



Subject Overview 2023/24: Maths



Curriculum and Pedagogy

| | | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | |
|------------|--|--|--|--|--|---|--|--|
| | | Number and Place Value | | | | | | |
| Curriculum | Number and Place Value | count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward | count from 0 in multiples of 4, 8, 50 and 100; | count in multiples of 6, 7, 9, 25 and 1000 | 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 up to 10 000 000 and determine the value of each digit | understand and use place value for decimals, measures and integers of any size | |
| | | recognise the place value of each digit in a two-digit number | find 10 or 100 more or less than a given number | find 1000 more or less than a given number | count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 | round any whole number to a required degree of accuracy | order positive and negative integers, decimals and fractions | |
| | | compare and order numbers from 0 up to 100; use <, > and = signs | recognise the place value of each digit in a three-digit number (hundreds, tens, ones) | count backwards through zero to include negative numbers | interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero | use negative numbers in context, and calculate intervals across zero | use the symbols =, ≠, <, >, ≤, ≥ | |
| | | use place value and number facts to solve problems; recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 | compare and order numbers up to 1000 | recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) | round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 | solve number and practical problems that involve all of the above. | round numbers and measures to an appropriate degree of accuracy | |
| | | | identify, represent and estimate numbers using different representations | order and compare numbers beyond 1000 | solve number problems and practical problems that involve all of the above | | | |
| | read and write numbers up to 1000 in numerals and in words | identify, represent and estimate numbers using different representations | read Roman numerals to 1000 (M) and recognise years written in Roman numerals. | | | | | |

| | | | | | | | | |
|--|--|--|--|--|---|---|--|--|
| | | | <p>solve number problems and practical problems involving these ideas</p> | <p>round any number to the nearest 10, 100 or 1000</p> | | | | |
| | | | | <p>solve number and practical problems that involve all of the above and with increasingly large positive numbers</p> | | | | |
| | | | | <p>read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.</p> | | | | |
| | Number – addition and subtraction | | | | | | | |
| Number – addition and subtraction | | <p>add and subtract numbers using concrete objects, pictorial representations, and mentally, including: TU+U, TU+T, TU+TU and U+U+U</p> | <p>add and subtract numbers mentally, including:</p> <ul style="list-style-type: none"> • a three-digit number and ones • a three-digit number and tens • a three-digit number and hundreds | <p>add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate</p> | <p>add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)</p> | <p>perform mental calculations, including with mixed operations and large numbers</p> | <p>use the 4 operations, including formal written methods, applied to integers, decimals, all both positive and negative</p> | |
| | | <p>recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.</p> | <p>add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction</p> | <p>estimate and use inverse operations to check answers to a calculation</p> | <p>add and subtract numbers mentally with increasingly large numbers</p> | <p>use their knowledge of the order of operations to carry out calculations involving the four operations</p> | <p>use conventional notation for the priority of operations, including brackets and powers</p> | |
| | | | <p>estimate the answer to a calculation and use inverse operations to check answer</p> | <p>solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why</p> | <p>use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy</p> | <p>solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</p> | <p>use a calculator and other technologies to calculate results accurately and then interpret them appropriately</p> | |

| | | | problems in which n objects are connected to m objects. | | | remainders according to the context | brackets and powers |
|--|--|--|---|--|--|---|---|
| | | | | | multiply two-digit and three-digit numbers by a one-digit number using formal written layout | multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers multiply and divide | perform mental calculations, including with mixed operations and large numbers use a calculator and other technologies to calculate results accurately and then interpret them appropriately |
| | | | 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. | | numbers mentally drawing upon known facts divide numbers up to 4 | identify common factors, common multiples and prime numbers | |
| | | | | digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context multiply and divide whole | use their knowledge of the order of operations to carry out calculations involving the four operations | | |
| | | | | numbers and those involving decimals by 10, 100 and 1000 recognise and use square | solve problems involving multiplication and division | | |
| | | | | numbers and cube numbers, and the notation for squared (2) and cubed (3) solve problems involving | use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. | | |
| | | | | multiplication and division including using their knowledge of factors and multiples, squares and cubes solve problems involving | | | |
| | | | | addition, subtraction, multiplication and division and a combination of these, including | | | |

