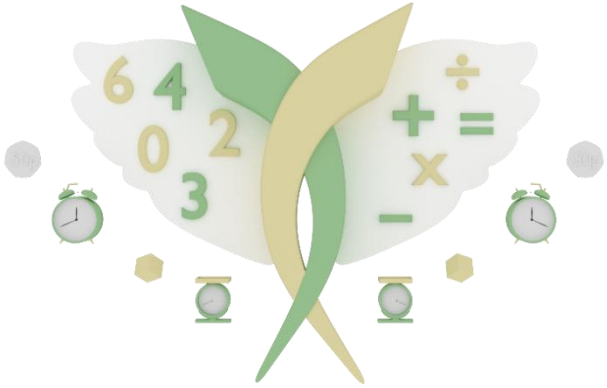
National Curriculum 2014

Planning Materials

Year 3



Purpose of study

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

Aims

The National Curriculum for mathematics aims to ensure that all pupils:

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

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

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

The principal focus of mathematics teaching Lower Key Stage 2

- The principal focus of mathematics teaching in lower Key Stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.
- At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.
- By the end of Year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.
- Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

Year 3 programme of study (statutory requirements)

Number and place value	Addition and subtraction	Multiplication and division	Fractions

• count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
• recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
• compare and order numbers up to 1000
• identify, represent and estimate numbers using different representations
• read and write numbers to at least 1000 in numerals and in words
• solve number problems and practical problems involving these ideas.
	• add and subtract numbers mentally, including:
	  – a three-digit number and ones
	  – a three-digit number and tens
	  – a three-digit number and hundreds
	• add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
	• estimate the answer to a calculation and use inverse operations to check answers
	• solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.
		• 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 for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
		• solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.
			• 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 (e.g. $^5/_7 + ^1/_7 = ^6/_7$)
			• compare and order unit fractions, and fractions with the same denominators
			• solve problems that involve all of the above.

Measurement	Geometry: properties of shapes	Statistics
• measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) • measure the perimeter of simple 2-D shapes • add and subtract amounts of money to give change, using both £ and p in practical contexts • tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks • estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight • know the number of seconds in a minute and the number of days in each month, year and leap year • compare durations of events, [for example to calculate the time taken by particular events or tasks].	• draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations; and describe them • recognise that angles are a property of shape or a description of a turn • identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle • identify horizontal and vertical lines and pairs of perpendicular and parallel lines	• interpret and present data using bar charts, pictograms and tables • solve one-step and two-step questions [e.g. 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.

Year 3 Notes and Guidance (non-statutory)

Number and place value	Addition and subtraction	Multiplication and division	Fractions
• *Pupils now use multiples of 2, 3, 4, 5, 8, 10, 50 and 100* • *They use larger numbers to at least 1000, applying partitioning related to place value using varied and increasingly complex problems, building on work in year 2 (e.g. 146 = 100 + 40 and 6, 146 = 130 and 16).* • *Using a variety of representations, including those related to measure, pupils continue to count in ones, tens and hundreds, so that they become fluent in the order and place value of numbers to 1000.*	• *Pupils practise solving varied addition and subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100.* • *Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent (see Mathematics Appendix) (see school routeway).*	• *Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.* • *Pupils develop efficient mental methods, for example, using commutativity and associativity (e.g. 4 × 12 × 5 = 4 × 5 × 12 = 20 × 12 = 240) and multiplication and division facts (e.g. using 3 ×2 = 6, 6 ÷ 3 = 2 and 2 = 6 ÷ 3) to derive related facts (30 × 2 = 60, 60 ÷ 3 = 20 and 20 = 60 ÷ 3).* • *Pupils develop reliable written methods for multiplication and division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication and division.* • *Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These including measuring and scaling contexts, (e.g. four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (e.g. 3 hats and 4 coats, how many different outfits; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).*	• *Pupils connect tenths to place value, decimal measures and to division by 10.* • *They begin to understand unit and non-unit fractions as numbers on the number line, and deduce relations between them, such as size and equivalence. They should go beyond the [0, 1] interval, relating this to measure.* • *Pupils understand the relation between unit fractions as operators (fractions of) and division by integers.* • *They continue to recognise fractions in the context of parts of a whole, numbers, measurements, a shape, or unit fractions as a division of a quantity.* • *Pupils practise adding and subtracting fractions with the same denominator through a variety of increasingly complex problems to improve fluency.*

Measurement	Geometry: properties of shapes	Statistics
• *Pupils continue to measure using the appropriate tools and units, progressing to using a wider range of measures, including comparing and using mixed units (e.g. 1 kg and 200g) and simple equivalents of mixed units (e.g. 5m = 500cm).* • *The comparison of measures includes simple scaling by integers (e.g. a given quantity or measure is twice as long or five times as high) and this should connect to multiplication.* • *Pupils continue to become fluent in recognising the value of coins, by adding and subtracting amounts, including mixed units, and giving change using manageable amounts. They record £ and p separately. The decimal recording of money is introduced formally in year 4.* • *Pupils use both analogue and digital 12-hour clocks and record their times. In this way they become fluent in and prepared for using digital 24-hour clocks in year 4.*	• *Pupils' knowledge of the properties of shapes is extended at this stage to symmetrical and non-symmetrical polygons and polyhedra. Pupils extend their use of the properties of shapes. They should be able to describe the properties of 2-D and 3-D shapes using accurate language, including lengths of lines and acute and obtuse for angles greater or lesser than a right angle.* • *Pupils connect decimals and rounding to drawing and measuring straight lines in centimetres, in a variety of contexts.*	• *Pupils understand and use simple scales (e.g. 2, 5, 10 units per cm) in pictograms and bar charts with increasing accuracy.* • *They continue to interpret data presented in many contexts.*

