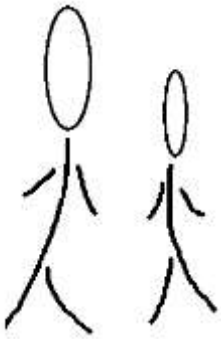
Harewood Primary School



Aspire, Acquire, Achieve

Maths Policy

Approved by Governors:	September 23
Review Date:	September 24
Signed by Headteacher:	Caroline Heywood
Signed by Chair of Governors:	Denis Robinson

Harewood Primary School

Mathematics Policy

National Curriculum
This policy should be read in conjunction with the 2014 National Curriculum.

"Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject."
National Curriculum 2014

What is the Intent of Maths at Harewood Primary?

Mental arithmetic and mathematical fact knowledge are key components in the process of achieving mastery in mathematics. Our maths lessons make the acquisition of these skills fun and engaging, enabling all children to feel successful in Maths.

Our aims in mathematics are

- to help children be confident and competent with numbers and measures. This requires an understanding of the number system, a range of computational skills and an inclination and ability to solve number problems in a variety of contexts. Mathematics also demands practical understanding of the ways in which information is gathered by counting and measuring, and is presented in graphs, diagrams, charts and tables.
- To develop an awareness of the language of maths and mathematical concepts
- To encourage children to question and reason
- To develop children's capacity for logical thinking
- To recall mathematical facts accurately and quickly
- To feel successful in Maths

How is the Subject Organised and Implemented within School?

Implementation
The White Rose scheme is used as a basis for the Long and Medium Term Planning across all year groups. This not only ensures coverage of the whole curriculum but has been designed to build upon previous skills and knowledge.

The reasons we chose the White Rose Maths scheme of Learning can be summarised by the following points:

- It provides a powerful CPA approach through the use of consistent models and images, which helps children to secure their understanding of Mathematics and to make connections between different representations.
- The use of mathematical language, questioning, reasoning and problem solving enables children to discuss and explain their understanding whilst supporting each other to develop a broad understanding.
- White Rose provides a progressive curriculum through carefully sequenced lessons built upon in each year group.
- CPA is provided to teachers to help further their knowledge of Mathematics.
- It is designed to use already acquired skills, learnt in different contexts 'interleaving' whenever possible. This supports children in remembering and making connections between different areas of the curriculum.
- White Rose enforces mastery, allowing more time to be spent on topics, therefore providing children with a deeper understanding, making connections, whilst keeping all children working together on the same topic to ensure progression for all.

- It is a scheme that is ambitious for all children, with every child learning the same topic whilst being provided with support or challenge as needed. Adaptive teaching is encouraged as all children are required to complete the worksheets, some through use of manipulatives, some through the direct approach, however all children succeed.

https://whiterosemaths.com/resources/primary-resources/primary-sols/

Although White Rose is the basis of our curriculum, it is supplemented with a variety of other resources.

Subject Time Allocation
Children in Foundation Stage receive Mathematics teaching in small focused groups and continuous provision enables the children to develop and utilise these skills in both the indoor and outdoor settings.

All children in Year One upwards have at least one hour of mathematics per day. These lessons tend to be taught in morning sessions although some may occur in the afternoon to ensure the delivery of the whole curriculum. Children in Year one and two will spend an additional 15 minutes a day using Numbersense.

What does a daily Mathematics lesson look like at Harewood Primary?

Early Years
Teaching in the Early Years and Foundation Stage is based upon **Mathematics development** which involves providing children with opportunities to practise and improve their skills in counting numbers, calculating simple addition and subtraction problems, and to describe shapes, spaces, and measures. Teachers use the Concrete, Pictorial, Abstract approach to deepen conceptual understanding.

In nursery there are daily planned and incidental subitising opportunities using story books, photographs and a range of resources both indoors and outdoors. These activities encourage children to notice amounts, to show amounts, to recognise similarities/differences in amounts, as well as focusing on pattern. Children move on to copying and visualising patterns and using a 5 frame on both a small and large scale. There are opportunities to visit the local environment to subitise using natural resources. As a result, children in nursery will begin to gain an understanding of early calculation by subitising and investigating whole/parts of a number.

