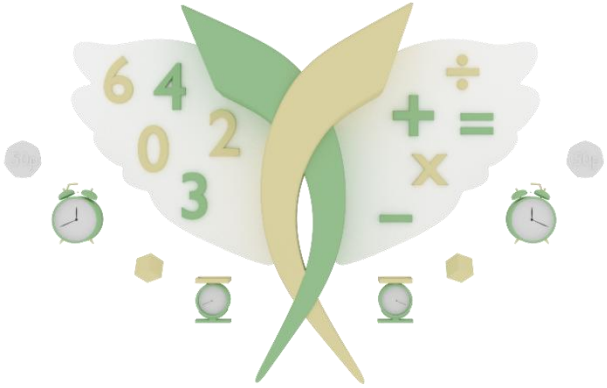
National Curriculum 2014

Planning Materials

Year 4



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 4 programme of study (statutory requirements)

Number and place value	Addition and subtraction	Multiplication and division	Fractions
• 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 (thousands, hundreds, tens, and ones) • order and compare numbers beyond 1000 • identify, represent and estimate numbers using different representations • round any number to the nearest 10, 100 or 1000 • solve number and practical problems that involve all of the above and with increasingly large positive numbers • 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.	• 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.	• 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 three numbers • recognise and use factor pairs and commutativity in mental calculations • multiply two-digit and three-digit numbers by a one-digit number using formal written layout • solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as which n objects are connected to m objects.	• recognise and show, using diagrams, families of common equivalent fractions • count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten • solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number • add and subtract fractions with the same denominator • recognise and write decimal equivalents of any number of tenths or hundredths • recognise and write decimal equivalents to $^1/_4$; $^1/_2$; $^3/_4$ • 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 two decimal place • solve simple measure and money problems involving fractions and decimals to two decimal places.

Measurement	Geometry: properties of shapes	Geometry: position and direction	Statistics
• convert between different units of measure [e.g. kilometre to metre; hour to minute] • measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres • find the area of rectilinear shapes by counting squares • estimate, compare and calculate different measures, including money in pounds and pence • read, write and convert time between analogue and digital 12 and 24-hour clocks • solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.	• 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 by size • identify lines of symmetry in 2-D shapes presented in different orientations • complete a simple symmetric figure with respect to a specific line of symmetry.	• describe positions on a 2-D grid 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.	• 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.

Year 4 Notes and Guidance (non-statutory)

Number and place value	Addition and subtraction	Multiplication and division	Fractions (including decimals)
Using a variety of representations, including measures, pupils become fluent in the order and place value of numbers beyond 1000, including counting in tens and hundreds, and maintaining fluency in other multiples through varied and frequent practice. *They begin to extend their knowledge of the number system to include the decimal numbers and fractions that they have met so far.* *They connect estimation and rounding numbers to the use of measuring instruments.* *Roman numerals should be put in their historical context so pupils understand that there have been different ways to write whole numbers and that the important concepts of zero and place value were introduced over a period of time.*	*Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency (see Mathematics Appendix) (see school routeway).*	*Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency.* *Pupils practise mental methods and extend this to three-digit numbers to derive facts, (e.g. 600 ÷ 3 = 200 can be derived from 2 x 3 = 6).* *Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers (see Mathematics Appendix) (see school routeway).* *Pupils write statements about the equality of expressions (e.g. use the distributive law 39 × 7 = 30 × 7 + 9 × 7 and associative law (2 × 3) × 4 = 2 × (3 × 4)). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations e.g. 2 × 6 × 5 = 10 × 6 = 60.* *Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the number of choices of a meal on a menu, or three cakes shared equally between 10 children.*	*Pupils should connect hundredths to tenths and place value and decimal measure.* *They extend the use of the number line to connect fractions, numbers and measures.* *Pupils understand the relation between non-unit fractions and multiplication and division of quantities, with particular emphasis on tenths and hundredths* *Pupils make connections between fractions of a length, of a shape and as a representation of one whole or set of quantities. Pupils use factors and multiples to recognise equivalent fractions and simplify where appropriate (e.g. $^{6}/_{9} = {}^{2}/_{3}$ or $^{1}/_{4} = {}^{2}/_{8}$).* *Pupils continue practice in adding and subtracting fractions with the same denominator, to become fluent through a variety of increasingly complex problems beyond one whole.* *Pupils are taught throughout that decimals and fractions are different ways of expressing numbers and proportions.* *Pupils' understanding of the number system and decimal place value is extended at this stage to tenths and then hundredths. This includes relating the decimal notation to division of whole number by 10 and later 100.* *They practise counting using simple fractions and decimals, both forwards and backwards.* *Pupils learn decimal notation and the language associated with it, including in the context of measurements. They make comparisons and order decimal amounts and quantities that are expressed to the same number of decimal places. They should be able to represent numbers with one or two decimal places in several ways, such as on number lines.*

