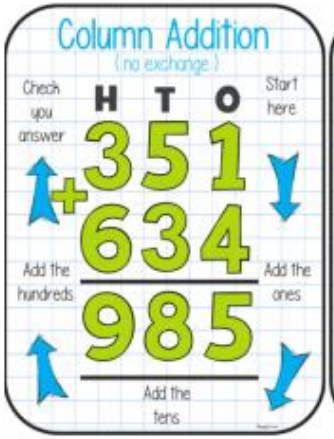
Careful—you may need to cross over some columns!

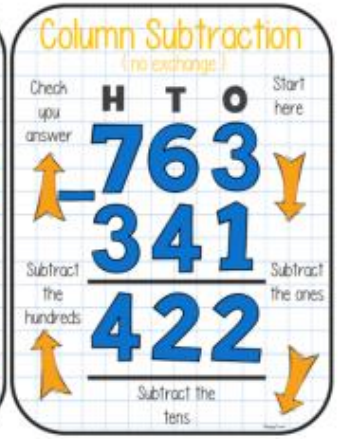


Stuff you need to know

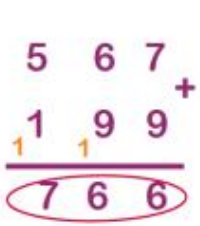
YEAR 3

Column addition and subtraction





Children will start with mental addition and use lots of resources to help them work out calculations before progressing to recording their working using column methods. They will also start to exchange using this method. They will not go above 3 digit numbers

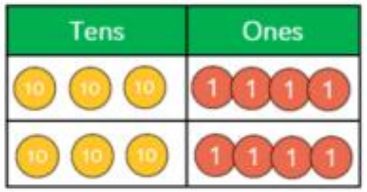


How to check answers using the inverse (the opposite)

Multiplication and division facts linked to the 3, 4 and 8 times tables

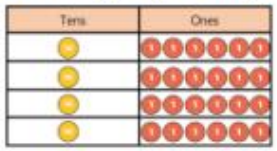
The THREE Times Table		
3 x 0 = 0	0	0 ÷ 3 = 0
3 x 1 = 3	3	3 ÷ 3 = 1
3 x 2 = 6	6	6 ÷ 3 = 2
3 x 3 = 9	9	9 ÷ 3 = 3
3 x 4 = 12	12	12 ÷ 3 = 4
3 x 5 = 15	15	15 ÷ 3 = 5
3 x 6 = 18	18	18 ÷ 3 = 6
3 x 7 = 21	21	21 ÷ 3 = 7
3 x 8 = 24	24	24 ÷ 3 = 8
3 x 9 = 27	27	27 ÷ 3 = 9
3 x 10 = 30	30	30 ÷ 3 = 10
3 x 11 = 33	33	33 ÷ 3 = 11
3 x 12 = 36	36	36 ÷ 3 = 12

Multiplying



	T	O
	3	4
×		2
	6	8

Children will explore multiplication up to 2 digits x 1 digit working with resources and counters first. They will then move on to recording it in these written methods. They will explore exchange like the example below.

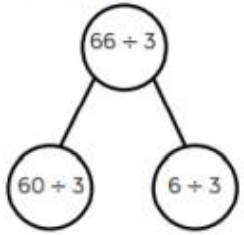


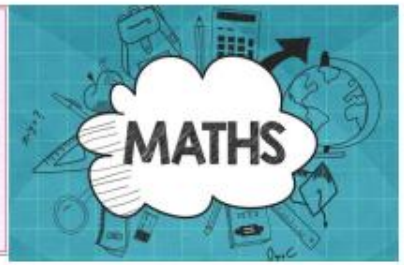
	T	O
	1	6
×		4
	6	4

2

Dividing

Children will partition the number and then divide each part using division facts that they know from their times tables





Times tables you need to know

YEAR 3

2 times table	3 times table	4 times table	5 times table	8 times table	10 times table
1 x 2 = 2	1 x 3 = 3	1 x 4 = 4	1 x 5 = 5	1 x 8 = 8	1 x 10 = 10
2 x 2 = 4	2 x 3 = 6	2 x 4 = 8	2 x 5 = 10	2 x 8 = 16	2 x 10 = 20
3 x 2 = 6	3 x 3 = 9	3 x 4 = 12	3 x 5 = 15	3 x 8 = 24	3 x 10 = 30
4 x 2 = 8	4 x 3 = 12	4 x 4 = 16	4 x 5 = 20	4 x 8 = 32	4 x 10 = 40
5 x 2 = 10	5 x 3 = 15	5 x 4 = 20	5 x 5 = 25	5 x 8 = 40	5 x 10 = 50
6 x 2 = 12	6 x 3 = 18	6 x 4 = 24	6 x 5 = 30	6 x 8 = 48	6 x 10 = 60
7 x 2 = 14	7 x 3 = 21	7 x 4 = 28	7 x 5 = 35	7 x 8 = 56	7 x 10 = 70
8 x 2 = 16	8 x 3 = 24	8 x 4 = 32	8 x 5 = 40	8 x 8 = 64	8 x 10 = 80
9 x 2 = 18	9 x 3 = 27	9 x 4 = 36	9 x 5 = 45	9 x 8 = 72	9 x 10 = 90
10 x 2 = 20	10 x 3 = 30	10 x 4 = 40	10 x 5 = 50	10 x 8 = 80	10 x 10 = 100
11 x 2 = 22	11 x 3 = 33	11 x 4 = 44	11 x 5 = 55	11 x 8 = 88	11 x 10 = 110
12 x 2 = 24	12 x 3 = 36	12 x 4 = 48	12 x 5 = 60	12 x 8 = 96	12 x 10 = 120

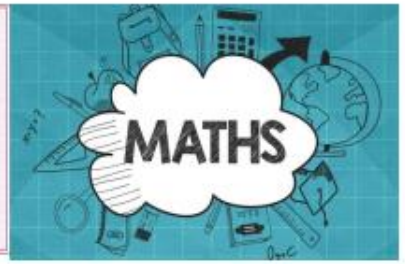
Do you know them inside out, back to front and in a random order? How quickly can you write them down? Can you spot any patterns to help you remember?

Use your times tables to work out inverse division facts by swapping the numbers around

4 x 5 = 20

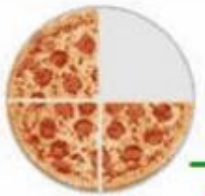
20 ÷ 5 = 4

20 ÷ 4 = 5



Fractions you need to know

YEAR 3



$\frac{3}{4}$

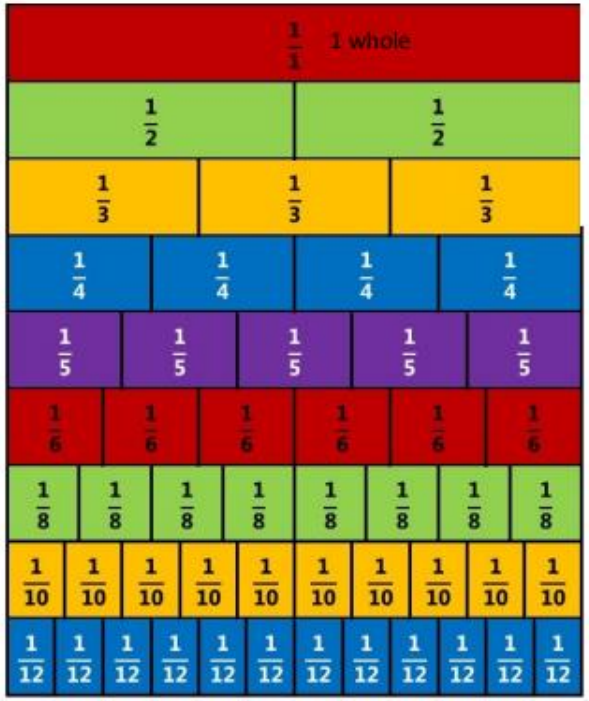
3 ← Numerator — The number of parts you have

4 ← Denominator — The number of parts that the whole is divided into

Adding and subtracting fractions

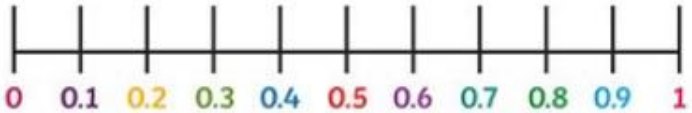
$$\frac{3}{7} + \frac{2}{7} = \boxed{\frac{5}{7}}$$

The denominator will stay the same—add or subtract the numerator.



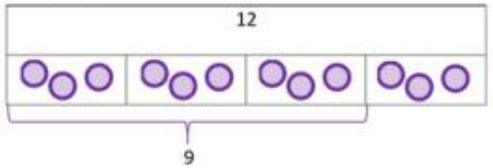
Counting up and down in tenths

$\frac{0}{10}$ $\frac{1}{10}$ $\frac{2}{10}$ $\frac{3}{10}$ $\frac{4}{10}$ $\frac{5}{10}$ $\frac{6}{10}$ $\frac{7}{10}$ $\frac{8}{10}$ $\frac{9}{10}$ $\frac{10}{10}$



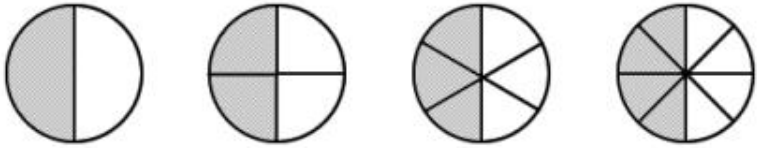
Fractions of amounts

¾ of 12



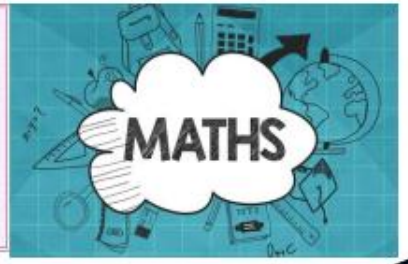
Equivalent fractions

Can you find any more equivalent fractions from the fraction wall?



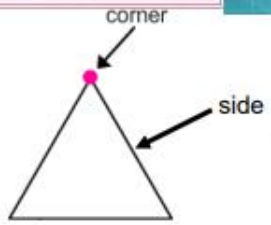
$\frac{1}{2}$ $\frac{2}{4}$ $\frac{3}{6}$ $\frac{4}{8}$

Fractions with different numerators and denominators can have the SAME VALUE. We call these equivalent fractions.



Shapes you need to know

YEAR 3



2D

Can you count the corners and sides on each 2D shape? Can you find any around your home?


Square


Rectangle


Triangle


Circle

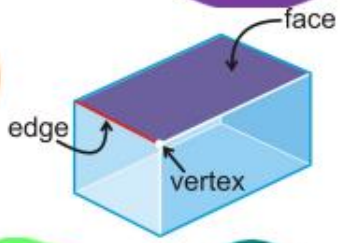

Pentagon


Hexagon


Octagon

3D

Can you count the faces, vertices and edges on each 3D shape? Can you find any around your home?




Cuboid


Cube


Sphere


Pyramid


Cylinder


Cone

Lines

Vertical

Straight line up and down

Horizontal

Straight line left and right

Parallel


Lines that will never meet and are always the same distance apart.

Perpendicular

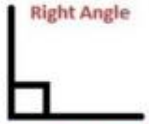

Lines that meet at a right angle (90°)

Angles

Acute Angle

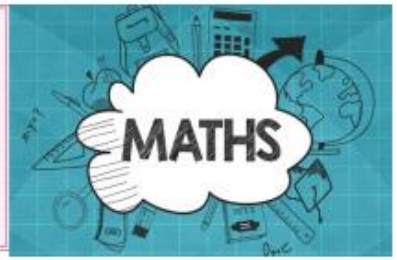

Less Than 90 Degree

Right Angle


Exact 90 Degree

Obtuse Angle

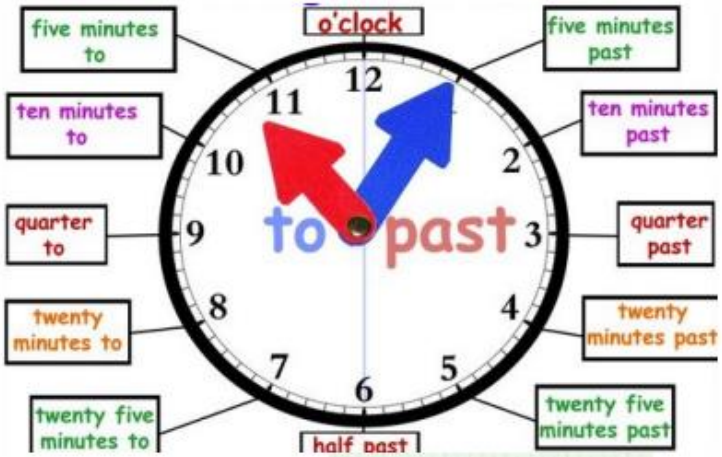

Greater than 90 degree and less than 180 degree.



Stuff you need to know

YEAR 3

Telling the time to the nearest minute



Days in each Month

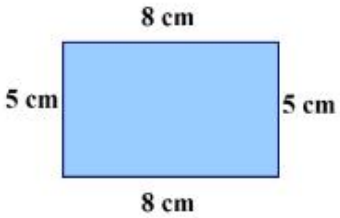
JANUARY	31
FEBRUARY	28/29
MARCH	31
APRIL	30
MAY	31
JUNE	30
JULY	31
AUGUST	31
SEPTEMBER	30

60 seconds = 1 minute
60 minutes = 1 hour

30 days have September, April, June and November.
All the rest have 31 except February alone which has but 28 days clear and 29 in each Leap Year

Perimeter

Is the distance all the way around the outside of a 2D shape.



To find the perimeter, add up all the sides.

P = 8 + 5 + 8 + 5 = 26cm

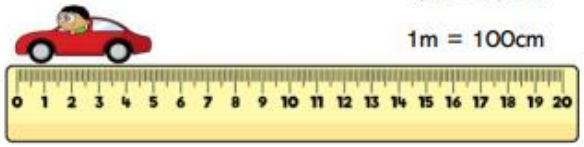
Why not practise measuring things around your home or telling the time at different points throughout the day?

Measures

Length can be measured in millimetres, centimetres and metres.

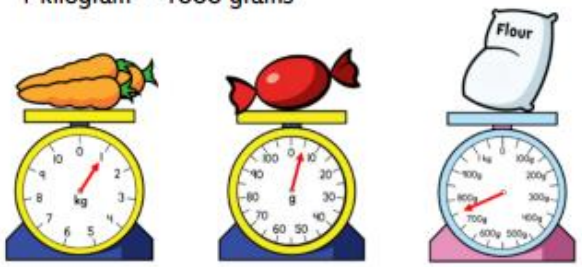
1cm = 10mm

1m = 100cm



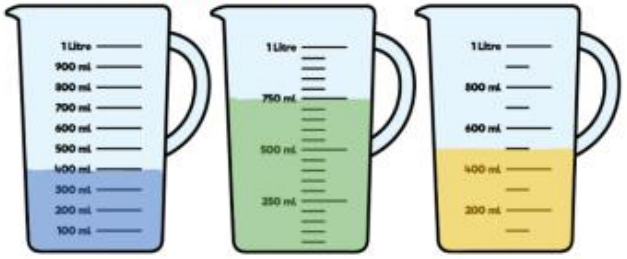
Mass can be measured in grams and kilograms

1 kilogram = 1000 grams



Volume of liquid can be measured in millilitres and litres.