Pupils in EY use real life objects, solving real life problems and manipulate abstract concrete objects. Children are provided with opportunities to subitise at a developmentally appropriate level. This allows them to develop number sense where they can see numbers within bigger numbers developing familiarity with number bonds and help their understanding of how numbers partition. By separating and combining numbers through subitising it lays the foundations for addition and subtraction.

Numberblocks are used alongside the White Rose maths scheme as support materials. Children use five frames and ten frames daily on a large and small scale to identify patterns within numbers and develop their subitising skills.

- **Numbers**: Have a deep understanding of number to 10, including the composition of each number. • Subitise (recognise quantities without counting) up to 5. • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

- **Numerical Patterns**: Verbally count beyond 20, recognising the pattern of the counting system. • Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity. • Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

- The development of mathematical understanding should include the use of stories, songs, games and imaginative play.

Key Stage 1 and 2

The approach to teaching in Key stages one and two, recommended by 2014 National Curriculum is based on a number of key principles:

- Dedicated mathematics lessons every day;
- Direct teaching and interactive oral work within the whole class and groups;
- An emphasis on mental calculation, problem solving and reasoning
- Controlled differentiation within a group, with all pupils engaged in mathematics relating to a common theme
- Integrated provision for speaking and listening to promote children's learning in mathematics
- Teachers use the concrete, pictorial, abstract approach to maths to deepen understanding.

A typical lesson in Key Stages one and two will have the following structure:

- Oral work and mental calculation – whole class work to rehearse, sharpen and develop mental and oral skills and fluency and ability to recall facts and apply them
- A multi objective activity to ensure that facts and skills are continually practiced and retained.
- The main teaching activity – interactive teaching input and pupil activities. The children may work as a whole class, in groups, in pairs or as individuals
- A plenary to round off the lesson – a time to work with the whole class to sort out misconceptions and identify progress, an opportunity for the children to self assess their own learning, to summarise key facts and ideas and what to remember, to make links with other work and discuss the next steps. This may also be the time to set work to do at home.
- In addition to this, all lessons will include element of problem solving or reasoning.

Within the framework teachers will adopt number of different teaching strategies. These will include directing, demonstrating, explaining and illustrating, questioning and discussing, consolidating, evaluating pupils' responses and summarising.

- The activities through which the learning objectives are taught are varied to reflect the different learning styles of individual children. These will include investigations, games and exercises and opportunities for speaking and listening to promote children's learning in mathematics.

CPA approach

Concrete, pictorial, abstract (CPA) is a highly effective approach to teaching that develops a deep and sustainable understanding of maths in pupils and is an integral part of the White Rose maths scheme.

THE CONCRETE, PICTORIAL, ABSTRACT FRAMEWORK AT A GLANCE:

- An essential technique of maths mastery that builds on a child's existing understanding.
- A highly effective framework for progressing pupils to abstract concepts like fractions.
- Involves concrete materials and pictorial/representational diagrams.
- Along with bar modelling and number bonds, it is an essential maths mastery strategy.

BACKGROUND TO THE CPA FRAMEWORK

Children can find maths difficult because it is abstract. The CPA approach builds on children's existing knowledge by introducing abstract concepts in a concrete and tangible way. It involves moving from concrete materials, to pictorial representations, to abstract symbols and problems.

THE CONCRETE STEP OF CPA

Concrete is the “doing” stage. During this stage, students use concrete objects to model problems. Unlike traditional maths teaching methods where teachers demonstrate how to solve a problem, the CPA approach brings concepts to life by allowing children to experience and handle physical (concrete) objects.

THE PICTORIAL STEP OF CPA

Pictorial is the “seeing” stage. Here, visual representations of concrete objects are used to model problems. This stage encourages children to make a mental connection between the physical object they just handled and the abstract pictures, diagrams or models that represent the objects from the problem.

