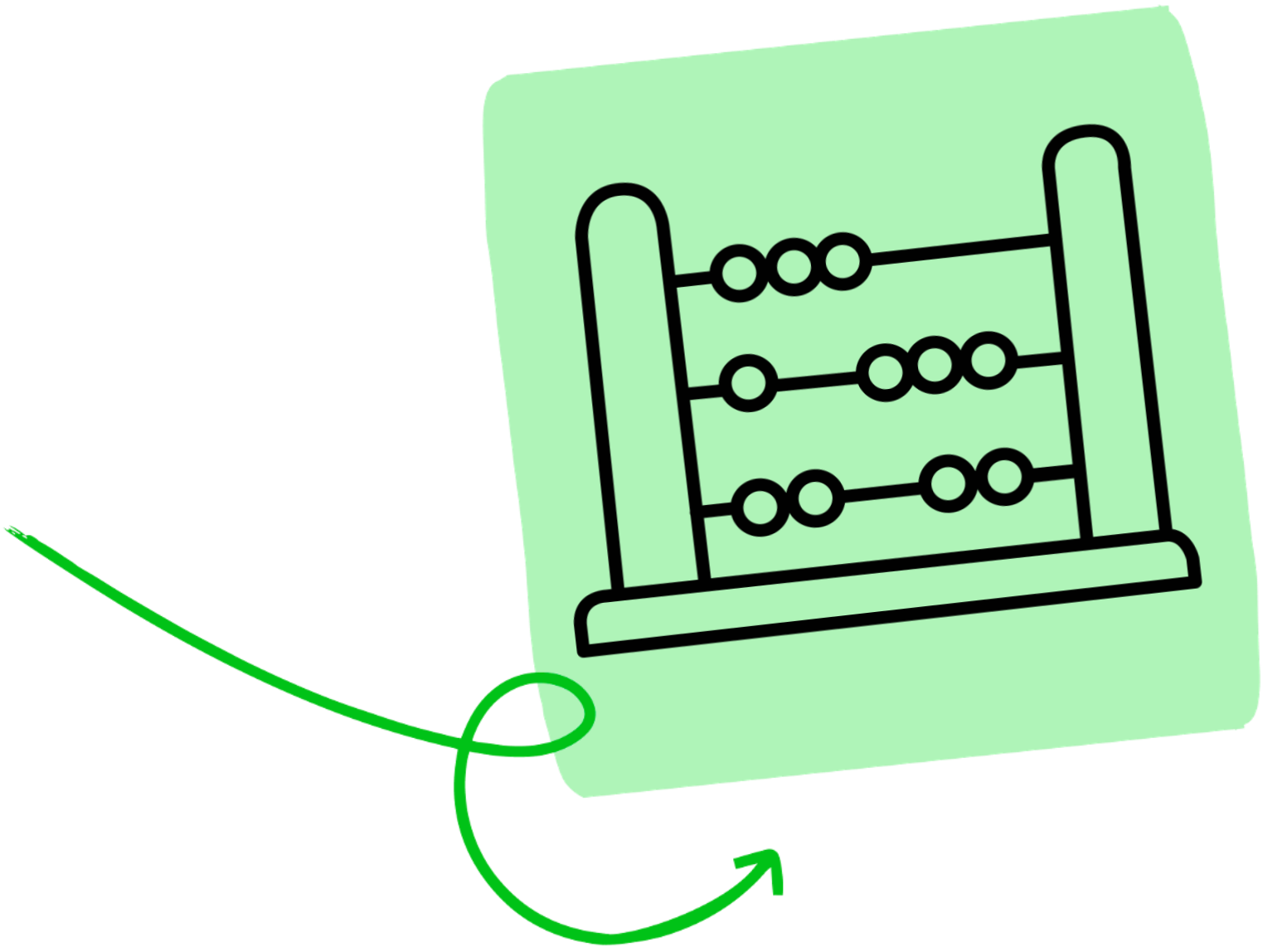
Oak National Academy

KS1 & KS2 Maths curriculum plan



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Threads in maths

Our curriculum

All of our curricula share the same set of principles that guide our curriculum design to ensure our curricula are high-quality. They are:

Knowledge and vocabulary rich

Lessons and units are knowledge and vocabulary rich. Pupils will build on what they already know to develop deep knowledge and apply this knowledge in the form of skills.

Sequenced and coherent

Careful sequencing and attention to building coherence via vertical threads so that pupils build on prior knowledge and make meaningful connections.

Flexible

Our flexible curriculum enables schools to tailor our content to their curriculum and context.

Accessible

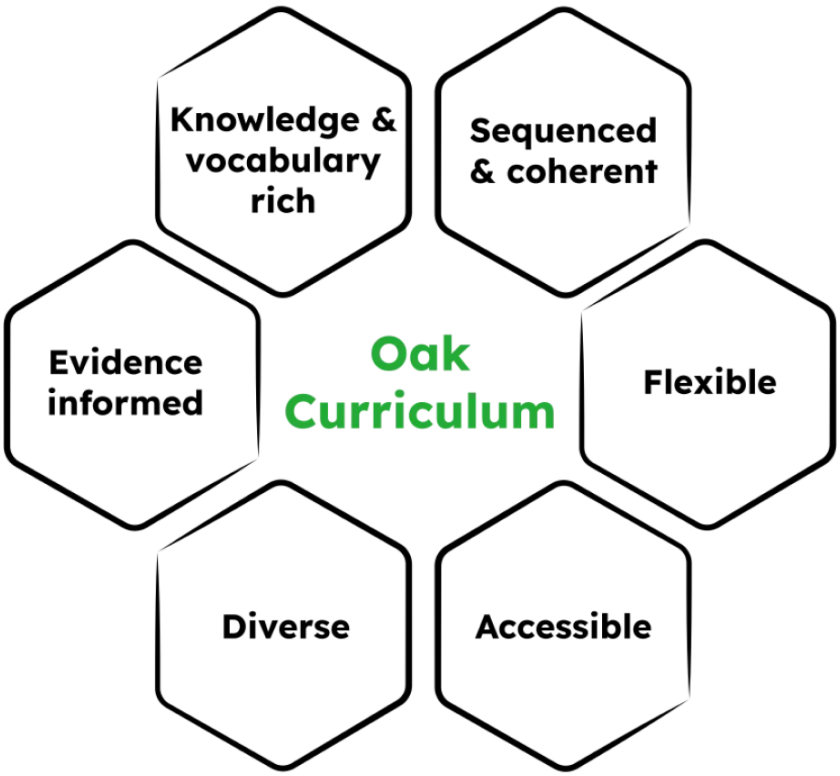
Creating an accessible curriculum that addresses the needs of all pupils and meets accessibility guidelines and requirements.

Diverse

We prioritise creating a diverse curriculum by committing to diversity in teaching and teachers, and the language, texts and media we use, so all pupils feel positively represented.

Evidence-informed

We take an evidence-informed approach applying the science of learning and subject-specific research.



Threads

What are threads?

We use threads to signpost groups of units that link to one another, that together build a common body of knowledge over time. We use the term thread, rather than vertical concepts, themes or big ideas, because it helps us bring to mind the visual concept of a thread weaving through the curriculum.

How to use threads

1. Familiarise yourself with all of the threads relating to the subject
2. Identify the unit you will be delivering
3. Review the threads associated with the unit
4. Audit where pupils have and will learn about these threads in your existing curriculum sequence.
5. Ensure you understand how the thread relating to your new unit has been framed in prior and future units
6. Review how the thread works within the unit you will be delivering
7. Teach and iterate your framing of the thread within the unit and across your curriculum sequence

Threads in subject

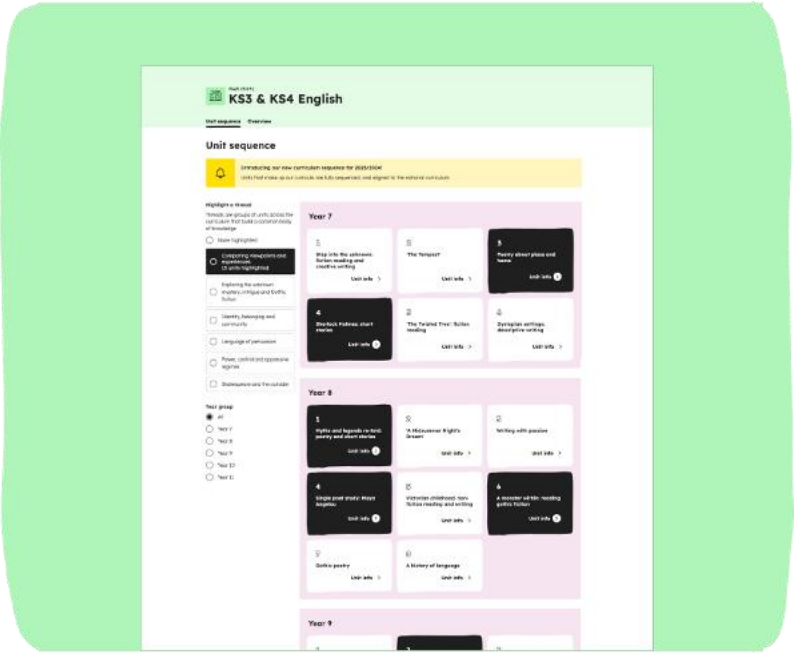
- Algebra
- Geometry and Measure
- Number
- Number: Addition and Subtraction
- Number: Fractions
- Number: Multiplication and division
- Number: Place value
- Probability
- Ratio and Proportion
- Statistics

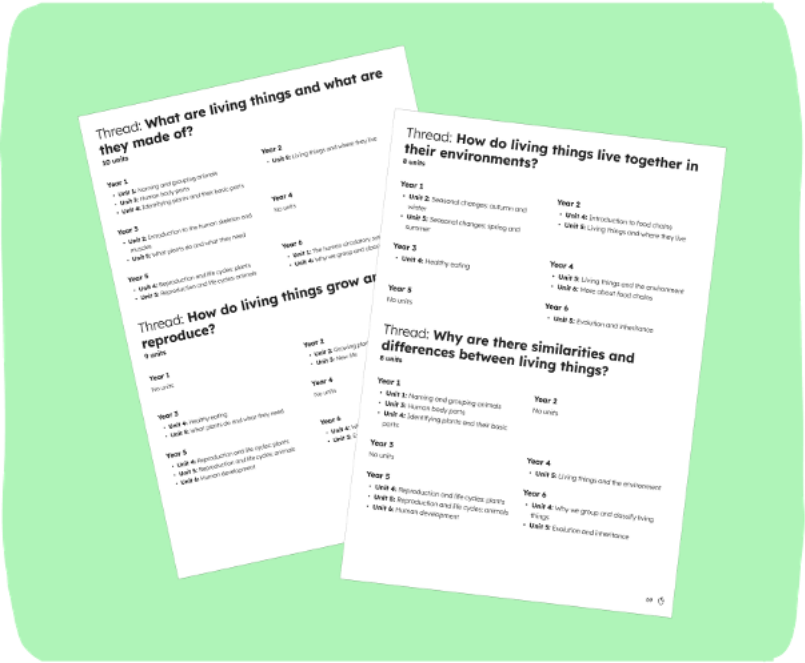
Tools for using threads

Online curriculum

Our interactive tool enables you to visualise how threads are sequenced across our curriculum plans.

Go to online curriculum





Threads in this document

The appendix displays the threads and their related units.

Go to threads appendix ↓

Maths curriculum explainer

Aims and purpose

What are the aims and purpose of our curriculum?

This curriculum develops pupils' understanding of mathematics over time so that they become competent and confident in identifying and performing the mathematics they need both at school and in their daily lives. We prepare pupils to become self-assured and resilient mathematicians by developing their ability to select the most suitable tools to solve problems across a range of topics and real-world scenarios.

Oak curriculum principles

What overarching curriculum principles inform the design of our curriculum?

Knowledge and vocabulary rich

This principle recognises the important role that knowledge, and vocabulary as a particularly important type of knowledge, plays in learning. We identify and map vocabulary across the curriculum, both in terms of the introduction of new vocabulary and the necessary repetition of vocabulary that has gone before. New vocabulary, called keywords, are signalled in bold in our lesson materials to indicate their importance. Our curriculum develops pupils' knowledge and understanding of mathematical concepts over time. For example, understanding of concepts such as 'factor' and 'equation' evolves with increasing complexity as pupils move through the key stages.

Sequenced and coherent

A careful and purposeful sequencing of our curriculum content underpins its design, ensuring that pupils are able to build on and make links with existing knowledge. At its simplest this means ensuring, for example, that pupils learn about the square and square root functions before meeting Pythagoras' Theorem. Attention is paid to vertical coherence in the curriculum through the strategic mapping of mathematical concepts across the curriculum, allowing for their incremental development over time. Curriculum content is intentionally revisited, for example, a lesson on right-angled trigonometry may retrieve construction or circle theorem content, or a lesson on ratios will use familiar models and tools to explicitly link to prior learning.

Evidence-informed

Our evidence-informed approach enables the rigorous application of research outcomes, science of learning and impactful best practice both in education in general and at a subject specific level. For example, the design of our resources reflects findings from Sweller's cognitive load theory and Mayer's principles of multimedia learning whilst our lesson design draws on Rosenshine's principles of instruction. We also draw on findings from research organisations such as the Education Endowment Foundation (EEF). At the subject level, our primary mathematics curriculum is inspired by the NCETM Curriculum Prioritisation materials to develop mastery of core concepts at an early age.

Flexible

Our flexible approach enables schools to use our resources in a way that fits their context and meets the varying needs of teachers and their pupils. Our curriculum can be used in its entirety or units can be selected to complement existing curricula. Our resources are adaptable so that, for example, teachers can change the mathematical model used to teach a concept to align with their agreed department or school approach or adapt practice tasks to better reflect the prior knowledge of their pupils. At key stage 4 our curriculum aligns with all exam board specifications for GCSE Mathematics.

Diverse

Our commitment to breadth and diversity in content, language, texts and media can be seen in our choices of real world contexts, mathematics history and application of mathematics plus the use of a group of diverse school age characters. For example, we use real data sets when analysing charts to make discussions and conjectures meaningful and grounded in recognisable places, situations and events.

Accessible

Our curriculum is intentionally designed to facilitate high-quality teaching as a powerful lever to support pupils with SEND. Aligned with EEF guidance, our resources have a focus on clear explanations, modelling and frequent checks for understanding, with guided and independent practice. Lessons are chunked into learning cycles and redundant images and information are minimised to manage cognitive load. We have removed reference to year groups in our resources so that they can be used when pupils are ready, regardless of their age. Our resources are purposefully created to be accessible, for example by using accessible fonts, colours with good contrast, and captions in our videos. We have used Equatio's equation editor to create digital, accessible written mathematics in our resources.

Oak subject principles

What subject specific principles inform the design of our curriculum?

Pairing procedural knowledge with conceptual understanding.

We introduce concepts and prompts to make pupils think hard about making sense of ideas, while also focusing on efficient procedural methods to ensure calculations can be completed easily and systematically. We often provide visual models to support understanding, then we remove scaffolding as ideas progress and foundation knowledge becomes secure, in order to aid development of mathematical fluency.

Aligning with the Concrete Pictorial Abstract approach to mathematics teaching and learning.

We incorporate consistent visual models to explain mathematical ideas, and draw upon existing knowledge directly through the models and tools used where underpinning concepts are the same as those taught previously. We make use of pictorial representations of familiar concrete manipulatives such as Dienes blocks, algebra tiles and double sided counters.

Use an agreed set of models and representations which bridge mathematical concepts.

We have identified and used the smallest set of models and representations that underpin and support the understanding of the greatest number of mathematical concepts. When pupils meet familiar tools and approaches this signals explicit links between implicitly connected elements of mathematics. For example, ratio tables are used to calculate the dimensions of similar shapes, percentage changes, plotting coordinates and equivalent fractions which signposts the links between them. For maximum impact, these models and representations are shared by both our primary and secondary curricula.

Use of variation theory in practice tasks and modelling.

Modelling and practice makes use of variation to minimise the risk of pupils drawing incorrect inferences which can cause misconceptions to develop. For example, varying the orientation of shapes in geometry to ensure pupils understand that a horizontal base is not a ‘feature’ of a particular type of shape, or that the ‘base’ of a triangle when calculating the area is not confined to being a horizontal side. We also use minimally different examples in some tasks to draw attention to singular changes and how they affect mathematical models and calculations.

National curriculum

How does our curriculum reflect the aims & purpose of the national curriculum?

There are three main aims of the national curriculum for mathematics: fluency, reasoning and problem solving. Our curriculum ensures that all pupils become fluent in the fundamentals of mathematics. For example, small steps when teaching the knowledge and understanding of counting, helps build fluency in simple addition and subtraction. Pupils are supported and encouraged to reason mathematically by justifying decisions when choosing whether something is true or false, providing the answer to a calculation or conjecturing when identifying patterns. Lastly, our curriculum ensures pupils can solve problems through lessons at the end of each unit that apply the knowledge they have learnt to new and sometimes unfamiliar contexts.

Curriculum delivery

What teaching time does our curriculum require?

Our curricula for key stages 1-3 are designed for 36 weeks of curriculum time across the school year, leaving time for other activities both within and beyond the curriculum such as assessments or school trips. At key stage 4, year 10 also has approximately 36 weeks of curriculum time, but year 11 has only 24 weeks (around 2 terms) to recognise that schools will not be teaching new content in the run up to the GCSE exams.

Our maths curriculum provides roughly a lesson a day for all key stages and year groups. Our key stage 1 lessons are designed to be taught in approximately 40 minutes, and 50 minutes to an hour in key stages 2, 3 and 4. We understand that exact time dedicated to mathematics can vary greatly between schools due to differences in curriculum planning, resource allocation and school-specific priorities. Therefore we fully expect and encourage teachers to adapt our curriculum and resources to best suit their needs and available curriculum time. This is particularly important where year groups may be streamed either through sets, or in key stage 4

where pupils may be working both between and within the foundation and higher exam routes. For example, a year 10 unit will typically include a few lessons revisiting knowledge taught previously, and end with challenging problem solving activities. A teacher may decide that the unit could be compressed to spend less time on earlier content, or more time developing it.

Curriculum coherence

What are 'threads'?

We use threads to signpost groups of units that link to one another, building a common body of knowledge over time. We use the term thread, rather than vertical concepts, themes, or big ideas, because it helps to bring to mind the visual concept of a thread weaving through the curriculum.

Primary mathematics threads

- Number
  - addition and subtraction
  - fractions
  - multiplication and division
  - place value
- Algebra
- Statistics
- Probability
- Ratio and proportion
- Geometry and measure

Secondary mathematics threads

- Number
- Algebra
- Statistics
- Probability
- Ratio and proportion
- Geometry and measure

These threads are the distinct domains that appear in the national curriculum programme of study. These domains have been used as threads because in each domain knowledge is built over time, teachers of mathematics are very familiar with them and they are used by examination boards. In primary, much of the curriculum is focussed on developing knowledge and understanding of ‘number’. Therefore this thread has been further broken down into ‘addition and subtraction’, ‘fractions’, ‘multiplication and division’, and ‘place value’. Common threads across our primary and secondary curricula can enable more effective transition, helping pupils to bridge their knowledge and understanding from primary to secondary.

Recommendations from subject specific reports

How does our curriculum address and enact recommendations from subject specific reports (e.g. EEF guidance reports & Ofsted Research Review)?

Our curriculum addresses the EEF recommendations from 2018, which found a strong evidence base for the use of manipulatives and visual models to support mathematical ideas. Our slides typically draw upon visual representations of common manipulatives such as the Rekenrek, multilink cubes, and counters, and we promote the use of physical versions of such tools in our teacher tips. We focus on development of both procedural and conceptual mathematics by making sense of concepts whilst developing efficacy through the use of algorithms and practice.

Subject-specific needs

How does our curriculum deal with elements that arise from the specific needs of the subject?

Does the Oak curriculum embrace a mastery approach?

Our subject principles align to those of a mastery approach. The concrete-pictorial-abstract approach is evident throughout, particularly as concepts are first introduced. Towards key stage 4, abstraction and efficacy are more frequently relied upon, however this is always with the support of strong visual diagrams, tools and small steps to help pupils make sense of the mathematics being used. We carefully build mathematical ideas using real-world situations and recognisable narrative structures. We offer opportunities for pupils to think hard and discuss concepts and problems together or with the teacher. We design activities for younger pupils to explore ideas using manipulatives while also ensuring they recognise familiar tools used consistently when learning topics underpinned by the same mathematical concept.

How are calculators introduced and used in the mathematics curriculum?

We have embedded calculator use throughout the secondary curriculum. It is introduced after the understanding of what is happening is taught, and highlights that the calculator is a useful tool for speeding up lengthy or repeated calculations. We make use of calculator functions such as storing answers and displaying them in different formats to create unique activities that can only be enabled by digital technology.

Our curriculum partner

Mathematics in Education and Industry (MEI) is an established charity and curriculum development body. Their primary aims are to raise the quality of maths education and promote the relevance of maths education to everyone. MEI are highly respected and are well connected with other quality assured organisations, including being a key partner in the NCETM, and are well known in schools for their excellent training and support programmes.



Year 1 units

View interactive sequence online

1 Counting, recognising and comparing numbers 0 - 10	**2** Counting to and from 20	**3** Counting in tens - decade numbers
4 Pattern in counting from 20 to 100	**5** Comparing quantities - part part whole relationships	**6** Composition of numbers 0 to 5
7 Recognise, compose, decompose and manipulate 2D and 3D shapes	**8** Composition of numbers 6 to 10	**9** Additive structures: addition
10 Additive structures: addition and subtraction	**11** Addition and subtraction facts within 10	**12** Composition of numbers 11 to 19
13 Numbers 0 to 20 in different contexts	**14** Unitising and coin recognition - counting in 2s, 5s and 10s	**15** Unitising and coin recognition - value of a set of coins

16
Solving problems in a range of contexts

17
Position and direction including fractions of turns

18
Time - sequencing events and telling the time to the hour and half hour

1. Counting, recognising and comparing numbers 0 - 10

Year 1

Go to unit resources

Threads

- Number
- Number: Place value

Unit description

In this unit pupils will review their knowledge from the EYFS of counting in all its forms to and from 10. They will compare and order numbers to 10 practically and will consider the role of zero to represent nothing.

Why this, why now?

This unit gives pupils and teachers the opportunity to revisit and build upon the knowledge of the counting principles they have from the Early Years. It develops the use of representations that will underpin the more formal recording of maths that is to come in Year 1 and onwards whilst also providing familiar contexts for pupils just starting in KS1.

Lessons in unit

1. Counting forwards and backwards within 10
2. Counting objects within ten
3. Counting different groups
4. Representing counting songs
5. Anything can be counted
6. Subitising numbers to five
7. Conservation
8. Using numerals
9. Introducing zero
10. Ordinal numbers
11. Ordering numbers to 10
12. More than and fewer than
13. One more with manipulatives and counting
14. One less with manipulatives and counting
15. Finding the missing numbers

Prior knowledge requirements

- Count reliably to 10 using concrete objects
- Recognise and order numerals from 0 to 10
- Compare quantities using language such as more, fewer, same

2. Counting to and from 20

Year 1

Go to unit resources

Threads

- Number
- Number: Place value

Unit description

In this unit pupils will consolidate counting to 20 and back They will secure their understanding of the teens numbers in a cardinal and an ordinal context.

Why this, why now?

This unit extends and secures the stable order principle of counting forwards and backwards to and from 20 in different contexts and from different starting points. Pupils have the opportunity to rehearse key language and to develop their understanding of how the numbers relate to different representations. This learning will be revisited and developed in later units focusing on composition of numbers to 20

Lessons in unit

1. Counting to and from 20
2. Counting on
3. Counting back from 20
4. Counting forward to 20 and back from 20
5. Comparing numbers to 20
6. Ordering numbers 11- 20 practically
7. Comparing and ordering numbers 0-20 practically
8. Finding one more and one less using representations
9. Finding one more and one less with manipulatives and images
10. Finding the missing number from 0 to 20

Prior knowledge requirements

- Count forwards and backwards from 0 to 20
- Recognise and write numerals to 20
- Compare small numbers

3. Counting in tens - decade numbers

Year 1

Go to unit resources

Threads

- Number
- Number: Place value

Unit description

In this unit pupils will extend their counting to counting the decade numbers which will later be known as multiples of ten and making representations of them using a variety of different manipulatives.

Why this, why now?

Patterns in the number system start from 20 but rely on children knowing the sequence of the decade numbers. This unit prepares them for counting up to 100 as they know the numbers to 20 and will be able to apply this knowledge between the decades in the following unit once the sequence of the decade numbers is secure.

