

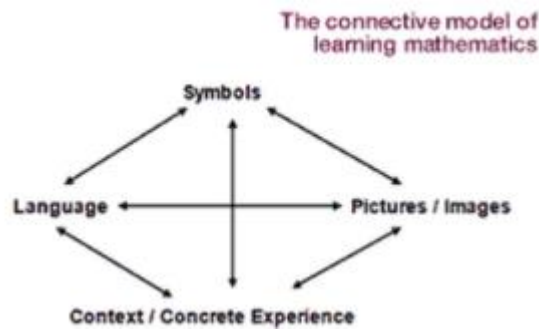
Mathematics Curriculum Guide

Content

- Rationale and intent
- Curriculum overview
- Skills Progression
- Policies
- Weekly expectations
- Planning, marking and feedback
- Assessment
- Numbers and Patterns
- Times Tables
- Resources
- Language
- Knowledge Organisers
- APE
- Captain Stretch

Maths Rationale at Knighton Mead

At Knighton Mead we value a maths curriculum that is creative and engaging. All children are to have access to this curriculum and make progress in lessons. Our children need to develop the necessary skills to make them 'deep thinkers' acquiring maths skills that can be recalled quickly and transferred and applied in different contexts. They need to be able to make rich connections across the areas of maths and use their knowledge in other subjects. Maths is the foundation for understanding the world and we want our children to know the purpose behind their learning and to apply their knowledge to their everyday lives. In order to do this, we consider the model of connectivity as presented by Haylock and Cockburn



Here at Knighton Mead, we follow The White Rose scheme of work in order to ensure that our children have full coverage of the Maths National Curriculum and to allow our children to revisit topics several times over the year allowing their knowledge to embed.

All children are catered for within maths lessons ensuring that the teacher offers the necessary support and challenge for each individual to make progress. We ensure that maths is taught in creative and engaging lessons using a wide range of manipulatives to aid and support our children in their learning. ICT is used across the school to deliver the maths curriculum and to offer our pupils a range of exciting activities to challenge and inspire.

We aim to encourage the deepest of learning for our children so that their knowledge can be transferred and applied in many other contexts including other subjects e.g., science and art and their everyday lives. Maths is widely promoted across the school and our classrooms have working walls that the children can utilise to support their learning.

Mastery at Knighton Mead

Mastery means pupils acquiring a deep, long-term, secure and adaptable understanding of the subject. Teaching for mastery describes the elements of classroom practice and school organisation that combine to give pupils the best chance of mastering maths. Achieving mastery means acquiring a solid enough understanding of the maths that has been taught to enable pupils to move onto more advanced material. At Knighton Mead, we believe that mastery is achievable for all. White Rose combines the best of both 'mastery' and 'spiral' approaches in the curriculum. It follows many mastery principles:

- Longer on topics to gain a deeper understanding
- Making connections
- Keeping the class together on the same topic
- Through effort, all pupils are capable of understanding, doing and improving at maths.

At the same time, recognising that spending a good chunk of time on a topic doesn't mean all pupils will 'master' it the first time they see it. They need to do it again and again in different contexts and different years to truly develop their understanding on their journey to mastery, therefore building in revisiting and reinforcing activities are important features of a spiral curriculum too.

Fluency, reasoning and problem solving play an essential role in helping pupils to gain a deeper understanding of a maths topic.

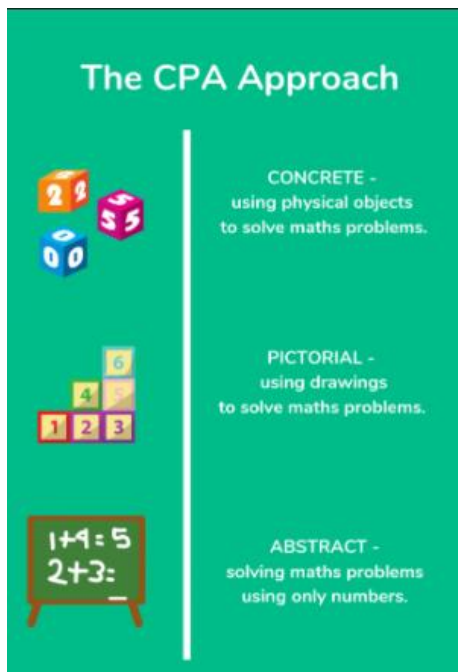
Problem solving is at the heart of mastering maths. While there is nothing new about using problem-solving questions to consolidate understanding, mastery is helping us to come away from the traditional lengthy word-problem format. Instead, problem-solving questions are often open-ended, with more than one right answer. Very often new topics are started by developing fluency in order to give learners confidence with the skill. However, sometimes starting with a problem-solving question – e.g., prove that $4+3=7$ can deepen understanding sooner. Pupils have access to resources, such as concrete manipulatives and pictorial representations, to help them explain the maths. This also gives the opportunity for all children to problem solve regardless of their ability.

