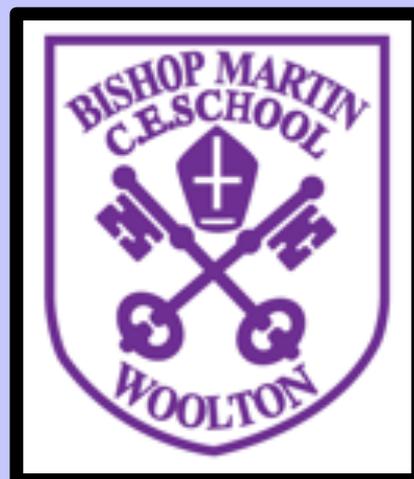


# Mathematics Handbook



Updated November 2022

## *Learning Together, in God's Love*

*At Bishop Martin, we INSPIRE and empower all members of our school community, providing the knowledge to enable everyone to thrive and flourish. Guided by our Christian Values, we are all determined to serve and lead the diverse world we live in treating everyone with compassion, dignity and respect. Hope and aspiration support all to grow and believe that*

***"...with God all things are possible."***

***Matthew 19:26***

### ***Our Christian Values***

<b><i>Christian Values Year 1</i></b>	<b><i>Thankfulness</i></b>	<b><i>Trust</i></b>	<b><i>Perseverance</i></b>	<b><i>Justice</i></b>	<b><i>Service</i></b>	<b><i>Truthfulness</i></b>
<b><i>Christian Values Year 2</i></b>	<b><i>Generosity</i></b>	<b><i>Compassion</i></b>	<b><i>Courage</i></b>	<b><i>Forgiveness</i></b>	<b><i>Friendship</i></b>	<b><i>Respect</i></b>

# Teaching Principles

At Bishop Martin we believe maths is for everyone. Developing a positive attitude and love of learning in maths is essential, promoting enjoyment and providing opportunities to reason mathematically and solve problems. We want all pupils to be passionate about maths and inspired to have a life-long curiosity.

## **Approach to Mathematics**

### **Intent**

In relation to the aims of the INSPIRE curriculum, our maths curriculum is developed to be fully inclusive for all the pupils we teach. The aim for our pupils is to develop curiosity and to think critically; challenging their individual thought processes and that of others. Children will be able to explain their reasoning and be perceptive in their questioning.

The aim is to introduce content and concepts visually, and practically, wherever possible. Content will become relatable to our pupils when shown in 'real-life' scenarios and across the curriculum. Children will be given the opportunity to apply everyday skills within their daily lessons.

The ambition is for children to be fluent in the fundamentals of mathematics to master the content they are taught; applying both mental and written methods where applicable. We define the fundamentals of maths as place value knowledge, use of the four operations, recall of multiplication and division facts and the identification of fractions and their equivalents. With fluency, children will apply their knowledge of number and procedures to a range of problems where they will show perseverance and demonstrate the ability to break problems down into simpler, smaller steps.

### **Implementation**

Maths will be taught daily, with sequences of learning clearly mapped out for each year group. The sequencing of topics, and lessons, will follow the White Rose Small Steps planning.

Each lesson will begin with a 20-minute calculations session. These sessions will incorporate skills already learnt and are differentiated to incorporate and engage all pupils.

Enquiry will be at the heart of maths lessons and children will be allowed to explore concepts using practical equipment. Lessons are designed to support children to progress between concrete, pictorial and abstract approaches. Representations and structures also allow pupils to understand make connections and develop their understanding of what is happening and how to perform the calculation. Key vocabulary, that is topic specific, develops pupils mathematical talk. This will be evident and at the forefront of dialogue within the classroom. Within lessons teachers will use variation to offer concepts in more than one way including misconceptions to develop and embed understanding.

### **Impact**

Children are creative, enjoy maths and the challenge it can provide. They will understand the importance and significance of mathematics in their educational journey and in their life beyond the classroom.

Children will develop an in-depth understanding of mathematical concepts using various representations, explaining their understanding using these representations and demonstrate confidence in mathematical talk. Children will be able to tackle unfamiliar problems through the ability to identify the smaller steps that will

help and linking in their prior knowledge. Children will use mathematical vocabulary to explain their mathematical thinking and processes.

Children will be successful by the end of Key Stage 2 and will have the fundamentals to be able to progress in Key Stage 3 and be able to use their maths skills and knowledge in the wider world.

