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**Dr Frost  
LEARNING**

# STRIDE INTO *THE FUTURE* OF ASSESSMENT

Teacher Companion Guide

**Proportions**



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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.

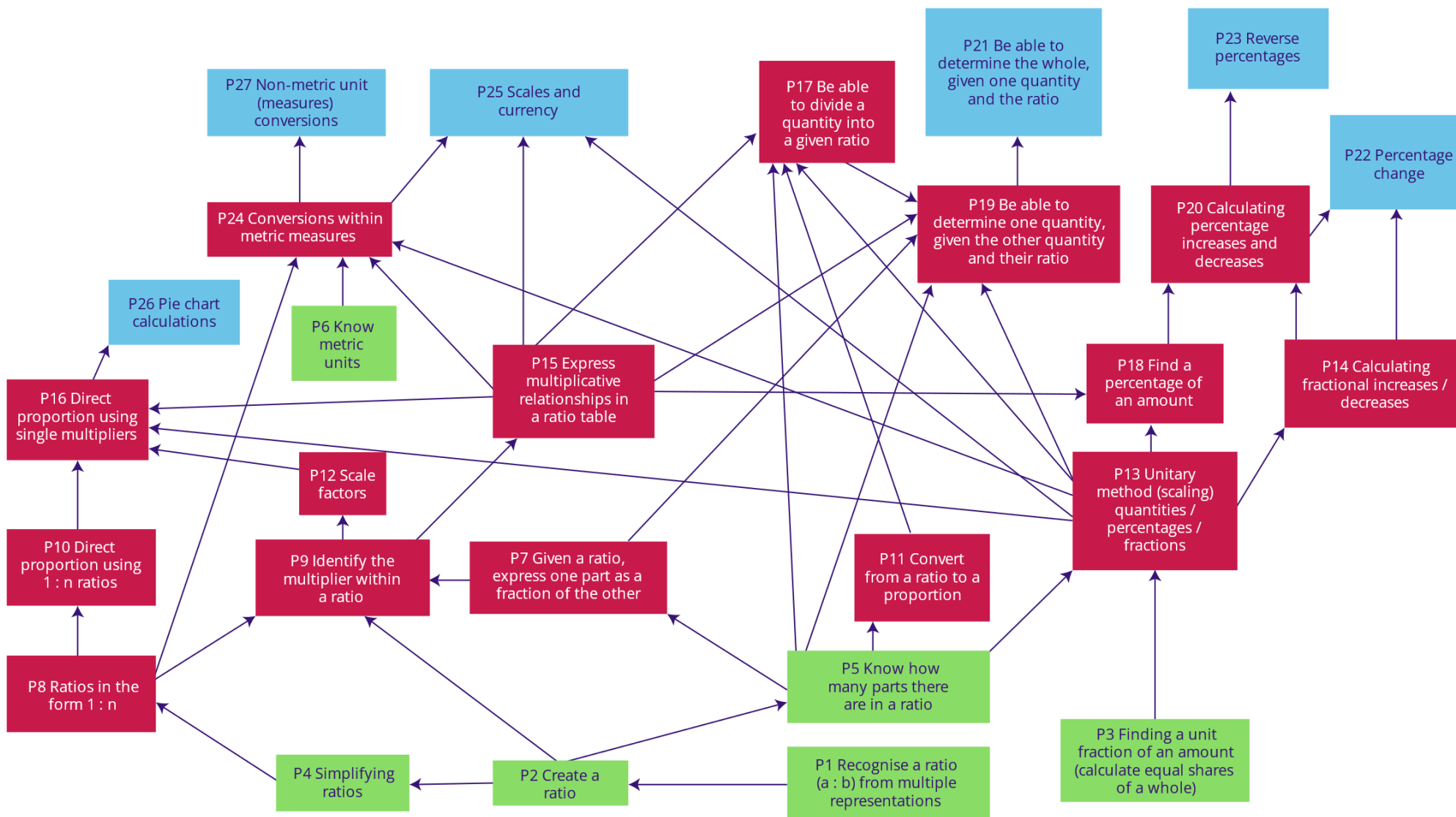
With this in mind, we want to empower teachers to take control of their classrooms and provide a nurturing environment in which gaps within key prerequisite understanding are identified and corrective instruction is deployed, filling the gaps and ensuring that more complex content can be taught, safe 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 for Proportions, shown on the next page, highlights the interconnectedness of the ideas which sit in the Proportions test, with two key nodes which underpin the higher order knowledge within the knowledge space.

