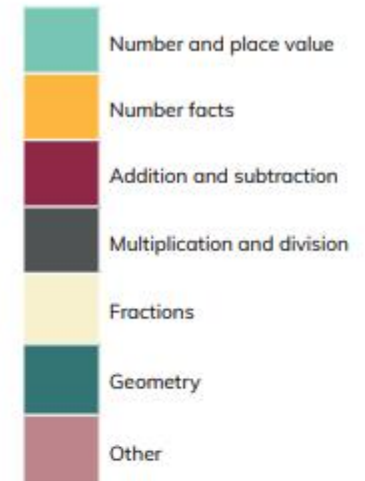


	Unit	Unit name
Autumn 1	1	Adding and subtracting across 10
	2	Numbers to 1,000
Autumn 2		
Spring 1	3	Right angles
	4	Manipulating the additive relationship and securing mental calculation
Spring 2	5	Column addition
	6	2, 4, 8 times tables
	7	Column subtraction
Summer 1	8	Unit fractions
Summer 2	9	Non-unit fractions
	10	Parallel and perpendicular sides in polygons
	11	Time



# Year 3

## Curriculum map

## NCETM Curriculum Prioritisation and Oak Academy Curriculum Mapping

Year 3			
Unit	NCETM	Unit	Oak
1	<p style="text-align: center;"><b>2 weeks</b></p> <p style="text-align: center;"><b>Adding and subtracting across 10</b></p> <p>RTP:</p> <ul style="list-style-type: none"> <li>2AS-1 Add and subtract across 10.</li> <li>3NF-1 Secure fluency in addition and subtraction facts that bridge 10, through continued practice.</li> <li>1.11 Addition and subtraction: bridging 10</li> </ul>	1	<p style="text-align: center;"><b>2 weeks (10 lessons)</b></p> <p>Review strategies for adding and subtracting across 10</p>
2	<p style="text-align: center;"><b>10 weeks</b></p> <p style="text-align: center;"><b>Numbers to 1,000</b></p> <p>RTP:</p> <ul style="list-style-type: none"> <li>3NPV-1 Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10; apply this to identify and work out how many 10s there are in other three-digit multiples of 10.</li> <li>3NPV-2 Recognise the place value of each digit in three-digit numbers, and compose and decompose three-digit numbers using standard and non-standard partitioning.</li> <li>3NPV-3 Reason about the location of any three-digit number in the linear number system, including identifying the previous and next multiple of 100 and 10.</li> <li>3NPV-4 Divide 100 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 100 with 2, 4, 5 and 10 equal parts.</li> <li>3AS-1 Calculate complements to 100.</li> <li>3NF-3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10).</li> <li>1.17 Composition and calculation: 100 and bridging 100</li> <li>1.18 Composition and calculation: three-digit numbers</li> </ul>	2	<p style="text-align: center;"><b>2 weeks (10 lessons)</b></p> <p>Securing place value to 100 and applying to addition and subtraction</p>
3		3	<p style="text-align: center;"><b>1 week (5 lessons)</b></p> <p>Bridging 100: counting on and back in 10s, adding/subtracting multiples of 10</p>
		4	<p style="text-align: center;"><b>2 weeks (10 lessons)</b></p> <p>Measuring length and recording in tables</p>
		5	<p style="text-align: center;"><b>3 weeks (15 lessons)</b></p> <p>Representing 3-digit numbers, comparing and positioning on number lines</p>
		6	<p style="text-align: center;"><b>2 weeks (10 lessons)</b></p> <p>Measures: mass and capacity</p>
		7	<p style="text-align: center;"><b>2 weeks (10 lessons)</b></p> <p>Right angles</p>
		8	<p style="text-align: center;"><b>2 weeks (10 lessons)</b></p> <p>Informal and mental strategies for adding and subtracting two 3-digit numbers</p>
4	<p style="text-align: center;"><b>4 weeks</b></p> <p style="text-align: center;"><b>Manipulating the additive relationship and securing mental calculation</b></p> <p>RTP:</p> <ul style="list-style-type: none"> <li>3AS-3 Manipulate the additive relationship: Understand the inverse relationship between addition and subtraction, and how both relate to the part-part-whole structure. Understand and use the commutative property of addition, and understand the related property for subtraction.</li> <li>1.19 Securing mental strategies: calculation up to 999</li> </ul>	9	<p style="text-align: center;"><b>2 weeks (10 lessons)</b></p> <p>Understand additive relationships and apply them to rearrange equations</p>
5	<p style="text-align: center;"><b>2 weeks</b></p> <p style="text-align: center;"><b>Column addition</b></p> <p>RTP:</p> <ul style="list-style-type: none"> <li>3AS-2 Add and subtract up to three-digit numbers using columnar methods.</li> <li>1.20 Algorithms: column addition</li> </ul>	10	<p style="text-align: center;"><b>2 weeks (10 lessons)</b></p> <p>Column addition</p>
5	<p style="text-align: center;"><b>3 weeks</b></p> <p style="text-align: center;"><b>2, 4, 8 times tables</b></p> <p>RTP:</p>	11	<p style="text-align: center;"><b>3 weeks (15 lessons)</b></p> <p>2, 4 and 8 times tables: using times tables to solve problems</p>

## NCETM Curriculum Prioritisation and Oak Academy Curriculum Mapping

6	<ul style="list-style-type: none"> <li>3MD-1 Apply known multiplication and division facts to solve contextual problems with different structures, including quotientive and partitive division.</li> <li>3NF-2 Recall multiplication facts, and corresponding division facts, in the 10, 5, 2, 4 and 8 multiplication tables, and recognise products in these multiplication tables as multiples of the corresponding number.</li> <li>3NF-3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10).</li> <li>2.7 Times tables: 2, 4 and 8, and the relationship between them</li> </ul>	12	<p style="text-align: center;"><b>1 week</b></p> <p style="text-align: center;"><b>Column subtraction</b></p> <p>RTP:</p> <ul style="list-style-type: none"> <li>3AS-2 Add and subtract up to three-digit numbers using columnar methods.</li> <li>1.21 Algorithms: column subtraction</li> </ul>	12	<p style="text-align: center;"><b>1 week (5 lessons)</b></p> <p>Column subtraction</p>
7		13	<p style="text-align: center;"><b>5 weeks</b></p> <p style="text-align: center;"><b>Unit fractions</b></p> <p>RTP:</p> <ul style="list-style-type: none"> <li>3F-1 Interpret and write proper fractions to represent 1 or several parts of a whole that is divided into equal parts.</li> <li>3F-2 Find unit fractions of quantities using known division facts (multiplication tables fluency).</li> <li>3.1 Preparing for fractions: the part-whole relationship</li> <li>3.2 Unit fractions: identifying, representing and comparing</li> </ul>	13	<p style="text-align: center;"><b>2 weeks (10 lessons)</b></p> <p>Unit fractions as part of a whole</p>
8		14		14	<p style="text-align: center;"><b>1 week (5 lessons)</b></p> <p>Identify parts and wholes in different contexts</p>
		15		15	<p style="text-align: center;"><b>1 week (5 lessons)</b></p> <p>Compare and order unit fractions</p>
		16		16	<p style="text-align: center;"><b>1 week (5 lessons)</b></p> <p>Calculate the value of a part (fractions as operators)</p>
		17		17	<p style="text-align: center;"><b>2 weeks (10 lessons)</b></p> <p>Non-unit fractions</p>
9		18	<p style="text-align: center;"><b>4 weeks</b></p> <p style="text-align: center;"><b>Non-unit fractions</b></p> <p>RTP:</p> <ul style="list-style-type: none"> <li>3F-1 Interpret and write proper fractions to represent 1 or several parts of a whole that is divided into equal parts.</li> <li>3F-3 Reason about the location of any fraction within 1 in the linear number system.</li> <li>3F-4 Add and subtract fractions with the same denominator, within 1.</li> <li>3.3 Non-unit fractions: identifying, representing and comparing</li> <li>3.4 Adding and subtracting within one whole</li> </ul>	18	<p style="text-align: center;"><b>2 weeks (10 lessons)</b></p> <p>Composition of non-unit fractions: addition and subtraction</p>
10		19	<p style="text-align: center;"><b>2 weeks</b></p> <p style="text-align: center;"><b>Parallel and perpendicular sides in polygons</b></p> <p>RTP:</p> <ul style="list-style-type: none"> <li>3G-2 Draw polygons by joining marked points, and identify parallel and perpendicular sides.</li> </ul>	19	<p style="text-align: center;"><b>2 weeks (10 lessons)</b></p> <p>**Parallel and perpendicular sides in polygons (and perimeter)**</p>
11		20	<p style="text-align: center;"><b>1 week</b></p> <p style="text-align: center;"><b>Time</b></p> <p>RTP:</p> <ul style="list-style-type: none"> <li>This topic is part of the National Curriculum but is not included in the DfE 2020 guidance or the NCETM Mastery PD Materials.</li> </ul>	20	<p style="text-align: center;"><b>2 weeks (7 lessons)</b></p> <p>Tell the time to the nearest minute and compare units of time</p>

**Unit 1: Adding and Subtracting Across 10 (2 weeks)**

**NCETM Small Steps**

Pupils add 3 addends

Pupils use a 'First.. Then... Now" story to add 3 addends

Pupils explain that addends can be added in any order

Pupils add 3 addends efficiently

Pupils add 3 addends efficiently by finding two addends that total 10

Pupils add two numbers that bridge through 10

Pupils subtract two numbers that bridge through 10

**Ready To Progress Criteria:**

**2AS-1-** Add and subtract across ten.

**3NF-1** Secure fluency in addition and subtraction facts that bridge 10, through continued practice.

**National curriculum objectives:**

- Revising objectives from Year 2

**Sticky knowledge:**

A child should be able to say:

When bridging 10, I can partition one of the addends to 'make 10' and then add on the remainder of the addend.

**Unit 2: Numbers to 1000 (10 weeks)**

**NCETM Small Steps**

Pupils explain that 100 is composed of ten tens and one hundred ones

Pupils explain that 100 is composed of 50s 25s and 20s

Pupils use known facts to find multiples of ten that compose 100

Pupils will use known facts to find a two-digit number and a one- or two-digit number that compose 100

Pupils use known facts to find correct complements to 100

Pupils use known facts to find complements to 100 accurately and efficiently

Pupils represent a three-digit number which is a multiple of ten using their numerals and names

Pupils use place value knowledge to write addition and subtraction equations

Pupils bridge 100 by adding or subtracting in multiples of ten

Pupils use knowledge of addition and subtraction of multiples of ten bridging the hundreds boundary to solve problems

Pupils count across and on from 100

Pupils represent a three-digit number up to 199 in different ways

Pupils bridge 100 by adding or subtracting a single-digit number

Pupils find ten more or ten less than a given number

Pupils cross the hundreds boundary when adding and subtracting any two-digit multiple of ten

Pupils become familiar with a metre ruler (marked and unmarked intervals, 1 x 1m, 10 x 10cm, 100 x 1 cm)

Pupils measure length and height from zero using whole metres and cm

Pupils measure length and height from zero using cm

**Ready To Progress Criteria:**

**3NP-1** Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10; apply this to identify and work out how many 10s there are in other three-digit multiples of 10.

**3NP-2** Recognise the place value of each digit in three-digit numbers, and compose and decompose three-digit numbers using standard and non-standard partitioning.

**3NP-3** Reason about the location of any three-digit number in the linear number system, including identifying the previous and next multiple of 100 and 10.

**3NP-4** Divide 100 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 100 with 2, 4, 5 and 10 equal parts.

**3AS-1** Calculate complements to 100.

**3NF-3** Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10)

**National curriculum objectives:**

- count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
- recognise the place value of each digit in a 3-digit number (100s, 10s, 1s)
- compare and order numbers up to 1,000
- identify, represent and estimate numbers using different representations
- read and write numbers up to 1,000 in numerals and in words
- solve number problems and practical problems involving these ideas

**Sticky knowledge:**

A child should be able to say:

I know that ten 10s are equivalent to 100 and I can use to understand how many tens are in other multiples of 100.

I can explain that a 3 digit number is made up of hundreds, tens and ones but also know that 3 digit numbers can be composed of tens and ones, hundreds and ones and ones.

