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**Dr Frost  
LEARNING**

# STRIDE INTO *THE FUTURE* OF ASSESSMENT

Teacher Companion Guide

**Numbers**



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## Overview

Stride is a new offering from AQA which is designed to empower students and quickly identify and close their knowledge gaps in mathematics. Designed to help students starting their GCSEs – either for the first time or as a resit – the tests are accessible for all and adapt to students' knowledge, delivering the right amount of challenge.

Our new maths tests will allow teachers to pinpoint gaps in their students' conceptual knowledge - saving them time and empowering students, who will understand how to improve. They're fully funded for schools and colleges, easy to use for teachers and engaging for students.

The five short tests, created with the [Key Stage 1 and 2](#) and [Key Stage 3](#) guidance in mind, focus on key areas of maths that experts have identified as the most impactful for GCSE success. They come with personalised learning and next steps to allow students to develop in both knowledge and confidence.

### Rationale

We know that maths is a hierarchical subject, with knowledge being built upon foundational maths which underpins the new concept. We have analysed data from hundreds of thousands of exam questions and found that even though content is first encountered in the early stages of a learner's schooling, a significant proportion of learners answer questions on the foundations of maths incorrectly.

With this in mind, we want to empower teachers to take control of their classrooms and provide a nurturing environment in which gaps within key prerequisite understanding are identified and corrective instruction is deployed, filling the gaps and ensuring that more complex content can be taught, safe in the knowledge that learners have the underlying knowledge required to be successful in their lessons, and thrive in the GCSE examinations.

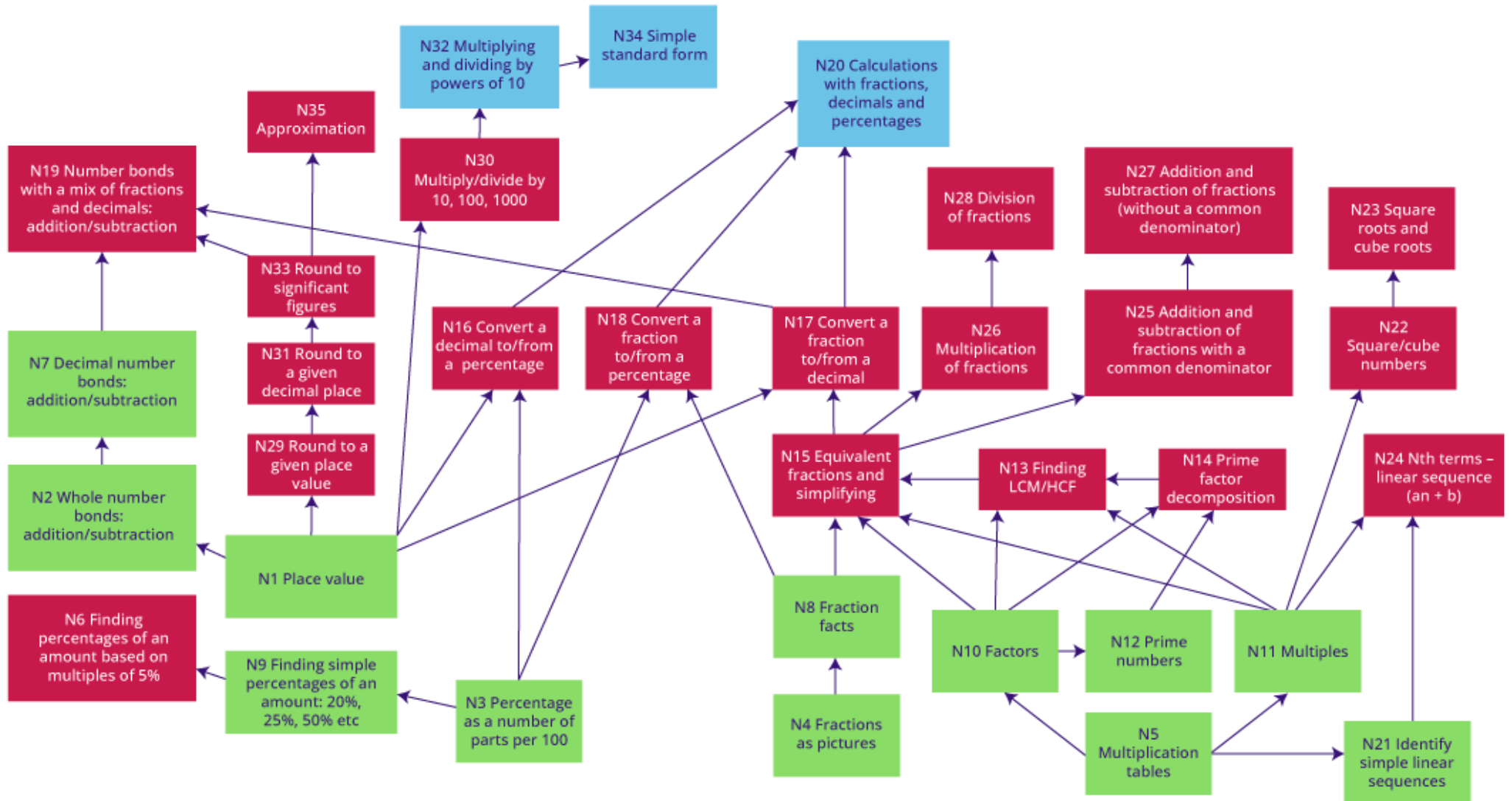
### Key features

The Concept Map on the following page shows that N1 Place Value is a key prerequisite in developing expertise and knowledge within Numbers, fundamental to success with rounding and estimation, equivalence between fractions, decimals and percentages, and multiplication and division by powers of ten.