P13 Unitary Method is a key node, feeding in to no fewer than seven successors, and P15 Express Multiplicative Relationships in a Ratio Table acts as a predecessor for six other nodes within the map. If learners develop expertise within these two key areas, their chances of success within the Proportions strand of the curriculum will be increased greatly, as it can be seen that these ideas work in tandem to underpin the ideas in direct proportion, conversions with units and currencies, and working with ratio problems.

## 3. Proportions



# P1 Recognise a ratio (a : b) from multiple representations

What is being tested	Learners are being tested on their understanding of unequal sharing in a variety of representations.
Learning Objectives	<p>P1.1 Match two-part ratios with their visual representation</p> <p>P1.2 Match two-part ratios with bar diagrams</p> <p>P1.3 Identify three-part ratios from worded scenarios</p> <p>P1.4 Match three-part ratios with their visual representation</p> <p>P1.5 Match three-part ratios with bar diagrams</p>
Predecessors	None
Successors	P2 Create a ratio
KS2 & KS3 Guidance	Learners are introduced to the idea of ratio in Year 6 (page 305, KS1 and KS2 guidance), and work with formal ratio notation in Year 7 (page 101, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	128 Multiplicative scaling with integer scale factors and ratio notation
	<b>New Lesson Resources</b>
	<a href="#">Introduction to Ratio</a>
	<b>Legacy Lesson Resources</b>
	<a href="#">Ratio &amp; Proportion (Pre-GCSE)</a> <a href="#">GCSE Ratio</a>

## P2 Create a ratio

What is being tested	Learners are being tested on their ability to construct a ratio, drawing on their understanding of unequal sharing.
Learning Objectives	<p>P2.1 Identify two-part ratios from a worded problem</p> <p>P2.2 Identify ratios that correspond with a comparison of two quantities</p> <p>P2.3 Recognise part-to-part ratios</p> <p>P2.4 Describe ratio</p>
Predecessors	P1 Recognise a ratio (a : b) from multiple representations
Successors	<p>P4 Simplifying ratios</p> <p>P5 Know how many parts there are in a ratio</p> <p>P9 Identify the multiplier within a ratio</p>
KS2 & KS3 Guidance	Learners construct ratios in Year 7 (page 101, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	128 Multiplicative scaling with integer scale factors and ratio notation
	<b>New Lesson Resources</b>
	<a href="#">Introduction to Ratio</a>
	<b>Legacy Lesson Resources</b>
	<a href="#">Ratio &amp; Proportion (Pre-GCSE)</a> <a href="#">GCSE Ratio</a>

## P3 Finding a unit fraction of an amount (calculate equal shares of a whole)

What is being tested	Learners are being tested on their understanding of equal sharing, using fraction notation.
Learning Objectives	<p>P3.1 Describe a unit fraction</p> <p>P3.2 Distinguish between unit fractions and those that are not unit fractions</p> <p>P3.3 Know that dividing by the denominator will find a unit fraction of an amount</p> <p>P3.4 Find equivalent calculations of dividing an amount by unit fractions (divide by denominator)</p>
Predecessors	None
Successors	P13 Unitary method (scaling) quantities/percentages/fractions
KS2 & KS3 Guidance	Learners are introduced to unit fractions as operators in Year 3 (page 124, KS1 and KS2 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	57a Calculate a half, quarter or third of a given quantity.
	57d Calculate a unit fraction of a given quantity (with denominator up to 12).
	<b>New Lesson Resources</b>
	<a href="#">Fractions of an Amount</a>
	<b>Legacy Lesson Resources</b>
<a href="#">Fractions</a>	

## P4 Simplifying ratios

What is being tested	Learners are being tested on their understanding of scaling, simplifying ratios.
Learning Objectives	<p>P4.1 Find simplified ratios by identifying common factors</p> <p>P4.2 Categorise ratios based on their simplest form</p> <p>P4.3 Match equivalent ratios with visual representations</p>
Predecessors	P2 Create a ratio
Successors	P8 Ratios in the form 1 : n
KS2 & KS3 Guidance	Learners work with ratio in Year 7 (page 101, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	224a Write a ratio with two parts in its simplest form.
	224b Write a ratio with three parts in its simplest form.
	224c Write a ratio in simplest form from a diagram (no simplifying).
	<b>New Lesson Resources</b>
	<a href="#">Working With Ratio</a>
<b>Legacy Lesson Resources</b>	
<a href="#">Ratio &amp; Proportion (Pre-GCSE)</a>	
<a href="#">GCSE Ratio</a>	