Lessons in unit

1. Counting forwards and backwards in 10s to 50
2. Counting forwards and backwards in 10s to 100
3. Composition of decade numbers to 100: making groups of 10
4. Count groups of 10 in decade numbers
5. Order and compare decade numbers on number tracks

Prior knowledge requirements

- Count in ones to at least 20
- Recognise and name decade numbers
- Understand counting patterns involving tens

4. Pattern in counting from 20 to 100

Year 1

Go to unit resources

Threads

- Number
- Number: Place value

Unit description

In this unit pupils will extend their learning by counting to 100. They will explore the pattern in counting and focus on the end of the decade and the start of the new decade numbers.¬†

Why this, why now?

This unit provides opportunities to extend knowledge of counting in ones to counting between the decade numbers or multiples of ten. The unit also explores crossing the tens boundaries, combining knowledge of counting in ones with knowledge of the sequence of the decades both forwards and backwards. These skills are needed to compare and calculate with numbers in later units.

Lessons in unit

1. Counting patterns within a decade
2. Crossing the tens boundary counting forwards
3. Crossing the tens boundary counting backwards
4. Crossing the tens boundary counting forwards and backwards
5. Find missing numbers between 20 and 100

Prior knowledge requirements

- Confidently count in ones to 20
- Recognise tens and ones in numbers to 20
- Continue simple counting sequences and identify number patterns

5. Comparing quantities - part part whole relationships

Year 1

Go to unit resources

Threads

- Geometry and Measure
- Number

Unit description

In this unit pupils will explain that items can be compared using length and height, mass and volume/capacity. They will compare sets of objects using equality/inequality symbols. Pupils will also explore part-part-whole relationships with representations.

Why this, why now?

This unit moves on from counting to comparing items and attaching value to those items through various criteria. Equality is seen as a result of comparison and considered alongside inequality. Learning then develops to look at part-part-whole relationships using objects which are then represented with numerals. This provides the language and structure needed to move onto the following units on composition of numbers.

Lessons in unit

1. Explain that items can be compared using length and height
2. Explain that items can be compared using weight and mass
3. Explain that items can be compared using capacity
4. Count a set of objects
5. Solve problems by comparing sets of objects
6. Use equality and inequality symbols to compare sets of objects
7. Use equality and inequality symbols to compare the relative size of two numbers
8. Explain what a whole is
9. Explain that a whole can be split into parts
10. Explain that a whole can represent a group of objects
11. Identify a part of a whole group
12. Explain what a part-part-whole model is
13. Use a part-part-whole model to represent a whole partitioned into two parts
14. Use a part-part-whole model to represent partitioning into more than two parts
15. Solve problems using part-part-whole models with more than two parts

Prior knowledge requirements

- Use bar models to compare two quantities
- Understand language of comparison (more than, less than, difference)

- Represent part-whole relationships using diagrams or equations

6. Composition of numbers 0 to 5

Year 1

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction

Unit description

In this unit pupils will revisit how numbers are represented cardinally and ordinally. They will partition 1 - 5 in different ways, find a missing part when one part and the whole are known and explore one more and one less with numbers to five.

Why this, why now?

This unit provides opportunities for pupils to explore the composition of numbers to 5, representing and describing the numbers in different ways and in different contexts. In future units they will apply this to secure understanding the structures of addition and subtraction.

Lessons in unit

1. Explain that numbers can represent how many objects there are in a set
2. Ordinal numbers show the position of an object in relation to another
3. Partition numbers one to five in different ways
4. Partition the numbers one to five in a systematic way
5. Find a missing part when one part and the whole is known
6. Solve problems finding a missing part when one part and the whole is known
7. Show one more and one less than a number using representations
8. Show one more and one less than a number using representations and describe this accurately
9. Use a bar model to represent a whole partitioned into two parts
10. Solve problems using a bar model to represent a whole partitioned into two parts

Prior knowledge requirements

- Count reliably up to 5
- Partition small numbers into parts
- Recognise that the whole is made up of parts

7. Recognise, compose, decompose and manipulate 2D and 3D shapes

Year 1

Go to unit resources

Threads

- Geometry and Measure

Unit description

In this unit pupils will compose, copy, extend and develop repeating and radiating patterns. They will explore, discuss and compare 3D and 2D shapes.

Why this, why now?

This unit provides a break from developing number work and an opportunity to develop other key mathematical skills of special reasoning and pattern. The unit builds on the spatial reasoning and pattern language and examples they will have encountered in the Early Years.

Lessons in unit

1. Composing pattern block images
2. Copy, extend and describe repeating patterns
3. Radiating patterns
4. Compose tangram images
5. Tetrominoes and pentominoes
6. Examine ways that cubes can be composed into different arrangements
7. Explore, recognise and compare three different 3D shapes
8. Explore, recognise and compare three more 3D shapes
9. Identify 2D shapes within 3D shapes
10. Recognise, describe and sort 3D shapes
11. Explore and recognise 2D shapes
12. Explore, discuss and compare 2D shapes
13. Explore, discuss and identify shapes that are and are not circles
14. Explore, discuss and identify shapes that are and are not triangles
15. Explore, discuss and identify shapes that are and are not rectangles

Prior knowledge requirements

- Identify and describe 2D and 3D shapes
- Explore how shapes can be combined or taken apart
- Understand symmetry and simple transformations

8. Composition of numbers 6 to 10

Year 1

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction

Unit description

In this unit pupils will represent numbers 6 - 10 by partitioning in different ways. They will learn what odd and even numbers are and how they can be partitioned. They will identify a missing part when a whole is partitioned into two parts where one of the parts is known.

Why this, why now?

This unit builds on exploring numbers to five by looking at five and a bit to explore the numbers 6 – 10. Cardinal and ordinal aspects of number are explored through representations including a number line. Pupils explore and describe patterns of odd and even numbers and extend their understanding of parts and wholes to include numbers to ten.

Lessons in unit

1. Count a set of objects and match the spoken number to the written numeral and number name
2. Represent the numbers 6 to 10 using a five and a bit structure
3. Compare two numbers and say which is greater than or less than the other
4. Identify the whole and parts of the numbers 6 to 10 using the five and a bit structure
5. Explore the numbers 6 to 10 using the parts and wholes on a number line
6. Explain where 6, 7, 8 and 9 lie on a number line
7. Estimate where 6, 7, 8 and 9 lie on an unmarked number line
8. Order and sort numbers into odd and even sets
9. Skip count in odds and evens
10. Explain what odd and even numbers are and the difference between them
11. Explain how even and odd numbers can be partitioned
12. Partition the numbers 6 and 7 in different ways
13. Partition the numbers 8 and 9 in different ways
14. Partition the numbers 6 to 10 in different ways
15. Identify a missing part when a whole is partitioned into two parts

Prior knowledge requirements

- Count and represent numbers to 10
- Partition numbers into different pairs

- Use concrete resources to explore number combinations

9. Additive structures: addition

Year 1

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction

Unit description

In this unit pupils will combine 2 or more parts to make a whole. They will learn addends can be represented in any order and that the = sign shows the whole and sum of the parts are equal.

Why this, why now?

This unit introduces the symbolic representation of addition and subtraction. Learning builds on the understanding of the part-part-whole structure and the composition of the numbers to 10, introducing the use of equations to represent known relationships before moving on, in later units, to solving problems involving addition.

Lessons in unit

1. Combine parts using the addition symbol
2. Understand that parts can be represented in any order
3. Understand the use of the equals sign in equations
4. Understanding part-part-whole relationships
5. Add parts to find the value of the whole and write the equation
6. Find the missing part in an equation
7. Partition a whole into two parts and write as a subtraction equation
8. Using bar models to subtract
9. Understand the relationship between addition and subtraction
10. Understand addition as increasing a quantity

Prior knowledge requirements

- Understand part-part-whole relationships
- Represent problems using bar models and equations
- Use different strategies for solving addition problems

10. Additive structures: addition and subtraction

Year 1

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction

Unit description

In this unit pupils will find missing addends in equations. They will partition a whole into 2 parts representing first, then, now stories with subtraction equations. They will learn + and - are inverse operations.

Why this, why now?

This unit develops the use of symbols to represent addition and subtraction stories and contexts. Pupils apply their understanding of the relationship between part-part-whole structures and addition and extend that to include subtraction representing decreasing an amount. Pupils also develop their understanding of the link between addition and subtraction using the inverse.

Lessons in unit

1. Interpret and represent addition stories
2. Understand subtraction as decreasing an amount
3. Interpret and represent subtraction stories
4. Furthering understanding of subtraction as decreasing an amount
5. Create addition and subtraction stories
6. Find the missing part of an addition story
7. Find the missing part in addition and subtraction stories
8. Find the missing part of a subtraction story
9. Know that addition and subtraction are inverse operations
10. Represent the inverse relationship between addition and subtraction

Prior knowledge requirements

- Understand part-whole relationships
- Recognise inverse nature of addition and subtraction
- Use equations and bar models to represent problems

11. Addition and subtraction facts within 10

Year 1

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction

Unit description

In this unit pupils will explain that addition is commutative. They will find pairs of numbers to 10 and add or subtract 1 from any number.¬†Pupils will also develop their knowledge and understanding of odd and even numbers and that even numbers relate to doubling and halving.

Why this, why now?

This unit develops understanding and recording of addition and subtraction through exploring number facts within ten. Pupils develop and rehearse their knowledge of the composition of the numbers to ten and explore patterns including odd and even numbers again. They will begin to explore the concepts of doubling and halving as they relate to addition and subtraction facts.

Lessons in unit

1. Explain that addition is commutative
2. Find pairs of numbers that sum to 10
3. Use number pairs to 10 in subtraction contexts
4. Add and subtract one from any number
5. Find the difference between consecutive numbers
6. Add and subtract two from even numbers within 10
7. Add and subtract two from odd numbers within 10
8. Explain the difference between consecutive even numbers
9. Explain the difference between consecutive odd numbers
10. Addition and subtraction involving zero
11. Double numbers and explain what doubling means
12. Halve numbers and explain what halving means
13. Use knowledge of doubles to calculate near-doubles
14. Solve problems by adding 3 to 5 and 6
15. Addition and subtraction facts within 10

Prior knowledge requirements

- Recall number facts and sequences
- Use place value understanding
- Apply basic operations in context

12. Composition of numbers 11 to 19

Year 1

Go to unit resources

Threads

- Number
- Number: Place value

Unit description

In this unit pupils will explain 11-19 as cardinal and ordinal numbers. They will double and halve numbers 6-9 and use addition and subtraction facts to add and subtract within 20.

Why this, why now?

This unit introduces two-digit numbers between 10 and 20, rehearsing the counting sequence and beginning to explore two-digit place value, building on the counting pattern to 100 in earlier units. Here pupils will represent 2-digit numbers in different ways to show the composition of ten and a bit. Number facts to ten will be applied within 20 and doubling to ten will be extended to 20.

Lessons in unit

1. Explain that the digits in the numbers 11 to 19 express quantity
2. Explain that the digits in the numbers 11 to 19 express position on a number line
3. Identify the quantity shown in a representation of numbers 11 to 19
4. Use knowledge of 10 and a bit to solve problems
5. Solve subtraction problems using knowledge of 10 and a bit
6. Explore odd and even numbers within 20
7. Double the numbers 6 to 9 and halve the result explaining what doubling and halving is
8. Use knowledge of addition facts within 10 to add within 20
9. Use knowledge of subtraction facts within 10 to subtract within 20
10. Use knowledge of addition and subtraction facts within 10 to add and subtract within 20

Prior knowledge requirements

- Count and represent numbers to 10
- Partition numbers into tens and ones
- Use number bonds to build teen numbers

13. Numbers 0 to 20 in different contexts

Year 1

Go to unit resources

Threads

- Geometry and Measure
- Number
- Number: Addition and Subtraction

Unit description

In this unit pupils will consolidate their counting to 20. They will measure objects using non-standard and standard measures and record outcomes, providing a context for counting and comparing numbers to 20.

Why this, why now?

This unit provides further opportunities for pupils to secure the counting sequence to 20 by exploring the numbers in different contexts beginning with non-standard measure and beginning to introduce length in centimetres. Pupils record the numbers to 20 in tables as part of their work and begin to make estimates based on what they know already.

Lessons in unit

1. Comparing lengths
2. Measure length using objects
3. Measure length using objects and record results in a table
4. Measure length using centimetre cubes
5. Measure items using centimetre cubes and record results in a table
6. Measure length using a ruler
7. Solve problems by measuring different lengths in cm using a ruler
8. Estimate length in cm
9. Estimate and measure length and record results in a table
10. Solve addition and subtraction problems involving length

Prior knowledge requirements

- Recognise and count objects to 20
- Represent numbers using words, digits and models
- Compare quantities and solve simple problems

14. Unitising and coin recognition - counting in 2s, 5s and 10s

Year 1

Go to unit resources

Threads

- Geometry and Measure
- Number
- Number: Multiplication and division

Unit description

In this unit pupils will count efficiently in groups of 2 5 10. They will recognise and explain the value of 1p 2p 5p 10p coins and how a single coin can be worth several pennies.¬†

Why this, why now?

This unit introduces 2, 5 and 10 p coins. Pupils explore objects and coins that represent more than one unit. They recognize the value of the coins and use the coins to support skip counting in 2, 10 and 5. This develops their counting and begins to prepare them for ideas of multiplicative thinking in Year 2 and onwards.

Lessons in unit

1. Skip count in twos forwards and backwards
2. Count efficiently in groups of two
3. Count efficiently in groups of ten
4. Skip count in fives forwards and backwards
5. Count efficiently in groups of five
6. Count efficiently in groups of two, five and ten
7. Recognise and explain the value of 1p in pence
8. Recognise and explain the value of 2p coins in pence
9. Recognise and explain the value of 5p in pence
10. Recognise and explain the value of 10p in pence.

Prior knowledge requirements

- Recall number facts and sequences
- Use place value understanding
- Apply basic operations in context

15. Unitising and coin recognition - value of a set of coins

Year 1

Go to unit resources

Threads

- Geometry and Measure
- Number
- Number: Addition and Subtraction

Unit description

In this unit pupils will use knowledge of the value of coins and apply their number facts and counting skills to calculate the total value of the coins in a set of 2p 5p 10p coins.¬†

Why this, why now?

This unit applies the skip counting rehearsed previously to solve problems involving numbers of coins. Pupils also have the opportunity to apply their counting and number facts knowledge to find and make amounts up to 20 p.

Lessons in unit

1. Calculate the total value of a set of 2 p coins
2. Find how many 2 p coins are needed to make a given value
3. Calculate the total value of the coins in a set of 10p coins
4. Find how many ten pence coins are needed to make a given amount
5. Calculate the total value of the coins in a set of 5 p coins
6. Find how many five pence coins are needed to make a given amount
7. Compare sets of 2 p, 5 p, and 10 p coins
8. Find and make amounts within 10p
9. Find and make amounts within 20 p
10. Calculate amounts up to 20 p

Prior knowledge requirements

- Recall number facts and sequences
- Use place value understanding
- Apply basic operations in context

16. Solving problems in a range of contexts

Year 1

Go to unit resources

Threads

- Geometry and Measure
- Number
- Number: Addition and Subtraction
- Number: Fractions
- Number: Multiplication and division

Unit description

In this unit pupils have the opportunity to apply their knowledge of counting, comparing and number facts to solve problems in a range of contexts.

Why this, why now?

This unit provides and opportunity to consolidate and apply a range of counting skills and number facts to solve problems. It brings together learning from previous units about numbers to 10 and 20 and counting in steps of 2, 10 and 5.

Lessons in unit

1. Counting and comparing
2. Combining and partitioning numbers within 10
3. Addition and subtraction within 10
4. Using known addition and subtraction facts
5. Counting in multiples of two, five, ten

Prior knowledge requirements

- Recall number facts and sequences
- Use place value understanding
- Apply basic operations in context

17. Position and direction including fractions of turns

Year 1

Go to unit resources

Threads

- Geometry and Measure
- Number: Fractions

Unit description

In this unit pupils will describe position direction and movement including whole half quarter and three-quarter turns.¬†

Why this, why now?

This unit builds on position, direction and spatial reasoning work in the Early Years. The learning is developed to include the ideas of turns that are a fraction of a whole to describe position and movement.

Lessons in unit

1. Using directional language
2. Using positional and proportional language
3. Understanding turns
4. Giving directions and describing turns
5. Follow and give directions

Prior knowledge requirements

- Use directional language (left, right, turn)
- Recognise quarter, half and full turns
- Represent turns using fractions

18. Time - sequencing events and telling the time to the hour and half hour

Year 1

Go to unit resources

Threads

- Geometry and Measure

Unit description

In this unit pupils will sequence events in chronological order and recognise and use language relating to dates. They will tell the time to the hour and half past the hour linking to fractions.

Why this, why now?

This unit builds both on sequencing events and language relating to dates from Early Years to include the days of the week and months of the year. The unit also builds on the fractional language of position and direction. Pupils apply this to telling the time to the hour and half hour.

Lessons in unit

1. Sequence events in the school day in chronological order
2. Sequence everyday events in chronological order
3. Use language relating to days of the week
4. Sequence events across a week in chronological order
5. Use language relating to months of the year
6. Use language relating to days, weeks, months and years
7. Draw and label a clock face talking about the hours
8. Tell the time to the hour using the hour hand
9. Tell the time to the half hour using the hour hand
10. Tell the time to the hour and half hour using the hour and minute hands

Prior knowledge requirements

- Read time to the hour and half hour
- Understand 12-hour clock notation
- Convert between hours and minutes

Year 2 units

View interactive sequence online

1 Composition of multiples of 10	**2** Counting and representing the numbers 20 to 99	**3** Comparing, ordering and partitioning 2-digit numbers
4 Secure fluency of addition and subtraction facts within 10	**5** Calculating within 20	**6** Adding and subtracting ones and tens to and from 2-digit numbers
7 Grouping objects in different ways and relating to multiplication	**8** Representing counting in 2s, 5s and 10s as the 2, 5 and 10 times tables	**9** Representing counting in 5s as the 5 times table and link to the 10 times tables
10 Multiplying by 2, doubling and halving (factors and products)	**11** Introduction to division structures	**12** Shape: discuss and compare 2D and 3D shapes
13 Addition and subtraction of two 2-digit numbers	**14** Money: recognise coins and use £ and p symbols	**15** Fractions: identify equal parts and be familiar with halves, thirds and quarters

16
Time: write and tell the time to five minutes

17
Position and direction

18
Doubling, halving, quotative and partitive division

19
Sense of measure - capacity, volume and mass

1. Composition of multiples of 10

Year 2

Go to unit resources

Threads

- Number
- Number: Place value

Unit description

In this unit pupils will represent multiples of ten using numerals and names and use knowledge of facts and unitising to add and subtract multiples of ten.

Why this, why now?

This first unit of Year 2 allows pupils to revisit Y1 learning relating to number facts within ten and how they relate to multiples of ten. This gives a familiar start and prepares them for work on numbers to 100 in the following units.

Lessons in unit

1. Explain that one ten is equivalent to ten ones
2. Represent multiples of ten using their numerals
3. Represent multiples of ten using their numerals and names
4. Represent multiples of ten in an expression or an equation
5. Estimate the position of multiples of ten on a 0 - 100 number line
6. Explain what happens when you add and subtract ten to a multiple of ten
7. Use knowledge of facts and unitising to add and subtract multiples of ten
8. Add and subtract multiples of ten
9. Solve problems involving multiples of ten
10. Solve problems involving multiples of ten in a range of contexts

Prior knowledge requirements

- Recognise and count in tens
- Partition multiples of 10 using place value
- Add and subtract tens mentally

2. Counting and representing the numbers 20 to 99

Year 2

Go to unit resources

Threads

- Geometry and Measure
- Number
- Number: Place value

Unit description

In this unit pupils will explore the counting sequence for counting to 100 and beyond representing numbers from 20-99 in different ways including marking the position on a number line They will learn to represent 20-99 in the context of length.

Why this, why now?

In Year 2, pupils explored and rehearsed counting patterns from 20 to 99. In this unit they relate this knowledge of the patterns to different representations of place value.

Lessons in unit

1. Explore the counting sequence for counting to 100 and beyond
2. Count groups of ten and extra ones
3. Count a large group of objects by counting tens and ones
4. Represent a number from 20 to 99
5. Use a number line to position and estimate the numbers 20-99

Prior knowledge requirements

- Count forwards and backwards from 0 to 100
- Partition two-digit numbers into tens and ones
- Represent numbers using concrete and pictorial models

3. Comparing, ordering and partitioning 2-digit numbers

Year 2

Go to unit resources

Threads

- Number
- Number: Place value

Unit description

In this unit pupils will compare two 2-digit numbers and partition a 2-digit number into 10s and 1s and position on a number line.

Why this, why now?

Pupils build on their understanding of the structure of 2-digit numbers in this unit and apply the understanding to comparing numbers and positioning them in the number system on a number line. This prepares them for applying place value understanding to calculation in future units.

Lessons in unit

1. Compare two-digit numbers
2. Partition two-digit numbers into tens and ones using place value resources
3. Partition two-digit numbers into tens and ones
4. Represent addition and subtraction of tens and ones with equations
5. Solve problems by adding and subtracting tens and ones

Prior knowledge requirements

- Count to 100
- Understand place value of tens and ones
- Partition numbers in different ways

4. Secure fluency of addition and subtraction facts within 10

Year 2

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction

Unit description

In this unit pupils will revisit addition and subtraction within ten. They will consolidate addition and subtraction strategies.

Why this, why now?

In preparation for calculating to and beyond 20, this unit allows pupils to review and secure addition facts within ten so that they can apply them to calculating beyond ten in the following units.

Lessons in unit

1. Represent addition and subtraction facts within 10
2. Recall one and two more or less than numbers to ten
3. Recall doubles within 10
4. Use near doubles within 10
5. Use known addition and subtraction facts within 10 to solve problems

Prior knowledge requirements

- Recall number facts and sequences
- Use place value understanding
- Apply basic operations in context

5. Calculating within 20

Year 2

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Statistics

Unit description

In this unit pupils will add 3 addends. They will use a strategy such as finding 2 addends to total 10 or 2 numbers to bridge though 10.

Why this, why now?

This unit applies known facts and explores strategies for adding within ten. Pupils use understanding of commutativity to reorder equations to calculate efficiently. The facts in this unit will then be applied to calculating beyond 20.

Lessons in unit

1. Add three addends
2. Use a 'First, then, then, now' story to add three addends
3. Explain that the addends can be added in any order
4. Add three addends efficiently
5. Add three addends efficiently by finding two addends that total 10
6. Add two numbers that bridge through 10
7. Add and subtract two numbers that bridge through 10
8. Compare the number of objects in two sets or difference between two measures.
9. Calculate the difference
10. Calculate the difference in different contexts
11. Explain what the difference is between consecutive numbers
12. Calculate the difference when information is presented in a pictogram
13. Calculate the difference when information is presented in a bar chart
14. Use knowledge of calculating within 20 to solve problems
15. Use knowledge of calculating within 20 to solve problems involving statistics

Prior knowledge requirements

- Recall number bonds to 10 and 20
- Use mental strategies such as counting on and bridging 10
- Represent calculations with concrete or visual models

6. Adding and subtracting ones and tens to and from 2-digit numbers

Year 2

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction

Unit description

In this unit pupils will add and subtract 1s and 10s from 2 digit numbers. They will use number facts to add/subtract a single-digit number to/from a 2-digit number. They will use a part-part-whole model to represent addition and subtraction.

Why this, why now?

This unit applies the number fact and place value work of the previous units to working with numbers beyond 20. Pupils use familiar representations: part-part-whole models and number lines, to support partitioning and bridging through tens.

Lessons in unit

1. Add and subtract one to or from a two-digit number within a decade
2. Add and subtract 1 to and from a 2-digit number crossing the tens boundary
3. Use number facts to add or subtract a one-digit number and a two-digit number.
4. Use number facts to solve addition and subtraction problems.
5. Use number facts to solve problems in measures and data contexts
6. Use number bonds to 10 to add/subtract one-digit and two-digit numbers
7. Add by bridging a multiple of ten
8. Subtract by bridging a multiple of ten
9. Use bridging to solve addition and subtraction problems
10. Find 10 more or less than a 2-digit number.
11. Add and subtract 10 to and from a 2-digit number.
12. Add multiples of 10 to 2-digit numbers.
13. Subtract multiples of ten from 2-digit numbers
14. Partition 2-digit numbers in different ways
15. Use efficient strategies to solve problems

Prior knowledge requirements

- Count to 100
- Understand place value of tens and ones
- Partition numbers in different ways

7. Grouping objects in different ways and relating to multiplication

Year 2

Go to unit resources

Threads

- Number
- Number: Multiplication and division

Unit description

In this unit pupils will describe how objects are grouped and will represent equal groups as repeated addition and multiplication.