It's also clear that N10 Factors and N11 Multiples are key to understanding many other areas of the mathematics curriculum, including prime factors and prime factor decomposition, equivalence and simplification of fractions, and square and cube numbers and their associated roots. Factors and multiples are successors of N5 Multiplication Tables, which is a key foundation for success in Numbers.

It is key that learners have not only developed fluency with these ideas, but have developed significant expertise with these building blocks, upon which success in GCSE mathematics is founded.

## 1. Numbers



# N1 Place value

What is being tested	Learners are being tested on their understanding of the place value table, between millions and millionths.
Learning Objectives	<p>N1.1 Recognise place values for integers up to 1 000</p> <p>N1.2 Recognise place values for integers up to 1 000 000</p> <p>N1.3 Label the place value columns</p> <p>N1.4 Identify which column a given digit of a decimal number is in</p> <p>N1.5 Identify the place of numbers on the number line</p> <p>N1.6 Recognise place values for decimal numbers up to 6 d.p.</p>
Predecessors	None
Successors	<p>N2 Whole number bonds: addition/subtraction</p> <p>N16 Convert a decimal to/from a percentage</p> <p>N17 Convert a fraction to/from a decimal</p> <p>N29 Round to a given place value</p> <p>N30 Multiply/divide by 10, 100, 1000</p>
KS2 & KS3 Guidance	Learners begin their journey with place value with tens and ones in Year 2 (page 48, KS1 and KS2 guidance) and begin working with decimals in Year 5 (page 208, KS1 and KS2 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	6 Understanding (positive) whole numbers on a number line
	17 Understanding place value involving tens and ones
	35 Place value above the 100s digit
	69 Place value of the tenths, hundredths and thousandths digits
	<b>New Lesson Resources</b>
<a href="#">Understand Numbers up to 1000</a>	
<a href="#">Explore Numbers to 10</a>	
<a href="#">Decimal Place Value</a>	
<a href="#">Decimal Number Lines</a>	
<b>Legacy Lesson Resources</b>	
N/A	

## N2 Whole number bonds: addition/subtraction

What is being tested	Learners are being tested on their understanding of number bonds with addition and subtraction.
Learning Objectives	N2.1 Calculate integer number bonds up to two digits N2.2 Calculate integer number bonds up to three digits N2.3 Calculate integer number bonds with a mixed number of digits
Predecessors	N1 Place value
Successors	N7 Decimal number bonds: addition/subtraction
KS2 & KS3 Guidance	Learners begin to work with number bonds in Year 1 (page 17, KS1 and KS2 guidance) and work with addition and subtraction of whole numbers throughout their mathematical journey.
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	8 Number bonds for numbers up to 20 18 Number bonds for numbers up to 100 34 Numbers above 100
	<b>New Lesson Resources</b>
	In development
	<b>Legacy Lesson Resources</b>
	N/A

## N3 Percentage as a number of parts per 100

What is being tested	Learners are being tested on their understanding of the use of the % sign and how this relates to fractional representations.
Learning Objectives	N3.1 Describe percentage N3.2 Recognise a visual representation of a percentage as parts per 100 N3.3 Calculate a fraction as a percentage when the denominator is 100
Predecessors	None
Successors	N9 Finding simple percentages of an amount: 20%, 25%, 50% etc N16 Convert a decimal to/from a percentage N18 Convert a fraction to/from a percentage
KS2 & KS3 Guidance	Learners begin to understand percentages in Year 5 (page 208, KS1 and KS2 guidance) and continue to work with percentages through KS2 and KS3 (page 162, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	105 Percentages as values out of 100 and converting between fractions and percentages
	<b>New Lesson Resources</b>
	In development
	<b>Legacy Lesson Resources</b>
	N/A

## N4 Fractions as pictures

What is being tested	Learners are being tested on their ability to identify simple fractions from diagrams.
Learning Objectives	N4.1 Recognise the diagram that represents a given fraction N4.2 Identify equivalent fractions represented as bars
Predecessors	None
Successors	N8 Fraction facts
KS2 & KS3 Guidance	Learners begin to use fraction notation to describe parts of a whole in Year 3 (page 120, KS1 and KS2 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	26 Recognising and using halves, quarters and thirds 54 Recognising and using fractions with denominators to 12
	<b>New Lesson Resources</b>
	N/A
	<b>Legacy Lesson Resources</b>
	N/A

## N5 Multiplication tables

What is being tested	Learners are being tested on their understanding of multiplication facts and their ability to identify numbers as being in specified times tables.
Learning Objectives	N5.1 Complete a multiplication grid with missing numbers N5.2 Categorise numbers between 50 and 100 according to their appearance in the 6,7,8 or 9 times tables
Predecessors	None
Successors	N10 Factors N11 Multiples N21 Identify simple linear sequences
KS2 & KS3 Guidance	Learners begin work with the 2, 5 and 10 multiplication tables in Year 2 (page 69, KS1 and KS2 guidance), progressing throughout KS2.
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	42 Times tables up to 12x12
	52 Multiples of a number
	<b>New Lesson Resources</b>
	<a href="#">Multiples, Factors and Primes</a>
	<b>Legacy Lesson Resources</b>
N/A	