Reasoning demonstrates that pupils understand their maths learning. Talk is an integral part of mastery as it encourages students to reason, justify and explain their thinking. Reasoning is encouraged and developed with the use of Blooms Taxonomy. Introducing scaffolded sentence structures and Voice 21 conventions when talking about maths gives pupils the confidence to communicate their ideas clearly, before writing them down.

Fluency, reasoning and problem solving underpins the deepening of understanding. Fluency alone doesn't give students the chance to delve deeper into the mathematics. They may well be able to answer the questions, but can they also justify their answer or explore other possibilities?

Concrete, Pictorial, Abstract

Working alongside the model of connectivity we advocate the use of the CPA approach. Children throughout the school need to be given the opportunity to see maths in a variety of contexts. The use of physical objects should not be seen solely as the domain of the Early Years.



Curriculum Overview

The fundamental idea behind curriculum design is to be able to support pupils to perform simpler tasks, so they can move on to perform more complex tasks. We can't expect a pupil to add two numbers together before they understand what each individual number represents. Each block has 'small steps' which are sequenced in order of difficulty and dependency. Each step builds carefully from the previous step, building on prior knowledge to develop new skills. After the block on addition and subtraction the children will revisit and practise skills again in other blocks later in the year such as money, length, mass and capacity.

EYFS

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Getting to know you		Match, sort and compare		Talk about measure and patterns		It's me 1, 2, 3		Circles and triangles	1, 2, 3, 4, 5		Shapes with 4 sides
Spring	Alive in 5		Mass and capacity	Growing 6, 7, 8		Length, height and time		Building 9 and 10		Explore 3-D shapes		
Summer	To 20 and beyond		How many now?	Manipulate, compose and decompose		Sharing and grouping		Visualise, build and map		Make connections	Consolidation	

Year 1

Autumn	Number Place value (within 10)				Number Addition and subtraction (within 10)				Geometry Shape	Consolidation	
Spring	Number Place value (within 20)		Number Addition and subtraction (within 20)		Number Place value (within 50)		Measurement Length and height		Measurement Mass and volume		
Summer	Number Multiplication and division		Number Fractions		Geometry Position and direction	Number Place value (within 100)		Measurement Money	Measurement Time		Consolidation

Year 2

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value				Number Addition and subtraction				Geometry Shape			
Spring	Measurement Money		Number Multiplication and division				Measurement Length and height		Measurement Mass, capacity and temperature			
Summer	Number Fractions			Measurement Time			Statistics		Geometry Position and direction		Consolidation	

Year 3

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value			Number Addition and subtraction				Number Multiplication and division A				
Spring	Number Multiplication and division B			Measurement Length and perimeter			Number Fractions A		Measurement Mass and capacity			
Summer	Number Fractions B		Measurement Money	Measurement Time			Geometry Shape		Statistics		Consolidation	

Year 4

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value				Number Addition and subtraction			Measurement Area	Number Multiplication and division A			Consolidation
Spring	Number Multiplication and division B			Measurement Length and perimeter		Number Fractions			Number Decimals A			
Summer	Number Decimals B		Measurement Money	Measurement Time		Consolidation	Geometry Shape		Statistics	Geometry Position and direction		

Year 5

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value			Number Addition and subtraction		Number Multiplication and division A			Number Fractions A			
Spring	Number Multiplication and division B			Number Fractions B		Number Decimals and percentages			Measurement Perimeter and area		Statistics	
Summer	Geometry Shape			Geometry Position and direction		Number Decimals			Number Negative numbers	Measurement Converting units		Measurement Volume

Year 6

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value		Number Addition, subtraction, multiplication and division					Number Fractions A		Number Fractions B		Measurement Converting units
Spring	Ratio		Algebra		Number Decimals		Number Fractions, decimals and percentages		Measurement Area, perimeter and volume		Statistics	
Summer	Geometry Shape			Geometry Position and direction	Themed projects, consolidation and problem solving							

Skills Progression

It is important for teachers to understand the mathematical journey that the children in our care need to take and the skills that the children need to have acquired, before you can build on prior knowledge and develop new skills.