Measurement	Geometry: properties of shapes	Geometry: position and direction	Statistics
Pupils build on their understanding of place value and decimal notation to record metric measures, including money. *They use multiplication to convert from larger to smaller units.* *Perimeter can be expressed algebraically as 2(a + b) where a and b are the dimensions in the same unit.* *They relate area to arrays and multiplication.*	*Pupils continue to classify shapes using geometrical properties, extending to classifying different triangles (e.g. isosceles, equilateral, scalene) and quadrilaterals (e.g. parallelogram, rhombus, trapezium).* *Pupils compare and order angles in preparation for using a protractor and compare lengths and angles to decide if a polygon is regular or irregular.* *Pupils draw symmetric patterns using a variety of media to become familiar with different orientations of lines of symmetry; and recognise line symmetry in a variety of diagrams, including where the line of symmetry does not dissect the original shape.*	*Pupils draw a pair of axes in one quadrant, with equal scales and integer labels. They read, write and use pairs of coordinates (2, 5), including using coordinate-plotting ICT tools.*	*Pupils understand and use a greater range of scales in their representations.* *Pupils begin to relate the graphical representation of data to recording change over time.*

Number and Place Value

Yr 4 Statutory requirements

- **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 (thousands, hundreds, tens, and ones)**
- **order and compare numbers beyond 1000**
- **identify, represent and estimate numbers using different representations**
- **round any number to the nearest 10, 100 or 1000**
- **solve number and practical problems that involve all of the above and with increasingly large positive numbers**
- **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.**

Autumn 1

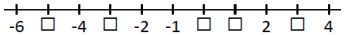
- count on and back in ones, tens, hundreds and thousands from any number *e.g. Count on or back 50 in tens from 378*
- count on and back in multiples of 6, 25, and 1000 and investigate patterns *e.g. When counting in steps of 25 from zero*
- know what each digit represents in a four-digit number *e.g. What needs to be added/subtracted to change 4782 to 9782; 3261 to 3961; 7070 to 5070? Is the 4 worth more in 234 507 or 243 560?*
- read and write four-digit numbers *e.g. What number is equivalent to seven thousands, four hundreds and six ones? Write the number seven thousand and twenty in figures*
- partition four-digit numbers (thousands, hundreds, tens, ones)
- understand the importance of zero as a place holder in numbers such as 2036
- compare and order numbers with four-digits *e.g. A water tank holds between 5900 litres and 6100 litres of water. What could its capacity be? Which is greater 7216 or 7261?*
- know 10, 100 or 1000 more / less than a given number using understanding of place value *e.g. 1000ml more/less than 3250 ml?*

Autumn 2

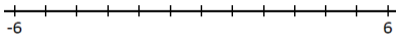
- count on and back in ones, tens, hundreds and thousands from any number *e.g. Starting with 374, how many 100s need to be added to get more than 1000?*
- know the multiple of 10, 100, that comes before and after any four-digit number
- round any number to the nearest 10, 100 or 1000
- recognise that rounding helps to estimate the answer to a calculation
- solve number problems *e.g. Jo has walked 4356m. Daisy has walked 4365m. Who has walked further? What's the biggest / smallest number that can be made with the digits 3, 2, 5, 4, 0*
- know how to partition two and three-digit numbers in to a multiple of 10 and the rest (to support division)

Spring 1

- count back in fours from 40 and discuss what happens when reaching 0
- recognise and interpret negative numbers on the number line and in practical contexts *e.g. Read positive and negative numbers on a thermometer. What are the missing numbers?*



Where would -3 be



- explore number sequences involving negative numbers, describing the rule and pattern *e.g. ☐, -9, -5, -1 create a sequence which involves -2. If I keep on subtracting 3 from 10 will –13 be in my sequence?*
- compare and order positive and negative numbers, and position them on a number line *e.g. Identify temperatures that are warmer than –9°C but colder than –6°C. Which temperature is lower: –4°C or –2°C? Put these in order, lowest first 2, –1, –6, –4; What integers lie between –5 and 3?*
- use the < and > signs to record statements *e.g. –3 < –1 or –1 > –3; If 3160 < ☐ < 3190, what numbers could ☐ be? What number could make this correct ☐ < -5*
- solve problems involving negative numbers *e.g. The temperature is –2°C. How much does it rise to reach 3°C*

Spring 2

- count on and back in ones, tens, hundreds and thousands from any number *e.g. Count on 6 in ones from 2998, count back 3000 in 1000s from 4700*
- count on and back in multiples of 6, 7, 9, 25, and 1000 and investigate patterns

Place value of decimals introduced in Spring 2 Fractions (including decimals)

Roman Numerals – *this may be linked with a topic on Romans*

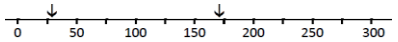
- know there are 5 symbols used to generate numbers between 1 and 100: I = 1, V = 5, X = 10, L = 50, C = 100

Key ideas:

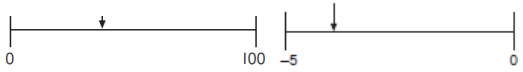
- a symbol before a larger symbol is subtracted e.g. IX = 9
- a symbol after a larger symbol is added e.g. XI = 11
- never use the same symbol more than 3 times in a row

Summer 1

- count forwards and backwards involving positive and negative numbers *e.g. 6, 3, 0 , -3… -150, -125, -100*
- reinforce knowledge of place value with four- digit numbers and numbers including up to 2 decimal places *e.g. Write the decimal equivalent to fifty-seven, nine tenths and three hundredths; In one step change 154.7 to 154.9*
- compare, order and identify missing numbers *e.g. If 3160 < ☐ < 3190, what could the number be? A car costs more than £8600 but less than £9100, what could the car cost? £8569, £9090, £9130 or £8999*
- make sensible estimates of values between marked divisions on number lines and various measuring scales, with increments such as 25, 100, 1000 *e.g. What numbers are the arrows pointing to*