## N6 Finding percentages of an amount based on multiples of 5%

What is being tested	Learners are being tested on their ability to calculate 5%, and multiples of 5%, of a specified amount.
Learning Objectives	N6.1 Calculate 5% of a two-digit integer N6.2 Calculate 5% of a decimal up to two decimal places N6.3 Know that dividing 100% into twenty parts equals 5%
Predecessors	N9 Finding simple percentages of an amount: 20%, 25%, 50% etc
Successors	None
KS2 & KS3 Guidance	Learners work with percentage calculations beginning in KS3 (page 162, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	130 Calculating a simple percentage of an amount, using chunking
	<b>New Lesson Resources</b>
	In development
	<b>Legacy Lesson Resources</b>
	<a href="#">GCSE Percentages</a>

## N7 Calculate decimal number bonds up to 1 d.p.

What is being tested	Learners are being tested on their understanding of number bonds with addition and subtraction of decimal numbers.
Learning Objectives	<p>N7.1 Calculate decimal number bonds up to 1 d.p.</p> <p>N7.2 Calculate decimal number bonds up to 2 d.p.</p> <p>N7.3 Calculate decimal number bonds up to 3 d.p.</p> <p>N7.4 Calculate decimal number bonds with a mixed number of decimal places</p>
Predecessors	N2 Whole number bonds: addition/subtraction
Successors	N19 Number bonds with a mix of fractions and decimals: addition/subtraction
KS2 & KS3 Guidance	Learners begin to add and subtract using decimals in Year 5 (page 216, KS1 and KS2 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	72 Number bonds with decimals
	<b>New Lesson Resources</b>
	<a href="#">Decimal Number Bonds</a>
	<b>Legacy Lesson Resources</b>
	N/A

## N8 Fraction facts

What is being tested	Learners are being tested on their understanding of the parts that form a fraction.
Learning Objectives	N8.1 Describe numerator N8.2 Describe denominator N8.3 Describe mixed fraction
Predecessors	N4 Fractions as pictures
Successors	N15 Equivalent fractions and simplifying
KS2 & KS3 Guidance	Learners begin to use fraction nomenclature to describe parts of a whole in Year 3 (page 120, KS1 and KS2 guidance), encountering mixed fractions in Year 4 (page 185, KS1 and KS2 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	26 Recognising and using halves, quarters and thirds
	54 Recognising and using fractions with denominators to 12
	101 Converting between mixed numbers and improper fractions
	<b>New Lesson Resources</b>
	<a href="#">Mixed Numbers and Improper Fractions</a>
<b>Legacy Lesson Resources</b>	
N/A	

## N9 Finding simple percentages of an amount; 20%, 25%, 50% etc

What is being tested	Learners are being tested on their ability to calculate a simple percentage of a specified amount.
Learning Objectives	<p>N9.1 Recognise how to find 50% of a number</p> <p>N9.2 Recognise how to find 25% of a number</p> <p>N9.3 Recognise how to find 20% of a number</p> <p>N9.4 Calculate 50% of a two-digit integer</p> <p>N9.5 Calculate 25% of a two-digit integer</p> <p>N9.6 Calculate 20% of a two-digit integer</p>
Predecessors	N3 Percentage as a number of parts per 100
Successors	N6 Finding percentages of an amount based on multiples of 5%
KS2 & KS3 Guidance	Learners work with percentage calculations beginning in KS3 (page 162, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	130 Calculating a simple percentage of an amount, using chunking
	<b>New Lesson Resources</b>
	In development
	<b>Legacy Lesson Resources</b>
	<p><a href="#">GCSE Percentages</a></p> <p><a href="#">All In One - FDP Correspondences - Part III - Understanding Percentages</a></p>

## N10 Factors

What is being tested	Learners are being tested on their understanding of the term 'factor', and how this links to multiplication facts.
Learning Objectives	<p>N10.1 Identify the factors of a given number</p> <p>N10.2 Identify common factors of different numbers</p> <p>N10.3 Match different numbers to their factors</p> <p>N10.4 Define a factor</p>
Predecessors	N5 Multiplication tables
Successors	<p>N12 Prime numbers</p> <p>N13 Finding LCM/HCF</p> <p>N14 Prime factor decomposition</p> <p>N15 Equivalent fractions and simplifying</p>
KS2 & KS3 Guidance	Learners build on their understanding of multiplication facts by finding factors of specified numbers in Year 5 (page 245, KS1 and KS2 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	53 Factors of a number
	95 Common factors by listing
	<b>New Lesson Resources</b>
	<p><a href="#">Multiples, Factors and Primes</a></p> <p><a href="#">Common Factors and the Highest Common Factor</a></p>
	<b>Legacy Lesson Resources</b>
	N/A

# N11 Multiples

What is being tested	Learners are being tested on their ability to identify multiples of a specified number as the values in that number's times table.
Learning Objectives	N11.1 Define the times table of a number N11.2 Identify common multiples of different numbers
Predecessors	N5 Multiplication tables
Successors	N13 Finding LCM/HCF N22 Square/cube numbers N24 Nth terms – linear sequence ( $an + b$ )
KS2 & KS3 Guidance	Learners are introduced to the idea of multiples in Year 1 (page 26, KS1 and KS2 guidance) and extend upon this idea throughout Key Stages 1 and 2, identifying multiples of specified numbers in Year 5 (page 244, KS1 and KS2 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	52 Multiples of a number 94 Common multiples by listing
	<b>New Lesson Resources</b>
	<a href="#">Multiples, Factors and Primes</a> <a href="#">Common Multiples and the Lowest Common Multiple</a>
	<b>Legacy Lesson Resources</b>
	N/A