I can explain that 100 can be divided into 2 equal parts = 50. 4 equal parts = 25, 5 equal parts = 20 and 10 equal parts = 10.

Pupils convert between m and cm (include whole m to cm, cm to whole m and cm and vice versa)

Pupils become familiar with a ruler in relation to cm and mm (marked and unmarked intervals, knowing 1 cm = 10mm)

Pupils measure length from zero using mm / whole cm and mm

Pupils convert between cm and mm (include whole cm to mm, mm to whole cm and mm and vice versa)

Pupils estimate a length/height, measure a length/height and record in a table

Pupils use knowledge of place value to represent a three-digit number in different ways

Pupils represent a three-digit number up to 1000 in different ways

Pupils use knowledge of the additive relationship to solve problems

Pupils count in hundreds and tens on a number line

Pupils identify the previous, next and nearest multiple of 100 on a number line for a three-digit multiples of ten

Pupils position three-digit numbers on number lines

Pupils estimate the position of three-digit numbers on unmarked number lines

Pupils compare one-, two- and three-digit numbers

Pupils compare two three-digit numbers

Pupils order sets of three-digit numbers

Pupils use known facts to add or subtract multiples of 100 within 1000

Pupils write a three-digit multiple of 10 as a multiplication equation

Pupils partition three-digit numbers in different ways

Pupils use known facts to solve problems involving partitioning numbers

Pupils use known facts to add or subtract to/from multiples of 100 in tens

Pupils use known facts to add or subtract to/from multiples of 100 in ones

Pupils add/subtract multiples of ten bridging 100

Pupils add/subtract to/from a three-digit number in ones bridging 100

Pupils find 10 more or less across any hundreds boundary

Pupils use knowledge of adding or subtracting to/from three-digit numbers to solve problems

Pupils count forwards and backwards in multiples of 2, 20, 5, 50 and 25

Pupils use knowledge of counting in multiples of 2, 20, 5, 50 and 25 to solve problems

Pupils become familiar with different weighing scales up to 1kg (intervals of 100g, 200g, 250g and 500g)

Pupils become familiar with the tools to measure volume and capacity up to 1 litre (intervals of 100ml, 200ml, 250ml and 500ml)

Pupils measure mass from zero up to 1kg using grams

Pupils measure mass from zero above 1kg using whole kg and grams

Pupils measure volume from zero up to 1 litre using ml

Pupils measure volume from zero above 1 litre using whole litres and ml

Pupils estimate mass in grams and volume in ml

Pupils estimate a mass/volume, measure a mass/volume and record in a table

### Unit 3: Right Angles (2 weeks)

#### NCETM Small Steps

Pupils rotate two lines around a fixed point to make different sized angles

Pupils draw triangles and quadrilaterals and identify vertices

Pupils learn that a right angle is a 'square corner' and identify them in the environment

Pupils learn that a rectangle is a 4-sided polygon with four right angles

Pupils learn that a square is a rectangle in which the four sides are equal length

Pupils cut rectangles and squares on the diagonal and investigate the shapes they make

Pupils join four right angles at a point using different right-angled polygons

Pupils investigate and draw other polygons with right angles

#### Ready To Progress Criteria:

**3G-1** Recognise right angles as a property of shape or a description of a turn, and identify right angles in 2D shapes presented in different orientations.

#### National curriculum objectives:

- recognise angles as a property of shape or a description of a turn
- identify right angles, recognise that 2 right angles make a half-turn, 3 make three-quarters of a turn and 4 a complete turn; identify whether angles are greater than or less than a right angle

#### Sticky knowledge:

A child should be able to say:

An angle is a description of a turn. A right angle is 90 degrees and is described as a quarter of a turn. 4 right angles equal a full turn.

**Unit 4: Manipulating the additive relationship and securing mental calculation (4 weeks)**

**NCETM Small Steps**

Pupils add two 3-digit numbers using partitioning

Pupils add two 3-digit numbers using adjusting

Pupils add a pair of 2- or 3-digit numbers using redistribution

Pupils subtract a pair of 2- or 3-digit numbers, bridging a multiple of 10, using partitioning

Pupils subtract a pair of 2-digit numbers, crossing a ten or hundreds boundary, by finding the difference between them

Pupils subtract a pair of three-digit multiples of 10 within 1000 by finding the difference between them

Pupils evaluate the efficiency of strategies for subtracting from a 3-digit number

Pupils explain why the order of addition and subtraction steps in a multi-step problem can be chosen

Pupils accurately and efficiently solve multi-step addition and subtraction problems

Pupils understand and can explain that both addition and subtraction equations can be used to describe the same additive relationship (2-digit numbers)

Pupils understand and can explain that both addition and subtraction equations can be used to describe the same additive relationship (3-digit numbers)

Pupils use knowledge of the additive relationship to rearrange equations

Pupils use knowledge of the additive relationship to identify what is known and what is unknown in an equation

Pupils use knowledge of the additive relationship to rearrange equations before solving

**Ready To Progress Criteria:**

**3AS–3** Manipulate the additive relationship: Understand the inverse relationship between addition and subtraction, and how both relate to the part–part–whole structure. Understand and use the commutative property of addition, and understand the related property for subtraction.

**National curriculum objectives:**

- add and subtract numbers mentally, including:
  - a three-digit number and 1s
  - a three-digit number and 10s
  - a three-digit number and 100s
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

**Sticky knowledge:**

**A child should be able to say:**

**Unit 5: Column Addition (2 weeks)**

**NCETM Small Steps**

Pupils identify the addends and the sum in column addition

Pupils use their knowledge of place value to correctly lay out column addition

Pupils add a pair of 2-digit numbers using column addition

Pupils add using column addition

Pupils use their knowledge of column addition to solve problems

Pupils add a pair of 2-digit numbers using column addition with regrouping in the ones column

Pupils add a pair of 2-digit numbers using column addition with regrouping in the tens column

Pupils add using column addition with regrouping

Pupils use known facts and strategies to accurately and efficiently calculate and check column addition

Pupils use their knowledge of column addition to solve problems

**Ready To Progress Criteria:**

**3AS–2** Add and subtract up to three-digit numbers using columnar methods.

**National curriculum objectives:**

- add and subtract numbers mentally, including:
  - a three-digit number and 1s
  - a three-digit number and 10s
  - a three-digit number and 100s
- add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

**Sticky knowledge:**

A child should be able to say:

When adding you start on the right hand side. If the amount adds up to more than 10 ones or 10 tens, you have to regroup.

**Unit 6: 2, 4, 8 Times Tables (3 weeks)**

**NCETM Small Steps**

Pupils represent counting in fours as the 4 times table

Pupils use knowledge of the 4 times table to solve problems

Pupils explain the relationship between adjacent multiples of four

Pupils explain the relationship between multiples of 2 and multiples of 4

Pupils use knowledge of the relationships between the 2 and 4 times tables to solve problems

Pupils represent counting in eights as the 8 times table

Pupils explain the relationship between adjacent multiples of eight

Pupils explain the relationship between multiples of 4 and multiples of 8

Pupils use knowledge of the relationships between the 4 and 8 times tables to solve problems

Pupils explain the relationship between multiples of 2, 4 and multiples of 8

Pupils use knowledge of the relationships between the 2, 4 and 8 times tables to solve problems

Pupils use knowledge of the divisibility rules for divisors of 2 and 4 to solve problems

Pupils use knowledge of the divisibility rules for divisors of 8 to solve problems

Pupils scale known multiplication facts by 10

Pupils scale division derived from multiplication facts by 10

**Ready To Progress Criteria:**

**3NF-3** Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10)

**National curriculum objectives:**

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which  $n$  objects are connected to  $m$  objects

**Sticky knowledge:**

**A child should be able to say:**

## Unit 7: Column Subtraction (1 week)

### NCETM Small Steps

Pupils identify the minuend and the subtrahend in column subtraction

Pupils explain the column subtraction algorithm

Pupils subtract from a 2-digit number using column subtraction with exchanging from tens to ones

Pupils subtract from a 3-digit number using column subtraction with exchanging from hundreds to tens (1)

Pupils subtract from a 3-digit number using column subtraction with exchanging from hundreds to tens (2)

Pupils evaluate the efficiency of strategies for subtraction

### Ready To Progress Criteria:

**3AS-2** Add and subtract up to three-digit numbers using columnar methods.

### National curriculum objectives:

- add and subtract numbers mentally, including:
  - a three-digit number and 1s
  - a three-digit number and 10s
  - a three-digit number and 100s
- add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

### Sticky knowledge:

A child should be able to say:

When subtracting, the minuend is the top number. You start on the right hand side. If the minuend has an insufficient number of any unit, we must exchange from the next column on the left.

## Unit 8: Unit Fractions (5 weeks)

### NCETM Small Steps

Pupils identify a whole and the parts that make it up

Pupils explain why a part can only be defined when in relation to a whole

Pupils identify the number of equal or unequal parts in a whole

Pupils identify equal parts when they do not look the same (i)

Pupils explain the size of the part in relation to the whole

Pupils construct a whole when given a part and the number of parts

Pupils identify how many equal parts a whole has been divided into

Pupils use fraction notation to describe an equal part of the whole

Pupils represent a unit fractions in different ways

Pupils identify parts and wholes in different contexts (i)

Pupils identify parts and wholes in different contexts (ii)

Pupils identify equal parts when they do not look the same (ii)

Pupils compare and order unit fractions by looking at the denominator

Pupils identify when unit fractions cannot be compared

Pupils construct a whole when given one part and the fraction that it represents

Pupils use knowledge of the relationship between parts and wholes in unit fractions to solve problems

Pupils identify the whole, the number of equal parts and the size of each part as a unit fraction

Pupils quantify the number of items in each part and connect to the unit fraction operator

Pupils calculate the value of a part by using knowledge of division and division facts

### Ready To Progress Criteria:

**3F-1** Interpret and write proper fractions to represent 1 or several parts of a whole that is divided into equal parts.

**3F-2** Find unit fractions of quantities using known division facts (multiplication tables fluency).

### National curriculum objectives:

- count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
- recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators
- recognise and show, using diagrams, equivalent fractions with small denominators
- add and subtract fractions with the same denominator within one whole [for example,  $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$ ]
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above

### Sticky knowledge:

A child should be able to say:

A fraction is a part of a whole. A fraction must be equal parts. A unit fraction has a numerator of one.

Pupils calculate the value of a part by connecting knowledge of division and division facts with finding a fraction of a quantity

Pupils find fractions of quantities using knowledge of division facts with increasing fluency

## Unit 9: Non-Unit Fractions (4 weeks)

### NCETM Small Steps

Pupils explain that non-unit fractions are composed of more than one unit fraction

Pupils identify non-unit fractions

Pupils identify the number of equal or unequal parts in a whole

Pupils use knowledge of non-unit fractions to solve problems

Pupils use knowledge of unit fractions to find one whole

Pupils place fractions between 0 and 1 on a numberline

Pupils use repeated addition of a unit fraction to form a non-unit fraction

Pupils use repeated addition of a unit fraction to form 1

Pupils compare using knowledge of non-unit fractions equivalent to one

Pupils compare non-unit fractions with the same denominator

Pupils compare unit fractions

Pupils compare fractions with the same numerator

Pupils add up fractions with the same denominator

Pupils add on fractions with the same denominator

Pupils add fractions with the same denominator using a generalised rule

Pupils subtract fractions with the same denominator

Pupils identify the whole, the number of equal parts and the size of each part as a unit fraction

Pupils explain that addition and subtraction of fractions are inverse operations

Pupils subtract fractions from a whole by converting the whole to a fraction

### Ready To Progress Criteria:

**3F-1** Interpret and write proper fractions to represent 1 or several parts of a whole that is divided into equal parts.

**3F-3** Reason about the location of any fraction within 1 in the linear number system.

**3F-4** Add and subtract fractions with the same denominator, within 1.

### National curriculum objectives:

- count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
- recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators
- recognise and show, using diagrams, equivalent fractions with small denominators
- add and subtract fractions with the same denominator within one whole [for example,  $5/7 + 1/7 = 6/7$ ]
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above

### Sticky knowledge:

A child should be able to say:

A fraction is a part of a whole. A non-unit fraction is one with a denominator greater than 1. You can only compare fractions when the denominators are the same or when the numerator is the same.