1 litre = 1000 millilitres



Mathematics Curriculum – Year 4

Autumn 1:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3 4	Place Value	Objectives from the national curriculum: • Count in multiples of 6,7,9,25 and 1000 • Find 1000 more or less than a given number • Count backwards through zero to include negative numbers • Recognise the place value of each digit in a four-digit number • 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 • 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 Learning sequence: • Representing numbers to 1000 • Understanding 100s, 10s and 1s – partitioning numbers • Number line to 1000 • Understanding 1000s 100s 10s and 1s • Partitioning and representing numbers to 10,000 • Flexible partitioning • Finding 1, 10, 100 or 1000 more or less • Number line to 10,000 • Comparing numbers • Ordering numbers • Roman numerals to 100 • Rounding to the nearest 10 – using a number line • Rounding to the nearest 100 – using a number line • Rounding to the nearest 1000 • Counting in 25s • Negative numbers	<u>Key concepts and facts</u> The concept of place value – that ten hundreds are equivalent to one thousand, ten tens are equivalent to one hundred and ten ones are equivalent to one ten. Fluency in a range of representations and orders  Rounding as a concept – determining which multiple of XX a number is closest to by placing it on a number line. Negative numbers as a concept – the understanding that the number system can go below zero. Roman numerals – how our place value system has evolved to include the concept of zero. <u>Vocabulary</u> Place value, digit, thousands, hundreds, tens, ones, zero, roman numeral, estimate, number line, scale, multiple, more, less, decimal place, greater than, less than, place holder, rounding, order, ascending order, descending order	Pupils will understand the concept of a multiple and counting in in multiples They will be secure in place value up to 3 digits and ordering and representing numbers Pupils will be aware of roman numerals up to 12 from Year 3 time curriculum Rounding is a brand new concept in Year 4 but can be related to understanding of number lines and approximation at first

			"twenty-five, fifty, seventy-five, one hundred needs to be a fluent spoken language pattern"	
5 6 7	Addition and Subtraction	Objectives from the national curriculum: • 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 Learning sequence: • Adding and subtracting 1s, 10s, 100s and 1000s • Adding two 4-digit numbers – no exchange • Adding two 4-digit numbers – one exchange • Adding two 4-digit numbers – more than one exchange • Subtract two 4-digit numbers – no exchange • Subtract two 4-digit numbers – one exchange • Subtract two 4-digit numbers – more than one exchange • Efficient addition and subtraction – range of digits up to 4 • Estimating answers • Checking strategies and the inverse	<u>Key concepts and facts</u> Concept of exchange – draw upon knowledge of place value columns and how ten ones is equal to one ten and so on. Application of place value and basic facts, including number bonds, should be encouraged to reach the most efficient method. Concept of the inverse and the relationship between addition and subtraction to be explored here. <u>Vocabulary</u> addition, subtraction, sum, total, difference, minus, less, plus, altogether, column addition, column subtraction, exchange, operation, estimate, equal, method, inverse, calculation	Despite the emphasis being upon column method, pupils continue to select and use mental methods and the use of a number line where appropriate Pupils will understand the concept of the inverse and have experience of column methods to build upon

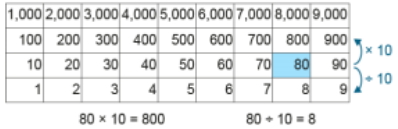
<u>Autumn 2:</u>

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3	Length and perimeter	Objectives from the national curriculum: • Convert between different units of measure. For example, kilometre to metre • Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres Learning sequence: • Equivalent lengths – m and cm • Equivalent lengths – mm and cm • Kilometres • Adding lengths • Subtracting lengths • Measuring perimeter • Perimeter on a grid • Perimeter of a rectangle • Perimeter of rectilinear shapes	<u>Key concepts and facts</u> 100cm = 1 metre 10mm = 1cm 1000m = 1 kilometre Measures may need to be converted to add and subtract them more efficiently Concept of perimeter – the length around the outside of a 2D shape Rectilinear shape = shapes where all sides meet at right angles <u>Vocabulary</u>	Pupils will have prior understanding of the concept of perimeter from Year 3 They will apply methods of mental and written addition and subtraction to lengths Properties of 2D shapes can be applied to make calculating perimeter more efficient e.g. knowing opposite sides on a rectangle are the same

<table>
<tr><td></td><td></td><td></td><td>Perimeter, Dimensions, Square, Rectangle, Rectilinear, Millimetre, Centimetre, Metre, Kilometre</td><td></td></tr>
<tr><td>4
5
6
7
8</td><td>Multiplication and division</td><td>Objectives from the national curriculum:
• Find the effect of dividing a one or two-digit number by 10 and 100
• Recall multiplication and division facts for multiplication tables up to 12 x 12
• Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together 3 numbers
• Recognise and use factor pairs and commutativity in mental calculations
Learning sequence:
• Multiply by 10
• Multiply by 100
• Divide by 10
• Divide by 100
• Multiply by 1 and 0
• Divide by 1 and itself
• Multiply and divide by 3 – the three times table
• Multiply and divide by 6
• the 6 times table and division facts
• Multiply and divide by 9
• the 9 times table and division facts
• 3, 6 and 9 times tables
• Multiply and divide by 7
• the 7 times table and division facts
• 11 times table and division facts
• 12 times table and division facts
• Multiply 3 numbers
• Factor pairs</td><td><u>Key concepts and facts</u>
Concept of commutativity – 3 x 4 is equal to 4 x 3 and multiplication can be done in any order.

Concept of an array to represent a multiplication fact which can also link to a division fact

Inverses of times tables will give corresponding division facts

Use of a Gattegno chart to understand the place value links when multiplying and dividing by 10 and 100
 

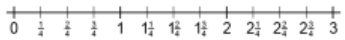
<u>Vocabulary</u>
Place value, Multiply, Multiplication, Times, Product, Commutative, Divide, Division, Tenth, Hundredth, Factor, Factor pairs, multiplication facts, division facts, Operation, Estimate, multiple, scaling, correspondence, shared equally, array</td><td>Pupils will have a secure understanding of place value for dividing by 10 and 100. Not to go into decimals at this point.

Pupils will have spent Autumn term 1 consolidating the 3, 4 and 8 times tables from Year 3 and the 2, 5 and 10 times tables from Year 2 in preparation for direct teaching of the remaining tables in this unit.</td></tr>
</table>

Spring 1:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3	Multiplication and division methods	Objectives from the national curriculum: • 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 numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects. Learning sequence: • Multiply 2- digits by 1-digit – no exchange • Multiply 2-digits by 1-digit - exchange • Multiply 3 digits by 1-digit • Divide 2 digits by 1-digit – no remainders • Divide 2 digits by 1-digit – exploring remainders • Divide 3-digits by 1-digit • Correspondence problems	<u>Key concepts and facts</u> The concept of a remainder as something 'left over' in a division calculation. Understanding that the remainder will always be less than what you're dividing by. Pupils should rely on the recall of times tables to link to related division facts and determine remainders. Concept of scaling as enlarging or reducing e.g.  <u>Vocabulary</u> Place value, Multiply, Multiplication, Times, Product, Commutative, Divide, Division, Tenth, Hundredth, Factor, Factor pairs, multiplication facts, division facts, Operation, Estimate, multiple, scaling, correspondence, shared equally, array	Pupils will understand the concepts of multiplication and division through grouping and sharing and will continue to extend this using concrete manipulatives before recording in a formal written layout for multiplication
4 5	Area	Objectives from the national curriculum: • Find the area of rectilinear shapes by counting squares Learning sequence: • Understanding area • Counting squares • Making shapes • Comparing area	<u>Key concepts and facts</u> Concept of area – the measurement of the space inside a shape. Understanding of why centimetre squares is the best unit of measurement. Rectilinear shape is where all sides meet at right angles. <u>Vocabulary</u> Perimeter, Area, Dimensions, Square, Rectangle, Rectilinear, Millimetre, Centimetre, Metre, Kilometre	Relate area to arrays and multiplication covered last term Children will have prior knowledge of rectilinear shapes from perimeter last term. Recap perimeter

Spring 2:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3 4	Fractions	Objectives from the national curriculum: • Recognise and show, using diagrams, families of common equivalent fractions • 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 Learning sequence: • Recapping unit and non-unit fractions and what a fraction represents • Understanding equivalent fractions in the concrete • Finding equivalent fractions • Fractions greater than 1 • Counting in fractions on a number line • Adding fractions • Adding 2 or more fractions • Subtracting fractions • Subtract 2 fractions • Subtracting from the whole • Fractions of a set of objects • Calculating fractions of a quantity • Problem solving – calculating quantities	<u>Key concepts and facts</u> A fraction representing part of a number. The concept of a denominator representing how many parts make a whole and the numerator representing how many of those parts you have. Concept of a mixed number and how they fit into the linear number system  <u>Vocabulary</u> Place value, Tenth, hundredth, Decimal, equivalent, fraction, decimal point, rounding, decimal place, Numerator, Denominator, Unit fraction, non-unit fraction, whole, mixed number	Pupils will have prior knowledge of equivalent fractions and adding and subtracting fractions within one whole from Year 3. Knowledge of how fractions are written and what the numerator and denominator represents should be used as a starting point for finding a fraction of an amount
5 6	Statistics	Objectives from the national curriculum: • 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 Learning sequence: • Interpreting bar charts • Comparison, sum and difference of bar charts and pictograms • Introducing line graphs • Solving comparison, sum and difference using line graphs	<u>Key concepts and facts</u> Concept of a graph or chart as a way of presenting data and that certain graphs or charts are more efficient for different sets of data. Concept of a line showing change over time. <u>Vocabulary</u> Data, pictogram, symbol, key, tally, bar chart, time graph, scale, axis, graph, frequency, line, plot, sum, difference, table, discrete data, continuous data	Pupils will be familiar with bar charts, pictograms and tables from the Year 3 curriculum. They will have an understanding of simple scales in bar charts and pictograms

Summer 1:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3 4	Decimals	Objectives from the national curriculum: • Count up and down in hundredths, recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten • Recognise and write decimal equivalents of any number of tenths or hundredths • Recognise and write decimal equivalents to ¼ ½ and ¾ • 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 • Round decimals with one decimal place to the nearest whole number • Compare numbers with the same number of decimal places up to 2 decimal places Learning sequence: • Recognise tenths and hundredths • Tenths as decimals • Tenths on a place value grid • Tenths on a number line • Divide 1-digit by 10 • Divide 2-digits by 10 • Hundredths • Hundredths as decimals • Hundredths on a place value grid • Divide one or two-digits by 100 • Writing decimals • Comparing decimals • Ordering decimals • Rounding decimals • Halves and quarters as decimals	Key concepts and facts The concept of place value beyond the decimal point. That ten tenths will make a whole one, ten hundredths will make a tenth and one hundred hundredths will make a whole one. Vocabulary Place value, Tenth, hundredth, Decimal, equivalent, fraction, decimal point, rounding, decimal place, whole	In Autumn term, pupils divided by 10 and 100 so will understand the concept of place value and how this is linked. Pupils built understanding of tenths in Year 3 Decimal notation is mostly new learning here
5 6	Money	Objectives from the national curriculum: • 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 Learning sequence: • Pounds and pence • Ordering money • Estimating money • Four operations with money	Key concepts and facts 100 p = £1 Can be written with decimal notation e.g. £1 and 24p can be £1.24 equivalent amounts can be made with different denominations of coins and notes. Vocabulary	Build upon understanding of decimals developed in the previous unit to record and calculate using money. Pupils build upon Year 3 objectives of adding and subtracting money and giving change.

		• Problem solving with money	estimate, compare, calculate, money, pounds, pence	

Summer 2:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2	Time	Objectives from the national curriculum: • 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 and weeks to days. Learning sequence: • Recapping telling time to the nearest minute • Using am and pm • 24 hour clock • Hours, minutes and seconds • Days, weeks, months and years • Analogue to digital • Analogue to digital – 12 hour clock • Analogue to digital – 24 hour clock	Key concepts and facts Am and pm and the difference between them. 60 seconds = 1 minute 60 minutes – 1 hour 24 hours = 1 day 7 days = 1 week 12 months = 1 year 365 days = 1 year Concept of the 24 hour clock showing the whole day and the 12 hour clock showing half of a day Vocabulary Analogue, Digital, 12-hour, 24-hour, Second, Minute, Hour, Day, Week, Month, Year,	Pupils can read time to the nearest minute from year 3 Pupils should recall facts from the year 3 curriculum of seconds in a minute and days in a month
3 4 5	Geometry	Objectives from the national curriculum: • Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes. • Identify acute and obtuse angles and compare and order angles up to two right angles • Identify lines of symmetry in 2D shapes presented in different orientations • Complete a simple symmetric figure with respect to a specific line of symmetry Learning sequence: • Identifying angles • Comparing and ordering angles • Recognising and describing 2D shapes • Types of triangles • Classifying types of triangles • Types of quadrilaterals • Classifying types of quadrilaterals • Understanding symmetry • Lines of symmetry	Key concepts and facts Angles – where two straight lines meet Symmetry – a line of symmetry splits a shape into two equal parts which are a mirror image of each other. Multiple lines of symmetry may exist on one shape and will still be there regardless of the orientation. Vocabulary Symmetry, Line of symmetry, Mirror line, Reflect, Reflection, Perpendicular, Parallel, Vertex (Vertices), Side, Edge, Quadrilateral, Square, Rectangle,	Pupils classified shapes in year 3 and will be familiar with shape names and vocabulary Pupils will understand turns, angles and right angles from year 3 Horizontal and vertical lines from year 3 to be recapped when starting lines of symmetry

		• Completing a symmetric figure	Parallelogram, Trapezium, Kite, Rhombus Triangle, Scalene, Right-angled, Isosceles, Equilateral Polygon, Hexagon, Pentagon, Octagon, Decagon Circle, Angle, Right angle, Acute angle, Obtuse angle, degrees,	
6 7	Position and direction	Objectives from the national curriculum: • Describe positions on a 2D gird as coordinates in the first quadrant. • Describe movements between positions as translations of a given unit to the left/right and up/down • Plot specified points and draw sides to complete a given polygon Learning sequence: • Describing a position • Drawing on a grid • Moving on a grid • Describing movement on a grid	<u>Key concepts and facts</u> Concept of a quadrant, axis and origin being the basis of coordinate geometry. Concept of translation being a movement where the shape does not change. Coordinate notation (x-axis, y-axis) <u>Vocabulary</u> Axis, axes, x-axis, y-axis, Origin, (First) quadrant, coordinates, Point, Translation, Transformation, Left, right, up, down	Pupils should already be able to join points accurately using a ruler to form a polygon. Language of up/down and left/right should be secure from KS1

<u>Times table strategy:</u>

Pupils will spend 15 minutes daily on times tables. They will spend Autumn 1 securing times tables from Y2 and Y3 in preparation for direct teaching of the 6,7,9,11 and 12 times tables in Autumn 2. This means that spring term will be spent recapping and practising all taught times tables with a focus of one per week. Summer term will focus on random and rapid recall in preparation for the MTC at the end of this year.