## P5 Know how many parts there are in a ratio

What is being tested	Learners are being tested on their ability to identify the number parts that represent the 'whole', given a ratio.
Learning Objectives	<p>P5.1 Identify the number of parts in a ratio</p> <p>P5.2 Identify the number of parts that represent the 'whole' in a given ratio</p> <p>P5.3 Match ratios to their number of parts</p>
Predecessors	P2 Create a ratio
Successors	<p>P7 Given a ratio, express one part as a fraction of the other</p> <p>P11 Convert from a ratio to a proportion</p> <p>P13 Unitary method (scaling) quantities/percentages/fractions</p>
KS2 & KS3 Guidance	Learners work with ratio in Year 7 (page 101, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	224f Determine the fraction that a number within a ratio represents.
	224g Convert fractional amounts to a ratio.
	224h Determine the percentage that a number within a ratio represents.
	224i Determine a ratio from a given context.
	<b>New Lesson Resources</b>
<a href="#">Working With Ratio</a>	
<b>Legacy Lesson Resources</b>	
<a href="#">Ratio &amp; Proportion (Pre-GCSE)</a>	
<a href="#">GCSE Ratio</a>	

## P6 Know metric units

What is being tested	Learners are being tested on their ability to recognise and recall common metric units of measure.
Learning Objectives	<p>P6.1 Match metric equivalents for length</p> <p>P6.2 Recognise metric equivalents for weight</p> <p>P6.3 Order measures of length</p> <p>P6.4 Order measures of weight</p> <p>P6.5 Order measures of capacity</p> <p>P6.6 Recognise metric equivalents for capacity</p>
Predecessors	None
Successors	P24 Conversions within metric measures
KS2 & KS3 Guidance	Learners begin to recognise metric units of measure throughout mathematics in KS1 and KS2.
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	15 Measuring using scales of lengths, mass and capacity
	186 Estimating measures in context
	<b>New Lesson Resources</b>
	N/A
	<b>Legacy Lesson Resources</b>
	<a href="#">GCSE/KS3 - Reading Scales</a>

## P7 Given a ratio, express one part as a fraction of another

What is being tested	Learners are being tested on their understanding of ratios as fractions.
Learning Objectives	<p>P7.1 Write one part of a ratio as a fraction of the other part</p> <p>P7.2 Write each part of a ratio as a fraction of the other part</p> <p>P7.3 Match fractions to the correct parts of a ratio</p>
Predecessors	P5 Know how many parts there are in a ratio
Successors	<p>P9 Identify the multiplier within a ratio</p> <p>P19 Be able to determine one quantity, given the other quantity and their ratio</p>
KS2 & KS3 Guidance	Learners work with ratio in Year 7 (page 101, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	224g Convert fractional amounts to a ratio.
	224j Convert an equation involving two variables into a ratio.
	226 Relationship between fractions, percentages and ratio
	<b>New Lesson Resources</b>
	<a href="#">Ratio, Fractions and Percentages</a>
	<b>Legacy Lesson Resources</b>
<a href="#">Ratio &amp; Proportion (Pre-GCSE)</a> <a href="#">GCSE Ratio</a>	

## P8 Ratios in the form 1 : n

What is being tested	Learners are being tested on their ability to scale ratios such that one value represents a unit.
Learning Objectives	<p>P8.1 Identify a correct conversion of a ratio to the form 1 : n</p> <p>P8.2 Write a ratio in the form 1 : n</p> <p>P8.3 Calculate an amount using a 1 : n ratio</p>
Predecessors	P4 Simplifying ratios
Successors	<p>P9 Identify the multiplier within a ratio</p> <p>P10 Direct proportion using 1 : n ratios</p> <p>P24 Conversions within metric measures</p>
KS2 & KS3 Guidance	Learners are exposed to the idea of 'for 1 part that a has, b has...' in Year 7 (KS3, page 101) and formalise this notation during their KS3 study.
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	224e Write a ratio in the form 1 : n or n : 1.
	<b>New Lesson Resources</b>
	<a href="#">Working With Ratio</a>
	<b>Legacy Lesson Resources</b>
	<a href="#">Ratio &amp; Proportion (Pre-GCSE)</a> <a href="#">GCSE Ratio</a>