Why this, why now?

This unit moves pupils on from thinking only about addition and introduces the concept and symbol for multiplication. Pupils explore how objects can be grouped and how to represent that grouping as multiplication as well as addition. This prepares them for work exploring the 2, 5 and 10 times tables.

Lessons in unit

1. Explain that objects can be grouped in different ways
2. Describe how objects have been grouped
3. Represent equal groups as repeated addition
4. Represent equal groups as repeated addition and multiplication
5. Represent equal groups as multiplication
6. Explain and represent multiplication when a group contains zero or one items
7. Identify and explain each part of a multiplication equation
8. Use knowledge of multiplication to calcuate the product
9. Use knowledge of multiplication to solve problems
10. Use knowledge of multiplication to solve problems in a range of contexts

Prior knowledge requirements

- Make equal groups and count the total
- Use repeated addition as a strategy
- Recognise arrays and relate to multiplication facts

8. Representing counting in 2s, 5s and 10s as the 2, 5 and 10 times tables

Year 2

Go to unit resources

Threads

- Number
- Number: Multiplication and division
- Statistics

Unit description

In this unit pupils will represent the 2x 10x table in different ways and use 2x 10x table to solve problems. They will explain the relationship between adjacent multiples of 2/10 and that factor pairs can be written in any order.

Why this, why now?

This unit develops understanding of multiplication and the skip counting pupils have done and applies it to the 2-, 5- and 10-times tables. They explore commutativity in that the factors can be written in any order and look at the relationship between adjacent multiples in preparation for looking for relationships between times tables in future units.

Lessons in unit

1. Represent the 2 times table in different ways
2. Use knowledge of the 2 times table to solve problems
3. Explain the relationship between adjacent multiples of 2
4. Explain that factor pairs can be written in any order
5. Represent counting in tens as the 10 times table
6. Represent the 10 times table in different ways
7. Explain the relationship between adjacent multiples of 10
8. Represent counting in fives as the 5 times table
9. Represent the 5 times table in different ways
10. Explain the relationship between adjacent multiples of 5

Prior knowledge requirements

- Count forwards and backwards in 1s to 20
- Use concrete or pictorial representations for equal groups
- Recognise repeated addition patterns in numbers

9. Representing counting in 5s as the 5 times table and link to the 10 times tables

Year 2

Go to unit resources

Threads

- Number
- Number: Multiplication and division
- Statistics

Unit description

In this unit pupils will represent the 5-times table in different ways. They will explain the relationship between adjacent multiples of 5 and how 5- and 10-times tables are related.¬†

Why this, why now?

This unit provides opportunities to rehearse the facts of the 5-times table and also to explore the link between the 5- and 10-times tables. The unit also links the times tables to multiplication contexts, identifying what the factors and product represent within the context.

Lessons in unit

1. Explain how groups of five and ten are related
2. Explain the relationship between multiples of five and ten
3. Use knowledge of the relationships between the 5 and 10 times tables to solve problems
4. Explain how a factor of zero or one affects the product
5. Represent multiplication equations in different ways
6. Use knowledge of the 2, 5 and 10 times tables to solve problems
7. Use knowledge of the 2, 5 and 10 times tables to solve problems in a range of contexts
8. Explain what each factor represents in a multiplication story
9. Explain what each factor represents in a multiplication story when one of the factors is one
10. Explain how a multiplication equation with 2 as a factor is related to doubling

Prior knowledge requirements

- Count in steps of 5 and 10
- Recognise patterns in number sequences
- Use arrays to represent multiples

10. Multiplying by 2, doubling and halving (factors and products)

Year 2

Go to unit resources

Threads

- Number
- Number: Fractions

Unit description

In this unit pupils will learn how multiplication with 2 as a factor relates to doubling and how we can see halving as the inverse of doubling, deriving the related halving fact from a known double.

Why this, why now?

This unit focuses on the fact that, when one of the factors is 2, we can think about doubling. Pupils also relate the factor being doubled to being half of the product and use this to solve problems and identify missing factors. Exploring the inverse of multiplication will lead on to exploring division structures in the next unit.

Lessons in unit

1. Double 2-digit numbers and record as multiplications where one of the factors is 2
2. Explain how doubling and halving are related
3. Halve even 2-digit numbers and multiples of 10
4. Identify missing factors when one factor is 2
5. Use knowledge of doubling, halving and the 2 times table to solve problems

Prior knowledge requirements

- Recall number facts and sequences
- Use place value understanding
- Apply basic operations in context

11. Introduction to division structures

Year 2

Go to unit resources

Threads

- Number
- Number: Multiplication and division

Unit description

In this unit pupils will use practical resources to model and explain when objects can and cannot be grouped or shared equally. They will then represent practical situations using division expressions and equations.

Why this, why now?

This unit continues to explore equal and unequal grouping and this time relates situations to the language and symbols of division. Contexts and representations look at equal grouping and sharing. This will be developed in a future unit focusing on those two ways we can think about division.

Lessons in unit

1. Explain that objects can be grouped equally
2. Identify and explain when objects cannot be grouped equally
3. Explain the relationship between division expressions and division stories
4. Calculate the number of equal groups in a division story
5. Use knowledge of skip counting and division to solve problems relating to measure
6. Skip count using the group size to find the number of groups
7. Explain that objects can be shared equally
8. Use skip counting to solve a sharing problem
9. Skip count to find the group size in a sharing problem
10. Solve a variety of division problems, explaining understanding

Prior knowledge requirements

- Use repeated subtraction and equal sharing
- Recognise and use multiplication facts
- Understand grouping and arrays in relation to division

12. Shape: discuss and compare 2D and 3D shapes

Year 2

Go to unit resources

Threads

- Geometry and Measure

Unit description

In this unit pupils will learn that polygons can be described, sorted, compared and named according to the number of sides and vertices. They will describe 3D shapes, finding different ways to sort and compare them.

Why this, why now?

This unit builds on sorting, classifying and pattern work, introducing more specific language and the concept of symmetry. It gives pupils the language needed to explore, describe and classify other shapes and their features in future units.

Lessons in unit

1. Recognise and sort polygons
2. Describe and name polygons, including triangles and quadrilaterals
3. Describe, name and sort polygons, including pentagons, hexagons and octagons
4. Lines of symmetry
5. Discuss and compare polygons
6. Investigate how polygons can be joined and folded to form 3D shapes
7. Describe and name 3D shapes
8. Describe and name 3d shapes – prisms and pyramids
9. Find different ways to sort 3D shapes
10. Discuss and compare 3D shapes

Prior knowledge requirements

- Name and identify common 2D and 3D shapes
- Describe properties such as sides, edges, faces, and vertices
- Sort shapes based on visual or physical characteristics

13. Addition and subtraction of two 2-digit numbers

Year 2

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Number: Place value
- Statistics

Unit description

In this unit pupils apply their knowledge of known facts and understanding of place value to add and subtract with 2-digit numbers both within and across the tens boundary.

Why this, why now?

This unit builds on and applies knowledge of single digit facts and applies this to larger numbers. Pupils explain different addition and subtraction strategies and decide on the most efficient one for a given equation or problem. These strategies will be developed in future units to handle larger numbers.

Lessons in unit

1. Use efficient addition strategies to calculate
2. Combine tens and ones within equations
3. Add two-digit numbers without crossing the tens boundary
4. Find the missing addend when adding two-digit numbers
5. Add 2-digit numbers when crossing the tens boundary
6. Solve problems involving the addition of two-digit numbers
7. Explain different strategies used to subtract
8. Solve equations involving the subtraction of two-digit numbers
9. Solve problems involving subtraction of two-digit numbers
10. Subtract two-digit numbers crossing the tens boundary
11. Find the missing part when subtracting two-digit numbers
12. Solve problems involving subtraction when bridging 10
13. Use efficient methods to solve subtraction equations
14. Solve problems involving addition and subtraction
15. Create addition and subtraction problems

Prior knowledge requirements

- Recall number bonds to 20
- Understand place value of tens and ones
- Use column or number line methods for addition and subtraction

14. Money: recognise coins and use £ and p symbols

Year 2

Go to unit resources

Threads

- Geometry and Measure
- Number: Addition and Subtraction
- Number: Place value

Unit description

In this unit pupils will recognise and use symbols for pounds and pence combining amounts to make particular values. They will solve simple problems including giving change.

Why this, why now?

This unit provides the opportunity to revisit number facts and calculation strategies in the context of money. Pupils also build on earlier number and money work to make and convert quantities, give change and learn about pounds and pence notation.

Lessons in unit

1. Recognise and understand the value of different coins
2. Recognise the value of 20 p, 50 p and £1 coins
3. Explore combinations of coins that total the same amount
4. Find the most efficient way to make a given value
5. Solve problems including those involving giving change

Prior knowledge requirements

- Recognise coin and note values
- Use symbols £ and p appropriately
- Apply number facts to money contexts

15. Fractions: identify equal parts and be familiar with halves, thirds and quarters

Year 2

Go to unit resources

Threads

- Geometry and Measure
- Number
- Number: Fractions

Unit description

In this unit pupils will identify whether something has or has not been split into equal parts. They will name fractions one-half one-quarter and one-third in relation to a fraction of a length shape or set of objects.

Why this, why now?

This unit develops understanding of parts and wholes, describing equal parts as fractions of a whole. Pupils then apply this to finding half of a number, relating doubling and halving to fractions. This unit prepares pupils with the language and representations for more detailed work on fractions later.

Lessons in unit

1. Equal or unequal parts
2. Recognise and name the fraction 'one half'
3. Recognise and name the fraction 'one quarter'
4. Recognise and name the fraction ‘one-third’
5. Read, write and understand fraction notation
6. Find one-half of a number
7. Relate finding half of a number to halving and doubling
8. Find one-third or one-quarter of a number
9. Find three-quarters of an object, shape, set of objects or quantity
10. Recognise the equivalence of 2/4 and 1/2

Prior knowledge requirements

- Identify equal parts of a whole
- Name common fractions (1/2, 1/3, 1/4)
- Use visual models for fractions

16. Time: write and tell the time to five minutes

Year 2

Go to unit resources

Threads

- Geometry and Measure
- Number: Fractions

Unit description

In this unit pupils will consolidate their understanding of time by comparing and sequencing intervals of time. They will learn to write the time to 5 minutes, including quarter past/quarter to

Why this, why now?

This unit builds on previous time learning, sequencing and also incorporates recent work on fractions to tell the time including half past and quarter past and to the hour. This will be built on in the future to tell the time to 5 minutes and calculate with time.

Lessons in unit

1. Know the number of minutes in an hour and hours in a day
2. Tell and write the time to five minutes past on a clock face
3. Tell and write the time to five minutes past and to on a clock face
4. Tell and write quarter past and quarter to on a clock face
5. Compare and sequence intervals of time

Prior knowledge requirements

- Read time to the hour and half hour
- Understand the relationship between minutes and hours
- Count in fives to track minutes on a clock face

17. Position and direction

Year 2

Go to unit resources

Threads

- Geometry and Measure

Unit description

In this unit pupils will order and arrange combinations of objects in patterns and sequences. They will consolidate and then extend understanding of position, direction

Why this, why now?

This unit consolidates understanding of whole, half, quarter and three-quarter using mathematical vocabulary to describe patterns, position direction and movement. This prepares pupils for work involving right angles in the future.

Lessons in unit

1. Review of using mathematical language to describe position
2. Use mathematical vocabulary to describe movement
3. Describe turns as a quarter, half, three-quarter or full turn
4. Solve problems involving position, direction and rotation
5. Order and arrange objects in patterns and explain the patterns

Prior knowledge requirements

- Use directional language such as left, right, forward, and back
- Understand quarter, half, and full turns
- Identify and describe position using a grid or map

18. Doubling, halving, quotative and partitive division

Year 2

Go to unit resources

Threads

- Number
- Number: Fractions
- Number: Multiplication and division

Unit description

In this unit pupils will double and halve 2-digit numbers. They will explore division as both grouping and sharing and learn to use times table facts to find the quotient for 2x 5x 10x tables.

Why this, why now?

This unit builds on knowledge of times tables and understanding of doubling and halving to develop understanding of the different structure of division: quotative (grouping) and partitive (sharing). Pupils also look for patterns in the 2-, 5- and 10-times tables and explore rules of divisibility based on the patterns. This is developed in future units and applied to larger numbers and other times tables.

Lessons in unit

1. Identify the patterns and relationships between the 5 and 10 times tables
2. Explain patterns and relationships between the 5 and 10 times tables
3. Use knowledge of the 5 and 10 times tables to solve problems
4. Explain how times table facts can help to find the quotient (10 times table)
5. Explain how times table facts can help to find the quotient (5 times table)
6. Explain how times table facts can help to find the quotient (2 times table)
7. Explain how a division equation with 2 as a divisor is related to halving
8. Explain each part of a division equation and know how they can be interchanged
9. Use knowledge of divisibility rules when the divisor is 2 to solve problems
10. Use knowledge of divisibility rules when the divisor is 10 to solve problems
11. Use knowledge of divisibility rules when the divisor is 5 to solve problems
12. Explain how a dividend of zero affects the quotient
13. Explain how the quotient is affected when the divisor is equal to the dividend
14. Explain how a divisor of one affects the quotient
15. Use knowledge of division strategies to solve problems

Prior knowledge requirements

- Recall doubles and halves of numbers up to 20
- Use sharing and grouping with small quantities

- Understand division as the inverse of multiplication

19. Sense of measure - capacity, volume and mass

Year 2

Go to unit resources

Threads

- Geometry and Measure
- Number: Addition and Subtraction

Unit description

In this unit pupils will choose, use and compare appropriate standard units to estimate and measure length/height mass, capacity and temperature to the nearest appropriate unit.

Why this, why now?

This unit highlights the need for standard units of measure and uses different contexts to introduce standard units for length, mass, capacity and temperature. Pupils estimate and measure, compare and order measurements, preparing them for applying units of measure to solve problems in various contexts in the future.

Lessons in unit

1. Length can be measured in any direction to give height, length and distance
2. Explain why standard units of measure are needed
3. Length can be measured in metres and centimetres
4. Read scales in metres and centimetres
5. Compare and order lengths
6. Mass can be measured in grams and kilograms
7. Compare and order measurements of mass
8. Volume and capacity can be measured in litres and millilitres
9. Compare and order measurements of volume and capacity
10. Temperature

Prior knowledge requirements

- Compare and describe measures using non-standard units
- Use standard units such as litres and grams
- Estimate and measure using appropriate tools

Year 3 units

View interactive sequence online

1 Review strategies for adding and subtracting across 10	**2** Securing place value to 100 and applying to addition and subtraction	**3** Bridging 100: counting on and back in 10s, adding/subtracting multiples of 10
4 Measuring length and recording in tables	**5** Representing 3-digit numbers, comparing and positioning on number lines	**6** Measures: mass and capacity
7 Right angles	**8** Informal and mental strategies for adding and subtracting two 3-digit numbers	**9** Understand additive relationships and apply them to rearrange equations
10 Column addition	**11** 2, 4 and 8 times tables: using times tables to solve problems	**12** Column subtraction
13 Unit fractions as part of a whole	**14** Identify parts and wholes in different contexts	**15** Compare and order unit fractions

16
Calculate the value of a part (fractions as operators)

17
Non-unit fractions

18
Composition of non-unit fractions: addition and subtraction

19
Parallel and perpendicular sides in polygons

20
Tell the time to the nearest minute and compare units of time

1. Review strategies for adding and subtracting across 10

Year 3

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction

Unit description

In this unit pupils will be reviewing and securing previous knowledge of adding 3 addends, understanding they can be added in any order and combined in different ways to bridge through 10

Why this, why now?

This first unit in Year 3 revisits and reviews single digit addition and subtraction facts, commutativity and bridging through ten. It gives pupils the opportunity to rehearse key facts that will be needed to work with the larger numbers introduced in the following units.

Lessons in unit

1. Add 3 numbers together using doubles and near doubles
2. Add 3 numbers together in different contexts
3. Numbers can be added in any order
4. Add three addends by finding pairs that total 10
5. Add three addends efficiently using a range of strategies
6. Addition by bridging through 10
7. Subtracting small numbers
8. Subtracting to and from 10
9. Subtracting numbers that bridge through 10
10. Solving problems involving addition and subtraction

Prior knowledge requirements

- Recall number bonds to 10 and 20
- Use partitioning and recombining to make 10
- Apply mental strategies for addition and subtraction within 20

2. Securing place value to 100 and applying to addition and subtraction

Year 3

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Number: Place value
- Ratio and Proportion

Unit description

In this unit pupils will use known facts to find multiples of ten that compose 100 and use known facts to find complements to 100. They will add and subtract multiples of ten, bridging 100.

Why this, why now?

This unit applies the single digit calculations crossing the tens boundaries of the last unit to multiples of ten, bridging 100. Pupils explore complements to 100, applying known facts within and to 20 whilst reviewing and securing place value to 100. This unit prepares pupils for working with 3-digit numbers in different contexts.

Lessons in unit

1. Composition of 100 in 10s and 1s
2. Composition of 100 in 50s, 25s and 20s
3. Multiples of 10 that total 100
4. Use known facts to find pairs of numbers that total 100
5. Use known facts to find complements to 100 efficiently
6. Represent 3-digit multiples of 10 in different ways
7. Use place value knowledge to write addition and subtraction equations
8. Bridge 100 by adding in multiples of 10
9. Bridge 100 by subtracting in multiples of 10
10. Solve problems using knowledge of addition and subtraction of multiples of 10

Prior knowledge requirements

- Count and read numbers to 100
- Partition numbers into tens and ones
- Add and subtract within 100 using place value

3. Bridging 100: counting on and back in 10s, adding/subtracting multiples of 10

Year 3

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Number: Place value
- Ratio and Proportion

Unit description

In this unit pupils will find pairs of number that compose 100. They will position 3-digit numbers on a number line and estimate their position on unmarked number lines. They will compare and order 3-digit numbers.

Why this, why now?

This unit develops the knowledge of multiples of 10 totaling 100 to pairs of numbers that compose 100. Pupils use place value knowledge to represent 3-digit numbers in different ways, including on a number line. They calculate mentally with 3-digit numbers, finding 10 more and less, adding and subtracting 2-digit multiples of ten in preparation for more formal calculations in later units.

Lessons in unit

1. Count across and on from 100
2. Represent a 3-digit number up to 199 in different ways
3. Bridge 100 by adding or subtracting a single-digit number
4. Find 10 more or 10 less than a given number
5. Cross the hundreds boundary when adding and subtracting any 2-digit multiple of 10

Prior knowledge requirements

- Recall number facts and sequences
- Use place value understanding
- Apply basic operations in context

4. Measuring length and recording in tables

Year 3

Go to unit resources

Threads

- Geometry and Measure
- Number
- Number: Place value
- Statistics

Unit description

In this unit pupils will continue to measure using appropriate tools and units progressing to using a wider range of measures, including comparing and using mixed units.

Why this, why now?

This unit provides an opportunity for pupils to apply the number work they have done in context and to look at the equivalence between metres and centimetres and cm and mm. Pupils also use tables and graphs to represent and compare data.

Lessons in unit

1. Estimate in metres and describe a metre in different ways
2. Measure length and height from zero using whole m or cm
3. Converting between metres and centimetres
4. Millimetres as a unit of measure and the relationship between them and cm
5. Measuring length and height using cm and mm
6. Converting between centimetres and millimetres
7. Estimate and measure lengths and heights and record in a table
8. Using graphs to represent lengths and heights
9. Solve problems involving length
10. Solve problems involving length and height

Prior knowledge requirements

- Measure using rulers or standard units
- Record lengths in cm and m
- Compare and order measurements

5. Representing 3-digit numbers, comparing and positioning on number lines

Year 3

Go to unit resources

Threads

- Geometry and Measure
- Number
- Number: Addition and Subtraction
- Number: Place value
- Statistics

Unit description

In this unit pupils will use knowledge of place value to represent a 3-digit number in different ways. They will compare and order 3-digit numbers and position on number lines and unmarked number lines.

Why this, why now?

This unit develops understanding of place value by looking at 3-digit numbers. Pupils represent them in different ways and explore how counting patterns and mental calculation strategies familiar to them can be applied to larger numbers. They consider the composition and relative size of numbers, comparing, partitioning and positioning them on number lines. Pupils also develop counting patterns by counting on and back in multiples of 2, 20, 5, 50 and 25.

Lessons in unit

1. Represent a 3-digit number up to 1,000 in different ways
2. Count forwards and backwards within 3-digits
3. Position 3-digit numbers on number lines
4. Estimate the position of 3-digit numbers on unmarked number lines
5. Comparing and ordering numbers with 1, 2 and 3 digits
6. Ordering sets of 3-digit numbers
7. Use known facts to add and subtract multiples of 100 within 1000
8. Write a 3-digit multiple of 10 as a multiplication equation
9. Partition 3-digit numbers in different ways
10. Use known facts to solve problems involving partitioning numbers
11. Use known facts to add and subtract to and from multiples of 100
12. Add and subtract to and from a 3-digit number bridging 100
13. Solve problems by adding and subtracting to or from 3-digit numbers
14. Count forwards and backwards in multiples of 2, 20, 5, 50 and 25
15. Solve problems by counting forwards and backwards in multiples of 2, 20, 5, 50 and 25

Prior knowledge requirements

- Recall number facts and sequences
- Use place value understanding
- Apply basic operations in context

6. Measures: mass and capacity

Year 3

Go to unit resources

Threads

- Geometry and Measure
- Number
- Number: Addition and Subtraction
- Number: Place value

Unit description

In this unit pupils will use weighing scales up to 1kg and measuring tools for volume and capacity up to 1 litre. They will measure mass from 0 to above 1kg using whole kg and grams and measure volume from 0 to above 1 litre using whole litres and ml.

Why this, why now?

This unit provides opportunities for pupils to apply their developing knowledge of 3-digit numbers in the context of mass and capacity. They will deepen their understanding of the concepts of volume and capacity with practical activities and record results in tables. Reading scales marked in different intervals allows pupils to apply counting in steps of different sizes which will support both measure and statistics work in the future.

Lessons in unit

1. Become familiar with scales with different intervals when measuring in grams
2. Measure the mass of objects using grams
3. Measure mass in whole kilograms and grams
4. Understanding capacity and volume
5. Measuring the volume of liquids using millilitres.
6. Measure volume in whole litres and millilitres
7. Comparing and estimating mass and volume
8. Estimate then measure mass and volume and record in a table
9. Solve problems involving mass
10. Solve problems involving volume

Prior knowledge requirements

- Identify and use appropriate units
- Estimate and compare quantities
- Convert between common units

7. Right angles

Year 3

Go to unit resources

Threads

- Geometry and Measure

Unit description

In this unit pupils will rotate 2 lines around a fixed point to make different angles. They identify vertices and describe half, quarter and three-quarter turns in terms of right angles.

Why this, why now?

This unit provides the opportunity for pupils to develop their understanding of angles by looking at angles relating to dynamic turning and also static angles as properties of 2-D shapes. Pupils identify right angles as properties of shapes and also identify when shapes have angles which are not right angles. This prepares them for work classifying and measuring angles in the future.

Lessons in unit

1. Make different sized angles by rotating two lines around a fixed point
2. Identify and describe right angles
3. Know that a right angle describes a quarter turn
4. Identify properties of triangles
5. Identify properties of quadrilaterals
6. Know that a rectangle is a four-sided polygon with four right angles
7. Know that a square is a rectangle in which the four sides are of equal length
8. Investigate the shapes made when rectangles are cut on the diagonal
9. Join four right angles at a point using different right-angled polygons
10. Investigate and draw other polygons with right angles

Prior knowledge requirements

- Identify angles in shapes and turns
- Recognise a quarter turn as a right angle
- Compare angles to a right angle using a right-angle checker

8. Informal and mental strategies for adding and subtracting two 3-digit numbers

Year 3

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Ratio and Proportion

Unit description

In this unit pupils will add and subtract two 3-digit numbers using partitioning, adjusting, redistribution and bridging.

Why this, why now?

This unit develops mental strategies applied to numbers bridging 100 and applies them to adding and subtracting 3-digit numbers. Pupils consider how to partition numbers to enable them to bridge multiples of 10 and 100. They also use number lines to find the difference and make decisions on which is the most efficient strategy to add or subtracts pairs of 3-digit numbers. This consolidation of mental and informal strategies prepares pupils for the introduction of more formal strategies in later units.