Pupils represent a whole as a fraction in different ways and use this to solve problems involving subtraction

**Unit 10: Parallel and Perpendicular Sides in Polygons (2 weeks)**

**NCETM Small Steps**

Pupils make compound shapes by joining two polygons in different ways (same parts, different whole)

Pupils investigate different ways of composing and decomposing a polygon (same whole, different parts)

Pupils draw polygons on isometric paper

Pupils use geostrips to investigate quadrilaterals with and without parallel and perpendicular sides

Pupils make and draw compound shapes with and without parallel and perpendicular sides

Pupils learn to extend lines and sides to identify parallel and perpendicular lines

Pupils make and draw triangles on circular geoboards

Pupils make and draw quadrilaterals on circular geoboards

Pupils draw shapes with given properties on a range of geometric grids

**Ready To Progress Criteria:**

**3G-2** Draw polygons by joining marked points, and identify parallel and perpendicular sides

**National curriculum objectives:**

- draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them
- identify horizontal and vertical lines and pairs of perpendicular and parallel lines

**Sticky knowledge:**

**A child should be able to say:**

**Unit 11: Time (1 week)**

**NCETM Small Steps**

None

**Ready To Progress Criteria:**

**3AS–2** Add and subtract up to three-digit numbers using columnar methods.

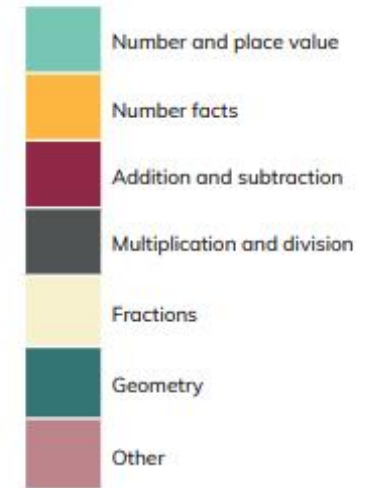
**National curriculum objectives:**

- tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks
- estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight
- know the number of seconds in a minute and the number of days in each month, year and leap year
- compare durations of events [for example to calculate the time taken by particular events or tasks].

**Sticky knowledge:**

A child should be able to say:  
I know the hour hand is the shorter hand and the minute hand is the longer hand. A clock goes up in 5 minute intervals. Different months have different amounts of days.

	Unit	Unit name
Autumn 1	1	Review of column addition and subtraction
	2	Numbers to 10,000
Autumn 2	3	Perimeter
	4	3, 6, 9 times tables
Spring 1	5	7 times table and patterns
	6	Understanding and manipulating multiplicative relationships
Spring 2	7	Coordinates
	8	Review of fractions
Summer 1	9	Fractions greater than 1
	10	Symmetry in 2D shapes
Summer 2	11	Time
	12	Division with remainders



# Year 4

## Curriculum map

### NCETM Curriculum Prioritisation and Oak Academy Curriculum Mapping

Year 4			
Unit	NCETM	Unit	Oak
1	<b>4 weeks</b> <b>Review of column addition and subtraction</b> RTP: • 3AS-2 Add and subtract up to three-digit numbers using columnar methods. • 1.20 Algorithms: column addition • 1.21 Algorithms: column subtraction	1	<b>3 weeks (15 lessons)</b> Review of column addition and subtraction
		2	<b>1 week (5 lessons)</b> Secure place value to 1000: apply to addition and subtraction: multiples of 100
2	<b>5 weeks</b> <b>Numbers to 10,000</b> RTP: • 4NPV-1 Know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100. • 4NPV-2 Recognise the place value of each digit in four-digit numbers, and compose and decompose four-digit numbers using standard and non-standard partitioning. • 4NPV-3 Reason about the location of any four-digit number in the linear number system, including identifying the previous and next multiple of 1,000 and 100, and rounding to the nearest of each. • 4NPV-4 Divide 1,000 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts. • 4NF-3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 100). • 1.22 Composition and calculation: 1,000 and four-digit numbers	3	<b>1 week (5 lessons)</b> Calculation and conversion of measures
		4	<b>1 week (5 lessons)</b> Comparing, ordering and rounding 4-digit numbers
		5	<b>2 weeks (10 lessons)</b> **Column addition and subtraction with 4-digit numbers**
		6	<b>2 weeks (10 lessons)</b> Perimeter
		7	<b>1 week (5 lessons)</b> Represent counting in threes and sixes as the 3 and 6 times tables
4	<b>4 weeks</b> <b>3, 6, 9 times tables</b> RTP: • 4NF-1 Recall multiplication and division facts up to 12x12, and recognise products in multiplication tables as multiples of the corresponding number. • 2.8 Times tables: 3, 6 and 9, and the relationship between them	8	<b>1 week (5 lessons)</b> Relationship between the 3 and 6 times tables and tests of divisibility
		9	<b>1 week (5 lessons)</b> Represent counting in nines as the 9 times table
		10	<b>1 week (5 lessons)</b> Relationship between the 3 and 9 times tables
		11	<b>2 weeks (10 lessons)</b> **7 times table: odd and even patterns, square numbers and tests of divisibility**
5	<b>2 weeks</b> <b>7 times table and patterns</b> RTP: • 4NF-1 Recall multiplication and division facts up to 12x12, and recognise products in multiplication tables as multiples of the corresponding number.		

### NCETM Curriculum Prioritisation and Oak Academy Curriculum Mapping

	<ul style="list-style-type: none"> <li>2.9 Times tables: 7 and patterns within/across times tables</li> </ul>		
6	<b>5 weeks</b> <b>Understanding and manipulating multiplicative relationships</b> RTP: • 4MD-1 Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size. • 4MD-2 Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication. • 4MD-3 Understand and apply the distributive property of multiplication. • 4NF-3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 100) • 2.10 Connecting multiplication and division, and the distributive law • 2.13 Calculation: multiplying and dividing by 10 or 100	12	<b>2 weeks (10 lessons)</b> **Understand and represent multiplicative structures**
		13	<b>1 week (5 lessons)</b> **Apply the distributive law to multiplication**
		14	<b>3 weeks (15 lessons)</b> **Understand what happens when a number is multiplied or divided by 10 and 100**
7	<b>2 weeks</b> <b>Coordinates</b> RTP: • 4G-1 Draw polygons, specified by coordinates in the first quadrant, and translate within the first quadrant.	15	<b>2 weeks (10 lessons)</b> **Coordinates**
		16	<b>1 week (5 lessons)</b> Review of fractions
8	<b>1 week</b> <b>Review of fractions</b> RTP: • 3F-1 Interpret and write proper fractions to represent 1 or several parts of a whole that is divided into equal parts. • 3.1 Preparing for fractions: the part-whole relationship	17	<b>1 week (5 lessons)</b> **Composition of fractions greater than one**
		18	<b>1 week (5 lessons)</b> **Compare and order mixed numbers and position on a number line**
		19	<b>1 week (5 lessons)</b> **Addition and subtraction of fractions and mixed numbers (within a whole)**
		20	<b>1 week (5 lessons)</b> **Convert improper fractions to mixed numbers and vice versa**
		21	<b>1 week (5 lessons)</b> **Efficient strategies for adding and subtracting mixed numbers (crossing a whole)**
10	<b>2 weeks</b> <b>Symmetry in 2D shapes</b> RTP: • 4G-3 Identify line symmetry in 2D shapes presented in different orientations. Reflect shapes in a line of symmetry and complete a symmetric figure or pattern with respect to a specified line of symmetry.	22	<b>2 weeks (10 lessons)</b> **Symmetry in 2D shapes**
		23	<b>1 week (5 lessons)</b>
11	<b>1 week</b> <b>Time</b> RTP: • This topic is part of the National Curriculum but is not included in the DfE 2020 guidance or the NCETM Mastery PD Materials.		Time: Convert between 12 and 24 hour clocks: analogue and digital
12	<b>2 weeks</b> <b>Division with remainders</b> RTP: • 4NF-2 Solve division problems, with two-digit dividends and one-digit divisors, that involve remainders. • 2.12 Division with remainders	24	<b>2 weeks (10 lessons)</b> **Division with remainders**

## Unit 1: Review of Column Addition and Subtraction (3 weeks)

### NCETM Small Steps

Pupils identify the addends and the sum in column addition

Pupils use their knowledge of place value to correctly lay out column addition

Pupils add a pair of 2-digit numbers using column addition

Pupils add using column addition

Pupils use their knowledge of column addition to solve problems

Pupils add a pair of 2-digit numbers using column addition with regrouping in the ones column

Pupils add a pair of 2-digit numbers using column addition with regrouping in the tens column

Pupils add using column addition with regrouping

Pupils use known facts and strategies to accurately and efficiently calculate and check column addition

Pupils use their knowledge of column addition to solve problems

Pupils identify the minuend and the subtrahend in column subtraction

Pupils subtract using column subtraction

Pupils subtract from a 2-digit number using column subtraction with exchanging from tens to ones

Pupils subtract from a 3-digit number using column subtraction with exchanging from hundreds to tens (1)

Pupils subtract from a 3-digit number using a column subtraction with exchanging from hundreds to tens (2)

Pupils evaluate the efficiency of strategies for subtraction

### Ready To Progress Criteria:

**3AS-2** Add and subtract up to three-digit numbers using columnar methods.

### National curriculum objectives:

- add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

### Sticky knowledge:

A child should be able to say:

When adding you start on the right-hand side. If the amount adds up to more than 10 ones or 10 tens, you must regroup.

When subtracting, the minuend is the top number. You start on the right-hand side. If the minuend has an insufficient number of any unit, we must exchange from the next column on the left.

## Unit 2: Numbers to 10,000 (5 weeks)

### NCETM Small Steps

Pupils explain how many tens, hundreds and ones 1,000 is composed of

Pupils use knowledge of 1,000 to explain common measure conversions

Pupils use knowledge of 1,000 to solve problems

Pupils use different strategies to add multiples of 100

Pupils use different strategies to subtract multiples of 100

Pupils use knowledge of calculation and common measure conversions to solve problems

Pupils compose and decompose four-digit numbers in different ways

Pupils use strategies to make solving calculations more efficient

Pupils compare and order four-digit numbers

Pupils calculate efficiently by using knowledge of place value, addition and subtraction

Pupils explain what rounding is

Pupils round a four-digit number to the nearest thousand

Pupils round a four-digit number to the nearest hundred and ten

Pupils round a four-digit number to the nearest thousand, hundred and ten

Pupils add up to 3 four-digit numbers using a column addition

Pupils subtract four-digit numbers using a column subtraction

Pupils use strategies to make solving calculations more efficient

Pupils explain how many '100s' and '200s', 1,000 is composed of

Pupils explain how many '500s' and '250s', 1,000 is composed of

### Ready To Progress Criteria:

**4NPV-1** Know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100.

**4NPV-2** Recognise the place value of each digit in four-digit numbers, and compose and decompose four-digit numbers using standard and nonstandard partitioning.

**4NPV-3** Reason about the location of any fourdigit number in the linear number system, including identifying the previous and next multiple of 1,000 and 100, and rounding to the nearest of each.

**4NPV-4** Divide 1,000 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts.

### National curriculum objectives:

- count in multiples of 6, 7, 9, 25 and 1,000
- find 1,000 more or less than a given number
- count backwards through 0 to include negative numbers
- recognise the place value of each digit in a four-digit number (1,000s, 100s, 10s, and 1s)
- order and compare numbers beyond 1,000
- identify, represent and estimate numbers using different representations
- round any number to the nearest 10, 100 or 1,000
- solve number and practical problems that involve all of the above and with increasingly large positive numbers
- read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of 0 and place value

### Sticky knowledge:

**Unit 3: Perimeter (3 weeks)**

**NCETM Small Steps**

A regular polygon has sides that are all the same length and interior angles that are all equal in size

Perimeter is the distance around the edge of a two-dimensional shape

Different shapes can have the same perimeter

Perimeter is measured in units of length and can be found by counting units

Perimeter can be calculated by adding together the side lengths of a 2D shape

The perimeter of a rectangle can be calculated by addition and multiplication

Unknown side lengths can be calculated from perimeter and known side lengths

The perimeter of a regular polygon can be calculated by multiplication

The side length of a regular polygon can be calculated by division where the perimeter is known

**Ready To Progress Criteria:**

**4G-2** Identify regular polygons, including equilateral triangles and squares, as those in which the side-lengths are equal and the angles are equal. Find the perimeter of regular and irregular polygons.