| | | | | | | |
|--|--|--|---|---|---|--|
| | | | | understanding the meaning of the equals sign | | |
| | | | | solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates. | | |
| | Number - fractions (including decimals and percentages) | | | | | |
| Number - fractions (including decimals and percentages) | <ul style="list-style-type: none"> recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity | count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10 | recognise and show, using diagrams, families of common equivalent fractions | compare and order fractions whose denominators are all multiples of the same number | use common factors to simplify fractions; use common multiples to express fractions in the same denomination | define percentage as 'number of parts per hundred', express 1 quantity as a percentage of another, compare 2 quantities using percentages, and work with percentages greater than 100% |
| | <ul style="list-style-type: none"> write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$. | recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators | count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. | identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths | compare and order fractions, including fractions > 1 | express 1 quantity as a fraction of another |
| | | recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators | 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 | recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$ | add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions | |
| | | recognise and show, using diagrams, equivalent fractions with small denominators | add and subtract fractions with the same denominator | add and subtract fractions with the same denominator and | multiply simple pairs of proper fractions, writing the answer in its simplest | |

| | | | | | |
|--|--|---|--|--|---|
| | | | | denominators that are multiples of the same number | form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$] |
| | | add and subtract fractions with the same denominator within one whole [for example, $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$] | recognise and write decimal equivalents of any number of tenths or hundredths | multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams | divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$] |
| | | compare and order unit fractions, and fractions with the same denominators | recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ | read and write decimal numbers as fractions [for example, $0.71 = \frac{71}{100}$] | associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$] |
| | | solve problems that involve all of the above. | 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 | recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents | identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places |
| | | | round decimals with one decimal place to the nearest whole number | round decimals with two decimal places to the nearest whole number and to one decimal place | multiply one-digit numbers with up to two decimal places by whole numbers |
| | | | compare numbers with the same number of decimal places up to two decimal places | read, write, order and compare numbers with up to three decimal places | use written division methods in cases where the answer has up to two decimal places |
| | | | solve simple measure and money problems involving fractions and decimals to two decimal places. | solve problems involving number up to three decimal places | solve problems which require answers to be rounded to specified degrees of accuracy |
| | | 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 | | recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. | |

| | | | | | | | |
|-----------------------------|-----------------------------|--|--|--|--|---|--|
| | | | | | <p>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.</p> | | |
| | Ratio and proportion | | | | | | |
| Ratio and proportion | | | | | | <p>solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts</p> | <p>use ratio notation, including reduction to simplest form</p> |
| | | | | | | <p>solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison</p> | <p>divide a given quantity into 2 parts in a given part:part or part:whole ratio; express the division of a quantity into 2 parts as a ratio</p> |
| | | | | | | <p>solve problems involving similar shapes where the scale factor is known or can be found</p> | |
| | | | | | | <p>solve problems involving unequal sharing and grouping using knowledge of fractions and multiples</p> | |

| Algebra | | | | | | |
|-------------|--|--|--|--|--|---|
| Algebra | | | | | Use simple formulae | use and interpret algebraic notation, including: ab in place of $a \times b$; $3y$ in place of $3 \times y$; a^2 in place of $a \times a$; a/b in place of $a \div b$ |
| | | | | | Generate and describe linear number sequences | substitute numerical values into formulae and expressions |
| | | | | | Express missing number problems algebraically | simplify algebraic expressions to maintain equivalence by: collecting like terms |
| | | | | | Find pairs of numbers that satisfy an equation with two unknowns | use algebraic methods to solve linear equations in 1 variable |
| | | | | | Enumerate possibilities of combinations of two variables | |
| Measurement | | | | | | |
| | recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value | measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) | Convert between different units of measure [for example, kilometre to metre; hour to minute] | convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) | solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate | use standard units of mass, length, time, money and other measures, including with decimal quantities |