## N12 Prime numbers

What is being tested	Learners are being tested on their understanding of the term 'prime number' and their ability to identify prime numbers.
Learning Objectives	N12.1 Define a prime number N12.2 Know the prime numbers up to thirty N12.3 Recognise prime numbers up to 50
Predecessors	N10 Factors
Successors	N14 Prime factor decomposition
KS2 & KS3 Guidance	Learners encounter prime numbers in Year 5 (page 246, KS1 and KS2 guidance), identifying primes up to 100.
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	97 Prime numbers
	<b>New Lesson Resources</b>
	<a href="#">Multiples, Factors and Primes</a>
	<b>Legacy Lesson Resources</b>
	N/A

## N13 Finding LCM/HCF

What is being tested	Learners are being tested on their understanding of common factors and multiples, calculating the Lowest Common Multiple and the Highest Common Factor.
Learning Objectives	<p>N13.1 Recognise the highest common factor from a list of multiples and factors</p> <p>N13.2 Recognise the lowest common multiples from a list of multiples and factors</p> <p>N13.3 Calculate the highest common factor of two positive integers from a Venn diagram</p> <p>N13.4 Calculate the lowest common multiple of two positive integers from a Venn diagram</p> <p>N13.5 Identify common factors of two positive integers using prime factor decomposition by completing a Venn diagram</p>
Predecessors	<p>N10 Factors</p> <p>N11 Multiples</p> <p>N14 Prime factor decomposition</p>
Successors	N15 Equivalent fractions and simplifying
KS2 & KS3 Guidance	Learners are introduced to the idea of common factors and common multiples in Year 5 (page 245, KS1 and KS2 guidance) and make the connection to prime numbers in Year 7 (page 30, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	96 Highest Common Factor and Lowest Common Multiple by listing
	162 Lowest Common Multiple or Highest Common Factor by prime factorisation
	<b>New Lesson Resources</b>
	<a href="#">Common Factors and the Highest Common Factor</a> <a href="#">Common Multiples and the Lowest Common Multiple</a>
	<b>Legacy Lesson Resources</b> <a href="#">Number Theory</a>

## N14 Prime factor decomposition

What is being tested	Learners are being tested on their ability to write composite numbers as a multiplication of prime numbers.
Learning Objectives	<p>N14.1 Identify the prime factors of a positive integer</p> <p>N14.2 Identify the prime factor decomposition of a given positive integer</p> <p>N14.3 Show the prime factor decomposition of a positive integer using index form where appropriate</p>
Predecessors	<p>N10 Factors</p> <p>N12 Prime numbers</p>
Successors	N13 Finding LCM/HCF
KS2 & KS3 Guidance	Learners are introduced to prime factorisation in Year 7 (page 30, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	161 Prime factorisation of a number
	<b>New Lesson Resources</b>
	<a href="#">Prime Factorisation of a Number</a>
	<b>Legacy Lesson Resources</b>
	<a href="#">Number Theory</a>

## N15 Equivalent fractions and simplifying

What is being tested	Learners are being tested on their ability to identify and use equivalence between fractions, and to write a fraction in its simplest form.
Learning Objectives	<p>N15.1 Write a fraction in its simplest form (lowest term)</p> <p>N15.2 Calculate missing numerators using equivalent fractions</p> <p>N15.3 Calculate missing denominators using equivalent fractions</p> <p>N15.4 Match equivalent fractions</p>
Predecessors	<p>N8 Fraction facts</p> <p>N10 Factors</p> <p>N11 Multiples</p>
Successors	<p>N17 Convert a fraction to/from a decimal</p> <p>N18 Convert a fraction to/from a percentage</p> <p>N25 Addition and subtraction of fractions with a common denominator</p> <p>N26 Multiplication of fractions</p>
KS2 & KS3 Guidance	Learners work with equivalent fractions in Year 5 (page 258, KS1 and KS2 guidance), simplifying fractions in Year 6 (page 312, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	98 Fractional equivalence using factors and multiples
	<b>New Lesson Resources</b>
	<a href="#">Compare and Order Fractions With Denominators Where One is a Multiple of the Other</a>
	<a href="#">Compare and Order Fractions With the Same Denominator</a>
	<a href="#">Compare and Order Fractions With the Same Numerator</a>
	<a href="#">Compare and Order Fractions With Different Denominators</a>
<a href="#">Compare and Order Fractions Greater Than 1</a>	
<a href="#">Equivalent Fractions and Simplifying</a>	
<b>Legacy Lesson Resources</b>	
N/A	

## N16 Convert a decimal to/from a percentage

What is being tested	Learners are being tested on their ability to convert between percentage and decimal representations of a number.
Learning Objectives	N16.1 Recognise the correct equivalence of a percentage as a decimal N16.2 Order decimals and percentages N16.3 Recognise a decimal as its equivalent percentage
Predecessors	N1 Place value N3 Percentage as a number of parts per 100
Successors	N20 Calculations with fractions, decimals and percentages
KS2 & KS3 Guidance	Learners begin to appreciate hundredths in Year 5 (page 212, KS1 and KS2 guidance), building on this in upper KS2 before KS3 study (page 81, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	106 Basic percentage and decimal equivalence
	175c Compare a given decimal and percentage using inequalities.
	<b>New Lesson Resources</b>
	In development
	<b>Legacy Lesson Resources</b>
	<a href="#">All In One - FDP Correspondences - Part VI - Percentages to Decimals/Fractions</a>

