Year 6 Learning and Progression Steps for Mathematics

What are Learning and Progression Steps (LAPS)?

The Learning and Progression Steps are designed to scaffold the learning required in order to meet the expectations of the National Curriculum. Statements in the Lancashire Key Learning for Mathematics document have been broken down into smaller steps to support teachers in planning appropriate learning opportunities. These key pieces of learning will support pupils in becoming fluent in the knowledge and skills of the curriculum and ensure that the learning is effective and sustained.

The number of steps is dependent on the learning and do **not** constitute expectations for the end of each term.

The colour coding is an approximate indicator of end of term expectations.
Orange (including the end of previous year expectation) are the steps in learning for the autumn term.
Green are the steps in learning for the spring term.
Yellow are the steps in learning for the summer term and incorporate the end of year expectations.
The colours correspond with the structure of the Lancashire Mathematics Curriculum and reflect how often each learning objective is explicitly taught across the year. Some key learning objectives are not taught in every term, and in some cases not in the summer term. This means that end of year expectations may need to be met before the end of the summer term.

The final step in the progression for each strand of learning is the end of year expectation.

The steps are **not** of equal size and different amounts of time may be required for children to move between individual steps. For example,

Understand how multiplication and division statements can be represented using arrays	Use arrays to identify what the term 'factor' means	Use arrays to identify all the factor pairs of a given number	Identify factor pairs of a given number within the multiplication tables that they know

Progression is likely to be within the same lesson

Progression is likely to be over a series of lessons

Some learning within the same end of year expectation has been split and designed to run concurrently alongside each other. For example,

Read and write numbers up to 1000 in numerals and in words	Read multiples of 1000 to 10 000 in numerals and in words	Read multiples of 100 to 10 000 in numerals and in words	Read numbers to 10 000 where 0 is not used as a place holder	Read numbers to 10 000 where 0 is used as a place holder	***Read and write numbers to at least 10 000***
	Write multiples of 1000 to 10 000 in numerals and in words	Write multiples of 100 to 10 000 in numerals and in words	Write numbers to 10 000 where 0 is not used as a place holder	Write numbers to 10 000 where 0 is used as a place holder	

Some LAPS may need to be completed before another can be started.

Where have they come from?

The Learning and Progression Steps (LAPS) have been derived from the Lancashire Key Learning in Mathematics statements, identified primarily from the National Curriculum 2014 programmes of study.

How are they different from the Key Learning Statements?

The Learning and Progression Steps (LAPS) are smaller, progressive steps which support learning towards the Key Learning in Mathematics expectations.

How are they different from the Key Learning Indicators of Performance (KLIPs)?

The Key Learning Indicators of Performance (KLIPs) document is an assessment tool. The Learning and Progression Steps (LAPS) document is a planning tool and is not intended to be used for summative assessment purposes. However, they may support teachers in judging whether children are on track to meet the end of year expectations at different points throughout the year.

The terms 'entering', 'developing' and 'secure' are used in Lancashire's assessment approach, KLIPs, as summative judgements in relation to age related expectations. Definitions for these terms can be found in the introduction to the KLIPs document.

How might Learning and Progression Steps (LAPS) in Mathematics be useful?

Learning and Progression Steps (LAPS) may be used in a number of ways. For whole class teaching, LAPS may be used to support differentiation. When planning, it may be appropriate to use LAPS statements to inform learning objectives for a session or number of sessions. Learning and Progression Steps (LAPS) in Mathematics should be selected according to the learning needs of the individual or group. Emphasis however, should always be on developing breadth and depth of learning to ensure skills, knowledge and understanding are sufficiently embedded before moving on.
The LAPS should **not** be used as an assessment tool, but they can inform teachers about children's progress towards the end of year expectations at the end of each term.

Are LAPS consistent with the other resources from the Lancashire Mathematics Team?

Yes, the LAPS are related to the content of the Mathematics Planning Support Disc and also the Progression Towards Written Calculation Policies and the Progression in Mental Calculation Strategies.
These can be found on the website:
www.lancsngfl.ac.uk/curriculum/primarymaths

Key Learning in Mathematics – Year 6

Number – number and place value

- *Count forwards or backwards in steps of integers, decimals, powers of 10*
- Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
- Identify the value of each digit to three decimal places
- *Identify, represent and estimate numbers using the number line*
- *Order and compare numbers including integers, decimals and negative numbers*
- *Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more/less than a given number*
- Round any whole number to a required degree of accuracy
- *Round decimals with three decimal places to the nearest whole number or one or two decimal places*
- Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places
- Use negative numbers in context, and calculate intervals across zero
- *Describe and extend number sequences including those with multiplication and division steps, inconsistent steps, alternating steps and those where the step size is a decimal*
- Solve number and practical problems that involve all of the above