| | | | | | | | |
|--|--|--|---|--|---|--|--|
| | | 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 | measure the perimeter of simple 2-D shapes | measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres | understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints | 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 three decimal places | change freely between related standard units |
| | | | add and subtract amounts of money to give change, using both £ and p in practical contexts | find the area of rectilinear shapes by counting squares | measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres | convert between miles and kilometres | |
| | | | tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks | estimate, compare and calculate different measures, including money in pounds and pence | calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm ²) and square metres (m ²) and estimate the area of irregular shapes | recognise that shapes with the same areas can have different perimeters and vice versa | |
| | | | estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight | read, write and convert time between analogue and digital 12- and 24-hour clocks | estimate volume [for example, using 1cm ³ blocks to build cuboids (including cubes)] and capacity [for example, using water] | recognise when it is possible to use formulae for area and volume of shapes | |
| | | | know the number of seconds in a minute and the number of days in each month, year and leap year | | solve problems involving converting between units of time | calculate the area of parallelograms and triangles | |
| | | | compare durations of events [for example to calculate the time taken by particular events or tasks]. | solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days. | use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling. | 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 [for example, mm ³ and km ³]. | |

| Geometry - properties of shapes/position and direction | | | | | | |
|--|---|--|--|---|--|---|
| Geometry - properties of shapes | identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line. | draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them | compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes | identify 3-D shapes, including cubes and other cuboids, from 2-D representations | draw 2-D shapes using given dimensions and angles | work with coordinates in all 4 quadrants |
| | identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces | recognise angles as a property of shape or a description of a turn | identify acute and obtuse angles and compare and order angles up to two right angles by size | know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles | recognise, describe and build simple 3D shapes, including making nets | generate terms of a sequence from either a term-to-term or a position-to-term rule |
| | | identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle | identify lines of symmetry in 2-D shapes presented in different orientations | draw given angles, and measure them in degrees (o) | compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons | calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes |
| | | identify horizontal and vertical lines and pairs of perpendicular and parallel lines. | complete a simple symmetric figure with respect to a specific line of symmetry. | identify: <ul style="list-style-type: none"> angles at a point and one whole turn (total 360o) angles at a point on a straight line and $\frac{1}{2}$ a turn (total 180o) other multiples of 90o | illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius | describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric |

| | | | | | | | | |
|--|--|---|--|---|---|--|---|--|
| | | | | | use the properties of rectangles to deduce related facts and find missing lengths and angles | recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles | derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures using appropriate language and technologies | |
| | | | | | distinguish between regular and irregular polygons based on reasoning about equal sides and angles. | | identify properties of, and describe the results of, translations, rotations and reflections applied to given figures | |
| | | | | | | describe positions on the full coordinate grid (all four quadrants) | apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles | |
| | | | | | | draw and translate simple shapes on the coordinate plane, and reflect them in the axes. | | |
| | | Statistics | | | | | | |
| | | interpret and construct simple pictograms, tally charts, block diagrams and simple tables | interpret and present data using bar charts, pictograms and tables | interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. | solve comparison, sum and difference problems using information presented in a line graph | interpret and construct pie charts and line graphs and use these to solve problems | describe, interpret and compare observed distributions of a single variable through: appropriate | |

| | | | | | | | |
|--|--|--|--|--|--|--|--|
| | | | | | | | graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) |
| | | | | | | | record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale |
| | | | | | | | understand that the probabilities of all possible outcomes sum to 1 |

| | | | | | | | |
|--|--|--|--|---|--|---|--|
| | | | <p>solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.</p> | <p>solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs</p> | <p>complete, read and interpret information in tables, including timetables.</p> | <p>calculate and interpret the mean as an average</p> | <p>construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data</p> |
|--|--|--|--|---|--|---|--|

