

Landgate School Long Term Planning 2019-2021

Key-Stage 3

Intent: We aim for our Learners to become maths-positive problem-solvers and to have ideas, to develop vocabulary and reasoning skills and so better understand mathematical concepts in the world around them. We aim to ensure learners can confidently apply their mathematics skills when out in the community to provide them both with the love of mathematics and the independent skills to support them into adulthood.

Teaching emphasis at KS3 is to nurture **Learner confidence** by **developing mastery through relevant contexts** (looking towards future careers and aspirations) thereby consolidating earlier work on **counting principles, fluency, reasoning and problem-solving:**

- consolidate numerical and mathematical capability, extend understanding of the number system and place value and make connections between number relationships and representations
- select and use appropriate calculation strategies to solve increasingly complex problems, make and test conjectures about patterns and relationships; look for proofs or counter examples where possible
- develop use of formal mathematical knowledge and recording to interpret and solve problems, evaluating the outcomes, including multi-step problems and financial mathematics.

This overview is not definitive but has starting points for teachers to use in conjunction with the National Curriculum, Equals, NRICH, Kangaroo Maths schemes of learning; Landgate Learning Ladders and the Engagement Model for assessment as well as their own professional judgement in providing a broad, balanced and meaningful Maths curriculum.

Opportunities: Learners develop greater **independence and perseverance, take risks and experience success** in practical application of mathematical knowledge, skills and processes within real-world situations, making connections between number facts, processes and concepts whilst experiencing variations. Learners are taught to apply potential solutions systematically to problems, develop metacognition (knowledge of how they learn) in planning, monitoring and evaluating their own learning, where possible.

Each class has four lessons per week consisting of number and 'topic' lessons. Key vocabulary is explicitly taught and modelled to encourage learners to describe, draw, compare, sort and reason using 'mathematical talk', developing reading and spelling of numbers and mathematical language. Enjoyment and Maths positive attitudes are encouraged through links with Learners' interests, life-skills, subjects, community visits, theme days, online programmes (iPad apps, RMEasimaths, Purple Mash, ICT to aid recording) in each area of Properties of Number and Calculations (including Algebra), and topics on Time, Money, Measures, Ratio, Geometry and Statistics following this approach:

1. **Concrete** – real-life objects and manipulatives to help learners understand concepts
2. **Pictorial** – representations used alongside concrete objects to help make connections and extend reasoning and problem solving skills
3. **Abstract** – more formal written strategies build on from pictorial and concrete activities to develop independence and consolidate mental strategies.

Verbalised thinking: modelled use of questions and 'maths talk': "What do I already know about problems like this? What ways of solving have I used before?" through trial, error and correction in scaffolded tasks.

KS3 Focus 1 (Autumn 1)	Key Focus/ Opportunities:	Properties of Number Sensory activities, outdoor and community visits, cross curricular links. World Maths Day 15 th October 2020 (3P Digital Learning of mental maths strategies)
	Vocabulary and Knowledge:	Rising Stars Vocabulary p39-40 Incl: 0-20, number, numeral, digit, count on/back, how many? same as, equal to, smallest, biggest, teens, tens, ones, place value, array, sequence, pattern, order <ul style="list-style-type: none"> Continue to subitise number and know how to identify and represent quantities in pictures and numerals read and write numbers to a given value and recognise odd and even numbers, ordinal numbers.
	Key Skills:	Learners working at Recognition to Application (upto Stage 8) should be taught to: <ul style="list-style-type: none"> engage/ respond to the sequence of numbers, count to find a quantity, recognise/match numerals to quantities of objects, pictorial representations and numerals, begin to sequence and order (<i>first, second, third, then, next, last</i>), type numbers one to ten on a keyboard/ ipad/ device Learners working at Emerging to Breakthrough (Stages 9-11) should be taught to: <ul style="list-style-type: none"> Rote count beyond 20, forwards and backwards using objects, numberline, 100 square, starting from any given number incl one more/less, comparisons of fewest/most/same quantities and number Estimate, sort and count objects/pictures/numbers accurately, by placing them in a line/array, check and represent numbers using pictorial representations, read and write numbers/words/input device use ordinal numbers (first, second, third etc) when describing the position of objects, people or events Learners working at Foundation and beyond(Stage 12+)should also be taught to: <ul style="list-style-type: none"> identify, represent and estimate numbers using different representations, including place on the number line and sequences.
KS3 Focus 2 (Autumn 1)	Key Focus/ Opportunities:	Statistics Sensory activities, outdoor and community visits, cross curricular links. World Maths Day 15 th October 2020 (3P Digital Learning of mental maths strategies)
	Vocabulary and Knowledge:	Rising Stars Vocabulary p44 Incl: 0-20, number, numeral, count, 1s, how many? same as, equal to, smallest, biggest, more than, less than, most, least, altogether, group, set, belong, same, different, chart, related to matching, sorting, classify, handling data <ul style="list-style-type: none"> How to sort information according to set criteria. Develop understanding and interpretation of simple statistical diagrams. How to conduct surveys and then analyse and communicate their results linked to real-world problems.
	Key Skills:	Learners working at Recognition to Application (upto Stage 8) should be taught to: <ul style="list-style-type: none"> Ask a simple question, compare 2 groups and be able to give an answer. Use objects/pictures/ICT, match/pair/group/sort by attribute (incl as a negative: red/not red), estimate, check by counting Learners working at Emerging to Breakthrough (Stages 9-11) should be taught to: <ul style="list-style-type: none"> Ask and answer questions, compare, interpret and construct simple pictograms, tally charts, block diagrams and simple tables. Learners working at Foundation and beyond(Stage 12+) should also be taught to: <ul style="list-style-type: none"> Conduct surveys with multiple variables, interpret and present data using tables, pictograms, bar charts, line graphs. Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