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Recapping 5 and 10 TT Recapping 2, 4 and 8 TT Recapping 3 times table	Recapping 3 TT Direct teaching of 6 TT Direct teaching of 9 TT Direct teaching of 7 TT Direct teaching of 11 TT Direct teaching of 12 TT	Recapping 2, 4 and 8 TT Recapping of 3, 6 and 9	Recapping of 7 TT Recapping of 11TT Recapping of 12 TT Recap of any other times table needed by cohort.	Focus on random and rapid recall of all times tables in preparation for the MTC	Consolidation and gap filling dependent upon cohort

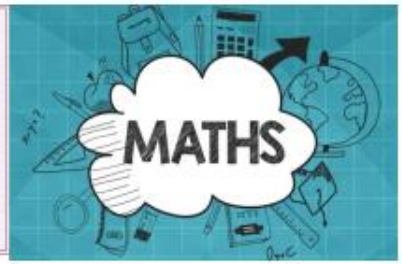
For pupils who do not have automatic recall of all facts by the MTC, fluency in facts up to 9 x 9 should be prioritised as important for progression into Year 5 as they are required for formal written multiplication and division. The 36 multiplication facts required for formal written multiplication are:

2×2							
3×2	3×3						
4×2	4×3	4×4					
5×2	5×3	5×4	5×5				
6×2	6×3	6×4	6×5	6×6			
7×2	7×3	7×4	7×5	7×6	7×7		
8×2	8×3	8×4	8×5	8×6	8×7	8×8	
9×2	9×3	9×4	9×5	9×6	9×7	9×8	9×9

Vocabulary:

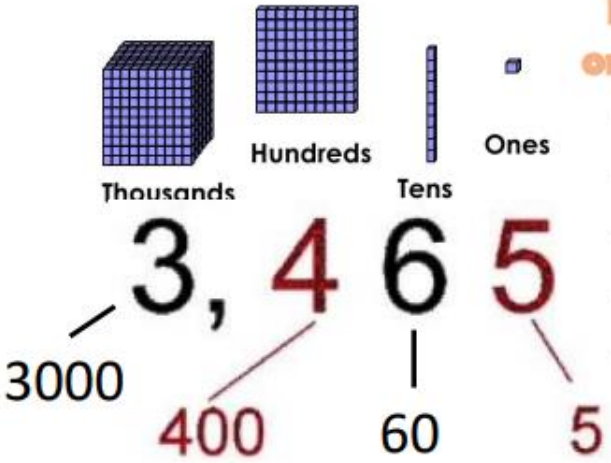
Number and place value	Addition and subtraction	Multiplication and division	Fractions, decimals and percentages	Geometry	Measures	Statistics
Place value, digit, thousands, hundreds, tens, ones, zero, roman numeral, estimate, number line, scale, multiple, more, less, decimal place, greater than, less than, place holder, rounding, order, ascending order, descending order	addition, subtraction, sum, total, difference, minus, less, plus, altogether, column addition, column subtraction, exchange, operation, estimate, equal, method, inverse, calculation	Place value, Multiply, Multiplication, Times, Product, Commutative, Divide, Division, Tenth, Hundredth, Factor, Factor pairs, multiplication facts, division facts, Operation, Estimate, multiple, scaling, correspondence, shared equally, array	Place value, Tenth, hundredth, Decimal, equivalent, fraction, decimal point, rounding, decimal place, Numerator, Denominator, Unit fraction, non-unit fraction, whole, mixed number	**Shape** Symmetry, Line of symmetry, Mirror line, Reflect, Reflection, Perpendicular, Parallel, Vertex (Vertices), Side, Edge, Quadrilateral, Square, Rectangle, Parallelogram, Trapezium, Kite, Rhombus Triangle, Scalene, Right-angled, Isosceles, Equilateral Polygon, Hexagon, Pentagon, Octagon, Decagon Circle, Angle, Right angle, Acute angle, Obtuse angle, degrees, **Position and direction** Axis, axes, x-axis, y-axis, Origin, (First) quadrant, coordinates, Point, Translation, Transformation, Left, right, up, down	Perimeter, Area, Dimensions, Square, Rectangle, Rectilinear, Millimetre, Centimetre, Metre, Kilometre Analogue, Digital, 12-hour, 24-hour, Second, Minute, Hour, Day, Week, Month, Year, estimate, compare, calculate, money, pounds, pence	Data, pictogram, symbol, key, tally, bar chart, time graph, scale, axis, graph, frequency, line, plot, sum, difference, table, discrete data, continuous data

Key facts:



Stuff you need to know

YEAR 4



Finding 1000 more or less than a number

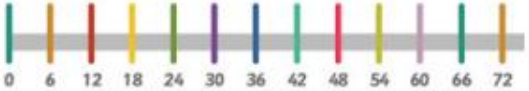
	TH	H	T	O
	6	6	7	8
	5	6	7	8
	4	6	7	8

Ordering numbers

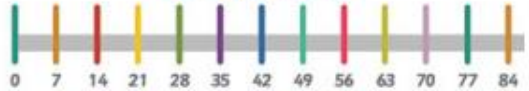
6,098 6,123 6,245

Children need to be able to place in order sets of numbers with up to 4 digits.

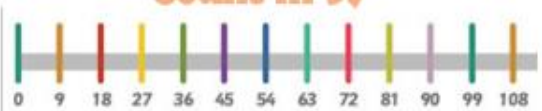
Count in 6s



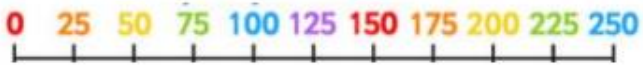
Count in 7s



Count in 9s



Count in 25s



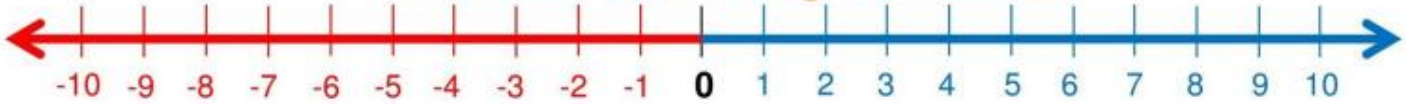
Know Roman Numerals up to 100

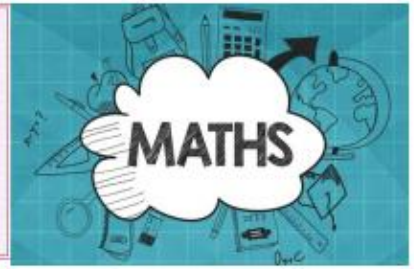
1	=	I	10	=	X
2	=	II	20	=	XX
3	=	III	30	=	XXX
4	=	IV	40	=	XL
5	=	V	50	=	L
6	=	VI	60	=	LX
7	=	VII	70	=	LXX
8	=	VIII	80	=	LXXX
9	=	IX	90	=	XC
			100	=	C

Rounding numbers

Children need to be able to say what any number is to the nearest 10, 100 or 1000. They will use a number line to represent the numbers and see which it is closest to. For example, 163 to the nearest 10.

Count backwards into negative numbers

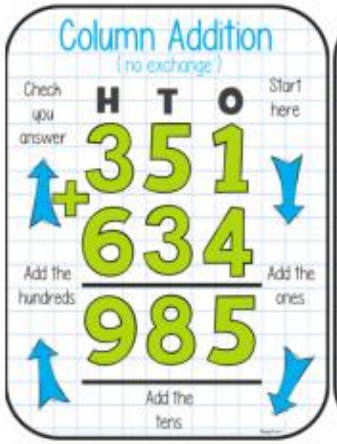


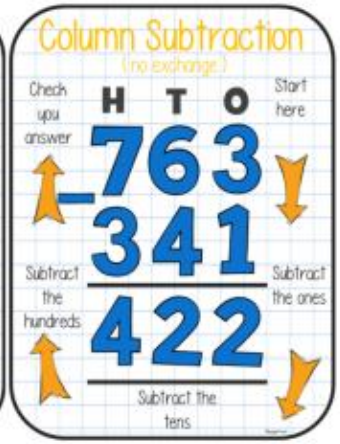


Stuff you need to know

YEAR 4

Use column addition and subtraction





With exchange

With up to 4 digit numbers

	Th	H	T	O
	3	3	5	6
+	2	4	3	5
	5	7	9	1
			1	

	Th	H	T	O
	5	6	~~4~~ 3	13
–	4	3	1	6
	1	3	2	7

How to check answers using the inverse (the opposite)

Multiplying

$0 \times 5 = 0$

$0 \times 0 = 0$

$57 \times 0 = 0$

Multiplying by zero will always be zero

Multiplying by 1 will always be whatever you multiplied it by.

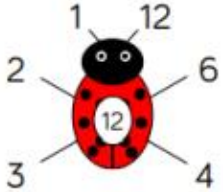
Multiplying 3 numbers together

$3 \times 2 \times 4 =$

$\boxed{3 \times 2} \times 4$

$= 6 \times 4 = 24$

This can be done in any order



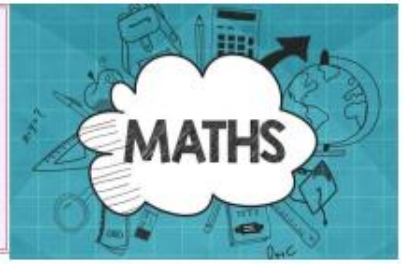
Factor pairs are pairs of numbers that multiply together to make a number

Start to use formal multiplication

	T	O
	3	4
×		2
	6	8

	H	T	O
	2	3	4
×			6
1	4	0	4
	2	2	

Up to 3 digits x 1 digit and including exchanging between the columns



Times tables you need to know

YEAR 4

2 times table	3 times table	4 times table	5 times table	6 times table	7 times table	8 times table
1 x 2 = 2	1 x 3 = 3	1 x 4 = 4	1 x 5 = 5	1 x 6 = 6	1 x 7 = 7	1 x 8 = 8
2 x 2 = 4	2 x 3 = 6	2 x 4 = 8	2 x 5 = 10	2 x 6 = 12	2 x 7 = 14	2 x 8 = 16
3 x 2 = 6	3 x 3 = 9	3 x 4 = 12	3 x 5 = 15	3 x 6 = 18	3 x 7 = 21	3 x 8 = 24
4 x 2 = 8	4 x 3 = 12	4 x 4 = 16	4 x 5 = 20	4 x 6 = 24	4 x 7 = 28	4 x 8 = 32
5 x 2 = 10	5 x 3 = 15	5 x 4 = 20	5 x 5 = 25	5 x 6 = 30	5 x 7 = 35	5 x 8 = 40
6 x 2 = 12	6 x 3 = 18	6 x 4 = 24	6 x 5 = 30	6 x 6 = 36	6 x 7 = 42	6 x 8 = 48
7 x 2 = 14	7 x 3 = 21	7 x 4 = 28	7 x 5 = 35	7 x 6 = 42	7 x 7 = 49	7 x 8 = 56
8 x 2 = 16	8 x 3 = 24	8 x 4 = 32	8 x 5 = 40	8 x 6 = 48	8 x 7 = 56	8 x 8 = 64
9 x 2 = 18	9 x 3 = 27	9 x 4 = 36	9 x 5 = 45	9 x 6 = 54	9 x 7 = 63	9 x 8 = 72
10 x 2 = 20	10 x 3 = 30	10 x 4 = 40	10 x 5 = 50	10 x 6 = 60	10 x 7 = 70	10 x 8 = 80
11 x 2 = 22	11 x 3 = 33	11 x 4 = 44	11 x 5 = 55	11 x 6 = 66	11 x 7 = 77	11 x 8 = 88
12 x 2 = 24	12 x 3 = 36	12 x 4 = 48	12 x 5 = 60	12 x 6 = 72	12 x 7 = 84	12 x 8 = 96

9 times table	10 times table	11 times table	12 times table
1 x 9 = 9	1 x 10 = 10	1 x 11 = 11	1 x 12 = 12
2 x 9 = 18	2 x 10 = 20	2 x 11 = 22	2 x 12 = 24
3 x 9 = 27	3 x 10 = 30	3 x 11 = 33	3 x 12 = 36
4 x 9 = 36	4 x 10 = 40	4 x 11 = 44	4 x 12 = 48
5 x 9 = 45	5 x 10 = 50	5 x 11 = 55	5 x 12 = 60
6 x 9 = 54	6 x 10 = 60	6 x 11 = 66	6 x 12 = 72
7 x 9 = 63	7 x 10 = 70	7 x 11 = 77	7 x 12 = 84
8 x 9 = 72	8 x 10 = 80	8 x 11 = 88	8 x 12 = 96
9 x 9 = 81	9 x 10 = 90	9 x 11 = 99	9 x 12 = 108
10 x 9 = 90	10 x 10 = 100	10 x 11 = 110	10 x 12 = 120
11 x 9 = 99	11 x 10 = 110	11 x 11 = 121	11 x 12 = 132
12 x 9 =108	12 x 10 = 120	12 x 11 = 132	12 x 12 = 144

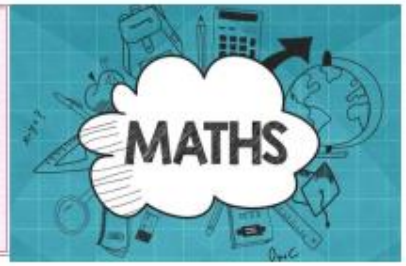
Use your times tables to work out inverse division facts by swapping the numbers around

4 x 5 = 20

20 ÷ 5 = 4

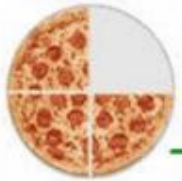
20 ÷ 4 = 5

Do you know them inside out, back to front and in a random order? How quickly can you write them down? Can you spot any patterns to help you remember?



Fractions you need to know

YEAR 4

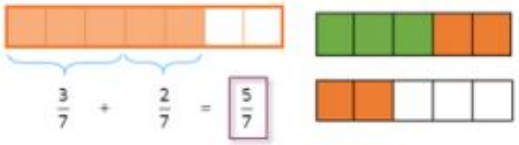


$\frac{3}{4}$

3 ← Numerator — The number of parts you have

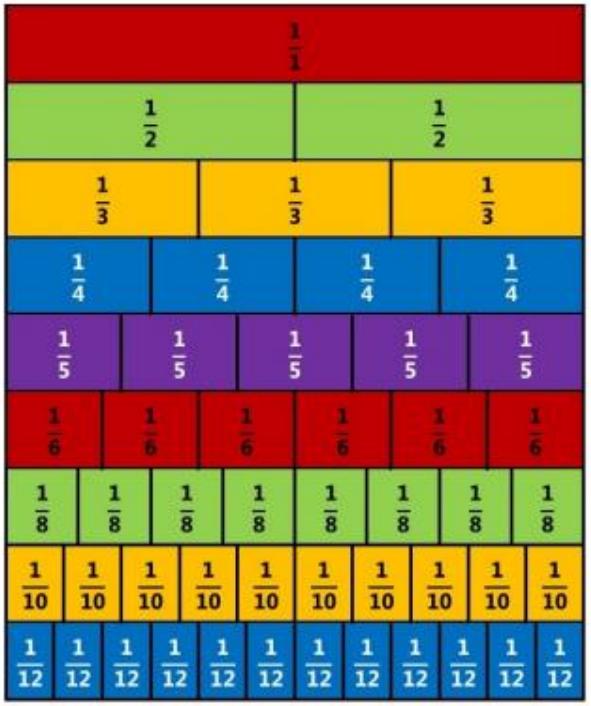
4 ← Denominator — The number of parts that the whole is divided into

Adding and subtracting fractions

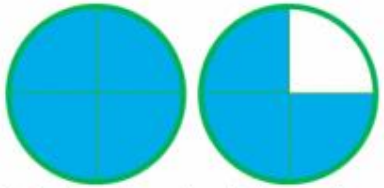


$\frac{3}{5} + \frac{4}{5}$

The denominator will stay the same and add or



Mixed numbers



$1\frac{3}{4}$

This is where there is a whole number and a fraction

Calculating a fraction of an amount

What are $\frac{4}{5}$ of £30?

£30

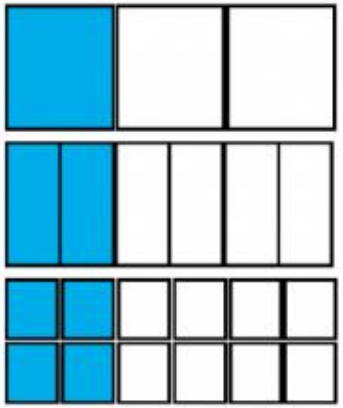
÷5

£6 £6 £6 £6 £6

x4

$\frac{4}{5}$ of £30 = £24

Equivalent fractions



$\frac{1}{3}$ $\frac{2}{6}$ $\frac{4}{12}$

Fractions with different numerators and denominators can have the SAME VALUE. We call these equivalent fractions.

Decimals you need to know

YEAR 4

Understand the tenths and hundredths columns and the position of the decimal point

Dividing by 10 and 100

Example 3,502 ÷ 100 = 35.02

TH	H	T	O		$\frac{1}{10}$	$\frac{1}{100}$
3	5	0	2	.		
		3	5	.	0	2

This

Becomes this

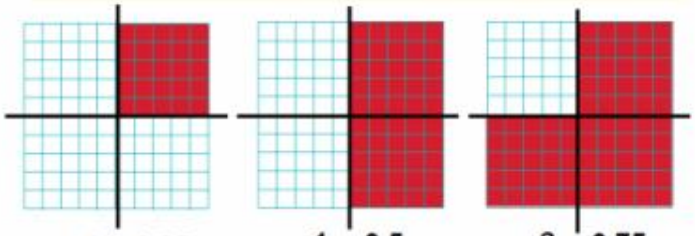
Round to the nearest whole number.