Lessons in unit

1. Add two 3-digit numbers using partitioning
2. Add two 3-digit numbers using adjusting strategies
3. Add 2 and 3-digit numbers by redistributing
4. Choose the most efficient strategy to add two 3-digit numbers
5. Subtract 2 or 3-digit numbers using partitioning and bridging a multiple of 10
6. Subtract a pair of 2-digit numbers by finding the difference
7. Subtract 3-digit multiples of 10 by finding the difference between them
8. Choose the most efficient strategy to subtract from a 3-digit number
9. Use addition and subtraction to solve problems involving bar charts, pictograms and tables
10. Use addition and subtraction to solve problems in different contexts

Prior knowledge requirements

- Use number bonds and partitioning to simplify
- Add and subtract multiples of 10 and 100
- Use rounding and adjusting to estimate
- Interpret and present data using bar charts, pictograms and tables

9. Understand additive relationships and apply them to rearrange equations

Year 3

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Ratio and Proportion

Unit description

In this unit pupils will accurately and efficiently solve multi-step addition and subtraction problems. They will understand and explain how both addition and subtraction equations can be used to describe the same additive relationship.

Why this, why now?

This unit allows pupils to deepen their understanding of the relationship between addition and subtraction. The part-part-whole structure is used to identify what is known and unknown in a given context or problem. Pupils generalize about how to find a missing part or whole using addition and subtraction. They have the opportunity to apply this understanding in different contexts including statistics.

Lessons in unit

1. Use the additive relationship to rearrange addition equations
2. Use the additive relationship to rearrange subtraction equations
3. Develop understanding of the relationship between addition and subtraction
4. Identify knowns and unknowns in addition equations
5. Identify knowns and unknowns in subtraction equations
6. Use the additive relationship to rearrange and solve equations
7. Solve problems using bar charts, pictograms and tables
8. Understand why the order of addition and subtraction steps can be chosen
9. Solve multi-step addition and subtraction problems efficiently
10. Solve one and two-step problems in different contexts

Prior knowledge requirements

- Know the inverse relationship between addition and subtraction
- Use number facts to solve missing number problems
- Recognise equivalent expressions in different forms
- Interpret adn present data using bar charts, pictograms and tables

10. Column addition

Year 3

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Ratio and Proportion
- Statistics

Unit description

In this unit pupils will identify the addends and the sum in column addition. They will use their knowledge of place value to correctly lay out column addition.

Why this, why now?

Now that pupils have a good understanding of what addition is and of place value, they can apply this to represent addition of larger numbers using column addition. They have the understanding needed to explain how this representation works and have the opportunity to apply this to find missing values, applying their understanding of parts and wholes or addends and sums. Pupils also use other known strategies to estimate and check their calculations.

Lessons in unit

1. Identify the addends and the sum in column addition
2. Use place value to correctly lay out column addition
3. Add 2-digit numbers using column addition
4. Add 3-digit numbers using column addition
5. Use column addition to solve problems
6. Use column addition to add numbers by regrouping ones
7. Use column addition to add numbers by regrouping tens
8. Use column addition with regrouping in ones and tens
9. Use known facts and strategies to accurately and efficiently calculate and check column addition
10. Use column addition with regrouping to solve problems

Prior knowledge requirements

- Recall number bonds and addition facts within 20
- Use place value knowledge to add 2- and 3-digit numbers
- Understand and use column layout for addition

11. 2, 4 and 8 times tables: using times tables to solve problems

Year 3

Go to unit resources

Threads

- Number
- Number: Multiplication and division
- Number: Place value
- Statistics

Unit description

In this unit pupils will solve multiplication and division problems using knowledge of the scaling relationships between the 2-, 4- and 8-times tables.

Why this, why now?

This unit provides a break in additive thinking between units on column addition and subtraction. Pupils have the chance to review the facts for the 2-times table and explore the relationship between the 2-, 4- and 8-times tables. This unit develops multiplicative thinking and introduces the concept and language of scaling, including multiples of 10. This builds on previous work on doubling and halving and leads on to exploring links between the 3-, 6- and 9-times tables in the future.

Lessons in unit

1. Represent counting in fours as the 4 times table
2. Use knowledge of the 4 times table to solve problems
3. Explain the relationship between adjacent multiples of four
4. Explain the relationship between multiples of 2 and multiples of 4
5. Use knowledge of the relationship between the 2 and 4 times tables to solve problems
6. Represent counting in eights as the 8 times table
7. Explain the relationship between adjacent multiples of eight
8. Explain the relationship between multiples of 4 and multiples of 8
9. Use knowledge of the relationship between the 4 and 8 times tables to solve problems
10. Explain the relationship between the multiples of 2, 4 and 8
11. Use knowledge of the relationship between the 2, 4 and 8 times tables to solve problems
12. Use knowledge of the divisibility rules for divisors of 2 and 4 to solve problems
13. Use knowledge of the divisibility rules for divisors 8 to solve problems
14. Scale known multiplication facts by 10
15. Scale divisions derived from multiplication facts by 10

Prior knowledge requirements

- Recall 2 and 4 times tables

- Use doubling strategies to derive 4 and 8 times tables
- Apply multiplication facts to word problems

12. Column subtraction

Year 3

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Ratio and Proportion
- Statistics

Unit description

In this unit pupils will identify the minuend and the subtrahend in column subtraction and explain the column subtraction algorithm. They will subtract from a 2-digit number using column subtraction with exchanging.

Why this, why now?

This unit returns to additive thinking and introduces pupils to representing subtraction in columns, applying both their understanding of place value and of subtraction. They identify wholes and parts and label them with the language of minuend and subtrahend. Pupils link the notation of regrouping in column subtraction with representations using base ten resources. They also make decisions about which strategy is more efficient: mental method or column subtraction.

Lessons in unit

1. Identify the minuend and subtrahend in column subtraction
2. Use column subtraction to subtract from a 2- or 3-digit number
3. Subtract from a 2-digit number using column subtraction with regrouping
4. Subtract from a 3-digit number using column subtraction with regrouping
5. Make efficient use of subtraction strategies including column subtraction

Prior knowledge requirements

- Understand place value and alignment of digits
- Use mental subtraction strategies
- Apply column method to 2- and 3-digit numbers

13. Unit fractions as part of a whole

Year 3

Go to unit resources

Threads

- Number
- Number: Fractions

Unit description

In this unit pupils will represent unit fractions in different ways, identifying the whole, the number of equal parts and the size of each part as a unit fraction, including tenths.

Why this, why now?

Pupils will have learned about fractions before and this unit revisits the idea of fractions as part of a whole and the notation of unit fractions. They will identify the whole and consider the number of equal parts, how this gives the name of the fraction and links to the way the fraction is recorded using fraction notation. Pupils also construct a whole once then know a part and the number of parts. This prepares them for identifying and comparing fractions in different contexts.

Lessons in unit

1. Identify a whole and the parts that make it up
2. Explain why a part can only be defined in relation to a whole
3. Identify the number of equal or unequal parts in a whole
4. Identify equal parts when they do not look the same
5. Explain the size of a part in relation to the whole
6. Construct a whole when given a part and the number of parts
7. Identify how many equal parts a whole has been divided into
8. Use fraction notation to describe an equal part of the whole
9. Represent unit fractions in different ways
10. Solve problems involving identifying equal parts and the whole

Prior knowledge requirements

- Identify equal parts of a whole
- Name common fractions (1/2, 1/3, 1/4)
- Use visual models for fractions

14. Identify parts and wholes in different contexts

Year 3

Go to unit resources

Threads

- Number
- Number: Fractions

Unit description

In this unit pupils will identify parts and wholes in different contexts including sets of objects, 3-D shapes and linear contexts.

Why this, why now?

This unit allows pupils to apply their understanding of unit fractions as one part of a number of equal parts in a whole in unfamiliar contexts including when the equal parts do not look the same. They will explore parts of wholes of 3-D shapes and linear contexts. Fractions of a line prepares pupils for the concept of fractions as numbers with a position on a number line rather than just as parts of a whole.

Lessons in unit

1. Identify parts and wholes in the contexts of lines and 3D objects
2. Identify parts and wholes in different contexts
3. Identify equal parts in a whole when they do not look the same in 2D shapes
4. Identify equal parts in a whole when they do not look the same in 3D contexts
5. Solve problems by identifying parts and wholes in a range of contexts

Prior knowledge requirements

- Recognise a whole as composed of parts
- Use part-part-whole models
- Apply knowledge of fractions or numbers in context

15. Compare and order unit fractions

Year 3

Go to unit resources

Threads

- Number
- Number: Fractions

Unit description

In this unit pupils will compare and order unit fractions by looking at the denominator and understanding what it represents.

Why this, why now?

In this unit, pupils begin to generalize about the relative size of unit fractions by comparing the denominators. They also continue to focus on the whole and explain when fractions cannot be compared in this way as the whole is different. This understanding of the relationship between parts and wholes in fractions will prepare them for calculating the value of a part and for comparing non-unit fractions.

Lessons in unit

1. Compare unit fractions by looking at the denominator
2. Compare and order unit fractions by looking at the denominator
3. Identify when unit fractions cannot be compared
4. Solve problems involving comparing unit fractions
5. Solve problems involving comparing and ordering unit fractions in a range of contexts

Prior knowledge requirements

- Recognise and name unit fractions
- Understand fractions as parts of a whole
- Use visual models to compare simple fractions

16. Calculate the value of a part (fractions as operators)

Year 3

Go to unit resources

Threads

- Number
- Number: Fractions
- Number: Multiplication and division

Unit description

In this unit pupils will quantify the number of items in each part and connect to the unit fraction operator. They will calculate the value of a part by connecting knowledge of division and division facts with finding a fraction of a quantity.

Why this, why now?

This unit draws together understanding of unit fractions and division understanding and known facts. Pupils begin to see fractions as operators and link fractions to division to calculate the value of a part of a set that relates to a unit fraction. This draws on understanding division as sharing (partitive division) where the number of parts is known and we calculate the value of each part.

Lessons in unit

1. Constructing a whole
2. Use knowledge of the relationship between parts and wholes to solve problems
3. Use parts and wholes to find a unit fraction of a set of objects
4. Calculate the value of parts and wholes using understanding of division
5. Connect division with finding a fraction of a quantity to find parts and wholes

Prior knowledge requirements

- Recognise fractions of shapes and sets
- Understand the numerator and denominator roles
- Link unit fractions to equal sharing and grouping

17. Non-unit fractions

Year 3

Go to unit resources

Threads

- Number
- Number: Fractions

Unit description

In this unit pupils will explain that non-unit fractions are composed of more than one unit fraction using knowledge of unit fractions to find one whole.

Why this, why now?

This unit introduces non-unit fractions which are composed of more than one unit fraction. Pupils express non-unit fractions as a number of unit fractions, including one whole. They look at the fractions in different contexts, including placing them on a number line to mark a particular point in the number system. Pupils apply understanding of ordering unit fractions to compare other fractions with the same numerator and also compare non-unit fractions with the same denominator.

Lessons in unit

1. Explain that non-unit fractions are made of more than one unit fraction
2. Identify non-unit fractions
3. Identifying equal parts in a whole in different contexts
4. Use knowledge of non-unit fractions to solve problems
5. Use knowledge of unit fractions to find one whole
6. Place fractions between 0 and 1 on a number line
7. Compare non-unit fractions with the same denominator
8. Review comparing unit fractions
9. Compare fractions with the same numerator
10. Compare non-unit fractions including those equal to 1

Prior knowledge requirements

- Understand unit fractions and their representation
- Use visual models (like number lines or shapes) to compare fractions
- Recognise numerator and denominator and their roles

18. Composition of non-unit fractions: addition and subtraction

Year 3

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Number: Fractions

Unit description

In this unit pupils will use repeated addition of a unit fraction to form a non-unit fraction. They will compare non-unit fractions with the same denominator. They will add and subtract fractions with the same denominator.

Why this, why now?

This unit continues to look at non-unit fractions and introduces the use of repeated addition to represent the composition of non-unit fractions. Pupils develop their understanding of the role of the numerator and denominator to compare non-unit fractions with the same denominator and to add and subtract fractions with the same denominator. They develop the language of unitizing to build understanding that non-unit fractions are a number of unit fractions. This will prepare pupils for more formal calculation with fractions in the future.

Lessons in unit

1. Use repeated addition of a unit fraction to form a non-unit fraction
2. Use repeated addition of a unit fraction to form 1
3. Add fractions with the same denominator
4. Add on fractions with the same denominator
5. Add fractions with the same denominator and generalise the rule
6. Subtract fractions with the same denominator
7. Add and subtract fractions with the same denominator in a range of contexts
8. Explain that addition and subtraction of fractions are inverse operations
9. Subtract fractions from a whole by converting the whole to a fraction
10. Substitute a fraction representing a whole to solve subtraction problems

Prior knowledge requirements

- Recognise and name non-unit fractions
- Understand adding and subtracting like denominators
- Use fraction walls or number lines to model calculations

19. Parallel and perpendicular sides in polygons

Year 3

Go to unit resources

Threads

- Geometry and Measure
- Number: Addition and Subtraction

Unit description

In this unit pupils will investigate ways to compose and decompose polygons. They will investigate quadrilaterals with and without parallel and perpendicular sides.

Why this, why now?

This unit allows pupils to explore 2-D shapes, composing and constructing shapes in different ways. Pupils are introduced to the concept of parallel and perpendicular sides as properties of shapes. Using different grids, including geoboards, draw triangles and quadrilaterals with given properties. In the unit, pupils have opportunities to rehearse and use the language of 2-shapes and their properties. This unit prepares them for work with other polygons and work on perimeter in the future.

Lessons in unit

1. Make shapes by joining two polygons in different ways
2. Investigate different ways of decomposing a polygon
3. Draw polygons on isometric paper
4. Construct quadrilaterals with and without parallel and perpendicular sides
5. Make and draw shapes with and without parallel and perpendicular sides
6. Identifying parallel lines
7. Make and draw triangles on circular geoboards
8. Make and draw quadrilaterals on circular geoboards
9. Draw shapes with given properties
10. Draw shapes with given properties on a range of geometric grids

Prior knowledge requirements

- Recall number facts and sequences
- Use place value understanding
- Apply basic operations in context

20. Tell the time to the nearest minute and compare units of time

Year 3

Go to unit resources

Threads

- Geometry and Measure
- Number
- Number: Addition and Subtraction
- Number: Multiplication and division

Unit description

In this unit pupils will tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks.

Why this, why now?

This unit develops understanding of telling the time on an analogue clock to include writing and telling the time to the nearest minute. Pupils also estimate and compare the duration of activities. They are introduced to the concept of am and pm, learn about equivalence between measures of time and are introduced to Roman numerals which are sometimes used to label the hours on an analogue clock.

Lessons in unit

1. Tell and write the time to the nearest minute past
2. Tell and write the time to the nearest minute past and to
3. Estimate and compare the duration of events and tasks
4. Tell and write the time including using Roman numerals
5. am and pm
6. Know the number of days in each month, year and leap year
7. How many seconds in a minute

Prior knowledge requirements

- Read time to the hour and half hour
- Count in fives on a clock face
- Understand and compare minutes, hours and durations

Year 4 units

View interactive sequence online

1 Review of column addition and subtraction	**2** Secure place value to 1000: apply to addition and subtraction: multiples of 100	**3** Calculation and conversion of measures
4 Comparing, ordering and rounding 4-digit numbers	**5** Column addition and subtraction with 4-digit numbers	**6** Perimeter
7 Represent counting in threes and sixes as the 3 and 6 times tables	**8** Relationship between the 3 and 6 times tables and tests of divisibility	**9** Represent counting in nines as the 9 times table
10 Relationship between the 3 and 9 times tables	**11** 7 times table: odd and even patterns, square numbers and tests of divisibility	**12** Understand and represent multiplicative structures
13 Apply the distributive law to multiplication	**14** Understand what happens when a number is multiplied or divided by 10 and 100	**15** Coordinates

16
Review of fractions

17
Composition of fractions greater than one

18
Compare and order mixed numbers and position on a number line

19
Addition and subtraction of fractions and mixed numbers (within a whole)

20
Convert improper fractions to mixed numbers and vice versa

21
Efficient strategies for adding and subtracting mixed numbers (crossing a whole)

22
Properties of 2D and 3D shapes and symmetry

23
Money: apply efficient strategies when calculating with money

24
Time: Convert between 12 and 24 hour clocks: analogue and digital

25
Division with remainders

1. Review of column addition and subtraction

Year 4

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Number: Place value
- Statistics

Unit description

In this unit pupils will revisit column addition with regrouping and column subtraction with exchanging to solve problems.

Why this, why now?

This unit gives pupils the chance to review and secure column and addition strategies, revisiting place value, estimating and ensuring that they are using the most efficient strategy in a given situation. They have the opportunity to apply known number facts and apply their knowledge to solve problems. This unit makes sure that pupils are ready to work with 4-digit numbers in future units.

Lessons in unit

1. Review column addition and identify the addends and sum
2. Review and use knowledge of place value to correctly lay out column addition
3. Review adding 2-digit numbers using column addition without regrouping
4. Review adding 3-digit numbers using column addition without regrouping
5. Use column addition to solve problems in different contexts
6. Review using column addition to add 2- and 3-digit numbers by regrouping ones
7. Review using column addition to add 2- and 3-digit numbers by regrouping tens
8. Review using column addition with regrouping in the ones and tens columns
9. Review using known facts and strategies to accurately and efficiently use and check column addition
10. Use knowledge of column addition to solve problems in a range of contexts
11. Review identifying the minuend and subtrahend in column subtraction
12. Review using column subtraction to subtract without regrouping
13. Review using column subtraction with regrouping from tens to ones
14. Review using column subtraction with regrouping from hundreds to tens
15. Decide on the most efficient subtraction strategy, including column subtraction

Prior knowledge requirements

- Use column methods with 2- and 3-digit numbers

- Understand regrouping and borrowing
- Estimate answers and check for reasonableness

2. Secure place value to 1000: apply to addition and subtraction: multiples of 100

Year 4

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Number: Place value
- Statistics

Unit description

In this unit pupils will explain how many tens, hundreds and ones 1,000 is composed of. They will use different strategies to add and subtract multiples of 100.

Why this, why now?

In this unit, pupils extend their understanding of place value to include 4-digit numbers. They explore the composition of numbers to 2,000 and use different strategies to add and subtract multiples of 100. This unit prepares pupils for working with 4-digit numbers in future units.

Lessons in unit

1. Explain how many hundreds, tens and ones 1,000 is composed of
2. Use place value to compose numbers up to 2,000 using hundreds, tens and ones
3. Use different strategies to add multiples of 100
4. Use different strategies to subtract multiples of 100
5. Use addition and subtraction strategies to solve problems with multiples of 100

Prior knowledge requirements

- Partition numbers into hundreds, tens and ones
- Recognise digit value to 1,000 or beyond
- Use number lines and base-10 apparatus

3. Calculation and conversion of measures

Year 4

Go to unit resources

Threads

- Geometry and Measure
- Number
- Number: Addition and Subtraction
- Number: Multiplication and division

Unit description

In this unit pupils will use knowledge of 1000 to explain common measure conversions and solve problems.

Why this, why now?

This unit provides the opportunity for pupils to explore numbers to 2,000 in the context of measures. They deepen their understanding of the composition of 4-digit numbers in the context of measures and statistics giving confidence to move on to other work involving 4-digit numbers.

Lessons in unit

1. Use knowledge of 1,000 to explain common measure conversions
2. Partitioning 1,000 in the context of measures
3. Partitioning 1,000 and 2,000 in the context of measures
4. Use knowledge of measure conversions to interpret graphs and tables
5. Use efficient strategies and common measure conversions to solve problems in a range of contexts

Prior knowledge requirements

- Identify and use appropriate units
- Estimate and compare quantities
- Convert between common units

4. Comparing, ordering and rounding 4-digit numbers

Year 4

Go to unit resources

Threads

- Number
- Number: Place value
- Statistics

Unit description

¬†In this unit pupils will compare and order 4-digit numbers. They will learn what rounding is and will round 4-digit numbers to the nearest thousand, hundred and ten.

Why this, why now?

This unit provides pupils with the chance to explore 4-digit place value, using their knowledge to decompose, compare, order and round numbers. They round 4-digit numbers to the nearest thousand, hundred and ten. In future units, they apply this knowledge and understanding when calculating with 4-digit numbers.

Lessons in unit

1. Use place value and number facts to decompose 4-digit numbers in different ways
2. Compare and order 4-digit numbers
3. Explain what rounding is and round a 4-digit number to the nearest thousand
4. Round a 4-digit number to the nearest hundred and ten
5. Round a 4-digit number to the nearest thousand, hundred and ten

Prior knowledge requirements

- Understand place value up to 1000
- Compare and order numbers using digit value
- Round numbers to the nearest 10 or 100

5. Column addition and subtraction with 4-digit numbers

Year 4

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Number: Place value

Unit description

In this unit pupils will consolidate column addition with regrouping and column subtraction with exchanging to solve problems. They will use known facts and strategies to accurately and efficiently calculate and check.

Why this, why now?

This unit extends pupil's understanding of column addition and subtraction to working with 4-digit numbers. They will also consider strategies to improve efficiency when solving calculations and consider the composition of 4-digit numbers. This gives pupils a range of ways of thinking about numbers, addition and subtraction that they can apply to future learning.

Lessons in unit

1. Add up to 3 four-digit numbers using column addition
2. Subtract 4-digit numbers using column subtraction
3. Pupils use strategies to make solving calculations more efficient
4. Explain how many '500s' and '250s', 1,000 is composed of
5. Explain how many '100s' and '200s', 1,000 is composed of

Prior knowledge requirements

- Understand place value to 1000
- Use column methods for 2- and 3-digit numbers
- Recall number facts and number bonds

6. Perimeter

Year 4

Go to unit resources

Threads

- Geometry and Measure
- Number: Addition and Subtraction

Unit description

In this unit pupil will learn perimeter as the distance around the edge of a 2D shape. They will learn perimeter is measured in units of length found by counting units and by calculating by adding the side lengths of a 2D shape.

Why this, why now?

In this unit, pupils explore the concept of the perimeter of a shape. They count and then use measurement to work out the side lengths. The unit looks at regular and irregular shapes and pupils identify where multiplication can be used to calculate area. They calculate missing side lengths when the perimeter is known and understand that different shapes can have the same perimeter. A good understanding of perimeter will reduce the risk of confusion when the concept of area is taught.

Lessons in unit

1. Know that a regular polygon has sides that are the same length and angles that are the same size
2. Know that the perimeter is the distance around a 2D shape
3. Understand that different shapes can have the same perimeter
4. Know that perimeter is measured in units of length and can be found by counting or measuring units
5. Know that perimeter can be calculated by adding together the side lengths of a 2D shape
6. Know that the perimeter of a rectangle can be calculated by addition and multiplication
7. Know that unknown side lengths can be calculated from the perimeter and known side lengths
8. Understand that the perimeter of a regular polygon can be calculated by multiplication
9. Calculate the side length of a regular polygon by division where the perimeter is known
10. Solve problems involving the perimeter and side lengths of polygons

Prior knowledge requirements

- Measure side lengths
- Understand the concept of distance around a shape
- Use addition to calculate total length

7. Represent counting in threes and sixes as the 3 and 6 times tables

Year 4

Go to unit resources

Threads

- Number
- Number: Multiplication and division
- Number: Place value

Unit description

In this unit pupils will represent counting in 3s as the 3-times table explaining the relationship between adjacent multiples of 3 and represent counting in 6s as the 6-times table explaining the relationship between adjacent multiples of 6.

Why this, why now?

This unit looks in depth at the 3- and 6-times tables. Pupils have the opportunity to rehearse the times table facts whilst also deepening their understanding of multiplication and how multiples are related. This unit prepares them for looking at the relationship between the 3- and 6-times tables and the introduction of the 9 times table.

Lessons in unit

1. Represent counting in threes as the 3 times table
2. Explain the relationship between adjacent multiples of three
3. Represent counting in sixes as the 6 times table
4. Explain the relationship between adjacent multiples of six
5. Solve problems involving multiples of 6

Prior knowledge requirements

- Count in equal steps
- Recall relevant multiplication facts
- Use arrays or repeated addition

8. Relationship between the 3 and 6 times tables and tests of divisibility

Year 4

Go to unit resources

Threads

- Number
- Number: Multiplication and division
- Number: Place value

Unit description

In this unit pupils will explain the relationship between multiples of 3 and of 6. They will use this relationship and tests of divisibility for the 3- and 6-times tables to solve problems.

Why this, why now?

This unit gives further opportunity for pupils to rehearse the facts for the 3- and 6-times tables whilst also exploring the relationship between the times tables. They also look at the tests of divisibility for 3 and 6 and use their knowledge of the facts along with these tests to solve problems. This secures their knowledge of the times table facts and prepares for the 9-times table and it's links with the 3-times table.