Number and Place Value

Yr 3 Statutory requirements

- **count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number**
- **recognise the place value of each digit in a three-digit number (hundreds, tens, ones)**
- **compare and order numbers up to 1000**
- **identify, represent and estimate numbers using different representations**
- **read and write numbers to at least 1000 in numerals and in words**
- **solve number problems and practical problems involving these ideas.**

AB BC MATHS

Autumn 1

- count on and back in ones, tens and hundreds from any number *e.g. Count on or back 6 from 129, count on from 141 to 147, how many did you count?*
- know what each digit represents in a three-digit number *e.g. Which number is equivalent to 4 hundreds, 5 tens and 6 ones or 9hundreds and 2 ones*
- partition three-digit numbers (hundreds, tens, ones) *e.g. 452 = 400 + ☐ + 2, 616 = ☐ + 16*
- make three-digit numbers using a range of equipment
- read and write three-digit numbers
- know the importance of zero as a place holder
- compare numbers to 1000 *e.g. Which is longer: 157cm or 517cm. I have 145 stamps; Becky has 154, who has more/fewer stamps?*
- use the language and symbols involved when comparing numbers <, > *e.g. What symbol makes this correct 147 ☐ 174?*
- order numbers up to 1000 *e.g. 136, 258, 285, 163, 28*
- find 10, 100 more or less than a given three-digit number *e.g. 540 + ☐ = 640*
- solve number problems and practical problems *e.g. Use the digits 2, 5, 3 to make the biggest/smallest number, the number closest to 240*

Spring 1

- count on and back in ones, tens and hundreds from any number *e.g. Count on or back 400 in hundreds from 520, 670... Count on in hundreds from 460 to 960. How many hundreds did you count?*
- know the number that is 10 and 100 more/less than any number *e.g. Jack walks 645 metres to school. Suzy walks 100 metres less. How far does Suzy walk?*
- know the value of each digit in a three-digit number *e.g. In one step make 478 into 978; make 326 into 396; change 707 to 507; change 263 to 203*
- read and write whole numbers to at least 1000 in numerals and words
- recognise and explain the effect on the digits when counting in 10s or 100s including crossing the 10 and 100 boundaries *e.g. 10 more than 199*
- partition two and three-digit numbers in different ways e.g. *72 = 70 + 2, 72 = 60 + 12, 72 = 50 + 22 or 853 = 800 + 53, 853 = 700 + 153, 853 = 600 + 253*
- solve number problems and practical problems *e.g. Use three of the digits 2, 1, 6 and 3 to write the numbers between 100 and 140.*

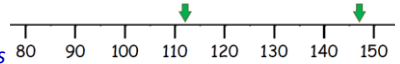
Summer 1

- count on and back in multiples of 3, 4, 8, 50 and 100 using a variety of representations including those related to measures (counting on using different scales in different orientations)
- compare and order numbers up to 1000, say which is more or less (< , >) and position on an unmarked number line explaining reasoning *e.g. On a 0 to 1000 line marked in ten increments, mark where 280, 615, 925would go? Which is more 4 hundreds or 41 tens?*
- estimate points on a number line or measuring scale *e.g. estimate the position marked by the arrow*

- solve number problems and practical problems *e.g. This ribbon is between 90 cm and 140 cm long. How long could it be?*

Autumn 2

- count on and back in multiples of 2, 3, 4, 5, 10 and 100
- recognise relationships between counting sequences *e.g. 2s and 4s, 5s and 10s, 10s and 100s*
- know the multiple of 10 that comes before and after any two-and three-digit numbers *e.g. 362 is between 360 and 370*
- position numbers on a number line by identifying key markers *e.g. Use multiples of 10 and 100 to position 137, 87 and 78 on the number line, estimate the value of the arrows*



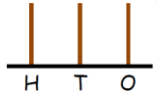
- round two-and three-digit numbers to the nearest 10
- understand rounding can support making sensible estimates
- solve number problems *e.g. reading scales in measures*

Spring 2

- count on or back in multiples of 3, 4, 8 and 50
- establish the step size in a sequence by finding the difference between two consecutive numbers
- describe and complete sequences *e.g. What are the missing numbers in these sequences 1, 7, 13, 19, ☐, ☐ and ☐, 26, 22, ☐, ☐, 10, 6, 2*
- create sequences *e.g. Make different sequences that include 4 and 12*
- use the vocabulary of estimation and approximation
- estimate the number of items in a container with up to 100 items *e.g. Say that the number of items is about 35 or that there are between 30 and 40*
- discuss different strategies for making estimates
- solve number problems *e.g. Counting in steps of 4 from 3 will generate odd numbers only, while counting in steps of 3 from 4 the numbers alternate between odd and even*

Summer 2

- count on and back in multiples of 3, 4, 8, 50 and 100
- find which whole number is half way between two given numbers *e.g. What number is half way between 26 and 48, 850 and 950, 145 and 175?*
- round two-digit and three-digit numbers to the nearest 10 and 100 *e.g. 750, 651, 770, 684, 72, 731 which numbers could be rounded to 700? Find a number that when rounded to the nearest 10 is 150 and when rounded to the nearest 100 is 200*
- solve non-routine problems e.g. *There are four beads. Place them to make numbers more than 100. How many different three-digit numbers can be made? What's the smallest possible three-digit even number, the largest possible odd two-digit number?*