Tens . Tenths

1 4 . 5 → 15

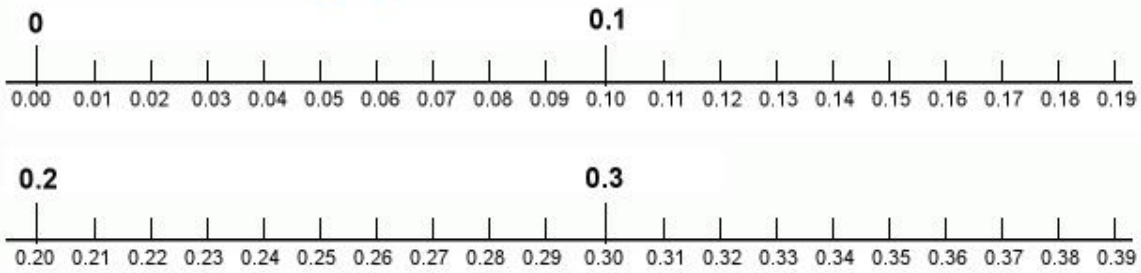
Know tenths, hundredths, quarters and a half as decimals

Fraction	Name	Decimal
1/10	One Tenth	0.1
2/10	Two Tenths	0.2
1/100	One Hundredth	0.01
15/100	Fifteen Hundredths	0.15



$\frac{1}{4} = 0.25$ $\frac{1}{2} = 0.5$ $\frac{3}{4} = 0.75$

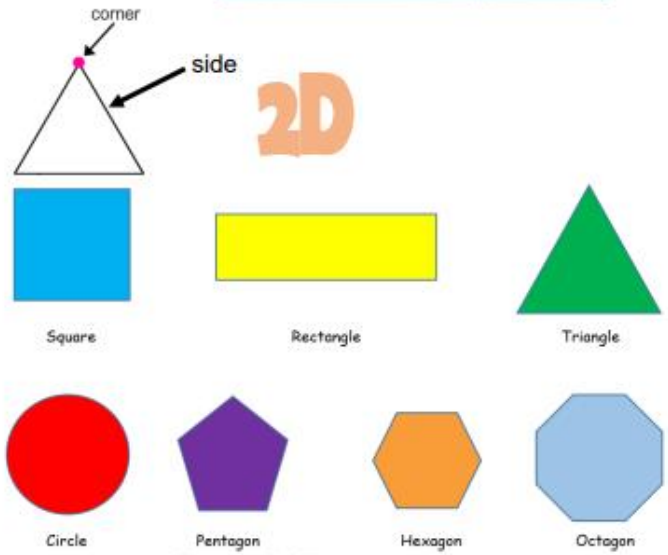
Counting up and down in hundredths



Shapes you need to know

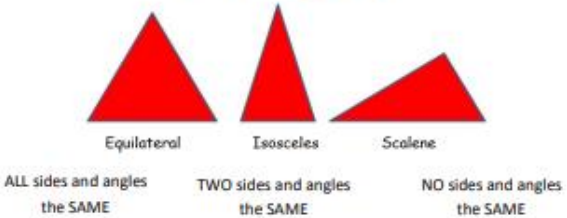
YEAR 4

2D

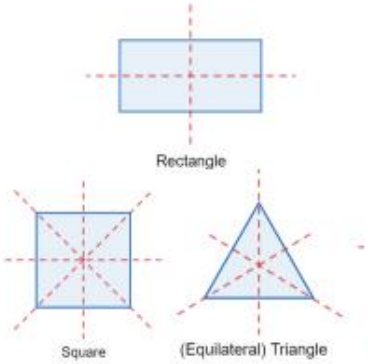


Quadrilaterals

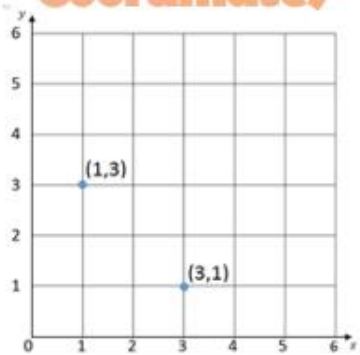
Triangles



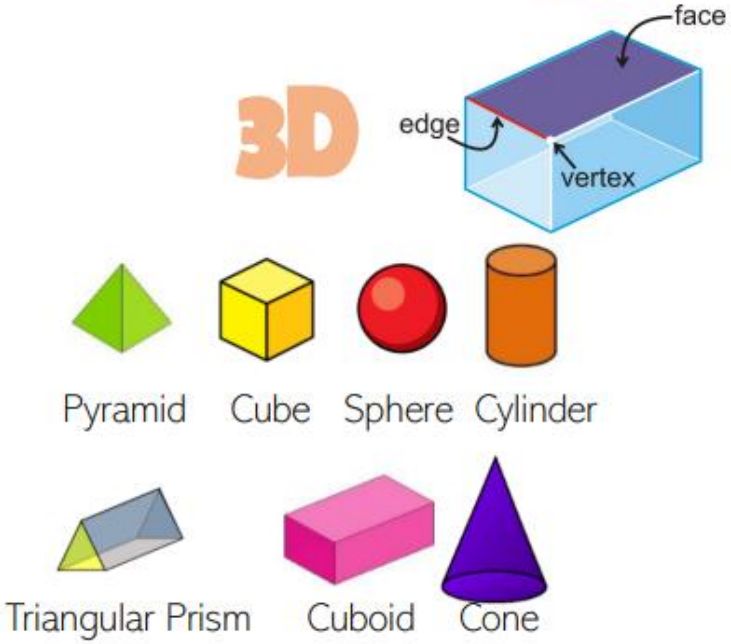
Lines of symmetry in different directions



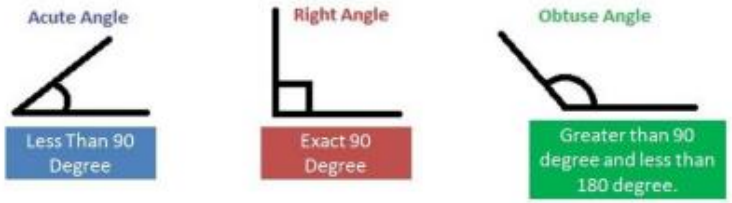
Coordinates

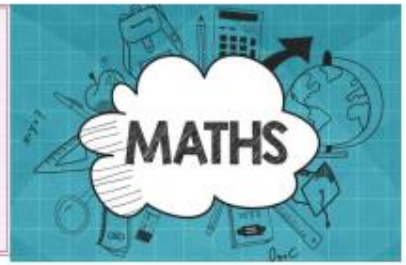


3D



Angles





Measures you need to know

YEAR 4

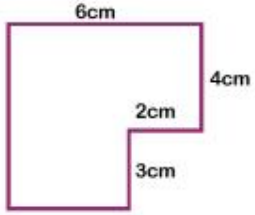
10 millimetres = 1 centimetre

100 centimetres = 1 metre

1000 metres = 1 kilometre

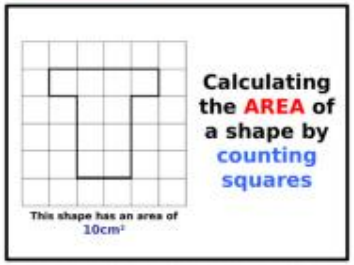
Understanding area and perimeter

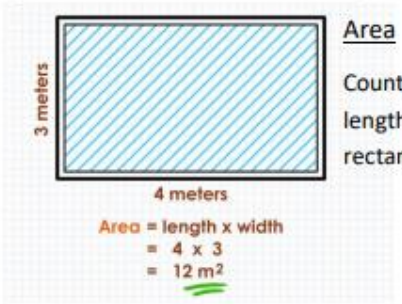
Perimeter is the length around a shape and area is the space inside a shape



Perimeter

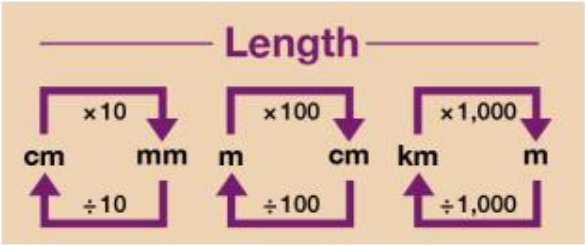
Add up ALL the sides





Area

Count the squares or length x width in a rectangle



Time

1 minute = 60 seconds

1 hour = 60 minutes

1 day = 24 hours

1 week = 7days

1 year = 52 weeks

1 year = 12 months

1 year = 365 days

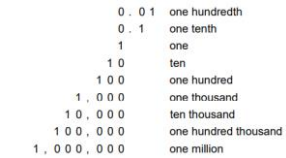
Time

Converting analogue to digital

Understanding 12 and 24 hour clocks

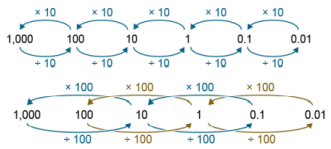
Mathematics Curriculum – Year 5

Autumn 1:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3	Place Value	Objectives from the national curriculum: • Read, write, order and compare numbers up to at least 1000000 and determine the value of each digit • Count forwards and 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 Learning sequence: • Understanding numbers to 10000 • Understanding numbers to 100000 • Understanding numbers to a million • Reading and writing numbers to a million • Powers of ten - Counting in 10s, 100s, 1000s, 10000s and 100000s • Partitioning numbers to a million • Comparing and ordering numbers to 100000 • Compare and order numbers to one million • Rounding to the nearest 10, 100 and 1000 • Rounding numbers within 100000 • Round numbers to one million • Negative numbers • Problem solving with negative numbers • Roman numerals to 1000 • Reading dates in Roman numerals	**Key concepts and facts** Pupils should understand the concept of place value deeply and powers of ten. They should understand fully how a digit's positioning on a place value grid determines its value.  0 . 0 1 one hundredth 0 . 1 one tenth 1 one 1 0 ten 1 0 0 one hundred 1 , 0 0 0 one thousand 1 0 , 0 0 0 ten thousand 1 0 0 , 0 0 0 one hundred thousand 1 , 0 0 0 , 0 0 0 one million They will use and apply this as the main concept to round, order and compare numbers. Pupils should explore the concept of rounding alongside the purpose of rounding – to eliminate unnecessary detail and linked to estimation. **Vocabulary** Place value, Digit, Million, hundred thousand, ten thousand, thousand, hundred, ten, one, decimal point, tenth, hundredth, thousandth, Roman numerals, Negative number, positive number, place holder, rounding, linear number sequence, powers of 10.	Pupils will be secure in place value up to 4 digits and comparing and ordering. Pupils will already be secure with rounding up to 4-digit numbers to different degrees of accuracy. Pupils will be aware of the concept of negative numbers and counting back through zero. Pupils will be secure with roman numerals to 100 Counting in different powers of ten is a new concept but can be related to understanding of counting in multiples and place value columns.

4 5	Addition and Subtraction	Objectives from the national curriculum: • add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • add and subtract numbers mentally with increasingly large numbers • 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 Learning sequence: • mental strategies • adding whole numbers with more than 4 digits using column method • subtracting whole numbers with more than 4 digits using column method • rounding to estimate and approximate answers • understanding inverse operations • multi-step addition and subtraction problems • comparing calculations • finding missing numbers	<u>Key concepts and facts</u> Pupils should maintain fluency in both formal written and mental methods for addition and subtraction. Mental methods can include jottings to keep track of calculation. Pupils should select the most efficient method to calculate depending on the numbers involved. Pupils should make sensible decisions about how and when to use columnar methods. Efficiency should be a key focus when applying calculation methods <u>Vocabulary</u> Addition, subtraction, sum, total, difference, minus, less, column addition, column subtraction, operation, exchange, inverse, estimate, digit, place holder, rounding, approximate, accuracy	Pupils will be secure with adding and subtracting using a column method with up to 4 digits. They should have a deep understanding of exchange Pupils will have an understanding of rounding and approximation from Y4 and from the previous Y5 place value unit. Pupils should have an understanding of the inverse.
6 7	Statistics	Objectives from the national curriculum: • solve comparison, sum and difference problems using information presented in a line graph • complete, read and interpret information in tables, including timetables Learning sequence: • recapping familiar charts and comparison, sum and difference • introducing line graphs • reading and interpreting line graphs • reading and interpreting tables, including two-way • timetables	<u>Key concepts and facts</u> Line graphs as being the most appropriate representation to show information changing over time. <u>Vocabulary</u> Timetable, Data, Scale, Axis, Graph, Frequency, Time graph, Time series, Line graph, Bar graph, vertical line chart, Maximum, minimum	Pupils will have understanding of comparison, sum and difference questions from other types of representations – bar charts and pictograms. From Y4, children will have an understanding of line graphs and how they are represented.

Autumn 2:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3 4	Multiplication and Division	Objectives from the national curriculum: • identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers • 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 • 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 • multiply and divide numbers mentally, drawing upon known facts • 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 • multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000 • 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 • solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign • solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates Learning sequence: • multiples • factors • common factors • prime and composite numbers up to 19 • prime and composite numbers up to 100 • square numbers • cube numbers • recapping multiplying by 10 and 100 • multiplying by 10, 100 and 1000 • recapping dividing by 10 and 100 • dividing by 10, 100 and 1000 • multiples of 10, 100 and 1000 • recapping multiplying 2 and 3 digits by 1 digit • multiplying 4 digit by 1 digit • multiplying 2-digits by 2-digits using the area model	Key concepts and facts Table facts must be secure - Before pupils begin work on formal multiplication and division, it is essential that pupils have automatic recall of multiplication and division facts within the multiplication tables. These facts are required for calculation within the 'columns' during application of formal written methods. All mental multiplicative calculation also depends on these facts. Concept of place value should be secure to build understanding of multiplying and dividing by 10, 100 and 1000. Understand this as equivalent to making a number 10 or 100 times the size, or 1 tenth or 1 hundredth times the size. They should understand division as the inverse action, and should be able to use and understand the language of one-tenth or one-hundredth times the size to describe division of numbers by 10 or 100, including to calculations that give decimal fraction quotients. Pupils already know the following relationships between powers of ten, and can describe them using scaling language  Understand the concepts of multiples and factors and the inverse relationship between them. Vocabulary	Children will have prior knowledge of the concept of a multiple and a factor and will use this to build towards common factors. Prime and composite numbers is a new concept but knowledge of factors from Y4 can be reviewed and applied here. Square and cube numbers are new concepts but should be linked to times tables and knowledge from Y4 of multiplying together 3 numbers. This should also be linked to arrays. Multiplying and dividing by 10, 100 and 1000 should already be secure from Y4 but will be built upon with new decimal places Long multiplication is a new method but use of short multiplication, place value and times tables should be drawn upon and applied.

5 6		• multiplying 2 digits by 2-digits using long multiplication • multiplying 3 digits by 2-digits using long multiplication • multiplying 4 digits by 2-digits using long multiplication • recapping dividing 2 and 3 digits by a 1-digit number • dividing a 4-digit number by a 1-digit number • division using remainders • problem solving using multiplication and division	multiply, multiplication, times, product, commutative, short multiplication, long multiplication, multiplication fact, estimate, multiple, (Common) factor, factor pair, cube number, square number, prime number, composite number, scaling, rates, remainder, equal value	
7 8	Measurement: Volume	Objectives from the national curriculum: • estimate volume [for example, using 1 cm³ blocks to build cuboids (including cubes)] and capacity [for example, using water] learning sequence: • understanding volume • comparing volume • estimating volume • estimating capacity • problem solving with capacity and volume	<u>Key concepts and facts</u> The volume of a solid 3D shape is the amount of space inside it. <u>Vocabulary</u> Area, Volume, Capacity, Dimensions, length, height, width	Volume is a new concept but should be linked to understanding of area and square and cube numbers

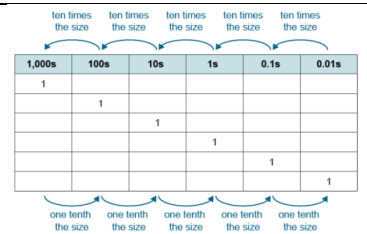
<u>Spring 1:</u>

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3	Fractions	Objectives from the national curriculum: • compare and order fractions whose denominators are all 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, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$] • 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 Learning sequence: • equivalent fractions to unit fractions • equivalent fractions to non-unit fractions • improper fractions to mixed numbers • mixed numbers to improper fractions • comparing fraction less than 1	<u>Key concepts and facts</u> Concept of equivalence - Find equivalent fractions and understand that they have the same value and the same position in the linear number system. Pupils need to understand that equivalent fractions, such as ¼ and 3/12, have the same numerical value because the numerator and denominator within each fraction have the same proportional relationship. $\times 3$ $\times 4 \left(\frac{1}{4} = \frac{3}{12}\right) \times 4$ $\times 3$ Concept of common denomination – by drawing upon multiples and equivalent fractions This will underpin addition, subtraction, ordering and comparing of fractions.	Children will understand the concept of a fraction and how they are written. They will have an understanding of the concept of equivalence as well as ordering and comparing. Children will understand that fractions can be greater than 1 Children have added and subtracted fractions only ever with the same denominator – they should review this alongside the concept of equivalence when learning to add and subtract with different denominators.