**National curriculum objectives:**

- compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes
- identify acute and obtuse angles and compare and order angles up to 2 right angles by size

**Sticky knowledge:**

## Unit 4: 3, 6, 9 Times Tables

### NCETM Small Steps

Pupils represent counting in threes as the three times table

Pupils explain the relationship between adjacent multiples of three

Pupils use knowledge of the three times table to solve problems

Pupils represent counting in sixes as the six times table

Pupils explain the relationship between adjacent multiples of six

Pupils use knowledge of the six times table to solve problems

Pupils use known facts from the five times table to solve problems involving the six times table

Pupils explain the relationship between multiples of three and multiples of six

Pupils use knowledge of the relationships between the three and six times tables to solve problems

Pupils represent counting in nines as the nine times table

Pupils explain the relationship between adjacent multiples of nine (1)

Pupils explain the relationship between adjacent multiples of nine (2)

Pupils use known facts from the ten times table to solve problems involving the nine times table

Pupils explain the relationship between multiples of three and multiples of nine

Pupils explain the relationship between pairs of three and nine times table facts that have the same product (1)

Pupils explain the relationship between pairs of three and nine times table facts that have the same product (2)

Pupils use the divisibility rules for divisors of three

Pupils use the divisibility rules for divisors of six (1)

Pupils use the divisibility rules for divisors of six (2)

### Ready To Progress Criteria:

**4MD–2** Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication.

**4MD–3** Understand and apply the distributive property of multiplication

**4NF–3** Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 100)

### National curriculum objectives:

- recall multiplication and division facts for multiplication tables up to  $12 \times 12$
- solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit, integer scaling problems and harder correspondence problems such as  $n$  objects are connected to  $m$  objects

### Sticky knowledge:

**Unit 5: 7 Times Tables and Patterns (2 weeks)**

**NCETM Small Steps**

Pupils represent counting in sevens as the 7 times table

Pupils explain the relationship between adjacent multiples of seven

Pupils use their knowledge of the 7 times table to solve problems

Pupils identify patterns of odd and even numbers in the times tables

Pupils represent a square number

Pupils use knowledge of divisibility rules to solve problems

**Ready To Progress Criteria:**

**4MD-2** Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication.

**4MD-3** Understand and apply the distributive property of multiplication

**4NF-3** Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 100)

**National curriculum objectives:**

- recall multiplication and division facts for multiplication tables up to  $12 \times 12$
- solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects

**Sticky knowledge:**

## Unit 6: Understanding and Manipulating Multiplicative Relationships (5 Weeks)

### NCETM Small Steps

Pupils explain what each factor represents in a multiplication equation

Pupils explain how each part of a multiplication and division equation relates to a story

Pupils explain where zero can be part of a multiplication or division expression and the impact it has

Pupils partition one of the factors in a multiplication equation in different ways using representations (I)

Pupils partition one of the factors in a multiplication equation in different ways using representations (II)

Pupils explain which is the most efficient factor to partition to solve a multiplication problem

Pupils use knowledge of distributive law to solve two part addition and subtraction problems, efficiently

Pupils use knowledge of distributive law to calculate products beyond known times tables facts

Pupils explain the relationship between multiplying a number by 10 and multiples of 10

Pupils explain why a zero can be placed after the final digit of a single-digit number when we multiply it by 10

Pupils explain why a zero can be placed after the final digit of a two-digit number when we multiply it by 10

Pupils explain why the final digit zero can be removed from a two-digit multiple of 10, when we divide by 10

Pupils explain why the final digit zero can be removed from a three-digit multiple of 10, when we divide by 10

Pupils explain the relationship between multiplying a number by 100 and multiples of 100

Pupils explain why two zeros can be placed after the final digit of a single-digit number when we multiply it by 100

### Ready To Progress Criteria:

**4MD–1** Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size.

**4MD–2** Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication.

**4MD–3** Understand and apply the distributive property of multiplication

**4NF–2** Solve division problems, with two-digit dividends and one-digit divisors, that involve remainders, and interpret remainders appropriately according to the context.

**4NF–3** Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 100)

### National curriculum objectives:

- recall multiplication and division facts for multiplication tables up to  $12 \times 12$
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together 3 numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit, integer scaling problems and harder correspondence problems such as  $n$  objects are connected to  $m$  objects

### Sticky knowledge:

Pupils explain why two zeros can be placed after the final digit of a two-digit number when we multiply it by 100

Pupils explain why the last two zeros can be removed from a three-digit multiple of 100 when we divide it by 100

Pupils explain why the last two zeros can be removed from a four-digit multiple of 100 when we divide it by 100

Pupils use knowledge of the composition of 100 to multiply by 100 in different ways

Pupils use knowledge of the composition of 100 to divide by 100 in different ways

Pupils explain how making a factor 10 times the size affects the product

Pupils explain how making the dividend 10 times the size affects the quotient

Pupils explain how making a factor 100 times the size affects the product

Pupils explain how making the dividend 100 times the size affects the quotient

Pupils scale known multiplication facts by 100

Pupils scale division derived from multiplication facts by 100

**Unit 7: Coordinates (2 Weeks)**

**NCETM Small Steps**

Pupils give directions from one position to another on a grid

Pupils move objects including polygons on a grid according to directions, and mark the new position

Pupils describe translations of polygons drawn on a square grid

Pupils draw polygons specified by translations

Pupils mark points specified as a translation from the origin

Pupils mark the position of points specified by coordinates in the first quadrant of a coordinate grid, and write coordinates for already-marked points

Pupils draw polygons specified by coordinates in the first quadrant

Pupils translate polygons in the first quadrant

**Ready To Progress Criteria:**

**4G-1** Draw polygons, specified by coordinates in the first quadrant, and translate within the first quadrant.

**National curriculum objectives:**

- describe positions on a 2-D grid as coordinates in the first quadrant
- describe movements between positions as translations of a given unit to the left/right and up/down
- plot specified points and draw sides to complete a given polygon

**Sticky knowledge:**

## Unit 8: Review of Fractions (1 week)

### NCETM Small Steps

Pupils identify a whole and the parts that make it up

Pupils explain why a part can only be defined when in relation to a whole

Pupils identify the number of equal or unequal parts in a whole

Pupils identify equal parts when they do not look the same

Pupils explain the size of the part in relation to the whole

Pupils construct a whole when given a part and the number of parts

### Ready To Progress Criteria:

**3F-1** Interpret and write proper fractions to represent 1 or several parts of a whole that is divided into equal parts.

### National curriculum objectives:

- recognise and show, using diagrams, families of common equivalent fractions
- count up and down in hundredths; recognise that hundredths arise when dividing an object by 100 and dividing tenths by 10
- solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
- add and subtract fractions with the same denominator
- recognise and write decimal equivalents of any number of tenths or hundredths
- recognise and write decimal equivalents to  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$
- find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
- round decimals with 1 decimal place to the nearest whole number
- compare numbers with the same number of decimal places up to 2 decimal places
- solve simple measure and money problems involving fractions and decimals to 2 decimal places

### Sticky knowledge:

## Unit 9: Fractions Greater than 1 (5 weeks)

### NCETM Small Steps

Pupils explain how to express quantities made up of both whole numbers and a fractional part

Pupils explain how a quantity made up of whole numbers and a fractional part is composed

Pupils compose and decompose quantities made of whole numbers and fractional parts

Pupils accurately label a range of number lines and explain the meaning of each part

Pupils identify numbers on marked but unlabelled number lines

Pupils estimate the position of numbers on a number line using fraction sense

Pupils compare and order mixed numbers using fraction sense

Pupils compare and order mixed numbers when the whole number is the same

Pupils compare and order mixed numbers when the whole number and the numerator of the fractional part is the same

Pupils make efficient choices about the order they solve an addition problem in

Pupils make efficient choices about the order they solve a subtraction problem in

Pupils express a quantity as a mixed number and an improper fraction (quarters)

Pupils convert a quantity from an improper fraction to a mixed number (quarters)

Pupils express and convert a quantity from an improper fraction to a mixed number (fifths)

Pupils explain how an improper fraction is converted into a mixed number (any unit)

Pupils explain how a mixed number is converted into an improper fraction

Pupils add mixed numbers

Pupils subtract a proper fraction from a mixed number (converting to an improper fraction first)

Pupils subtract a mixed number from a mixed number and explain which strategy is most efficient

Pupils use knowledge of subtraction to choose correct and efficient approaches when subtracting mixed numbers

### Ready To Progress Criteria:

**4F-1** Reason about the location of mixed numbers in the linear number system.

**4F-2** Convert mixed numbers to improper fractions and vice versa

**4F-3** Add and subtract improper and mixed fractions with the same denominator, including bridging whole numbers.

### National curriculum objectives:

- recognise and show, using diagrams, families of common equivalent fractions
- count up and down in hundredths; recognise that hundredths arise when dividing an object by 100 and dividing tenths by 10
- solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
- add and subtract fractions with the same denominator
- recognise and write decimal equivalents of any number of tenths or hundreds
- recognise and write decimal equivalents to  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$
- find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
- round decimals with 1 decimal place to the nearest whole number
- compare numbers with the same number of decimal places up to 2 decimal places
- solve simple measure and money problems involving fractions and decimals to 2 decimal places

### Sticky knowledge:

**Unit 10: Symmetry in 2D Shapes (2 weeks)**

**NCETM Small Steps**

Pupils complete a symmetrical pattern

Pupils compose symmetrical shapes from two congruent shapes

Pupils investigate lines of symmetry in 2D shapes by folding paper shape cut-outs

Pupils find lines of symmetry in 2D shapes using a mirror

Pupils reflect polygons in a line of symmetry

Pupils reflect polygons that are dissected by a line of symmetry

**Ready To Progress Criteria:**

**4G-3** Identify line symmetry in 2D shapes presented in different orientations. Reflect shapes in a line of symmetry and complete a symmetric figure or pattern with respect to a specified line of symmetry.

**National curriculum objectives:**

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

**Sticky knowledge:**

**Unit 11: Time (1 week)**

**NCETM Small Steps**

None

**Ready To Progress Criteria:**

**National curriculum objectives:**

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

When planning this unit, build on current understanding of time on an analogue clock and a 12-hour digital clock, that children will have developed in Years 1-3 (see unit 11 in Years 1, 2 and 3).

**Sticky knowledge:**

**Unit 12: Division with Remainders (2 weeks)**

**NCETM Small Steps**

Pupils interpret a division story when there is a remainder and represent it with an equation (i)

Pupils interpret a division story when there is a remainder and represent it with an equation (ii)

Pupils interpret a division story when there is a remainder and represent it with an equation (iii)

Pupils explain how the remainder relates to the divisor in a division equation

Pupils explain when there will and will not be a remainder in a division equation

Pupils use knowledge of division equations and remainders to solve problems

Pupils interpret the answer to a division calculation to solve a problem (i)

Pupils interpret the answer to a division calculation to solve a problem (ii)

**Ready To Progress Criteria:**

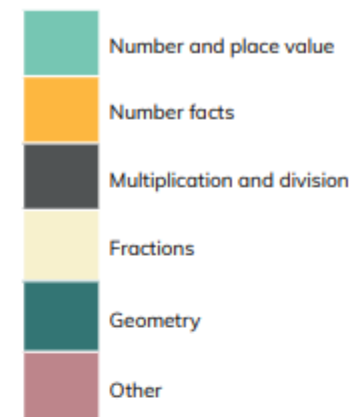
**4NF-2** Solve division problems, with two-digit dividends and one-digit divisors, that involve remainders, and interpret remainders appropriately according to the context.

