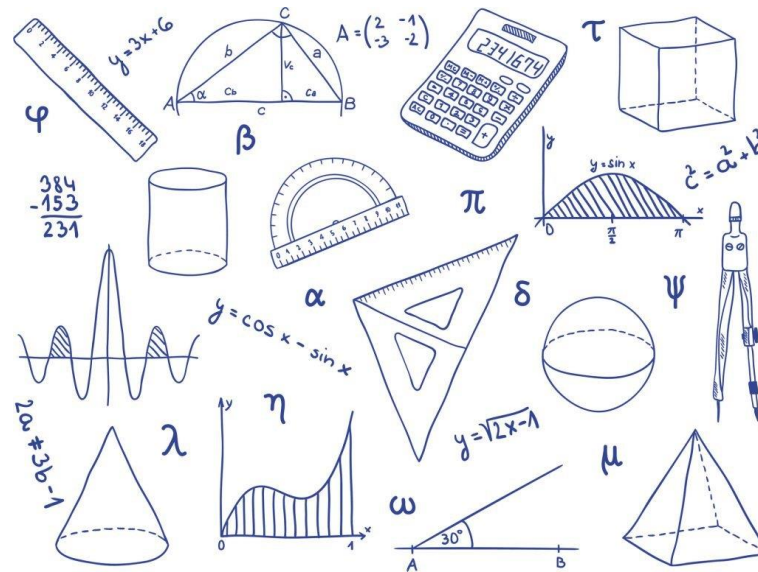




Curriculum:

Progression in Mathematics



INTENT - The Mathematics Curriculum

The 2014 National Curriculum for Maths aims to ensure that all children:

- Become fluent in the fundamentals of Mathematics
- Are able to reason mathematically
- Can solve problems by applying their Mathematics

At Hunton and Arrathorne, these skills are embedded within Maths lessons and developed consistently over time. We are committed to ensuring that children are able to recognise the importance of Maths in the wider world and that they are also able to use their mathematical skills and knowledge confidently in their lives in a range of different contexts. We want all children to enjoy Mathematics and to experience success in the subject, with the ability to reason mathematically. We are committed to developing children's curiosity about the subject and supporting them through innovative teaching styles, accompanied by rich resources and cross-curricular links.

IMPLEMENTATION - Progression Mathematics: Rationale

We have bespoke calculation policies for both written and mental calculations which demonstrate what progress looks like across school. These calculation policies have been designed with our children in mind and are in fully in line with the National Curriculum. As a basis for our learning we follow White Rose Maths Mixed Age Planning and the White Rose Maths Schemes of Learning for our children. Teachers use these planning tools as a start point for objectives; ideas of reasoning and challenging children to work at greater depth. They then use a variety of other resources to supplement the WRM scheme and give our children the varied diet of mathematics they including the Teaching for Mastery documents which further propel us towards our goal of children in all year groups and of all abilities developing strengths in their reasoning and problem solving skills. This approach is further developed through our involvement in the Maths Hubs ‘Teaching for Mastery’ programme. As a school, we follow the CPA (concrete-pictorial-abstract) approach – ensuring children are given access to concrete manipulatives, varied fluency and a range of reasoning and problem solving opportunities. This underpins both our lessons and our learning environments.

Within each lesson, teachers follow a rigorous approach of ‘Teach It’ which includes clear modelling; ‘Twist It’ where varied fluency is applied and ‘Deepen It’ where reasoning and problem solving is applied.

Mental and written calculations are taught through the National Curriculum mathematics lessons although children may also work on these in more bespoke target time sessions or early intervention sessions when appropriate. In Lower Key Stage 2, these skills are further embedded with daily mental arithmetic sessions to prepare pupils fully for the Multiplication Check at the end of Year 4. These are supplemented by daily ‘Fluent in Five’ sessions in all classes which take place first thing every morning. sessions provide pupils the opportunity to consolidate or learn new calculation skills and cover whole class gaps in learning.

Alongside planning and progression documents, to aid teacher’s in their delivery of mathematics lessons the ‘Curriculum Expectations for Mathematics’ ensure consistency for our children in terms of work-books, learning environments and lesson structure.