4 5		• ordering fractions less than 1 • comparing fractions greater than 1 • ordering fractions greater than 1 • recapping adding and subtracting fractions within 1 and with the same denominator • adding fractions within 1 • adding 3 or more fractions • adding fractions over 1 • adding fractions with mixed numbers • subtracting fractions • subtracting mixed numbers • subtracting 2 mixed numbers • multiplying a unit fraction by an integer • multiplying a non-unit fraction by an integer • multiplying a mixed number by an integer • recapping fractions of quantities and amounts • problem solving with fractions	Mixed numbers have a whole number and a part of a number. Improper fractions are another way of expressing the same value but the numerator is greater than the denominator. <u>Vocabulary</u> Fraction, Numerator, Denominator, Improper fraction, Tenth, hundredth, thousandth, Per cent, Percentage, Decimal, Equivalent, Place value, Tenth, hundredth, thousandth, Proper fraction, scaling, mixed number, common denominator, simplify, decimal place.	Children should use the concept of repeated addition of fractions with the same denominator to introduce multiplying fractions by integers.

<u>Spring 2:</u>

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3	Decimals and Percentages	Objectives from the national curriculum: • read and write decimal numbers as fractions [for example, 0.71 = $\frac{71}{100}$] • recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents • round decimals with 2 decimal places to the nearest whole number and to 1 decimal place • read, write, order and compare numbers with up to 3 decimal places • solve problems involving number up to 3 decimal places • recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per 100', and write percentages as a fraction with denominator 100, and as a decimal fraction • 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 Learning sequence: • recapping decimals up to 2 decimal places • understanding decimals as fractions • understanding thousandths	<u>Key concepts and facts</u> Know that 10 tenths are equivalent to 1 one, and that 1 is 10 times the size of 0.1. Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01. Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10 times the size of 0.01. Place value of decimals - The value of a given digit is made 10 times the size if it is moved 1 position to left, and is made one tenth times the size if it is moved 1 position to the right.	Children will already be secure with the hundredths and tenths columns and the position of the decimal point They will be aware of tenths and hundredths as fractions and decimals and the common equivalences of 0.5, 0.25 and 0.75. Percentages is a new concept but should be related to prior knowledge of hundredths.

4		• understanding thousandths as decimals • rounding decimals • comparing and ordering decimals • understanding percentages • percentages as fractions and decimals • equivalent fractions, decimals and percentages • adding and subtracting decimals within 1 • adding and subtracting decimals with the same number of decimal places • adding and subtracting decimals with a different number of decimal places • adding and subtracting wholes and decimals • decimal sequences • multiplying decimals by 10, 100 and 1000 • dividing decimals by 10, 100 and 1000	 Pupils must be able to read, write and interpret decimal fractions with up to 2 decimal places. Pupils use the knowledge of place value and number lines to help round decimals to the nearest whole number  Vocabulary Tenth, hundredth, thousandth, Per cent, Percentage, Decimal, Equivalent, Place value, decimal place.	
5 6	Perimeter and Area	Objectives from the national curriculum: • measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • calculate and compare the area of rectangles (including squares), including using standard units, square centimetres (cm²) and square metres (m²), and estimate the area of irregular shapes Learning sequence: • measuring perimeter • calculating perimeter • area of rectangles • area of compound shapes • area of rectilinear shapes	Key concepts and facts Perimeter of any polygon is the distance around the outside. Area of a polygon is the amount of space inside. Pupils should then learn that the area of a rectangle can be calculated by multiplying the length by the width. They should learn why this is the case by examining rectangles drawn on square-centimetre grids, and understand that the factors can be written in either order. Vocabulary Perimeter, Area, Square, rectangle, Composite rectilinear, centimetre cube, square centimetres, square metres.	Children will already be aware of the concept of perimeter and how to calculate. They have done this with rectilinear shapes in Y4. Children will be secure with the concept of area from counting squares in Y4. This should be reviewed and linked to understanding of arrays.

Summer 1:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1	Arithmetic recap – based on gaps from diagnostics			

2
3
4
5
6
	Geometry: Properties of Shape	Objectives from the national curriculum:
		• identify 3-D shapes, including cubes and other cuboids, from 2-D representations
		• know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles
		• draw given angles, and measure them in degrees (°)
		• identify:
		  • angles at a point and 1 whole turn (total 360°)
		  • angles at a point on a straight line and half a turn (total 180°)
		  • other multiples of 90°
		  • 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
		Learning sequence:
		• recapping shapes and angles
		• identifying angles and comparing and ordering
		• estimating angles in degrees
		• measuring using a protractor
		• drawing lines and angles accurately
		• calculating angles on a straight line
		• calculating angles around a point
		• recapping triangles and quadrilaterals
		• calculating lengths and angles in shapes
		• regular and irregular polygons
		• reasoning about 3D shapes
			Key concepts and facts
			Pupils must learn that we can measure the size of angles just as we can measure the length of sides. They should learn that the unit used is called degrees and indicated by the ° symbol. Pupils should know that there are 360° in a full turn, 90° in a quarter turn or right angle, and 180° in a half turn or on a straight line.
			
			Idea that a shape can be regular or irregular and that the length of size and sides of angles contributes to this.
			
			Vocabulary
			Names of all 2D and 3D shapes. Parallel, perpendicular, congruent, face, edge, diagonal, vertical, horizontal, angle, degrees, protractor, right angle, acute, obtuse, reflex, regular, irregular, sides, vertices (vertex)
				Pupils should already be secure on the names of 3D and 2D shapes, including most associated vocabulary.
				
				Pupils will understand angles and know that they are measured in degrees and be familiar with acute, obtuse and right angles. They will be able to order angles.
				
				They will be aware of angles in terms of turns around a point

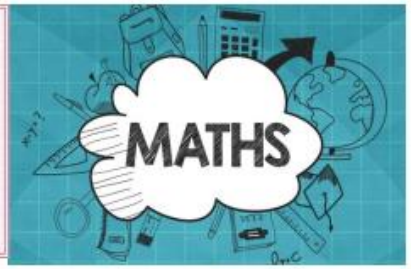
Summer 2:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3	Measurement: converting units	Objectives from the national curriculum: • convert between different units of metric measure [for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre] • 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 • use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling Learning sequence: • recapping measurement language and skills • converting millimetres and centimetres • converting centimetres and metres • converting metres and kilometres • converting grams and kilograms • converting litres and millilitres • converting metric units – milli, centi, kilo • converting metric and imperial units • converting units of time • problem solving with converting units of time • problem solving using all measures	Key concepts and facts Concept of conversion as altering the unit of measurement but the value stays the same. Pupils should memorise the following facts: 1km = 1,000m 1m = 100cm 1cm = 10mm 1 litre = 1,000ml 1kg = 1,000g £1 = 100p Pupils should apply knowledge of fractions and decimals to work out e.g. ¾ kg Vocabulary Millennium, Century, Decade, Year, Month, Week, Day, Timetable, Length, distance, Mass, weight, Volume, Capacity, imperial, metric, kilometre, metre, centimetre, millimetre, Kilogram, gram, Litre, millilitre, Hour, minute, second, Inch, foot, yard, Pound, ounce, Pint, gallon,	Children will already be aware of a range of units of measurement from the Y3 and Y4 curriculum. They will be secure with multiplying and dividing by 10, 100 and 1000 for converting metric measurements
4 5 6	Position and Direction	Objectives from the national curriculum: • 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 learning sequence: • recapping describing and drawing position on a grid • position in the first quadrant • translation • translation using coordinates • recapping symmetry and completing a symmetric figure • reflection • reflection with coordinates	Key concepts and facts Translation – the shape stays exactly the same but moves in a given direction. Reflection – the shape stays the same dimensions but is a mirror image of itself over a given point. Vocabulary Reflection, translation, 2D grid, coordinates, quadrant, axes, parallel, movement, left, right, up, down	Children will already be aware of coordinates and plotting points in the first quadrant. Children will be aware of the concept of translation and the associated language
7	Arithmetic recap – based on gaps from diagnostics			

Vocabulary:

Number and place value	Addition and subtraction	Multiplication and division	Fractions, decimals and percentages	geometry	measures	statistics
Place value, Digit, Million, hundred thousand, ten thousand, thousand, hundred, ten, one, decimal point, tenth, hundredth, thousandth, Roman numerals, Negative number, positive number, place holder, rounding, linear number sequence, powers of 10.	Addition, subtraction, sum, total, difference, minus, less, column addition, column subtraction, operation, exchange, inverse, estimate, digit, place holder, rounding, approximate, accuracy	multiply, multiplication, times, product, commutative, short multiplication, long multiplication, multiplication fact, estimate, multiple, (Common) factor, factor pair, cube number, square number, prime number, composite number, scaling, rates, remainder, equal value	Fraction, Numerator, Denominator, Improper fraction, Tenth, hundredth, thousandth, Per cent, Percentage, Decimal, Equivalent, Place value, Tenth, hundredth, thousandth, Proper fraction, scaling, mixed number, common denominator, simplify, decimal place.	**Shape** Names of all 2D and 3D shapes. Parallel, perpendicular, congruent, face, edge, diagonal, vertical, horizontal, angle, degrees, protractor, right angle, acute, obtuse, reflex, regular, irregular, sides, vertices (vertex) **Position and direction** Reflection, translation, 2D grid, coordinates, quadrant, axes, parallel, movement, left, right, up, down	Millennium, Century, Decade, Year, Month, Week, Day, Timetable, Length, distance, Mass, weight, Volume, Capacity, imperial, metric, kilometre, metre, centimetre, millimetre, Kilogram, gram, Litre, millilitre, Hour, minute, second, Inch, foot, yard, Pound, ounce, Pint, gallon, Perimeter, Area, Volume, Capacity, Dimensions, Square, rectangle, Composite rectilinear, centimetre cube, square centimetres, square metres.	Timetable, Data, Scale, Axis, Graph, Frequency, Time graph, Time series, Line graph, Bar graph, vertical line chart, Maximum, minimum

Key facts:



Stuff you need to know

YEAR 5

Place value of numbers up to 1 million

Millions	Thousands			Ones		
Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
1	5	6	4	7	9	8
1,000,000	500,000	60,000	4,000	700	90	8
One million, five hundred and sixty-four thousand, seven hundred and ninety-eight						

Count up and down in jumps of 10, 100, 1000, 10000 and 100000

864,664, 764,664, 664,664,

Rounding Rules

1. Find the place value and circle the digit.
(Example: If you are rounding to the nearest tens, circle the tens place)

1257

2. Move to the right of the circled number and underline that digit.

1257

3. Zero to four, the circled digit stays the same. But, five to nine adding 1 is the game.
(In the example, the underlined number is between 5 and 9. So, we need to add 1 to the circled number)

1267

4. Now flex your muscles just like a hero. Digits to the right, change to the zero.

1260

5. All the other numbers, they stay the same. Yahoo!! you are a winner at the rounding game.

© 2019 www.themumeducates.com

Roman Numerals: 1 - 1000

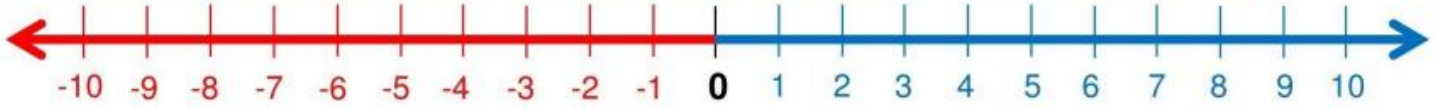
I	V	X	L	C	D	M
1	5	10	50	100	500	1000

1	I	11	X1	200	CC
2	II	20	XX	300	CCC
3	III	30	XXX	400	CD
4	IV	40	XL	500	D
5	V	50	L	600	DC
6	VI	60	LX	700	DCC
7	VII	70	LXX	800	DCCC
8	VIII	80	LXXX	900	CM
9	IX	90	XC	1000	M
10	X	100	C	1001	MI

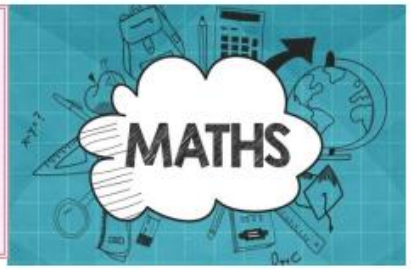
Ordering and comparing sets of numbers

City	Population
Leeds	720,492
Durham	87,559
Sheffield	512,827
Birmingham	992,000

Count forwards and backwards into negative numbers and through zero



Children should round any number up to one million to the nearest 10, 100, 1000, 10000 or 100000. We use the strategy of circling and underlining.



Stuff you need to know

YEAR 5

Column addition and subtraction

789 + 642 becomes

	7	8	9
+	6	4	2
1	4	3	1
	1	1	

Answer: 1431

932 – 457 becomes

	8	12	1
	~~9~~	~~3~~	2
–	4	5	7
	4	7	5

Answer: 475

Short and long multiplication

	3	4	2
×			7
2,	3	9	4
	2	1	

124 × 26 becomes

	1	2	
	1	2	4
×		2	6
	7	4	4
2	4	8	0
3	2	2	4
1	1		

Answer: 3224

Short division with different remainders

Short division

98 ÷ 7 becomes

$$\begin{array}{r|rr} & 1 & 4 \\ \hline 7 & 9^{2} & 8 \end{array}$$

Answer: 14

432 ÷ 5 becomes

$$\begin{array}{r|rrr} & 8 & 6 & r2 \\ \hline 5 & 4^{3} & 3 & 2 \end{array}$$

Answer: 86 remainder 2

496 ÷ 11 becomes

$$\begin{array}{r|rrr} & 4 & 5 & r1 \\ \hline 11 & 4^{5} & 9 & 6 \end{array}$$

Answer: $45\frac{1}{11}$

Multiply and divide by 10, 100 and 1000

× 10

1,000s	100s	10s	1s	0.1s	0.01s
			8		
			0	8	

÷ 10

8 ÷ 10 = 0.8 0.8 × 10 = 8

Prime Numbers to 100

2 , 3 , 5, 7 , 11 , 13 ,
17 , 19 , 23 , 29 , 31 ,
37 , 41 , 43 , 47 , 53 ,
59 , 61 , 67 , 71 , 73 ,
79 , 83 , 89 , 97

Multiples

A number that will be in that times table.

Multiples of 6: 6, 12, 18, 24, 30

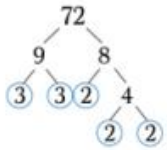
Multiples of 4: 4, 8, 12, 16, 20, 24

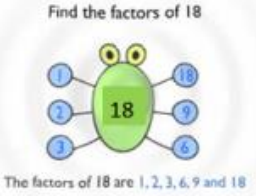
Multiples of 3: 3, 6, 9, 12, 15, 18, 21, 24

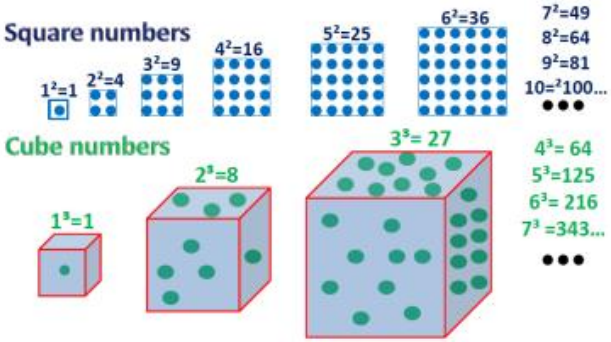
Factors

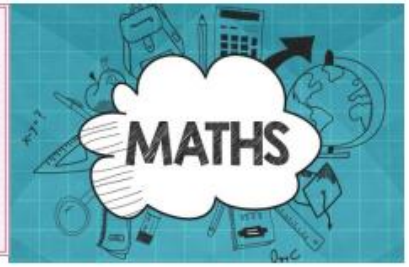
The numbers that multiply together to make a certain number.