**National curriculum objectives:**

- recall multiplication and division facts for multiplication tables up to  $12 \times 12$
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together 3 numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects

**Sticky knowledge:**

	Unit	Unit name
Autumn 1	1	Decimal fractions
	2	Money
	3	Negative numbers
Autumn 2	4	Short multiplication and short division
	5	Area and scaling
Spring 1	6	Calculating with decimal fractions
	7	Factors, multiples and primes
Spring 2	8	Fractions
	9	Converting units
Summer 1	10	Angles
Summer 2		



# Year 5

## Curriculum map

Year 5			
Unit	NCETM	Unit	Oak
1	<b>5 weeks</b> <b>Decimal fractions</b> RTP: <ul style="list-style-type: none"> <li>SNPV-1 Know that 10 tenths are equivalent to 1 one, and that 1 is 10 times the size of 0.1.</li> <li>Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01.</li> <li>Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10 times the size of 0.01.</li> <li>SNPV-2 Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and non-standard partitioning.</li> <li>SNPV-3 Reason about the location of any number with up to 2 decimals places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each.</li> <li>SNPV-4 Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts.</li> <li>SNF-2 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 1 tenth or 1 hundredth).</li> <li>1.23 Composition and calculation: tenths</li> <li>1.24 Composition and calculation: hundredths and thousandths</li> </ul>	1	1 week (5 lessons) Understand tenths as part of a whole, represent and calculate mentally
		2	1 week (5 lessons) Compose and calculate with decimals including column addition and subtraction
		3	1 week (5 lessons) Understand hundredths as parts of a whole and represent
		4	2 weeks (10 lessons) Use knowledge of decimals to solve problems in different contexts: length
2	<b>2 weeks</b> <b>Money</b> RTP: <ul style="list-style-type: none"> <li>1.25 Addition and subtraction: money</li> </ul>	5	2 weeks (10 lessons) Money: apply efficient strategies when calculating with money
3	<b>2 weeks</b> <b>Negative numbers</b> RTP: <ul style="list-style-type: none"> <li>1.27 Negative numbers: counting, comparing and calculating</li> </ul>	6	2 weeks (10 lessons) Negative numbers
4	<b>6 weeks</b> <b>Short multiplication and short division</b> RTP: <ul style="list-style-type: none"> <li>SMD-3 Multiply any whole number with up to 4 digits by any one-digit number using a formal written method.</li> <li>SMD-4 Divide a number with up to 4 digits by a one-digit number using a formal written method, and interpret remainders appropriately for the context.</li> <li>2.14 Multiplication: partitioning leading to short multiplication</li> <li>2.15 Division: partitioning leading to short division</li> </ul>	7	2 weeks (10 lessons) Multiplication by partitioning leading to short multiplication (2 by 1-digit)
		8	1 week (5 lessons) Multiplication by partitioning leading to short multiplication (3 by 1-digit)
		9	3 weeks (15 lessons) Division by partitioning leading to short division (2 and 3-digits by 1-digit)

5	<b>Area and scaling</b> RTP: <ul style="list-style-type: none"> <li>5G-2 Compare areas and calculate the area of rectangles (including squares) using standard units.</li> <li>2.16 Multiplicative contexts: area and perimeter 1</li> <li>2.17 Structures: using measures and comparison to understand scaling</li> </ul>	10	1 week (5 lessons) Understand the concept of area
		11	2 weeks (10 lessons) Link area of rectangles to multiplication
		12	2 weeks (10 lessons) Compare and describe measurements using knowledge of multiplication and division
6	<b>Calculating with decimal fractions</b> RTP: <ul style="list-style-type: none"> <li>SMD-1 Multiply and divide numbers by 10 and 100; understand this as equivalent to making a number 10 or 100 times the size, or 1 tenth or 1 hundredth times the size.</li> <li>2.19 Calculation: <math>\times/\div</math> decimal fractions by whole numbers</li> <li>2.29 Decimal place-value knowledge, multiplication and division</li> </ul>	13	3 weeks (15 lessons) Calculating with decimal fractions
		14	1 week (5 lessons) Understand the concept of volume
7	<b>Factors, multiples and primes</b> RTP: <ul style="list-style-type: none"> <li>SMD-2 Find factors and multiples of positive whole numbers, including common factors and common multiples, and express a given number as a product of 2 or 3 factors.</li> <li>2.20 Multiplication with three factors and volume</li> <li>2.21 Factors, multiples, prime numbers and composite numbers</li> </ul>	15	1 week (5 lessons) Multiply 3 or more numbers (commutative and associative laws)
		16	1 week (5 lessons) Understand and use the concept of factorisation (square and prime numbers)
		17	1 week (5 lessons) Use common factors and multiples to solve calculations efficiently
		18	1 week (5 lessons) Multiply a proper fraction by a whole number
8	<b>Fractions</b> RTP: <ul style="list-style-type: none"> <li>SNPV-5 Convert between units of measure, including using common decimals and fractions.</li> <li>SF-1 Find non-unit fractions of quantities.</li> <li>SF-2 Find equivalent fractions and understand that they have the same value and the same position in the linear number system.</li> <li>SF-3 Recall decimal fraction equivalents for <math>1/2</math>, <math>1/4</math>, <math>1/5</math> and <math>1/10</math>, and for multiples of these proper fractions.</li> <li>3.6 Multiplying whole numbers and fractions</li> <li>3.7 Finding equivalent fractions and simplifying fractions</li> <li>3.10 Linking fractions, decimals and percentages</li> </ul>	19	1 week (5 lessons) Multiply improper fractions and mixed numbers by a whole number
		20	2 weeks (10 lessons) Find unit and non-unit fractions of whole numbers exploring parts and wholes
		21	3 weeks (15 lessons) Comparing fractions using equivalence and decimals
		22	2 weeks (10 lessons) Converting units
9	<b>Converting units</b> RTP: <ul style="list-style-type: none"> <li>SNPV-5 Convert between units of measure, including using common decimals and fractions.</li> </ul>		
10	<b>Angles</b> RTP: <ul style="list-style-type: none"> <li>5G-1 Compare angles, estimate and measure angles in degrees (<math>^{\circ}</math>) and draw angles of a given size.</li> </ul>	23	3 weeks (15 lessons) Angles: compare, name, estimate and measure angles

## Unit 1: Decimal Fractions (5 weeks)

### NCETM Small Steps

Pupils identify tenths as part of a whole

Pupils describe and represent tenths as a decimal fraction

Pupils count in tenths in different ways

Pupils describe and write decimal numbers with tenths in different ways

Pupils compare and order decimal numbers with tenths

Pupils explain that decimal numbers with tenths can be composed additively

Pupils explain that decimal numbers with tenths can be composed multiplicatively

Pupils use their knowledge to calculate with decimal numbers within and across one whole

Pupils use their knowledge to calculate with decimal numbers using mental methods

Pupils use their knowledge to calculate with decimal numbers using column addition and subtraction

Pupils use representations to round a decimal number with tenths to the nearest whole number

Pupils identify hundredths as part of a whole

Pupils describe and represent hundredths as a decimal fraction

Pupils describe and write decimal numbers with hundredths in different ways

Pupils compare and order decimal numbers with hundredths

Pupils explain that decimal numbers with hundredths can be partitioned in different ways

Pupils use their knowledge of decimal place value to convert between and compare metres and centimetres

Pupils explain that different lengths can be composed additively and multiplicatively

Pupils use their knowledge of decimal place value to solve problems in different contexts

### Ready To Progress Criteria:

**5NPV-1** Know that 10 tenths are equivalent to 1 one, and that 1 is 10 times the size of 0.1. Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01. Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10 times the size of 0.01.

**5NPV-2** Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and nonstandard partitioning.

**5NPV-3** Reason about the location of any number with up to 2 decimal places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each.

**5NPV-4** Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts.

**5NF-2** Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 1 tenth or 1 hundredth).

### National curriculum objectives:

- read and write decimal numbers as fractions [for example,  $0.71 = \frac{71}{100}$ ]
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- round decimals with 2 decimal places to the nearest whole number and to 1 decimal place
- read, write, order and compare numbers with up to 3 decimal places
- solve problems involving number up to 3 decimal places
- recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per 100', and write percentages as a fraction with denominator 100, and as a decimal fraction
- solve problems which require knowing percentage and decimal equivalents of  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{3}{4}$ , and those fractions with a denominator of a multiple of 10 or 25

### Sticky knowledge:

Pupils use their knowledge to calculate with decimal numbers up to and bridging one tenth

Pupils use their knowledge to calculate with decimal numbers using column addition and subtraction

Pupils round a decimal number with hundredths to the nearest tenth

Pupils round a decimal number with hundredths to the nearest whole number

Pupils read and write numbers with up to 3 decimal places

Pupils compare and order numbers with up to 3 decimal places

**Unit 2: Money (2 weeks)**

**NCETM Small Steps**

Pupils explain and represent whole pounds as a quantity of money

Pupils explain and represent whole pounds and pence as a quantity of money

Pupils explain how to compare amounts of money

Pupils convert quantities of money between pounds and pence

Pupils use their knowledge of addition to efficiently add commonly used prices

Pupils use their knowledge of subtraction to calculate the change due when paying whole pounds or notes

Pupils use and explain the most efficient strategies when adding quantities of money

Pupils use and explain the most efficient strategies when subtracting quantities of money

Pupils find the change when purchasing several items

Pupils use the most efficient and reliable strategy to find the change when purchasing several items

**Ready To Progress Criteria:**

None

**National curriculum objectives:**

- use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling

**Sticky knowledge:**

**Unit 3: Negative Numbers (2 weeks)**

**NCETM Small Steps**

- Pupils represent a change story using addition and subtraction symbols
- Pupils interpret numbers greater than and less than zero in different contexts
- Pupils read and write negative numbers
- Pupils explain how the value of a number relates to its position from zero
- Pupils identify and place negative numbers on a number line
- Pupils interpret sets of negative and positive numbers in a range of contexts
- Pupils use their knowledge of positive and negative numbers to calculate intervals
- Pupils explain how negative numbers are used on a coordinate grid
- Pupils use their knowledge of positive and negative numbers to interpret graphs

**Ready To Progress Criteria:**

None

**National curriculum objectives:**

- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through 0
- solve number problems and practical problems that involve all of the above

**Sticky knowledge:**

#### Unit 4: Short Multiplication and Short Division (6 weeks)

##### NCETM Small Steps

Pupils multiply a two-digit number by a single-digit number using partitioning and representations (no regroupings)

Pupils multiply a two-digit number by a single-digit number using partitioning and representations (one regroup)

Pupils multiply a two-digit number by a single-digit number using partitioning and representations (two regroupings)

Pupils multiply a two-digit number by a single-digit number using partitioning

Pupils multiply a two-digit number by a single-digit number using expanded multiplication (no regroupings)

Pupils multiply a two-digit number by a single-digit number using short multiplication (no regroupings)

Pupils multiply a two-digit number by a single-digit number using expanded multiplication (regrouping ones to tens)

Pupils multiply a two-digit number by a single-digit number using short multiplication (regrouping ones to tens)

Pupils multiply a two-digit number by a single-digit number using expanded multiplication (regrouping tens to hundreds)

Pupils multiply a two-digit number by a single-digit number using short multiplication (regrouping tens to hundreds)

Pupils multiply a two-digit number by a single-digit number using both expanded and short multiplication (two regroupings)

Pupils use estimation to support accurate calculation

Pupils multiply a three-digit number by a single-digit number using partitioning and representations

Pupils multiply a three-digit number by a single-digit number using partitioning

Pupils multiply a three-digit number by a single-digit number using expanded and short multiplication (no regroupings)

##### Ready To Progress Criteria:

**5MD-3** Multiply any whole number with up to 4 digits by any one digit number using a formal written method.

**5MD-4** Divide a number with up to 4 digits by a one-digit number using a formal written method, and interpret remainders appropriately for the context.

