

Alston and Nenthead
Primary School

Primary Mathematics Policy

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Statement of Intent

At Alston Primary School, we believe that, through the study of mathematics, children make sense of their world and enrich their understanding of it.

This policy sets out the framework in which the mathematics curriculum will be taught.

Through this curriculum, children will become fluent in the fundamentals of mathematics by:

- Developing conceptual understanding.
- Recalling and applying knowledge rapidly and accurately.
- Reasoning mathematically.
- Solving problems by applying mathematical skills to a variety of routine and non-routine problems.

Despite being a subject of its own, pupils should make rich connections with science and other subjects.

Signed by

Headteacher

Date:

Chair of Governors

Date:

1. Introduction

Purpose of study

Mathematics is vital to everyday life, and has provided the solution to many intriguing problems over the centuries. Most forms of employment benefit from knowledge of mathematics, and therefore an education in it provides a very important understanding of the world.

Information and computer technology (ICT)

Calculators should only be introduced near the end of key stage 2 to allow pupils to first learn how to solve simple problems in their heads. Teachers should decide when is best to use ICT tools.

Spoken language

Pupils should be encouraged to speak about mathematical problems aloud to assist their learning and provoke thoughts of solutions.

Attainment targets

By the end of each key stage, pupils should know, be able to apply and understand the subject matter, skills and processes specified in the curriculum.

Curriculum

Nenthead and Alston primary School use White Rose Hub materials to ensure the correct coverage of areas over the school year. This may be through their mixed year overviews or through particular age group overviews.

This along, with their Schemes of Learning, forms the basis for our planning. This allows us to have a clear overview of the progression and expectations for each year and what this looks like. The suggested activities may be used or adapted for teacher assessment purposes.

Assessment is done formatively through our use of ScholarPack. In December 2016, our summative assessments will be done at the end of each term with White Rose assessments tests.

In addition, each class has a quick maths/ten a day session. This is an independent task which is then marked as a class with a great deal of shared talk about how the children have completed questions. They are encouraged to increase their own personal scores. The questions are based around the end of term assessments.

2. Key stage 1 – years 1 and 2

- 2.1. The main focus of key stage 1 is to ensure pupils develop the necessary confidence and skills with whole numbers, counting and place value. This involves numerals, words and the 4 operations, including with practical resources.
- 2.2. Pupils should be able to describe, draw, compare, and sort different shapes with relevant vocabulary. Length, mass, capacity/volume, time and money should all be involved in lessons.
- 2.3. By the end of year 2, all pupils should know the number bonds to 20 and be comfortable with place value.
- 2.4. Pupils should also be able to read and spell mathematical vocabulary appropriate to their age.

3. Year 1 programme of study

3.1. Number – number and place value

Pupils will be taught to:

- 3.1.1. Count to 100, forwards and backwards, beginning from any number.
- 3.1.2. Count, read, and write numbers from 1 to 100.
- 3.1.3. Count in multiples of 2, 5, and 10.
- 3.1.4. Identify 1 more and 1 less from a number.
- 3.1.5. Identify and represent numbers using objects and pictures (using a number line) and use language of: equal to, more than, less than (fewer), most, least.
- 3.1.6. Read and write numbers from 1 to 20 in numerals and words.

3.2. Number – addition and subtraction

Pupils will be taught to:

- 3.2.1. Read, write, and interpret statements involving addition, subtraction, and equals signs.
- 3.2.2. Represent and use number bonds and related subtraction facts within 20.
- 3.2.3. Add and subtract one and two-digit numbers to 20, including 0.
- 3.2.4. Solve one-step problems which involve addition and subtraction.

3.3. Number – multiplication and division

Pupils will be taught to:

3.3.1. Solve one-step problems using multiplication and division.

3.4. Number - fractions

Pupils will be taught to:

3.4.1. Recognise, find and name a half as 1 of 2 equal parts.

3.4.2. Recognise, find and name a quarter as 1 of 4 equal parts.

3.5. Measurement

Pupils will be taught to:

3.5.1. Compare, describe and solve practical problems for:

- Lengths and heights.
- Mass/weight.
- Capacity and volume.
- Time.

3.5.2. Measure and begin to record the following:

- Lengths and heights.
- Mass/weight.
- Capacity and volume.
- Time.
- Recognise and know the value of different denominations of coins and notes.
- Sequence events in chronological order using language.

3.5.3. Recognise and use language relating to dates, including days of the week, weeks, months, and years.

3.5.4. Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.