Prime factors





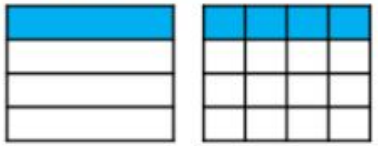




Fractions you need to know

YEAR 5

Find equivalent fractions



$$\frac{1}{4} \xrightarrow{\times 4} \frac{4}{16}$$

Compare and order fractions

Which fraction is larger: $\frac{2}{3}$ or $\frac{4}{5}$?

$$\frac{2}{3} = \frac{10}{15} \quad (\times 5) \qquad \frac{4}{5} = \frac{12}{15} \quad (\times 3)$$

When one denominator is not a multiple of another, you need to convert both fractions.

15 is a multiple of both 3 and 5, so we can find two equivalent fractions with a denominator of 15.

Add and subtract fractions

$$\frac{2}{15} + \frac{3}{5} = ?$$

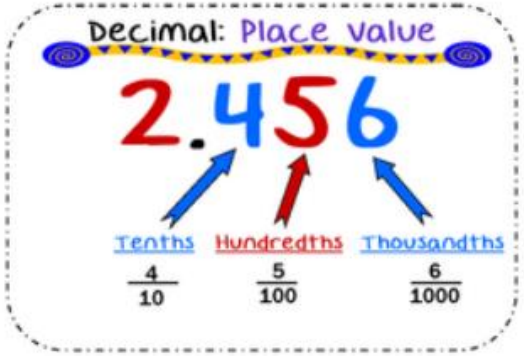
$$\frac{2}{15} + \frac{3 \times 3}{5 \times 3}$$

Find a common denominator

$$\frac{2}{15} + \frac{9}{15} = \frac{2+9}{15} = \frac{11}{15}$$

Same

Decimals



Work with thousandths and round decimals

Tens	Units	.	Tenths	Hundredths
4	.		5	6

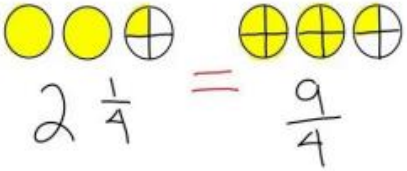
→ 4.6

Converting a mixed number to an improper fraction

Then add.

$$4\frac{1}{3} = \frac{13}{3}$$

Multiply.

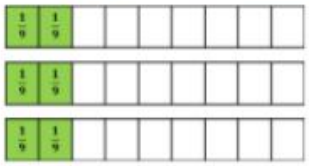


Percentages %

Recognise the percent symbol, understand that it is out of 100 and know some equivalences

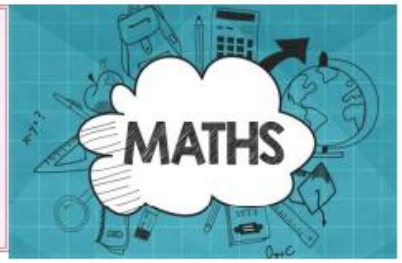
$$\frac{73}{100} = 73\%$$

Multiply a fraction by a whole number



$$3 \times \frac{2}{9} = \frac{6}{9}$$

Decimal	Percentage	Fraction
0.5	50%	$\frac{1}{2}$
0.25	25%	$\frac{1}{4}$
0.75	75%	$\frac{3}{4}$
0.2	20%	$\frac{1}{5}$
0.1	10%	$\frac{1}{10}$



Times tables you need to know

YEAR 5

2 times table

1 x 2 = 2
2 x 2 = 4
3 x 2 = 6
4 x 2 = 8
5 x 2 = 10
6 x 2 = 12
7 x 2 = 14
8 x 2 = 16
9 x 2 = 18
10 x 2 = 20
11 x 2 = 22
12 x 2 = 24

3 times table

1 x 3 = 3
2 x 3 = 6
3 x 3 = 9
4 x 3 = 12
5 x 3 = 15
6 x 3 = 18
7 x 3 = 21
8 x 3 = 24
9 x 3 = 27
10 x 3 = 30
11 x 3 = 33
12 x 3 = 36

4 times table

1 x 4 = 4
2 x 4 = 8
3 x 4 = 12
4 x 4 = 16
5 x 4 = 20
6 x 4 = 24
7 x 4 = 28
8 x 4 = 32
9 x 4 = 36
10 x 4 = 40
11 x 4 = 44
12 x 4 = 48

5 times table

1 x 5 = 5
2 x 5 = 10
3 x 5 = 15
4 x 5 = 20
5 x 5 = 25
6 x 5 = 30
7 x 5 = 35
8 x 5 = 40
9 x 5 = 45
10 x 5 = 50
11 x 5 = 55
12 x 5 = 60

6 times table

1 x 6 = 6
2 x 6 = 12
3 x 6 = 18
4 x 6 = 24
5 x 6 = 30
6 x 6 = 36
7 x 6 = 42
8 x 6 = 48
9 x 6 = 54
10 x 6 = 60
11 x 6 = 66
12 x 6 = 72

7 times table

1 x 7 = 7
2 x 7 = 14
3 x 7 = 21
4 x 7 = 28
5 x 7 = 35
6 x 7 = 42
7 x 7 = 49
8 x 7 = 56
9 x 7 = 63
10 x 7 = 70
11 x 7 = 77
12 x 7 = 84

8 times table

1 x 8 = 8
2 x 8 = 16
3 x 8 = 24
4 x 8 = 32
5 x 8 = 40
6 x 8 = 48
7 x 8 = 56
8 x 8 = 64
9 x 8 = 72
10 x 8 = 80
11 x 8 = 88
12 x 8 = 96

9 times table

1 x 9 = 9
2 x 9 = 18
3 x 9 = 27
4 x 9 = 36
5 x 9 = 45
6 x 9 = 54
7 x 9 = 63
8 x 9 = 72
9 x 9 = 81
10 x 9 = 90
11 x 9 = 99
12 x 9 =108

10 times table

1 x 10 = 10
2 x 10 = 20
3 x 10 = 30
4 x 10 = 40
5 x 10 = 50
6 x 10 = 60
7 x 10 = 70
8 x 10 = 80
9 x 10 = 90
10 x 10 = 100
11 x 10 = 110
12 x 10 = 120

11 times table

1 x 11 = 11
2 x 11 = 22
3 x 11 = 33
4 x 11 = 44
5 x 11 = 55
6 x 11 = 66
7 x 11 = 77
8 x 11 = 88
9 x 11 = 99
10 x 11 = 110
11 x 11 = 121
12 x 11 = 132

12 times table

1 x 12 = 12
2 x 12 = 24
3 x 12 = 36
4 x 12 = 48
5 x 12 = 60
6 x 12 = 72
7 x 12 = 84
8 x 12 = 96
9 x 12 = 108
10 x 12 = 120
11 x 12 = 132
12 x 12 = 144

Use your times tables to work out inverse division facts by swapping the numbers around

4 x 5 = 20

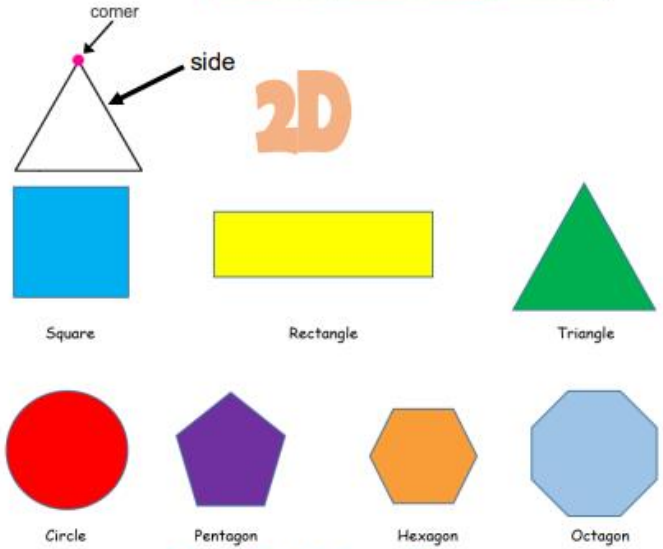
20 ÷ 5 = 4

20 ÷ 4 = 5

Do you know them inside out, back to front and in a random order? How quickly can you write them down? Can you spot any patterns to help you remember?

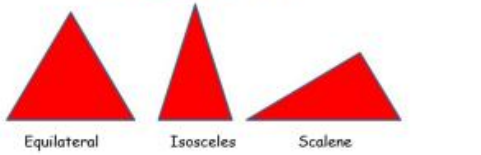
Shapes you need to know

2D



Quadrilaterals

Triangles

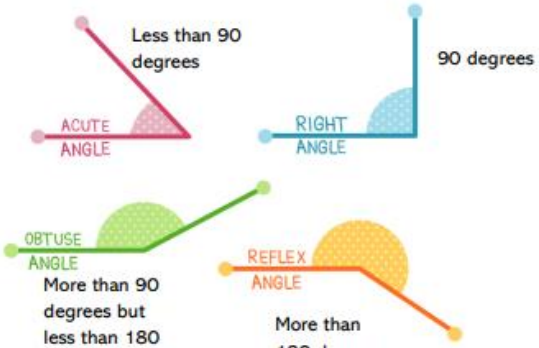


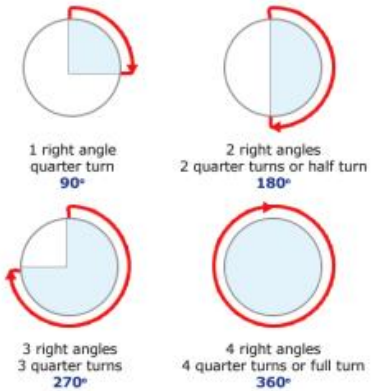
ALL sides and angles the SAME

TWO sides and angles the SAME

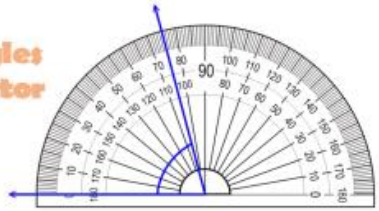
NO sides and angles the SAME

Angles

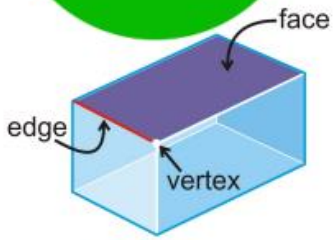


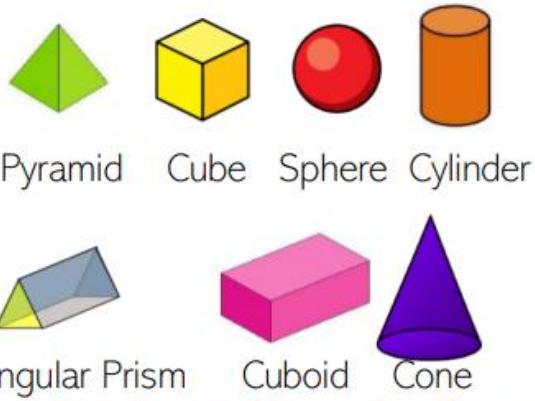


Measuring angles with a protractor



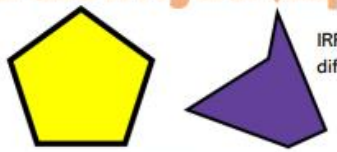
3D



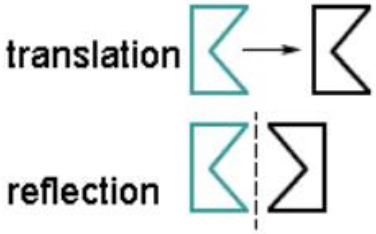


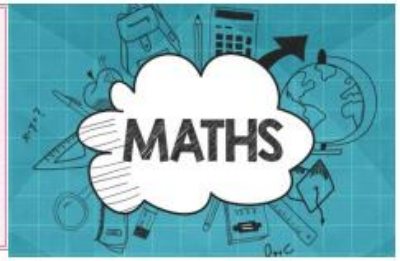
Regular and Irregular shapes

REGULAR shapes have all sides and angles the same.



IRREGULAR shapes have different sized sides and angles





Measures you need to know

YEAR 5

10 millimetres = 1 centimetre
100 centimetres = 1 metre
1000 metres = 1 kilometre
1000 grams = 1 kilogram
1000 millilitres = 1 litre

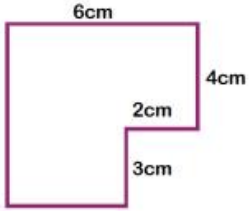
One inch is approximately 2.5 centimetres
1 inch ≈ 2.5 cm

1 kilogram is approximately 2 pounds
1 kg ≈ 2 lbs

568ml = 1 pint

Calculate area and perimeter

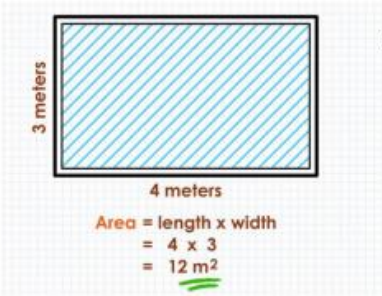
Perimeter is the length around a shape and area is the space inside a shape



Perimeter

Add up ALL the sides

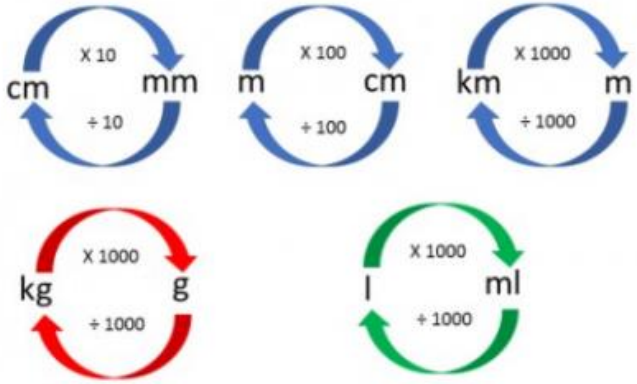
You may need to find some missing sides!



Area

Count the squares or length x width in a rectangle

Convert metric measurements



Time

1 minute = 60 seconds
1 hour = 60 minutes
1 day = 24 hours
1 week = 7days
1 year = 52 weeks
1 year = 12 months
1 year = 365 days

Estimate volume

10 cubes will make this shape = 10cm³

Mathematics Curriculum – Year 6

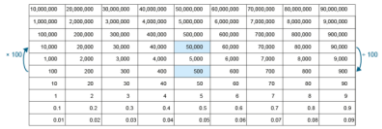
Autumn 1:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3	Place Value	Objectives from the national curriculum: • 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 0 • solve number and practical problems that involve all of the above Learning sequence: • Recapping the place value of numbers to a million • Place value of numbers up to ten million • Reading and writing numbers to ten million • Powers of ten • Comparing numbers • Ordering numbers • Recapping rounding to 10, 100 and 1000 • Rounding any number to any degree of accuracy • Negative numbers	<u>Key concepts and facts</u> Pupils should understand the concept of place value deeply and powers of ten. They should understand fully how a digit's positioning on a place value grid determines its value. 0 . 0 1 one hundredth 0 . 1 one tenth 1 one 1 0 ten 1 0 0 one hundred 1 , 0 0 0 one thousand 1 0 , 0 0 0 ten thousand 1 0 0 , 0 0 0 one hundred thousand 1 , 0 0 0 , 0 0 0 one million 1 0 , 0 0 0 , 0 0 0 ten million They will use and apply this as the main concept to round, order and compare numbers. Pupils should explore the concept of rounding alongside the purpose of rounding – to eliminate unnecessary detail and linked to estimation. <u>Vocabulary</u> Approximate, Round, Decimal place, Estimate, Accuracy, Place value, Digit, Negative number, positive number, minus, value, partition, ascending order, descending order, place value columns, millions, hundred thousands, ten thousands, thousands, hundreds, tens, ones, decimal point, tenths, hundredths, thousandths	Children will understand the concept of place value and the value of all digits up to 1 million. They will be aware of the concept of ordering and comparing smaller numbers They will be aware of the concept of rounding and be able to round to any degree of accuracy They will have an understanding of negative numbers to review before starting to calculate using them.