Building or drawing a model makes it easier for children to grasp difficult abstract concepts (for example, fractions). Simply put, it helps students visualise abstract problems and make them more accessible.

THE ABSTRACT STEP OF CPA

Abstract is the “symbolic” stage, where children use abstract symbols to model problems. Students will not progress to this stage until they have demonstrated that they have a solid understanding of the concrete and pictorial stages of the problem. The abstract stage involves the teacher introducing abstract concepts (for example, mathematical symbols). Children are introduced to the concept at a symbolic level, using only numbers, notation, and mathematical symbols (for example, +, –, x, /) to indicate addition, multiplication or division.

Although we have presented CPA as three distinct stages, a skilled teacher will go back and forth between each stage to reinforce concepts.

It is important to recognise that the CPA model is a progression. By the end of KS1, children need to be able to go beyond the use of concrete equipment to access learning using either pictorial representations or abstract understanding. What is important, therefore, is that all learners, however young, can see the connections between each representation.

The Number Sense Maths Programme

The Number Sense Maths Programme provides the structure and materials for daily number fact teaching in KS1, and works alongside the White Rose Maths Scheme. The programme gives addition and subtraction facts the focus they need for children to become fluent in them, just as phonics gets the focus it needs to teach children to decode.

The Number Sense Maths Programme is fully aligned with NCETM PD materials and the ready to progress criteria in the recent DfE guidance (Summer 2020).

At the core of the Number Sense Maths Programme are the Addition and Subtraction Fact Grids. These essential facts are the equivalent of times tables for addition and subtraction. Just as all multiplication and division calculations use root times table facts, all future addition and subtraction calculations use these root addition and subtraction facts

The Number Sense Maths Programme teaches 12 calculation strategies. Learning and applying these strategies gives children a deep understanding of number and number relationships. Using these strategies children can then "use what they know to work out what they don't know". Explicit teaching of derived fact strategies is an effective route to fluency in addition and subtraction facts for all children, including lower attainers.

Planning

Medium Term Planning has addressed the 2014 National Curriculum. The revised planning includes weekly key objectives to aid assessment.

Lessons are planned for the Unit of maths they are teaching. Children are identified on the weekly plans as are FSM ever children. All planning is stored electronically in a shared area, available for staff to access.

Pupil Grouping
Children in the Foundation Stage and Year one are taught in class where the children are organised into ability groups. Mathematics is taught in sets within each year group from Year two upwards. The lower ability set which may include children with an EHCP or Children with an enhanced mainstream provision are supported by a classroom assistant.

Cross- Curricular Links
Teachers try whenever possible to link concepts from within different subjects to give them meaning in a wider context. Cross-curricular links can be identified in the schemes of work and the long term plan. Where opportunities arrive maths topics are linked in with the weekly creative curriculum area, for example, data handling may be taught during a Science week.

Computing
Class teachers and the Computing team explore the opportunities offered by Computing to enhance teaching and learning. All classrooms have access to an Interactive whiteboard and a wide range of mathematical Computing resources including, Maths shed, Mathsframe, Espresso, Numbots, Numbershark, Prodigy maths, Stick and Split and TTRockstars to enhance teaching. Individual programmes can be set up for individual children using, Maths shed, TTRockstars, Numbots, Numbershark and Prodigy where appropriate.
All year groups provide links to suitable websites on their year group DB primary page.
There are a number of IPADs in school that can be used to support mathematics learning.

TT Rockstars is used from Year 3-6, children are encouraged to access daily for 10 minutes to improve fluency of times tables. TT Rockstars can be adapted to suit the learning of children as specific tables can be set for children to learn and develop.

Cross Phase Links
Staff work closely with Key Stage 1 colleagues to ensure there is continuity and progression on transfer. Year one staff work closely with foundation colleagues to ensure continuous progression is followed at the beginning of Year one.

Specialist Teaching
Where there is a teacher with a Numeracy specialism within a year group they will lead the planning and support colleagues with advice and in some cases teach the subject across the year group.