3.6. Geometry – properties of shapes

Pupils will be taught to:

3.6.1. Recognise and name 2D and 3D shapes.

3.7. Geometry – position and direction

Pupils will be taught to:

3.7.1. Describe position, direction and movement, including whole, half, quarter and three-quarter turns.

4. Year 2 programme of study

4.1. Number – number and place value

Pupils will be taught to:

- 4.1.1. Count in steps of 2, 3, and 5 from 0, and in 10s from any number, forward and backward.
- 4.1.2. Recognise the place value of each digit in a two-digit number.
- 4.1.3. Identify, represent and estimate numbers using different depictions, including the number line.
- 4.1.4. Compare and order numbers from 0 to 100; using $<$, $>$ and $=$ signs.
- 4.1.5. Read and write numbers 1 to 100 in numerals and words.
- 4.1.6. Use place value and number facts to solve problems.

4.2. Number – addition and subtraction

Pupils will be taught to:

- 4.2.1. Solve problems with addition and subtraction:
 - Using concrete objects and pictorial representations.
 - Applying their increasing knowledge of mental and written methods.
- 4.2.2. Recall and use addition and subtraction facts to 20, and derive and use related facts up to 100.
- 4.2.3. Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
 - A two-digit number and 1s.
 - A two-digit number and 10s.
 - 2 two-digit numbers.
 - Adding 3 one-digit numbers.
- 4.2.4. Show that the addition of 2 numbers can be done in any order and subtraction of 1 number from another cannot.
- 4.2.5. Recognise and use the inverse relationship between addition and subtraction, and use this to check calculations and solve missing number problems.

4.3. Number – multiplication and division

Pupils will be taught to:

- 4.3.1. Recall and use multiplication and division facts for the 2, 5, and 10 multiplication tables.
- 4.3.2. Recognise odd and even numbers.

- 4.3.3. Calculate mathematical statements for multiplication and division within the multiplication tables and write them using \times , \div , and $=$ signs.
- 4.3.4. Show that multiplication of 2 numbers can be done in any order and division of 1 number by another cannot.
- 4.3.5. Solve problems involving multiplication and division using materials, arrays, repeated addition, mental methods, and multiplication and division facts.

4.4. Number – fractions

Pupils will be taught to:

- 4.4.1. Recognise, find, name, and write fractions of a length, shape, set of objects or quantity.
- 4.4.2. Write simple fractions and recognise their equivalence e.g. $\frac{1}{2}$ and $\frac{2}{4}$.

4.5. Measurement

Pupils will be taught to:

- 4.5.1. Choose and use appropriate standard units to estimate and measure length/height, mass, temperature, and capacity.
- 4.5.2. Compare and order lengths, mass, volume/capacity and record the results using $>$, $<$ and $=$.
- 4.5.3. Recognise and use symbols for pounds (£) and pence (p); and combine amounts to make a particular value.
- 4.5.4. Find different combinations of coins that equal the same amounts of money.
- 4.5.5. Solve simple problems in a practical context e.g. giving change.
- 4.5.6. Compare and order intervals of time.
- 4.5.7. Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times.
- 4.5.8. Know the number of minutes in an hour and the number of hours in a day.

4.6. Geometry – properties of shapes

Pupils will be taught to:

- 4.6.1. Identify and describe the properties of 2D shapes, including the number of sides, and line symmetry in a vertical line.

- 4.6.2. Identify and describe the properties of 3D shapes, including the number of edges, vertices and faces.
- 4.6.3. Identify 2D shapes on the surface of 3D shapes.
- 4.6.4. Compare and sort common 2D and 3D shapes and everyday objects.

4.7. Geometry – position and direction

Pupils will be taught to:

- 4.7.1. Order and arrange combinations of mathematical objects in patterns and orders.
- 4.7.2. Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns.

4.8. Statistics

Pupils will be taught to:

- 4.8.1. Interpret and construct simple pictograms, tally charts, block diagrams and tables.
- 4.8.2. Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity.
- 4.8.3. Ask and answer questions about totalling and comparing data.

5. Lower key stage 2 – years 3 and 4

The main focus of lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the 4 operations, including facts to do with numbers and the concept of place value.

Pupils should also develop their ability to solve a range of problems, including simple fractions and decimal place value. Pupils should draw with increasing accuracy and develop mathematical reasoning.

By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table. They should show precision and fluency in their work.

Pupils should read and spell mathematical vocabulary correctly and confidently.

6. Year 3 programme of study

6.1. Number – number and place value

Pupils will be taught to:

- 6.1.1. Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number.
- 6.1.2. Recognise the place value of each digit in a 3-digit number (100s, 10s, 1s).
- 6.1.3. Compare and order numbers up to 1,000.
- 6.1.4. Identify, represent and estimate numbers using different representations.
- 6.1.5. Read and write numbers up to 1,000 in numerals and in words.
- 6.1.6. Solve number problems and practical problems involving these concepts.