## *Lesson Structure*

### **Retrieval/Feedback**

*Prerequisite knowledge required for that lesson.*

### **Guided Practice**

*Using Walktrus, questioning, manipulatives or pictorial representations, where appropriate, children are supported to explore and develop their understanding of the concept being taught. Children will discuss, explore, make connections, and spot patterns through various activities. Children develop and practise their language using key vocabulary and stem sentences to reason and explain their thinking.*

### **Independent Practice**

*Children work independently or with a partner to apply their knowledge and skills from the guided practice.*

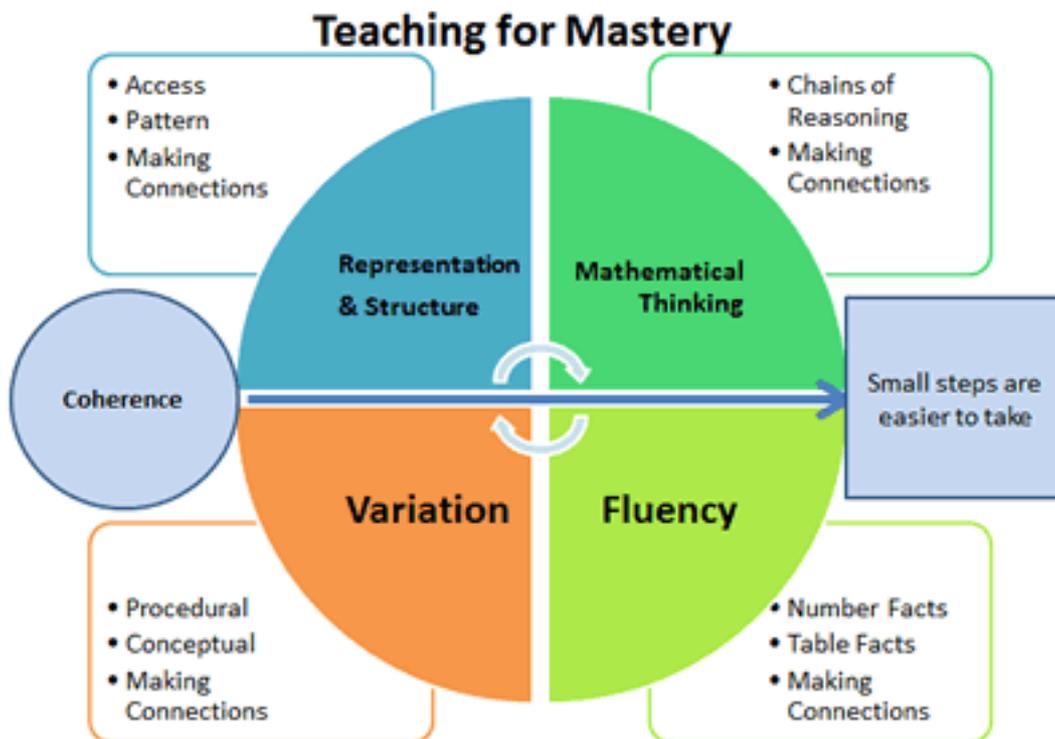
### **Review**

*Reflect and review the lessons learning.*

# Maths Mastery

Maths Mastery is a teaching and learning approach that aims for pupils to develop deep understanding of maths and mastering mathematical concepts. The goal of maths mastery is for all pupils, with a very limited exception, to acquire the fundamental facts and concepts for their year or key stage. This will then mean that pupils will be able to use their fluency facts, knowledge and mathematical vocabulary to solve unfamiliar reasoning problems. We are currently working alongside the NCETM Maths Hub to embed mastery and supplement the White Rose Maths scheme we follow.

Teaching for Mastery is underpinned by Five Big ideas as the model below demonstrates, these big ideas have been drawn from research to support our teachers in achieving mastery. Each component is explained below.



## Coherence

Lessons are broken down into small, connected steps (sometimes referred to as chunks) that gradually unfold the concept, providing access for all children and leading to a generalisation of the concept and the ability to apply the concept to a range of contexts.

## Representation and Structure

Representations used in lessons expose the mathematical structure being taught, the aim being that students can do the maths without recourse to the representation. Mathematical equipment and manipulatives are part and parcel of our lessons and available for children to use when they need to in both calculations lessons and mathematics lessons.

## Mathematical Thinking

If taught ideas are to be understood deeply, they must not merely be passively received but must be worked on by the student thought about, reasoned with and discussed with others. Talk partners, collaborative group

tasks and teaching and learning strategies taken from THRIVE and WalkThrus support pupils to develop their talk.

### Fluency

Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics. Calculation sessions at the beginning of each maths lesson support the development and learning of fluency facts.

### Variation

Variation is twofold. It is firstly about how the teacher represents the concept being taught, often in more than one way, to draw attention to critical aspects, and to develop deep and holistic understanding. It is also about the sequencing of the episodes, activities and exercises used within a lesson and follow up practice, paying attention to what is kept the same and what changes, to connect the mathematics and draw attention to mathematical relationships and structure.

## Stem Sentences

Stem sentences are used throughout school to support fundamental mathematical understanding. The sentences use key language linked to a concept and work alongside the different mathematical representations to help pupils to understand the structure. The sentences can be adapted to suit multiple questions around a specific area, with different numbers/examples being included. This also supports variation.

Stem sentences scaffold thinking and language development for pupils. We take an 'I say, we say, you say' approach modelling using the sentence and explicitly teaching reasoning answers. All stem sentences are colour coded based on topic across the school so there is a consistent approach and symbols are used to identify the area of maths.

Year 1 Example -

\_\_\_ is longer/shorter  
because \_\_\_



Year 5 Example -

I know \_\_\_ ml is equivalent to \_\_\_ L  
because there are 1000 ml in 1L.

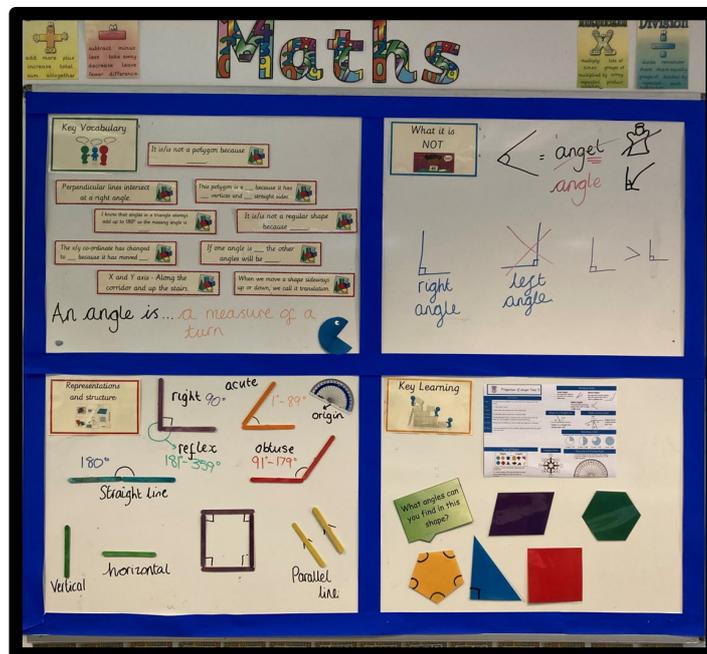


## Maths Working Walls

We use Maths Working Walls in maths to support pupils learning and develop their conceptual understanding. This helps pupils know more, remember more and do more. The working walls are split into 4 sections using a whiteboard so that teachers can write straight onto the working wall and use it as a teaching tool.

The sections are;

- Key Learning
- Key Vocabulary
- Representations and structures
- What it is NOT



For each topic a Knowledge Organiser is produced, this along with the stem sentences makes up the key learning section of the working wall. Key vocabulary is a way to introduce mathematical language linked to the topic that pupils can use when using mathematical talk or to support reasoning. Representations and structures are used to give conceptual understanding and where possible teachers are urged to display actual examples on the wall to support pupils e.g. a set of 3d shapes. Understanding misconceptions is a fundamental part of developing mathematical knowledge, using the What it is NOT section teachers can address the misconceptions that are common.

## Supporting Pupils with SEND

In Mathematics children with SEND are supported by quality first teaching using a range of strategies from our Thrive Teaching Toolkit and Walkthrus. We believe that all children are entitled to an education which meets their individual needs, and our curriculum is differentiated to ensure all children make progress and learn more. Specific strategies are used in Mathematics lessons to support children with SEND.

# Long Term Planning

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 <i>(key times of day, class routines and positional language – where does this belong?)</i>			Just like me <i>(Matching and sorting, making comparisons and exploring patterns)</i>			It's Me 1, 2, 3! <i>(Numbers to 5, 1 more and 1 less)</i>			Light and Dark <i>(Geometrical and spatial thinking, time night and day)</i>		
Spring	Alive in 5! <i>(Compositions of 4 and 5, comparing to 5, introducing 0)</i>			Growing 6, 7, 8 <i>(combining 2 amounts and making pairs)</i>			Building 9 and 10 <i>(Counting to 9 and 10, comparing to 10 and bonds to 10)</i>			Consolidation		
Summer	To 20 and Beyond <i>(Building numbers beyond 10, counting patterns)</i>			First Then Now <i>(Adding more and taking away)</i>			Find my Pattern <i>(Doubling, sharing and grouping and even and odd)</i>			On the move <i>(Deepening understanding of patterns and relationships)</i>		

Year 1												
	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 (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	Statistics		Number: Fractions			Geometry: Position and Direction		Problem Solving		Measurement: Time			

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			
Spring	Number: Multiplication and division			Measurement: Length and Perimeter			Number: Fractions			Measurement: Mass and Capacity		
Summer	Number: Fractions		Measurement: Money		Measurement: Time			Geometry: Properties of Shape		Statistics		Consolation

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			Consolation
Spring	Number: Multiplication and division			Measurement: Length and Perimeter		Number: Fractions				Number: Decimals		
Summer	Number: Decimals		Measurement: Money		Measurement: Time		Consolation	Geometry: Properties of 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			Number: Fractions A			
Spring	Number: Multiplication and division			Number: Fractions B		Number: Decimals and Percentages			Measurement: Perimeter and Area		Statistics	
Summer	Geometry: Properties of 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	Number: Ratio and Proportion		Number: Algebra		Number: Decimals		Number: Fractions, Decimals and Percentages		Measurement: Perimeter, Area and Volume		Statistics	
Summer	Geometry: Properties of Shape			Geometry: Position and direction Revision	Investigations							

## Daily Calculations

Daily calculations allow children to practice what they have been taught to have procedural fluency. These sessions function as retrieval practice so that facts and procedures can be committed to long term memory. Children work independently, with resources where appropriate. Teachers will assess, support, and intervene to ensure that children are making progress throughout the session.

Calculations develops children's ability to access the wider maths curriculum. They can solve problems and reason with numbers if they have a solid foundation in arithmetic and key facts. Practising these daily will reduce the cognitive overload children can encounter when solving more complex problems. Mathematical fluency is vital to success in maths and we prioritise this at Bishop Martin. All classes from Year 1 to Year 6 work on daily calculations at the age-appropriate level. Systems and routines are established to ensure children maximise learning time during these sessions.

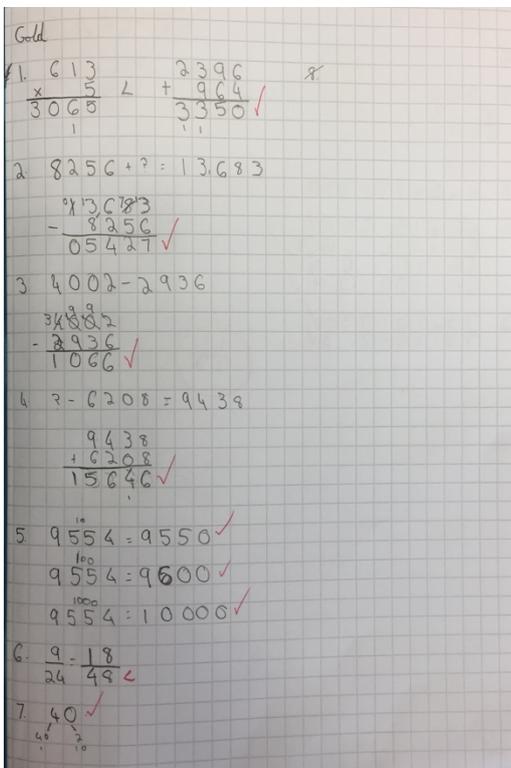
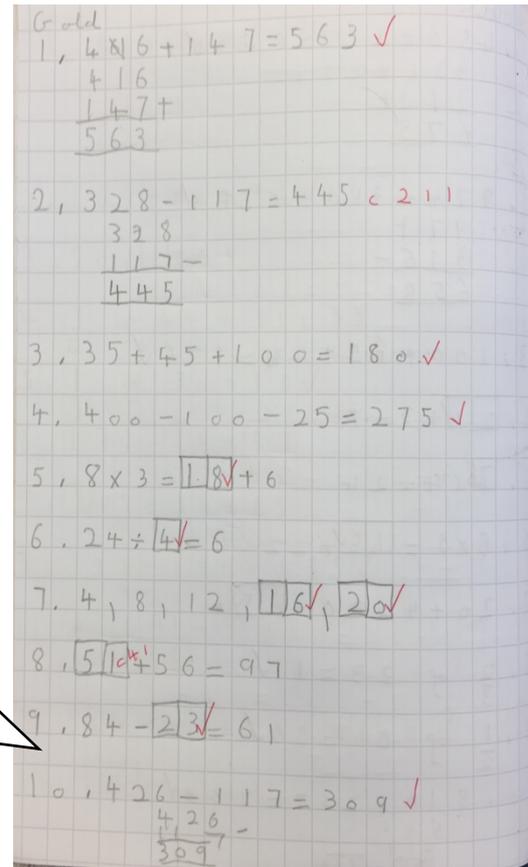
These calculations should incorporate the skills already learnt in maths lessons and support children in knowing more and remembering more. Calculations are planned into Bronze, Silver and Gold to ensure all children can access them at their level.

Calculations books should be -

- Well presented
- Have one digit per square
- Feature regular practise of the four operations
- Focus on practising skills children have already learned
- Consolidate new learning
- Cover the objectives of the year group

Year 2 example

- Addition and subtraction methods
- Adding and subtracting 3 numbers
- Missing number problems
- Number sequences



Year 4 example

- Addition and subtraction methods
- Multiplication of HTO x O
- Rounding problems
- Finding equivalent fractions
- Self-marked

Year 6 example

- Daily Speed Check
- Division and multiplication methods
- Missing number problems
- Finding percentages
- Self-marked
- Corrected using red pen

**THURSDAY**

1. Time? (24-hour)  $07:55$  

2.  $99\ 996 + 7 = 100\ 003$

3. A regular pentagon has  2  5  10 lines of symmetry. 

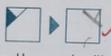
4.  $\frac{2}{3}$  of 60 =  $40$  ✓

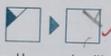
5.  $0.3 \times 10 = 3$  ✓

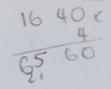
6. Write the numeral one hundred thousand and twenty.  $100\ 020$  ✓

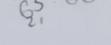
7. Write these fractions from largest to smallest.  $\frac{8}{9}$  ✓,  $\frac{4}{6}$  ✓,  $\frac{1}{3}$  ✓

8. The value of 9 in 18.9 is:  9 tenths ✓,  9 hundredths.

9.  $70 \div 7 = 10$  ✓ 

10. Draw a  $90^\circ$  turn clockwise. 

11. Jeremy earns £16.40 per hour. How much will he earn in 4 hours?  $65\ 60$  ✓ 

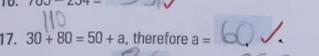
12.  $(9 \times 5) + 5 = 50$  ✓ 

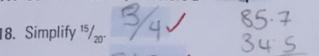
13.  $11^2 = 121$  ✓

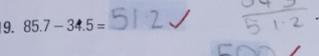
14. Which instrument would you use to measure a field?  trundle wheel  ruler ✓

15. Is this angle  acute ✓  obtuse? 

16.  $765 - 234 = 531$  ✓

17.  $30 + 80 = 50 + a$ , therefore  $a = 60$  ✓ 

18. Simplify  $\frac{15}{20} = \frac{3}{4}$  ✓ 

19.  $85.7 - 34.5 = 51.2$  ✓ 

20. Round 504 to the nearest 100.  $500$  ✓

**20/20**

Handwritten notes on grid paper:

- $\frac{2}{3} \text{ of } 900 = \frac{1}{4} \text{ of } ?$
- $3 \overline{) 900} = 300$
- $300 \times 2 = 600$
- $600 \times 4 = 2400$
- $? = 2400$  ✓
- $\frac{4}{5} \text{ of } 250 = \frac{1}{4} \text{ of } ?$
- $4 \overline{) 250} = 62\ 50$
- $62\ 50 \times 4 = 250$
- $5536 \div 41 = 135\ 1$  ✓
- $41 \overline{) 5536} = 135\ 1$
- $25\% \text{ of } ? = \frac{1}{5} \text{ of } 250$
- $50 \times ? = 200$  ✓
- $200 \div 4 = 50$
- $4 \overline{) 200} = 50$
- $65^\circ$
- $x = 65^\circ$  ✓
- $y = 115^\circ$  ✓
- $z = 115^\circ$  ✓
- $230 + 130 = 360$
- $230 + 130 = 360$

# Teaching Maths

## **EYFS**

In EYFS, Mathematics is taught daily. Children are supported to develop their mathematical skills and language through mathematically rich learning environments, real life contexts, rhymes, stories, adult directed activities and children's interests. Children are provided with meaningful contexts for mathematics in EYFS.

The Mastering Number approach and the White Rose Maths are incorporated into our Long-Term Plan for Mathematics. The Mastering Number approach is aimed at strengthening the understanding of number and fluency with number facts. This approach is consistent and complementary to the Primary Teaching for Mastery programme and all skills and knowledge learned, builds on and further develops children's understanding. Children use a range of materials and representations to support their learning.

## **Key Stage 1 &2**

Maths is taught daily for 60 minutes. Children learn through the process of Concrete, Pictorial, Abstract (CPA) helping to develop deep and sustainable understanding on concepts. During lessons pupils complete a range of activities working alongside the teacher, independently and with peers to support their understanding always using manipulatives to connect ideas.

## **SEND**

In maths we support children with SEND with quality first teaching. This includes a range of strategies from our Thrive Teaching toolkit and Walktrus. All lessons are differentiated to match the ability of the pupils within the class and additional scaffolding is used to support pupils with SEND. There is big focus on using concrete resources and visual representations.

## **Schemes of work**

We follow the White Rose Maths scheme of work for Reception through to Year 6. This scheme allows our teachers, and pupils, to explore and understand concepts in depth. There are clear long term plans that are broken down into lesson by lesson overviews developing mathematical talk around specific areas before moving onto fluency and then reasoning and problem solving. The resources provided can be adapted to suit the needs of individual cohorts and provide pupils with a variety of question types to help develop their understanding through fluency and reasoning.

Teaching for Mastery is being embedded alongside White Rose Maths scheme of work. We use elements of this to support pupils in acquiring a deep, long-term, secure and adaptable understanding of the maths.

As a school we also use different mathematics to support pupils in school and at home to consolidate prior learning. We subscribe to Numbots and Times Table Rockstars (TTRS) which focus on fluency facts and build pupils recall speed through games and competitions. MyMaths gives teachers and pupils access to a range of lessons and online homework tasks. Interactive lessons, games and worksheets are linked to an assessment management system enabling the teacher to track progress effectively. If the child is unable to access a computer at home computers will be available in school at breakfast club, after school club and during the school day.

## **Exercise books for recording**

It is the school policy that the following text books are used:

	Calculation Books	Maths Books	Jotter Books
KS1	Red, A4, 1cm Squared	Blue, A4, 1cm Squared	N/A
KS2	Red, A4, 7mm Squared	Blue, A4, 7mm Squared	Blue, A5, 7mm Squared

All children are encouraged to work tidily and neatly when recording their work. The presentation guidelines state:

- Miss a line then underline your last piece of work with a pencil and ruler.
- Start a new page if you have fewer than 8 lines left.
- Write your date in figures at the left side of the page like this: 17.06.20
- Miss a line and write your Learning Objective
- Miss another line- now you are ready to start your work.
- When doing number work, use one square for each digit. Leave one square between the question number and calculation.

1.		3	+	6	=	9
----	--	---	---	---	---	---

- If you make a mistake, draw a straight ruler line through.
- Show your working- you do not need to rub it out when you have finished.

Never...

- Circle question numbers
- Underline without using a ruler
- Scribble out mistakes

## **Marking in Maths**

Refer to the marking policy.

### **Homework**

*It is our school policy to provide parents and carers with opportunities to work with their children at home. These activities should focus on consolidating existing skills or learning from the current topic. Activities are set on the different apps e.g. Times tables rock stars or using Seesaw to give specific tasks linked to the lessons from that week.*

### **Assessment**

*We assess children daily through a range of formative assessment strategies. This may include the use of examination style questions to apply existing knowledge or it could be in the form of a short, multiple choice quiz to embed learning in the long term memory. Teachers should continue these activities until children have learned the specified content. Retrieval practice is used in every lesson in various formats including retrieval grids, THRIVE teaching activities (see Teaching and Learning Policy) and additional resources from White Rose Maths. Alongside this we use NFER assessments termly. These rigorous assessments allow us to challenge all children in each year group. These take the form of an arithmetic test, as well as a problem solving and reasoning test. These also have a similar layout and appearance to end of Key Stage tests. The data is inputted into AskEddi and reports are used by the Subject Leader and class teachers.*

### **Monitoring**

*Monitoring of books will take place on a regular basis to evaluate the quality and standards of mathematics throughout the school. Feedback will be given to individual teachers and summarised for the whole school.*

### **School Website**

*Further information and resources can be found on our school Sharepoint site, in the curriculum section under maths.*