IMPLEMENTATION - Progression Mathematics: Teaching Expectations

We have developed a system for teaching mathematics which is consistent across school and in line with our intent for all children to be able to master mathematics confidently.

Planning Structure

As a school, we follow the White Rose Maths Hub long term plan. In EYFS and KS1 pupils follow single aged overviews and associated small steps guidance; in KS2 mixed age plans are followed. Although teachers use the White Rose plans to sequence lessons appropriately we are committed to ensuring children receive a wide diet of mathematics tasks and therefore activities will not be exclusively from the White Rose resources. The small steps guidance provides staff with continual CPD about how to break down the concepts into small progressive chunks.

It may be appropriate, for example at the beginning of the unit, to spend one session investigating concrete representations. Likewise, at the end of the unit the teacher may choose to spend a session entirely on the application of reasoning.

In addition to the White Rose overviews, we also have bespoke progression documents for calculations and mental calculations. When teaching these aspects, teachers refer to these. Likewise, in rapid recall work these follow the basis of our plans.

Lesson Structure

Active Counting (5 minutes)

Each class has between 5-10 minutes rapid recall of counting per day – this could include key number bonds, multiplication tables or other curriculum related tasks.

Rapid Recall (5 minutes)

Rapid recall sessions should last 10 minutes and provide the pupils with opportunities to recap and revisit key skills – these should have a focus on progression in calculations and mental calculations although should not be exclusively limited to this. In KS2 pupils may use A3 paper to share their workings and calculations, although squared whiteboards should also be used.

Teach It #1

High quality teacher modelling should include concrete, pictorial and abstract representations with the adult or adults modelling clearly initially.

Teach It #2

Utilise the 'I do' / 'You do' approach so the children apply what they have learnt during teacher modelling. This could be on whiteboards or within books – it may come from a variety of resources such as White Rose, teacher made resources etc.

Twist It #1

The objective is presented in a different way (varied fluency) and modelled clearly once again by the teacher.

Twist It #2

Children apply their knowledge in a different context.

Deepen It

The children are given the opportunity to explore the objective at a deeper level through reasoning and problem solving tasks.

Challenge

An additional extension challenge which some children may access.

Plenary

This may involve a recap of knowledge, children self-marking or additional extensions. Where possible, real life links should be clearly explained to the children.

The teacher may decide to follow the above sequence within the initial lesson and stop the children after each part, moving some children on. Equally, they may decide to hold a whole class input first and then allow the children to work through problems independently.

Learning Environments

Learning environments should be maths rich. Resources should be readily accessible to the children. In addition each classroom should include:

Age appropriate number lines (linked to curriculum objectives)

- A hundred square
- Concrete resources which are readily accessible
- Four sections – Concrete / Pictorial / Abstract / Reasoning with examples of each.
- A vocabulary section with relevant vocabulary for the topic
- Squared easel paper for modelling key concepts

Presentation

Children worked in squared maths books which are clearly labelled in the school style. Children use one square per digit and are encouraged to present their work to the best of their ability. When paper is used, it is trimmed and children are taught how to stick it in neatly. All work has a date and learning objective which starts with 'To...' and an objective clearly linked to the national curriculum. Objectives may be provided for the children or written themselves depending on their age and ability. Children start a new page for each piece of work.

Self-Assessment

Children self-assess at the end of a piece of work using a green, red or orange colouring pencil.

Marking & Feedback

Our emphasis will be on 'live marking' with either the children marking their own work (blue pen) or teacher marking correct or incorrect answers.

The teacher will not provide written comments in maths books, instead whole class feedback forms will be used. Children will respond to teacher feedback immediately using a purple pen. They will also correct a reasonable amount of work or complete extension activities in purple pen.

IMPLEMENTATION – LONG TERM PLANNING

As stated above, we follow White Rose Maths single age planning for Reception and KS1 and mixed age planning for Key Stage 2. We supplement this with guidance from the ‘small steps’ materials to ensure that pupils are taught skills and knowledge systematically with plenty of opportunity to master. By supplementing this with our bespoke approach within lessons we can be confident that pupils receive a full diet of mathematical tasks. This is further supplemented by our Progression in Calculations and Progression in Mental Calculations documents which are based on best practice research from Maths Hubs and the National Centre for Excellence in Teaching Mathematics.