Number – fractions, decimals and percentages

- Compare and order fractions, including fractions > 1 *(including on a number line)*
- Use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts
- Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375 and $\frac{3}{8}$)
- 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 (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$)
- Divide proper fractions by whole numbers (e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$)
- *Find simple percentages of amounts*
- *Solve problems involving fractions*
- Solve problems which require answers to be rounded to specified degrees of accuracy
- Solve problems involving the calculation of percentages (e.g. of measures and such as 15% of 260) and the use of percentages for comparison

Ratio and proportion

- Solve problems involving the relative sizes of two quantities where missing values can be found using integer multiplication/division facts
- Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples
- Solve problems involving similar shapes where the scale factor is known or can be found

Number – addition and subtraction

- *Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method)*
- *Select a mental strategy appropriate for the numbers in the calculation*
- *Recall and use addition and subtraction facts for 1 (with decimals to two decimal places)*
- Perform mental calculations including with mixed operations and large numbers *and decimals*
- *Add and subtract whole numbers and decimals using formal written methods (columnar addition and subtraction)*
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
- Use knowledge of the order of operations to carry out calculations
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- Solve problems involving all four operations, *including those with missing numbers*

Geometry – properties of shapes

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

Geometry – position and direction

- Describe positions on the full coordinate grid (all four quadrants)
- Draw and translate simple shapes on the coordinate plane, and reflect them in the axes

Statistics

- *Continue to complete and interpret information in a variety of sorting diagrams (including sorting properties of numbers and shapes)*
- Interpret and construct pie charts and line graphs and use these to solve problems
- *Solve comparison, sum and difference problems using information presented in all types of graph*
- Calculate and interpret the mean as an average

Algebra

- Use simple formulae
- Generate and describe linear number sequences
- Express missing number problems algebraically
- Find pairs of numbers that satisfy an equation with two unknowns
- Enumerate possibilities of combinations of two variables

Number – multiplication and division

- *Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method)*
- Identify common factors, common multiples and prime numbers
- *Use partitioning to double or halve any number*
- Perform mental calculations, including with mixed operations and large numbers
- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- Multiply one-digit numbers with up to two decimal places by whole numbers
- Divide numbers up to 4 digits by a two-digit whole number using the formal written methods of short or long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- Use written division methods in cases where the answer has up to two decimal places
- Use estimation *and inverse* to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
- Use knowledge of the order of operations to carry out calculations
- Solve problems involving all four operations, *including those with missing numbers*

Measurement

- Use, read and write standard units of length, mass, volume and time using decimal notation to three decimal places
- Convert between standard units of length, mass, volume and time using decimal notation to three decimal places
- Convert between miles and kilometres
- Recognise that shapes with the same areas can have different perimeters and vice versa
- Calculate the area of parallelograms and triangles
- Recognise when it is possible to use formulae for area and volume of shapes
- Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units (e.g. mm^3 and km^3)
- *Calculate differences in temperature, including those that involved a positive and negative temperature*
- Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate

These Learning and Progression Statements (LAPS) are designed to show the necessary steps in learning to make effective and sustainable progress within a single year. They begin with the 'end of year' expectation from the previous year and build up to the 'end of year expectation' of the current year.

The number of steps is dependent on the learning and do **not** constitute expectations for the end of each term.

The steps are **not** of equal size and different amounts of time may be required for children to move between individual steps.

<table>
<tr><td rowspan="11">Number and Place Value</td><td>End of Year 5 expectation</td><td colspan="4">Learning and Progression Statements</td><td>End of Year 6 expectation</td></tr>
<tr><td>Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000

Count forwards and backwards in decimal steps</td><td>Count forwards or backwards in steps of powers of 10 from any number up to 10 000 000</td><td>Count forwards or backwards in steps of integers from any number up to 10 000 000 and through zero
e.g. 105, 60, 15, -30, -75
(counting in steps of 45)</td><td>Count forwards or backwards in decimal steps where the step size is in thousandths greater than one hundredth
e.g. 5.742, 5.757, 5.772
(counting in steps of 0.015)</td><td></td><td>Count forwards or backwards in steps of integers, decimals, powers of 10</td></tr>
<tr><td rowspan="4">Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit</td><td colspan="4">Read numbers up to 10 000 000</td><td rowspan="4">Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit</td></tr>
<tr><td colspan="4">Write numbers up to 10 000 000</td></tr>
<tr><td colspan="4">Compare numbers up to 10 000 000</td></tr>
<tr><td colspan="4">Order numbers up to 10 000 000</td></tr>
<tr><td>Identify the value of each digit to three decimal places</td><td colspan="4">This is consolidation of Year 5 learning and therefore there are no steps towards this end of year expectation</td><td>Identify the value of each digit to three decimal places</td></tr>
<tr><td rowspan="2">Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit

Read, write, order and compare numbers with up to 3 decimal places</td><td colspan="4">Order negative numbers including in a variety of contexts</td><td rowspan="2">Order and compare numbers including integers, decimals and negative numbers</td></tr>
<tr><td colspan="4">Compare negative numbers including in a variety of contexts</td></tr>
<tr><td>Find 0.01, 0.1, 1, 10, 100, 1000 and other powers of 10 more or less than a given number</td><td>Find 0.001 more/less than a given number without crossing any boundaries</td><td>Find 1, 10, 100 or 1000 more/less than a given number up to 10 000 000 including crossing any boundaries</td><td>Find 10 000 or 100 000 more/less than a given number up to 10 000 000 including crossing any boundaries</td><td>Find 0.001 more/less than a given number including crossing any boundaries</td><td>Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more/less than a given number</td></tr>
<tr><td>Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000</td><td colspan="4">Round any number up to 10 000 000 to the nearest 10, 100, 1000, 10 000, 100 000 or 1 000 000</td><td>Round any whole number to a required degree of accuracy</td></tr>
</table>

	Round decimals with two decimal places to the nearest whole number and to one decimal place	Round decimals with three decimal places to the nearest whole number e.g. 327.702 rounds to 328	Round decimals with three decimal places to the nearest tenth e.g. 327.702 rounds to 327.7	Round decimals with three decimal places to the nearest hundredth e.g. 327.702 rounds to 327.70		***Round decimals with three decimal places to the nearest whole number or one or two decimal places***
	Multiply/divide whole numbers and decimals by 10, 100 and 1000	Multiply whole numbers and numbers with up to three decimal places by 10, 100 or 1000		Divide whole numbers by 10, 100 or 1000 and numbers with up to two decimal places by 10 and numbers with up to one decimal place by 100		**Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places**
	Interpret negative numbers in context, count on and back with positive and negative whole numbers, including through zero	Add a positive number to a negative number, including crossing zero e.g. -7 + 4 or -5 + 12 Subtract a positive number from a positive number crossing zero e.g. 4 - 9	Subtract a positive number from a negative number e.g. -8 – 4	Calculate the difference between a positive and a negative number	Calculate the difference between two negative numbers	**Use negative numbers in context, and calculate intervals across zero**
	Describe and extend number sequences including those with multiplication/division steps and where the step size is a decimal	Continue a sequence with inconsistent steps given the rule e.g. if the number is a multiple of 4 then halve it, but if it is odd then add 3	Identify the rule of a sequence with inconsistent steps e.g. 1, 3, 6, 10, 15 by adding one more than the previous step size	Continue a sequence forwards and backwards with alternating steps given the rule e.g. double the number then subtract 3	Identify the rule of a sequence with alternating steps e.g. 5, 50, 55, 550, 555, 5550 by multiplying by 10 then adding 5	***Describe and extend number sequences including those with multiplication and division steps, inconsistent steps, alternating steps and those where the step size is a decimal***
	Solve number and practical problems that involve all of the above	**Children need frequent access to arrange of contexts using the content from all of the above.** **See Using and Applying, Contextual Learning and Assessment section from the Lancashire Mathematics Planning Disc.**				**Solve number and practical problems that involve all of the above**

Number – Addition and Subtraction	End of Year 5 expectation	Learning and Progression Statements					End of Year 6 expectation
	Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method)	**Children need frequent opportunities to select appropriate strategies from the range they have learnt. The most efficient strategy may differ between children as it will be based on their confidence and competence.**					***Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method)***
	Select a mental strategy appropriate for the numbers in the calculation	Recognise and solve calculations that involve known or related facts e.g. 0.62 + 0.38 using knowledge of 62 + 38 = 100	Recognise that the numbers in calculations can be reordered to make calculating more efficient e.g. 54 – 65 + 39 becomes 54 + 39 – 65 and use this strategy where appropriate	Recognise calculations that require mental partitioning e.g. 6584 – 2360 or 873 + 350 and use this strategy where appropriate	Recognise calculations that require counting on mentally to find the difference e.g. 4.1 – 3.46 and use this strategy where appropriate *(This should be supported by a number line)*	Recognise calculations that require counting on or back mentally, bridging efficiently e.g. 0.7 + 0.56 becomes 0.7 + 0.3 + 0.26 and use this strategy where appropriate Recognise calculations that require a mental compensation method e.g. 5.6 + 3.9 becomes 5.6 + 4 – 0.1 and use this strategy where appropriate	***Select a mental strategy appropriate for the numbers in the calculation***
	Recall and use addition and subtraction facts for 1 and 10 (with decimal numbers to one decimal place)	There are no separate steps towards this end of year expectation					***Recall and use addition and subtraction facts for 1 (with decimals to two decimal places)***
	Add and subtract numbers mentally with increasingly large numbers *and decimals to two decimal places*	There are no separate steps towards this end of year expectation					**Perform mental calculations including with mixed operations and large numbers *and decimals***
	Add and subtract whole numbers with more than 4 digits *and decimals with two decimal places,* including using formal written methods (columnar addition and subtraction)	Add and subtract whole numbers up to 10 000 000		Add and subtract numbers with three decimal places e.g. 354.126 – 176.452		Add and subtract numbers with up to three decimal places e.g. 834.2 – 58.829	***Add and subtract whole numbers and decimals using formal written methods (columnar addition and subtraction)***