Lessons in unit

1. Use knowledge of the 3 and 6 times tables to solve problems
2. Explain the relationship between multiples of three and six
3. Use knowledge of the relationships between the 3 and 6 times tables to solve problems
4. Use the divisibility rules to find multiples of 3
5. Use divisibility rules for multiples of 6

Prior knowledge requirements

- Recall multiplication facts for the 3 and 6 times tables
- Understand the concept of doubling and its link to multiples
- Identify patterns in number sequences and apply divisibility rules

9. Represent counting in nines as the 9 times table

Year 4

Go to unit resources

Threads

- Number
- Number: Multiplication and division

Unit description

In this unit pupils will represent counting in 9s as the 9x table explaining the relationship between adjacent multiples of 9. They will use known facts from the 10x table to solve problems involving the 9x table.

Why this, why now?

This unit uses the same language and structures as have been used for other times tables to introduce and rehearse the facts for the 9-times table. Pupils look at the link to the 10-times table, drawing on and deepening their understanding of the structures of multiplication. This unit prepares them to look at the link between the 3- and 9-times tables.

Lessons in unit

1. Represent counting in nines as the 9 times table
2. Explain the relationship between adjacent multiples of nine
3. Solve problems involving adjacent multiples of nine
4. Use known facts from the 10 times table to solve problems involving the 9 times table
5. Use knowledge of the 9 times table to solve problems

Prior knowledge requirements

- Read time to the hour and half hour
- Understand 12-hour clock notation
- Convert between hours and minutes

10. Relationship between the 3 and 9 times tables

Year 4

Go to unit resources

Threads

- Number
- Number: Multiplication and division
- Number: Place value

Unit description

In this unit pupils will explain the relationship between multiples of 3 and multiples of 9 and use it, along with the tests of divisibility for the 3-, 6- and 9-times tables, to solve problems.

Why this, why now?

This unit gives further opportunity for pupils to rehearse and recall facts for the 3- and 9-times tables as they explore the links between the times tables. They also link the tests of divisibility for the 3-, 6- and 9-times tables and use these, along with their knowledge of the number facts, to solve problems.

Lessons in unit

1. Explain the relationship between multiples of three and multiples of nine
2. Explain the relationship between pairs of 3 and 9 times table facts that have the same product
3. Solve problems using the relationship between 3 and 9 times table
4. Solve problems using divisibility rules for divisors of 3, 6 and 9
5. Solve problems involving the 3, 6 and 9 times tables

Prior knowledge requirements

- Recall the 3 times table
- Use patterns to derive the 9 times table
- Identify and apply divisibility rules and patterns

11. 7 times table: odd and even patterns, square numbers and tests of divisibility

Year 4

Go to unit resources

Threads

- Number
- Number: Multiplication and division
- Number: Place value

Unit description

In this unit pupils will represent counting in sevens as the 7-table, explaining the relationship between adjacent multiples. The unit also looks at odd and even patterns in times tables and identifies square numbers.

Why this, why now?

This unit introduces and rehearses the facts for the 7-times table. Pupils explore the odd and even patterns in times tables and use this to support problem solving. They identify and represent square numbers as a particular set of multiplication facts. Pupils bring together their times table knowledge, tests of divisibility and new knowledge of square numbers to solve problems. These facts will support the coming units exploring multiplication structures.

Lessons in unit

1. Represent counting in sevens as the 7 times table
2. Explain the relationship between adjacent multiples of seven
3. Use known facts from the 2, 5 and 6 times tables to solve problems involving the 7 times table
4. Use knowledge of the 7 times table to solve problems
5. Identify patterns of odd and even numbers in the times tables
6. Use patterns of odd and even numbers in the times tables to solve problems
7. Represent a square number
8. Identify and use square numbers to solve problems
9. Use divisibility rules for 3, 4, 6 and 8 times tables to solve problems
10. Use divisibility rules for 2, 3, 4, 5, 6, 8 and 10 times tables to solve problems

Prior knowledge requirements

- Read time to the hour and half hour
- Understand 12-hour clock notation
- Convert between hours and minutes

12. Understand and represent multiplicative structures

Year 4

Go to unit resources

Threads

- Number
- Number: Multiplication and division

Unit description

In this unit pupils will explain how each part of a multiplication and division equation relates to a story. They will partition one of the factors in a multiplication equation in different ways using representations.

Why this, why now?

In this unit, pupils look in depth at how multiplication equations relate to the situations and problems they represent. Pupils explain what each factor in an equation represents both in multiplication and division contexts. They partition one of the factors in a multiplication equation and consider the most efficient way to apply this to solve problems. This will lead to work on the distributive law which underpins partitioning strategies for multiplication and division.

Lessons in unit

1. Explain what each factor represents in a multiplication equation
2. Explain how each part of a multiplication and division equation relates to a story
3. Explain where zero can be part of a multiplication or division expression and the impact it has
4. Partition one of the factors in a multiplication equation using representations
5. Explain which is the most efficient factor to partition to solve a multiplication problem

Prior knowledge requirements

- Recognise equal groups and repeated addition
- Use arrays and skip counting to model multiplication
- Understand multiplicative comparison (e.g., "twice as many")

13. Apply the distributive law to multiplication

Year 4

Go to unit resources

Threads

- Number
- Number: Multiplication and division

Unit description

In this unit pupils will use knowledge of the distributive law to calculate products beyond known times tables facts and relate this to partitioning one of the factors.

Why this, why now?

This unit explores the use of common factors in two-part problems to solve them efficiently. Pupils identify when there is a common factor and they can apply the distributive law and when there isn't. They also use the strategy to break down a factor in order to calculate products beyond their times table knowledge. This informal mental strategy will underpin more formal methods of multiplication in the future.

Lessons in unit

1. Use knowledge of the distributive law to solve two part problems
2. Use knowledge of the distributive law to solve further two-part problems
3. Use knowledge of the distributive law to calculate products using known times tables
4. Use knowledge of the distributive law to calculate products beyond known times tables
5. Use knowledge of the distributive law to solve problems in different contexts

Prior knowledge requirements

- Recall multiplication facts to 12 _ 12
- Use arrays and grouping to model multiplication
- Partition numbers to simplify calculations

14. Understand what happens when a number is multiplied or divided by 10 and 100

Year 4

Go to unit resources

Threads

- Number
- Number: Fractions
- Number: Place value

Unit description

In this unit pupils will explain the relationship between multiplying and dividing a number by 10 and multiples of 10.

Why this, why now?

In this unit, pupils extend their knowledge of multiplication as scaling to understand that multiplying by 10 makes a number ten times the size and dividing by 10 makes it one-tenth times the size. They explain the role of zero as a placeholder when calculating with whole numbers and multiplying and dividing by 10 and 100. Pupils also explore what happens to the product and quotient when factors and dividends are made 10 or 100 times the size and apply this thinking to their multiplication facts.

Lessons in unit

1. Explain the relationship between multiplying a number by 10 and multiples of 10
2. Understand that multiplying by 10 makes a number ten times the size
3. Use place value to explain placing a zero after the final digit when we multiply whole numbers by 10
4. Understand that dividing a number by 10 makes it one-tenth times the size
5. Use place value to explain removing the zero in the ones from a multiple of ten when we divide by 10
6. Explain the relationship between multiplying a number by 100 and multiples of 100
7. Explain the use of placeholders when multiplying whole numbers by 100
8. Explain the removal of placeholders when dividing whole numbers by 100
9. Use knowledge of the composition of 100 to multiply and divide by 100 in different ways
10. Explain how making a factor 10 times the size affects the product
11. Explain how making the dividend 10 times the size affects the quotient
12. Explain how making a factor 100 times the size affects the product
13. Explain how making the dividend 100 times the size affects the quotient
14. Scale known multiplication facts by 100
15. Scale division facts derived from multiplication facts by 100

Prior knowledge requirements

- Understand place value of digits in whole numbers
- Recognise patterns when multiplying by 10
- Identify how digit position changes with multiplication/division

15. Coordinates

Year 4

Go to unit resources

Threads

- Geometry and Measure
- Number: Place value

Unit description

In this unit pupils will give directions from one position to another on a grid and move objects including polygons on a grid according to directions, and mark the new position. They will describe and draw polygons specified by translations.

Why this, why now?

This unit develops the position and direction work from previous units and uses coordinates to describe positions of points and polygons. Pupils plot and translate shapes in the first quadrant. The unit provides the opportunity to review the properties of polygons and to apply new knowledge of coordinates. This unit leads to coordinates beyond the first quadrant and to considering reflections as well as translations.

Lessons in unit

1. Give directions from one position to another on a grid
2. Move objects including polygons on a grid according to directions and mark the new position
3. Describe translations of polygons drawn on a square grid
4. Draw polygons specified by translations
5. Mark the position of points specified by coordinates in the first quadrant of a coordinate grid
6. Write coordinates for already marked points in the first quadrant of a coordinate grid
7. Draw polygons specified by coordinates in the first quadrant
8. Complete polygons with missing coordinates
9. Translate polygons in the first quadrant
10. Solve problems involving marking and translating points in the first quadrant on a coordinate grid

Prior knowledge requirements

- Read and plot values on a number line
- Understand vertical and horizontal directions
- Locate positions on a simple grid using (x, y) format

16. Review of fractions

Year 4

Go to unit resources

Threads

- Number
- Number: Fractions

Unit description

In this unit pupils will identify equal parts when they do not look the same related to equivalence. They will construct a whole when given a part and the number of parts.

Why this, why now?

This unit gives pupils to review and secure understanding of previous learning in fractions identifying equal parts and explaining the size of a part in relation to the whole. This understanding is needed before the pupils move on to fractions greater than one.

Lessons in unit

1. Secure identifying a whole and the parts that make it up
2. Identifying the number of equal or unequal parts in a whole
3. Secure identifying equal parts when they do not look the same
4. Review explaining the size of the part in relation to the whole
5. Review constructing a whole when given a part and the number of parts

Prior knowledge requirements

- Recognise and name unit and non-unit fractions
- Compare and order simple fractions
- Use bar models and number lines to represent fractions

17. Composition of fractions greater than one

Year 4

Go to unit resources

Threads

- Number
- Number: Fractions

Unit description

In this unit pupils will compose and decompose quantities made of whole numbers and fractional parts.

Why this, why now?

This unit introduces pupils to fractions greater than one. They will explain how mixed numbers are composed and rehearse composing and decomposing them into the whole number and fraction parts. Pupils will solve problems and label a range of number lines. This will prepare pupils for comparing and ordering mixed numbers.

Lessons in unit

1. Quantities that are made up of both whole numbers and a fractional part
2. Explain how a mixed number is composed
3. Compose and decompose mixed numbers
4. Solve problems involving mixed numbers
5. Accurately label a range of number lines

Prior knowledge requirements

- Recognise unit and non-unit fractions
- Understand how to add and subtract fractions with the same denominator
- Convert between improper fractions and mixed numbers

18. Compare and order mixed numbers and position on a number line

Year 4

Go to unit resources

Threads

- Number
- Number: Fractions

Unit description

In this unit pupils will estimate the position of numbers on a number line using fraction sense. They will compare and order mixed numbers using fraction sense when the whole number and the numerator of the fractional part is the same.

Why this, why now?

This unit deepens understanding of fractions and mixed numbers. Pupils compare mixed numbers when the fractional parts are different and when the denominators of the fractional parts are different. This prepares pupils for calculating with mixed numbers in future lessons.

Lessons in unit

1. Identify numbers on marked but unlabelled number lines
2. Estimate the position of a number on a number line using fraction sense
3. Compare and order mixed numbers using fraction sense
4. Compare mixed numbers when the numerators of fractional parts are different
5. Compare mixed numbers when the denominators of fractional parts are different

Prior knowledge requirements

- Recognise and order proper and improper fractions
- Understand how to place numbers on a number line
- Convert between improper fractions and mixed numbers

19. Addition and subtraction of fractions and mixed numbers (within a whole)

Year 4

Go to unit resources

Threads

- Geometry and Measure
- Number
- Number: Fractions
- Statistics

Unit description

In this unit pupils will make efficient choices about the order they solve an addition and subtraction problem in.

Why this, why now?

This unit introduces pupils to calculating with mixed numbers, starting within a whole. They will then begin to convert numbers of quarters and fifths into mixed numbers and improper fractions in preparation for converting any mixed number into an improper fraction and vice versa.

Lessons in unit

1. Efficiently solve addition problems (within a whole)
2. Efficiently solve subtraction problems (within a whole)
3. Express an amount of quarters as a mixed number and an improper fraction.
4. Express an amount of fifths as a mixed number and an improper fraction.
5. Express a quantity as a mixed number and an improper fraction

Prior knowledge requirements

- Convert between improper and mixed numbers
- Add and subtract fractions with like denominators
- Represent calculations using number lines or bar models

20. Convert improper fractions to mixed numbers and vice versa

Year 4

Go to unit resources

Threads

- Number
- Number: Fractions

Unit description

In this unit pupils will express and convert a quantity from an improper fraction to a mixed number and explain how a mixed number is converted into an improper fraction.

Why this, why now?

This unit extends understanding of mixed numbers and pupils explain how to convert improper fractions to mixed numbers and mixed numbers to improper fractions. This skill will be applied when they consider efficient strategies for adding and subtracting mixed numbers.

Lessons in unit

1. Convert a number of quarters from an improper fraction to a mixed number
2. Convert a number of fifths from an improper fraction to mixed number
3. Explain how an improper fraction is converted into a mixed number
4. Explain how a mixed number is converted into an improper fraction
5. Solve problems involving converting between mixed numbers and improper fractions

Prior knowledge requirements

- Recognise improper and mixed number forms
- Use division to convert between forms
- Represent fractions on number lines or bar models

21. Efficient strategies for adding and subtracting mixed numbers (crossing a whole)

Year 4

Go to unit resources

Threads

- Number
- Number: Fractions

Unit description

In this unit pupils will add mixed numbers. They will subtract a proper fraction from a mixed number and subtract a mixed number from a mixed number explaining which strategy is most efficient.

Why this, why now?

In this unit, pupils put together their understanding of mixed numbers and converting between them and improper fractions, to add and subtract mixed numbers when crossing the whole. This thinking will be applied and developed when calculating with fractions in future units.

Lessons in unit

1. Add mixed numbers crossing the whole
2. Subtract a proper fraction from a mixed number crossing the whole
3. Subtract a mixed number from a mixed number
4. Choose efficient approaches when subtracting mixed numbers
5. Solve problems involving addition and subtraction of mixed numbers

Prior knowledge requirements

- Recall number facts and sequences
- Use place value understanding
- Apply basic operations in context

22. Properties of 2D and 3D shapes and symmetry

Year 4

Go to unit resources

Threads

- Geometry and Measure

Unit description

In this unit pupils will complete and compose symmetrical shapes from two congruent shapes and investigate lines of symmetry in 2D shapes.

Why this, why now?

This unit revisits known properties of shapes and extends pupils' knowledge to identify, sort and classify different types of triangles. They then investigate symmetry by creating and completing patterns and looking at symmetry in 2D shapes. This will prepare pupils for future work with 2D shapes including area.

Lessons in unit

1. Identify different types of triangle
2. Explore, sort and classify triangles
3. Complete a symmetrical pattern
4. Explore symmetry by joining two identical shapes
5. Investigate lines of symmetry in 2D shapes by folding
6. Find lines of symmetry in 2D shapes
7. Reflect polygons in a line of symmetry
8. Reflect polygons that are dissected by the line of symmetry
9. Diagonal lines of symmetry
10. Investigate symmetry and symmetrical patterns

Prior knowledge requirements

- Identify lines of symmetry
- Reflect shapes across an axis
- Classify shapes using symmetry

23. Money: apply efficient strategies when calculating with money

Year 4

Go to unit resources

Threads

- Geometry and Measure
- Number: Addition and Subtraction
- Number: Fractions
- Number: Multiplication and division

Unit description

In this unit pupils will explain represent and compare whole pounds and pence. They will convert quantities of money between pounds and pence and use the most efficient and reliable strategy to find the change.

Why this, why now?

This unit allows pupils to apply decimal place value in a different context and to use calculation strategies to convert between pounds and pence, calculate totals and find change from a given amount. The evaluate and decide on the most efficient and reliable strategies for adding values and giving change. Having worked with length and money, pupils will go on in the future to convert between different units of measure, using their knowledge of place value.

Lessons in unit

1. Explain and represent whole pounds as a quantity of money
2. Explain and represent whole pounds and pence as a quantity of money
3. Explain how to compare amounts of money without converting
4. Convert quantities of money between pounds and pence
5. Use knowledge of addition to add commonly used prices efficiently
6. Use knowledge of subtraction to calculate change when paying with whole pounds or notes
7. Use and explain the most efficient strategies when adding quantities of money
8. Use and explain the most efficient strategies when subtracting quantities of money
9. Calculate change when purchasing several items
10. Solve a range of problems, including finding change

Prior knowledge requirements

- Recognise coin and note values
- Use symbols £ and p appropriately
- Apply number facts to money contexts

24. Time: Convert between 12 and 24 hour clocks: analogue and digital

Year 4

Go to unit resources

Threads

- Geometry and Measure

Unit description

In this unit pupils will read, write and convert time between analogue and digital 12- and 24-hour clocks. They will solve problems involving converting from hours to minutes, minutes to seconds, years to months, weeks to days.

Why this, why now?

This unit reviews and develops previous work on time to include reading digital time and converting between times given in 12 and 24 hour formats. Pupils use their knowledge of writing, telling and converting between units of time to solve problems. This will prepare them for calculating with and converting between units of time to solve problems in the future.

Lessons in unit

1. Read the time on a 12 and 24 hour digital clock
2. Convert between times given in 12 and 24 hours
3. Convert from hours to minutes and minutes to seconds
4. Convert from days to weeks and months to years
5. Solve problems involving writing, telling and converting the time

Prior knowledge requirements

- Read time to the hour and half hour
- Understand 12-hour clock notation
- Convert between hours and minutes

25. Division with remainders

Year 4

Go to unit resources

Threads

- Number
- Number: Multiplication and division

Unit description

In this unit pupils will interpret a division story with a remainder representing it with an equation. They will explain how the remainder relates to the divisor.

Why this, why now?

This unit develops pupils' understanding of multiplication and division to include remainders. They will explain how situations are represented by division equations including sharing and grouping structures. Pupils will also explain how the remainder relates to the divisor in an equation and what to do with the remainder in the context of different problems. This understanding will be developed when they learn more formal division strategies.

Lessons in unit

1. Represent division by grouping with multiplication and addition equations
2. Solve division problems involving grouping, including those with remainders
3. Represent division by sharing with equations
4. Solve division problems involving sharing, including those with remainders
5. Use multiplication facts to answer division questions
6. Explain how the remainder relates to the divisor in a division equation
7. Identify when there will be a remainder
8. Use knowledge of division equations and remainders to solve problems
9. Decide what to do with the answer to a division calculation to solve a problem
10. Use knowledge of division to solve problems

Prior knowledge requirements

- Understand division as sharing and grouping
- Recall multiplication and division facts
- Recognise when a number cannot be divided exactly

Year 5 units

View interactive sequence online

1 Understand tenths as part of a whole, represent and calculate mentally	**2** Compose and calculate with decimals including column addition and subtraction	**3** Understand hundredths as parts of a whole and represent
4 Use knowledge of decimals to solve problems in different contexts: length	**5** Negative numbers	**6** Multiplication by partitioning leading to short multiplication (2 by 1-digit)
7 Multiplication by partitioning leading to short multiplication (3 by 1-digit)	**8** Division by partitioning leading to short division (2 and 3-digits by 1-digit)	**9** Understand the concept of area
10 Link area of rectangles to multiplication	**11** Compare and describe measurements using knowledge of multiplication and division	**12** Calculating with decimal fractions
13 Understand the concept of volume	**14** Multiply 3 or more numbers (commutative and associative laws)	**15** Understand and use the concept of factorisation (square and prime numbers)

16
Use common factors and multiples to solve calculations efficiently

17
Multiply a proper fraction by a whole number

18
Multiply improper fractions and mixed numbers by a whole number

19
Find unit and non-unit fractions of whole numbers exploring parts and wholes

20
Comparing fractions using equivalence and decimals

21
Converting units

22
Angles: compare, name, estimate and measure angles

1. Understand tenths as part of a whole, represent and calculate mentally

Year 5

Go to unit resources

Threads

- Number
- Number: Fractions
- Number: Place value
- Statistics

Unit description

In this unit pupils will describe, represent and order tenths as a decimal fraction. They will round a decimal number with tenths to the nearest whole number and calculate mentally with decimal numbers including tenths.

Why this, why now?

This unit introduced the decimal notation for tenths. It builds on pupils' knowledge of fractions and of using place value multiply and divide by 10 and 100. They will also develop their understanding of rounding to include rounding decimals to the nearest whole number. Pupils will then go on to calculate with decimals in column addition and subtraction and to extend their decimal understanding to include hundredths.

Lessons in unit

1. Identify tenths as part of a whole
2. Describe and represent tenths as a decimal number
3. Count tenths in different ways
4. Describe and write decimal numbers with tenths in different ways
5. Compare and order decimal numbers with tenths

Prior knowledge requirements

- Recognise place value in decimals
- Link tenths to fractions and division by 10
- Represent tenths using diagrams or number lines

2. Compose and calculate with decimals including column addition and subtraction

Year 5

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Number: Place value
- Statistics

Unit description

In this unit pupils will extend their understanding of formal calculation strategies to use column methods to add and subtract with decimal numbers.

Why this, why now?

In this unit pupils have the opportunity to revisit column representations of addition and subtraction and to extend their understanding and calculate with decimal numbers. Having deepened their understanding of tenths as a decimal, they will go on to understand and represent hundredths as parts of a whole.

Lessons in unit

1. Explain that decimal numbers with tenths can be composed additively
2. Explain that decimal numbers with tenths can be composed multiplicatively
3. Use known facts and mental strategies to calculate with decimal numbers within and across a whole
4. Use knowledge of column addition and subtraction to calculate with decimal numbers
5. Use representations to round a decimal number with tenths to the nearest whole number

Prior knowledge requirements

- Understand tenths and hundredths
- Link fractions to decimal notation
- Use place value in decimal contexts

3. Understand hundredths as parts of a whole and represent

Year 5

Go to unit resources

Threads

- Number
- Number: Fractions
- Number: Place value
- Statistics

Unit description

In this unit pupils will identify hundredths as part of a whole and describe and represent hundredths as a decimal fraction. They will compare and order decimal numbers with hundredths.

Why this, why now?

This unit further develops place value understanding to include hundredths represented as decimals. Pupils describe, represent, compare and order decimal numbers with hundredths and partition them in different ways. They will then go on to use decimals including hundredths in the context of length.

Lessons in unit

1. Identify hundredths as part of a whole
2. Describe and represent hundredths as a decimal number
3. Describe and write decimal numbers with hundredths in different ways
4. Compare and order decimal numbers with hundredths
5. Explain that decimal numbers with hundredths can be partitioned in different ways

Prior knowledge requirements

- Recall number facts and sequences
- Use place value understanding
- Apply basic operations in context

4. Use knowledge of decimals to solve problems in different contexts: length

Year 5

Go to unit resources

Threads

- Geometry and Measure
- Number: Multiplication and division
- Number: Place value

Unit description

In this unit pupils will use their knowledge of decimal place value to convert between and compare metres and centimetres explaining that different lengths can be composed additively and multiplicatively.

Why this, why now?

This unit gives pupils the opportunity to apply their understanding of decimal place value in the context of measure, converting between metres and centimetres. They will use mental, informal and formal methods to calculate with length and include three decimal places when comparing, ordering and solving problems with length. They will then go on to apply their decimal place value understanding in the context of money.

Lessons in unit

1. Use knowledge of decimal place value to convert between and compare metres and centimetres
2. Explain that different lengths can be composed additively and multiplicatively
3. Use knowledge of decimal place value to solve problems in different contexts
4. Use knowledge of place value to calculate with decimal numbers up to and bridging one tenth
5. Use knowledge of column addition and subtraction to calculate with decimals: tenths and hundredths
6. Round a decimal number with hundredths to the nearest tenth
7. Round a decimal number with hundredths to the nearest whole number
8. Read and write numbers with up to 3 decimal places
9. Compare and order numbers with up to 3 decimal places
10. Solve problems with numbers with up to 3 decimal places

Prior knowledge requirements

- Understand tenths and hundredths as decimals
- Convert between cm and m
- Compare and add lengths with the same or related units

5. Negative numbers

Year 5

Go to unit resources

Threads

- Geometry and Measure
- Number
- Number: Place value
- Statistics

Unit description

In this unit pupils will interpret numbers greater than and less than zero. They will read and write negative numbers, explain how the value of a number relates to its position from zero, positioning on a number line.