## P9 Identify the multiplier within a ratio

What is being tested	Learners are being tested on their understanding of the scaling between the parts of a ratio, giving this as a multiplier.
Learning Objectives	<p>P9.1 Recognise the multiplier, given a ratio</p> <p>P9.2 Identify ratios that have a given multiplier</p> <p>P9.3 Find the multiplier, given a ratio</p>
Predecessors	<p>P2 Create a ratio</p> <p>P7 Given a ratio, express one part as a fraction of the other</p> <p>P8 Ratios in the form 1 : n</p>
Successors	<p>P12 Scale factors</p> <p>P15 Express multiplicative relationships in a ratio table</p>
KS2 & KS3 Guidance	Learners work with ratio tables and identifying multipliers within ratios in Year 7 (page 100, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	128 Multiplicative scaling with integer scale factors and ratio notation
	<b>New Lesson Resources</b>
	<a href="#">Introduction to Ratio</a>
	<b>Legacy Lesson Resources</b>
	<a href="#">Ratio &amp; Proportion (Pre-GCSE)</a> <a href="#">GCSE Ratio</a> <a href="#">GCSE Multiplicative Scaling</a>

## P10 Direct proportion using 1 : n ratios

What is being tested	Learners are being tested on their understanding of scaling as a unit ratio.
Learning Objectives	<p>P10.1 Recognise the result of a conversion from km to miles</p> <p>P10.2 Recognise the result of a conversion from inches to cm</p> <p>P10.3 Recognise the result of a conversion from kg to lbs</p>
Predecessors	P8 Ratios in the form 1 : n
Successors	P16 Direct proportion using single multipliers
KS2 & KS3 Guidance	Learners convert between related units in Year 7 (page 98, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	108 Equivalence of metric and imperial units (inches, pints, pounds and miles)
	<b>New Lesson Resources</b>
	N/A
	<b>Legacy Lesson Resources</b>
	<p><a href="#">Ratio &amp; Proportion (Pre-GCSE)</a></p> <p><a href="#">GCSE Ratio</a></p>

## P11 Convert from a ratio to a proportion

What is being tested	Learners are being tested on their ability to re-write a ratio as a linear equation.
Learning Objectives	<p>P11.1 Convert two-part ratios into proportions</p> <p>P11.2 Describe proportion</p> <p>P11.3 Convert three-part ratios into proportions</p>
Predecessors	P5 Know how many parts there are in a ratio
Successors	P17 Be able to divide a quantity into a given ratio
KS2 & KS3 Guidance	Learners begin to identify multipliers within ratios in Year 7 (page 100, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	224j Convert an equation involving two variables into a ratio.
	<b>New Lesson Resources</b>
	<a href="#">Introduction to Direct Proportion</a>
	<b>Legacy Lesson Resources</b>
	<a href="#">Ratio &amp; Proportion (Pre-GCSE)</a> <a href="#">GCSE Ratio</a>

## P12 Scale factors

What is being tested	Learners are being tested on their understanding of scaling, recognising that scale factors greater than one increase a value, and scale factors between zero and one decrease a value.
Learning Objectives	<p>P12.1 Describe scale factor</p> <p>P12.2 Match the descriptions with numerical scale factors</p> <p>P12.3 Recognise which scale factors increase a quantity</p> <p>P12.4 Recognise which scale factors decrease a quantity</p> <p>P12.5 Calculate a scale factor using inverse operation</p> <p>P12.6 Categorise scale factors based on their effect on the original amount</p>
Predecessors	P9 Identify the multiplier within a ratio
Successors	P16 Direct proportion using single multipliers
KS2 & KS3 Guidance	Learners work with scaling in Upper KS2, extending on this idea in Year 9 (page 212, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	128 Multiplicative scaling with integer scale factors and ratio notation
	176 Multiplicative scaling and numerical proportion relationships
	<b>New Lesson Resources</b>
	<a href="#">Introduction to Direct Proportion</a>
	<b>Legacy Lesson Resources</b>
<a href="#">Ratio &amp; Proportion (Pre-GCSE)</a>	
<a href="#">GCSE Multiplicative Scaling</a>	