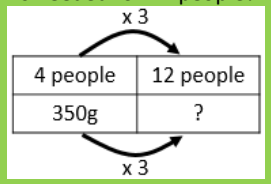
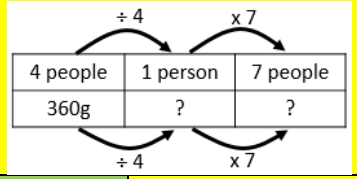
	Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	Round numbers to an appropriate power of 10 e.g. 23 567 + 8214 + 345 210 becomes 24 000 + 8000 + 345 000		**Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy**
	No equivalent objective in Year 5	Know that calculations within brackets are performed first e.g. 3 x (4 + 7) = 33	Know that multiplication or division calculations are performed before addition or subtraction calculations e.g. 60 – 42 ÷ 6 = 53	**Use knowledge of the order of operations to carry out calculations**
	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	**Children need frequent access to arrange of contexts using the content from all of the above. See Using and Applying, Contextual Learning and Assessment section from the Lancashire Mathematics Planning Disc.**		**Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why**
	Solve addition and subtraction problems involving missing numbers	**Children need frequent access to arrange of contexts using the content from all of the above. See Using and Applying, Contextual Learning and Assessment section from the Lancashire Mathematics Planning Disc.**		**Solve problems involving all four operations, *including those with missing numbers***

Number – Multiplication and Division	End of Year 5 expectation	Learning and Progression Statements				End of Year 6 expectation
	Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method)	**Children need frequent opportunities to select appropriate strategies from the range they have learnt. The most efficient strategy may differ between children as it will be based on their confidence and competence.**				***Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method)***
	Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers Establish whether a number up to 100 is prime and recall prime numbers up to 19	Identify common multiples of two numbers	Identify common multiples of three or more numbers	Use rules of divisibility to identify whether a number is prime or composite up to 144 (multiplication tables knowledge)		**Identify common factors, common multiples and prime numbers**
	Use partitioning to double or halve any number, including decimals to two decimal places	Use partitioning to double any number, including decimals to three decimal places	Use partitioning to halve any number, including decimals to three decimal places where all the digits are even e.g. halve 24.682	Use partitioning to halve any number, including decimals to three decimal places where all the digits are not even e.g. halve 34.654		***Use partitioning to double or halve any number***
	Multiply and divide numbers mentally drawing upon known facts	Use knowledge of place value and multiplication facts to divide related decimal numbers where the divisor is scaled down e.g. 32 ÷ 0.8 = 40		Use knowledge of place value and multiplication facts to divide related decimal numbers where the dividend and the divisor are scaled down by different powers of 10 e.g. 0.32 ÷ 0.8 = 0.4		**Perform mental calculations, including with mixed operations and large numbers**
	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	This is consolidation of Year 5 learning and therefore there are no steps towards this end of year expectation				**Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication**
	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 a number with one decimal place by a single digit e.g. 34.3 x 8	Multiply a number with two decimal places by a single digit e.g. 45.38 x 7	Multiply a number with one decimal place by a two-digit number e.g. 34.7 x 53	Multiply a number with two decimal places by a two-digit number e.g. 34.52 x 23	**Multiply one-digit numbers with up to two decimal places by whole numbers**

	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	Divide a 3-digit number by a 2-digit number	Divide a 3-digit number by a 2-digit number and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context	Divide a 4-digit number by a 2-digit number	Divide a 4-digit number by a 2-digit number 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 whole number using the formal written methods of short or 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 one-digit number using the formal written method of short division and interpret remainders appropriately for the context	Use written division methods where the answer has one decimal place				**Use written division methods in cases where the answer has up to two decimal places**
	Use estimation / inverse to check answers to calculations; determine, in the context of a problem, an appropriate degree of accuracy	This is consolidation of Year 5 learning and therefore there are no steps towards this end of year expectation				**Use estimation *and inverse* to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy**
	Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	Know that calculations within brackets are performed first e.g. 3 x (4 + 7) = 33		Know that multiplication or division calculations are performed before addition or subtraction calculations e.g. 60 – 42 ÷ 6 = 53		**Use knowledge of the order of operations to carry out calculations**
	Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	**Children need frequent access to arrange of contexts using the content from all of the above. See Using and Applying, Contextual Learning and Assessment section from the Lancashire Mathematics Planning Disc.**				**Solve problems involving all four operations, *including those with missing numbers***