- estimate positions on an empty number line *e.g.*



- find the number that is half-way between two given numbers *e.g. 4000 and 4100 or 2350 and 2380*

Summer 2

- extend number sequences, including those involving decimals in the context of money and length *e.g. Count in steps of 50p … £1.00, £1.50, £2.00, or in steps of 25cm … 1.25m, 1.5m, 1.75m*
- predict numbers that will occur in a sequence and ask What if… questions *e.g. What would my sequence look like if I counted in steps of 20p from £1.10?*
- solve non-routine number problems *e.g. In 5 days Maggie made 80 sandcastles. Each day she made 4 fewer castles than the day before. How many castles did she make each day? Maggie went on making 4 fewer castles each day. How many castles did she make altogether?*

Apply knowledge of measures to solve mathematical problems or puzzles

Addition and Subtraction

Yr 4 Statutory requirements

- **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.**

Autumn 1

- know addition and subtraction facts to 100 *e.g. 56 + 44, □ + 21 = 100*
- use and apply addition and subtraction facts *e.g. 60 + 30, 20 + 34, 48 + 7, 68 – 40, 90 - 30, 72 - 9*
- add and subtract mentally two or more two-digit numbers *e.g. 45+ 26, 57 – 38, 34 + 13 + 43*
- solve problems involving mental addition and subtraction *e.g. Use numbers 37, 52, 77 and 87 to satisfy statements such as □ – ○ = 35 or □ + ○ = 114*
- add two or more three-digit numbers using formal written columnar method *e.g. 235 + 624 + 127*
- subtract three-digit numbers with exchanges using the formal written columnar method, (with place value equipment to aid understanding as required) *e.g. 634 – 347*
- solve a range of problems involving written methods *e.g. What's the missing number?*

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  5 4 □        6 □ 7
+ 7 □ 7      - 4 3 □
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□ 3 2 5        □ 9 6
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Find all the different totals you can make by using three of these numbers 219, 193, 474, 356

Spring 1

- know addition and subtraction facts to 100
- use and apply addition and subtraction facts *e.g. 3154 + 200, 562 + 50, 2653 – 40, 312 – 50*
- add mentally a two-digit number to a three-digit multiple of ten *e.g. 430 + 54*
- estimate the answer to a calculation using rounding *e.g. 3670 + 1850 is less than 4000 + 2000, and 7256 – 4779 is about 7000 – 5000*
- add and subtract numbers with up to four digits using the formal written columnar methods, in a variety of contexts including those with a different number of digits *e.g. 6432m – 4714m. Find the sum of £426, £1256 and £204*
- use knowledge of inverse operations to check answers to subtraction of whole numbers involving up to four digits and multiple exchange
- solve two-step problems, choosing and carrying out appropriate calculations and explain why *e.g. Susie needs to fill a 2000ml jug with fruit punch, 1080ml of orange juice, 435ml of pineapple juice, and the rest is apple juice, how much apple juice does she need?*

Summer 1

- mentally calculate what is added to any three-digit number to make the next multiple of 1000 *e.g. 370 + □ = 1000, 1452 + □ = 2000*
- add and subtract numbers and quantities mentally, choosing an appropriate strategy based on the numbers involved and explain choices *e.g. 7731 + □ = 8000, 320 + 4142, 742 – □ = 532, 1382 – 400, 91 + □ + 45 = 250*
- investigate how many different ways an equation can be completed, and find the largest and smallest possible differences *e.g. □□ – 47 = □9*
- confidently use and apply formal written methods of columnar addition and subtraction with four-digit numbers in a range of contexts
- estimate and use knowledge of inverse operations to check answers to subtraction of whole numbers involving up to four digits in a problem solving context *e.g. Explain how you know that 8456 – 2567 = 4889 is incorrect*

Autumn 2

- add and subtract single digits, multiples of 10, 100 and 1000 to/from four-digit numbers using place value in a variety of contexts *e.g. 3461 + □ = 7461*
- add four-digit numbers with an increasing number of exchanges using formal written columnar method *e.g. Find the sum of 4253 and 1284, 2563 + 5159*
- subtract four-digit numbers with an increasing number of exchanges using formal written columnar method *e.g. 4523 – 2416, 6265 - 4837*
- use understanding of inverses to check calculations
- solve two-step problems in a range of contexts *e.g. A stadium has 5620 seats, 2571 were occupied by home supporters and 1675 by away supporters. How many empty seats were there?*

Spring 2

- mentally calculate what is added to any three- and four-digit number to make the next multiple of 10 and 100 *e.g. 1376 + □ = 1380, 1452 + □ = 1500*
- find the difference by counting up as efficiently as possible *e.g. 2403 – 2386 or 5326 – 4178 on an empty number line*
- subtract amounts of money in a real life context by finding the difference *e.g. £7.50 – £2.84, I spend £43.65, what change do I get from £75*
- solve one or two-step problems, choosing and carrying out appropriate mental and written calculations and explain why *e.g. Total this shopping bill 45p + 32p + 55p + 12p; work out the change from £5. Ruth collects 3674 stamps. Tom collects 4706.How many more stamps does Tom collect than Ruth? How many do they collect altogether?*