Why this, why now?

This unit introduces negative numbers in a range of contexts. Pupils will learn to read and write negative numbers, considering their position relative to zero on a number line. They will interpret negative and positive sets of numbers in different contexts including temperature, coordinate grids and graphs. Having explored negative numbers, pupils will later expand their place value understanding to include numbers with up to 8 digits.

Lessons in unit

1. Represent a change story using addition and subtraction symbols
2. Interpret numbers greater than and less than zero in different contexts
3. Read and write negative numbers
4. Explain how the value of a number relates to its position from zero
5. Identify and place negative numbers on a number line
6. Interpret sets of negative and positive numbers in a range of contexts
7. Use knowledge of positive and negative numbers to calculate intervals
8. Explain how negative numbers are used on a coordinate grid
9. Use knowledge of positive and negative numbers to interpret graphs
10. Solve problems involving positive and negative numbers in a range of contexts

Prior knowledge requirements

- Count forwards and backwards through zero
- Understand zero as a position on a number line
- Compare and order positive and negative integers

6. Multiplication by partitioning leading to short multiplication (2 by 1-digit)

Year 5

Go to unit resources

Threads

- Number
- Number: Multiplication and division
- Number: Place value

Unit description

In this unit pupils will multiply a 2-digit number by a single-digit number using partitioning and representations using expanded multiplication and using short multiplication.

Why this, why now?

This unit builds on knowledge and understanding of multiplication, including multiplying and dividing by 10 and multiples of 10 to introduce the representation of short multiplication. Pupils apply their understanding of informal strategies based on the distributive law and refine them into short multiplication for 2-digit by 1-digit calculations. This will prepare them for multiplying a 3-digit by a 1-digit number in the next unit.

Lessons in unit

1. Multiply a 2-digit number by a 1-digit number using partitioning and representations (one regroup)
2. Multiply a 2-digit number by a 1-digit number using partitioning and representations (two regroups)
3. Multiply a 2-digit number by a 1-digit number using partitioning
4. Multiply a 2-digit number by a 1-digit number using expanded multiplication (no regroups)
5. Multiply a 2-digit number by a 1-digit number using short multiplication (no regroups)
6. Multiply a 2-digit number by a 1-digit number using expanded multiplication (regrouping 1s to 10s)
7. Multiply a 2-digit number by a 1-digit number using short multiplication (regrouping 1s to 10s)
8. Multiply a 2-digit number by a 1-digit number using expanded multiplication (regrouping 10s to 100s)
9. Multiply a 2-digit number by a 1-digit number using short multiplication (regrouping 10s to 100s)
10. Estimate and multiply a 2-digit by a 1-digit number using expanded and short multiplication

Prior knowledge requirements

- Recall number facts and sequences
- Use place value understanding
- Apply basic operations in context

7. Multiplication by partitioning leading to short multiplication (3 by 1-digit)

Year 5

Go to unit resources

Threads

- Number
- Number: Multiplication and division
- Number: Place value

Unit description

In this unit pupils will multiply a 3-digit number by a single-digit number using expanded and short multiplication.

Why this, why now?

This unit develops the understanding of using short multiplication for 2-digit by 1-digit calculations and introduces 3-digit by 1-digit multiplication. Pupils are encouraged to use estimation to support accurate calculation. Having explored short multiplication, pupils will later go on to look at how knowledge of equivalence in multiplicative relationships can support both mental and written methods of calculation.

Lessons in unit

1. Multiply a 3-digit by a 1-digit number using partitioning
2. Multiply a 3-digit by a 1-digit number with no regroups
3. Multiply a 3-digit by a 1-digit number with one or two regroups
4. Multiply a 3-digit by a 1-digit number with multiple regroups
5. Use estimation to support accurate calculation

Prior knowledge requirements

- Recall multiplication facts
- Partition numbers into hundreds, tens, and ones
- Multiply each part and recombine to solve

8. Division by partitioning leading to short division (2 and 3-digits by 1-digit)

Year 5

Go to unit resources

Threads

- Number
- Number: Multiplication and division
- Number: Place value

Unit description

In this unit pupils will divide a 2-digit and a 3-digit number by a single-digit number using partitioning and representations and divide a 2-digit number by a single-digit number by using short division.

Why this, why now?

This unit revisits the concept of division and introduces a short division representation to support calculation, drawing on times table and place value knowledge and understanding. Pupils learn how to record regrouping and remainders using the short division representation. This will prepare them for using multiplication and division in the context of measures and for division involving larger numbers in the future.

Lessons in unit

1. Divide a 2-digit by a 1-digit number using partitioning and representations (no remainders)
2. Divide a 2-digit by a 1-digit number using partitioning (with regrouping)
3. Divide a 2-digit by a 1-digit number using representations with exchanging and remainders
4. Divide a 2-digit by a 1-digit number using short division (no regrouping)
5. Divide a 2-digit by a 1-digit number using short division (with regrouping)
6. Divide a 2-digit number using short division (with regrouping and remainders)
7. Divide a 3-digit by a 1-digit number using partitioning and representations (no remainders)
8. Divide a 3-digit number using partitioning and representations (one regroup)
9. Divide using partitioning and representations (multiple regroups and remainder)
10. Divide a 3-digit by a 1-digit number using short division
11. Divide using short division with regrouping and remainders
12. Use short division when the hundreds digit is smaller than the divisor
13. Use efficient division strategies to solve problems
14. Solve problems involving multiplication and division

15. Solve problems involving multiplication and division in a range of contexts

Prior knowledge requirements

- Understand division as sharing or grouping
- Use partitioning strategies
- Recall multiplication and division facts

9. Understand the concept of area

Year 5

Go to unit resources

Threads

- Geometry and Measure
- Number: Multiplication and division

Unit description

In this unit pupils will explain what area is and measure using counting as a strategy. They will make different shapes with the same area and compare the area of different shapes.

Why this, why now?

This unit builds on pupils' understanding of 2D shape to understand the concept of area. They will explain what area is and use strategies of counting squares to measure area, compare areas and explore different shapes with the same area. This will prepare them for using multiplication to calculate area.

Lessons in unit

1. Explain what area is
2. Measure area using counting with squares as a strategy
3. Explain how to make different shapes with the same area
4. Explain how to compare the area of different shapes
5. Solve problems involving counting and drawing the areas of different shapes

Prior knowledge requirements

- Count unit squares in simple shapes
- Understand arrays and multiplication
- Recognise and name common 2D shapes

10. Link area of rectangles to multiplication

Year 5

Go to unit resources

Threads

- Geometry and Measure
- Number: Multiplication and division

Unit description

In this unit pupils will calculate the area of a rectangle using multiplication and use their knowledge of area to solve problems.

Why this, why now?

This unit develops pupils' understanding of the concept of area and introduces the use of multiplication to calculate the area of shapes formed from rectangles. They explore compound shapes, calculating the length of unmarked sides and using knowledge of multiplication and division to solve problems involving areas and side lengths. This understanding will underpin understanding of volume and be developed to calculate the areas of other shapes in the future.

Lessons in unit

1. Measure the area of flat shapes using square centimetres
2. Measure the area of flat shapes using square metres
3. Explain how to calculate the area of a rectangle using multiplication
4. Calculate the areas of rectangles using multiplication
5. Calculate the area of shapes made from 2 rectangles by decomposing the shape in different ways
6. Calculate the area of compound rectilinear shapes
7. Choose an efficient way to decompose a compound shape to calculate the area
8. Calculate missing dimensions in rectangles and compound rectilinear shapes
9. Calculate the area of shapes made from 2 or more rectangles
10. Use knowledge of area to solve problems in a range of contexts

Prior knowledge requirements

- Identify right angles
- Compare angles using visual tools
- Estimate angle size using known benchmarks

11. Compare and describe measurements using knowledge of multiplication and division

Year 5

Go to unit resources

Threads

- Number: Multiplication and division

Unit description

In this unit pupils will learn to compare and describe measurements using multiplication and division, applying their understanding of scaling as a structure of multiplication.

Why this, why now?

This unit uses the scaling understanding of multiplication and division to compare measurements multiplicatively. Pupils use the language of '___ times the size ___' to describe and compare measurements in the contexts of length, mass, capacity, money and time and to solve problems involving comparison and change. This will prepare them for work converting between units using knowledge of place value and scaling in the future.

Lessons in unit

1. Compare and describe lengths using knowledge of multiplication
2. Solve comparison and change problems using multiplication
3. Compare and describe lengths using knowledge of division
4. Solve comparison and change problems using division
5. Solve problems involving comparison and change
6. Compare and describe measurements involving mass and capacity
7. Compare and describe measurements involving time and money
8. Describe changes in measurement using knowledge of multiplication and division
9. Use knowledge of multiplication and division to solve comparison and change problems
10. Solve comparison and change problems in a range of contexts

Prior knowledge requirements

- Understand standard units for length, mass and capacity
- Use times tables to scale or compare quantities
- Apply multiplication/division to convert units

12. Calculating with decimal fractions

Year 5

Go to unit resources

Threads

- Number
- Number: Fractions
- Number: Multiplication and division

Unit description

In this unit pupils will explain the effect of multiplying and dividing a number by 10, 100 and 1,000 and use their knowledge of multiplying decimal fractions by whole numbers to solve measures problems.

Why this, why now?

This unit builds on previous units exploring decimal place value and addition and subtraction of decimals. Pupils use place value to multiply and divide decimals by 10, 100 and 1,000. They solve problems in the context of measures, including some conversion between common units. Pupils then extend their use of formal calculation strategies to include decimals. This will be applied in future lessons including more focused work on converting between units.

Lessons in unit

1. Multiplying and dividing a number by 10, 100 and 1,000
2. Multiplying and dividing a number by 10, 100 and 1,000 including bridging 1
3. Explain how to multiply and divide a number by 10, 100 and 1,000
4. Converting units of length
5. Converting units of mass and capacity
6. Multiply tenths by whole numbers
7. Multiply hundredths by whole numbers
8. Solve measures problems using knowledge of multiplying decimal fractions
9. The relationship between multiplying by 0.1 and dividing by 10
10. The relationship between multiplying by 0.01 and dividing by 100
11. Multiply 1-digit numbers by decimals
12. Multiply 1-digit numbers by decimal fractions using written methods
13. Predicting the size of a product
14. Divide decimal fractions by 1-digit numbers
15. Divide decimal fractions by 1-digit numbers using written methods

Prior knowledge requirements

- Identify equal parts of a whole
- Name common fractions (1/2, 1/3, 1/4)
- Use visual models for fractions

13. Understand the concept of volume

Year 5

Go to unit resources

Threads

- Geometry and Measure
- Number: Multiplication and division

Unit description

In this unit pupils will explain what volume is using a range of contexts and describe the units used to measure volume. They will explain how to calculate the volume of a cuboid.

Why this, why now?

After a break from the introduction of the concept of area, pupils now look at the concept of volume and 3D rectilinear shapes. They explore the concept of volume in a range of contexts, consider the units used to measure volume and then use multiplication to calculate the volume of cubes, cuboids and compound shapes made from cubes and cuboids. This learning leads into work on multiplying 3 or more numbers, drawing on understanding of the commutative and associative laws.

Lessons in unit

1. Explain what volume is in a range of contexts
2. Describe the units used to measure volume
3. Explain how to calculate the volume of a cuboid and a cube
4. Explain how to calculate the volume of compound shapes
5. Use knowledge of calculating volume to solve problems in a range of contexts

Prior knowledge requirements

- Recognise and count cubes in a 3D structure
- Understand the concept of space and capacity
- Measure using non-standard or standard cubic units

14. Multiply 3 or more numbers (commutative and associative laws)

Year 5

Go to unit resources

Threads

- Geometry and Measure
- Number
- Number: Multiplication and division

Unit description

In this unit pupils will explain the use of the commutative and associative laws to rearrange and simplify calculations when multiplying three or more numbers.

Why this, why now?

In this unit, pupils learn how the commutative and associative laws allow for calculations to be rearranged and factors multiplied in different orders and combinations to give the same product. They use this to simplify calculations and apply it in the context of calculating volume and to solve problems in a range of contexts. This learning will be developed with factorisation also introduced as a strategy for solving multiplication calculations.

Lessons in unit

1. Explain the use of the commutative and associative laws when multiplying three or more numbers
2. Apply commutative and associative laws to simplify multiplications
3. Explain the reasons for changing two-factor multiplication calculations to three-factor calculations
4. Apply the commutative and associative laws to simplify volume calculations
5. Apply the commutative and associative laws to simplify problems in a range of contexts

Prior knowledge requirements

- Recall basic multiplication facts
- Understand and use commutative property of multiplication
- Group numbers to simplify multiplication (associative property)

15. Understand and use the concept of factorisation (square and prime numbers)

Year 5

Go to unit resources

Threads

- Number
- Number: Multiplication and division

Unit description

In this unit pupils will understand and use the concept of factorisation, explaining what a factor is and how to use arrays and multiplication/division facts to find them. They will identify prime numbers, square numbers and composite numbers.

Why this, why now?

Pupils have used the word factor in describing multiplication equations and in this unit they deepen their understanding and use the word to describe factors and explore factorization of numbers. They will link this to their understanding of arrays and also explore the special cases of square and prime numbers and how this relates to their factors. This knowledge and understanding of factors will be applied when they use factorization to solve calculations efficiently.

Lessons in unit

1. Explain what a factor is and use arrays and multiplication and division facts to find them
2. Explain how to find all the factors of a number systematically
3. Use a complete list of factors to explain when a number is a square number
4. Explain how to identify a prime number or a composite number
5. Explain how to identify a prime factor of a number

Prior knowledge requirements

- Know multiplication facts to 12x12
- Identify square numbers
- Recognise and list factors of a number

16. Use common factors and multiples to solve calculations efficiently

Year 5

Go to unit resources

Threads

- Number
- Number: Multiplication and division

Unit description

In this unit pupils will explain how to identify common factors and multiples and use this knowledge of properties of number along with knowledge of the commutative and associative laws to solve problems in a range of contexts.

Why this, why now?

Pupils in this unit apply their understanding of factors and multiples to find common factors and multiples of two or more numbers. They use their knowledge of properties of numbers to solve problems including using factor pairs of numbers, including 100, along with understanding of the commutative and associative laws to simplify calculations and work efficiently. This work will be developed in the future when pupils look at using equivalence to calculate.

Lessons in unit

1. Explain how to identify common factors between two or more numbers
2. Explain how to identify a common multiple of two or more numbers
3. Use knowledge of properties of number to solve problems
4. Explain how to use the factor pairs of 100 to solve calculations efficiently
5. Use properties of numbers and the commutative and associative laws to simplify calculations

Prior knowledge requirements

- Understand the meaning of factor and multiple
- Identify factor pairs of whole numbers
- Recall multiplication facts and use times table fluency

17. Multiply a proper fraction by a whole number

Year 5

Go to unit resources

Threads

- Number
- Number: Fractions

Unit description

In this unit pupils will explain the relationship between repeated addition of a proper fraction and multiplication of fractions with both unit and not-unit fractions. They will multiply a proper fraction by a whole number.

Why this, why now?

This unit builds both on prior learning where pupils calculated the value of a part of a set using unit fractions as operators and on more recent learning calculating with mixed numbers. In this unit, pupils relate repeated addition of unit fractions to multiplication of fractions before multiplying proper fractions by whole numbers both within and greater than a whole. This will prepare them for multiplying improper fractions and mixed numbers by a whole number.

Lessons in unit

1. Explain the relationship between repeated addition of unit fractions and multiplication of fractions
2. Explain the relationship between repeated addition of fractions and multiplication of fractions
3. Multiply a proper fraction by a whole number where the product is within a whole
4. Multiply a proper fraction by a whole number where the product is greater than a whole
5. Solve problems involving multiplying proper fractions by whole numbers

Prior knowledge requirements

- Recognise and represent proper fractions
- Understand multiplication as repeated addition
- Use visual models to show groups of fractions

18. Multiply improper fractions and mixed numbers by a whole number

Year 5

Go to unit resources

Threads

- Number
- Number: Fractions

Unit description

In this unit pupils will multiply an improper fraction and a mixed number by a whole number.

Why this, why now?

Pupils extend their understanding of multiplying fractions by whole numbers to multiplying improper fractions and mixed numbers both within and bridging a whole. This will be developed further when they find unit and non-unit fractions of whole numbers by exploring parts and wholes.

Lessons in unit

1. Represent and multiply an improper fraction by a whole number.
2. Multiply a mixed number by a whole number not bridging a whole
3. Multiply a mixed number by a whole number bridging a whole
4. Solve problems involving multiplication of mixed numbers by a whole number
5. Solve problems involving fractions and mixed numbers

Prior knowledge requirements

- Identify equal parts of a whole
- Name common fractions (1/2, 1/3, 1/4)
- Use visual models for fractions

19. Find unit and non-unit fractions of whole numbers exploring parts and wholes

Year 5

Go to unit resources

Threads

- Number
- Number: Fractions

Unit description

In this unit pupils will find unit and non-unit fractions of whole numbers and explore parts and wholes.

Why this, why now?

In this unit, pupils link multiplying fractions by whole numbers with finding a fraction of a quantity. They explore this using representations and explain this link focusing on the use of the word 'of' to represent multiplication. Pupils use mental and written strategies to calculation non-unit fractions of quantities and consider how to calculate the whole when a part, either a unit or non-unit fraction is known.

Lessons in unit

1. Find a unit fraction of a quantity using representations
2. Explain how finding a fraction of a quantity relates to multiplying by a unit fraction
3. Explain how dividing by a whole number relates to multiplying by a unit fraction
4. Use knowledge of multiplying a whole number by a unit fraction to solve problems
5. Find a non-unit fraction of a quantity using mental and written calculation strategies
6. Multiply a whole number by a proper fraction
7. Explain when a calculation represents scaling down and when it represents repeated addition
8. Find the whole when the size of a unit fraction is known
9. Find a unit fraction when the size of a non-unit fraction is known
10. Find the whole when the size of a non-unit fraction is known

Prior knowledge requirements

- Recognise a whole as composed of parts
- Use part-part-whole models
- Apply knowledge of fractions or numbers in context

20. Comparing fractions using equivalence and decimals

Year 5

Go to unit resources

Threads

- Number
- Number: Fractions
- Number: Multiplication and division

Unit description

In this unit pupils will use representations to describe and compare two fractions. They will explain the relationship within families of equivalent fractions and use their knowledge of common equivalents to compare fractions with decimals.

Why this, why now?

In this unit, pupils use contexts and representations to explore equivalence between fractions. They position equivalent fractions in the same position on a number line and explain equivalence using the relationship between the numerators and denominators within and across equivalent fractions. Using tenths and hundredths, pupils also look at decimal equivalence and use this knowledge to compare and order fractions and decimals. This unit prepares pupils to add and subtract fractions in future units.

Lessons in unit

1. Use representations to describe and compare two fractions
2. Use representations to describe and compare fractions
3. Use representations to describe and compare two fractions in a continuous context
4. Use the language of equivalent fractions correctly
5. Explain the relationship between numerators and denominators in equivalent fractions
6. Use the relationship between the numerator and denominator in equivalent fractions to solve problems
7. Explain the relationship between numerators and denominators across equivalent fractions
8. Explain the relationship within families of equivalent fractions
9. Use the relationship between the numerator and denominator to simplify fractions
10. Use understanding of equivalent fractions to solve problems
11. Explain and represent how to divide 1 into different numbers of equal parts
12. Identify and describe patterns in the number system
13. Use knowledge of common equivalents to compare fractions and decimals
14. Recall common fraction-decimal equivalents
15. Solve problems using fraction-decimal equivalents

Prior knowledge requirements

- Identify equal parts of a whole
- Name common fractions (1/2, 1/3, 1/4)
- Use visual models for fractions

21. Converting units

Year 5

Go to unit resources

Threads

- Geometry and Measure
- Number: Multiplication and division
- Number: Place value

Unit description

In this unit pupils will apply memorised unit conversions to convert between units of measure and solve problems involving converting between units of time and money.

Why this, why now?

This unit builds on knowledge of equivalence between units of measure and applies this to solve problems in the contexts of measures, time and money. Pupils look at metric and imperial equivalence and use a line graph to convert between pounds and Euro. They also apply their knowledge and understanding of multiplying and dividing by 10, 100 and 1,000 which will prepare them for handling numbers with up to 8 digits in the future.

Lessons in unit

1. Convert from larger to smaller units of measure
2. Convert from smaller to larger units of measure
3. Convert to and from fraction and decimal quantities of larger units
4. Use known facts to derive common conversions over 1
5. Use known facts to carry out conversions that correspond to 10 and 100 parts
6. Solve problems involving different units of measure
7. Understand approximate equivalence between metric and imperial units
8. Convert between miles and kilometres and pounds and Euro
9. Solve problems involving converting between units of time
10. Solve problems involving converting units in different contexts

Prior knowledge requirements

- Know common metric conversions
- Multiply and divide by powers of 10
- Apply conversion in context

22. Angles: compare, name, estimate and measure angles

Year 5

Go to unit resources

Threads

- Geometry and Measure

Unit description

In this unit pupils will compare the size of angles where there is a clear visual difference and use the terms acute, obtuse and reflex when describing the size of angles or amount of rotation with relation to right angles using a unit called degrees.

Why this, why now?

This unit builds on and formalizes knowledge of angles as a measure of turn and as properties of 2D shapes. Pupils classify and define acute, obtuse and reflex angles, identifying them in shapes and using them to classify shapes. They calculate missing angles, using knowledge that there are 360 degrees in a full turn and also use an angle measurer or protractor to measure and construct angles. This will be built on as they learn to draw construct shapes in the future.

Lessons in unit

1. Review understanding and identification of right angles
2. Review understanding of angles as a measure of turn
3. Use the terms acute, obtuse and reflex when comparing angles to a right angle
4. Use the unit of degrees as a standard unit to measure angles
5. Describe static angles using the standard unit of degrees when compared to a right angle
6. Describe rotations using the standard unit of degrees when compared to a right angle
7. Estimate acute and obtuse angles using the standard unit of degrees
8. Know that the angles in a full turn sum to 360 degrees and use this to solve problems
9. Know that the angles at a point sum to 360 degrees and use this to solve problems
10. Angles in quadrilaterals
11. Know that the angles on a straight line sum to 180 degrees and use this to solve problems
12. Angles in triangles
13. Measure the size of angles accurately using a protractor
14. Draw angles accurately using a protractor
15. Reasoning about angles in polygons

Prior knowledge requirements

- Identify right angles
- Compare angles using visual tools

- Estimate angle size using known benchmarks

Year 6 units

View interactive sequence online

1 Use knowledge of part-part-whole structure to solve additive problems	**2** Use equivalence and compensation to simplify and solve addition calculations	**3** Use equivalence and compensation to simplify and solve subtraction problems
4 Multiples of 1,000	**5** Understand place value within numbers with up to 7 digits	**6** Order, compare and calculate with numbers up to 8 digits
7 Rounding and solving problems with numbers up to 7 digits	**8** Draw, compose and decompose shapes	**9** Using equivalence to calculate
10 Multiplying and dividing by 2-digit numbers	**11** Area, perimeter, position and direction	**12** Addition and subtraction of fractions
13 Comparing fractions	**14** Multiplication and division of fractions	**15** Understanding percentages

16
Statistics

17
Ratio and proportion

18
Calculating using knowledge of equivalence in addition and subtraction

19
Solving problems with two unknowns

20
Order of operations

21
Mean average

1. Use knowledge of part-part-whole structure to solve additive problems

Year 6

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Number: Fractions

Unit description

In this unit pupils will identify the mathematical structures within stories and use their knowledge of additive structures to create stories and to solve problems.

Why this, why now?

This unit revisits the part-part-whole structure and its language to support pupils to make sense of, represent and solve addition and subtraction problems in a range of contexts. They use mental and written strategies to calculate the value of missing parts. This leads to using equivalence and compensation in both addition and then subtraction.

Lessons in unit

1. Explain how a combination of different parts can be equivalent to the same whole
2. Identify structures within stories and use knowledge of structures to create stories
3. Identify the missing part using knowledge of relationships and structures
4. Use a model to interpret a part-part-whole problem with three addends
5. Create stories to match structures presented in a model
6. Use knowledge of additive structure to solve problems
7. Use mental strategies and known facts to calculate the value of a missing part
8. Use written strategies and known facts to calculate the value of a missing part
9. Represent an equation in a part-part-whole model correctly
10. Use part-part-whole structures to solve additive problems in a range of contexts

Prior knowledge requirements

- Understand the meaning of factor and multiple
- Represent addition and subtraction using bar models or part-whole diagrams
- Recognise inverse relationships between addition and subtraction

2. Use equivalence and compensation to simplify and solve addition calculations

Year 6

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction

Unit description

In this unit pupils used the concept of same sum to simplify and solve addition problems.