Number – Fractions	End of Year 5 expectation	Learning and Progression Statements						End of Year 6 expectation
	Compare and order fractions whose denominators are all multiples of the same number *(including on a number line)*	Compare two fractions or mixed numbers by using common multiples to express the fractions in the same denomination			Order three or more fractions or mixed numbers by using common multiples to express the fractions in the same denomination			**Compare and order fractions, including fractions > 1 *(including on a number line)***
	Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths	Understand and use the term 'simplify' and use common factors to simplify fractions			Use common multiples to express fractions in the same denomination			**Use common factors to simplify fractions; use common multiples to express fractions in the same denomination**
	Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents **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 fractions with a denominator of a multiple of 10 or 25**	Know that: $\frac{3}{5}$ is 0.6 or 60% $\frac{1}{3}$ is approximately 0.33 or 33.3% $\frac{2}{3}$ is approximately 0.66 or 66.6% $\frac{1}{8}$ is 0.125 or 12.5%			Use the fact that $\frac{1}{8}$ is 0.125 or 12.5% to derive decimal and percentage equivalents for $\frac{3}{8}$, $\frac{5}{8}$ and $\frac{7}{8}$			**Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts**
	Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents	Calculate decimal fraction equivalents by scaling up from the decimal equivalent of the unit fraction e.g. $\frac{1}{8}$ is 0.125 so $\frac{3}{8}$ is 0.125 x 3 = 0.375			Calculate decimal fraction equivalents by dividing the numerator by the denominator			**Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375 and $\frac{3}{8}$)**
	Add and subtract fractions with denominators that are the same and that are multiples of the same number *(using diagrams)*	Add two fractions by converting both into fractions with a common denominator	Subtract two fractions by converting both into fractions with a common denominator	Add a fraction to a mixed number by converting both fractional parts into fractions with a common denominator	Subtract a fraction from a mixed number by converting both fractional parts into fractions with a common denominator	Add two mixed numbers by converting both fractional parts into fractions with a common denominator	Subtract two mixed numbers by converting both fractional parts into fractions with a common denominator	**Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions**
	Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	Use pictorial representations to show multiplication of one unit fraction by another e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ by interpreting $\frac{1}{4} \times \frac{1}{2}$ as $\frac{1}{4}$ of $\frac{1}{2}$	Use pictorial representations to show multiplication of a non-unit fraction by a unit fraction e.g. $\frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$ by interpreting $\frac{3}{4} \times \frac{1}{2}$ as $\frac{3}{4}$ of $\frac{1}{2}$	Use pictorial representations to show multiplication of a non-unit fraction by another e.g. $\frac{3}{4} \times \frac{2}{3} = \frac{6}{12}$ by interpreting $\frac{3}{4} \times \frac{2}{3}$ as $\frac{3}{4}$ of $\frac{2}{3}$	Recognise that the numerators are multiplied together to give the numerator of the answer and the denominators are multiplied together to give the denominator of the answer	Write answers in their simplest form		**Multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$)**

	No equivalent objective in Year 5	Use pictorial representations to show division of a non-unit fraction by a whole number where the numerator is the same as the divisor e.g. $\frac{3}{5} \div 3 = \frac{1}{5}$ understanding ÷ 2 as halving, ÷ 3 as finding one third etc.	Use pictorial representations to show division of a non-unit fraction by a whole number where the numerator is a multiple of the divisor e.g. $\frac{8}{9} \div 4 = \frac{2}{9}$ understanding ÷ 2 as halving, ÷ 3 as finding one third etc.	Recognise that when dividing a fraction by a whole number, if the numerator is a multiple of the divisor then the numerator is divided by the divisor and the denominator stays the same	Use pictorial representations to show division of one unit fraction by a whole number e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$ understanding ÷ 2 as halving, ÷ 3 as finding one third etc	Use pictorial representations to show division of a non-unit fraction by a whole number where the numerator is not a multiple of the divisor e.g. $\frac{5}{6} \div 3 = \frac{5}{18}$ understanding ÷ 2 as halving, ÷ 3 as finding one third etc.	Recognise that when dividing a fraction by a whole number, if the numerator is not a multiple of the divisor then the denominator is multiplied by the divisor and the numerator stays the same	**Divide proper fractions by whole numbers (e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$)**
	Recognise the per cent symbol (%) and understand that per cent relates 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 fractions with a denominator of a multiple of 10 or 25**	Find 1% of an amount by dividing by 100 or by dividing 10% of the amount by 10	Find 5% of an amount by dividing 10% by 2 (finding half of 10%)	Find 15%, 35%, 45%, 55%, 65%, 85% of an amount by adding multiples of 10% of the amount to 5% of the amount	Find percentages of amounts that are multiples of 10% of the amount added to multiples of 1% of the amount e.g. 43% of 120	Find percentages of amounts that require a compensation strategy e.g. 95% of an amount is 100% - 5%		***Find simple percentages of amounts***
	Solve problems involving fractions and decimals to three places	**Children need frequent access to arrange of contexts using the content from all of the above. See Using and Applying, Contextual Learning and Assessment section from the Lancashire Mathematics Planning Disc.**						***Solve problems involving fractions***
	Solve problems involving fractions and decimals to three places	**Children need frequent access to arrange of contexts using the content from all of the above. See Using and Applying, Contextual Learning and Assessment section from the Lancashire Mathematics Planning Disc.**						**Solve problems which require answers to be rounded to specified degrees of accuracy**
	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 fractions with a denominator of a multiple of 10 or 25	**Children need frequent access to arrange of contexts using the content from all of the above. See Using and Applying, Contextual Learning and Assessment section from the Lancashire Mathematics Planning Disc.**						**Solve problems involving the calculation of percentages (e.g. of measures and such as 15% of 260) and the use of percentages for comparison**