6.2. Number – addition and subtraction

Pupils will be taught to:

- 6.2.1. Add and subtract numbers mentally, including:
 - A three-digit number and 1s.
 - A three-digit number and 10s.
 - A three-digit number and 100s.
- 6.2.2. Add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction.
- 6.2.3. Estimate the answer to a calculation and reverse operations to check answers.
- 6.2.4. Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.

6.3. Number – multiplication and division

Pupils will be taught to:

- 6.3.1. Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.
- 6.3.2. Write and calculate mathematical statements for multiplication and division using the multiplication tables, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.
- 6.3.3. Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

6.4. Number - fractions

Pupils will be taught to:

- 6.4.1. Count up and down in tenths.
- 6.4.2. Distinguish what tenths are.
- 6.4.3. Distinguish, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.
- 6.4.4. Distinguish and use fractions as numbers: unit fractions and non-unit fractions with small denominators.
- 6.4.5. Distinguish and show, using diagrams, equivalent fractions with small denominators.
- 6.4.6. Add and subtract fractions with the same denominator within one whole.
- 6.4.7. Compare and order unit fractions, and fractions with the same denominators.
- 6.4.8. Solve problems that involve all of the above.

6.5. Measurement

Pupils will be taught to:

- 6.5.1. Measure, compare, add and subtract: lengths, mass, volume/capacity.
- 6.5.2. Measure the perimeter of simple 2D shapes.
- 6.5.3. Add and subtract amounts of money to give change.
- 6.5.4. Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks.
- 6.5.5. Estimate, record, compare and read times with increasing accuracy to the nearest minute.
- 6.5.6. Use vocabulary such as o'clock, am/pm, morning, afternoon, noon, and midnight.
- 6.5.7. Distinguish the number of seconds in a minute and the number of days in each month, year and leap year.
- 6.5.8. Compare the durations of events.

6.6. Geometry – properties of shapes

Pupils will be taught to:

- 6.6.1. Draw 2D shapes and make 3D shapes using modelling materials; recognise 3D shapes in different orientations and describe them.

- 6.6.2. Recognise angles as a property of shape or a description of a turn.
- 6.6.3. Identify right angles and distinguish that 2 right angles make a half-turn, 3 make three-quarters of a turn and 4 a complete turn; identify whether angles are greater than or less than a right angle.
- 6.6.4. Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.

6.7. Statistics

Pupils will be taught to:

- 6.7.1. Show data using bar charts, pictograms and tables.
- 6.7.2. Solve one and two step data using bar charts, pictograms and tables.

7. Year 4 programme of study

7.1. Number – number and place value

Pupils will be taught to:

- 7.1.1. Count in multiples of 6, 7, 9, 25 and 1,000.
- 7.1.2. Find 1,000 more or less than a chosen number.
- 7.1.3. Count negative numbers back from 0.
- 7.1.4. Recognise place value of each digit of a four-digit number.
- 7.1.5. Recognise, represent and estimate numbers using different representations.
- 7.1.6. Round any number to the nearest 10, 100 or 1,000.
- 7.1.7. Solve number and practical problems that involve all of the above, and with increasingly large numbers.
- 7.1.8. Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of 0 and place value.

7.2. Number – addition and subtraction

Pupils will be taught to:

- 7.2.1. Add and subtract numbers with up to 4 digits using formal written methods and columnar addition and subtraction where necessary.
- 7.2.2. Estimate and use inverse operations to check answers to a calculation.
- 7.2.3. Solve addition and subtraction two step problems in contexts, deciding which operations to use and why.

7.3. Number – multiplication and division

Pupils will be taught to:

- 7.3.1. Use multiplication and division facts for tables up to 12x12.
- 7.3.2. Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together 3 numbers.
- 7.3.3. Recognise and use factor pairs and commutativity in mental calculations.
- 7.3.4. Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.
- 7.3.5. Solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

7.4. Number - fractions (including decimals)

Pupils will be taught to:

- 7.4.1. Recognise and show, using diagrams, families of common equivalent fractions.
- 7.4.2. Count up and down in hundredths; recognise that hundredths arise when dividing an object by 100 and dividing tenths by 10.
- 7.4.3. Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number.
- 7.4.4. Add and subtract fractions with the same denominator.
- 7.4.5. Recognise and write decimal equivalents of any number of tenths or hundreds.
- 7.4.6. Identify and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$
- 7.4.7. Find the effect of dividing a one or two digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.
- 7.4.8. Round decimals with 1 decimal place to the nearest whole number.
- 7.4.9. Compare numbers with the same number of decimal places up to 2 decimal places.