##### National curriculum objectives:

- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- multiply and divide numbers mentally, drawing upon known facts
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000
- recognise and use square numbers and cube numbers, and the notation for squared ( $^2$ ) and cubed ( $^3$ )
- solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes
- solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates

##### Sticky knowledge:

Pupils multiply a three-digit number by a single-digit number using expanded and short multiplication (one regroup)

Pupils multiply a three-digit number by a single-digit number using expanded and short multiplication (multiple regroup)

Pupils use estimation to support accurate calculation

Pupils divide a two-digit number by a single-digit number using partitioning and representations (no remainders, no exchanging)

Pupils divide a two-digit number by a single-digit number using partitioning and representations (with exchanging)

Pupils divide a two-digit number by a single-digit number using partitioning and representations (with exchanging and remainders)

Pupils divide a two-digit number by a single-digit number using short division (no exchanging, no remainders)

Pupils divide a two-digit number by a single-digit number using short division (with exchanging)

Pupils divide a two-digit number by a single-digit number using short division (with exchanging and remainders)

Pupils divide a three-digit number by a single-digit number using partitioning and representations (no exchanging, no remainders)

Pupils divide a three-digit number by a single-digit number using partitioning and representations (one exchange, no remainders)

Pupils divide a three-digit number by a single-digit number using partitioning and representations (with exchanging and remainders)

Pupils divide a three-digit number by a single-digit number using short division

Pupils divide a three-digit number by a single-digit number using short division (with exchanging and remainders)

Pupils solve short division problems accurately when the hundreds digit is smaller than the divisor

Pupils will use efficient strategies of division to solve problems

## Unit 5: Area and Scaling (5 weeks)

### NCETM Small Steps

- Pupils explain what area is and can measure using counting as a strategy (1)
- Pupils explain what area is and can measure using counting as a strategy (2)
- Pupils explain how to make different shapes with the same area
- Pupils explain how to compare the area of different shapes
- Pupils measure the area of flat shapes area using square centimetres
- Pupils measure the area of flat shapes area using square metres
- Pupils calculate the area of a rectangle using multiplication
- Pupils calculate the area of rectilinear shapes
- Pupils use their knowledge of area to solve problems
- Pupils compare and describe lengths by using their knowledge of multiplication
- Pupils use their knowledge of multiplication to solve comparison and change problems
- Pupils compare and describe lengths by using their knowledge of division
- Pupils use their knowledge of division to solve comparison and change problems
- Pupils compare and describe measurements by using their knowledge of multiplication and division (mass/capacity/time) (1)
- Pupils compare and describe measurements by using their knowledge of multiplication and division (mass/capacity/time) (2)
- Pupils describe the changes in measurements using their knowledge of multiplication and division
- Pupils use their knowledge of multiplication and division to solve comparison and change problems

### Ready To Progress Criteria:

**5G-2** Compare areas and calculate the area of rectangles (including squares) using standard units.

### National curriculum objectives:

- convert between different units of metric measure [for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre]
- understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints
- measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres
- calculate and compare the area of rectangles (including squares), including using standard units, square centimetres ( $\text{cm}^2$ ) and square metres ( $\text{m}^2$ ), and estimate the area of irregular shapes
- estimate volume [for example, using  $1 \text{ cm}^3$  blocks to build cuboids (including cubes)] and capacity [for example, using water]
- solve problems involving converting between units of time
- use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling

### Sticky knowledge:

## Unit 6: Calculating with Decimal Fractions (3 weeks)

### NCETM Small Steps

Pupils explain the effect of multiplying and dividing a number by 10, 100 and 1,000 (1)

Pupils explain the effect of multiplying and dividing a number by 10, 100 and 1,000 (2)

Pupils explain how to multiply and divide a number by 10, 100 and 1,000 (first 'number' two or more non-zero digits)

Pupils use their knowledge of multiplication and division by 10/100/1,000 to convert between units of measure (length)

Pupils use their knowledge of multiplication and division by 10/100/1,000 to convert between units of measure (mass and capacity)

Pupils explain how to use known multiplication facts and unitising to multiply decimal fractions by whole numbers (tenths)

Pupils explain how to use known multiplication facts and unitising to multiply decimal fractions by whole numbers (hundredths)

Pupils use their knowledge of multiplying decimal fractions by whole numbers to solve measures problems

Pupils explain the relationship between multiplying by 0.1 dividing by 10

Pupils explain the relationship between multiplying by 0.01 dividing by 100

Pupils explain how to use multiplying by 10 or 100 to multiply one-digit numbers by decimal fractions (1)

Pupils explain how to use multiplying by 10 or 100 to multiply one-digit numbers by decimal fractions (2)

Pupils explain how to use the size of the multiplier to predict the size of the product compared to the multiplicand

Pupils explain how to use multiplying by 10 or 100 to divide decimal fractions by one-digit numbers (1)

Pupils explain how to use multiplying by 10 or 100 to divide decimal fractions by one-digit numbers (2)

### Ready To Progress Criteria:

**5MD-1** Multiply and divide numbers by 10 and 100; understand this as equivalent to making a number 10 or 100 times the size, or 1 tenth or 1 hundredth times the size.

### National curriculum objectives:

- read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000
- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through 0
- round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000
- solve number problems and practical problems that involve all of the above
- read Roman numerals to 1,000 (M) and recognise years written in Roman numerals

### Sticky knowledge:

## Unit 7: Factors, Multiples and Primes (4 weeks)

### NCETM Small Steps

Pupils explain what 'volume' is using a range of contexts

Pupils describe the units used to measure volume

Pupils explain how to calculate the volume of a cuboid

Pupils explain what a cube number is

Pupils use their knowledge of calculating volume to solve problems in a range of contexts

Pupils explain how to calculate the volume of compound shapes

Pupils explain the use of the commutative and distributive laws when multiplying three or more numbers

Pupils explain the reasons for changing two-factor multiplication calculations to three-factor multiplications

Pupils explain what a factor is and how to use arrays and multiplication/division facts to find them

Pupils explain how to systematically find all factors of a number and how they know when they have found them all

Pupils use a complete list of factors to explain when a number is a square number

Pupils explain how to identify a prime number or a composite number

Pupils explain how to identify a common factor or a prime factor of a number

Pupils explain how to identify a multiple or common multiple of a number

Pupils use knowledge of properties of number to solve problems in a range of contexts

Pupils explain how to use the factor pairs of '100' to solve calculations efficiently

### Ready To Progress Criteria:

**5MD-2** Find factors and multiples of positive whole numbers, including common factors and common multiples, and express a given number as a product of 2 or 3 factors.

### National curriculum objectives:

- identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers
- know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19

### Sticky knowledge:

## Unit 8: Fractions (7 weeks)

### NCETM Small Steps

Pupils explain the relationship between repeated addition of a proper fraction and multiplication of fractions (unit fractions)

Pupils explain the relationship between repeated addition of a proper fraction and multiplication of fractions (non-unit fractions)

Pupils multiply a proper fraction by a whole number (within a whole)

Pupils multiply a proper fraction by a whole number (greater than a whole)

Pupils multiply an improper fraction by a whole number

Pupils multiply a mixed number by a whole number (product is within a whole)

Pupils multiply a mixed number by a whole number (product is greater than a whole)

Pupils find a unit fraction of a quantity

Pupils explain the relationship between finding a fraction of a quantity and multiplying a whole number by a unit fraction

Pupils explain the relationship between dividing by a whole number and multiplying a whole number by a unit fraction

Pupils use their knowledge of multiplying a whole number by a unit fraction to solve problems

Pupils find a non-unit fraction of a quantity (mental calculation)

Pupils find a non-unit fraction of a quantity (written calculation)

Pupils multiply a whole number by a proper fraction

Pupils explain when a calculation represents scaling down and when it represents repeated addition

Pupils find the whole when the size of a unit fraction is known

Pupils find a unit fraction when the size of a non-unit fraction is known

### Ready To Progress Criteria:

**5NPV-5** Convert between units of measure, including using common decimals and fractions

**5F-1** Find non-unit fractions of quantities

**5F-2** Find equivalent fractions and understand that they have the same value and the same position in the linear number system.

**5F-3** Recall decimal fraction equivalents for  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$  and  $\frac{1}{10}$  and for multiples of these proper fractions.

### National curriculum objectives:

- compare and order fractions whose denominators are all multiples of the same number
- identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements  $> 1$  as a mixed number [for example,  $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1 \frac{1}{5}$ ]
- add and subtract fractions with the same denominator, and denominators that are multiples of the same number
- multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
- read and write decimal numbers as fractions [for example,  $0.71 = \frac{71}{100}$ ]
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- round decimals with 2 decimal places to the nearest whole number and to 1 decimal place
- read, write, order and compare numbers with up to 3 decimal places
- solve problems involving number up to 3 decimal places
- recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per 100', and write percentages as a fraction with denominator 100, and as a decimal fraction
- solve problems which require knowing percentage and decimal equivalents of  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$ ,  $\frac{2}{5}$ ,  $\frac{4}{5}$  and those fractions with a denominator of a multiple of 10 or 25

### Sticky knowledge:

Pupils find the whole when the size of a non-unit fraction is known

Pupils find the unit fraction when the size of a non-unit fraction is known

Pupils use representations to describe and compare two fractions ( $\frac{1}{4}$  and  $\frac{3}{12}$ )

Pupils use representations to describe and compare two fractions ( $\frac{1}{5}$  and  $\frac{5}{10}$ )

Pupils use representations to describe and compare two fractions (pouring context)

Pupils correctly use the language of equivalent fractions

Pupils explain the vertical relationship between numerators and denominators within equivalent fractions ( $\frac{1}{5}$ ,  $\frac{1}{3}$  and equivalent)

Pupils use their knowledge of the vertical relationship to solve equivalent fractions problems

Pupils explain the horizontal relationship between numerators and denominators across equivalent fractions ( $\frac{1}{5}$ ,  $\frac{1}{3}$  and equivalent)

Pupils explain the relationship within families of equivalent fractions

Pupils use their knowledge of equivalent fractions to solve problems

Pupils explain and represent how to divide 1 into different amounts of equal parts

Pupils identify and describe patterns within the number system

Pupils use their knowledge of common equivalents to compare fractions with decimals

Pupils practise recalling common fraction-decimal equivalents

Pupils use their knowledge of common fraction-decimal equivalents to solve conversion problems in a range of contexts

Pupils use their knowledge of common equivalents to compare fractions with decimals beyond one

Pupils use their knowledge of simplifying calculations by substitution to solve problems in a range of contexts

**Unit 9: Converting Units (2 weeks)**

**NCETM Small Steps**

Pupils apply memorised unit conversions to convert between units of measure (larger to smaller units - whole number conversions)

Pupils apply memorised unit conversions to convert between units of measure (smaller to larger units - whole number conversions)

Pupils convert from and to fraction and decimal fraction quantities of larger units

Pupils derive common conversions over 1

Pupils carry out conversions that correspond to 100 parts

Pupils solve measures problems involving different units

Pupils understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints

Pupils convert between miles and kilometres

Pupils solve problems involving converting between units of time

**Ready To Progress Criteria:**

**5NPV-5** Convert between units of measure, including using common decimals and fractions.

**National curriculum objectives:**

- Convert between different units of metric measures
- Recognise the percent symbol and understand that percent related to number of parts per hundred and write percentages as a fraction with denominator 100 and as a decimal.
- Solve problems which require knowing percentage and decimal equivalents of  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$ ,  $\frac{2}{5}$ ,  $\frac{4}{5}$  and those fractions with a denominator of a multiple of 10 or 25.

**Sticky knowledge:**

**Unit 10: Angles (3 weeks)**

**NCETM Small Steps**

Pupils compare the size of angles where there is a clear visual difference

Pupils use the terms acute, obtuse and reflex when describing the size of angles or amount of rotation with relation to right angles

Pupils use a unit called degrees ( $^{\circ}$ ) as a standard unit to measure angles

Pupils estimate the size of angles in degrees using angle sets

Pupils measure the size of angles accurately using a protractor

**Ready To Progress Criteria:**

**5G-1** Compare angles, estimate and measure angles in degrees and draw angles of a given size.

**National curriculum objectives:**

Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles.

Draw given angles, and measure them in degrees.

Identify:

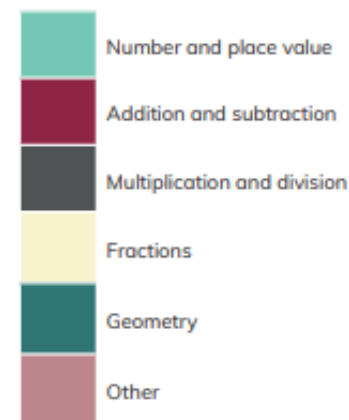
- Angles at a point and one whole turn (360 degrees)
- Angles at a point on a straight line and  $\frac{1}{2}$  a turn (180 degrees)
- Other multiples of 90 degrees.

Use the properties of rectangles to deduce related facts and find missing lengths and angles.

- Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.