We have 3 documents to aid with this.

DFE ready to progress criteria.

National Curriculum Progression (White Rose document)

Knighton Mead small steps progression document

Policies

Calculation Policy

Our Calculation Policy sets out pre-requisite skills and a progression of skills needed for each operation. Examples are given using manipulatives that we have in school and the models and images that are used in the White Rose Scheme.

Mental Calculations Policy

The aim at Knighton Mead Primary Academy is that by the end of Key Stage 2, children should be able to use an efficient method for each operation confidently and with understanding. It is encouraged that children recognise how and when to use mental methods to work out a calculation. The Mental Calculation Policy aims to give Knighton Mead Primary Academy teachers guidance linked to the progression in teaching and learning of mental calculations from Nursery to year 6.

Children have a weekly mental maths test.

Year 1 and 2 use the Rising Stars mental maths test, whilst Year 3,4,5 & 6 use the Topical Resources Tests.

Weekly Expectations in maths

White Rose Maths

Key Stage 1

5 x daily lesson following White Rose Scheme of Work

Key Stage 2

5 x daily lesson following White Rose Scheme of Work

Morning Calculations

Children are given a series of calculations to work through in order for them practise their mental recall and their formal written methods of calculating. These need to be planned to an appropriate level, in order for the children to be able to employ these written methods.

The children can mark their own using a purple polishing pen, but these must be looked over by the teacher in order to pick up on any misconceptions.

Key Stage 1:

Year 2: 8.40 – 9.00 3 x weekly

Year 1: to introduce in the summer term 2 x weekly

Key Stage 2:

8.40 – 9.00 3 x weekly

Planning, Marking and Feedback

Planning

All teachers will be expected to identify on the weekly overview the objectives to be covered during the week. White Rose PowerPoints are to be adapted for the needs of the children and to include Flashback 4, character muscles, a review of previous learning, sentence stems, vocabulary, application of skills, a review of the learning in the lesson and next steps.

Marking and Feedback

Research has shown that in the moment feedback and marking is the most effective and this is the approach that we take at Knighton Mead. Adults will circulate round the classroom addressing misconceptions where necessary. Use a green pen to mark. If it is correct you use a green tick, if it is incorrect, you put a green dot. If you want the children to go back and look at the question, they can write their response next to it with a purple polishing pen. High expectations are needed with the use of the purple polishing pen.

Peer marking is a useful tool, and the children are able to do this using a purple polishing pen, but it must be checked by the teacher so that any misconceptions can be addressed.

Assessment

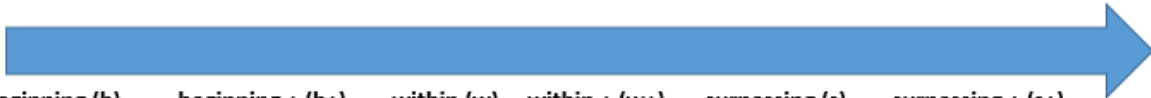
At each data point all children will complete a White Rose assessment.

This is a progress check consisting of 2 papers: Paper 1: Arithmetic and Paper 2: Reasoning and Problem Solving.

Evidence will also be drawn from the following areas:

- Highlighted assessment grids (when the children have mastered a skill, not when they have covered a skill).
- Work in books (including Morning Calculation books) and on Tapestry.
- Weekly mental maths tests results.
- Times Tables Sound Check to be carried out at each data point in Years 3 – 6. The Sound Check will be completed by Year 2 pupils at the Summer Data Point.

- Pupil interviews can be carried out if deemed necessary.



	beginning (b)	beginning + (b+)	within (w)	within + (w+)	surpassing (s)	surpassing + (s+)

	ARE	GD
DP1	b and b+	w and higher
DP2	b+ and w	w+ and higher
DP3	w+	s and higher

Teachers will carry out assessments and present their judgements. These judgements will then be moderated by SLT. Teachers will also get the opportunity to carry out standardisation in Maths at Cross Trust Moderation Meetings.