- 7.4.10. Solve simple measure and money problems involving fractions and decimals to 2 decimal places.

7.5. Measurement

Pupils will be taught to:

- 7.5.1. Convert between different units of measurement.
- 7.5.2. Measure and calculate the perimeter of a rectilinear figure in centimetres and metres.
- 7.5.3. Find the area of rectilinear shapes by counting squares.
- 7.5.4. Estimate, compare and calculate different measures, including money in pounds and pence.
- 7.5.5. Read, write and convert time between analogue and digital 12 and 24-hour clocks.
- 7.5.6. Solve problems involving converting from hours to minutes, minutes to seconds, years to months, weeks to days.

7.6. Geometry - properties of shapes

Pupils will be taught to:

- 7.6.1. Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.
- 7.6.2. Recognise acute and obtuse angles and compare and order angles up to 2 right angles by size.
- 7.6.3. Recognise lines of symmetry in 2D shapes presented in different orientations.
- 7.6.4. Complete a simple symmetric figure with respect to a specific line of symmetry.

7.7. Geometry - position and direction

Pupils will be taught to:

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

7.8. Statistics

Pupils will be taught to:

- 7.8.1. Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.
- 7.8.2. Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

8. Upper key stage 2 - years 5 and 6

The main focus in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This allows pupils to develop connections between multiplication and division with fractions, decimals, percentages and ratio.

During this time, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to algebra as a means for solving problems. Teaching in geometry and measures should merge and extend understanding developed in number. Classifying shapes with increasingly complex geometric properties should also be completed and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all 4 operations, including long multiplication and division, and also fractions, decimals and percentages.

Pupils should read, spell and pronounce mathematical vocabulary correctly.

9. Year 5 programme of study

9.1. Number - number and place value

Pupils will be taught to:

- 9.1.1. Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit.
- 9.1.2. Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000.
- 9.1.3. Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through 0.
- 9.1.4. Round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000.
- 9.1.5. Solve number problems and practical problems that involve all of the above.
- 9.1.6. Read Roman numerals to 1,000 (M) and recognise years written in Roman numerals.

9.2. Number - addition and subtraction

Pupils will be taught to:

- 9.2.1. Add and subtract whole numbers with more than 4 digits, including using formal written methods.
- 9.2.2. Add and subtract numbers mentally with increasingly large numbers.
- 9.2.3. Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.
- 9.2.4. Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

9.3. Number - multiplication and division

Pupils will be taught to:

- 9.3.1. Recognise multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers.
- 9.3.2. Know and use the vocabulary of prime numbers, prime factors and composite numbers.
- 9.3.3. Establish whether a number up to 100 is prime and recall prime numbers up to 19.
- 9.3.4. 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.
- 9.3.5. Multiply and divide numbers mentally.
- 9.3.6. 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.
- 9.3.7. Multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000.
- 9.3.8. Identify and use square numbers and cube numbers, and the notation for squared (2) and cubed (3).
- 9.3.9. Solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes.
- 9.3.10. Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.
- 9.3.11. Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.

9.4. Number - fractions (including decimals and percentages)

Pupils will be taught to:

- 9.4.1. Compare and order fractions whose denominators are all multiples of the same number.
- 9.4.2. Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.
- 9.4.3. Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number.
- 9.4.4. Add and subtract fractions with the same denominator, and denominators that are multiples of the same number.
- 9.4.5. Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.
- 9.4.6. Read and write decimal numbers as fractions.
- 9.4.7. Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.
- 9.4.8. Round decimals with 2 decimal places to the nearest whole number and to 1 decimal place.
- 9.4.9. Read, write, order and compare numbers with up to 3 decimal places.
- 9.4.10. Solve problems involving numbers up to 3 decimal places.
- 9.4.11. Recognise the percent symbol (%) and understand that percent relates to 'number of parts per 100,' and write percentages as a fraction with denominator 100, and as a decimal fraction
- 9.4.12. Solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{2}{5}, \frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25.

9.5. Measurement

Pupils will be taught to:

- 9.5.1. Convert between different units of metric measure.
- 9.5.2. Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints.
- 9.5.3. Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres.

- 9.5.4. Calculate and compare the area of, including using standard units, square centimetres (cm²) and square metres (m²), and estimate the area of irregular shapes.
- 9.5.5. Estimate volume and capacity.
- 9.5.6. Solve problems involving converting between units of time.
- 9.5.7. Use all four operations to solve problems involving measure using decimal notation, including scaling.