Summer 2

- know how much more needs to be added to make the next pound *e.g. £65.36 + □ = £66*
- add and subtract by rounding and adjusting *e.g. Subtracting £5.98 by subtracting £6 and adding 2p.*
- find totals using mental or written methods of calculation in the context of money *e.g. Find the total of £4.21 and £3.57, £25.67 + £51.15, £33.24 + £49.75*
- estimate and solve money problems *e.g. Peter wanted to buy a book for £7.95 and an audio CD for £17.89. He has £25, is that enough?*
- solve two-step problems, choosing and carrying out appropriate calculations *and explain why e.g. Raj buys a hat for £15.35 and a scarf for £12.56, how much change would he get from £30*

AB BC MATHS

Multiplication and Division

Yr 4 Statutory requirements

- **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 three numbers**
- **recognise and use factor pairs and commutativity in mental calculations**
- **multiply two-digit and three-digit numbers by a one-digit number using formal written layout**
- **solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as which n objects are connected to m objects**

Autumn

- know multiplication facts for the 2, 3, 4, 5, 8 and 10 times-tables and corresponding division facts and learn the 6 and 12 times table
- reinforce connections between multiplication facts and division facts using arrays as required
- use doubling to connect the 3, 6 and 12 multiplication tables *e.g. I double my sixes to get my twelves*
- know and understand the effect of multiplying by 0 and 1 and dividing by 1
- multiply and divide whole numbers up to 1000 by 10 and then 100, with whole number answers *e.g. 4000 ÷ □ = 400*
- understand and explain that when a number is divided by 100 the digits of the number move two places to the right and when a number is multiplied by 100 the digits move two digits to the left
- investigate whether dividing by 10 and then 10 again has the same effect as dividing by 100 (using a calculator as required)
- solve problems involving scaling using knowledge of multiplying and dividing by 10 and 100 *e.g. A giant is 100 times bigger than you are. How wide is the giant's hand span? How long is the giant's foot?*
- multiply and divide multiples of 10 using multiplication and division facts and place value *e.g. 50 × 6, 150 ÷ 3*
- multiply two- and three-digit numbers by a single digit using partitioning and multiplication facts (the distributive law) (expanded method e.g. grid)
- divide two-digit and three-digit numbers by a single-digit using partitioning and known division facts with 'teen' and then 'non teen' answers (expanded method or place value equipment) *e.g. 108 ÷ 6 (teen answers)*

$$6\overline{)60 + 48}^{10 + 6}$$

, 72 ÷ 3 (non-teen answers)

- investigate patterns and relationships *e.g. Add together the digits of any multiple of 3 and generalise to help recognise two- and three-digit multiples of 3*

Spring

- know multiplication facts for the 2, 3, 4, 5, 6, 8, 10 and 12 times-tables and corresponding division facts and learn the 7 and 9 times table *e.g. □ ÷ 9 = 6 There are exactly 9 weeks until my birthday. How many days until my birthday?*
- understand and use a range of vocabulary associated with multiplication and division including multiple, factor and product *e.g. 4 x 5 = 20, 20 is a multiple of 4 and 5. 4 and 5 are factors of 20. 4 and 5 are a factor pair of 20. 20 is the product of 4 and 5*
- begin to recognise the use of factor pairs and commutativity to multiply and divide mentally *e.g. 90 × 4 = 10 times bigger than 9x4 because 90 = 9 x 10 180 ÷ 3 using 18 ÷ 3 and making it 10 times bigger. 9 x 30 from 9 x 3, 540 ÷ 9 from 54 ÷ 9*
- multiply two-digit numbers by a single-digit number mentally *e.g. 23 x 4, 81 x 3*
- solve scaling problems using multiplication and division facts e.g. *Ingredients for pancake recipe for two people to serve 12 people. You have collected 65 football cards, I have 5 times fewer, how many do I have? Susie runs 50m but Bailey runs three times as far. How far does Bailey run? What number is four times bigger than 19*
- multiply two-digit numbers by a single digit using the formal written layout
- divide three-digit numbers by a single-digit number involving more complex partitioning and known division facts *e.g. 204 ÷ 6 partitioning into 180 and 24*

$$6\overline{)180 + 24}^{30 + 6}$$

- estimate an answer before calculating and use inverses to check

Summer 1

- know all multiplication and division facts to 12 × 12
- mentally multiply three single digits, using commutativity *e.g. 2 x 6 x 5 = 2 x 5 x 6 = 10 x 6 = 60*
- solve problems mentally, using commutativity and known factor pairs *e.g. (factor pairs are underlined) 14 x 6 = 2x7 x 6 = 2 x 7x6 = 2 x 42 = 84, 6 x 15 = 6 x 5 x 3 = 30 x 3 = 90*
- multiply two-digit then three-digit numbers by a single-digit using a formal written layout
- solve division calculations mentally involving known facts with remainders *e.g. 65 ÷ 7 How many lengths of 9cm can I cut from 183cm of ribbon?*
- solve problems using inverses and number properties *e.g. I think of a number, add 4 and multiply by 7. The answer is 56. What was my number? Find a pair of numbers with a sum of 15 and a product of 54. Make seven eight times bigger and subtract 18*