White Rose resources, including mixed age planning, can be found here:

<https://whiterosemaths.com/resources/primary>

IMPLEMENTATION – PROGRESSION IN MENTAL CALCULATIONS

At our school we teach mental calculation strategies progressively.
Below are the key facts each year group should know by their final term.

Reception (The Super Six)

Count objects reliably to 20

Count reliably from 1-20

Say which number is 1 more or 1 less than any given number to 20

Subitise 1-5

Recall bonds for 1-5

Recall doubles for 1-5

Year 1 (The Nifty Nine)

Adding 1 (e.g. $7+1$ and $1+7$)

Adding 2 (e.g. $2+7$ and $7+2$)

Number bonds of 10 (e.g. $8+2$ and $2+8$)

Adding 10 to a number (e.g. $10+5$ and $5+10$)

Adding 0 to a number (e.g. $0+3$ and $3+0$)

Near doubles up to double 5 (e.g. $5+4$ and $4+5$)

Adding 3 (e.g. $5+3$ / $6+3$)

Recall doubles 6-10

Recall bonds of 20 (e.g. $17+3$ and $3+17$)

Year 2 (The Nifty Nine)

Partition 11-20 into single digit addends

Near doubles (e.g. $5+6$ and $6+5$)

Bridging (e.g. $8+4$ and $4+8$)

Compensating

Know the multiples of 2 in and out of order

Know the multiples of 5 in and out of order

Know the multiples of 10 in and out of order

Instantly recall multiplication sentences for 2,5 and 10 x

Subtraction of facts within 20

Year 3 (The Incredible Eight)

Know multiplication facts for the 3 times table

Know multiplication facts for the 6 times table

Know multiplication facts for the 4 times table

Know multiplication facts for the 8 times table

Know corresponding division facts for the 3 times table

Know corresponding division facts for the 6 times table

Know corresponding division facts for the 4 times table

Know corresponding division facts for the 8 times table

Year 4 (The Incredible Eight)

Know multiplication facts for the 7 times table

Know multiplication facts for the 9 times table

Know multiplication facts for the 11 times table

Know multiplication facts for the 12 times table

Know corresponding division facts for the 7 times table

Know corresponding division facts for the 9 times table

Know corresponding division facts for the 11 times table

Know corresponding division facts for the 12 times table

Year 5 (The Key Three)

Convert between simple units of metric measurement.

Count reliably in powers of 10 from any given number to 10,000

Identify factors, multiples and squares of any given number.

Year 6 (The Key Three)

Convert between miles and kilometres.

Convert between different units of metric measurement.

Know equivalent fractions, decimals and percentages.

IMPACT

The school has a supportive ethos and our approaches support the children in developing their collaborative and independent skills, as well as empathy and the need to recognise the achievement of others. Children can underperform in Mathematics because they think they can't do it or are not naturally good at it. Our programme addresses these preconceptions by ensuring that all children experience challenge and success in Mathematics by developing a growth mindset. Regular and ongoing assessment informs teaching, as well as intervention, to support and enable the success of each child.

Our mathematics curriculum is high quality, well thought out and is planned to demonstrate progression. Within each objective, children should access varied fluency, the opportunity to reason and problem solve. Children use mathematics books to record their progression which are marked in accordance to our feedback policy.

The expectation is that the majority of the children will move through the domains of mathematics and where needed, will access 'keep up' interventions to ensure they do not fall behind. Staff monitor this through the use of the Target Tracker assessment package which is formally monitored on a termly basis. In conjunction with this, teachers make sound teacher assessment judgements through the use of summative assessments (PUMA) tests and past SAT's papers for Y6. Progression in mental calculations is assessed half-termly through our 'Progression in Mental Arithmetic' tracker. Rigorous assessment of this tracker ensures gaps are closed readily and children are secure in their mental knowledge at the end of each stage of learning.