Why this, why now?

In this unit pupils build on their understanding of additive structures by exploring equivalence in addition equations. They will learn how redistribution can be used to support calculation with whole numbers and decimals. Pupils will calculate missing parts in balanced equations, applying known facts and strategies in a range of contexts. They will then go on to explore equivalence and compensation in subtraction.

Lessons in unit

1. Using redistribution with addition of integers
2. Using redistribution with addition of decimal fractions
3. Using balanced equations to calculate redistribution
4. Use a balanced equation to calculate unknown parts
5. Explain how adjusting one part affects the sum
6. Solve addition calculations mentally by using known facts
7. Solve addition calculations mentally by using known facts in a range of contexts
8. Solve calculations with missing parts
9. Use equivalence and compensation strategies to solve problems
10. Use equivalence and compensation strategies to solve addition problems in a range of contexts

Prior knowledge requirements

- Recognise number pairs and place value relationships
- Apply rounding and adjusting strategies
- Understand and apply fact families

3. Use equivalence and compensation to simplify and solve subtraction problems

Year 6

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction

Unit description

In this unit pupils will explain how increasing or decreasing the minuend affects the difference and solve subtraction calculations mentally by using known facts explaining how adjusting the minuend can make mental calculation easier.

Why this, why now?

Having previously explored equivalence and compensation in addition, pupils now explore these in the context of subtraction where they will consider constant difference and how increasing or decreasing the whole (minuend) and known part (subtrahend) affects the difference. They will apply known facts and strategies to solve problems in a range of contexts. This will prepare them for solving problems with larger numbers and to apply equivalence in different contexts.

Lessons in unit

1. Explain and represent constant difference for subtraction
2. Explain how constant difference can make written calculations more efficient
3. Use constant difference to balance equations and find unknowns
4. Explain how increasing or decreasing the minuend affects the difference
5. Solve subtraction calculations mentally by using known facts
6. Explain how adjusting the minuend can make mental calculation easier
7. Explain how adjusting the subtrahend affects the difference: reduction structure
8. Explain how adjusting the subtrahend affects the difference: partitioning
9. Calculate the difference using knowledge of an adjusted subtrahend: difference structure
10. Use equivalence and compensation strategies to solve subtraction problems in a range of contexts

Prior knowledge requirements

- Understand inverse operations and balancing
- Use number bonds and rounding to adjust calculations
- Rearrange and simplify expressions using known facts

4. Multiples of 1,000

Year 6

Go to unit resources

Threads

- Number
- Number: Place value
- Statistics

Unit description

In this unit pupils will explain how one hundred thousand can be composed and read and write numbers up to one million.

Why this, why now?

This unit develops pupils' understanding of the structure of larger numbers. Having considered the composition of 1,000 through exploring measures contexts, pupils now apply their place value understanding to explain how 10 and 100 thousand can be composed before reading and writing numbers up to 1 million, using place value charts and numbers in different contexts. This will prepare pupils to understand number with 7 and then 8-digits.

Lessons in unit

1. Explain how ten thousand can be composed
2. Explain how one hundred thousand can be composed
3. Read and write numbers up to one million using a place value chart
4. Read and write numbers up to one million in a range of contexts
5. Position five-digit multiples of 1,000 on a marked but unlabelled number line
6. Position 6-digit multiples of 1,000 on a marked but unlabelled number line
7. Count forwards and backwards in powers of 10 to and from any multiple of 1,000
8. Explain that 10,000 is composed of 5,000s, 2,500s and 2,000s
9. Explain that 100,000 is composed of 50,000s, 25,000s and 20,000s
10. Read the scales of graphs and measures using knowledge of the composition of 10,000 and 100,000

Prior knowledge requirements

- Recognise and count in hundreds
- Understand place value to 1,000
- Identify multiples using skip counting

5. Understand place value within numbers with up to 7 digits

Year 6

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Number: Multiplication and division
- Number: Place value

Unit description

In this unit pupils will identify and place the position of 6-digit multiple of one thousand numbers, on a marked, but unlabelled number line They will read scales in graphing and measures contexts by using their knowledge of the composition of 10,000 and 100,000.

Why this, why now?

In this unit, pupils will explore what is meant by the powers of 10 and their multiples and will use this language, along with their knowledge of place value, to read, write and represent numbers up to 10,000,000. They will use their knowledge of the composition of powers of 10 to solve problems. This will prepare them for ordering, comparing and calculating with numbers of this scale.

Lessons in unit

1. Powers of 10 and their multiples
2. Composition of one million and 10 million
3. Problem solving using knowledge of the composition of powers of 10
4. Read and write numbers up to 10 million
5. Representing numbers up to 10 million

Prior knowledge requirements

- Partition numbers into hundreds, tens and ones
- Recognise digit value to 1,000 or beyond
- Use number lines and base-10 apparatus

6. Order, compare and calculate with numbers up to 8 digits

Year 6

Go to unit resources

Threads

- Number: Addition and Subtraction
- Number: Multiplication and division

Unit description

In this unit pupils will use representations to identify and explain patterns in powers of 10 and read numbers with up to 7 digits efficiently. They will order and compare numbers with up to 8 digits and calculate with numbers of this scale.

Why this, why now?

Pupils now apply their understanding of the composition of numbers up to 10,000,000 to explain the values of digits in these numbers and to compare and order large numbers. They will use mental strategies to add and subtract within and then across boundaries including the millions boundary. Pupils will use patterns in counting sequences and solve problems including positioning and identifying numbers on number lines. This will support them when they round large numbers and solve problems in different contexts.

Lessons in unit

1. Determine the value of digits in numbers up to 10 million
2. Compare numbers with up to eight digits
3. Use knowledge of the composition of seven-digit numbers to solve problems
4. Add and subtract mentally without bridging a boundary
5. Add multiples of powers of 10 crossing the millions boundary
6. Subtract multiples of powers of 10 crossing the millions boundary
7. Composition of seven-digit numbers
8. Using patterns in counting sequences
9. Estimate and identify numbers on number lines
10. Solving problems using column addition and subtraction

Prior knowledge requirements

- Understand place value up to 1 million
- Use formal written methods for addition and subtraction
- Read, write and compare numbers with up to 7 digits

7. Rounding and solving problems with numbers up to 7 digits

Year 6

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Number: Multiplication and division
- Number: Place value

Unit description

In this unit pupils will use their knowledge of the composition of seven-digit numbers to round them and to solve problems, adding and subtracting numbers whilst crossing the millions boundary.

Why this, why now?

Pupils will apply their place value understanding of 7-digit numbers to round them to any power of ten. They will apply mental and written strategies, deciding which is the most efficient, to solve problems in different contexts.

Lessons in unit

1. Rounding 7-digit numbers to the nearest million
2. Rounding seven-digit numbers to any power of 10
3. Solving calculations efficiently
4. Explore mental and written strategies to solve problems
5. Solve problems explaining which strategy is most efficient

Prior knowledge requirements

- Understand place value to at least 1 million
- Round numbers to the nearest 10, 100 or 1000
- Estimate and check answers using rounding

8. Draw, compose and decompose shapes

Year 6

Go to unit resources

Threads

- Geometry and Measure
- Probability

Unit description

In this unit pupils will use knowledge of shape properties to draw, sketch and identify shapes.

Why this, why now?

This unit revisits the properties of 2D and 3D shapes and ideas of area and perimeter. Pupils use their knowledge and understanding to reason about shapes including 2D nets of 3D shapes and the relationship between side lengths and both area and perimeter. They revisit the idea that shapes with the same area can have a different perimeter and vice versa. This prepares them for calculating the are and perimeter of other shapes in the future.

Lessons in unit

1. Use knowledge of shape properties to sketch and identify shapes
2. Use knowledge of shape properties to draw shapes accurately using rulers and protractors
3. 3D shapes can be composed from 2D nets
4. The same 3D shapes can be composed from different 2D nets
5. When a 2D shape is decomposed and the parts rearranged, the areas remains the same
6. Any parallelogram can be decomposed and the parts rearranged to form a rectangular parallelogram
7. Two congruent triangles can be arranged to compose a parallelogram
8. Shapes with the same areas can have different perimeters and vice versa
9. Reason about shapes using the relationship between side lengths and area and perimeter
10. Reason about compound shapes using the relationship between side lengths and area and perimeter

Prior knowledge requirements

- Name and describe common 2D and 3D shapes
- Recognise how shapes can be built and taken apart
- Use basic geometric vocabulary to describe components

9. Using equivalence to calculate

Year 6

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Number: Multiplication and division

Unit description

In this unit pupils will explain why the product stays the same when one factor is doubled and the other is halved using knowledge of equivalence. They will explain the effect on the quotient when scaling the dividend and divisor by the same amount.

Why this, why now?

Having explored using equivalence to calculate in addition and subtraction, this unit considers equivalence in the context of multiplication and division. Pupils explore and explain what happens when a factor in a multiplication is doubled or halved and the effect on the quotient when the dividend and divisor are scaled. The language of scaling is highlighted which prepares pupils for considering multiplication and division in the context of ratio and proportion in the future.

Lessons in unit

1. Explain why the product stays the same when one factor is doubled and the other is halved
2. Explain the effect on the product when scaling the factors up and down by the same amount
3. Use knowledge of equivalence when scaling factors to solve problems
4. Explain the effect on the quotient when scaling the dividend and the divisor by 10
5. Explain the effect on the quotient when scaling the dividend and the divisor by the same amount

Prior knowledge requirements

- Recognise equivalent fractions or expressions
- Apply balancing strategies to equations
- Use known facts and relationships to simplify calculations

10. Multiplying and dividing by 2-digit numbers

Year 6

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Number: Multiplication and division
- Number: Place value

Unit description

In this unit pupils will extend their understanding of formal calculation strategies to multiply and divide by 2-digit numbers, explaining when other strategies are more efficient.

Why this, why now?

In this unit pupils will apply their understanding of multiplication and division, place value, informal and formal calculation and extend this to multiply and divide by 2-digit numbers. This will include the representations of long multiplication and long division. Pupils will also revisit mental and informal strategies, applying their times table knowledge and the skill of factorising. They will explain when informal and mental strategies are more efficient. This will prepare them to calculate with integers and decimals in the future.

Lessons in unit

1. Explain how to multiply a 3-digit number by a 2-digit number
2. Explain how to use long multiplication to multiply two 2-digit numbers regrouping ones to tens
3. Explain how to use long multiplication to multiply two 2-digit numbers with regrouping
4. Explain how to use long multiplication to multiply a 3-digit by a 2-digit number
5. Explain how to use long multiplication to multiply a 4-digit by a 2-digit number
6. Explain how to use the associative law to multiply efficiently
7. Explain when it is efficient to use factorising or long multiplication to multiply by 2-digits
8. Dividing numbers with up to 4 digits by multiples of 10
9. Using short and long division to divide by a 2-digit divisor
10. Dividing by a 2-digit divisor including using long division
11. Solve problems with 4-digit dividends using factors and long division
12. Dividing by a 2-digit divisor with a remainder
13. Use long division with fraction remainders
14. Use long division with decimal remainders
15. Solve problems involving remainders in context

Prior knowledge requirements

- Recall multiplication facts to 12 _ 12

- Use partitioning strategies for multiplication
- Understand division as sharing and grouping

11. Area, perimeter, position and direction

Year 6

Go to unit resources

Threads

- Algebra
- Geometry and Measure
- Probability

Unit description

In this unit pupils will explain how to calculate the area of a parallelogram and a triangle. They will describe the relationship between scale factors and side lengths. They will describe positions in all 4 quadrants.

Why this, why now?

This unit builds on previous work on area and perimeter, introducing the formula for the area of a parallelogram and for a triangle. Pupils calculate the areas from given measurements and missing measurements when given the area of a shape. They also construct shapes by plotting positions on a full coordinate grid, with simple translations and reflections. This work will be developed further in a unit focusing on plotting coordinates in different contexts.

Lessons in unit

1. Explain how to calculate the area of a parallelogram
2. Use the area of a parallelogram formula to calculate unknown measurements
3. Explain how to calculate the area of a triangle
4. Use the area of a triangle to calculate unknown measurements
5. Solve problems involving area and perimeter
6. Describe the relationship between scale factors and perimeters of two shapes
7. Draw and complete simple shapes by plotting positions on the full coordinate grid
8. Draw and translate simple shapes on the full coordinate grid
9. Reflect simple shapes in the axes on a full coordinate grid
10. Solve problems involving missing coordinates

Prior knowledge requirements

- Measure length using standard units
- Understand basic properties of 2D shapes
- Use language of direction and identify turns

12. Addition and subtraction of fractions

Year 6

Go to unit resources

Threads

- Number
- Number: Addition and Subtraction
- Number: Fractions

Unit description

In this unit pupils will explain how to write a fraction in its simplest form when solving addition and subtraction problems.

Why this, why now?

In this unit, pupils combine their understanding of equivalent fractions and fractions in their simplest form to add fractions with different denominators. To begin with the denominators are within related unit fractions, building to adding and subtracting non-related fractions with different denominators including bridging a whole. This will prepare them for calculating with fractions in the future and for comparing fractions using equivalence.

Lessons in unit

1. Explain how to write a fraction in its simplest form
2. Reason about how to write a fraction in its simplest form
3. Use knowledge of fractions in their simplest form when solving addition and subtraction problems
4. Explain how to add related unit fractions with a representation or image
5. Explain how to add related unit fractions without a representation or image
6. Explain how to subtract related unit fractions
7. Use knowledge of adding and subtracting related unit fractions to solve problems
8. Explain with and without an image how to add and subtract related non-unit fractions
9. Explain with and without images how to add and subtract related non-unit fractions bridging a whole
10. Add and subtract non-related fractions with different denominators

Prior knowledge requirements

- Recognise unit and non-unit fractions
- Add and subtract fractions with the same denominator
- Use visual models like bars and number lines

13. Comparing fractions

Year 6

Go to unit resources

Threads

- Number
- Number: Fractions

Unit description

In this unit pupils will use their fraction sense to explain how to compare pairs of non-related fractions either by converting to common denominators or using fraction knowledge and understanding.

Why this, why now?

This unit gives pupils the opportunity to bring together their understanding of fraction and fraction sense to compare and order fractions. They compare and order non-related fractions using strategies including comparing to a half, comparing to a whole as well as finding equivalent fractions with common denominators. They will apply this thinking when working with fractions in the future, including multiplication and division of fractions.

Lessons in unit

1. Explain how to compare non-related fractions finding equivalent fractions with common denominators
2. Explain how to compare pairs of non-related fractions by comparing to a half
3. Explain how to compare pairs of non-related fractions using fraction sense
4. Explain which strategy for comparing non-related fractions is most efficient
5. Order sets of non-related fractions using a range of strategies

Prior knowledge requirements

- Identify equal parts of a whole
- Name common fractions (1/2, 1/3, 1/4)
- Use visual models for fractions

14. Multiplication and division of fractions

Year 6

Go to unit resources

Threads

- Number
- Number: Fractions
- Number: Multiplication and division

Unit description

In this unit pupils will learn how to multiply 2 unit fractions and 2 non-unit fractions. They will learn how to divide a unit fraction and a non-unit fraction by a whole number.

Why this, why now?

This unit introduces pupils to multiplying pairs of unit and then non-unit fractions, using representations to explain the scale of the answer in relation to the fractions being multiplied. They will also use representations and their knowledge of division to divide a fraction by a whole number. They will take this understanding and apply it in the context of percentages, seeing the link between fractions and percentages.

Lessons in unit

1. Explain how to multiply two unit fractions
2. Explain how to multiply two non-unit fractions
3. Explain how to divide a unit fraction by a whole number
4. Explain how to divide a non-unit fraction by a whole number
5. Explain how to divide a fraction by a whole number efficiently

Prior knowledge requirements

- Understand fractions as parts of a whole
- Multiply a fraction by a whole number
- Interpret division of a whole number by a unit fraction

15. Understanding percentages

Year 6

Go to unit resources

Threads

- Number
- Number: Fractions
- Number: Multiplication and division
- Ratio and Proportion

Unit description

In this unit pupils will explain what percent means and how to represent a percentage in different ways. They will learn how to convert percentages to decimals and fractions and solve conversion problems.

Why this, why now?

This unit introduces pupils to percentages. They explain what percent means and represent percentages in different ways, linking them to parts of a whole and converting between common fractions and percentages. They also consider equivalence with decimals. They use knowledge of calculating parts of a whole to calculate 50, 10 and 1% of values before combining these to calculate other percentages. Pupils also explain how to calculate the whole when a percentage is known and solve problems in a range of contexts. This prepares pupils for work on statistics.

Lessons in unit

1. Explain what percent means and represent a percentage in different ways
2. Explain how to convert percentages to decimals and fractions with a denominator of 100
3. Explain how to convert a percentage to a fraction without a denominator of 100
4. Use knowledge of fraction-decimal-percentage conversions to solve problems in a range of contexts
5. Use knowledge of calculating 50%, 10% and 1% of a number to solve problems in a range of contexts
6. Use knowledge of calculating common percentages of a number to solve problems in a range of contexts
7. Use knowledge of calculating any percentage of a number to solve problems in a range of contexts
8. Explain how to solve problems where the percentage part and size is known but the whole is unknown
9. Solve problems where the known percentage part and size represents a change to the whole
10. Solve problems involving percentages in a range of contexts

Prior knowledge requirements

- Understand fractions as parts of a whole
- Relate simple fractions to decimals
- Recognise percentages as number of parts per hundred

16. Statistics

Year 6

Go to unit resources

Threads

- Geometry and Measure
- Number: Addition and Subtraction
- Number: Multiplication and division
- Statistics

Unit description

In this unit pupils will interpret and construct pie charts and line graphs. They will read scales linked to fractions angles percentages and understanding proportional relationships.

Why this, why now?

This unit develops knowledge of statistics into pie charts and line graphs. Pupils interpret and construct graphs and charts and use fractions and percentages to interpret pie charts. They use a line graph to represent two variables such as distance and time and represent familiar contexts. This will prepare them for future work on statistics and for a unit on mean average.

Lessons in unit

1. Use understanding of angles, fractions and percentages to interpret pie charts
2. Use understanding of angles, fractions and percentages to construct pie charts
3. Interpret line graphs representing two variables in familiar contexts
4. Construct line graphs representing two variables in familiar contexts
5. Interpret the scales used in graphs, including pie charts, to solve problems

Prior knowledge requirements

- Collect and organise simple data using tally charts or tables
- Interpret pictograms and block graphs
- Understand labels, scales and axes in simple charts

17. Ratio and proportion

Year 6

Go to unit resources

Threads

- Geometry and Measure
- Number: Multiplication and division
- Probability
- Ratio and Proportion

Unit description

In this unit pupils will describe the relationship between two factors, representing the relationship in different ways. They will build to using a ratio grid to calculate unknown values.

Why this, why now?

This unit builds on pupils' understanding of fractions and multiplication to describe the relationship between two factors in a ratio context. They represent ratio in different ways and use the described relationship to calculate unknown values. They link ratio and proportion to scaling as used in maps and other contexts. Pupils also use scaling and positive scale factors to identify and describe the relationship between polygons. This work will be further developed in Year 7.

Lessons in unit

1. Describe the relationship between two factors in a ratio context
2. Representing ratio in different ways
3. Explain how to represent ratio and to calculate unknown values
4. Use multiplication and division to calculate unknown values in ratio problems
5. Solve problems involving ratio
6. Explain how and why scaling is used to make and interpret maps
7. Use knowledge of multiplication and division to solve scaling problems in a range of contexts
8. Solve problems involving scaling and ratio
9. Identify and describe the relationship between regular polygons using scale factors
10. Identify and describe the relationship between irregular polygons using scale factors

Prior knowledge requirements

- Use multiplication and division facts
- Recognise scaling in simple contexts
- Compare quantities and express multiplicative relationships

18. Calculating using knowledge of equivalence in addition and subtraction

Year 6

Go to unit resources

Threads

- Algebra
- Number
- Number: Addition and Subtraction

Unit description

In this unit pupils will explain how to balance equations with addition or subtraction expressions and use their knowledge of balancing equations to solve problems.

Why this, why now?

This unit allows pupils to become more familiar with using equivalence, relating to addition and subtraction, to solve problems in a range of contexts. This will support them as they move on into solving problems with two unknowns and into more formal algebra in Year 7.

Lessons in unit

1. Explain how to balance equations with addition expressions
2. Explain how to balance equations with subtraction expressions
3. Explain how to balance equations with addition or subtraction expressions
4. Explain how to balance equations with addition and subtraction expressions
5. Use knowledge of balancing equations to solve problems

Prior knowledge requirements

- Understand inverse relationship between addition and subtraction
- Rearrange number sentences to find missing values
- Recognise when to apply compensation or balancing strategies

19. Solving problems with two unknowns

Year 6

Go to unit resources

Threads

- Algebra
- Number: Addition and Subtraction
- Number: Multiplication and division

Unit description

In this unit pupils will compare and represent the structure of problems with two unknowns using a bar model. They will systematically solve problems with two unknowns using trial and improvement.

Why this, why now?

This unit introduces pupils to situations where a problem has two unknown values. They explore situations where there is one solution, where there are many solutions and where there are infinite solutions. Pupils use bar models to represent problems set in a range of contexts and explain how to balance an equation with two unknowns. This unit prepares them for more formal work in algebra with expressions and equations in Year 7.

Lessons in unit

1. Compare the structure of problems with one or two unknowns
2. Represent the structure of a problem with two unknowns in context
3. Explain why there is sometimes only one solution to a problem
4. Represent and solve problems with two unknowns efficiently
5. Use a bar model to represent spatial problems with two unknowns
6. Explain how to represent an equation with a bar model
7. Solve problems with two unknowns in a range of contexts
8. Explain how you know you have found all the possible solutions to a problem with two unknowns
9. Explain how to balance an equation with two unknowns
10. Solve problems with two unknowns with one, several and infinite solutions

Prior knowledge requirements

- Use symbols or shapes to represent missing numbers
- Understand inverse operations
- Solve one-step equations or balance scales

20. Order of operations

Year 6

Go to unit resources

Threads

- Algebra
- Number
- Number: Addition and Subtraction
- Number: Multiplication and division

Unit description

In this unit pupils will explore what happens when we combine addition and subtraction with multiplication and division, bringing up the need for the order of operations.

Why this, why now?

This unit gives pupils the opportunity to combine multiplication and then division with addition and subtraction. They will explore the different results if operations are done in different orders and realise that, without a context, a set order of operations is needed. They will revisit the distributive las as it applies to multiplications with a common factor and divisions with a common divisor. This will lead on to work on arithmetic procedures with integers and decimals in Year 7.

Lessons in unit

1. Combine multiplication with addition and subtraction
2. Explain how the distributive law applies to multiplication expressions with a common factor
3. Combine division with addition and subtraction
4. Explain how the distributive law applies to division expressions with a common divisor
5. Use knowledge of the order of operations to solve equations

Prior knowledge requirements

- Know order of operations (BIDMAS/BODMAS)
- Use brackets in calculations
- Evaluate multi-step expressions

21. Mean average

Year 6

Go to unit resources

Threads

- Number: Addition and Subtraction
- Number: Multiplication and division
- Statistics

Unit description

In this unit pupils will learn how to calculate the mean of a set of data and use the mean to make comparisons between two sets of information where appropriate.

Why this, why now?

This unit develops pupil's range of strategies for examining data by introducing the concept of the mean average. They will learn to calculate the mean average of a set of data and explain how it changes when the total value or number of values changes in the set. Pupils use the mean average to make comparisons and also explain when the mean is not appropriate for comparing data. This will lead on to using other ways of summarising data in the future.