**Sticky knowledge:**

	Unit	Unit name
Autumn 1	1	Calculating using knowledge of structures (1)
	2	Multiples of 1,000
Autumn 2	3	Numbers up to 10,000,000
	4	Draw, compose and decompose shapes
Spring 1	5	Multiplication and division
	6	Area, perimeter, position and direction
Spring 2	7	Fractions and percentages
	8	Statistics
Summer 1		KS2 tests
Summer 2	9	Ratio and proportion
	10	Calculating using knowledge of structures (2)
	11	Solving problems with two unknowns
	12	Order of operations
	13	Mean average



# Year 6

## Curriculum map

Year 6			
Unit	NCETM	Unit	Oak
1	<b>6 weeks</b> <b>Calculating using knowledge of structures (1)</b> RTP: <ul style="list-style-type: none"> <li>6AS/MD-1 Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number).</li> <li>6AS/MD-2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.</li> <li>1.28 Common structures and the part-part-whole relationship</li> <li>1.29 Using equivalence and the compensation property to calculate</li> </ul>	1	2 weeks (10 lessons) Use knowledge of part-part-whole structure to solve additive problems
		2	2 weeks (10 lessons) Use equivalence and compensation to simplify and solve addition calculations
		3	2 weeks (10 lessons) Use equivalence and compensation to simplify and solve subtraction problems
2	<b>2 weeks</b> <b>Multiples of 1,000</b> RTP: <ul style="list-style-type: none"> <li>1.26 Composition and calculation: multiples of 1,000 up to 1,000,000</li> </ul>	4	2 weeks (10 lessons) Multiples of 1,000
3	<b>4 weeks</b> <b>Numbers up to 10,000,000</b> RTP: <ul style="list-style-type: none"> <li>6NPV-1 Understand the relationship between powers of 10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000).</li> <li>6NPV-2 Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and non-standard partitioning.</li> <li>6NPV-3 Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system, and round numbers, as appropriate, including in contexts.</li> <li>6NPV-4 Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts.</li> <li>1.30 Composition and calculation: numbers up to 10,000,000</li> </ul>	5	1 week (5 lessons) Understand place value within numbers with up to 7 digits
		6	2 weeks (10 lessons) Order, compare and calculate with numbers up to 8 digits
		7	1 week (5 lessons) Rounding and solving problems with numbers up to 7 digits
4	<b>2 weeks</b> <b>Draw, compose and decompose shapes</b> RTP: <ul style="list-style-type: none"> <li>6G-1 Draw, compose, and decompose shapes according to given properties, including dimensions, angles and area, and solve related problems. (Including circles)</li> </ul>	8	2 weeks (10 lessons) Draw, compose and decompose shapes
5	<b>4 weeks</b> <b>Multiplication and division</b> RTP: <ul style="list-style-type: none"> <li>6AS/MD-2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.</li> <li>2.18 Using equivalence to calculate</li> <li>2.23 Multiplication strategies for larger numbers and long multiplication</li> <li>2.24 Division: dividing by two-digit divisors</li> <li>2.25 Using compensation to calculate</li> </ul>	9	1 week (5 lessons) Using equivalence to calculate
		10	3 weeks (15 lessons) **Multiplying and dividing by 2-digit numbers**

6	<b>2 weeks</b> <b>Area, perimeter, position and direction</b> RTP: <ul style="list-style-type: none"> <li>2.30 Multiplicative contexts: area and perimeter 2</li> </ul>	11	2 weeks (10 lessons) **Area, perimeter, position and direction**
7	<b>6 weeks</b> <b>Fractions and percentages</b> RTP: <ul style="list-style-type: none"> <li>6F-1 Recognise when fractions can be simplified, and use common factors to simplify fractions.</li> <li>6F-2 Express fractions in a common denominator and use this to compare fractions that are similar in value.</li> <li>6F-3 Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denominator as a comparison strategy.</li> <li>3.8 Common denominator: more adding and subtracting</li> <li>3.9 Multiplying fractions and dividing fractions by a whole number</li> <li>3.10 Linking fractions, decimals and percentages</li> </ul>	12	2 weeks (10 lessons) **Addition and subtraction of fractions**
		13	1 week (5 lessons) **Comparing fractions**
		14	1 week (5 lessons) **Multiplication and division of fractions**
8	<b>1 week</b> <b>Statistics</b> RTP: <ul style="list-style-type: none"> <li>This topic is part of the National Curriculum but is not included in the DfE 2020 guidance or the NCETM Mastery PD Materials.</li> </ul>	15	2 weeks (10 lessons) **Understanding percentages**
		16	1 week (5 lessons) **Statistics**
9	<b>2 weeks</b> <b>Ratio and proportion</b> RTP: <ul style="list-style-type: none"> <li>6AS/MD-3 Solve problems involving ratio relationships.</li> <li>2.27 Scale factors, ratio and proportional reasoning</li> </ul>	17	2 weeks (10 lessons) Ratio and proportion
10	<b>1 week</b> <b>Calculating using knowledge of structures (2)</b> RTP: <ul style="list-style-type: none"> <li>6AS/MD-2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.</li> <li>1.29 Using equivalence and the compensation property to calculate</li> </ul>	18	1 week (5 lessons) **Calculating using knowledge of equivalence in addition and subtraction**
11	<b>2 weeks</b> <b>Solving problems with two unknowns</b> RTP: <ul style="list-style-type: none"> <li>6AS/MD-4 Solve problems with 2 unknowns.</li> <li>1.31 Problems with two unknowns</li> </ul> NB: Taught ongoing throughout year through FF	19	2 weeks (10 lessons) **Solving problems with two unknowns**
12	<b>1 week</b> <b>Order of operations</b> RTP: <ul style="list-style-type: none"> <li>2.22 Combining multiplication with addition and subtraction</li> <li>2.28 Combining division with addition and subtraction</li> <li>NB: Taught ongoing throughout year through FF</li> </ul>	20	1 week (5 lessons) **Order of operations**
13	<b>1 week</b> <b>Mean average</b> RTP: <ul style="list-style-type: none"> <li>2.26 Mean average and equal shares</li> </ul> NB: Taught ongoing throughout year through FF	21	1 week (5 lessons) **Mean average**

## Unit 1: Calculating Using Knowledge of Structures (6 weeks)

### NCETM Small Steps

Pupils explain how a combination of different parts can be equivalent to the same whole and can represent this in an expression

Pupils identify structures within stories and use their knowledge of structures to create stories

Pupils identify the missing part using their knowledge of part whole relationships and structures

Pupils interpret and represent a part-whole problem with 3 addends using a model

Pupils create stories to correctly match a structure presented in a model

Pupils use their knowledge of additive structures to solve problems

Pupils calculate the value of a missing part (1)

Pupils calculate the value of a missing part (2)

Pupils correctly represent an equation in a part-whole model

Pupils explain how adjusting both addends affects the sum (2 digit numbers)

Pupils explain how adjusting both addends affects the sum (decimal fractions)

Pupils use the 'same sum' rule to balance equations

Pupils use the 'same sum' rule to balance equations with an unknown

Pupils explain how adjusting one addend affects the sum

Pupils solve addition calculations mentally by using known facts

Pupils solve calculations with missing addends

Pupils explain how adjusting both the minuend and subtrahend by the same amount affects the difference

Pupils explain how using the 'same difference' rule can make mental calculation easier (1)

Pupils explain how using the 'same difference' rule can make written calculation easier (2)

### Ready To Progress Criteria:

**6AS/MD-1** Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number).

**6AS/MD-2** Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.

### National curriculum objectives:

- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the 4 operations
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- solve problems involving addition, subtraction, multiplication and division
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

### Sticky knowledge:

Pupils use the 'same difference' rule to balance equations

Pupils explain how increasing or decreasing the minuend affects the difference (1)

Pupils explain how increasing or decreasing the minuend affects the difference (2)

Pupils solve subtraction calculations mentally by using known facts

Pupils explain how adjusting the minuend can make mental calculation easier

Pupils explain how adjusting the subtrahend affects the difference

Pupils explain how increasing or decreasing the subtrahend affects the difference

Pupils calculate the difference using their knowledge of an adjusted subtrahend (1)

Pupils calculate the difference using their knowledge of an adjusted subtrahend (2)

**Unit 2: Multiples of 1,000 (2 weeks)**

**NCETM Small Steps**

Pupils explain how ten thousand can be composed

Pupils explain how one hundred thousand can be composed

Pupils read and write numbers up to one million (1)

Pupils read and write numbers up to one million (2)

Pupils identify and place the position of five-digit multiple of one thousand numbers, on a marked, but unlabelled number line

Pupils identify and place the position of six-digit multiple of one thousand numbers, on a marked, but unlabelled number line

Pupils count forwards and backwards in steps of powers of 10, from any multiple of 1,000

Pupils explain that 10,000 is composed of 5,000s 2,500s and 2,000s

Pupils explain that 100,000 is composed of 50,000s 25,000s and 20,000s

Pupils read scales in graphing and measures contexts, by using their knowledge of the composition of 10,000 and 100,000

**Ready To Progress Criteria:**

**6NPV-1** Understand the relationship between powers of 10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000).

**6NPV-2** Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and non-standard partitioning.

**6NPV-3** Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system, and round numbers, as appropriate, including in contexts.

**6NPV-4** Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts.

**National curriculum objectives:**

- read, write, order and compare numbers up to 10,000,000 and determine the value of each digit
- round any whole number to a required degree of accuracy
- use negative numbers in context, and calculate intervals across 0
- solve number and practical problems that involve all of the above

**Sticky knowledge:**

### Unit 3: Numbers up to 10,000,000 (4 weeks)

#### NCETM Small Steps

Pupils use representations to identify and explain patterns in powers of 10

Pupils compose seven or eight-digit numbers using common intervals

Pupils use their knowledge of the composition of up to eight-digit numbers to solve problems

Pupils explain how to read numbers with up to seven digits efficiently

Pupils recognise and create numbers that contain place-holding zeroes

Pupils determine the value of digits in numbers up to tens of millions

Pupils explain how to compare up to eight-digit numbers

Pupils use their knowledge of the composition of seven-digit numbers to solve problems

Pupils add and subtract mentally without bridging a boundary (only one and more than one digit changes)

Pupils add numbers whilst crossing the millions boundary

Pupils subtract numbers whilst crossing the millions boundary (multiples of 100,000 and different powers of 10)

Pupils explain how a seven-digit number can be composed and decomposed into parts

Pupils identify and explain a pattern in a counting sequence

Pupils identify numbers with up to seven digits on marked number lines

Pupils estimate the value and position of numbers on unmarked or partially marked number lines

Pupils explain why we round and how to round seven-digit numbers to the nearest million

Pupils explain how to round seven-digit numbers to the nearest hundred thousand

Pupils explain how to round up to seven-digit numbers to any power of 10 in context

Pupils identify and explain the most efficient way to solve a calculation

#### Ready To Progress Criteria:

**6NPV-1** Understand the relationship between powers of 10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000).

**6NPV-2** Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and non-standard partitioning.

**6NPV-3** Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system, and round numbers, as appropriate, including in contexts.

**6NPV-4** Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts.

#### National curriculum objectives:

- read, write, order and compare numbers up to 10,000,000 and determine the value of each digit
- round any whole number to a required degree of accuracy
- use negative numbers in context, and calculate intervals across 0
- solve number and practical problems that involve all of the above

#### Sticky knowledge:

Pupils add and subtract numbers with up to seven digits using column addition and subtraction

Pupils explore and explain different written and mental strategies to solving addition and subtraction problems

Pupils solve addition and subtraction problems and explain whether a mental or written strategy would be most efficient

#### Unit 4: Draw, Compose and Decompose Shapes (2 weeks)

##### NCETM Small Steps

Use knowledge of shape properties to draw, sketch and identify shapes

The same 3D shape can be composed from different 2D nets

When a 2D shape is decomposed and the parts rearranged, the area remains the same. The area of a compound shape is therefore equal to the total of the areas of the constituent parts

Any parallelogram can be decomposed and the parts rearranged to form a rectangular parallelogram

Two congruent triangles can be composed to form a parallelogram

Shapes with the same area can have different perimeters. Shapes with the same perimeters can have different areas

We can use the relationship between area and side length, and perimeter and side length, to reason about measurements of shapes, including compound shapes

##### Ready To Progress Criteria:

**6G–1** Draw, compose, and decompose shapes according to given properties, including dimensions, angles and area, and solve related problems.