## N17 Convert a fraction to/from a decimal

What is being tested	Learners are being tested on their ability to convert between fractional and decimal representations of a number.
Learning Objectives	<p>N17.1 Match decimals and equivalent fractions</p> <p>N17.2 Order fractions and decimals</p> <p>N17.3 Find the equivalent fraction from a decimal (hundredths)</p> <p>N17.4 Find the equivalent decimal from a fraction (hundredths)</p> <p>N17.5 Match fractions to equivalent decimals (non-standard)</p> <p>N17.6 Convert a fraction to a decimal using division</p>
Predecessors	<p>N1 Place value</p> <p>N15 Equivalent fractions and simplifying</p>
Successors	<p>N19 Number bonds with a mix of fractions and decimals: addition/subtraction</p> <p>N20 Calculations with fractions, decimals and percentages</p>
KS2 & KS3 Guidance	Learners recall decimal equivalents for common fractions in Year 5 (page 262, KS1 and KS2 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	104 Basic fraction and decimal equivalence
	175a Compare a given fraction and decimal using inequalities.
	172f Convert a fraction to a non-recurring decimal using division.
	<b>New Lesson Resources</b>
	<a href="#">Converting Between Fractions and Decimals for Tenths, Hundredths and Thousandths</a>
<b>Legacy Lesson Resources</b>	
<a href="#">Fraction Decimal Equivalences</a>	
<a href="#">All In One - FDP Correspondences - Part IV - Decimals to Fractions</a>	

## N18 Convert a fraction to/from a percentage

What is being tested	Learners are being tested on their ability to convert between percentage and fractional representations of a number.
Learning Objectives	<p>N18.1 Recognise the correct equivalence of a percentage as a fraction out of 100</p> <p>N18.2 Calculate a fraction as a percentage when the denominator is a factor of 100</p> <p>N18.3 Match percentages to their equivalent fractions</p> <p>N18.4 Identify the calculation to convert a real-world fraction to a percentage</p> <p>N18.5 Find the equivalent fraction from a percentage containing a decimal</p> <p>N18.6 Match fractions to equivalent percentages</p>
Predecessors	<p>N3 Percentage as a number of parts per 100</p> <p>N15 Equivalent fractions and simplifying</p>
Successors	N20 Calculations with fractions, decimals and percentages
KS2 & KS3 Guidance	Learners begin to appreciate hundredths in Year 5 (page 212, KS1 and KS2 guidance), building on this in upper KS2 before KS3 study (page 81, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	105 Percentages as values out of 100 and converting between fractions and percentages
	172g Convert a fraction to a percentage via an equivalent decimal.
	<b>New Lesson Resources</b>
	In development
	<b>Legacy Lesson Resources</b>
	<a href="#">All In One - FDP Correspondences - Part VI - Percentages to Decimals/Fractions</a>

## N19 Number bonds with a mix of fractions and decimals: addition/subtraction

What is being tested	Learners are being tested on their understanding of number bonds with addition and subtraction of a combination of fractional and decimal representations of numbers.
Learning Objectives	N19.1 Calculate mixed number bonds involving whole numbers and decimals
Predecessors	N7 Decimal number bonds: addition/subtraction N17 Convert a fraction to/from a decimal
Successors	None
KS2 & KS3 Guidance	Learners begin to appreciate fraction/decimal equivalence in Year 7 (page 80, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	72 Number bonds with decimals
	<b>New Lesson Resources</b>
	<a href="#">Decimal Number Bonds</a>
	<b>Legacy Lesson Resources</b>
	N/A

## N20 Calculations with fractions, decimals and percentages

What is being tested	Learners are being tested on their ability to convert between percentage, decimal and fractional representations of a specified number, extending this knowledge to identify the best value in a specified context.
Learning Objectives	<p>N20.1 Order a mixture of fractions, percentages, and decimals</p> <p>N20.2 Order sale offers that are in a mixture of fractions, percentages and decimals</p> <p>N20.3 Recognise 'best buys' by using the equivalence of fractions, percentages and decimals</p>
Predecessors	<p>N16 Convert a decimal to/from a percentage</p> <p>N17 Convert a fraction to/from a decimal</p> <p>N18 Convert a fraction to/from a percentage</p>
Successors	None
KS2 & KS3 Guidance	Learners use fractions, decimals and percentages interchangeably in Year 8 (page 160, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	175 Comparing and ordering fractions, decimal and percentages
	<b>New Lesson Resources</b>
	In development
	<b>Legacy Lesson Resources</b>
	<p><a href="#">Full Coverage: Fractions, Decimal &amp; Percentage Correspondences</a></p> <p><a href="#">Fraction Decimal Equivalences</a></p>

## N21 Identify simple linear sequences

What is being tested	Learners are being tested on their ability to extend simple linear sequences.
Learning Objectives	N21.1 Identify next term in a sequence of diagrams N21.2 Match positive number sequences with their term-to-term rule N21.3 Identify next term in a simple linear sequence
Predecessors	N5 Multiplication tables
Successors	N24 Nth terms – linear sequence ( $an + b$ )
KS2 & KS3 Guidance	Learners begin working with sequences in Year 1 (page 18, KS1 and KS2 guidance) and continue this work through KS1 and KS2.
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	135 Introduction to sequences
	203 Describing, generating and continuing sequences using term-to-term rules
	<b>New Lesson Resources</b>
	<a href="#">Introduction to Sequences</a>
	<a href="#">Sequences in Greater Depth - Pictorial Representation</a>
<a href="#">Arithmetic Sequences including nth Term Rule</a>	
<b>Legacy Lesson Resources</b>	
<a href="#">Sequences</a>	
<a href="#">GCSE Term-to-term sequences &amp; Arithmetic vs Geometric Progressions</a>	