KS3 Focus 3 (Autumn 2)	Key Focus/ Opportunities:	Number Calculations: Addition and Subtraction Sensory activities, outdoor and community visits linked to subjects, Christmas Markets/Enterprise/Careers.
	Vocabulary and Knowledge:	Rising Stars Vocab p40-41, p44 Incl: <i>how many, add, addition, plus, increase, more, and, make, equals, total, altogether, groups, compare, number, quantity, subtract, minus, take away, less, fewer, find the difference</i> <ul style="list-style-type: none"> develop understanding of calculation signs + - = and relationships between operations to undertake calculations using mental arithmetic and more formal written methods involving addition and subtraction.
	Key Skills:	<i>Learners working at Recognition to Application (upto Stage 8) should be taught to:</i> <ul style="list-style-type: none"> add one more/take one away to three/five/ten objects and say, sign or indicate how many <i>Learners working at Emerging to Breakthrough (Stage 9-11) should be taught to:</i> <ul style="list-style-type: none"> rapidly recall and apply number bonds to 10, 20, 50, 100 within one and two-step problems, show addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot. begin to estimate answers to calculations and use the inverse rule to find missing numbers (basic algebra) and check calculations. <i>Learners working at Foundation and beyond (Stage 12+) should also be taught to:</i> <ul style="list-style-type: none"> apply partitioning related to place value using varied and increasingly complex addition and subtraction problems and awareness of decimal notation within formal calculations, explain and give reasons/proof for strategies and answers.
KS3 Focus 4 (Autumn 2)	Key Focus/ Opportunities:	Money Sensory activities, outdoor and community visits linked to subjects, Christmas Markets/Enterprise/Careers.
	Vocabulary and Knowledge:	Rising Stars Vocab p42 Incl: <i>money, coin, penny, pence, pound, notes, price, cost, buy, sell, spend, spent, pay, value, total, altogether, change, difference, more, less, discount, how much?</i> <ul style="list-style-type: none"> Know the concept of exchange and value of coins and notes through practical activities and real-world contexts.
	Key Skills:	<i>Learners working at Recognition to Application (upto Stage 8) should be taught to:</i> <ul style="list-style-type: none"> solve simple real life problems involving identify items on a shopping list and quantities, request an item or price match coins and notes where appropriate and identify number on coins/notes, use moneybox, coin sorter, till to exchange small amounts of money develop awareness of more/less relating to cost of items. <i>Learners working at Emerging to Breakthrough (Stage 9-11) should be taught to:</i> <ul style="list-style-type: none"> use < > = to compare increasing amounts of money combine knowledge of money and counting in 2s 5s 10s to count money more efficiently. convert pounds and pence, add small amounts together and find the difference to give change using addition and subtraction strategies. keep simple records of savings and expenditure, <i>Learners working at Foundation and beyond (Stage 12+) should also be taught to:</i> <ul style="list-style-type: none"> use rapid mental recall of number bonds with decimal notation to work out equivalent amounts of money.. create simple budgets and shopping lists/orders

KS3 Focus 5 (Spring 1)	Key Focus/ Opportunities:	<p style="text-align: center;">Properties of Number</p> <p style="text-align: center;">Sensory activities, outdoor and community visits, cross curricular links.</p>
	Vocabulary and Knowledge:	<p>Rising Stars Vocabulary p39-40 Incl: 0-100, number, numeral, digit, count on/back, how many? same as, equal to, smallest, biggest, teens, tens, ones, place value, array, sequence, pattern, order, ones, teens, tens, hundreds, thousands, place value, round up/back</p> <ul style="list-style-type: none"> Continue to subitise number and know how to identify and represent quantities in pictures and numerals Investigate and use Place Value; read, write and compare numbers to a given value,
	Key Skills:	<p><i>Learners working at Recognition to Application (upto Stage 8) should be taught to:</i></p> <ul style="list-style-type: none"> engage with patterns and sequencing of objects, pictorial representations and numbers incl input device if appropriate <p><i>Learners working at Emerging to Breakthrough (Stage 9-11) should be taught to:</i></p> <ul style="list-style-type: none"> Rote count beyond 100, forwards and backwards using objects, pictorial arrays, numberline, 100 square incl in 1s, 2s, 5s, 10s Estimate, sort and count objects/pictures/numbers accurately, by placing them in a line/array, check and represent numbers using pictorial representations, read and write numbers/words/input device, use place value knowledge and round to nearest ten <p><i>Learners working at Foundation and beyond (Stage 12+) should also be taught to:</i></p> <ul style="list-style-type: none"> Investigate and use Place Value (Thousands, Hundreds, Tens, Ones) to complete sequences and patterns with number round numbers to 10, 100 and 1000 as appropriate.
KS3 Focus 6 (Spring 1)	Key Focus/ Opportunities:	<p style="text-align: center;">Time and Calendar</p> <p style="text-align: center;">Sensory activities, outdoor and community visits, cross curricular links, daily/weekly routines and school/calendar events</p>
	Vocabulary and Knowledge:	<p>Rising Stars Vocabulary p42 Incl: time, routine and positional language (<i>first, next, then, now, before, yesterday, today, tomorrow, morning, afternoon, dinner time, playtime, bedtime..</i>), days of the week, months of the year, birthday, holiday, clock, hour, minutes, o'clock, quarter past/to, half past, start, stop, timer</p> <ul style="list-style-type: none"> vocabulary linked to 12 and 24 hour clocks, Calendars and timetables in everyday use, days of the week, months of the year
	Key Skills:	<p><i>Learners working at Recognition to Application (upto Stage 8) should be taught to:</i></p> <ul style="list-style-type: none"> develop sense of time, vocab, sequence daily/weekly/monthly events in chronological order inc simple standard units of measure request the time <p><i>Learners working at Emerging to Breakthrough (Stage 9-11) should be taught to:</i></p> <ul style="list-style-type: none"> recognise and use language relating to days, dates of the calendar, sequencing events, telling the time estimate, measure and compare durations of time eg how long an activity, challenge or event takes show/write hands on a clock for o'clock, quarter/half-past, quarter past/to and 5 and 1 minute increments where appropriate calculate, measure and record time, including a.m, p.m, 12-hour, 24-hour clock, analogue incl roman numerals <p><i>Learners working at Foundation and beyond (Stage 12+) should also be taught to:</i></p> <ul style="list-style-type: none"> order familiar events and read the time on an analogue and digital clock. add up to three amounts of time and find the difference between two given times solve problems involving time; convert seconds, minutes, hours linked to real-world problems.

KS3 Focus 7 (Spring 2)	Key Focus/ Opportunities:	<p align="center">Number Calculations: Multiplication and Division</p> <p align="center">Sensory activities, outdoor and community visits linked to subjects STEM challenge within Science week</p>
	Vocabulary and Knowledge:	<p>Rising Stars Vocabulary p40-41, p44 Incl: multiply, groups of, sets of, array, equal, count in steps of, pair, doubles, sequence, odd, even, share, divide, half/halving, number patterns, inverse, multiplication facts, equal, unequal, groups, sets of, odd/even, twos, fives, tens, whole, fraction, quarter, three-quarters, thirds, fifths, tenths..</p> <ul style="list-style-type: none"> develop understanding of calculation signs $\times \div =$ and relationships between operations to undertake calculations using mental arithmetic and more formal written methods be able to estimate answers to calculations and know the inverse rule to find missing numbers and check calculations.
	Key Skills:	<p><i>Learners working at Recognition to Application (upto Stage 8) should be taught to:</i></p> <ul style="list-style-type: none"> make and recognise equal sets and unequal sets, groups and sets of items that belong together, including various arrays of objects (eg pairs of, jumps of 2, sets of 4..), pictures, dot pattern cards. make and recognise patterns odd/even/equal/unequal linked to real-life situations <p><i>Learners working at Emerging to Breakthrough (Stage 9-11) should be taught to:</i></p> <ul style="list-style-type: none"> partition a set into sub-sets, share/halve/quarter odd and even groups of objects using one-to-one correspondence and inverse of multiples of twos, fives, tens etc, then count on to find total solve real-life problems, including missing number problems (basic algebra), show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot <p><i>Learners working at Foundation and beyond (Stage 12+) should be taught to:</i></p> <ul style="list-style-type: none"> write and calculate mathematical statements for division using the multiplication tables they know, (where appropriate, $\times 3 \times 4 \times 6 \times 8$ incl for two-digit numbers times one-digit), using mental strategies and progressing to formal written methods incl remainders.
KS3 Focus 8 (Spring 2)	Key Focus/ Opportunities:	<p align="center">Geometry</p> <p align="center">Sensory activities, outdoor and community visits linked to subjects STEM challenge within Science week</p>
	Vocabulary and Knowledge:	<p>Rising Stars Vocabulary p42-43 Incl: names of 2D 3D shapes, sides, vertices, angles, parallel lines, symmetry, pattern, size, position, direction</p> <ul style="list-style-type: none"> name 2D and 3D shapes, their properties and recognise reflective symmetry, nets of solids, right angles, including size of angles, know and use the language of position, direction and motion and use coordinates including NSEW directions.
	Key Skills:	<p><i>Learners working Recognition to Application (upto Stage 8) should be taught to:</i></p> <ul style="list-style-type: none"> handle common 2-D and 3-D shapes, name and relate to everyday objects fluently; recognise in different orientations/ sizes <p><i>Learners working at Emerging to Breakthrough (Stage 9-11) should be taught to:</i></p> <ul style="list-style-type: none"> identify, compare, sort and draw/make shapes by properties, use vocabulary precisely, such as sides, edges, vertices and faces

		<ul style="list-style-type: none"> identify right angles and make whole, half, quarter and three-quarter turns in both directions and connect turning clockwise with movement on a clock face, use coordinates, including NSEW directions, the language of position, direction and motion to, symmetry and tessellation. <p><i>Learners working at Foundation and beyond (Stage 12+) should also be taught to:</i></p> <ul style="list-style-type: none"> recognise properties of symmetrical/non-symmetrical polygons/polyhedral, sort triangles/quadrilaterals, measure/ name angles use equipment and ICT tools to plot coordinates, draw and measure shapes/area accurately incl decimals and rounding.
KS3 Focus 9 (Summer 1)	Key Focus/ Opportunities:	Properties of Number Sensory activities, outdoor and community visits linked to subjects
	Vocabulary and Knowledge:	Rising Stars Vocabulary p39-40, p44 <ul style="list-style-type: none"> Continue to subitise number and know how to identify and represent quantities in pictures and numerals Investigate and use Place Value; read, write and compare numbers to a given value, Develop confidence and fluency through practise of mental calculations
	Key Skills:	<p><i>Learners working at Recognition to Application (upto Stage 1-8) should be taught to:</i></p> <ul style="list-style-type: none"> rote count to beyond 10, estimate a small number (up to 10) and check by counting, use $<$ $>$ = signs with support. <p><i>Learners working at Emerging to Breakthrough (Stage 9-11) should be taught to:</i></p> <ul style="list-style-type: none"> Rote count beyond 100, forwards and backwards from any given number; compare and order numbers to 100; use $<$ $>$ = signs Estimate, sort and count objects/pictures/numbers accurately, by placing them in a line/array, check and represent numbers using pictorial representations, read and write numbers/words/input device, use place value knowledge, round to nearest ten/hundred, practise rapid recall of one-step mental calculation strategies and use vocabulary to explain strategies used. <p><i>Learners working at Foundation and beyond (Stage 12+) should also be taught to:</i></p> <ul style="list-style-type: none"> compare and order numbers from 0 up to 1000; incl know times tables multiples and factors, sequences, patterns such as square numbers and prime numbers; give reasoning and find proof; use $<$, $>$ and = signs
KS3 Focus 10 (Summer 1)	Key Focus/ Opportunities:	Ratio Sensory activities, outdoor and community visits linked to subjects
	Vocabulary and Knowledge:	Rising Stars Vocabulary p40-41 <i>Incl Fractions, numerator, denominator, equivalent equal part equal grouping equal sharing parts of a whole half, two halves one of two equal parts, quarter, two quarters, three quarter (including proper/improper fraction, mixed number, reduced to, decimals, percentages, ratio and proportion where appropriate),</i> <ul style="list-style-type: none"> Recognise fractions of shapes and quantities and understand equivalence of fractions

Key Skills:	<p>Learners working at Recognition to Application (upto Stage-8) should be taught to:</p> <ul style="list-style-type: none"> • explore proportion and name fractions of shapes and quantities of number linked to familiar objects and situations <p>Learners working at Emerging to Breakthrough (Stage 9-11) should be taught to:</p> <ul style="list-style-type: none"> • calculate fractions of shapes and whole numbers and understand the equivalence of fractions within real-life scenarios • use knowledge of multiplication and division facts to work out fractions <p>Learners working at Foundation and beyond (Stage 12+) should also be taught to:</p> <ul style="list-style-type: none"> • add and subtract fractions with the same denominator • compare and order unit fractions, and fractions with the same denominators; • recognise, find, name and write fractions $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of quantities and equivalents in real-life context(including percentages of money amounts where appropriate), solve problems that involve all of the above.
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KS3 Focus 11 (Summer 2)	Key Focus/ Opportunities:	<p>Number Calculations: The Four Operations</p> <p>Sensory activities, outdoor and community visits linked to subjects Outdoor pursuits week and Sports Day</p>
	Vocabulary and Knowledge:	<p>Rising Stars Vocabulary p39-41 , p44 (see previous)</p> <ul style="list-style-type: none"> • Consolidate understanding and use of the four operations within real-life contexts, selecting the appropriate operation and strategies, using mental recall and written methods accurately and checking own work.
	Key Skills:	<p>Learners working at Recognition to Application (upto Stage 1-8) should be taught to:</p> <ul style="list-style-type: none"> • Explore number quantities and numerals, use + - < > = signs with support • apply potential solutions systematically to problems through trial, error and correction incl use of ICT tools <p>Learners working at Emerging to Foundation and beyond (Stage 9 onwards) should be taught to:</p> <ul style="list-style-type: none"> • undertake calculations using mental and written arithmetic involving addition, subtraction, division and multiplication for real-world problems and scenarios, including multi-step word problems and missing numbers (basic algebra) • be able to estimate answers to calculations, use trial, error and correction • use the inverse rule to find missing numbers and check calculations using appropriate mathematical vocabulary to make conjectures, give reasons and proof with increasing numbers and complexity in problems.
KS3 Focus 12 (Summer 2)	Key Focus/ Opportunities:	<p>Measures</p> <p>Sensory activities, outdoor and community visits linked to subjects Outdoor pursuits week and Sports Day</p>
	Vocabulary and Knowledge:	<p>Rising Stars Vocabulary p41-44 Incl: <i>measure, length, height, long, short, tall, high, far, near, (-er, -est comparatives). (metre, centimetre, millimetre, equipment)mass, weight, weigh, balances, heavy, light, heavier than, lighter than heaviest, lightest, scale, container, capacity, volume, full, empty, half, quarter, three-quarters full, holds, estimate, guess, more than, less than, almost, equal to, equivalent, unit,</i></p> <ul style="list-style-type: none"> • Know methods to measure length, mass and capacity using non-standard and standard units and associated vocabulary.

	<p>Key Skills:</p>	<p><i>Learners working at Recognition to Application (upto Stage 8) should be taught to:</i></p> <ul style="list-style-type: none"> • engage purposefully to explore objects and activities related to measures to compare, order and use associated comparative vocabulary <p><i>Learners working at Emerging to Breakthrough (Stage 9-11) should be taught to:</i></p> <ul style="list-style-type: none"> • use measuring equipment and read scales of measurement accurately, rounding to nearest 10 • use standard units of measure to record length, mass and capacity accurately and use comparative language • compare temperature with negative values. • use all four operations to solve problems involving measure (for example, length, area, mass, volume, money, time..) <p><i>Learners working at Foundation and beyond (Stage 12+) should also be taught to:</i></p> <ul style="list-style-type: none"> • begin to convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre). • use approximate equivalences between metric units and common imperial units such as inches, pounds and pints • use all four operations to solve problems involving measure (for example, length, area, mass, volume, money) using decimal notation, including scaling.
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