4 5 6 7	Addition, Subtraction, Multiplication and Division	Objectives from the national curriculum: • multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication • 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 • 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 • 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 4 operations • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • 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 learning sequence: • adding and subtracting integers • inverse operations • multi-step addition and subtraction problems • common factors • common multiples • rules of divisibility • prime numbers to 100 • square and cube numbers • multiply 4 digits by 1 digit • multiply 2 digits by up to 4 digits • solve problems with multiplication • short division • division using factors • long division • long division with remainders • solve problems with division • sole multi-step problems • order of operations • mental calculations and estimations	<u>Key concepts and facts</u> Pupils should apply understanding of all four operations to calculate and derive related calculations, using arithmetic strategies, inverse relationships and place value understanding. Pupils should explore the compensation property of addition. If one addend is increased and the other addend is decreased by the same amount, the sum stays the same. Concept of factors, multiples and primes. <u>Vocabulary</u> Addition, subtraction, sum, total, difference, minus, less, column, operation, inverse, estimate, approximate, multiply, multiplication, times, product, commutative, short multiplication, long multiplication, estimate, remainder, fraction, decimal, brackets, (common) multiple, (common) factor, divisible, prime, composite.	Pupils will be aware of methods for multiplication and division and should review these before building upon them and becoming efficient with larger numbers. They will have a sound understanding of factors, multiples and prime numbers to review before introducing common multiples and prime factors. Pupils should use understanding of multiplies to build up long division

Autumn 2:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2 3 4	Fractions	Objectives from the national curriculum: • use common factors to simplify fractions; use common multiples to express fractions in the same denomination • compare and order fractions, including fractions >1 • 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, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$] • divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$] • associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$] Learning sequence: • equivalent fractions • simplifying fractions • improper fractions to mixed numbers • mixed numbers to improper fractions • comparing and ordering fractions • adding and subtracting fractions • adding mixed numbers • subtracting mixed numbers • subtracting fractions • mixed addition and subtraction – multi-step problems • multiplying a fraction by an integer • multiplying a fraction by a fraction • dividing fractions by integers • four operations with fractions • fractions of amounts • fractions of amounts – finding the whole	<u>Key concepts and facts</u> Concept of simplifying – when the numerator and denominator have no common factors, it is in its simplest form. That simplifying a fraction does not change its value. This is linked to equivalent fractions Concept of common denomination – by drawing upon multiples and equivalent fractions This will underpin addition, subtraction, ordering and comparing of fractions. Mixed numbers have a whole number and a part of a number. Improper fractions are another way of expressing the same value but the numerator is greater than the denominator. <u>Vocabulary</u> percent, percentage, decimal place, lowest terms, simplify, simplest form, numerator, denominator, equivalent, whole, improper fraction, mixed number, decimal equivalent, rounding, common denominator.	Children should review and build upon knowledge of equivalent fractions and factors when learning to simplify. They will be secure with finding a common denominator from year 5 and should review this along with adding and subtracting fractions. Pupils should link multiplying fractions by an integer to repeated addition of fractions. E.g ¾ x 4 is the same as ¾ + ¾ + ¾ + ¾

5 6	Decimals	<u>Objectives from the national curriculum:</u> • identify the value of each digit in numbers given to 3 decimal places and multiply and divide 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 learning sequence: • place value up to 3 decimal places • multiplying and dividing by 10, 100 and 1000 • multiplying decimals by integers • dividing decimals by integers • decimals to fractions • fractions to decimals	<u>Key concepts and facts</u> Pupils should apply the concept of place value to build understanding of multiplying and dividing by powers of 10.  The concept of equivalence between fractions and decimals. How a decimal and a fraction can represent the same value. <u>Vocabulary</u> decimal place, whole, decimal equivalent, rounding, tenths, hundredths, thousandths, decimal point	Children will already be aware of the place value of decimals and be able to multiply and divide by 10, 100 and 1000 Pupils will have an understanding of written methods of multiplication and division and should review these before learning to use them with decimals
7	Percentages	Objectives from the national curriculum: • recall and use equivalences between simple fractions, decimals and percentages, including in different contexts • solve problems involving the calculation of percentages [for example, of measures and such as 15% of 360] and the use of percentages for comparison learning sequence: • understanding percentages • fractions to percentages • equivalent fractions, decimals and percentages • ordering fractions, decimals and percentages • percentages of amounts • percentages – missing values	<u>Key concepts and facts</u> Percentage is number of parts per 100 Concept of equivalence – how a percentage can represent part of a whole, just like fractions and decimals. How other percentages can be used to calculate percentages of amounts <u>Vocabulary</u> percent, percentage, decimal place, numerator, denominator, equivalent, whole, decimal equivalent, common denominator.	Children will recognise the per cent symbol from Year 5 and understand that per cent is number of parts per hundred. They will be aware of equivalences between common fractions and decimals.
8	Converting Measurements	<u>Objectives from the national curriculum:</u> • solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 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 3 decimal places • convert between miles and kilometres <u>Learning sequence:</u> • metric measures • converting metric measures • calculating metric measures	<u>Key concepts and facts</u> Concept of conversion – how a measurement can change units but the size remains the same. Approximation and how when converting from imperial to metric, approximation may be more suitable. 10mm = 1cm 100cm = 1m 1000m = 1km 1000g = 1 kg 1000ml = 1litre 5 miles is approximately 8km	Children will be aware of place value up to 3 decimal places and all common measurements. They will be proficient in multiplying and dividing by 10, 100 and 1000 Pupils will have an understanding of kilometres to review and relate to miles.

		• miles and kilometres • imperial measures	<u>Vocabulary</u> Length, distance, mass, weight, volume, capacity, kilometre, metre, centimetre, millimetre, tonne, kilogram, gram, milligram, litre, millilitre, hour, minute, second, inch, foot, yard, mile, pound, ounce, pint, gallon, conversion, temperature, degrees, Celsius	

<u>Spring 1:</u>

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1 2	Algebra	Objectives from the national curriculum: • use simple formulae • generate and describe linear number sequences • express missing number problems algebraically • find pairs of numbers that satisfy an equation with 2 unknowns • enumerate possibilities of combinations of 2 variables Learning sequence: • find a rule – one step • find a rule – two step • forming expressions • substitution • formulae • forming equations • solving one-step equations • solving two-step equations • finding pairs of values • enumerating possibilities	<u>Key concepts and facts</u> Algebraic expressions where a letter or shape can represent a number. The idea that an equation can have multiple solutions and many unknowns. <u>Vocabulary</u> Formulae, linear number sequence, equation, equivalent, inverse, pattern	Algebra is a new concept but pupils could review and apply their understanding of the equals sign and missing number problems.
3	Geometry	Objectives from the national curriculum: • draw 2-D shapes using given dimensions and angles • recognise, describe and build simple 3-D shapes, including making nets • compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons • illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius • recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles	<u>Key concepts and facts</u> Understanding of dimensions – by the end of year 6, pupils should be able to draw, compose and decompose shapes defined by specific measurements. Vertically opposite angles are equal Angles on a straight line total 180 Angles around a point total 360 Angles in a triangle total 180 Angles in a quadrilateral total 360	Pupils will already be able to use a protractor to draw angles. They should be aware of all 2D and 3D shape names and associated vocabulary, including all quadrilaterals. They will be aware of most angle facts from Year 5 geometry such as

4		Learning sequence: • recapping angles – drawing and measuring with a protractor • angles on a straight line • angles around a point • vertically opposite angles • angles in a triangle • angles in quadrilaterals • drawing shapes accurately • nets of 3D shapes	<u>Vocabulary</u> Degrees, angle, protractor, acute, obtuse, reflex, quadrilateral, square, rectangle, parallelogram, isosceles, trapezium, kite, rhombus, delta, arrowhead, scalene, triangle, right-angled, equilateral, polygon, regular, irregular, pentagon, hexagon, octagon, decagon, dodecagon, circle, radius, diameter, circumference, centre, parallel, congruent, diagonal, cube, cuboid, cylinder, pyramid, prism, net, edge, face, vertex, vertices, visualise	angles on a straight line and a full turn.
5	Perimeter, Area and Volume	Objectives from the national curriculum: • 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 cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3] Learning sequence: • recapping perimeter and area • area of a triangle – counting square, right angled triangles, formulae • area of a parallelogram • volume counting cubes • volumes of cuboids	<u>Key concepts and facts</u> Perimeter of any polygon is the distance around the outside. Area of a polygon is the amount of space inside. The volume of a solid 3D shape is the amount of space inside it. <u>Vocabulary</u> cubic centimetres, cubic metres, area, perimeter, centimetre squared, metre squared, kilometre, millimetre, parallelogram, triangle	Children will have prior understanding of all 3 concepts including for composite rectilinear shapes and missing lengths. Children will understand the properties of a parallelogram and the different types of triangles to build upon and apply

Spring 2:

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1	Position and direction	Objectives from the national curriculum: • describe positions on the full coordinate grid (all 4 quadrants) • draw and translate simple shapes on the coordinate plane, and reflect them in the axes • describe positions on the full coordinate grid (all 4 quadrants) • draw and translate simple shapes on the coordinate plane, and reflect them in the axes Learning sequence: • recapping the first quadrant – coordinates • all four quadrants – coordinates • translation • reflection	<u>Key concepts and facts</u> A quadrant being one of 4 parts that makes a grid. Translation – the shape stays exactly the same but moves in a given direction. Reflection – the shape stays the same dimensions but is a mirror image of itself over a given point. <u>Vocabulary</u> grid, axis, axes, x-axis, y-axis, origin, quadrant, coordinates, point, translation, reflection, transformation	Children will be secure with coordinates in the first quadrant and should review this before learning all four quadrants. They will be aware of both concepts of reflection and translation and the associated language that they will now apply over all four quadrants
2	Ratio	Objectives from the national curriculum: • solve problems involving the relative sizes of 2 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 Learning sequence: • using ratio language and the ratio symbol • calculating ratio • using scale factors • calculating scale factors • ratio and proportion problems	<u>Key concepts and facts</u> Understanding the concept of correspondence and that n objects can be linked to m objects. This concept is best explored in familiar contexts e.g. smoothie recipe. The concept of proportionality being fixed e.g. there is always twice the volume of water needed compared to the volume of rice. <u>Vocabulary</u> Proportion, quantity, integer, similar, enlargement, scale factor, group, share, multiples, percentage	Ratio is a new concept but pupils can review and apply times tables and multiplication and division facts to support. Pupils will already possess the arithmetic skills to calculate ratios.
3	Statistics	Objectives from the national curriculum: • interpret and construct pie charts and line graphs and use these to solve problems • calculate and interpret the mean as an average Learning sequence: • read and interpreting line graphs • drawing line graphs • using line graphs to solve problems	<u>Key concepts and facts</u> The mean as an average – the total of a set of data divided by the number of data sets. Understanding of the parts of a circle and that radius is twice the diameter. Understanding that pie charts represent data proportionally and exploring the	Pupils can apply their knowledge of circles to construct pie charts and their knowledge of degrees in a full turn. They will also apply fraction knowledge when looking for percentages and fractions apparent in data represented in pie charts.

		• circles • reading and interpreting pie charts • pie charts with percentages • drawing pie charts • the mean	identification of fractions within a pie chart. <u>Vocabulary</u> Data, scale, axis, axes, graph, frequency, time graph, time series, line graph, pie chart, sector, angle, protractor, degrees, maximum, minimum, average, mean, measure, data, statistics, statistic, approximate, round	The mean is a new concept but knowledge of addition and division can be revisited as a review of learning.
4	Pre-SATS review			
5				
6				

<u>Summer 1:</u>

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1	Pre-SATS review			
2				
3				
4	SATS week			
5	Post- SATS theme projects Preparing for secondary – using calculators			
6				

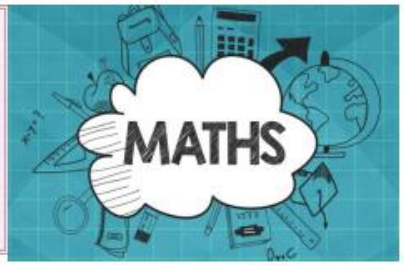
<u>Summer 2:</u>

Week	Topic	Objectives and learning sequence	Key concepts, facts and vocabulary	Prior learning to review and build upon
1	Post – SATS theme projects White Rose Bakery – best value, profit and loss White Rose Tours – climate conversions, distance conversions, money conversions, budgeting White Rose Futures – salaries, hourly rates, bills, mortgages			
2				
3				
4				
5				
6				
7				

Vocabulary:

Number and place value	Addition and subtraction	Multiplication and division	Fractions, decimals and percentages	Geometry	Measures	Statistics	Ratio	Algebra
Approximate, Round, Decimal place, Estimate, Accuracy, Place value, Digit, Negative number, positive number, minus, value, partition, ascending order, descending order, place value columns, millions, hundred thousands, ten thousands, thousands, hundreds, tens, ones, decimal point, tenths, hundredths, thousandths	Addition, subtraction, sum, total, difference, minus, less, column, operation, inverse, estimate, approximate,	multiply, multiplication, times, product, commutative, short multiplication, long multiplication, estimate, remainder, fraction, decimal, brackets, (common) multiple, (common) factor, divisible, prime, composite.	percent, percentage, decimal place, lowest terms, simplify, simplest form, numerator, denominator, equivalent, whole, improper fraction, mixed number, decimal equivalent, rounding, common denominator.	**Position and direction** grid, axis, axes, x-axis, y-axis, origin, quadrant, coordinates, point, translation, reflection, transformation **Shape** Degrees, angle, protractor, acute, obtuse, reflex, quadrilateral, square, rectangle, parallelogram, isosceles, trapezium, kite, rhombus, delta, arrowhead, scalene, triangle, right-angled, equilateral, polygon, regular, irregular, pentagon, hexagon, octagon, decagon, dodecagon, circle, radius, diameter, circumference, centre, parallel, congruent, diagonal, cube, cuboid, cylinder, pyramid, prism, net, edge, face, vertex, vertices, visualise	Length, distance, mass, weight, volume, capacity, kilometre, metre, centimetre, millimetre, tonne, kilogram, gram, milligram, litre, millilitre, hour, minute, second, inch, foot, yard, mile, pound, ounce, pint, gallon, conversion, cubic centimetres, cubic metres, area, perimeter, temperature, degrees, Celsius	Data, scale, axis, axes, graph, frequency, time graph, time series, line graph, pie chart, sector, angle, protractor, degrees, maximum, minimum, average, mean, measure, data, statistics, statistic, approximate, round	Proportion, quantity, integer, similar, enlargement, scale factor, group, share, multiples, percentage	Formulae, linear number sequence, equation, equivalent, inverse, pattern, substitution

Key facts:



Stuff you need to know

YEAR 6

Place value of numbers up to 10 million

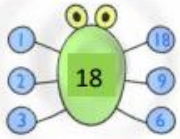
Millions		Thousands			Ones		
Ten millions	Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
2	1	5	6	4	7	9	8
2,000,000	1,000,000	500,000	60,000	4,000	700	90	8
Twenty-one million, five hundred and sixty-four thousand, seven hundred and ninety-eight							

Children need to be able to say, read and write all numbers accurately and confidently

Factors

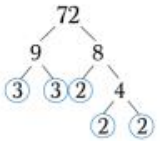
The numbers that multiply together to make a certain number.

Find the factors of 18



The factors of 18 are 1, 2, 3, 6, 9 and 18

Prime factors



City	Population
Leeds	720,492
Durham	87,559
Sheffield	512,827
Birmingham	992,000

Ordering and comparing sets of numbers

Multiples

A number that will be in that times table.

Multiples of 3

3, 6, 9, 12, 15, 18, 21, 24, 27, 30, ...

Multiples of 5

5, 10, 15, 20, 25, 30, 35, 40, 45, 50, ...

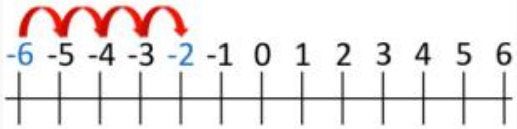
Lowest common multiple = 15

Calculate using negative numbers

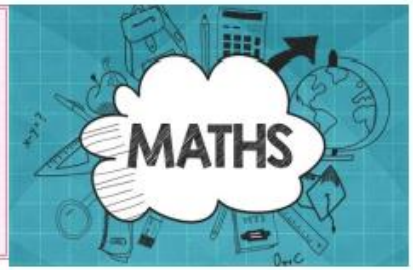
To subtract we move left

To add we move right

-6 + 4 = -2



Children should round any number to any column. We use the strategy of circling and underlining.