Approach to Maths

Mastery of maths means a deep, long-term, secure and adaptable understanding of the subject. Developing mastery consists of three main elements:

- Fluency (rapid and accurate recall and application of facts and concepts)
- a growing confidence to reason mathematically
- the ability to apply maths to solve problems, to conjecture and to test hypotheses

Mastery of maths, builds gradually as a child goes through school, is a tool for life, and is more valuable than the short term ability to answer questions in tests or exam. A detailed, structured curriculum is mapped out across all phases, ensuring continuity and supporting transition (appendix 1). An effective mastery curriculum in mathematics is designed in relatively small carefully sequenced steps, which must each be mastered before pupils move to the next stage. Fundamental skills and knowledge are secured first. As a school, we are passionate about children acquiring the basic skills of mathematics that will be valuable to them as they move on to further education and beyond. We give children a reason for their learning so that they understand the real-life context of their learning.

All year groups are using a 'Bronze, Silver, Gold, Platinum' approach to the activities that are set. This system enables the children to either consolidate their understanding of concepts before moving on (usually bronze and silver) or to apply their mathematical skills to reason and problem solve (usually gold and platinum). We are developing elements of whole class teaching, unlike the old model, where advanced learners are accelerated through new content, those pupils who grasp concepts quickly are challenged with rich and sophisticated problems within the topic. Those children who are not sufficiently fluent are provided additional support to consolidate their understanding before moving on.

The long term plan for the teaching of maths in each year group has been developed following analysis of Summer 2021 assessments and is tailored to each year group.

When walking into a typical maths lesson it is evident that there is a challenging, engaging ethos that promotes a positive and confident attitude to maths as an exciting, creative and relevant subject. We also want to ensure that all our children realise their potential, becoming confident and enthusiastic mathematicians. Our curriculum is designed to ensure that there is a focus on promoting core maths skills; such as multiplication tables, number bonds and place value; as well as practical maths and 'using and applying' skills which promote independent problem solving skills and mastery. We use 'Can you still...?' starters to help to revisit previous learning, which should develop retention of prior learning.

To provide adequate time for developing mathematics, maths is taught daily and discretely. However, application of skills is linked across the curriculum where appropriate.

At Alexandra Junior, we use an exciting, interactive maths programme to teach the children the essential skill of recalling their multiplication and division facts. The national expectation is that every child will be able to answer any times table question or division fact mentally within a five second period. Times Tables Rock Stars is an online programme which allows the children to access multiplication and division questions both at school and at home, whilst listening to rock music to motivate and engage them.

The online programme contains a competitive element where the children collect coins for every answer they input correctly. The more coins they earn, the more accessories they can buy for their avatar and the higher up the school leader board they will go. This resource is accessible and is a fun and engaging way to learn a vital mathematical skill. We have a half termly school Times Tables Rock Star league, within which the children compete to be the highest earning pupil in order to bring their class to victory over the others, thus engaging more with the programme.

The maths lessons support our school context-based drivers, the 5Es (Excel yourself, Embrace yourself, Explore the world, Engage with others, Express yourself). These are explicitly shared with the children.

This is an overview of a typical maths week at Alexandra Junior School. These occur in a two week cycle.

| Session 1 | Session 2 | Session 3 | Session 4 | Session 5 |
|----------------------|----------------------|----------------------|---|---------------------------------------|
| Regular maths lesson | Regular maths lesson | Regular maths lesson | Guided reasoning linked to current learning | Arithmetic teach and practise session |
| Session 1 | Session 2 | Session 3 | Session 4 | Session 5 |
| Regular maths lesson | Regular maths lesson | Regular maths lesson | Regular maths lesson | Arithmetic teach and practise session |

Morning Maths

Each morning 15 minutes is given to maths in order to cover three areas: counting, retention and VIPs

- Counting objectives have been taken from the curriculum for each year group and 5 minutes is given to explicitly counting.
- The Can you still... 5 minutes looks back at learning the children have covered in previous years and guidance for areas to focus on is given by the subject lead from analysis of Summer NTS tests which showed areas of weakness.
- The VIPs are facts which the children need to know in order to understand more complex mathematics such as the number of minutes in an hour and the conversion of mg to kg etc. These have been decided upon by the subject lead and the teachers plan using the VIPs for the final 5 minutes of Morning Maths.