	End of Year 5 expectation	Learning and Progression Statements					End of Year 6 expectation
Ratio and Proportion	**Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates**	Use concrete materials or pictorial representations to show scaling up or down to find missing values e.g. 4 people eat 350g of pasta, how much pasta is needed for 12 people?		Use a direct proportion diagram to solve problems when finding missing values e.g. 4 people eat 350g of pasta, how much pasta is needed for 12 people? 	Use a direct proportion diagram to solve problems when finding missing values by finding how much is needed for one first e.g. 4 people eat 360g of pasta, how much pasta is needed for 7 people? 	**Solve problems involving the relative sizes of two quantities where missing values can be found using integer multiplication / division facts**
	No equivalent objective in Year 5	Use concrete materials or pictorial representations to share a single digit to a given ratio e.g. a total of 5 sweets in the ratio of 2:3 (2 sweets for you and 3 sweets for me)	Use concrete materials or pictorial representations to share amounts to a given ratio where the total is a multiple of the sum of the parts (a ratio of 2:3 has 5 parts) e.g. 25 sweets in the ratio of 2:3 would be shared as 10:15	Use concrete materials or pictorial representations to share amounts to a given ratio where the value of one of the parts is given and the value of the other part is calculated e.g. A number of apples are in the ratio of 1 green to 3 red. 5 of them are green, how many are red?	Use concrete materials or pictorial representations to share amounts to a given ratio where the value of one of the parts is given and the total is calculated e.g. A number of apples are in the ratio of 1 green to 3 red. 5 of them are green, how many apples are there?	Use knowledge of multiplication and division facts to solve problems involving unequal sharing	**Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples**
	Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates	Identify the multiplicative relationship between corresponding sides of similar shapes			Use the multiplicative relationship for corresponding sides to calculate the lengths of missing sides		**Solve problems involving similar shapes where the scale factor is known or can be found**

	End of Year 5 expectation	Learning and Progression Statements						End of Year 6 expectation
Algebra	**No equivalent objective in Year 5**	Describe simple rules using words e.g. perimeter of a regular hexagon is one length multiplied by 6	Write simple rules using symbols e.g. p = l x 6 where p is the perimeter of a regular hexagon and l is the length of one side	Understand and use algebraic convention for multiplication e.g. 6 x l = 6l (because it is l + l + l + l + l + l) and a + a = 2a	Understand and use algebraic convention for combining like terms e.g. a + 4 + a + 8 = 2a + 12	Substitute values for variables (letters) in simple formulae e.g. 3t + 4 = ? where t is 5	Find the value of a variable (letter) from a given formula e.g. 3t + 4 = 16	**Use simple formulae**
	Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 ***Count forwards and backwards in decimal steps*** ***Describe and extend number sequences including (those with multiplication / division steps and) where the step size is a decimal***	Generate a linear number sequence when given the rule for each term Term 1 2 3 4 Value 2 Complete the sequence using the rule: multiply the term by 3 and subtract 1	Describe the relationship between the values in a linear sequence and their position (term) where the relationship is a single step Term 1 2 3 4 Value 3 6 9 12 e.g. the value is 3 times the term	Describe the relationship between the values in a linear sequence and their position (term) where the relationship is two steps Term 1 2 3 4 Value 4 7 10 13 e.g. the value is 3 times the term plus 1	Use the relationship between the values in a linear sequence and their position to identify the value of a given term	Use the relationship between the values in a linear sequence and their position to identify the term from a given value	Describe the rule for a linear sequence algebraically e.g. 3 times the term plus 1 can be represented as 3n + 1 where n is the term number	**Generate and describe linear number sequences**
	No equivalent objective in Year 5	Express a given one-step word problem algebraically e.g. I think of a number and subtract 15. My answer is 12. What is my number? a – 15 = 12			Express a given two-step word problem algebraically e.g. Megan has two boxes. There are m counters in each box. She puts all her counters together in a pile and then removes five of them. Write an expression for the number of counters that are in the pile now 2m – 5 or m + m – 5			**Express missing number problems algebraically**
	Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	Find pairs of missing numbers to complete an equation where a total is given e.g. 2g + w = 10	Find pairs of missing numbers to complete an equation with addition and/or subtraction e.g. 235 + ? = ! - 190	Describe the relationship between the pairs of numbers used to solve the equation e.g. 235 + ? = ! – 190 the missing numbers have a difference of 425 which is the same difference between 235 and -190	Find pairs of missing numbers to complete an equation with multiplication and/or division e.g. ? x 6 = 18 x !	Describe the relationship between the pairs of numbers used to solve the equation e.g. ? x 6 = 18 x ! the missing number on the left of the = sign is 3 times greater than the missing number on the right of the = because 18 is 3 times greater than 6		**Find pairs of numbers that satisfy an equation with two unknowns**
	No equivalent objective in Year 5	Use concrete materials or pictorial representations to systematically find all the combinations of two variables e.g. a football kit is made up of a shirt, shorts and socks and each item can be red or blue. How many different combinations are there?			Identify and use the relationship between the number of options for each variable and the number of possible combinations of the two variables e.g. variable 1 are the items of clothing (3 items) variable 2 are the colours (2 colours) 8 possibilities which is 2 x 2 x 2			**Enumerate possibilities of combinations of two variables**