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Summer 2

- know all multiplication and division facts to 12 × 12
- divide two-digit by a single-digit numbers with exact answers using formal short division
- solve one and two step problems, choosing and carrying out calculations using appropriate methods *e.g. 7 schools each send 184 children to a concert. The organisers already have 765 chairs. How many more do they need?*
- estimate an answer before calculating and use knowledge of rounding, number operations and inverses to check answers
- solve non-routine problems, representing and then interpreting information *e.g. Sean counts his books in fours. He has one left over. He then counts his books in fives. He has three left over. How many books does Sean have?*
- solve correspondence problems *e.g. On the meal deal menu, there is a choice of 3 drinks, 3 pizzas and 2 puddings. How many possible meals are there? Cakes are packed in boxes of 4, there are 16 boxes, how many cakes can be packed?*

Apply knowledge to solve mathematical problems or puzzles

Fractions (including decimals)

Yr 4 Statutory requirements

- **recognise and show, using diagrams, families of common equivalent fractions**
- **count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten**
- **solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number**
- **add and subtract fractions with the same denominator**
- **recognise and write decimal equivalents of any number of tenths or hundredths**
- **recognise and write decimal equivalents to $^1/_4$; $^1/_2$; $^3/_4$**
- **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 two decimal places**
- **solve simple measure and money problems involving fractions and decimals to two decimal places.**

Autumn 1

- count on and back in halves, quarters, fifths and tenths
- know that fractions are numbers and place a set of fractions on a number line
- read, write and understand fraction notation for unit and non-unit fractions
- recognise fractions of shapes/diagrams *e.g. Which diagrams have exactly a half shaded?*

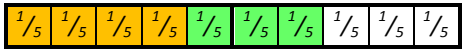
How much of the shape is shaded?

- recognise the equivalence between common equivalent fractions using visual representations, such as a fraction walls and number lines *e.g. Establish equivalences such as $^2/_{10}$ and $^1/_5$*

- represent equivalences by shading shapes that have been divided into equal parts

Autumn 2

- count on and back in fractions including hundredths
- explore the equivalence between tenths and hundredths *e.g. Cut a 10 by 10 square into ten strips to find tenths, and observe that 1 tenth is equivalent to 10 hundredths, or that 4 tenths is equivalent to 40 hundredths*
- recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten
- add and subtract fractions with the same denominator, using a fraction wall for answers within the whole and a fraction track for answers beyond one *e.g. $^2/_5 + {}^1/_5$, $^4/_5 + {}^3/_5$*



- solve problems by finding fractions of numbers and quantities relating fractions to division *e.g. $^1/_6$ of £42, $^3/_8$ of 56kg, $^2/_3$ of 240m. There are 24 stickers on a roll. $^1/_4$ of them are red. $^1/_3$ are blue. The rest are yellow. How many stickers are yellow?*

Spring 1

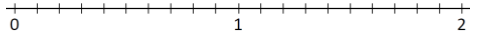
- count on and back in halves, quarters, fifths and tenths include equivalent fractions *e.g. $^1/_4$, $^1/_2$, $^3/_4$, 1, $1\,^1/_4$, $1\,^1/_2$, $1\,^3/_4$*
- identify whether a fraction is more or less than a half and explain why
- explore the equivalence between fractions and make families of equivalent fractions using shapes, fraction walls and other models and images
- recognise when fractions are equivalent using knowledge of factors and multiples *e.g. $^1/_4 = {}^2/_8$ or $^6/_9 = {}^2/_3$*
- begin to know equivalent fractions families *e.g. $^1/_2 = {}^2/_4 = {}^4/_8$, $^1/_4 = {}^2/_8$, $^1/_2 = {}^5/_{10}$, $^1/_5 = {}^2/_{10}$, $^1/_3 = {}^2/_6$*
- compare and order simple fractions using knowledge of equivalence *e.g. Which is more ^{2}/5 or $^3/_{10}$? Explain why $^3/_8$ is less than $^3/_6$? Put these fractions in order $^1/_2$, $^3/_4$, $^1/_{10}$, $^7/_8$.*

Spring 2

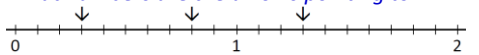
- develop understanding of decimal notation for tenths and hundredths
- recognise and write the decimal equivalent to tenths and then hundredths *e.g. $^3/_{10} = 0.3$, $^7/_{100} = 0.07$, $^{13}/_{100} = 0.13$*
- know that the decimal point separates the whole number from the decimal fraction
- know what each digit represents in numbers with one then two decimal places (to tenths, then hundredths) *e.g. What's the 7 worth in 2.71, 24.37; write the decimal equivalent to fifty-seven and nine tenths; in one step change 4.7 to 4.9, 6.92 to 6.12*
- compare and order numbers and quantities with the same number of decimal places up to two decimal places *e.g. Which is lighter 3.4kg or 2.5kg, 7.12kg or 7.21kg? Which is less £5.50 or £5.05? What symbol <, > makes this correct 5.1 ☐ 4.6? Order these decimals 99p, £9, 90p, £1.99 and 6.25, 5.74, 4.53, 7.61, 5.22. Suggest a decimal between 3.8 and 4.2*
- solve problems involving money and measure *e.g. True or false $^1/_{10}$m is longer than 0.11m?*

Summer 1

- count on and back in decimals *e.g. 2.37, 2.38, …*
- derive pairs of decimal tenths with a total of 1 using place value and bonds to 10 *e.g. 0.3 + 0.7 = 1*
- position numbers with one decimal place on a number line *e.g. 0.6, 0.1, 0.5, 1.2, 1.8 on the line*