## N22 Square/cube numbers

What is being tested	Learners are being tested on their ability to identify square and cube numbers, using correct definitions and terminology.
Learning Objectives	<p>N22.1 Identify square numbers up to 100</p> <p>N22.2 Identify cube numbers up to 100</p> <p>N22.3 Define square number</p> <p>N22.4 Define cube number</p> <p>N22.5 Show numbers using index notation e.g. <math>16 = 4 \times 4 = 4^2</math></p>
Predecessors	N11 Multiples
Successors	N23 Square roots and cube roots
KS2 & KS3 Guidance	Pupils work with square and cube numbers in upper KS2 (page 30, KS3 guidance) and extend upon this knowledge in Year 7 (page 30, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	88 Power notation and calculate simple powers, e.g. squares, cubes
	<b>New Lesson Resources</b>
	<a href="#">Introduction to Powers and Roots (including Square and Cube Numbers)</a>
	<b>Legacy Lesson Resources</b>
	N/A

## N23 Square roots and cube roots

What is being tested	Learners are being tested on their understanding of square and cube numbers, working inversely to find roots, using correct definitions and terminology.
Learning Objectives	<p>N23.1 Define square root</p> <p>N23.2 Define cube root</p> <p>N23.3 Recall that taking the square root is the inverse of squaring</p> <p>N23.4 Recall that that taking the cube root is the inverse of cubing</p> <p>N23.5 Identify the square root of <math>x^2</math></p> <p>N23.6 Identify the cube root of <math>x^3</math></p>
Predecessors	N22 Square/cube numbers
Successors	None
KS2 & KS3 Guidance	Pupils work with square and cube roots in Year 7 (page 30, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	157 Roots and further powers
	<b>New Lesson Resources</b>
	<a href="#">Introduction to Powers and Roots (including Square and Cube Numbers)</a>
	<a href="#">Powers and Roots with a Calculator</a>
	<b>Legacy Lesson Resources</b>
N/A	

## N24 Nth term: Linear sequence ( $an + b$ )

What is being tested	Learners are being tested on their ability to describe an arithmetic sequence using an algebraic position-to-term rule.
Learning Objectives	<p>N24.1 Identify linear sequences</p> <p>N24.2 Find first terms of a linear sequence given the nth term</p> <p>N24.3 Match the sequences with their nth term rule</p> <p>N24.4 Identify the nth term of a list of multiples</p> <p>N24.5 Find the first four terms of a sequence given in the form <math>an</math></p> <p>N24.6 Write the general term for the multiples of a number</p>
Predecessors	<p>N11 Multiples</p> <p>N21 Identify simple linear sequences</p>
Successors	None
KS2 & KS3 Guidance	Learners begin using the nth term to describe a sequence in Year 8 (page 129, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	204 Generating terms of a sequence given a position-to-term rule
	205 nth term formula for arithmetic sequences (no standard formulae)
	<b>New Lesson Resources</b>
	<p><a href="#">Introduction to Sequences</a></p> <p><a href="#">Arithmetic Sequences including nth Term Rule</a></p> <p><a href="#">Sequences in Greater Depth - Calculator Skills</a></p>
	<p><b>Legacy Lesson Resources</b></p> <p><a href="#">Sequences</a></p>

## N25 Addition and subtraction of fractions with a common denominator

What is being tested	Learners are being tested on their ability to add and subtract fractions which are written in the same denominator.
Learning Objectives	<p>N25.1 Recognise the correct addition of common fractions with the same denominator</p> <p>N25.2 Calculate the addition of mixed fractions with the same denominator</p> <p>N25.3 Recognise non-unit fractions as repeated addition of unit fractions</p> <p>N25.4 Calculate the subtraction of mixed fractions with the same denominator</p> <p>N25.5 Calculate common fraction bonds involving addition</p> <p>N25.6 Calculate common fraction bonds involving subtraction</p>
Predecessors	N15 Equivalent fractions and simplifying
Successors	N27 Addition and subtraction of fractions (without a common denominator)
KS2 & KS3 Guidance	Learners add and subtract fractions written in the same unit in Year 4 (page 188, KS1 and KS2 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	56 Adding and subtracting fractions with the same denominator
	102 Adding and subtracting mixed numbers with the same denominator
	<b>New Lesson Resources</b>
	<a href="#">Adding and Subtracting Mixed Numbers with the Same Denominator</a>
	<b>Legacy Lesson Resources</b>
	<a href="#">Fractions</a>

## N26 Multiplication of fractions

What is being tested	Learners are being tested on their ability to multiply using fractions.
Learning Objectives	<p>N26.1 Calculate non-unit fractions of an amount</p> <p>N26.2 Select the correct calculation to find a common fraction of an amount</p> <p>N26.3 Recognise the product of two fractions</p> <p>N26.4 Find the product of two fractions (no simplification)</p> <p>N26.5 Find the product of two fractions (with simplification)</p> <p>N26.6 Find the product of three fractions (no simplification)</p>
Predecessors	N15 Equivalent fractions and simplifying
Successors	N28 Division of fractions
KS2 & KS3 Guidance	Learners encounter multiplication of fractions in Year 7 (page 85, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	57 Fractions of an amount
	119 Multiplying fractions and mixed numbers by an integer
	120 Multiplying proper fractions with no simplifying
	165 Multiplying proper fractions requiring simplification
	167 Dividing fractions involving a mixed number
<b>New Lesson Resources</b>	
N/A	
<b>Legacy Lesson Resources</b>	
<a href="#">Fractions</a>	