Stuff you need to know

YEAR 6

Column addition and subtraction

789 + 642 becomes

```
    7 8 9
  + 6 4 2
  -------
  1 4 3 1
    1 1
```

Answer: 1431

932 – 457 becomes

```
    8  12  1
    ~~9~~ ~~3~~ 2
  - 4  5  7
  ---------
    4  7  5
```

Answer: 475

Short and long multiplication

2741 × 6 becomes

```
    2 7 4 1
×         6
---------
1 6 4 4 6
  4 2
```

Answer: 16 446

124 × 26 becomes

```
    1 2
    1 2 4
×     2 6
---------
    7 4 4
  2 4 8 0
---------
  3 2 2 4
  1 1
```

Answer: 3224

Short division with different remainders

BUS STOP DIVISION

142 ÷ 4 = 35·5

```
        r2
      0 3 5·5   2/4 = 1/2 = 0.5
4 ) 1 1 4 2 2·2 0
```

Multiply and divide by 10, 100 and 1000

× 10

1,000s	100s	10s	1s	0.1s	0.01s
			8		
			0	8	

÷ 10

8 ÷ 10 = 0.8 0.8 × 10 = 8

Multiplying decimals

```
      2.4 3
x         7
---------
  1 7.0 1
    3 2
```

Long division by chunking

432 ÷ 15 becomes

```
        2 8
1 5 | 4 3 2
      3 0 0   15×20
      -----
      1 3 2
      1 2 0   15×8
      -----
        1 2
```

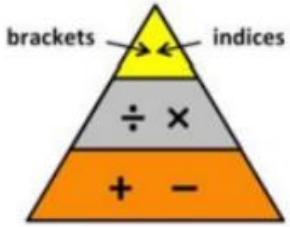
15
30
45
60
75
90
105
120
135
150

Answer: 28 r 12

Remainder as a fraction:

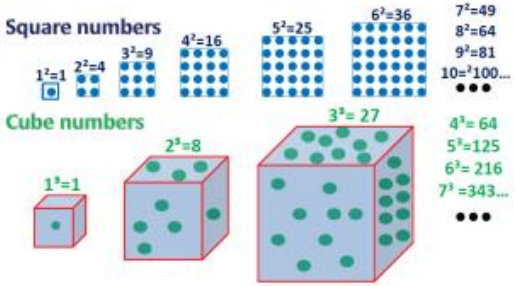
$\frac{12}{15} = \frac{4}{5}$

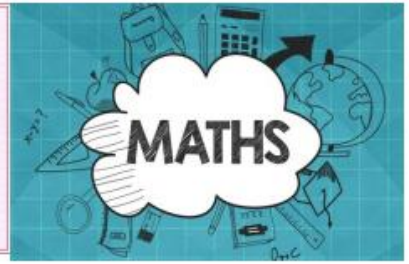
Order of operations



Prime Numbers to 100

2 , 3 , 5, 7 , 11 , 13 ,
17 , 19 , 23 , 29 , 31 ,
37 , 41 , 43 , 47 , 53 ,
59 , 61 , 67 , 71 , 73 ,
79 , 83 , 89 , 97





Times tables you need to know

YEAR 6

2 times table	3 times table	4 times table	5 times table	6 times table	7 times table	8 times table
1 x 2 = 2	1 x 3 = 3	1 x 4 = 4	1 x 5 = 5	1 x 6 = 6	1 x 7 = 7	1 x 8 = 8
2 x 2 = 4	2 x 3 = 6	2 x 4 = 8	2 x 5 = 10	2 x 6 = 12	2 x 7 = 14	2 x 8 = 16
3 x 2 = 6	3 x 3 = 9	3 x 4 = 12	3 x 5 = 15	3 x 6 = 18	3 x 7 = 21	3 x 8 = 24
4 x 2 = 8	4 x 3 = 12	4 x 4 = 16	4 x 5 = 20	4 x 6 = 24	4 x 7 = 28	4 x 8 = 32
5 x 2 = 10	5 x 3 = 15	5 x 4 = 20	5 x 5 = 25	5 x 6 = 30	5 x 7 = 35	5 x 8 = 40
6 x 2 = 12	6 x 3 = 18	6 x 4 = 24	6 x 5 = 30	6 x 6 = 36	6 x 7 = 42	6 x 8 = 48
7 x 2 = 14	7 x 3 = 21	7 x 4 = 28	7 x 5 = 35	7 x 6 = 42	7 x 7 = 49	7 x 8 = 56
8 x 2 = 16	8 x 3 = 24	8 x 4 = 32	8 x 5 = 40	8 x 6 = 48	8 x 7 = 56	8 x 8 = 64
9 x 2 = 18	9 x 3 = 27	9 x 4 = 36	9 x 5 = 45	9 x 6 = 54	9 x 7 = 63	9 x 8 = 72
10 x 2 = 20	10 x 3 = 30	10 x 4 = 40	10 x 5 = 50	10 x 6 = 60	10 x 7 = 70	10 x 8 = 80
11 x 2 = 22	11 x 3 = 33	11 x 4 = 44	11 x 5 = 55	11 x 6 = 66	11 x 7 = 77	11 x 8 = 88
12 x 2 = 24	12 x 3 = 36	12 x 4 = 48	12 x 5 = 60	12 x 6 = 72	12 x 7 = 84	12 x 8 = 96

9 times table	10 times table	11 times table	12 times table
1 x 9 = 9	1 x 10 = 10	1 x 11 = 11	1 x 12 = 12
2 x 9 = 18	2 x 10 = 20	2 x 11 = 22	2 x 12 = 24
3 x 9 = 27	3 x 10 = 30	3 x 11 = 33	3 x 12 = 36
4 x 9 = 36	4 x 10 = 40	4 x 11 = 44	4 x 12 = 48
5 x 9 = 45	5 x 10 = 50	5 x 11 = 55	5 x 12 = 60
6 x 9 = 54	6 x 10 = 60	6 x 11 = 66	6 x 12 = 72
7 x 9 = 63	7 x 10 = 70	7 x 11 = 77	7 x 12 = 84
8 x 9 = 72	8 x 10 = 80	8 x 11 = 88	8 x 12 = 96
9 x 9 = 81	9 x 10 = 90	9 x 11 = 99	9 x 12 = 108
10 x 9 = 90	10 x 10 = 100	10 x 11 = 110	10 x 12 = 120
11 x 9 = 99	11 x 10 = 110	11 x 11 = 121	11 x 12 = 132
12 x 9 =108	12 x 10 = 120	12 x 11 = 132	12 x 12 = 144

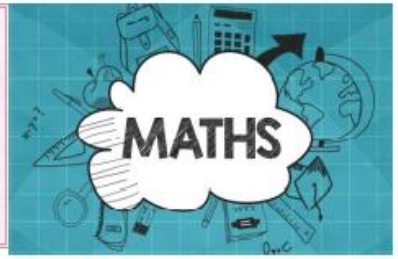
Use your times tables to work out inverse division facts by swapping the numbers around

4 x 5 = 20

20 ÷ 5 = 4

20 ÷ 4 = 5

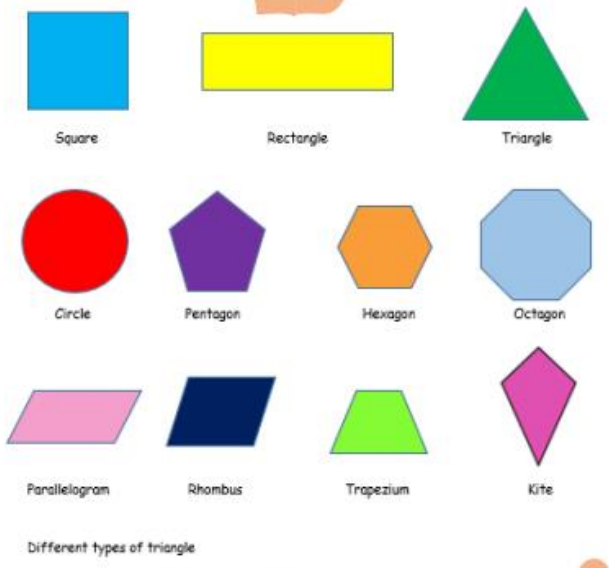
Do you know them inside out, back to front and in a random order? How quickly can you write them down? Can you spot any patterns to help you remember?



Shapes you need to know

YEAR 6

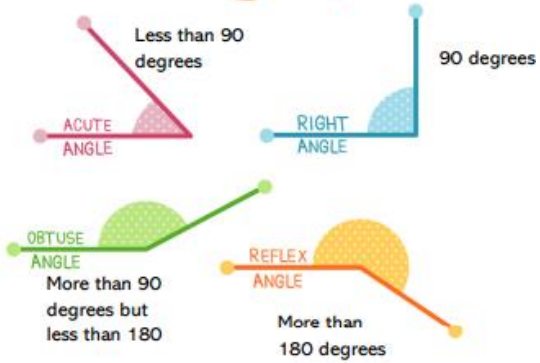
2D



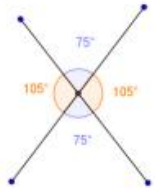
3D

Shape	Name	Net
	Cone	
	Cuboid	
	Cube	
	Triangular prism	
	Cylinder	
	Tetrahedron	
	Square based pyramid	

Angles

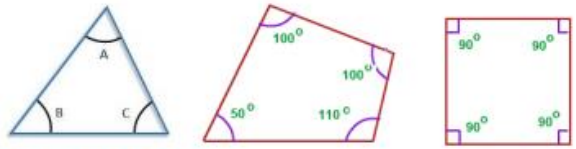


Vertically opposite angles are the <u>same.</u>



Angles in a straight line add up to 180 degrees

Angles in a full turn add up to 360 degrees.

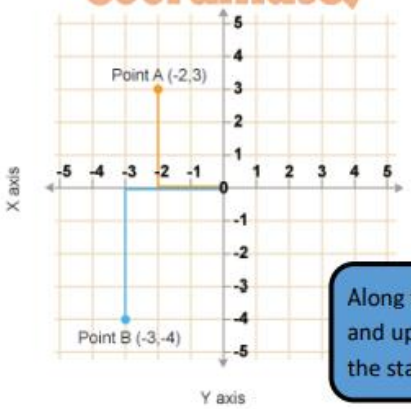


A + B + C = 180°

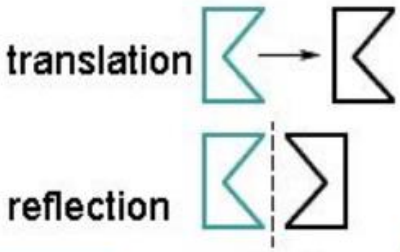
Angles inside a triangle add up to 180 degrees

Angles inside a quadrilateral add up to 180 degrees

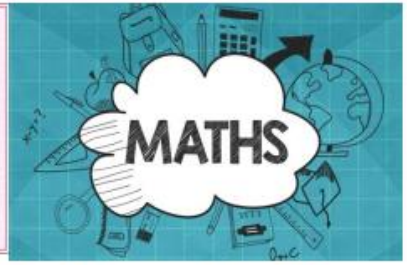
Coordinates



Along the corridor and up or down the stairs (-2,3)



Know parts of a circle



Fractions you need to know

YEAR 6

Find equivalent fractions and simplify

$$\frac{4}{12} = \frac{1}{3}$$

SIMPLIFY FRACTIONS

Divide a fraction by a whole number

$\frac{3}{4} \div 2$

Flip it $\frac{4}{3}$

Times it $\frac{4}{3} \times 2 = \frac{8}{3}$

Flip it back $\frac{3}{8}$

Add and subtract fractions

$$\frac{2}{15} + \frac{3}{5} = ?$$

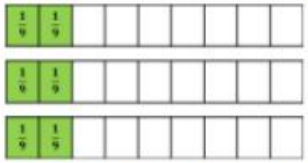
$$\frac{2}{15} + \frac{3 \times 3}{5 \times 3}$$

Find a common denominator

$$\frac{2}{15} + \frac{9}{15} = \frac{2+9}{15} = \frac{11}{15}$$

Same

Multiply a fraction by a whole number



$$3 \times \frac{2}{9} = \frac{6}{9}$$

Multiply a fraction by a fraction

numerator X numerator

$$\frac{3}{4} \times \frac{3}{5} = \frac{9}{20}$$

denominator X denominator

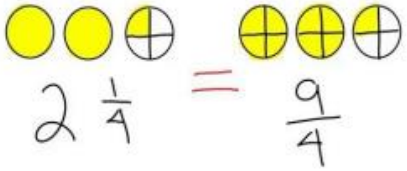
Fraction	Percent	Decimal
1	100%	1.0
1/2	50%	0.5
1/3	33.3%	0.33
1/4	25%	0.25
1/5	20%	0.2
1/8	12.5%	0.125
1/10	10%	0.1

Converting a mixed number to an improper fraction

Then add.

$$4\frac{1}{3} = \frac{13}{3}$$

Multiply.



Percentages

Out of 100

To find a percentage, make it over 100.

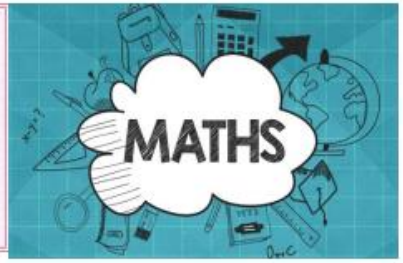
$\frac{2}{5} = \frac{40}{100} = 40\%$

x20

Percentages of amounts

Find 50 %	÷ 2	half it
Find 25%	÷ 4	half it and half it again
Find 10%	÷ 10	
Find 1%	÷ 100	

Use these parts to find any other percentage



Measures you need to know

YEAR 6

Converting measurements

Length

10 millimetres = 1 centimetre

100 centimetres = 1 metre

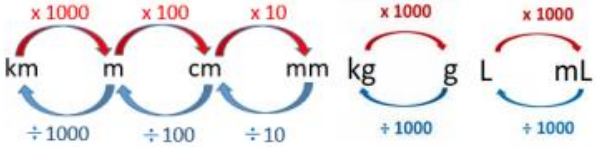
1000 metres = 1 kilometre

Mass

1000grams = 1 kilogram

Capacity

1000 millilitres = 1 litre



Time

1 minute = 60 seconds
1 hour = 60 minutes
1 day = 24 hours
1 week = 7days
1 year = 52 weeks
1 year = 12 months
1 year = 365 days

Tell the time accurately with 12 and 24 hour clocks

Ratio

I plant 2 purple flowers for every 6 red flowers in my garden. If I have 12 purple flowers, how many are red?

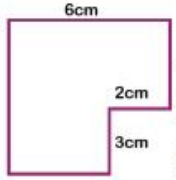
Purple	Red	Total
2 :	6	8
x6	x6	x6
12	36	48

One inch is approximately 2.5 centimetres
1 inch ≈ 2.5 cm

1 kilogram is approximately 2 pounds
1 kg ≈ 2 lbs

568ml = 1 pint

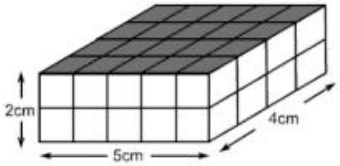
Area, Perimeter and Volume



Perimeter

Add up ALL the sales

Volume = length x width x height

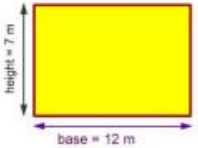


Volume = 5 x 4 x 2 = 40 cm³

Area of Rectangle

The area of a Rectangle equals the base times the height.

A = b x h

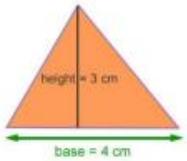


A = b x h
A = 12 x 7
A = 84 m²

Area of Triangle

The area of a Triangle equals one half the base times the height.

A = ½ x b x h or A = (b x h) / 2

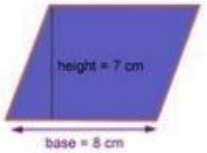


A = ½ x b x h
A = ½ x 4 x 3
A = 6 cm²

Area of Parallelogram

The area of a Parallelogram equals the base times the height.

A = b x h



A = b x h
A = 8 x 7
A = 56 cm²