Addition and Subtraction

Yr 3 Statutory requirements

- **add and subtract numbers mentally, including:**
  - **a three-digit number and ones**
  - **a three-digit number and tens**
  - **a three-digit number and hundreds**
- **add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction**
- **estimate the answer to a calculation and use inverse operations to check answers**
- **solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction**

Autumn 1

- recall fluently addition and subtraction facts to 20
- use and apply facts to add several single-digit numbers *e.g. 6 + 7 + 5, 8 + 9 + 8*
- add and subtract one-digit numbers to/from three-digit numbers mentally e.g. 264 + 5, 158 – 4, 356 + 7, 362 – 8, 356 + ☐ = 364, 431 = 438 - ☐
- know pairs of multiples of 10 that total 100 and pairs of multiples of 100 that total 1000
- add and subtract two two-digit numbers mentally, in a range of contexts *e.g. 76 – 50, 45 + 53, 78m -- 26m, £56 + £38, 50p – 37p*
- solve problems in a range of contexts *e.g. I think of a number and add 8 and my answer was 26. What was my number? I need 500 points. I already have 493, how many more do I need? Explain how you would solve 70 – 36. Is it always, sometimes or never true that when you add two two-digit numbers together you will get an even number?*

Autumn 2

- recall fluently addition and subtraction facts to 20
- know addition and subtraction fact for multiples of 10 and 100 *e.g. 7 - 2 = 5, 70 - 20 = 50, 700 - 200 = 500*
- add and subtract two-digit numbers mentally, crossing the hundreds boundary using partitioning flexibly and number facts *e.g.56 + 83, ☐ + 74 = 128, 82 - 38*
- estimate an answer and check using inverse
- add and subtract multiples of 10 and 100 to and from three-digit numbers, recognising the significance of each digit *e.g.345 + 50, ☐ + 200 = 652, 494 – 50, 679 - ☐ = 279, 435 - 70*
- know what must be added to any two- or three-digit number to make the next multiple of 10 *e.g. 127 + ☐ = 130*
- understand and use the term difference
- find a small difference by counting up using pairs to 10 and number facts *e.g. the difference between 83 and 76, 143 - 135*
- use a range of calculation strategies to solve problems in the context of money and measures

Spring 1

- recall fluently addition and subtraction facts to 20
- begin to derive pairs to 100 *e.g. 34 + 66*
- know addition and subtraction facts involving multiples of 10 and 100 *e.g. 40 + 70, 900 - 500, 190 – 70, 120 - ☐ = 50*
- add and subtract two two-digit numbers using place value equipment and an expanded method (in preparation for understanding formal written method)

e.g. arrow cards, diennes,
- add and subtract two three-digit numbers using place value equipment and an expanded method (in preparation for Spring 2)
- begin to introduce exchange knowing that ten ones make 10, ten tens make 100 *e.g. 452 - 237*
- solve problems in a range of contexts *e.g. Jill buys 37 balloons and Jack buys 84. How many do they have in total? 275 bulbs in a packed, 156 are planted by Pete, Becky plants the rest. How many does she plant?*

Spring 2

- know pairs of numbers that total 100 *e.g. 3☐ + ☐5 = 100*
- solve problems mentally involving the addition and subtraction of two- or three-digit numbers, including crossing the hundreds boundary in a range of contexts *e.g. Harry has 82 comics, Bill has 65 more. How many comics does Bill have? Ben has 426 cars and is given 60 more. How many does he have?*
- check an answer using the inverse operation
- add and subtract two two-digit then three-digit numbers making at least one exchange, using formal columnar methods (model with place value equipment as required) *e.g. 426 + 256, 746 – 418*
- solve problems using the formal columnar methods of addition and subtraction *e.g. There are 244 children in school, 118 go on a school trip, how many are still in school? In a pot of counters, 354 are red and 273 are white. How many counters are in the pot? What's wrong with these calculations?*

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  5 4 5        6 6 4
+ 3 2 7      - 2 3 7
-------      -------
  8 6 12       4 3 3
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Summer 1

- know addition and subtraction facts to 20 and pairs to 100 *e.g. 100 = 24 + ☐, 100 - ☐ = 72*
- extend adding and subtracting multiples of 10 and 100 to adding and subtracting near-multiples *e.g. 632 + 200 and 632 – 200, 632 + 198 and 632 – 203*
- add and subtract two three-digit numbers using formal columnar methods, making multiple exchanges *e.g. 546 + 377, 731 - 276*
- add and subtract a two-digit and a three-digit number using formal columnar methods, including exchange
- use inverse operations to check answers
- solve problems in a range of contexts *e.g. True or false 346 – 199 = 145 and explain why. Which of these calculations have the answer that is between 70 and 80? 284 - 218, 432 – 357, 946 – 871*

Summer 2

- secure formal written methods of columnar addition and subtraction with three-digit numbers in a range of contexts *e.g. Three holidays cost £279, £635 and £542. What's the difference in price between the most and least expensive holiday?*
- estimate the answer to a calculation and use inverse operations to check the answer
- know that finding the difference is the same as asking 'How much larger/smaller is one than the other?'
- find the difference by counting up and apply to the context of money and measures *e.g. Using a number line*
- solve problems making sensible calculation choices, deciding whether to use a written or mental method *e.g. How would you solve 345 + 6, 104 – 96, 563 + 262? Clare has £376, spends £9. How much does she have left? There are 265 children at Bird Park School. 102 children have a packed lunch. 27 children go home for lunch. The other children have a school lunch. How many children have a school lunch? Tilly is 109cm tall. Willow is 137cm tall. How much taller is Willow than Tilly?*