##### National curriculum objectives:

- draw 2-D shapes using given dimensions and angles
- recognise, describe and build simple 3-D shapes, including making nets
- compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
- illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
- recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles

##### Sticky knowledge:

## Unit 5: Multiplication and Division (4 weeks)

### NCETM Small Steps

Pupils explain why the product stays the same when one factor is doubled and the other is halved

Pupils explain the effect on the product when scaling the factors by the same amount

Pupils use their knowledge of equivalence when scaling factors to solve problems

Pupils explain the effect on the quotient when scaling the dividend and divisor by 10

Pupils explain the effect on the quotient when scaling the dividend and divisor by the same amount

Pupils explain how to multiply a three-digit by a two-digit number

Pupils explain how to accurately use the method of long multiplication to multiply two, two-digit numbers (no regrouping of ones to tens)

Pupils explain how to accurately use the method of long multiplication (with regrouping of ones to tens)

Pupils explain how to accurately use the method of long multiplication (with regrouping of ones to tens & tens to hundreds)

Pupils explain how to accurately use the method of long multiplication to multiply a three-digit by a two-digit number

Pupils explain how to accurately use the method of long multiplication to multiply a four-digit by a two-digit number

Pupils explain how to use the associative law to multiply efficiently

Pupils explain when it is more efficient to use long multiplication or factorising to multiply by two-digit numbers

Pupils explain how to use accurately the methods of short and long division (two and three-digit number by multiples of 10)

Pupils explain how to use accurately the method of long division with and without remainders (two-digit by two-digit numbers)

### Ready To Progress Criteria:

**6AS/MD-2** Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.

### National curriculum objectives:

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- use their knowledge of the order of operations to carry out calculations involving the 4 operations
- solve problems involving addition, subtraction, multiplication and division

### Sticky knowledge:

Pupils use knowledge of long division to solve problems in a range of contexts (with and without remainders)

Pupils explain how to use a ratio chart to solve efficiently: short division

Pupils explain how to use a ratio chart to solve efficiently: long division

Pupils explain how to use a ratio chart to solve efficiently: long division (II)

Pupils explain how to use accurately the method of long division with and without remainders (three-digit by two-digit, four-digit by two-digit numbers)

Pupils use long division with decimal remainders (1 decimal place)

Pupils use long division with fraction remainders

Pupils use long division with decimal remainders (2 decimal places)

Pupils use knowledge of the best way to interpret and represent remainders from a range of division contexts

Pupils explain how and why a product changes when a factor changes multiplicatively

Pupils use their knowledge of multiplicative change to solve problems efficiently (multiplication)

Pupils explain how and why a quotient changes when a dividend changes multiplicatively (increase or decrease)

Pupils explain how and why a quotient changes when a divisor changes multiplicatively

Pupils identify and explain the relationship between divisors and quotients

**Unit 6: Area, Perimeter, Position & Direction (2 weeks)**

**NCETM Small Steps**

Pupils explain how to calculate the area of a parallelogram

Pupils explain how to calculate the area of a triangle

Pupils explain why shapes can have the same perimeters but different areas

Pupils explain why shapes can have the same areas but different perimeters

Pupils describe the relationship between scale factors and side lengths of two shapes

Pupils describe the relationship between scale factors and perimeters of two shapes

Pupils describe positions on the full coordinate grid (all four quadrants)

Pupils draw and translate simple shapes on the coordinate plane and reflect them in the axes

**Ready To Progress Criteria:**

**6G–1** Draw, compose, and decompose shapes according to given properties, including dimensions, angles and area, and solve related problems.

**National curriculum objectives:**

- recognise that shapes with the same areas can have different perimeters and vice versa
- recognise when it is possible to use formulae for area and volume of shapes
- calculate the area of parallelograms and triangles

**Sticky knowledge:**

**Unit 7: Fractions and Percentages (6 weeks)**

**NCETM Small Steps**

Pupils explain how to write a fraction in its simplest form

Pupils reason and apply their knowledge of how to write a fraction in its simplest form

Pupils use their knowledge of how to write a fraction in its simplest form when solving addition and subtraction problems (1)

Pupils use their knowledge of how to write a fraction in its simplest form when solving addition and subtraction problems (2)

Pupils use their knowledge of how to write a fraction in its simplest form when solving multiplication problems

Pupils explain, using an image, how to add related fractions (unit fractions)

Pupils explain what is meant by 'related fractions'

Pupils explain, without using an image, how to add related fractions

Pupils use their knowledge of adding related fractions to solve problems in a range of contexts

Pupils explain, with and without using an image, how to subtract related fractions (unit fractions)

Pupils use their knowledge of adding and subtracting related fractions to solve problems in a range of contexts

Pupils explain, with and without using an image, how to add and subtract related fractions (non-unit fractions)

Pupils explain, with and without using an image, how to add and subtract related fractions (non-unit fractions that bridge the whole)

Pupils use their fraction sense to fraction addition, subtraction and comparison

Pupils explain how to add or subtract non-related fractions with different denominators

Pupils use their knowledge of adding or subtracting non-related fractions with different denominators to solve problems in a range of contexts (non related fractions)

**Ready To Progress Criteria:**

**6F-1** Recognise when fractions can be simplified, and use common factors to simplify fractions.

**6F-2** Express fractions in a common denominator and use this to compare fractions that are similar in value.

**6F-3** Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denominator as a comparison strategy.

**National curriculum objectives:**

- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- compare and order fractions, including fractions  $>1$
- add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- multiply simple pairs of proper fractions, writing the answer in its simplest form [for example,  $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$ ]
- divide proper fractions by whole numbers [for example,  $\frac{1}{2} \div 2 = \frac{1}{4}$ ]
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example,  $\frac{3}{8}$ ]
- identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places
- multiply one-digit numbers with up to 2 decimal places by whole numbers
- use written division methods in cases where the answer has up to 2 decimal places
- solve problems which require answers to be rounded to specified degrees of accuracy
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts

**Sticky knowledge:**

Pupils explain how to compare pairs of non-related fractions (converting to common denominators)

Pupils explain how to compare pairs of non-related fractions (using fraction sense)

Pupils explain how to compare pairs of non-related fractions (using common numerators)

Pupils explain which method for comparing non-related fractions is most efficient

Pupils explain how to multiply two unit fractions

Pupils explain how to multiply two non-unit fractions

Pupils explain how to divide a unit fraction by a whole number

Pupils explain how to divide a non-unit fraction by a whole number

Pupils explain when and how to divide efficiently a fraction by a whole number

Pupils explain what percent means

Pupils explain how to represent a percentage in different ways

Pupils explain how to convert percentages to decimals and fractions (with a denominator of 100)

Pupils explain how to convert a percentage to a fraction (without denominator of 100)

Pupils use their knowledge of fraction-decimal-percentage conversions to solve conversion problems in a range of contexts

Pupils use their knowledge of calculating 50%, 10% and 1% of a number to solve problems in a range of contexts

Pupils use their knowledge of calculating common percentages of a number to solve problems in a range of contexts

Pupils use their knowledge of calculating any percentage of a number to solve problems in a range of contexts

Pupils explain how to solve problems where the percentage part and the size of the part is known and the whole is unknown

Pupils explain how to solve problems where the known percentage part and the size of the part changes the whole

**Unit 8: Revision (including Statistics)**

**NCETM Small Steps**

No small steps for this unit.

**Ready To Progress Criteria:**

No RTPs for this unit

**National curriculum objectives:**

- interpret and construct pie charts and line graphs and use these to solve problems
- calculate and interpret the mean as an average.

**Sticky knowledge:**

As appropriate based on FDP

## Unit 9: Ratio and Proportion (2 weeks)

### NCETM Small Steps

Pupils describe the relationship between two factors (in a ratio context)

Pupils explain how to use multiplication and division to calculate unknown values (two variables)

Pupils explain how to use multiplication and division to calculate unknown values (three variables)

Pupils explain how to use a ratio grid to calculate unknown values

Pupils explain how to use multiplication to solve correspondence problems

Pupils explain how and why scaling is used to make and interpret maps

Pupils will use their knowledge of multiplication and division to solve scaling problems in a range of contexts

Pupils identify and describe the relationship between two shapes using scale factors (squares)

Pupils identify and describe the relationship between two shapes using scale factors and ratios (regular polygons)

Pupils identify and describe the relationship between two shapes using scale factors and ratios (irregular polygons)

### Ready To Progress Criteria:

**6AS/MD-3** Solve problems involving ratio relationships.

### National curriculum objectives:

- solve problems involving the relative sizes of 2 quantities where missing values can be found by using integer multiplication and division facts
- solve problems involving the calculation of percentages [for example, of measures and such as 15% of 360] and the use of percentages for comparison
- solve problems involving similar shapes where the scale factor is known or can be found
- solve problems involving unequal sharing and grouping using knowledge of fractions and multiples

### Sticky knowledge:

**Unit 10: Calculating Using Knowledge of Structures 2 (1 week)**

**NCETM Small Steps**

Pupils explain how to balance equations with addition expressions

Pupils explain how to balance equations with subtraction expressions

Pupils explain how to balance equations with addition or subtraction expressions

Pupils explain how to balance equations with addition and subtraction expressions

Pupils use their knowledge of balancing equations to solve problems

**Ready To Progress Criteria:**

**6AS/MD-1** Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number).

**6AS/MD-2** Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.

**National curriculum objectives:**

- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the 4 operations
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- solve problems involving addition, subtraction, multiplication and division
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

**Sticky knowledge:**

**Unit 11: Solving Problems with Two Unknowns (2 weeks)**

**NCETM Small Steps**

- Pupils compare the structure of problems with one or two unknowns
- Pupils compare the structure of problems with two unknowns
- Pupils represent the structure of contextual problems with two unknowns
- Pupils represent a problem with two unknowns using a bar model
- Pupils explain why sometimes there is only one solution to a sum and difference problem
- Pupils explain why sometimes there is only one solution to a sum and multiple problem
- Pupils explain the values a part-whole model could represent
- Pupils use a bar model to visualise how to solve a problem with two unknowns
- Pupils use diagrams to explain how to solve a spatial problem
- Pupils explain how to represent an equation with a bar model
- Pupils solve problems with two unknowns in a range of contexts
- Pupils systematically solve problems with two unknowns using 'trial and improvement' (one and several solutions)
- Pupils explain how I know I have found all possible solutions to problems with two unknowns
- Pupils explain how to balance an equation with two unknowns
- Pupils systematically solve problems with two unknowns using 'trial and improvement' (one, several and infinite solutions)

**Ready To Progress Criteria:**

**6AS/MD-4** Solve problems with 2 unknowns.

**National curriculum objectives:**

- use simple formulae
- generate and describe linear number sequences
- express missing number problems algebraically
- find pairs of numbers that satisfy an equation with 2 unknowns
- enumerate possibilities of combinations of 2 variables

**Sticky knowledge:**

**Unit 12: Order of Operations (1 week)**

**NCETM Small Steps**

Pupils explain how addition and subtraction can help to solve multiplication problems efficiently (I)

Pupils explain how addition and subtraction can help to solve multiplication problems efficiently (II)

Pupils explain how the distributive law applies to multiplication expressions with a common factor (addition)

Pupils use their knowledge of the distributive law to solve equations including multiplication, addition and subtraction

Pupils explain how addition and subtraction can help to solve division problems efficiently

Pupils explain how the distributive law applies to division expressions with a common divisor (addition)

Pupils explain how the distributive law applies to division expressions with a common divisor (subtraction)

Pupils use their knowledge of the distributive law to solve equations including division, addition and subtraction

**Ready To Progress Criteria:**

No RTPs for this unit

**National curriculum objectives:**

- use their knowledge of the order of operations to carry out calculations involving the 4 operations

**Sticky knowledge:**

**Unit 13: Mean Average (1 week)**

**NCETM Small Steps**

Pupils explain the relationship between the mean and sharing equally

Pupils explain how to calculate the mean of a set of data

Pupils explain how the mean changes when the total quantity or number of values changes

Pupils explain how to calculate the mean when one of the values in the data set is zero or missing

Pupils explain how to use the mean to make comparisons between two sets of information

Pupils explain when the mean is not an appropriate representation of a set of data

**Ready To Progress Criteria:**

No RTPs for this unit

**National curriculum objectives:**

- calculate and interpret the mean as an average

**Sticky knowledge:**