## N27 Addition and subtraction of fractions (without a common denominator)

What is being tested	Learners are being tested on their ability to add and subtract fractions which are written in different denominators, drawing on their understanding of equivalent fractions.
Learning Objectives	<p>N27.1 Recognise the method for the sum of two fractions</p> <p>N27.2 Match fractions to their common denominators</p> <p>N27.3 Recognise the difference of two fractions</p> <p>N27.4 Find the difference of two fractions (no simplification)</p> <p>N27.5 Find the sum of two fractions (with simplification to a mixed number)</p> <p>N27.6 Find the difference of two mixed number fractions</p>
Predecessors	N25 Addition and subtraction of fractions with a common denominator
Successors	None
KS2 & KS3 Guidance	Learners begin to add and subtract fractions written in different units in upper KS2 and continue to work on this in Year 7 (page 84, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	100 Adding and subtracting fractions where the denominators are multiples of each other
	103 Adding and subtracting mixed numbers where one denominator is a multiple of another
	117 Adding and subtracting fractions with any denominator
	118 Adding and subtracting mixed numbers with different denominators
	<b>New Lesson Resources</b>
<a href="#">Adding and Subtracting Proper Fractions</a>	
<a href="#">Adding and Subtracting Mixed Numbers with Different Denominators</a>	
<b>Legacy Lesson Resources</b>	
<a href="#">Fractions</a>	

## N28 Division of fractions

What is being tested	Learners are being tested on their ability to divide using fractions.
Learning Objectives	<p>N28.1 Recognise the method for the division of fractions</p> <p>N28.2 Recognise the quotient of two fractions</p> <p>N28.3 Find the quotient of two fractions (no simplification)</p> <p>N28.4 Find the quotient of two fractions (with simplification to a mixed number)</p>
Predecessors	N26 Multiplication of fractions
Successors	None
KS2 & KS3 Guidance	Learners encounter division of fractions in Year 7 (page 85, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	121 Dividing fractions by integers
	166 Dividing proper fractions
	168 Dividing fractions involving a mixed number
	<b>New Lesson Resources</b>
	N/A
	<b>Legacy Lesson Resources</b>
<a href="#">Fractions</a>	

## N29 Round to a given place value

What is being tested	Learners are being tested on their understanding of rounding to the nearest multiple of powers of 10, and to the nearest whole number.
Learning Objectives	N29.1 Round to the nearest whole number N29.2 Round to the nearest 10 N29.3 Round to the nearest 100 N29.4 Round to the nearest 1000
Predecessors	N1 Place value
Successors	N31 Round to a given decimal place
KS2 & KS3 Guidance	Learners begin to round specified values in Year 4 (page 150, KS1 and KS2 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	37 Rounding a number to nearest 10, 100, 1000 and beyond 75a Round a number to the nearest whole.
	<b>New Lesson Resources</b>
	<a href="#">Rounding to the Nearest 10, 100 or 1000</a>
	<a href="#">Rounding to Decimal Places</a>
	<b>Legacy Lesson Resources</b>
<a href="#">Rounding &amp; Approximation</a>	

## N30 Multiply/divide by 10, 100, 1000

What is being tested	Learners are being tested on their ability to multiply and divide by 10, 100 and 1000 drawing on their understanding of the place value.
Learning Objectives	<p>N30.1 Recognise the effect of multiplying by 100 or 1000</p> <p>N30.2 Recognise the effect of dividing by 100 or 1000</p> <p>N30.3 Identify the product when multiplying a given number by 1000</p> <p>N30.4 Identify the quotient when dividing a given number by 100</p> <p>N30.5 Calculate the multiplication of decimal numbers by 10, 100, 1000</p> <p>N30.6 Calculate the division of decimal numbers by 10, 100, 1000</p>
Predecessors	N1 Place value
Successors	N32 Multiplying and dividing by powers of 10
KS2 & KS3 Guidance	Learners begin to multiply and divide by 10 and 100 in Year 4 (page 170, KS1 and KS2 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	45 Multiplying and dividing by 10, 100, 1000 etc, excluding decimals
	70 Multiplying and dividing by 10, 100, 1000, including decimals
	<b>New Lesson Resources</b>
	<a href="#">Multiplying and Dividing Decimals by 10, 100, 1000 and Other Powers of Ten</a>
	<b>Legacy Lesson Resources</b>
N/A	

## N31 Round to a given decimal place

What is being tested	Learners are being tested on their ability to round decimals to a specified number of decimal places.
Learning Objectives	N31.1 Round to one decimal place N31.2 Round to two decimal places N31.3 Round to three decimal places
Predecessors	N29 Round to a given place value
Successors	N33 Round to significant figures
KS2 & KS3 Guidance	Learners begin to round to a specified number of decimal places in Year 6 (page 289, KS1 and KS2 guidance) and continue this work in Year 8 (page 122, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	75 Rounding a number to a given number of decimal places
	<b>New Lesson Resources</b>
	<a href="#">Rounding to Decimal Places</a>
	<b>Legacy Lesson Resources</b>
	<a href="#">Rounding &amp; Approximation</a>

## N32 Multiplying and dividing by powers of 10

What is being tested	Learners are being tested on their ability to multiply and divide by powers of 10, recognising that multiplication and division are inverses.
Learning Objectives	<p>N32.1 Identify the product of multiplying a given number by a power of 10 (<math>&gt;0</math>, in index form)</p> <p>N32.2 Identify the quotient when dividing a given number by a power of 10 (<math>&gt;0</math>, power in index form)</p> <p>N32.3 Recognise that the division with negative powers of 10 is equivalent to multiplication with positive powers of 10</p>
Predecessors	N30 Multiply/divide by 10, 100, 1000
Successors	N34 Simple standard form
KS2 & KS3 Guidance	Learners continue to multiply and divide by powers of ten in Year 7 (page 26, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	45e Multiply and divide integers by powers of 10, greater than 1000, excluding decimals.
	70c Multiply decimals with up to 3 decimal places by positive powers of 10, greater than 1000.
	159a Understand reciprocals as multiplicative inverses.
	<b>New Lesson Resources</b>
	<a href="#">Reciprocals of Integers, Fractions and Decimals</a> <a href="#">Standard Form with Large Numbers</a>
<b>Legacy Lesson Resources</b>	
	N/A