Multiplication and Division

Yr 3 Statutory requirements

- **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 for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods**
- **solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.**

Autumn

- know multiplication facts for the 2, 5, and 10 times-tables and corresponding division facts *e.g. 5 x 6, 35 ÷ 5, 18 divided by 3, 10 times 6, how many 5s in 40*
- count from zero in steps of 2, 3, 4, 5, 8, 10 and start to recognise multiples of 3, 4 and 8
- identify and sort multiples of 2, 5, 10 within 1000 *e.g. Is 36 a multiple of 5, explain how you know*
- learn the 4 times table and corresponding division facts *e.g. Linking to counting in 4s.Iinvestigating patterns in multiples of 2 and 4 leading to double the two times table to get the four times table*
- secure understanding of multiplication as repeated addition and division as grouping and sharing *e.g. Using practical equipment, arrays and real life contexts*
- know and use the fact that multiplication is commutative and can be done in any order *e.g. 5 x 6 = 6 x 5*
- know what happens when you multiply then divide by the same number, understanding that division reverses multiplication
- solve scaling problems using doubles, halves and tables facts *e.g. Bailey has 8 Scooby snacks, Lucy has three times as many. How many Scooby snacks does Lucy have? Becca has 14 stickers but Susie has twice as many. How many stickers does Susie have? Make a tower of 15 red cubes, make a tower of blue cubes that is five times shorter*
- begin to multiply a 'teens' numbers by a single–digit using practical and informal methods *e.g. To find 14 × 3 combining the knowledge that 10 x 3 = 30 and 4 x 3 = 12*
- derive doubles of numbers to at least 50 and corresponding halves *e.g. Double the tens and double the ones*
- solve simple multiplication and division problems in a range of contexts *e.g. There are 12 stickers on each sheet, how many stickers would there be on 5 sheets. Yasmin has 36cm of ribbon, how many 4cm pieces can she cut?*

Spring

- count from zero in steps of 3, 4, 8
- know multiplication facts for the 2, 4, 5 and 10 times-tables and corresponding division facts *e.g. multiply 10 by 6, divide 45 by 5, how many fours in 32?*
- learn the 3 and 8 times-tables *e.g. 8 x 3, 4 x ☐ = 36, 18 ÷ ☐ = 6*
- connect the 4 and 8 times tables *e.g. Double the four times table to get the eight times table*
- know and use the inverse relationship between multiplication and division *e.g. ☐ ÷ 3 = 6 using 3 x 6 = 18*
- use known multiplication and division facts to derive new facts *e.g. Derive 8 x 6 = 48 from 8 x 5 = 40 and then add 8. Use 6 ÷ 3 = 2 to derive 60 ÷ 3 = 20*
- multiply one-digit numbers by multiples of 10, recording methods informally *e.g. 3 x 50*
- multiply two-digit numbers by a single digit using partitioning and multiplication facts (expanded method e.g. grid) *e.g. 23 x 3, 26 x 5*
- solve division calculations involving known facts with exact answers and those with remainders *e.g. 37 ÷ 4 by grouping in fours on a bead string or using multiples of 4*
- know that a remainder represents what is left over after a division and is always smaller than the divisor
- solve problems involving multiplication and division in a range of contexts *e.g. A cook puts 3 cake cases in each of the 4 rows in her baking tray. How many cake cases does she use? Andi has 8 stickers. Jo has 3 times as many as Andi. How many stickers does Jo have? I have 46 cakes. One box holds 5 cakes. How many boxes can I fill? 24 sweets shared equally between 4 children, how many will they have each?*

Summer

- know the 2, 3, 4, 5, 8 and 10 times-tables and corresponding division facts *e.g. ☐ ÷ 8 = 5, 24 = ☐x☐ Six eggs in each box, how many boxes are needed for 48 eggs.*
- recall doubles of all numbers to 100 and corresponding halves
- solve scaling problems *e.g. Work out a recipe for eight people or two people by doubling or halving the quantities for four people*
- divide two-digit numbers by a single-digit using partitioning and known division facts (expanded method or place value equipment) *e.g. 64 ÷ 4*

$$4 \overline{)\ 40 + 24} = 10 + 6 = 16$$

- secure multiplication of two-digit numbers by a single digit using partitioning and multiplication facts (expanded method e.g. grid) *e.g. 35 x 8, 64 x 3*
- solve multiplication and division problems in range a contexts, select an appropriate strategy and explain choices made e.g. Explain how I could use 8 x 5 = 40 to work out 8 x 7. *Greg spent £54 on tickets that cost £3, how many tickets did he buy? There are 15 pens in a pack, how many would be in 3 packs?*
- solve correspondence problems *e.g. For lunch Peter can choose between a baked potato, a toasted sandwich or a tuna salad. For pudding he can have a yogurt or strawberries and cream or jelly. How many different meals could he make? Joe has 3 different coloured T-shirts. He has 4 different coloured pairs of shorts. How many possible outfits does he have?*

Apply knowledge to solve mathematical problems or puzzles

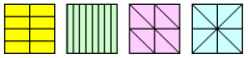
Fractions

Yr 3 Statutory requirements

- **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 (e.g. $^5/_7 + {}^1/_7 = {}^6/_7$)**
- **compare and order unit fractions, and fractions with the same denominators**
- **solve problems that involve all of the above.**

Autumn

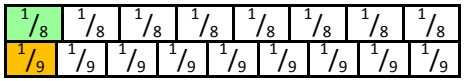
- count in halves, quarters and thirds *e.g. Count in steps of $^1/_4$ using concrete models and images, recognising that $^2/_4$ and $^1/_2$ are equivalent*
- know that fractions can be expressed as one number written above another *e.g. $^1/_5$, $^3/_4$*
- understand the terms denominator (bottom number) as the number of parts a whole is divided in to, and numerator (top number) as the number of parts we are interested in
- identify fractions of a whole beyond finding $^1/_2$, $^1/_4$, $^1/_3$, $^3/_4$ *e.g. Divide shapes into a different number of pieces, such as a hexagon into 2, 3, or 6 equal parts*
- know that tenths arise from dividing an object or an amount into 10 equal parts
- know that one whole is equivalent to two halves, three thirds, four quarters, five fifths, … ,ten tenths
- investigate alternate ways of dividing a shape into a given fraction *e.g. How many different ways can a square be folded into eighths?*



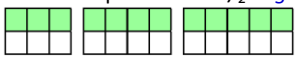
- understand that unit fractions have a numerator of 1 and represent one part of a whole divided into equal pieces; that a non-unit fraction is used when the numerator is greater than one *e.g. $^3/_4$, $^2/_5$*
- extend knowledge of unit fractions to fractions that represent several parts of a whole *e.g. shade $^3/_8$ of an octagon, understanding that any 3 of the 8 triangles can be shaded*
- compare and order unit fractions using visual images *e.g. Which is larger $^1/_3$ or $^1/_5$? Convince me you're right - using strips of paper and fraction walls*
- know that finding one half is equivalent to dividing by two *e.g. $^1/_2$ of 16 is equivalent to 16 ÷ 2*
- find unit fractions of amounts using known division facts or by practical equal sharing on to a fraction board *e.g. $^1/_{10}$ of 30, $^1/_5$ of 20*
- solve problems and reason about fractions *e.g. If ▲ represents $^1/_5$ what could the whole look like? Explain what fraction of the shape is shaded?*

Spring

- count in fractions *e.g. in fifths 'zero, one fifth, two fifths, three fifths, four fifths, one, one and one fifth…'* and
- count on and back in tenths *e.g. eight tenths, nine tenths, one, one and one tenth… three and one tenth, three, two and nine tenths, two and eight tenths…*
- read and write proper fractions understanding the denominator as parts of the whole and the numerator as the number of parts
- understand the larger the denominator the smaller the unit fraction, because the whole is divided into more equal parts *e.g. Which is larger $^1/_8$ or $^1/_9$?*



- understand equivalence as having the same value
- compare fractions establishing equivalence between halves, quarters and eighths; fifths and tenths; thirds, sixths and ninths *e.g. Using paper strips, fraction walls*
- recognise when the numerator is half the denominator the fraction is equivalent to $^1/_2$ *e.g.* $^1/_2 = {}^3/_6 = {}^4/_8 = {}^5/_{10}$

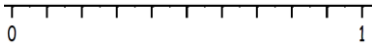


- find equivalent fractions of a given unit fraction *e.g. Use a fraction wall to explain why $^1/_5$ is equivalent to $^2/_{10}$*
- investigate ways of making one whole using visual representations such as fraction walls
- identify pairs of fractions that total 1 understanding the role of the denominator as describing the 'group' i.e. all thirds, tenths *e.g. $^1/_3 + {}^2/_3$, $^1/_4 + {}^3/_4$, $^3/_{10} + {}^7/_{10}$*
- find unit fractions and non-unit fractions, with small denominators, of a discrete set of objects and quantities *e.g. $^1/_8$ of 24, $^1/_3$ of £27, $^2/_3$ of 12m, $^3/_{10}$ of 40kg*
- solve simple problems in a range of context *e.g. I have eaten $^3/_{10}$ of my bar of chocolate. What fraction do I have left to eat? If $^2/_3$ of the class are girls, what fraction are boys? True or false $^1/_5$ of 1m is less than 30cm, how do you know?*

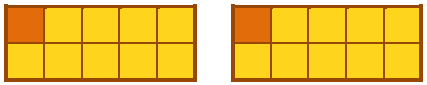
Summer

- count in fractions *e.g. If we count in halves, what numbers comes between 3 and 5, if we count in quarters, what number comes between $2^1/_2$ and $3^1/_2$?*
- recognise that fractions are numbers in their own right and place fractions on a number line *e.g. What fraction is the arrow pointing to?*

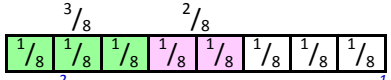
Where would $^1/_2$, $^1/_{10}$, $^7/_{10}$ be on this number line?



- extend links between fractions and division *e.g. Realising that when finding $^1/_5$ of an amount we are dividing it into 5 equal groups, in contrast to an object being divided into 5 equal pieces*
- understand that when, for example, one whole cake is divided equally into 4, each person gets one quarter, or 1 ÷ 4 = $^1/_4$
- know that tenths arise from dividing an object into 10 equal parts, by dividing an amount / quantity by 10 and by dividing one-digit numbers by 10 *e.g. 2 tray bakes divided equally between 10 is 2 ÷ 10 = $^2/_{10}$*



- extend knowledge of identifying pairs of fractions that make one whole to adding and subtracting fractions with the same denominator within one whole *e.g.* $^3/_8 + {}^2/_8 = {}^5/_8$

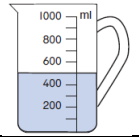


Andrea has $^2/_5$ of a bag of sweets. Becky has $^1/_5$. What fraction of the sweets do they have altogether? What fraction is left in the bag?

- solve problems using fractions in context *e.g. Would you rather have $^1/_5$ of 30 sweets or $^3/_4$ of 12 sweets? Why? If Tom eats $^2/_5$ of a pizza and Susie eats $^2/_5$, how much pizza have they eaten altogether? How much of the pizza is left?*
- solve correspondence problems involving fractions *e.g. 5 cakes shared equally between 10 children*

Apply knowledge to solve mathematical problems or puzzles

Measures

Yr 3 Statutory requirements	Autumn	Spring	Summer
• **measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)** • **measure the perimeter of simple 2-D shapes**	• know the relationships between standard units of measure *e.g. Know that 1kg is the same as 1000g, 1L is the same as 1000ml, 1m is 100cm* • use the relationship 1kg = 1000g to convert kilograms to grams *e.g. 2kg = 2000g, 5kg = 5000g* • make sensible estimates using a known marker as a comparison (1kg bag of sugar) *e.g. Would you expect: a new born baby to be 3kg or 30 kg? The mass of an apple to be 20g, 200g, 2000g?* • suggest suitable units and measuring equipment to estimate and measure (using known markers) mass • read scales to the nearest marked division or half-division in practical contexts, on a range of scales, involving mass *e.g. When cooking* • solve addition and subtraction measures problems including reading a scales *e.g.* • solve a range of problems involving scaling *e.g. Pete is 80cm tall, his older brother is twice as tall. How tall is his brother? The larger parcel is five times heavier than the parcel that weighs 3kg. How heavy is the larger parcel? Becky's water bottle holds half as much as Andrea's. How much does Andrea's bottle hold?*	• know the relationship between standard units measure *e.g. Know that 1m is 100cm, that 1cm is 10mm, 1kg is 1000g, 1l is 1000ml* • use the relationship 1m = 100cm to convert whole metres to cm *e.g. 2m = 200cm, 5m = 500cm* • know that, for example, 1m and 34cm is the same as 100cm and 34cm = 134cm • compare mixed units of length using the relationship between the standard units *e.g. Which is longer 1m and 45cm or 153cm? Explain how you know this statement is true 2cm and 4mm > 21mm* • make sensible estimates using a known marker as a comparison (a metre stick / 30cm ruler) *e.g. Would you expect a front door to be 1m, 2m or 5m tall?* • suggest suitable units and measuring equipment to estimate and measure (using known markers) length • solve addition and subtraction measures problems *e.g. Two rolls of tape are 35cm and 41cm long. What is their total length? What is the difference in their lengths?* • use a ruler to measure and draw lines accurately to the nearest half-centimetre • know that the perimeter is the distance around the outside of a 2-D shape • measure the perimeter of a simple 2-D shape by measuring its sides and adding them up *e.g. Draw round the edge of a rectangle with a pencil. How far did the pencil travel? Measure the distance.* • calculate the perimeter of rectangles and other simple 2-D shapes *e.g. What's the perimeter of a 4cm x 7cm rectangle...a triangle whose sides are 10m, 20m and 24m? The perimeter of a square is 28cm. What is the length of one side? Draw two rectangles with the same perimeter as the square*	• know the relationship between standard units measure *e.g. Know that 1l is 1000ml, 1m is 100cm, that 1cm is 10mm, 1kg is 1000g* • use the relationship 1litre = 1000ml to convert litres to millilitres *e.g. 2l = 2000ml, 5l = 5000ml* • know that, for example, 1l and 300ml is the same as 1000ml and 300ml = 1300ml • compare mixed units of capacity using the relationship between the standard units *e.g. Explain how you know this statement is true 2l and 400ml < 3000ml* • make sensible estimates using a known marker as a comparison (1L bottle of pop) *e.g. Would you expect a teapot to hold 1 litre, 10 litres or 100 litres?* • suggest suitable units and measuring equipment to estimate and measure (using known markers) volume/capacity *e.g. Pour 100ml of water into three differently shaped bottles, using this to estimate the capacities when the bottles are full, and checking how close estimates are by measuring* • reading scales to the nearest marked division or half-division in practical activities *e.g. When cooking* • when solving measures problems, appreciate the importance of the units, recognising when there is a need to convert between them *e.g. Ron has 600ml of chocolate milk and Harry has 500ml of chocolate milk. How much do they have between them? How much more than 1 litre do they have? George has 1l and 500ml of juice, but Fred has 900ml of juice. Who has the most juice? How much more?* • solve addition and subtraction measures problems including reading a scale *e.g. If 150ml is poured from the jug, how much would be left?* 

Apply knowledge of measures to solve mathematical problems or puzzles

Measures: Time

Yr 3 Statutory requirements	Autumn	Spring	Summer
tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks **estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight** **know the number of seconds in a minute and the number of days in each month, year and leap year** **compare durations of events, [for example to calculate the time taken by particular events or tasks].**	know 60 seconds is one minute know how many days in each month, how many days in a year and in a leap year know and use relationships to compare time durations *e.g. July has more days than June? Which is longer 2 minutes or 100 seconds? 2 weeks or 10 days?* use vocabulary such as morning, afternoon, noon and midnight consolidate telling the time to the hour, half hour, quarter hour and to the nearest five minutes on an analogue clock with increasing accuracy (including those with Roman numerals) know that a digital clock does not have hands but shows the time using three or four digits *e.g. 10:35* know that digital clocks always show minutes past the hour *e.g. 11:40 represents 40 minutes past 11, which on an analogue clock could be read as twenty to 12* write the time to the nearest 5 minutes *e.g. Using words or digital notation* calculate time differences *e.g. Find the length of a journey to school if you left home at 8:40 and arrive at school at 9:05. Find the length of a programme using a TV guide.*	read the time to the nearest five minutes and then one minute on an analogue clock and a 12-hour digital clock write the time to the nearest minute know that on a 12- hour clock there are twelve hours running from midnight to noon (a.m.) and twelve hours running from noon to midnight (p.m.) know that a time can be expressed in different ways *e.g. That 4:37, or 37 minutes past 4, or 23 minutes to 5 are equivalent* solve problems that involve finding a start or end time for a given interval, explain choice of method and discuss alternative strategies *e.g. Mark got into the pool at 3:25 pm. He swam for 40 minutes. What time did he get out? Lunch takes 50 minutes. It ends at 1:00 pm. What time does it start? The cake went in the oven at 10:20. It came out at 10:45* use time lines to record thinking	estimate and read time with increasing accuracy to the nearest minute on a range of clocks solve a mix of time problems including finding a time difference, start and end times *e.g. Rita got into the pool at 2:26. She swam until 3 o'clock. How long did she swim? How long was it in the oven? Lunch takes 40 minutes. It ends at 1:10 pm. What time does it start?* know, use and apply time conventions and units of time *e.g. Identify suitable units for a range of activities* compare the time duration of events in seconds, minutes and hours after finding the time difference *e.g. Which took longer …* link the knowledge that there are 24 hours in a day to a 24 hour clock know that a 24 - hour clock shows how many minutes and hours have passed since midnight and shows the time using four digits tell and write the time from a 24-hour clock

Use everyday activities and opportunities, throughout the year, to practice telling the time. Solve simple everyday problems

Measures: Money

Yr 3 Statutory requirements	Autumn	Spring	Summer
add and subtract amounts of money to give change, using both £ and p in practical contexts	secure knowledge of coins and notes *e.g. Which coin is next in value after 20p? Which coins are not circular? Which coins are worth less than 20p?* investigate equivalences *e.g. Using only silver coins how many possible ways are there to make 40p* solve one- and two-step problems using pounds and pence *e.g. If you add two 20p coins to £1 and 35p, how much money is that altogether? Anna has a 50p coin and three 20p coins. She pays 90p for a Big Dipper ride. How much does she have left?*	find change from £1 using knowledge of pairs that total 100 *e.g. Ella buys one toy costing 35p and another costing 48p. She pays with £1. How much change does she get?* begin to understand money notation *e.g. £1.25* find change from pounds *e.g. Find the change from £5 when buying an item that costs 83p. Recognise that 83p add 17p makes £1; that another £4 is needed to reach £5* solve problems involving coins *e.g. Winston offered two silver coins to pay for a 17p toy. Investigate how much change he got.*	use rounding to estimate answers to problems *e.g. When finding the total of £53 plus £28* consolidate basic equivalence *e.g. Number of 20p or 5p, 2p coins in a £1, £2…* solve one and two step problems involving addition and subtraction *e.g. Work out the cost of a meal from a menu. Adult tickets cost £2.50, child tickets cost £1.50. What's the total price for 2 adults and 3 children? How much change from a £10 note?* solve problems involving coins *e.g. Which five coins make 74p? What other amounts can you make with five different coins?*

Geometry: properties of shapes

Yr 3 Statutory requirements

- **draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations; and describe them**
- **recognise that angles are a property of shape or a description of a turn**
- **identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle**
- **identify horizontal and vertical lines and pairs of perpendicular and parallel lines**

Autumn

- know that angles are a measure of turn
- understand and identify right angles as a quarter turn *e.g. Draw what the arrow would look like after turning through a right angle*

- know that two right angles make a half-turn, three right angles make three quarters of a turn and four right angles make a complete turn *e.g. In P.E. make right-angled turn. Programme Beebot*

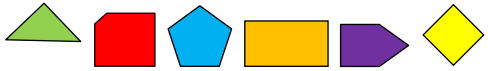
after 2 right angles this clown would look like


or

or

or


- know that the vertices of a square are right-angles and use that to identify right angles in other shapes and within the environment *e.g. How many right angles are in each shape?*

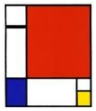


- identify whether an angle is equal to, greater than or smaller than a right angle *e.g.*

- compare and order a set of angles *e.g. Rip the vertices off an irregular shape and put them in order of size*
- describe the properties of 2-D shapes including relative size of the angles *e.g. Put three identical right-angled triangles (not isosceles) together in different ways, describe all the new shapes made*

Spring

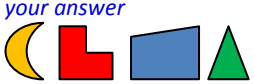
- introduce and use the terms horizontal and vertical
- know that horizontal lines go straight across from left to right and that vertical lines go straight up and down
- know that parallel lines never meet
- know that perpendicular lines are lines that meet at a right angle
- know that when horizontal and vertical lines meet they are also perpendicular lines and that pairs of horizontal/vertical lines are parallel
- identify horizontal/vertical, parallel and perpendicular sides within 2-D shapes and lines within the environment *e.g. In the door frames, window sills, football goals.. In Piet Mondrian art work*



- know that polyhedra is another word for 3-D shapes with flat faces
- describe the features of 3-D shapes including hemispheres and prisms using appropriate mathematical vocabulary *e.g. A hemisphere is a sphere cut in half. It has one flat face and a curved surface. A cube has 3 pairs of parallel faces.*
- identify faces of 3-D shapes *e.g. 'A triangular prism has two identical triangular faces at opposite ends and the other three faces are rectangles'*
- sort 3-D shapes *e.g. Using criteria such as the number of vertices, edges or faces*
- construct 3-D shapes using construction kits and straws and count the number of edges or vertices
- investigate and identify 3-D shapes in pictures and the environment, in different orientations
- investigate general statements *e.g. The number of edges of a prism is always a multiple of 3. The number of faces of a pyramid is one more than the number of edges of the base. All pyramids have an even number of edges*

Summer

- identifying whether or not a 2-D shape is symmetrical, check using a mirror or by folding *e.g. True or false these shapes are symmetrical, explain your answer*



- identify a horizontal or vertical line of symmetry in a 2-D shape
- sort collections of 2-D shapes in different ways, based on their properties and explain reasoning *e.g. Length of sides, symmetrical or not, right angles, perpendicular or parallel sides*
- describe 2-D shapes including properties of their sides and angles *e.g. This pentagon has 2 right angles, 2 angles that are more than a right angle and 1 that is less. It has 2 sets of perpendicular sides. It has 1 set of parallel sides. The parallel sides are horizontal*
- investigate shapes and pairs of lines in pictures and in the environment *e.g. What shapes can you see in the gate?* Can you find pentagon, an octagon? Where are the parallel and perpendicular lines? How many horizontal / vertical lines can you find?

- construct 2-D shapes using tangram pieces *e.g. Can you make: a square using all of the pieces, a square using three triangles, a four sided shape using two shapes, a rectangle using three shapes, a hexagon. What other shapes can you make and describe?*

Apply knowledge of shape properties to solve mathematical problems or puzzles

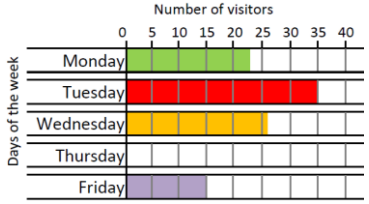
Statistics

Yr 3 Statutory requirements

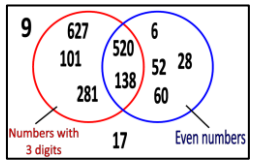
- **interpret and present data using bar charts, pictograms and tables**
- **solve one-step and two-step questions [e.g. 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.**

Autumn

- know that a bar chart should have a title and that both axis should be labelled
- interpret and present data on a scaled bar chart where either the vertical or horizontal axis are marked in multiples of 2, 5, 10 or 50 *e.g. Using data from a table, data collected from a Science experiment.*
  Children visiting the school library



- interpret data on bar chart using key questions *e.g. How many visitors were there on Monday?', 'How many more visitors were there on Tuesday than Friday?' and 'Which is the most/least popular day for visitors?' If there were 5 more visitors on Thursday than Friday. Show this on the bar chart*
- complete a partially filled in bar chart using information from a table and vice versa
- sort numbers and shapes by their properties and present using Venn and Carroll Diagrams *e.g. Where should 236, 99, 100, 385 go on the Venn Diagram or on the Carroll Diagram?*



	3-digit numbers	Not 3-digit numbers
Even	138 520	6 28 52 60
Not even	101 627 281	9 17

- identify numbers or shapes that are in positioned incorrectly within a Venn or Carroll Diagram and explain why
- identify the criteria used to sort numbers and shapes in Venn and Carroll diagrams

Spring

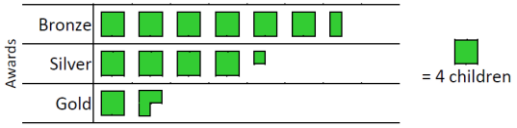
- interpret data presented in tables answering key questions *e.g. What colour was the second highest number of cars? Which two colours of cars were seen the least? How many cars were seen altogether?*

Colour of cars we saw

Colour	Number of cars
Red	18
Green	5
Blue	4
White	8
Silver	11

True or false 'twice as many white cars than blue cars were seen'

- know that a pictogram should have a title and that only one axis should be labelled and that there should be a key used to indicate the value of each symbol > 1
- interpret and present data on pictograms, where a symbol represents more than one (include computer generated examples) *e.g. Class certificates/awards won*
- know what partial symbols represent on pictogram

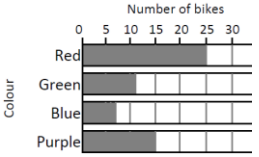


- interpret data on pictograms using key questions *e.g. ' How many children won a silver award?', 'How many fewer children won a gold award than a silver one?', 'How many children won awards?'*
- complete a partially filled in pictogram using information from a table and vice versa
- interpret pictograms using knowledge multiplication facts

Summer

- collect like sets of data presented in different ways *e.g. Bar charts, pictograms and tables all showing the same information*
- identify and explain the similarities and differences between different representations
- complete a bar chart or pictogram from information presented in a table, choosing appropriate scales (2, 5, 10, 50 or 100) on bar charts or values for each symbol in pictograms *e.g. Robbie collected some information about the colours of some bikes. Here are his results. The bar graph shows the information from the table. Fill in all the missing labels and numbers.*

Colour	Number of bikes
Red	11
Green	7
Blue	25
Purple	15



- solve one-step and two-step questions using information presented in tables, pictograms and bar charts *e.g. 'There are more red bikes than green and purple together.' Is this statement true?*

Where possible use meaningful data and experiences from across the curriculum