Maths Starters

Using the resources from Third Space Learning, we use the Fluent in Five resources on a Monday, Wednesday and Friday in order to continuously work on both mental and written calculation strategies with the children. The children are given time to complete the questions in their fluency books and then this is reviewed together as a class.

Differentiated set of questions are used according to the needs of the children.

On a Tuesday and Thursday, the Rapid Reasoning resources are used in order to keep visiting problem solving with the children. These are again differentiated to meet the needs of the different groups, however, these are worked through as guided problems, discussing with the children how to pull apart the questions in order to find the simple maths within them.

Regular Maths lesson

As much as possible all children to be taught the same objective but differentiated so that they can achieve, either by support, small steps or by apparatus.

For example, if teaching shape and the lowers don't need to move on to the higher objectives for their level then their learning will be done in small steps over a few days to allow them to be successful at their own level for the simpler objectives.

Each group will be given the opportunity in each lesson to problem solve.

Following the 5 and apply rule ensures that children only complete 5 fluency tasks before completing an application task. Following this application task, the children would be given 5 varied fluency questions before completing another application task. This will ensure that the children have the opportunity to apply their skills to problems throughout the lesson.

Guided reasoning session

This session will be linked to their current learning. For example, if the learning during the rest of the week is about 2D shapes, the reasoning problems will also be about 2D shapes. If the learning during the rest of the week is addition, the reasoning problems will also be about addition.

These sessions are taught after basic skills lessons have been taught so that the focus can be on how to solve the problem, rather than the maths skills within it. The teaching follows the I do, we do, you do approach in order to explicitly teach the skills of unpicking problems in order to see the simple maths within them. The children will have the chance to complete a guided question in their book followed by a couple of chances for them to practise on their own (or in a group with support for the lower achievers).

Arithmetic teach and apply session

This lesson is usually delivered either at the beginning or the week or at the end of the week so that it stands alone and does not interfere with the flow of the learning in the week.

A long term plan has been created by the subject lead, which covers all of the mental strategies needed in order to calculate addition, subtraction, multiplication and division. This has been devised following a vast amount of research into mental strategies and is followed directly by all staff when planning the arithmetic sessions.

It is slightly different from the arithmetic sessions we have been used to doing with the children.

The lesson will begin with a taught segment where the children will have a short session following an I do, we do approach, being taught a particular skill (following the mental arithmetic long term plan).

The second aspect of the arithmetic session will be a chance for the children to practise the skill focused on the particular skill that has been taught. As the children move through the skills, previously learnt skills can be included in the arithmetic test as a 'Can you still?..' type retention practise.

Literacy in Mathematics

Speaking and Listening

Throughout every maths lesson at Alexandra Junior School, our children have regular opportunities to describe, explain and justify their understanding of mathematical concepts, and practise using precise mathematical vocabulary and they are given opportunities to 'think together', discuss and explore ideas with each other, and share their mathematical reasoning and understanding. The children will be provided with, or develop, STEM sentences to support the retention of key information that they will need to explain their understanding throughout the lesson.

Reading

Although reading and maths may not seem to be linked a large part of children being able to solve problems is actually being able to understand what the question requires from them. Reading in mathematics involves a range of skills, including visualisation, interpretation, prediction and personal response. Reading skills underpin information processing skills. These enable pupils to find and organise relevant information, to compare and contrast it and to identify and analyse relationships within questions.