What numbers are the arrows pointing to



- know how many tenths are needed to make the next whole number *e.g. 0.3 + ☐ = 1*
- round decimals with one decimal place to the nearest whole number *e.g. 25.6, 3.4m, 134.6kg*
- know 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 *e.g. Start with a two-digit number and repeatedly divide by 10, describe the pattern 26 ÷ 10 = 2.6, 2.6 ÷ 10 = 0.26*

Summer 2

- count forwards and backwards using simple fractions and decimals
- recognise the equivalence between the decimal and fraction forms of one half, one quarter and three quarters *e.g. Recognise that 0.25 is 25 hundredths, and that this is one quarter, $^1/_4$*
- explore the equivalence between half, quarters, tenths represented as fractions and decimals *e.g. On a number line*
- solve problems involving finding fractions of numbers, shapes and quantities *e.g. What fraction of 1m is 25cm? What fraction of one day is one hour, eight hours, twelve hours? Max has £48. He spends $^3/_4$ of it. How much has he got left? $^5/_6$ of 180, $^1/_4$ of 36 = $^1/_2$ of ☐*

Apply knowledge to solve mathematical problems or puzzles

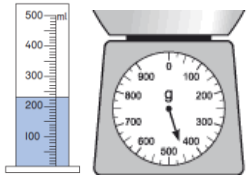
Measures

Yr 4 Statutory requirements

- **convert between different units of measure [e.g. kilometre to metre; hour to minute]**
- **measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres**
- **find the area of rectilinear shapes by counting squares**
- **estimate, compare and calculate different measures, including money in pounds and pence**

Autumn

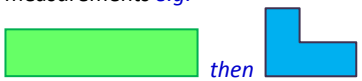
- know and use relationships between familiar units of measurement *e.g. A bag of flour weighs 2kg. How many grams is this? $^1/_2$ litre is how many millilitres? A piece of ribbon is $^1/_4$ m long, how many cm is it?*
- convert (involving whole numbers) from the larger unit of measure to the smaller by multiplying by 10, 100 and 1000 *e.g. How many millilitres are in 8 litres? How many millimetres are in 8cm? Which is shorter 2m or 187cm? Which is heavier 4kg or 3600g?*
- solve problems in a range of contexts, using the relationships between familiar units to convert measurements to the same unit *e.g. 300g of flour are used from a $^1/_2$kg bag. How much flour is left? Robert drinks a $^1/_4$ of a litre of juice from his bottle containing 600ml. How much does he have left?*
- realise that milli means one thousandth to reinforce the relationship between litres and millilitres
- develop an increasing awareness of how small 1ml is and how light 1g is *e.g. 1g is equivalent to approximately 50 grains of rice*
- estimate, measure and compare the capacity/volume of containers and the mass of objects practically, choosing and using appropriate units *e.g. 'This bottle holds about three cans of pop'*
- read a range of partly numbered scales to the nearest half division in practical contexts and explain how the reading was calculated *e.g. Identify two labelled divisions, count the number of intervals between them, use division to work out the value of the interval, count along the scale to check*



- solve problems involving comparing and calculating measures *e.g. A baby elephant weighs 227kg, when he is fully grown he will weigh 6174kg, how much more weight will he gain? A baby giraffe weighs 56kg. How much lighter is the giraffe than the baby elephant?*

Spring

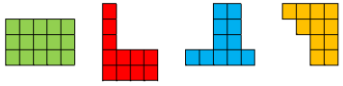
- recognise kilo (one thousand), centi (one hundredth) and milli (one thousandth)
- know and use the relationships between kilometres, metres, centimetres and millimetres *e.g. How many metres are there in one and a half kilometres? Is 213cm more or less than $2^1/_4$m? How many millimetres in half a metre?*
- measure and draw lines with increasing accuracy to the nearest $^1/_2$ cm
- estimate, measure and compare lengths/heights in metres, centimetres and millimetres practically choosing and using appropriate units *e.g. Who has the longest stride? What is the difference between the length of your longest finger and your shortest finger?*
- calculate perimeter of rectilinear shapes by measuring the length of the sides and combining the measurements *e.g.*



- calculate the perimeter of rectilinear shapes from given measurements *e.g. The side of a square is 5cm, what's its perimeter? A rectangular pitch has sides of 6m and 17m, what's the perimeter?*
- investigate what the lengths of the sides a rectangle could be given its perimeter *e.g. The perimeter of a rectangle is 24cm, what could the lengths of the sides be? Draw a rectangle with a perimeter of 32cm*
- begin to recognise that the perimeter of a rectangle can be found by doubling the sum of the longer and shorter side

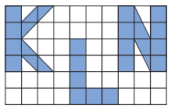
Summer

- find the area of rectilinear shapes by counting squares



e.g.