Fluency Bee

Fluency Bee is used as an intervention that takes place 3 times a week: Tuesday, Wednesday and Thursday at 11.00. Children are identified and work in small groups with teachers and TA's. It is a structured teaching programme designed to give children confidence with numbers through varied and frequent practice. With conceptual understanding at its heart, Fluency Bee builds number sense and develops a range of core skills in maths. With children spending extra time on developing their fluency skills, it will put them in a strong position to tackle problem solving.

Numbers and Patterns

Numbers and Patterns is a strategy that can be used across the school as an intervention. The purpose of it is to:

- To lay secure foundations in early mathematics
- To develop the children's mathematical vocabulary
- To develop the children's mathematical reasoning and understanding
- To encourage TALK about mathematics
- To develop confidence and enjoyment in mathematics

The focus is on Number words and numerals and counting sets. This will eventually lead the children to be able to calculate confidently and with a secure understanding.

Sessions take place as deemed necessary, using the following teaching sequence:

Teaching sequence

- Shared objective
- Adult model (talking about each process rather than telling instructions-using mathematical vocabulary)
- Independent activity
- TALK TIME (Use a variety of open and closed questions to allow children to explain their mathematical reasoning)

Times Tables

The children need to be fluent in the recall of their times tables. It is vitally important the children have this knowledge as many concepts hinge on the understanding of these. Knowing their times tables by rote is important, but this must not be at the detriment of understanding. They need to work alongside each other.

At Knighton Mead we subscribe to TTRS (Times Tables Rock Stars). All children are given a login which can be accessed at both home and school. Children need to be given the opportunity to log onto TTRS in school weekly. Each class has a TTRS Ambassador who meets with the Maths Lead on a regular basis to plan competitions, events and provide encouragement in their classes.

Times tables and all areas of Maths are celebrated weekly in the Friday Assembly. A Maths Star of the week is selected - this being given to any pupil who has demonstrated they have demonstrated an excellent attitude towards their maths work regardless of their starting point. Times Tables competitions are arranged within school between classes and across the trust.

At the end of Year 4, children take part in the Multiplication Tables Check.

See the attached cross-trust document regarding the teaching of times tables.

Resources

Maths Zone/Learning Environment

Every classroom should have a dedicated area to set up a maths zone. This is an area where the children can come and select equipment to help them complete their maths work. It needs to be on show, not in drawers. The children need to be encouraged to collect the equipment themselves. Initially they will need to be directed towards the most appropriate equipment, in time they will be able to make these decisions for themselves. The equipment in the zones can be changed as the topic changes, but the list below highlights the equipment that should always be available. Vocabulary and Knowledge Organisers can also be displayed in the Maths Zones.

Maths Zone

Recommended equipment that should be readily accessible for children to use to support their learning:

FS & Y1

- A variety of number lines and number tracks (horizontal and vertical)
- *100 squares (to be used with caution!)
- Numicon
- Base ten
- Bundled objects e.g. straws or cotton buds, bundled into groups of ten plus loose ones
- Bead strings
- A wide variety of counting equipment e.g. counters, small objects
- Ten frames
- Part/whole models

Y2-6

- Hundred squares
- 200 grid
- Variety of number lines and number tracks 0-100 and beyond
- Tape measures (vertical 0-100 number line)
- Bundled objects e.g. straws or cotton buds, bundled into groups of ten plus loose ones
- Numicon – good for whole numbers and decimals
- Bead Strings – good for whole numbers and decimals
- Counting equipment e.g. counters, small objects
- Place value arrow cards – place on top of each other to create any number (ThHTU)
- Spinners/dice etc. for generating random numbers
- Tens frames
- Part/whole models
- Calculators
- Vocabulary flashcards

Resources for maths are kept in the storeroom above the RB2L Room.

Language

Developing the children's correct mathematical vocabulary is vitally important for their development. Children come into school having acquired 20% of the language they will acquire in a lifetime. We need to be modelling correct language for the children and having the high expectation that they will use it. Voice 21 provides the building blocks of language development and this needs to develop as the children continue their journey through the school. Language that is needed to be used is highlighted in The White Rose planning resources.

See the attached vocabulary document.

APE

Answer Prove Explain

All children will be introduced to APE as this will help to develop their reasoning skills. The children should be given the opportunity to carry out an APE activity at least once a week.



<i>Answer</i>
<i>Prove</i>
<i>Explain</i>

Captain Stretch

All children should be given the opportunity to carry out a Captain Stretch activity appropriate to their level. This will allow the children to further develop their skills and understanding once they have practised a skill. This is a good opportunity to see if the children can use learnt skills in a different context.