## N33 Round to significant figures

What is being tested	Learners are being tested on their understanding of rounding to significant figures, drawing on their understanding of rounding to the nearest power of 10.
Learning Objectives	N33.1 Round to one significant figure N33.2 Round to two significant figures N33.3 Round to three significant figures
Predecessors	N31 Round to a given decimal place
Successors	N35 Approximation
KS2 & KS3 Guidance	Learners begin to round to a specified number of significant figures in Year 8 (page 121, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	187 Rounding a number to a given number of significant figures
	<b>New Lesson Resources</b>
	<a href="#">Rounding to Significant Figures</a>
	<b>Legacy Lesson Resources</b>
	<a href="#">Rounding &amp; Approximation</a>

## N34 Simple standard form

What is being tested	Learners are being tested on their understanding of the use of standard form to represent large numbers.
Learning Objectives	<p>N34.1 Convert numbers in simple standard form <math>A \times 10^n</math> (positive value of A and positive integer value of n) into an ordinary number</p> <p>N34.2 Convert ordinary numbers into simple standard form <math>A \times 10^n</math> (positive value of A and positive integer value of n)</p> <p>N34.3 Identify the simple standard form of a number <math>A \times 10^n</math></p>
Predecessors	N32 Multiplying and dividing by powers of 10
Successors	None
KS2 & KS3 Guidance	Learners encounter the idea of 'standard index form' in Year 7 and extend on this idea in Year 9 (page 253, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	301 Conversion of large numbers to and from standard form/scientific notation
	<b>New Lesson Resources</b>
	<a href="#">Standard Form with Large Numbers</a>
	<b>Legacy Lesson Resources</b>
	<a href="#">GCSE Standard Form</a>

## N35 Approximation

What is being tested	Learners are being tested on their ability to approximate a calculation, drawing on their understanding of rounding to significant figures.
Learning Objectives	<p>N35.1 Estimate integer number bonds of any size by using rounding</p> <p>N35.2 Recognise the appropriate rounded number by rounding to the nearest 10, 100, 1000</p> <p>N35.3 Recognise the appropriate rounded number by rounding to a specified decimal place</p> <p>N35.4 Recognise the appropriate rounded number by rounding to a specified significant figure</p> <p>N35.5 Estimate decimal number bonds of any size by using rounding</p>
Predecessors	N33 Round to significant figures
Successors	None
KS2 & KS3 Guidance	Learners build on their understanding of rounding, estimating calculations in Year 8 (page 121, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	51 Checking calculations
	188 Estimating the result of a calculation by first rounding each number
	<b>New Lesson Resources</b>
	N/A
	<b>Legacy Lesson Resources</b>
	<a href="#">Rounding &amp; Approximation</a>

## Contributors

### AQA

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Our qualifications expertise dates back to 1903, when our predecessor boards were founded by five leading universities. Today, we're the largest provider of academic qualifications taught in schools and colleges.

We set and mark the papers for over half of all GCSEs and A-levels taken every year. But exams are only part of the story – we also make sure the content of our qualifications support great teaching.

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### Dr Frost Learning

The vision of Dr Frost Learning is to provide high quality education for all regardless of income, centred around the core philosophy that education is a fundamental right and central to addressing social inequality on a global level. We believe learning is for everyone. Dr Frost Learning has helped students in isolated communities, prisons, and students outside of a mainstream school environment. Additionally, Jamie Frost received the Global Teacher Prize Covid Hero Award 2020 for the role of the platform in supporting schools during Covid lockdowns.

Our platform includes over 1500 question generators, with more in development, along with videos to support student understanding, which can be set as homework tasks for students or used for independent learning. We also provide advanced data analytics for teachers to track student progress. We're constantly striving to innovate, with research into AI to provide tailored learning plans for students based on their activity.

Sometimes one size doesn't fit all and we have worked hard to ensure coverage for curricula worldwide. In addition to our own question generators, we work with exam boards in the UK and internationally to contribute to our bank of over 40,000 exam questions and create courses for teachers and students on the platform.

Our offering also includes free comprehensive classroom resources, with a focus on teaching for understanding. Each lesson is designed to both scaffold and stretch students on their mathematics journey, and reduce teacher workload.

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### Notes from Dr Frost Learning:

- Though the DF Index provides a comprehensive framework of mathematical ideas, not all of the subskills have associated live Question Generators as yet. As such, you may find some subskills are unavailable at this time. These are being continually updated and we aim to have much of the KS1-4 content completed by Summer 2025.
- It is important to note that each skill can include ideas across various Key Stages or levels of prior attainment, with the subskills higher in the alphabet including more complexity. As such, **not all subskills within these listed skills will be applicable** to the content listed here or for the specific misconceptions held by their students. Teachers should use their discretion as to whether the full skill or just a portion of subskills should be assigned to their students
- Resources are split into 'New' and 'Legacy' categories. Any 'New' resources have been published after October 2023 to fulfil out charitable aims. These have a new format and a focus on teaching for understanding, stretch and scaffold. Anything published before this is referred to as 'Legacy' – these resources were created by Jamie Frost for use with his own classes, and shared before establishing the charity, and thus the content or pacing may not be appropriate for your students.