Lessons in unit

1. Explain the relationship between the mean and sharing equally
2. Explain how to calcluate the mean of a set of data including a value of zero
3. Explain how the mean changes when the total quantity or number of values changes
4. Explain how to use the mean to make comparisons between two sets of data
5. Explain why the mean is useful and when it is not appropriate

Prior knowledge requirements

- Add and total a data set
- Divide a total equally
- Understand fair share concept

Threads in maths

See how to use threads ↑

- Algebra
- Geometry and Measure
- Number
- Number: Addition and Subtraction
- Number: Fractions
- Number: Multiplication and division
- Number: Place value
- Probability
- Ratio and Proportion
- Statistics

Thread, **'Algebra'**

Year 6

- **Unit 11,** 'Area, perimeter, position and direction'
- **Unit 18,** 'Calculating using knowledge of equivalence in addition and subtraction'
- **Unit 19,** 'Solving problems with two unknowns'
- **Unit 20,** 'Order of operations'

Thread, **'Geometry and Measure'**

Year 1

- **Unit 5,** 'Comparing quantities - part part whole relationships'
- **Unit 7,** 'Recognise, compose, decompose and manipulate 2D and 3D shapes'
- **Unit 13,** 'Numbers 0 to 20 in different contexts'
- **Unit 14,** 'Unitising and coin recognition - counting in 2s, 5s and 10s'
- **Unit 15,** 'Unitising and coin recognition - value of a set of coins'
- **Unit 16,** 'Solving problems in a range of contexts'
- **Unit 17,** 'Position and direction including fractions of turns'
- **Unit 18,** 'Time - sequencing events and telling the time to the hour and half hour'

Year 2

- **Unit 2,** 'Counting and representing the numbers 20 to 99'
- **Unit 12,** 'Shape: discuss and compare 2D and 3D shapes'
- **Unit 14,** 'Money: recognise coins and use £ and p symbols'
- **Unit 15,** 'Fractions: identify equal parts and be familiar with halves, thirds and quarters'
- **Unit 16,** 'Time: write and tell the time to five minutes'
- **Unit 17,** 'Position and direction'
- **Unit 19,** 'Sense of measure - capacity, volume and mass'

Year 3

- **Unit 4,** 'Measuring length and recording in tables'
- **Unit 5,** 'Representing 3-digit numbers, comparing and positioning on number lines'
- **Unit 6,** 'Measures: mass and capacity'
- **Unit 7,** 'Right angles'
- **Unit 19,** 'Parallel and perpendicular sides in polygons'
- **Unit 20,** 'Tell the time to the nearest minute and compare units of time'

Year 4

- **Unit 3,** 'Calculation and conversion of measures'
- **Unit 6,** 'Perimeter'
- **Unit 15,** 'Coordinates'
- **Unit 19,** 'Addition and subtraction of fractions and mixed numbers (within a whole)'
- **Unit 22,** 'Properties of 2D and 3D shapes and symmetry'
- **Unit 23,** 'Money: apply efficient strategies when calculating with money'
- **Unit 24,** 'Time: Convert between 12 and 24 hour clocks: analogue and digital'

Year 5

- **Unit 4,** 'Use knowledge of decimals to solve problems in different contexts: length'
- **Unit 5,** 'Negative numbers'
- **Unit 9,** 'Understand the concept of area'

- **Unit 10,** 'Link area of rectangles to multiplication'
- **Unit 13,** 'Understand the concept of volume'
- **Unit 14,** 'Multiply 3 or more numbers (commutative and associative laws)'
- **Unit 21,** 'Converting units'
- **Unit 22,** 'Angles: compare, name, estimate and measure angles'

Year 6

- **Unit 8,** 'Draw, compose and decompose shapes'
- **Unit 11,** 'Area, perimeter, position and direction'
- **Unit 16,** 'Statistics'
- **Unit 17,** 'Ratio and proportion'

Thread, **'Number'**

Year 1

- **Unit 1,** 'Counting, recognising and comparing numbers 0 - 10'
- **Unit 2,** 'Counting to and from 20'
- **Unit 3,** 'Counting in tens - decade numbers'
- **Unit 4,** 'Pattern in counting from 20 to 100'
- **Unit 5,** 'Comparing quantities - part part whole relationships'
- **Unit 6,** 'Composition of numbers 0 to 5'
- **Unit 8,** 'Composition of numbers 6 to 10'
- **Unit 9,** 'Additive structures: addition'
- **Unit 10,** 'Additive structures: addition and subtraction'
- **Unit 11,** 'Addition and subtraction facts within 10'
- **Unit 12,** 'Composition of numbers 11 to 19'
- **Unit 13,** 'Numbers 0 to 20 in different contexts'
- **Unit 14,** 'Unitising and coin recognition - counting in 2s, 5s and 10s'
- **Unit 15,** 'Unitising and coin recognition - value of a set of coins'
- **Unit 16,** 'Solving problems in a range of contexts'

Year 2

- **Unit 1,** 'Composition of multiples of 10'
- **Unit 2,** 'Counting and representing the numbers 20 to 99'
- **Unit 3,** 'Comparing, ordering and partitioning 2-digit numbers'
- **Unit 4,** 'Secure fluency of addition and subtraction facts within 10'
- **Unit 5,** 'Calculating within 20'
- **Unit 6,** 'Adding and subtracting ones and tens to and from 2-digit numbers'
- **Unit 7,** 'Grouping objects in different ways and relating to multiplication'
- **Unit 8,** 'Representing counting in 2s, 5s and 10s as the 2, 5 and 10 times tables'
- **Unit 9,** 'Representing counting in 5s as the 5 times table and link to the 10 times tables'
- **Unit 10,** 'Multiplying by 2, doubling and halving (factors and products)'
- **Unit 11,** 'Introduction to division structures'
- **Unit 13,** 'Addition and subtraction of two 2-digit numbers'
- **Unit 15,** 'Fractions: identify equal parts and be familiar with halves, thirds and quarters'
- **Unit 18,** 'Doubling, halving, quotative and partitive division'

Year 3

- **Unit 1,** 'Review strategies for adding and subtracting across 10'
- **Unit 2,** 'Securing place value to 100 and applying to addition and subtraction'
- **Unit 3,** 'Bridging 100: counting on and back in 10s, adding/subtracting multiples of 10'
- **Unit 4,** 'Measuring length and recording in tables'
- **Unit 5,** 'Representing 3-digit numbers, comparing and positioning on number lines'
- **Unit 6,** 'Measures: mass and capacity'

- **Unit 8,** 'Informal and mental strategies for adding and subtracting two 3-digit numbers'
- **Unit 9,** 'Understand additive relationships and apply them to rearrange equations'
- **Unit 10,** 'Column addition'
- **Unit 11,** '2, 4 and 8 times tables: using times tables to solve problems'
- **Unit 12,** 'Column subtraction'
- **Unit 13,** 'Unit fractions as part of a whole'
- **Unit 14,** 'Identify parts and wholes in different contexts'
- **Unit 15,** 'Compare and order unit fractions'
- **Unit 16,** 'Calculate the value of a part (fractions as operators)'
- **Unit 17,** 'Non-unit fractions'
- **Unit 18,** 'Composition of non-unit fractions: addition and subtraction'
- **Unit 20,** 'Tell the time to the nearest minute and compare units of time'

Year 4

- **Unit 1,** 'Review of column addition and subtraction'
- **Unit 2,** 'Secure place value to 1000: apply to addition and subtraction: multiples of 100'
- **Unit 3,** 'Calculation and conversion of measures'
- **Unit 4,** 'Comparing, ordering and rounding 4-digit numbers'
- **Unit 5,** 'Column addition and subtraction with 4-digit numbers'
- **Unit 7,** 'Represent counting in threes and sixes as the 3 and 6 times tables'
- **Unit 8,** 'Relationship between the 3 and 6 times tables and tests of divisibility'
- **Unit 9,** 'Represent counting in nines as the 9 times table'
- **Unit 10,** 'Relationship between the 3 and 9 times tables'
- **Unit 11,** '7 times table: odd and even patterns, square numbers and tests of divisibility'
- **Unit 12,** 'Understand and represent multiplicative structures'
- **Unit 13,** 'Apply the distributive law to multiplication'
- **Unit 14,** 'Understand what happens when a number is multiplied or divided by 10 and 100'
- **Unit 16,** 'Review of fractions'
- **Unit 17,** 'Composition of fractions greater than one'
- **Unit 18,** 'Compare and order mixed numbers and position on a number line'
- **Unit 19,** 'Addition and subtraction of fractions and mixed numbers (within a whole)'
- **Unit 20,** 'Convert improper fractions to mixed numbers and vice versa'
- **Unit 21,** 'Efficient strategies for adding and subtracting mixed numbers (crossing a whole)'
- **Unit 25,** 'Division with remainders'

Year 5

- **Unit 1,** 'Understand tenths as part of a whole, represent and calculate mentally'
- **Unit 2,** 'Compose and calculate with decimals including column addition and subtraction'
- **Unit 3,** 'Understand hundredths as parts of a whole and represent'
- **Unit 5,** 'Negative numbers'
- **Unit 6,** 'Multiplication by partitioning leading to short multiplication (2 by 1-digit)'

- **Unit 7,** 'Multiplication by partitioning leading to short multiplication (3 by 1-digit)'
- **Unit 8,** 'Division by partitioning leading to short division (2 and 3-digits by 1-digit)'
- **Unit 12,** 'Calculating with decimal fractions'
- **Unit 14,** 'Multiply 3 or more numbers (commutative and associative laws)'
- **Unit 15,** 'Understand and use the concept of factorisation (square and prime numbers)'
- **Unit 16,** 'Use common factors and multiples to solve calculations efficiently'
- **Unit 17,** 'Multiply a proper fraction by a whole number'
- **Unit 18,** 'Multiply improper fractions and mixed numbers by a whole number'
- **Unit 19,** 'Find unit and non-unit fractions of whole numbers exploring parts and wholes'
- **Unit 20,** 'Comparing fractions using equivalence and decimals'

Year 6

- **Unit 1,** 'Use knowledge of part-part-whole structure to solve additive problems'
- **Unit 2,** 'Use equivalence and compensation to simplify and solve addition calculations'
- **Unit 3,** 'Use equivalence and compensation to simplify and solve subtraction problems'
- **Unit 4,** 'Multiples of 1,000'
- **Unit 5,** 'Understand place value within numbers with up to 7 digits'
- **Unit 7,** 'Rounding and solving problems with numbers up to 7 digits'
- **Unit 9,** 'Using equivalence to calculate'
- **Unit 10,** 'Multiplying and dividing by 2-digit numbers'
- **Unit 12,** 'Addition and subtraction of fractions'
- **Unit 13,** 'Comparing fractions'
- **Unit 14,** 'Multiplication and division of fractions'
- **Unit 15,** 'Understanding percentages'
- **Unit 18,** 'Calculating using knowledge of equivalence in addition and subtraction'
- **Unit 20,** 'Order of operations'

Thread, **'Number: Addition and Subtraction'**

Year 1

- **Unit 6,** 'Composition of numbers 0 to 5'
- **Unit 8,** 'Composition of numbers 6 to 10'
- **Unit 9,** 'Additive structures: addition'
- **Unit 10,** 'Additive structures: addition and subtraction'
- **Unit 11,** 'Addition and subtraction facts within 10'
- **Unit 13,** 'Numbers 0 to 20 in different contexts'
- **Unit 15,** 'Unitising and coin recognition - value of a set of coins'
- **Unit 16,** 'Solving problems in a range of contexts'

Year 2

- **Unit 4,** 'Secure fluency of addition and subtraction facts within 10'
- **Unit 5,** 'Calculating within 20'
- **Unit 6,** 'Adding and subtracting ones and tens to and from 2-digit numbers'
- **Unit 13,** 'Addition and subtraction of two 2-digit numbers'
- **Unit 14,** 'Money: recognise coins and use £ and p symbols'
- **Unit 19,** 'Sense of measure - capacity, volume and mass'

Year 3

- **Unit 1,** 'Review strategies for adding and subtracting across 10'
- **Unit 2,** 'Securing place value to 100 and applying to addition and subtraction'
- **Unit 3,** 'Bridging 100: counting on and back in 10s, adding/subtracting multiples of 10'
- **Unit 5,** 'Representing 3-digit numbers, comparing and positioning on number lines'
- **Unit 6,** 'Measures: mass and capacity'
- **Unit 8,** 'Informal and mental strategies for adding and subtracting two 3-digit numbers'
- **Unit 9,** 'Understand additive relationships and apply them to rearrange equations'
- **Unit 10,** 'Column addition'
- **Unit 12,** 'Column subtraction'
- **Unit 18,** 'Composition of non-unit fractions: addition and subtraction'
- **Unit 19,** 'Parallel and perpendicular sides in polygons'
- **Unit 20,** 'Tell the time to the nearest minute and compare units of time'

Year 4

- **Unit 1,** 'Review of column addition and subtraction'
- **Unit 2,** 'Secure place value to 1000: apply to addition and subtraction: multiples of 100'
- **Unit 3,** 'Calculation and conversion of measures'
- **Unit 5,** 'Column addition and subtraction with 4-digit numbers'
- **Unit 6,** 'Perimeter'
- **Unit 23,** 'Money: apply efficient strategies when calculating with money'

Year 5

- **Unit 2,** 'Compose and calculate with decimals including column addition and subtraction'

Year 6

- **Unit 1,** 'Use knowledge of part-part-whole structure to solve additive problems'
- **Unit 2,** 'Use equivalence and compensation to simplify and solve addition calculations'
- **Unit 3,** 'Use equivalence and compensation to simplify and solve subtraction problems'
- **Unit 5,** 'Understand place value within numbers with up to 7 digits'
- **Unit 6,** 'Order, compare and calculate with numbers up to 8 digits'
- **Unit 7,** 'Rounding and solving problems with numbers up to 7 digits'
- **Unit 9,** 'Using equivalence to calculate'
- **Unit 10,** 'Multiplying and dividing by 2-digit numbers'
- **Unit 12,** 'Addition and subtraction of fractions'
- **Unit 16,** 'Statistics'
- **Unit 18,** 'Calculating using knowledge of equivalence in addition and subtraction'
- **Unit 19,** 'Solving problems with two unknowns'
- **Unit 20,** 'Order of operations'
- **Unit 21,** 'Mean average'

Thread, **'Number: Fractions'**

Year 1

- **Unit 16,** 'Solving problems in a range of contexts'
- **Unit 17,** 'Position and direction including fractions of turns'

Year 2

- **Unit 10,** 'Multiplying by 2, doubling and halving (factors and products)'
- **Unit 15,** 'Fractions: identify equal parts and be familiar with halves, thirds and quarters'
- **Unit 16,** 'Time: write and tell the time to five minutes'
- **Unit 18,** 'Doubling, halving, quotative and partitive division'

Year 3

- **Unit 13,** 'Unit fractions as part of a whole'
- **Unit 14,** 'Identify parts and wholes in different contexts'
- **Unit 15,** 'Compare and order unit fractions'
- **Unit 16,** 'Calculate the value of a part (fractions as operators)'
- **Unit 17,** 'Non-unit fractions'
- **Unit 18,** 'Composition of non-unit fractions: addition and subtraction'

Year 4

- **Unit 14,** 'Understand what happens when a number is multiplied or divided by 10 and 100'
- **Unit 16,** 'Review of fractions'
- **Unit 17,** 'Composition of fractions greater than one'
- **Unit 18,** 'Compare and order mixed numbers and position on a number line'
- **Unit 19,** 'Addition and subtraction of fractions and mixed numbers (within a whole)'
- **Unit 20,** 'Convert improper fractions to mixed numbers and vice versa'
- **Unit 21,** 'Efficient strategies for adding and subtracting mixed numbers (crossing a whole)'
- **Unit 23,** 'Money: apply efficient strategies when calculating with money'

Year 5

- **Unit 1,** 'Understand tenths as part of a whole, represent and calculate mentally'
- **Unit 3,** 'Understand hundredths as parts of a whole and represent'
- **Unit 12,** 'Calculating with decimal fractions'
- **Unit 17,** 'Multiply a proper fraction by a whole number'
- **Unit 18,** 'Multiply improper fractions and mixed numbers by a whole number'
- **Unit 19,** 'Find unit and non-unit fractions of whole numbers exploring parts and wholes'
- **Unit 20,** 'Comparing fractions using equivalence and decimals'

Year 6

- **Unit 1,** 'Use knowledge of part-part-whole structure to solve additive problems'
- **Unit 12,** 'Addition and subtraction of fractions'
- **Unit 13,** 'Comparing fractions'
- **Unit 14,** 'Multiplication and division of fractions'
- **Unit 15,** 'Understanding percentages'

Thread, **'Number: Multiplication and division'**

Year 1

- **Unit 14,** 'Unitising and coin recognition - counting in 2s, 5s and 10s'
- **Unit 16,** 'Solving problems in a range of contexts'

Year 2

- **Unit 7,** 'Grouping objects in different ways and relating to multiplication'
- **Unit 8,** 'Representing counting in 2s, 5s and 10s as the 2, 5 and 10 times tables'
- **Unit 9,** 'Representing counting in 5s as the 5 times table and link to the 10 times tables'
- **Unit 11,** 'Introduction to division structures'
- **Unit 18,** 'Doubling, halving, quotative and partitive division'

Year 3

- **Unit 11,** '2, 4 and 8 times tables: using times tables to solve problems'
- **Unit 16,** 'Calculate the value of a part (fractions as operators)'
- **Unit 20,** 'Tell the time to the nearest minute and compare units of time'

Year 4

- **Unit 3,** 'Calculation and conversion of measures'
- **Unit 7,** 'Represent counting in threes and sixes as the 3 and 6 times tables'
- **Unit 8,** 'Relationship between the 3 and 6 times tables and tests of divisibility'
- **Unit 9,** 'Represent counting in nines as the 9 times table'
- **Unit 10,** 'Relationship between the 3 and 9 times tables'
- **Unit 11,** '7 times table: odd and even patterns, square numbers and tests of divisibility'
- **Unit 12,** 'Understand and represent multiplicative structures'
- **Unit 13,** 'Apply the distributive law to multiplication'
- **Unit 23,** 'Money: apply efficient strategies when calculating with money'
- **Unit 25,** 'Division with remainders'

Year 5

- **Unit 4,** 'Use knowledge of decimals to solve problems in different contexts: length'
- **Unit 6,** 'Multiplication by partitioning leading to short multiplication (2 by 1-digit)'
- **Unit 7,** 'Multiplication by partitioning leading to short multiplication (3 by 1-digit)'
- **Unit 8,** 'Division by partitioning leading to short division (2 and 3-digits by 1-digit)'
- **Unit 9,** 'Understand the concept of area'
- **Unit 10,** 'Link area of rectangles to multiplication'
- **Unit 11,** 'Compare and describe measurements using knowledge of multiplication and division'
- **Unit 12,** 'Calculating with decimal fractions'
- **Unit 13,** 'Understand the concept of volume'
- **Unit 14,** 'Multiply 3 or more numbers (commutative and associative laws)'

- **Unit 15,** 'Understand and use the concept of factorisation (square and prime numbers)'
- **Unit 16,** 'Use common factors and multiples to solve calculations efficiently'
- **Unit 20,** 'Comparing fractions using equivalence and decimals'
- **Unit 21,** 'Converting units'

Year 6

- **Unit 5,** 'Understand place value within numbers with up to 7 digits'
- **Unit 6,** 'Order, compare and calculate with numbers up to 8 digits'
- **Unit 7,** 'Rounding and solving problems with numbers up to 7 digits'
- **Unit 9,** 'Using equivalence to calculate'
- **Unit 10,** 'Multiplying and dividing by 2-digit numbers'
- **Unit 14,** 'Multiplication and division of fractions'
- **Unit 15,** 'Understanding percentages'
- **Unit 16,** 'Statistics'
- **Unit 17,** 'Ratio and proportion'
- **Unit 19,** 'Solving problems with two unknowns'
- **Unit 20,** 'Order of operations'
- **Unit 21,** 'Mean average'

Thread, **'Number: Place value'**

Year 1

- **Unit 1,** 'Counting, recognising and comparing numbers 0 - 10'
- **Unit 2,** 'Counting to and from 20'
- **Unit 3,** 'Counting in tens - decade numbers'
- **Unit 4,** 'Pattern in counting from 20 to 100'
- **Unit 12,** 'Composition of numbers 11 to 19'

Year 2

- **Unit 1,** 'Composition of multiples of 10'
- **Unit 2,** 'Counting and representing the numbers 20 to 99'
- **Unit 3,** 'Comparing, ordering and partitioning 2-digit numbers'
- **Unit 13,** 'Addition and subtraction of two 2-digit numbers'
- **Unit 14,** 'Money: recognise coins and use £ and p symbols'

Year 3

- **Unit 2,** 'Securing place value to 100 and applying to addition and subtraction'
- **Unit 3,** 'Bridging 100: counting on and back in 10s, adding/subtracting multiples of 10'
- **Unit 4,** 'Measuring length and recording in tables'
- **Unit 5,** 'Representing 3-digit numbers, comparing and positioning on number lines'
- **Unit 6,** 'Measures: mass and capacity'
- **Unit 11,** '2, 4 and 8 times tables: using times tables to solve problems'

Year 4

- **Unit 1,** 'Review of column addition and subtraction'
- **Unit 2,** 'Secure place value to 1000: apply to addition and subtraction: multiples of 100'
- **Unit 4,** 'Comparing, ordering and rounding 4-digit numbers'
- **Unit 5,** 'Column addition and subtraction with 4-digit numbers'
- **Unit 7,** 'Represent counting in threes and sixes as the 3 and 6 times tables'
- **Unit 8,** 'Relationship between the 3 and 6 times tables and tests of divisibility'
- **Unit 10,** 'Relationship between the 3 and 9 times tables'
- **Unit 11,** '7 times table: odd and even patterns, square numbers and tests of divisibility'
- **Unit 14,** 'Understand what happens when a number is multiplied or divided by 10 and 100'
- **Unit 15,** 'Coordinates'

Year 5

- **Unit 1,** 'Understand tenths as part of a whole, represent and calculate mentally'
- **Unit 2,** 'Compose and calculate with decimals including column addition and subtraction'
- **Unit 3,** 'Understand hundredths as parts of a whole and represent'
- **Unit 4,** 'Use knowledge of decimals to solve problems in different contexts: length'

- **Unit 5,** 'Negative numbers'
- **Unit 6,** 'Multiplication by partitioning leading to short multiplication (2 by 1-digit)'
- **Unit 7,** 'Multiplication by partitioning leading to short multiplication (3 by 1-digit)'
- **Unit 8,** 'Division by partitioning leading to short division (2 and 3-digits by 1-digit)'
- **Unit 21,** 'Converting units'

Year 6

- **Unit 4,** 'Multiples of 1,000'
- **Unit 5,** 'Understand place value within numbers with up to 7 digits'
- **Unit 7,** 'Rounding and solving problems with numbers up to 7 digits'
- **Unit 10,** 'Multiplying and dividing by 2-digit numbers'

Thread, **'Probability'**

Year 6

- **Unit 8,** 'Draw, compose and decompose shapes'
- **Unit 11,** 'Area, perimeter, position and direction'
- **Unit 17,** 'Ratio and proportion'

Thread, **'Ratio and Proportion'**

Year 3

- **Unit 2,** 'Securing place value to 100 and applying to addition and subtraction'
- **Unit 3,** 'Bridging 100: counting on and back in 10s, adding/subtracting multiples of 10'
- **Unit 8,** 'Informal and mental strategies for adding and subtracting two 3-digit numbers'
- **Unit 9,** 'Understand additive relationships and apply them to rearrange equations'
- **Unit 10,** 'Column addition'
- **Unit 12,** 'Column subtraction'

Year 6

- **Unit 15,** 'Understanding percentages'
- **Unit 17,** 'Ratio and proportion'

Thread, **'Statistics'**

Year 2

- **Unit 5,** 'Calculating within 20'
- **Unit 8,** 'Representing counting in 2s, 5s and 10s as the 2, 5 and 10 times tables'
- **Unit 9,** 'Representing counting in 5s as the 5 times table and link to the 10 times tables'
- **Unit 13,** 'Addition and subtraction of two 2-digit numbers'

Year 3

- **Unit 4,** 'Measuring length and recording in tables'
- **Unit 5,** 'Representing 3-digit numbers, comparing and positioning on number lines'
- **Unit 10,** 'Column addition'
- **Unit 11,** '2, 4 and 8 times tables: using times tables to solve problems'
- **Unit 12,** 'Column subtraction'

Year 4

- **Unit 1,** 'Review of column addition and subtraction'
- **Unit 2,** 'Secure place value to 1000: apply to addition and subtraction: multiples of 100'
- **Unit 4,** 'Comparing, ordering and rounding 4-digit numbers'
- **Unit 19,** 'Addition and subtraction of fractions and mixed numbers (within a whole)'

Year 5

- **Unit 1,** 'Understand tenths as part of a whole, represent and calculate mentally'
- **Unit 2,** 'Compose and calculate with decimals including column addition and subtraction'
- **Unit 3,** 'Understand hundredths as parts of a whole and represent'
- **Unit 5,** 'Negative numbers'

Year 6

- **Unit 4,** 'Multiples of 1,000'
- **Unit 16,** 'Statistics'
- **Unit 21,** 'Mean average'



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