Writing

Children are given the opportunity to write a written explanation as an answer to a question such as 'explain why'. Teachers model as an 'expert' demonstrating how to do something whilst thinking through the process aloud. Teachers use modelling to demonstrate skills, decisions and processes that are normally hidden. As teachers model, they can also demonstrate the need to make alterations and corrections, revise and edit information. Modelling helps pupils to develop the confidence to use these processes themselves in their own work.

Vocabulary

Each lesson starts with a review of vocabulary that the children will be expected to use within the lesson using the three tiered vocabulary planner and an emphasis will be put on using the correct mathematical vocabulary when sharing answers. Key vocabulary for the four operations can be found in the calculation policy for each year group (appendix 2a, 2b, 2c, 2d) STEM sentences are used to support the vocabulary development within each sequence of maths learning.

Differentiation/SEND

Our maths curriculum ensures provision for all children. Through the use of concrete, pictorial, abstract teaching, children are provided with small steps that will ensure they are able to not only access the skills, but also retain the mathematical understanding to use in future lessons. The use of interventions to provide pre-teaching of vocabulary and reviewing skills from previous teaching enable children to approach new mathematical learning with more confidence.

The Times Table Rock Stars programme also allows the children to be targeted at whichever times table level is appropriate for the children and in the school league, focus is on pupil engagement with the programme rather than pupils being higher attaining.

The lowest 20% in each class will be targeted and tracked throughout their learning and provided with further support. As well as TT Rock Stars, these children will use Numbots to develop their understanding of number.

Moral/Social and Cultural Development

At Alexandra Junior, we use maths to support our children's spiritual development by helping them to develop deep thinking and question the way in which the world works. Moral development is supported through discussion about mathematical understanding and challenging assumptions, supporting children to question information and data that they are presented with. Self-esteem and building self-confidence is integral to social development and we use growth mindset, metacognition and our differentiation model to support this. Collaborative learning is encouraged at Alexandra Junior in the form of listening and learning from each other and paired discussion and working with partners.

Assessment

Formative Assessment

Assessment is an integral and continuous part of the teaching and learning process at and much of it is done informally as part of each teacher's day-to-day work. Teachers integrate the use of formative assessment strategies such as: effective questioning, clear learning objectives, the use of success criteria, effective feedback and response in their teaching and marking especially in the form of live marking, which ensures that any misconceptions are addressed within the lesson and enable the children to be successful in every lesson. Findings from these types of assessment are used to inform future planning.

Summative Assessment

More formal methods are used to determine the levels of achievement of children at various times during the school year.

Before the assessment point, we use the White Rose termly test to help to inform teacher judgments for the units that have already been taught.

At the end of a term, we use the NTS tests to give a standardised score, allowing for comparison to previous tests and this test also allows the teacher to check for the retention of skills and gives an analysis of gaps for future objectives to be taught.

At the end of the year, we use the GL assessment which provides us with a nationally comparable standardised score.

Metacognition in Maths

In Maths, we encourage the children to use metacognition skills in order to make connections, think back, justify and various other metacognition strategies. This helps the children to develop a better understanding of the steps they must go through in order to be successful in their mathematical learning.

Visitors/Trips/Whole school

We engage in city wide times table competitions for all year groups in order to promote a love of learning their times tables and to give the children a chance to show off their rapid recall of times table facts.

We use Times Table Rock Stars, an online interactive times table resource that the children can use at school and out of school. We have a school league in which every class participates to try to become the class who engages the most in the programme. The score board on the school maths display tells the children how well their class has done and there are certificates presented to the top three contributors in each class.

We hold a yearly real life maths week, which gives the children the opportunity to use learnt mathematical skills in real life situations. This gives children a deeper understanding of why mathematics is important in their life outside our school gates. During this week, children are exposed to careers which are maths based or require an understanding of maths.

At Alexandra Junior, we take part in NSPCC Number day, during which the children are asked to dress up in an outfit containing a number, for example a football shirt. The children will then be asked to carry out various maths activities and challenges using the numbers from their outfits.