Geometry – Properties of Shapes	End of Year 5 expectation	Learning and Progression Statements							End of Year 6 expectation
	Complete and interpret information in a variety of sorting diagrams (including those used to sort properties of numbers and shapes)	This is consolidation of Year 5 learning and therefore there are no steps towards this end of year expectation							**Compare/classify geometric shapes based on the properties and sizes**
	Draw given angles, and measure them in degrees (°)	Complete a given shape by drawing one angle of a given size and one side of a given length		Draw a given shape by drawing one angle of a given size and sides of a given length		Draw a given shape by drawing angles of a given size and sides of a given length			**Draw 2-D shapes using given dimensions and angles**
	No equivalent objective in Year 5	Know that the perimeter of a circle is called the circumference Know that a straight line from one point on the edge of a circle to another point on the edge that passes through the centre is called the diameter. Know that a straight line from the centre of a circle to the edge is called a radius. Identify that the radius is half of the diameter or that the diameter is double the radius.							**Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius**
	Identify 3-D shapes from 2-D representations	Identify nets that create 3-D shapes and ones that do not	Draw the net of a cube in different ways	Draw the net of a variety of cuboids in which the end faces are square	Draw the net of a variety of cuboids in which no faces are square	Draw the net of a variety of triangular prisms in which the end faces are equilateral triangles	Draw the net of a variety of triangular prisms in which the end faces are isosceles triangles	Draw the net of other simple 3-D shapes including a range of pyramids and prisms	**Recognise, describe and build simple 3-D shapes, including making nets**
	Identify: - angles at a point and one whole turn (total 360°) - angles at a point on a straight line and half a turn (total 180°) - other multiples of 90°	Recognise that vertically opposite angles are equal				Calculate missing angles where two straight lines meet and one angle is given			**Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles**
	Use the properties of rectangles to deduce related facts and find missing lengths and angles	Find missing angles in triangles where two angles are given		Find missing angles in isosceles triangles where one angle is given		Use properties of quadrilaterals to find missing angles when given an appropriate amount of information		Use properties of regular polygons to find missing angles when given an appropriate amount of information	**Find unknown angles in any triangles, quadrilaterals, regular polygons**

Geometry – Position and Direction	**End of Year 5 expectation**	**Learning and Progression Statements**				**End of Year 6 expectation**
	Describe positions on the first quadrant of a coordinate grid ***Plot specified points and complete shapes***	Describe positions in the first two quadrants of a coordinate grid (the x-axis only is extended into negative numbers)				**Describe positions on the full coordinate grid (all four quadrants)**
	Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed	Translate simple shapes in two directions on a coordinate grid within the first quadrant identifying the coordinates of the vertices after translation	Translate simple shapes in two directions on a coordinate grid where one axis is crossed identifying the coordinates of the vertices after translation	Translate simple shapes in two directions on a coordinate grid where both axes are crossed identifying the coordinates of the vertices after translation	Reflect a shape in one axis, including when the shape is touching an axis and has no sides parallel or perpendicular to the axis, identifying the coordinates of the vertices after reflection	**Draw and translate simple shapes on the coordinate plane, and reflect them in the axes**