## P13 Unitary method (scaling) quantities/percentages/fractions

What is being tested	Learners are being tested on their ability to use the unitary method when scaling quantities, percentages and fraction.
Learning Objectives	<p>P13.1 Know that sharing 100% into 100 parts equals 1%</p> <p>P13.2 Calculate the value of one item, given the multiple value of the same item</p> <p>P13.3 Calculate a given percentage of a two-digit integer by first finding 1%</p> <p>P13.4 Select the correct method to find a common fraction of an amount by first finding the unit fraction of the amount</p> <p>P13.5 Calculate the value of multiple items by first finding the value of one item</p>
Predecessors	<p>P3 Finding a unit fraction of an amount (calculate equal shares of a whole)</p> <p>P5 Know how many parts there are in a ratio</p>
Successors	<p>P14 Calculating fractional increases/decreases</p> <p>P16 Direct proportion using single multipliers</p> <p>P17 Be able to divide a quantity into a given ratio</p> <p>P18 Find a percentage of an amount</p> <p>P19 Be able to determine one quantity given the other quantity and their ratio</p> <p>P24 Conversions within metric measures</p> <p>P25 Scales and currency</p>
KS2 & KS3 Guidance	Learners first encounter the unitary method in Year 6 (KS1 and KS2, page 306) and use this method throughout Key Stage 3.
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	128 Multiplicative scaling with integer scale factors and ratio notation
	176 Multiplicative scaling and numerical proportion relationships
	<b>New Lesson Resources</b>
	<a href="#">Introduction to Direct Proportion</a>
	<b>Legacy Lesson Resources</b>
<a href="#">Ratio &amp; Proportion (Pre-GCSE)</a>	
<a href="#">GCSE Multiplicative Scaling</a>	

## P14 Calculating fractional increases/decreases

What is being tested	Learners are being tested on their ability to apply fractional increases and decreases.
Learning Objectives	<p>P14.1 Calculate a fractional increase of an integer amount by multiplying by a mixed fraction</p> <p>P14.2 Match bar diagrams with the fractional increase they represent</p> <p>P14.3 Match bar diagrams with the fractional decrease they represent</p> <p>P14.4 Recognise the correct mixed fraction multiplier of a fractional increase</p> <p>P14.5 Recognise the correct common fraction multiplier of a fractional decrease</p> <p>P14.6 Calculate a fractional decrease of an integer amount by multiplying by a common fraction</p>
Predecessors	P13 Unitary method (scaling) quantities/percentages/fractions
Successors	<p>P20 Calculating percentage increases and decreases</p> <p>P22 Percentage change</p>
KS2 & KS3 Guidance	Learners build on their knowledge of fractions and the unitary method to explore multiplicative relationships in Year 7 (KS3, page 100).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	169 Fractional increase and decrease
	<b>New Lesson Resources</b>
	<a href="#">Fractional Increase and Decrease</a>
	<b>Legacy Lesson Resources</b>
	<a href="#">Fractions</a>

## P15 Express multiplicative relationships in a ratio table

What is being tested	Learners are being tested on their understanding of a multiplicative relationships when ratios are represented in a table.
Learning Objectives	<p>P15.1 Find the missing values in a ratio table</p> <p>P15.2 Know that a proportion is the equality of two ratios</p> <p>P15.3 Calculate missing quantities for ratios with integer multipliers using equality of ratios</p> <p>P15.4 Calculate missing quantities for ratios with decimal multipliers to one decimal place using equality of ratios</p> <p>P15.5 Apply a ratio table to percentage problems</p>
Predecessors	P9 Identify the multiplier within a ratio
Successors	<p>P16 Direct proportion using single multipliers</p> <p>P17 Be able to divide a quantity into a given ratio</p> <p>P18 Find a percentage of an amount</p> <p>P19 Be able to determine one quantity, given the other quantity and their ratio</p> <p>P24 Conversions within metric measures</p> <p>P25 Scales and currency</p>
KS2 & KS3 Guidance	Learners begin to identify multipliers within ratios in Year 7 (page 100, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	176 Multiplicative scaling and numerical proportion relationships
	<b>New Lesson Resources</b>
	<a href="#">Introduction to Direct Proportion</a>
	<b>Legacy Lesson Resources</b>
	<a href="#">Ratio &amp; Proportion (Pre-GCSE)</a> <a href="#">GCSE Multiplicative Scaling</a>

## P16 Direct proportion using single multipliers

What is being tested	Learners are being tested on their ability to apply proportional change using a multiplier.
Learning Objectives	<p>P16.1 Apply a given scale factor to a quantity using multiplication</p> <p>P16.2 Calculate missing quantities using single multipliers</p> <p>P16.3 Calculate proportions of ingredients needed, based on a recipe</p> <p>P16.4 Calculate missing quantities in real-life scenarios using single multipliers</p>
Predecessors	<p>P10 Direct proportion using 1 : n ratios</p> <p>P12 Scale factors</p> <p>P13 Unitary method (scaling) quantities/percentages/fractions</p> <p>P15 Express multiplicative relationships in a ratio table</p>
Successors	P26 Pie chart calculations
KS2 & KS3 Guidance	Learners work with scaling in Upper KS2, extending on this idea in Year 9 (page 212, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	176 Multiplicative scaling and numerical proportion relationships
	<b>New Lesson Resources</b>
	<a href="#">Introduction to Direct Proportion</a>
	<a href="#">Multiplicative Reasoning With Recipes</a>
	<b>Legacy Lesson Resources</b>
<a href="#">GCSE Multiplicative Scaling</a>	

## P17 Be able to divide a quantity into a given ratio

What is being tested	Learners are being tested on their ability to divide quantities in a specified ratio, drawing on their understanding of unequal sharing.
Learning Objectives	<p>P17.1 Calculate the value of one part of a whole divided in a given ratio</p> <p>P17.2 Find an amount shared in a given ratio, given the value of 1 part</p> <p>P17.3 Find an amount shared in a given ratio with two parts</p> <p>P17.4 Find an amount shared in a given ratio with three parts</p>
Predecessors	<p>P5 Know how many parts there are in a ratio</p> <p>P11 Convert from a ratio to a proportion</p> <p>P13 Unitary method (scaling) quantities/percentages/fractions</p> <p>P15 Express multiplicative relationships in a ratio table</p>
Successors	None
KS2 & KS3 Guidance	Learners are introduced to the idea of ratio in Year 6 (page 305, KS1 and KS2 guidance), and work with formal ratio notation in Year 7 (page 101, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	225 Finding a quantity within a ratio where either the total amount, a particular amount or a difference in an amount is given
	<b>New Lesson Resources</b>
	<a href="#">Finding a Quantity Within a Ratio</a>
	<b>Legacy Lesson Resources</b>
	<a href="#">Ratio &amp; Proportion (Pre-GCSE)</a> <a href="#">GCSE Ratio</a>

## P18 Find a percentage of an amount

What is being tested	Learners are being tested on their ability to calculate percentages of a specified amount.
Learning Objectives	<p>P18.1 Match percentages to their multipliers</p> <p>P18.2 Find a percentage of an amount using a ratio table</p> <p>P18.3 Find a percentage of a number in terms of another number where the percentage is <math>&gt; 100\%</math></p>
Predecessors	<p>P13 Unitary method (scaling) quantities/percentages/fractions</p> <p>P15 Express multiplicative relationships in a ratio table</p>
Successors	P20 Calculating percentage increases and decreases
KS2 & KS3 Guidance	Learners calculate percentages of a specified amount in Year 8 (page 160, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	130 Calculating a simple percentage of an amount, using chunking
	217 Percentage of an amount, greater than 100%, by chunking
	219 Percentage of an amount, using decimal multipliers
	<b>New Lesson Resources</b>
	N/A
<b>Legacy Lesson Resources</b>	
<a href="#">GCSE Percentages</a>	

## P19 Be able to determine one quantity, given the other quantity and their ratio

What is being tested	Learners are being tested on their understanding of scaling within a ratio, finding one quantity when given another.
Learning Objectives	<p>P19.1 Find a quantity, given the other quantity, and find their ratio using a ratio table</p> <p>P19.2 Identify a quantity, given the other quantity and their ratio</p> <p>P19.3 Calculate a quantity, given the other quantity and their ratio</p>
Predecessors	<p>P5 Know how many parts there are in a ratio</p> <p>P7 Given a ratio, express one part as a fraction of the other</p> <p>P13 Unitary method (scaling) quantities/percentages/fractions</p> <p>P15 Express multiplicative relationships in a ratio table</p> <p>P17 Be able to divide a quantity into a given ratio</p>
Successors	P21 Be able to determine the whole, given one quantity and the ratio
KS2 & KS3 Guidance	Learners are introduced to the idea of ratio in Year 6 (page 305, KS1 and KS2 guidance), and work with formal ratio notation in Year 7 (page 101, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	225 Finding a quantity within a ratio where either the total amount, a particular amount or a difference in an amount is given
	<b>New Lesson Resources</b>
	<a href="#">Finding a Quantity Within a Ratio</a>
	<b>Legacy Lesson Resources</b>
	<a href="#">Ratio &amp; Proportion (Pre-GCSE)</a> <a href="#">GCSE Ratio</a>

## P20 Calculating percentage increases and decreases

What is being tested	Learners are being tested on their ability to apply increases and decreases to amounts using percentages.
Learning Objectives	<p>P20.1 Match percentage increase with single multipliers</p> <p>P20.2 Match percentage decrease with single multipliers</p> <p>P20.3 Identify the percentage increase that is represented by the bar diagram</p> <p>P20.4 Identify the percentage decrease that is represented by the bar diagram</p> <p>P20.5 Calculate a percentage increase using a single multiplier</p> <p>P20.6 Calculate a percentage decrease using a single multiplier</p>
Predecessors	<p>P14 Calculating fractional increases/decreases</p> <p>P18 Find a percentage of an amount</p>
Successors	<p>P22 Percentage change</p> <p>P23 Reverse percentages</p>
KS2 & KS3 Guidance	Learners encounter the idea of percentage change in Year 8 (page 160, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	220 Value after a simple percentage change, using non-calculator methods
	221 Value after a general percentage change, using decimal multipliers
	<b>New Lesson Resources</b>
	N/A
	<b>Legacy Lesson Resources</b>
	<a href="#">GCSE Percentages</a>

## P21 Be able to determine the whole, given one quantity and the ratio

What is being tested	Learners are being tested on their ability to calculate the value of the 'whole', given a ratio and the value of one part.
Learning Objectives	<p>P21.1 Find the whole, given one quantity and a 1 : n ratio, using a ratio table</p> <p>P21.2 Identify the whole, given one quantity and the ratio, using a ratio table</p> <p>P21.3 Calculate the whole, given one quantity and the ratio, using a ratio table</p>
Predecessors	P19 Be able to determine one quantity, given the other quantity and their ratio
Successors	None
KS2 & KS3 Guidance	Learners are introduced to the idea of ratio in Year 6 (page 305), and work with formal ratio notation in Year 7 (page 101).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	225 Finding a quantity within a ratio where either the total amount, a particular amount or a difference in an amount is given
	<b>New Lesson Resources</b>
	<a href="#">Finding a Quantity Within a Ratio</a>
	<b>Legacy Lesson Resources</b>
	<a href="#">Ratio &amp; Proportion (Pre-GCSE)</a> <a href="#">GCSE Ratio</a>

## P22 Percentage change

What is being tested	Learners are being tested on their ability to calculate a percentage change, given the original and new values, as well as to calculate the original and new values given a percentage change.
Learning Objectives	<p>P22.1 Identify the original value from a worded problem</p> <p>P22.2 Identify the new value from a worded problem</p> <p>P22.3 Calculate the percentage change, given the original and new values</p>
Predecessors	<p>P14 Calculating fractional increases/decreases</p> <p>P20 Calculating percentage increases and decreases</p>
Successors	None
KS2 & KS3 Guidance	Learners encounter the idea of percentage change in Year 8 (page 160, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	215 Percentage change
	<b>New Lesson Resources</b>
	N/A
	<b>Legacy Lesson Resources</b>
	<a href="#">GCSE Percentages</a>

## P23 Reverse percentages

What is being tested	Learners are being tested on their understanding of percentages, working inversely to find the 'whole' given a scaled value.
Learning Objectives	<p>P23.1 Identify the initial and final value from a worded question</p> <p>P23.2 Identify the correct division for reversing a percentage increase between 10% and 100%</p> <p>P23.3 Identify the correct division for reversing a percentage decrease between 10% and 100%</p> <p>P23.4 Identify the correct division for reversing a percentage increase between 0% and 10%</p> <p>P23.5 Identify the correct division for reversing a percentage decrease between 0% and 10%</p> <p>P23.6 Calculate the original value after a percentage increase has been applied</p> <p>P23.7 Calculate the original value after a percentage decrease has been applied</p>
Predecessors	P20 Calculating percentage increases and decreases
Successors	None
KS2 & KS3 Guidance	Learners encounter the idea of percentage change in Year 8 (page 160, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	222 Reverse percentage problems using chunking
	223 Reverse percentage problems using decimal multipliers
	<b>New Lesson Resources</b>
	N/A
	<b>Legacy Lesson Resources</b>
	<a href="#">GCSE Percentages</a>

## P24 Conversions within metric measures

What is being tested	Learners are being tested on their ability to convert between common metric units of measure.
Learning Objectives	<p>P24.1 Convert from g to kg</p> <p>P24.2 Convert from grams to kilograms using a ratio table</p> <p>P24.3 Find the number of millimetres in a given number of metres, with a ratio table</p> <p>P24.4 Recognise the correct conversion from cm to km</p> <p>P24.5 Recognise metric conversions</p> <p>P24.6 Recognise the correct conversion from m to mm</p>
Predecessors	<p>P6 Know metric units</p> <p>P8 Ratios in the form 1 : n</p> <p>P13 Unitary method (scaling) quantities/percentages/fractions</p> <p>P15 Express multiplicative relationships in a ratio table</p>
Successors	<p>P25 Scales and currency</p> <p>P27 Non-metric unit (measures) conversions</p>
KS2 & KS3 Guidance	Learners begin converting between metric measures in Year 5 (page 229, KS1 and KS2 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	224d Simplify a ratio involving mismatched metric units or time (excluding distance).
	107 Converting between metric units of measure
	<b>New Lesson Resources</b>
	N/A
	<b>Legacy Lesson Resources</b>
N/A	

## P25 Scales and currency

What is being tested	Learners are being tested on their ability to apply their understanding of scaling to currencies.
Learning Objectives	<p>P25.1 Calculate real life distances using a map and its scale</p> <p>P25.2 Identify how to calculate a real-life distance using a map and its scale</p> <p>P25.3 Calculate real life measurements using a scaled drawing</p> <p>P25.4 Convert £ to € (1 : n)</p> <p>P25.5 Convert € to £ (n : 1)</p> <p>P25.6 Identify a suitable scale for a scaled drawing, given real-life measurements</p> <p>P25.7 Identify the scale of a map, given real life measurements</p>
Predecessors	<p>P13 Unitary method (scaling) quantities/percentages/fractions</p> <p>P15 Express multiplicative relationships in a ratio table</p> <p>P24 Conversions within metric measures</p>
Successors	None
KS2 & KS3 Guidance	Learners work with multiplicative relationships in Year 7 (page 99, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	283 Scale drawings including map scales
	177 Exchange rates
	<b>New Lesson Resources</b>
	N/A
	<b>Legacy Lesson Resources</b>
	<p><a href="#">Ratio &amp; Map Scale</a></p> <p><a href="#">Ratio &amp; Proportion (Pre-GCSE)</a></p> <p><a href="#">GCSE Ratio</a></p>

## P26 Pie chart calculations

What is being tested	Learners are being tested on their ability to interpret data represented in, and construct, pie charts.
Learning Objectives	<p>P26.1 Recognise the number of degrees for one unit in a pie chart</p> <p>P26.2 Interpret data displayed in a pie chart</p> <p>P26.3 Calculate frequencies of categories using pie chart construction angles</p> <p>P26.4 Calculate angles required for categories to construct a pie chart</p> <p>P26.5 Calculate the number of degrees per category, given the number of degrees per unit</p>
Predecessors	P16 Direct proportion using single multipliers
Successors	None
KS2 & KS3 Guidance	Students encounter pie charts in KS2 and build on this in Year 8 (page 167, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	131 Pie charts with simple fractions and percentages
	246 Pie charts with any proportion
	<b>New Lesson Resources</b>
	N/A
	<b>Legacy Lesson Resources</b>
	<a href="#">Charts &amp; Averages</a>

## P27 Non-metric unit (measures) conversions

What is being tested	Learners are being tested on their ability to convert between common metric units of measure their corresponding Imperial units of measure.
Learning Objectives	<p>P27.1 Find the number of miles, given the kilometres and a ratio table</p> <p>P27.2 Calculate the number of steps, given steps : 100 metres and a distance in km</p> <p>P27.3 Calculate pounds from kg, given the ratio 5 kg : 11 lb</p>
Predecessors	P24 Conversions within metric measures
Successors	None
KS2 & KS3 Guidance	Learners work with multiplicative relationships in Year 7 (page 99, KS3 guidance).
Dr Frost Learning Platform References	<b>DF Index skills/subskills</b>
	108 Equivalence of metric and imperial units (inches, pints, pounds and miles)
	<b>New Lesson Resources</b>
	N/A
	<b>Legacy Lesson Resources</b>
	<a href="#">Units</a>



## Contributors

### AQA

We're an independent education charity, providing high quality assessments that are fair, reliable, and support students in their educational journey.

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.

Our qualifications are designed to suit a range of abilities and include GCSEs, AS and A-levels, the Extended Project Qualification and Technical Awards. Our qualifications are internationally recognised and taught in more than 40 countries around the world and they're highly valued by employers and universities.

We're led by our Executive Team and governed by a Board of Trustees drawn from schools, colleges, higher education, children's services and the business community.

### 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.

Dr Frost Learning is a registered charity. Subscription fees and donations allow us to continue operating as a charity and all fees are invested in improving our offering. No subscription is

required for individual teachers for up to three classes. For whole school use there is a fee of £600 per year. However, as part of our charity's vision to make sure our services are available to all schools regardless of budget, we allow schools to apply for a discount. More information on our offering and pricing can be found here: <https://www.drfrost.org/pricing.php>

### 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.