9.6. Geometry - properties of shapes

Pupils will be taught to:

- 9.6.1. Identify 3D shapes, including cubes and other cuboids, from 2D representations.
- 9.6.2. Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles.
- 9.6.3. Draw given angles, and measure them in degrees (°).
- 9.6.4. Identify:
- Angles at a point and 360° (1 whole turn).
 - Angles at a point on a straight line and 180° (half a turn).
 - Other multiples of 90°.
 - Use the properties of rectangles to deduce related facts and find missing lengths and angles.
 - Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.

9.7. Geometry - position and direction

Pupils will be taught to:

- 9.7.1. 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.

9.8. Statistics

Pupils will be taught to:

- 9.8.1. Solve comparison, sum and difference problems using information presented in a line graph.
- 9.8.2. Complete, read and interpret information in tables, including timetables.

10. Year 6 programme of study

10.1. Number - number and place value

Pupils will be taught to:

- 10.1.1. Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit.
- 10.1.2. Round any whole number to a required degree of accuracy.
- 10.1.3. Use negative numbers in context, and calculate intervals across 0.
- 10.1.4. Solve number and practical problems that involve all of the above.

10.2. Number - addition, subtraction, multiplication and division

Pupils will be taught to:

- 10.2.1. Multiply multi-digit numbers up to 4 digits by a two digit whole number using the formal written method of long multiplication.
- 10.2.2. Divide numbers up to 4 digits by a two digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.
- 10.2.3. Divide numbers up to 4 digits by a two digit number using the formal written method of short division where appropriate, interpreting remainders according to the context.
- 10.2.4. Perform mental calculations, including with mixed operations and large numbers.
- 10.2.5. Identify common factors, common multiples and prime numbers.
- 10.2.6. Use their knowledge of the order of operations to carry out calculations involving the 4 operations.
- 10.2.7. Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
- 10.2.8. Solve problems involving addition, subtraction, multiplication and division.
- 10.2.9. Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

10.3. Number - fractions (including decimals and percentages)

Pupils will be taught to:

- 10.3.1. Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.
- 10.3.2. Compare and order fractions, including fractions >1 .

- 10.3.3. Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.
- 10.3.4. Multiply simple pairs of proper fractions, writing the answer in its simplest form.
- 10.3.5. Divide proper fractions by whole numbers.
- 10.3.6. Associate a fraction with division and calculate decimal fraction equivalents for a simple fraction.
- 10.3.7. Identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places.
- 10.3.8. Multiply one digit numbers with up to 2 decimal places by whole numbers.
- 10.3.9. Use written division methods in cases where the answer has up to 2 decimal places.
- 10.3.10. Solve problems which require answers to be rounded to specified degrees of accuracy.
- 10.3.11. Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

10.4. **Ratio and proportion**

Pupils will be taught to:

- 10.4.1. Solve problems involving the relative sizes of 2 quantities where missing values can be found by using integer multiplication and division facts.
- 10.4.2. Solve problems involving the calculation of percentages and the use of percentages for comparison.
- 10.4.3. Solve problems involving similar shapes where the scale factor is known or can be found.
- 10.4.4. Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.

10.5. **Algebra**

Pupils will be taught to:

- 10.5.1. Use simple formulae.
- 10.5.2. Generate and describe linear number sequences.
- 10.5.3. Express missing number problems algebraically.

10.5.4. Find pairs of numbers that satisfy an equation with 2 unknowns.

10.5.5. Enumerate possibilities of combinations of 2 variables.

10.6. Measurement

Pupils will be taught to:

10.6.1. Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate.

10.6.2. Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to 3 decimal places.

10.6.3. Convert between miles and kilometres.

10.6.4. Recognise that shapes with the same areas can have different perimeters and vice versa.

10.6.5. Recognise when it is possible to use formulae for area and volume of shapes.

10.6.6. Calculate the area of parallelograms and triangles.

10.6.7. 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.

10.7. Geometry - properties of shapes

Pupils will be taught to:

10.7.1. Draw 2D shapes using given dimensions and angles.

10.7.2. Recognise, describe and build simple 3D shapes, including making nets.

10.7.3. Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons.

10.7.4. Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.

10.7.5. Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.

10.8. Geometry - position and direction

Pupils will be taught to:

10.8.1. Describe positions on the full coordinate grid.

10.8.2. Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.

10.9. **Statistics**

Pupils will be taught to:

10.9.1. Interpret and construct pie charts and line graphs and use these to solve problems.

10.9.2. Calculate and interpret the mean as an average.