<table>
<tr><td rowspan="5">Statistics</td><td>End of Year 5 expectation</td><td colspan="7">Learning and Progression Statements</td><td>End of Year 6 expectation</td></tr>
<tr><td>Complete and interpret information in a variety of sorting diagrams (including those used to sort properties of numbers and shapes)</td><td colspan="7">This is consolidation of Year 5 learning and therefore there are no steps towards this end of year expectation</td><td>Continue to complete and interpret information in a variety of sorting diagrams (including sorting properties of numbers and shapes)</td></tr>
<tr><td>No equivalent objective in Year 5</td><td>Interpret pie charts by directly comparing the size of the segments</td><td>Identify halves, quarters and thirds of a circle including in different orientations</td><td>Relate the proportion (including percentage) of the circle to the proportion of the total where the segments are halves, thirds and quarters</td><td>Identify sixths and eighths of a circle, including different orientations, by comparing them to halves, quarters and thirds</td><td>Relate the proportion (including percentage) of the circle to the proportion of the total where the segments are sixths and eighths</td><td>Construct a pie chart using a circle split into equal sections where the values of the data set are multiples of the number of sections of the circle</td><td>Construct a pie chart using a protractor where the total of the data set is a factor of 360 (degrees)</td><td>Interpret and construct pie charts and line graphs and use these to solve problems</td></tr>
<tr><td>Solve comparison, sum and difference problems using information presented in all types of graph including a line graph</td><td colspan="7">Children need frequent access to arrange of contexts using the content from all of the above.
See Using and Applying, Contextual Learning and Assessment section from the Lancashire Mathematics Planning Disc.</td><td>Solve comparison, sum and difference problems using information presented in all types of graph</td></tr>
<tr><td>Calculate and interpret the mode, median and range</td><td colspan="3">Calculate the mean as an average and understand that it is the mathematical representation of the typical value of a series of numbers i.e. the mean of 4, 6, 8, 10 and 12 is 8 because 8 + 8 + 8 + 8 + 8 would give the same total</td><td colspan="4">Interpret the mean as an average including when it is appropriate to be used</td><td>Calculate and interpret the mean as an average</td></tr>
</table>

	End of Year 5 expectation	Learning and Progression Statements					End of Year 6 expectation
Measurement	***Use, read and write standard units of length and mass*** **Estimate *(and calculate)* volume ((e.g., using 1 cm³ blocks to build cuboids (including cubes)) and capacity (e.g. using water)**	This is consolidation of Year 5 learning and therefore there are no steps towards this end of year expectation					**Use, read and write standard units of length, mass, volume and time using decimal notation to three decimal places**
	Convert between different units of metric measure	Convert between different units of time where long division is required e.g. how many days is 356 hours?	Calculate the number of cm³ in different cuboids where dimensions are given in metres				**Convert between standard units of length, mass, volume and time using decimal notation to three decimal places**
	Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints	Understand and use approximate equivalences between miles and kilometres when given the conversion graph or conversion fact that 5 miles ≈ 8km					**Convert between miles and kilometres**
	Measure/calculate the perimeter of composite rectilinear shapes **Calculate and compare the area of rectangle, use standard units square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes**	Find the perimeter of different rectangles that have the same area					**Recognise that shapes with the same areas can have different perimeters and vice versa**
	Calculate and compare the area of rectangle, use standard units square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes	Derive the area of a parallelogram by relating it to a rectangle with the same width and vertical height	Calculate the area of parallelograms	Derive the area of a right angled triangle by relating it to a rectangle with the same width and vertical height	Derive the area of any triangle by relating it to a rectangle with the same width and vertical height	Calculate the area of triangles	**Calculate the area of parallelograms and triangles**

	Calculate and compare the area of rectangle, use standard units square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes **Estimate *(and calculate)* volume ((e.g., using 1 cm^3 blocks to build cuboids (including cubes)) and capacity (e.g. using water)**	Know the formulae for the area of: rectangles (including squares) is length x width and how this relates to the area of parallelograms as base x height	Know the formulae for the area of: rectangles (including squares) is length x width and how this relates to the area of triangles as ½ (base x height)	Know the formulae for the volume of cuboids (including cubes) is length x width x depth	Know the formulae for the volume of triangular prisms is ½ (base x height) x depth	**Recognise when it is possible to use formulae for area and volume of shapes**
	Estimate *(and calculate)* volume ((e.g., using 1 cm^3 blocks to build cuboids (including cubes)) and capacity (e.g. using water) ***Understand the difference between liquid volume and solid volume***	Calculate and compare the volumes of different cuboids (including cubes) where the dimensions of the cuboids are in the same unit		Calculate and compare the volumes of different cuboids (including cubes) where the dimensions of the cuboids are not in the same unit		**Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units (e.g. mm^3 and km^3)**
	Interpret negative numbers in context, count on and back with positive and negative whole numbers, including through zero	Calculate the difference between a positive and a negative temperature		Calculate the difference between two negative temperatures		***Calculate differences in temperature, including those that involved a positive and negative temperature***
	Solve problems involving converting units of time **Use all four operations to solve problems involving measure using decimal notation, including scaling**	**Children need frequent access to arrange of contexts using the content from all of the above.** **See Using and Applying, Contextual Learning and Assessment section from the Lancashire Mathematics Planning Disc.**				**Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate**