

## Maths Intent, Implementation and Impact Template

### Maths Intent (the What) and Implementation (the How):

#### How we ensure an ambitious Maths curriculum – a mastery curriculum:

Our Maths teaching is underpinned by the belief that all children need **a deep understanding of the mathematics they are learning**. This is what we mean by Mastery. There is one set of Mathematical concepts for all. We ensure all pupils have access to these concepts and the rich connections between them. Mastery is, therefore, the aim for all children, hence we have an ambitious Maths curriculum for all.

Mastery is a continuum. We believe mastery is only going to be achieved when **more time is spent on key concepts** that are revisited and reviewed. This allows for the development of depth and sufficient practice to embed learning. Devoting time to key concepts enables us to:

- Represent concepts in lots of different ways (multiple representations).
- Teach the processes, then allow the children to apply their knowledge, increasingly rapidly and accurately. (Following a process / procedure won't enable mastery; applying a process will!)
- Commit key facts to children's long term memory.

Therefore, at an age appropriate level, we expect the vast majority of our children to be able to:

- **Use mathematical concepts, facts and procedures appropriately, flexibly and fluently**
- **Have a sufficient depth of knowledge and understanding to reason and explain mathematical concepts and procedures and use them to solve a variety of problems.**
- **Recall key number facts e.g. number bonds and times tables with speed and accuracy and use them to calculate and work out unknown facts.**

#### How we ensure challenge

We ensure that the majority of pupils will move through the curriculum at broadly the same pace. However, based on good AfL, our teachers make decisions about when to progress children, based on the security of pupils' understanding and their readiness to progress to the next stage. This does not mean that 'we hold children back' and that all children have the opportunity to access the same questions and same activities all of the time. Pupils who grasp concepts rapidly are challenged by 'going deeper', being offered rich and more sophisticated problems before any acceleration through new content. Differentiation still takes place although it will often be through the same concept, posing different questions and problems for 'rapid graspers' to extend their thinking. We constantly review where children are by carrying out pre and post assessments within small units of work. The results from these provide the sequence of teaching and determine the levels of differentiation and challenge needed. Mastery strategies such as 'Prove it; Compare; True or False are used. 'Deepening' through differentiation is important in all year groups but of paramount importance in our mixed age classes. This is where we have provided external and internal support for those teachers with mixed classes. Those who are not sufficiently fluent with earlier material, consolidate their understanding, including through additional practice, before moving on. A ceiling is not put on children's learning and flexible grouping is adopted based on pre-assessments. We also use something called pre-teach sessions, where teachers have identified children who need support before starting a unit of work or during and these sessions are used to teach those concepts to give this children an understanding of the concept before starting the lesson.

### How we ensure a well sequenced, progressive curriculum

We teach the National Curriculum 2014. Pupils gain understanding of the mathematics relevant to their year group so that it is built upon in subsequent years.

- Our **high level long term map** for Maths outlines in year groups / phases when mathematical knowledge, in units of work, will be taught and revisited. This is the basis for our well sequenced and progressive curriculum. We use White Rose Hub to determine our long term plan.
- Our **Calculation policies** outline in more detail which concepts and procedures / strategies will be introduced and then developed. Our parents have a copy of this and we also send out maths knowledge organisers that offer examples of vocabulary and strategies to support families at school.
- Our **weekly planning** is based on White Rose Maths which is tailored to the needs of our children. We use many concrete resources throughout the school to ensure children are exposed to multiple representations of a concept. This is part of our CPA (Concrete, Pictorial and Abstract) approach which we are just starting to work on in our journey.

Whilst we teach Maths in progressive distinct domains (units of work) we recognise that Maths is an interconnected subject. Therefore, we encourage children to make connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. Children also apply their mathematical knowledge across the curriculum, and particularly in Science, where relevant.

We regard talk in Maths as important and introduce mathematical vocabulary in an age appropriate way. We encourage children to verbalise their thinking; our teachers ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions. We discuss maths vocabulary at the start of units and this information goes out to parents and is also on display in all classrooms.

### We make time to teach Maths:

Children in EYFS have a daily mathematical focus from a teacher but this is not recorded every day. This is followed up in continuous provision and in adult led activities. Children still have a pre and post assessment to measure the progress between units.

Children in Year 2, 3, 4, 5 and 6 have a daily Maths session lasting for 1 hour. Year 1 have a maths lesson 4 days a week.

If children are not reaching the expectations outlined below we intervene quickly by giving extra support. We give catch up support by 1:1 / group interventions / pre-teach, post teach and follow up work. We also identify these pupils at pupil progress meetings and actions are put into place. The content of these sessions is determined by on-going gap analyses and our in depth knowledge of each child. These sessions are additional to our daily Maths sessions.

### We build a skilled team who can teach Maths:

Every member of our teaching staff has accessed PDET training by our Maths Consultant on each domain in the Maths curriculum this academic year. This has focussed on Maths subject knowledge and pedagogical subject knowledge. Our Maths Subject Leader has also accessed PDET CPD this academic year. We have carried out a regular number of in house CPD sessions based on the aforementioned training and have carried out 1:1 coaching for identified staff – which has included external support.

Leaders in our academy prioritise the teaching of Maths. Maths is identified as a key priority on our Academy Improvement Plan. Leaders monitor the provision of Maths through learning walks in Maths sessions, book scrutinies, peer reviews and pupil interview and the impact of this provision through the analysis of (i) end of year cohort data (end of KS1 and 2 Maths) and (ii) individual pupil attainment and progress throughout the year (on going assessments). Leaders also look at progress between units through developments between pre and post assessments.

### **Early Maths (Implementation and Impact):**

#### **EYFS:**

From the beginning of EYFS (third week) we prioritise the **five principles of counting:**

- (i) The one-to-one principle: A child knows that we only count each item once.
- (ii) The stable order principle: A child knows that the order of the number names always stays the same. We always count by saying one, two, three, four, five....in that order.
- (iii) The cardinal principle: A child knows that the number they attach to the last object they count gives the answer to the question how many....?
- (iv) The abstraction principle: A child knows that we can count anything – they do not all need to be the same type of object.
- (v) The order irrelevance principle: A child knows that we count a group of objects in any order and in any arrangement and we will still get the same number.

We also prioritise:

- **Subitising:** the ability to recognise how many there are in a small group of objects without counting them. This allows children to see that numbers can be represented in different ways.
- **Unitising:** one object can have a value of more than one (equivalence). e.g. using Base 10 equipment, Numicon, coins.

#### **EYFS Impact**

**By the end of EYFS, we expect the vast majority of our children to achieve the ELGs in Number and Shape, Space and Measure.**

Number ELG: Count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.

Shape, Space and Measure ELG: Children use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems. They recognise, create and describe patterns. They explore characteristics of everyday objects and shapes and use mathematical language to describe them.

### **KS1 (Implementation and Impact):**

In KS1 our main priority is to ensure children are developing an appropriate, deep understanding and fluency of **place value and the four operations.**

We focus on:

- Using the CPA approach (Concrete, Pictorial and Abstract) as a way to introduce children to a range of representations. Each year group / class can access concrete resources.
- Practice to aid fluency at this early stage.
- Early Addition and Subtraction strategies which include:
  - (i) Addition and Subtraction facts to 10
  - (ii) Recording when appropriate, using the word 'and' progressing to = .
  - (iii) Including putting the 'answer' at the front e.g.  $10 = 4 + 6$  and including missing numbers  $4 + \_ = 10$
  - (iv) Exploring commutative  $4 + 6 = 6 + 4$
  - (v) Exploring balanced sides e.g.  $4 + 6 = 3 + 7$
 Progressing to:
  - (vi) Subtraction and addition facts to 20
  - (vii) Recording of balanced sides e.g.  $8 + 5 = 10 + 3$
  - (viii) Including missing numbers e.g.  $8 + \_ = 10 + 4$ ;  $9 + \_ = 10 + \_$
  - (ix) Structured progression to addition of larger numbers:
    - e.g. How does making 10 help to solve
    - 2 digit and 1 digit (with a 1 in the tens column, bridging ten) e.g.  $14 + 7 = 10 + 10 + 1$
    - 2 digit and 2 digit (with a 1 in both the ten columns) e.g.  $14 + 17 = 20 + 10 + 1$
    - 2 digit and 2 digit e.g.  $27 + 18 = 30 + 10 + 5$
- Partitioning in different ways.
- Early multiplication and division strategies which include:
  - (i) Repeated addition
  - (ii) Counting in multiples
  - (iii) Arrays
  - (iv) Progressing from division as sharing to grouping. (Division as sharing becomes an inefficient strategy as soon as numbers become larger. Division as grouping also enables the connection to be made between  $\times$  and  $\div$ .)

(See detailed progression in our Calculation policies.)

In addition, we aim for children to:

- Develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary.
- Use a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money.

We develop visualisation by:

- Using equipment
- Seeing equipment but not using it
- Visualising using a jotting.
- Introducing such methods as bar modelling to visualise mathematical concepts and solve problems.

We build in opportunities for verbalisation of thinking in younger years leading to written explanations of thinking / reasoning by Year 5/6. Children encouraged to answer in 'full sentence answers' by the use of sentence stems.

### **KS1 Impact**

**By the end of KS1 we expect the vast majority of our children to have developed confidence and mental fluency with whole numbers, counting and place value including working with numerals, words and the four operations.**

### **Lower KS2 (Implementation and Impact)**

**In Lower KS2 our main priority is to ensure children are becoming increasingly fluent with the four operations (including efficient methods), number facts and place value (including simple fractions and decimals) and are able to problem solve.**

We focus on:

- Continuing to use the CPA approach (Concrete, Pictorial and Abstract) as a way to develop children's conceptual understanding.
- Encouraging the most efficient strategies for calculation. Children are taught a range of strategies; they are taught to look at the calculation as a whole to encourage thinking about what the numbers mean rather than just the digits and using one strategy.
- Progressing understanding of multiplication by looking for linked / connected calculations:
- Progressing understanding of division by e.g.:
  - (i) By halving to make the calculation easier:
  - (ii) By dividing the dividend and the divisor by any number to make the calculation easier
  - (iii) Divide by partitioning in different ways.

(See detailed progression in our Calculation policies.)

In addition, we aim for children to:

- Draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them.
- Use measuring instruments with accuracy and make connections between measure and number.

### **LKS2 Impact**

**By the end of Year 4 we expect the vast majority of our children to have:**

- **Become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value.**
- **Developed efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.**
- **Developed their ability to solve a range of problems, including with simple fractions and decimal place value.**
- **Memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.**

## Upper Key Stage 2 (Implementation and Impact)

In Upper KS2 our main priority is to ensure that children are:

- Extending their understanding of the **number system and place value** to include larger integers.
- Developing connections between multiplication and division with **fractions, decimals, percentages and ratio**.
- Developing their ability to **solve a wider range of problems**, including **increasingly complex properties of numbers** and arithmetic, and problems demanding efficient written and mental methods of calculation.
- Introduced to the language of **algebra** as a means for solving a variety of problems.

Calculators are introduced near the end of KS2 to support pupils' conceptual understanding and exploration of more complex number problems, if written and mental arithmetic are secure.

In addition, we aim for children to:

- to consolidate and extend their knowledge developed in number in geometry and measures.
- Classify shapes with increasingly complex geometric properties and learn the vocabulary they need to describe them.

## UKS2 Impact

By the end of Year 6, we expect the vast majority of our children to:

- **Be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.**
- **Have deep conceptual understanding and the ability to recall and apply mathematical knowledge rapidly and accurately.**
- **Reason mathematically by following a line of enquiry, using their knowledge of relationships and generalisations, and justify using mathematical language**
- **Solve problems by applying their mathematics to a variety of problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.**