- find the area of shapes involving half squares e.g. *What's the area of each letter?*



- begin to realise that the area of a rectangle can be found by using knowledge of arrays *e.g. Timesing the number in a column by the number in a row*
- investigate the rectilinear shapes that can be made with a given area *e.g. How many shapes can be made with an area of 24 square units?*
- measure and record lengths using decimal notation relating metres to the whole numbers, centimetres to the tenths and hundredths *e.g. They measure how far they can throw a beanbag, recording 5m 62cm as 5.62 m, 2m 60cm as 2.6m*
- compare and order lengths using decimal notation *e.g. Order these lengths 2.34m, 3.42m, 3.24m and 4.5m*

Apply knowledge of measures to solve mathematical problems or puzzles

Measures: Time

Yr 4 Statutory requirements	Autumn	Spring	Summer
• **read, write and convert time between analogue and digital 12 and 24-hour clocks** • **solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.**	• know, use and apply the relationship between hours, minutes and seconds; between years and months; between weeks and days • compare and order time durations *e.g. 25 mins, $^1/_4$ hr, 120 seconds, 5 mins, 600 seconds* • estimate and read time with increasing accuracy to the nearest minute on analogue and digital clocks • write the time to the nearest minute *e.g. Using words and digital notation* • solve problems including finding a time difference, start and end times *e.g. Nikki went strawberry picking. She began at 10:10 and was picking strawberries for 2 hours 55 minutes. When did she finish?*	• read and write 24-hour clock times • recognise the difference between a.m. times from midnight to before noon and p.m. times from noon to before midnight • convert 12 hour to 24-hour times, knowing that the 24 hour time is the same as the 12 hour time if it's morning and you add 12 hours if it's afternoon *e.g. 9:52 a.m. would be 09:52 and 9:52p.m would be 21:52* • solve problems involving the 24-hour clock *e.g. Jenny and Chris were gardening. They started at 13:25. Jenny finished at 15:55. Chris carried on for another hour and ten minutes. For how long was Chris gardening?*	• know, use and apply the relationship between hours, minutes and seconds; between years and months; between weeks and days • use a calendar to work out the day of the week for a particular date, or the time interval between one date and another *e.g. How long they have to wait for their birthday?* • solve problems converting (larger to smaller) units of time *e.g. Years to months, weeks to days, hours to minutes… have you lived for more or less than 500 weeks*

Measures: Money

Yr 4 Statutory requirements	Autumn	Spring	Summer
• **estimate, compare and calculate different measures, including money in pounds and pence** **Ideas embedded into Number and Place Value, Addition and Subtraction**	• use calculation strategies to solve one- and two-step problems involving money *e.g. Find total cost of designer trainers at £149 and football kit at £198.* *It costs 60p for a child to swim. How much does it cost for 8 children to swim?*	• solve one- and two-step word problems rounding to estimate the solution *e.g. Tins of dog food cost 42p. They are put into packs of 10. How much does one pack of dog food cost? 10 packs?* *Lauren has three 50p coins and three 20p coins. She pays 90p for a Big Dipper ride. How much does she have left?* *A shop has two special offers. "A pack of 6 pens was 80p, it's now half price" and " two pens for 30p or 3 packets for the price of 2" Joe wants to buy 6 pens, which is the cheaper offer?*	• use calculation strategies to solve one- and two-step problems involving money *e.g. Dad bought three tins of paint at £5.68 each. How much change does he get from £20?* *For her party Susie spent £2.88 on apples, £3.38 on bananas £3.76 on oranges. Will a £10 note cover the cost? Explain your reasoning.* Star candles cost 60p and Stripe candles cost 85p. Susie buys 4 star candles and 2 stripe candles. How much does she pay altogether? *Lisa saved £45. She wants to buy a music player for £22.49. She also wants to download music from the internet. This will cost £9.87. Does she have enough money left to buy some headphones at £13.96?*

Apply knowledge to solve mathematical problems or puzzles

Geometry: properties of shapes

Yr 4 Statutory requirements

- **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 by size**
- **identify lines of symmetry in 2-D shapes presented in different orientations**
- **complete a simple symmetric figure with respect to a specific line of symmetry.**

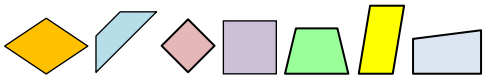
Autumn

- know that polygons are closed 2-D shapes with all straight sides
- recognise and name different triangles (isosceles, equilateral, scalene, right-angled)
- know the angle and side properties of scalene, isosceles and equilateral triangles
- know that quadrilaterals are four sided polygons
- recognise and describe quadrilaterals (parallelogram, rhombus, trapezium, kite, rectangle) *e.g. Choose two of these quadrilaterals and say what's the same and what's different?*

- know that polygons can be regular or irregular and that a regular polygon has equal sides and equal angles *e.g. Explore polygons that have equal sides but unequal angles, and those that have equal angles but unequal sides*
- sort polygons based on their properties, justify reasons, explain why some shapes may not fit a chosen criteria *e.g. Using Carroll or Venn diagrams and criteria including number/length of sides, types of angle, lines of symmetry, number of parallel or perpendicular sides (including heptagons)*
- describe properties of polygons using correct mathematical vocabulary *e.g. Has more than one right angle, is regular, has two or more sides of equal length, has a parallel pair of sides, is a quadrilateral…*
- investigate properties of 2-D shapes *e.g. The maximum number of right angles in a triangle, quadrilateral, pentagon*
- recognise 2-D shapes as the faces of 3-D shapes *e.g. What 3-D shape has a face that is an equilateral triangle?*

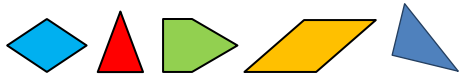
Spring

- know if a polygon is symmetrical or not, stating the number of lines of symmetry
- identify lines of symmetry in 2-D shapes in various orientations *e.g. Look at these quadrilaterals and identify the lines of symmetry.*



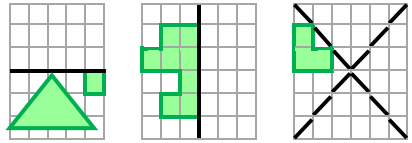
- sort 2-D shapes according to the lines of symmetry *e.g. Using a table, Venn or Carroll diagram*
- investigate a statement applying knowledge of properties of 2-D shapes *e.g. Sometimes, always never 'The number of lines of symmetry in a polygon is equal to the number of sides of the polygon' find examples to show your answer.* Can you draw a non-right angled triangle with a line of symmetry?
- understand that angle is a measure of turn and know that a quarter turn is a right angle and is equivalent to 90° and a whole turn is 360° or four right angles
- know that acute angles are less than a right angle (90°) and obtuse angles are more than a right angle but less than a straight line (between 90° and 180°)
- identify acute, obtuse and right angles *e.g.*

- compare and order a set of angles less than 180°
- recognise acute, obtuse and right angles in 2-D shapes *e.g.*

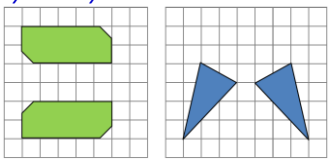


Summer

- complete and draw symmetric patterns using a variety of media (pegboards, tiles, squared or dotted paper) to become familiar with different orientations of lines of symmetry
- know that equivalent points are the same distance from the line of symmetry
- complete a simple symmetrical shape or pattern *e.g.*

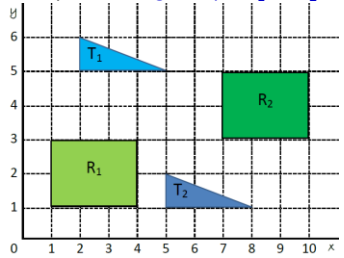


- recognise line symmetry in a variety of diagrams, including identifying if the line of symmetry is horizontal or vertical or neither
- identify a line of symmetry when it does not dissect the original shape *e.g. Where are the lines of symmetry?*



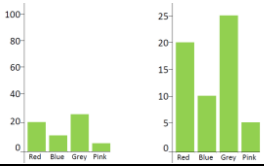
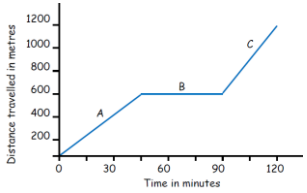
Apply knowledge of shape properties to solve mathematical problems or puzzles

Geometry: direction and movement

Yr 4 Statutory requirements	Autumn	Spring	Summer
describe positions on a 2-D grid 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.**		understand the convention that (3, 2) describes a point found by starting from the origin (0, 0) and moving three lines to the right and two lines up read and plot coordinates in the first quadrant *e.g. Identify the co-ordinates of the treasure on a treasure map* recognise that (4, 1) and (1, 4) describe different points plot the missing points of squares or rectangles given some of the vertices, recognising that there may be more than one solution to the problem *e.g. Three of the vertices of a square are (2, 1), (2, 4) and (5, 4). What are the co-ordinates of the fourth vertex? If (6, 5) and (8, 5) are two vertices of a square, they find all three possibilities for the pair of missing vertices*	understand translation as sliding a given unit (point, shape, object)to a new position, moving from side to side or up and down describe translations *e.g. The point (4,6) is translated to (6,3) as moving 2 to the right and 3 down* describe the translation of a shape using left/right and up/down *e.g. Shape R_1 to R_2 and T_1 to T_2* 

Apply knowledge of shape properties to solve mathematical problems or puzzles

Statistics

Yr 4 Statutory requirements	Autumn	Spring	Summer
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.**	know that bar charts should have a title and that both axis should be labelled interpret and present discrete data on a bar chart where either the vertical or horizontal axis are marked using an appropriate scale, marked and partially numbered divisions in multiples of 2, 5, 10, 25, 50 or 100 *e.g. Data in a table, collected from a Science experiment, class / year group attendance* solve comparison, sum and difference problems using information obtained from bar charts *e.g. How many more… than ….? How many in total…? How many chose … and …? Is it true that fewer… than…* evaluate the effect of different scales on the interpretation of data, deciding which are the most meaningful *e.g. The ease at seeing the differences between the bars* 	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 2, 4, 10, 100 *e.g. Sales at the book fair* solve comparison, sum and difference problems using information obtained from pictograms *e.g. What is the difference between the most and least popular … How many more… than ….? How many in total…? How many chose … and …? Is it true that fewer… than…* interpret pictograms using an increase range of multiplication facts solve problems using information taken from tables *e.g. How many Chocolate ice creams were sold? How many more ice creams were sold on Friday than Sunday?* | | Friday | Saturday | Sunday | | Vanilla | 15 | 23 | 16 | | Chocolate | 24 | 15 | 22 | | Banana | 18 | 17 | 8 |	recognise the difference between discrete and continuous data begin to collect meaningful continuous *e.g. Measure and record height of pupils* interpret and present continuous data using time graphs in meaningful contexts *e.g. Personal growth, reading temperature scales over time, other curriculum subjects. The distance travelled of the Hare and the Tortoise over time*  *What do you think the Hare was doing in each part of the race? When did he stop for a rest? How long did he rest for?* solve problems by interrogating data *e.g. Comparing and finding the difference between the temperature in the morning and in the afternoon*

Where possible use meaningful data and experiences from across the curriculum