

## Curriculum Intent: EYFS/KS1/KS2

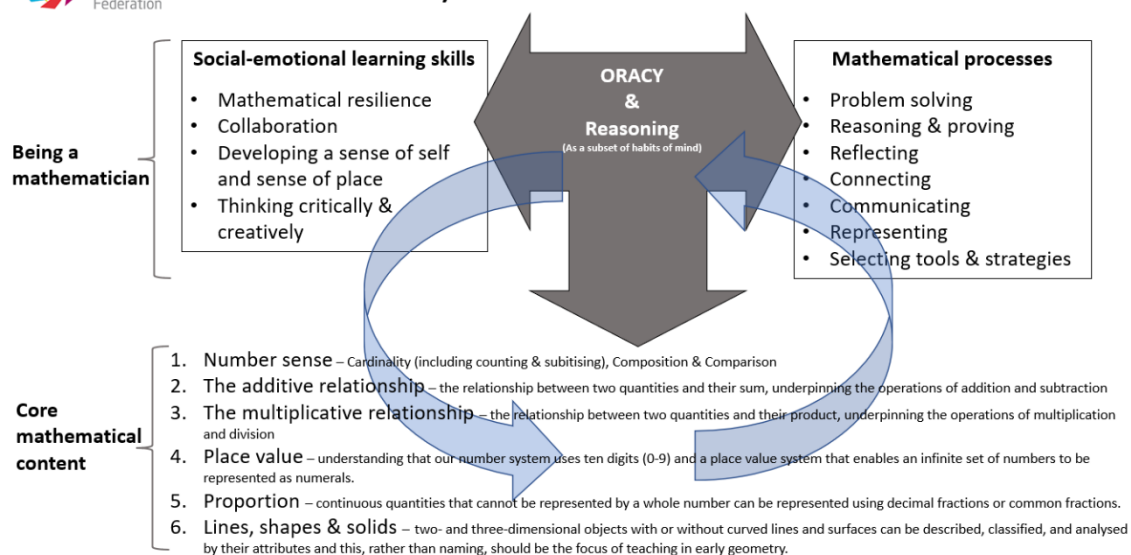
### Intent

At King's Oak, we want all children to believe that they are a mathematician, so we aim for all children to feel like confident, curious, problem-solving learners. We encourage children to know the answer is only the beginning and develop a bank of strategies and resilience to persevere.

In order to become fluent in recognising, representing and communicating about mathematical concepts, learners actively explore and analyse them through talk with others and can explain the how they got to their answer.



### CLF Primary Mathematics curriculum core offer



### Implementation

In the English national curriculum, outcomes in mathematics go beyond recalling facts and emulating procedures, as emphasised by the three aims of the curriculum and in the expectation that:

*“By the end of each key stage, pupils are expected to **know, apply and understand** the matters, skills and processes specified in the relevant programme of study.”*

(DfE, 2014)

Our curriculum intends to make explicit the content knowledge and the necessary processes and skills involved in learning mathematics so that teachers and leaders help all learners achieve the three aims of the national curriculum and to demonstrate all elements of “*mathematical proficiency*” (National Research Council, 2001).

Learners develop mathematical processes through working with the content of the curriculum. As they engage in applying these processes, together with social-emotional learning skills, they develop their understanding of the content.

The processes that support effective learning in mathematics are as follows:

- problem solving
- reasoning and proving
- reflecting
- connecting
- communicating
- representing
- selecting tools and strategies

They are the means through which all learners develop and apply mathematical knowledge, concepts, and skills.

### **Fluency**

Mastering Number is a comprehensive, fully planned, daily programme (4 days per week, 30 weeks per year) for learners in Years R-2. In Reception, this can be the only whole-class, teacher-led content (c.10-15 minutes) for number learning. In Year 1 and Year 2 the sessions are intended to be 10-15 minutes, whole-class and in addition to the daily maths lesson.

Mastering Number is free to access and aims to support learners to develop number sense and a deep conceptual understanding of number, reach the early learning goals for maths by the end of Reception, achieve factual fluency for addition and subtraction within 10 by end of Year 1 and achieve factual fluency for addition and subtraction within 20 by end of Year 2.

Number Sense Maths is intended to be taught separate to the daily maths lesson and aims to support learners to have a deep knowledge of the composition of numbers, achieve factual fluency for addition and subtraction within 20. This programme

A strategy to support outcomes in the Year 4 Multiplication Times table Check (MTC), the Ashley Downs Timetable booklets support learners in memorising a strong, verbal pattern for the ‘36 learnable multiplication facts’. Times Table Rock Stars is another programme learners can use to develop their fluency.

### **In EYFS:**

**Pupils learn through a balance of child-initiated and adult-directed learning opportunities.** The timetable is carefully structured so that children have rigorous directed

teaching in Maths with daily review time sessions to focus on children’s self-reflection against the Characteristics of Effective Learning. **We follow the NCETM Maths Mastering Number approach in Reception** with an emphasis on studying key skills of number, calculation and shape so that pupils develop deep understanding and the acquisition of mathematical language. Pupils learn through games and guided teacher tasks using concrete manipulatives which are then rehearsed and applied to their own learning during Discovery Time.

## In KS1 and KS2

We aim to develop mathematical processes and social-emotional learning skills through the mathematical content. In each sequence of learning, all learners are given the opportunity to develop their knowledge, a selection of tools and strategies to help analyse an idea, justify a conjecture, and solve problems whilst enjoying mathematics. The imagine below is an example of a long-term plan for mathematics. The proposed length for each unit is flexible and judgements to move on should be based on securing deep understanding.

CLF 1-page curriculum overview (R-6)

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Characteristics of effective learning	<ul style="list-style-type: none"> <li>Play &amp; explore</li> <li>Have a go</li> <li>Active learning</li> <li>Enjoy achieving goals</li> <li>Creative &amp; critical thinking</li> <li>Make links</li> </ul>	<p>The content knowledge specified in the next row will be developed through <b>learners demonstrating curiosity</b> and engaging with it to:</p> <ul style="list-style-type: none"> <li><b>Develop conceptual understanding</b> so that they become fluent in the fundamental ideas of mathematics, enabling them to <b>recall and apply knowledge accurately</b>;</li> <li>Reason mathematically by following a line of enquiry and <b>analysing</b> examples to <b>conjecture</b> relationships and <b>generalisations</b> and to <b>justify &amp; prove</b> using mathematical language;</li> <li><b>Solve problems</b> by applying mathematics to routine and non-routine situations, including <b>using mathematical habits of mind</b> (attitudes, strategies, actions and questions) to <b>collaborate</b> in breaking down problems and <b>persevering</b> to reach solutions.</li> </ul> <p>Recalling and using content knowledge and skills (below) in isolation is no more mathematical than exercising the above mathematical processes and socio-emotional learning skills without mathematical content and skills. <b>Being a mathematician in the CLF entails developing increasingly sophisticated content alongside the processes and skills so that learners develop self-agency and a sense of their place as mathematicians.</b></p>					
Progress in key knowledge and skills  (Y1-6 content summary from the Ready to Progress guidance)	<ul style="list-style-type: none"> <li>Cardinality including subitising &amp; counting</li> <li>Composition</li> <li>Comparison</li> <li>Pattern</li> <li>Spatial reasoning including shape, space &amp; measures</li> <li>Personal sense of time</li> </ul>	<ul style="list-style-type: none"> <li>Counting within 100</li> <li>Counting multiples of 2, 5 &amp; 10</li> <li>Composition of numbers to 10</li> <li>Part-whole relationships in addition and subtraction</li> <li>Reason about location of numbers to 20 in a linear number system</li> <li>Comparing quantities and measures</li> <li>Classify and describe 2-D and 3-D shapes by their properties</li> </ul>	<ul style="list-style-type: none"> <li>Place value of 2-digit numbers</li> <li>Reason about location of numbers to 100 in a linear number system</li> <li>Fluency in addition &amp; subtraction facts within 10</li> <li>Mentally add and subtract 2-digit numbers</li> <li>Difference as an additive structure</li> <li>Recognise simple multiplicative structures</li> <li>Use precise mathematical language to describe 2-D and 3-D shapes and classify / sort.</li> </ul>	<ul style="list-style-type: none"> <li>Place value of 3-digit numbers and location in linear number system; apply place value knowledge <math>\times 10</math> to known facts</li> <li>Read scales and make links to division of 100 into 2, 4, 5 &amp; 10 equal parts</li> <li>Fluency for all addition and subtraction within 20</li> <li>Understand and manipulate the additive relationship</li> <li>Recall multiplication &amp; division facts for 2, 4, 5, 8 &amp; 10</li> <li>Columnar addition &amp; subtraction</li> <li>Solve multiplication &amp; division problems</li> <li>Conceptual understanding of fractions and location (within 1) in linear number system</li> <li>Recognise right angles, parallel &amp; perpendicular</li> <li>Draw polygons by joining marked points</li> </ul>	<ul style="list-style-type: none"> <li>Place value &amp; rounding of 4-digit numbers &amp; location in linear number system; apply place value knowledge <math>\times 100</math> to known facts</li> <li>Read scales and make links to division of 1000 into 2, 4, 5 &amp; 10 equal parts</li> <li>Recall multiplication &amp; division facts to <math>12 \times 12</math> and apply to solve division problems with remainders</li> <li>Multiply &amp; divide by 10 &amp; 100 (integer quotients) and understand this as scaling</li> <li>Understand the multiplicative relationship and apply commutativity &amp; distributivity</li> <li>Conceptual understanding of mixed numbers &amp; improper fractions and location in linear number system</li> <li>Draw polygons on co-ordinate grid (1<sup>st</sup> quadrant)</li> <li>Specific properties of regular and irregular polygons including finding perimeter</li> <li>Identify line symmetry in 2-D shapes</li> </ul>	<ul style="list-style-type: none"> <li>Place value &amp; rounding of numbers with up to 2 d.p. &amp; location in linear number system; apply place value knowledge <math>\times 0.1</math> and <math>\times 0.01</math> to known facts</li> <li>Read scales and make links to division of 1 into 2, 4, 5 &amp; 10 equal parts</li> <li>Convert between units of measure</li> <li>Secure fluency in multiplication and division facts</li> <li>Multiply &amp; divide by 10 &amp; 100 and understand this as scaling</li> <li>Develop understanding of the multiplicative composition of number</li> <li>Short multiplication and short division</li> <li>Find non-unit fractions of quantity</li> <li>Understand and find equivalent fractions</li> <li>Recall fraction/decimal equivalents for <math>1/2</math>, <math>1/4</math>, <math>1/5</math> &amp; <math>1/10</math> and all proper fractions with these denominators</li> <li>Compare, estimate, measure and draw angles in degrees</li> <li>Compare and calculate areas of rectangles</li> </ul>	<ul style="list-style-type: none"> <li>Understand and apply place value when calculating and when reading scales, including dividing powers of 10 from 1 hundredth to 10 million into 2, 4, 5 &amp; 10 equal parts</li> <li>Place value (including rounding of numbers) up to 10 million and with decimals &amp; their location in linear number system</li> <li>Understand that two numbers can be related both additively and multiplicatively and quantify additive and multiplicative relationships</li> <li>Use arithmetic properties, inverse relationships and place value to derive or complete calculations from a given calculation</li> <li>Solve problems involving ratio relationships</li> <li>Solve problems with two unknown values</li> <li>Compare and simplify fractions using common denominators where necessary</li> <li>Use reasoning to compare fractions and choose between reasoning and common denominator</li> <li>Draw, compose and decompose shapes according to given properties</li> </ul>

In KS1 and KS2. the children access a maths lesson everyday and the lesson follows the structure below:

**Learning**

*Learning* – content outcome (I can)

Teachers will consider what they want children to be thinking about (i.e. the concept that they are learning about) and therefore what children will need to do (i.e. with manipulatives, models or images) and say (e.g. discussion points, key vocabulary, useful sentence frames) to support their thinking so they can demonstrate their understanding.

*How* – Oracy and Reasoning e.g. We are going to talk in pairs to share our ideas and we are going to use an example to convince each other.

*Why* – why this why now –Teachers able to explain why we are learning about this either in the context of real-life application that will make sense to the children or why this why now.

**Vocabulary**

New vocabulary, link with old vocabulary, stem sentences to guide children with their oracy.

**Starter**

Could be fluency, could be reasoning prompt. Doesn't have to be written, could be verbal  
Number talk – mental arithmetic – for example explain to your partner how you would work this out.

**Reasoning (Let's explore this concept)**

Reasoning prompts – let's reason about a concept. What do you notice? How do you know?

**Manipulatives/Representations (CPA)**

Identify a clear rationale for the representation learners are going to.

**Modelling**

Think about the oracy strategies that will be covered – enable the children to feel confident in these roles and what is expected of them.

Model oracy, model reasoning and could model our way of thinking about it. This could be through an I do, We do, You do approach.

**Practice, Reason, Challenge**

Practice – For all learners if there is a skill that needs practising and for some learners if they need to consolidate. It may be practical, paired or written.

Reason – main activity that all learners should be able to access. This does not have to be written; you can listen to children about what they have thought about.

Challenge – Could be open ended with multiple answers

### Assessment:

The main purpose of assessment activities is to identify next steps for learners to develop all aspects of their mathematical proficiency. Therefore, the majority of assessment is formative and ongoing.

### EYFS

Every member of staff uses **ongoing observational assessment** to identify children's starting points and plan experiences which ensure progress and some **summative assessments** such as termly maths assessments to track progress. We use this information on a weekly basis to plan learning experiences and next steps so that knowledge and skills are built cumulatively. During each assessment window, three times a year, teachers update the progress children have made which allows us to assess the impact of teaching and plan for the children's next steps. The characteristics of effective learning are fundamental to assessing young learners' mathematics. As well as the knowledge and skills we want children to develop, building mathematical resilience, an inquisitive mind and 'willingness to have a go' – key habits of mind for mathematicians.

### KS1 and KS2

As in Early Years, understanding what children already know and can do is key. Teachers should use Ready to Progress example assessment questions prior to planning to check for prior knowledge.

Daily teaching incorporates assessment for learning; in line with our curriculum expectations, we check for prior knowledge and assess content knowledge through application with social-emotional learning skills and the mathematical processes.

Teachers make their judgements as to whether pupils are on track to meet the end of year expectations based on learners' work in class, when they demonstrate their ability to reason about age-appropriate content and to apply age-appropriate content to solve problems. (see document below)

I am a Mathematician: Year 3 Pupil: \_\_\_\_\_ Class: \_\_\_\_\_ School: \_\_\_\_\_

Mathematics	Key assessment criteria		Yes/No
Key knowledge	Fluency	Identifies or places 3-digit numbers on marked or unmarked number lines with a variety of scales, identifying previous and next multiples of 100 and 10. <b>(3NPV-3)</b>	
		Uses mental and written addition and subtraction strategies, fluently using all number bonds within 20, applying commutativity and inverse <b>(3AS-3)</b>	
		Uses age-appropriate mathematical vocabulary accurately	
Characteristics of effective learning	<b>Reasoning</b> <small>(with age-appropriate content)</small>	Reasons effectively* across a range of content	
	<b>Problem solving</b> <small>(with age-appropriate content)</small>	Has strategies to tackle and solve novel problems	
	<b>Learning dispositions</b>	Enjoys and engages in mathematics	
		Perseveres in the face of difficulties and evidences a growth mindset about challenges and errors	
Additional specific comments about strengths or areas for development in mathematics			

**All shaded criteria must be fully met to make an 'On track' judgement at the end of the year.**

\*Consistently meets 'Developing' criteria on at least two of the three reasoning actions (1 Analysing, 2 Conjecturing & generalising, 3 Convincing, justifying & proving) using the reSolve reasoning rubric.

Throughout the year, teachers may use low-stakes summative assessments to check for recall and accuracy of facts and skills. Teachers may use SATS in Year 2 and Year 6 and PIXL in the other year groups at various intervals throughout the year.