Role of the Teacher
- Teachers' planning and assessment should meet the needs of all children in their groups. Tasks should provide valuable learning opportunities for all abilities.
- Teachers should establish a dialogue with parents about numeracy to enable parents to get involved with homework activities at home which will support the children's learning
- Teachers should have high expectations of the children and provide opportunities which will challenge and extend the children's learning. They should provide a learning environment which fosters children's self confidence and values their work.
- Teachers should liaise and direct the work of teaching assistants.

Teaching Assistants
Teaching Assistants work alongside the children to provide additional explanations or they may adapt activities to meet the particular special needs of an individual child. They work under the guidance of the class teacher and are part of the planning for the lessons. They may work with a small group of children during the beginning part of the lesson – this is to allow these children more time to process their thoughts and strategies. Teaching Assistants are utilised effectively to ensure individual children are supported when necessary.
HLTA's can prepare, plan, deliver and assess specified work under the direction of a qualified teacher.
Teaching assistants are trained in delivering intervention strategies. They also take responsibility for the Year group domino challenge to develop quick and accurate recall of facts.

Presentation and Recording of Work
In mathematics children's work can take various forms such as, informal jottings, written calculations, graphs or tables or as a game. We encourage children to take pride in their work.

Resources

Foundation Stage
There is a wide range of practical resource materials available in each classroom. These include equipment and apparatus for time, money, number and shape. Sand and water trays are available in each area, together with pertinent equipment. The White Rose scheme is available to support teaching activities. Numicon, Cuisenaire rods, 5 frames and 10 frames are available in Foundation Stage.

Key Stage One
Practical apparatus is available in all classrooms. Number lines are clearly displayed and children have access to individual ones where needed. The White Rose scheme is used to support teaching and learning activities. Numicon, Cuisenaire rods, counters and number lines are available in all Key stage one classrooms.

Key Stage Two
The White Rose scheme is used to support the implementation of the Daily Mathematics Lesson. This scheme provides staff with support but is not intended to be the only resource used and a variety of materials are incorporated into planning and delivering the lessons across school. There are a variety of class-based resources such as number lines, digit cards, place value cards and number squares. All other mathematics resources are kept centrally, to be used when needed. All year groups have access to visual fraction resources, Numicon and Cuisenaire rods, double sided counters, and year group specific place value charts.

SEN
Practical resources including Numicon are available to develop understanding of maths.

Assessment and Record Keeping
Formative assessment is ongoing, teachers and children continually reflect on how learning is progressing, see where improvements can be made and identify the next steps to take.

The marking of written work is part of the assessment process and identifies attainment and progress that is shared with the children. Objectives taught are identified on the individual target sheets in the children's' books. When a child has demonstrated understanding away from the direct teaching, either during a multi starter input or written work then the objective will be assessed as achieved. Testbase assessments are implemented termly and analysed. Greater depth is awarded when the objective can be applied to a variety of settings. The information from the individual target sheet is transferred to INSIGHT where it can be used to identify topic areas that need reinforcing.

Assessment activities are varied and can be a test, an investigation or whiteboard work during the lesson. In addition to this, a termly Testbase assessment will be used as a summative assessment and used to identify areas of weakness for individual children. Children are given the opportunity to self assess their written work using a traffic light code as well as opportunities to assess each other.

FFT Estimates are used to identify potential targets for the end of Key stage 2 assessments. Staff use these to aid target setting for children in Key stage 2. All children are set targets at the beginning of the year which are recorded on INSIGHT. Data recorded on INSIGHT is analysed by the Numeracy co-ordinator to identify areas of weakness and strength. These results are used to identify cohorts of children who may need interventions and to inform future planning.

SEN
SEN children are taught mathematics within a class group, well supported by adults. Children with mathematical special needs are given access to the learning outcomes by additional support from the classroom teaching assistants, planned differentiated activities and specific resources where

appropriate. Some children may work with a teaching assistant during the starter activity to allow them more time to process their strategies. The SENCO is available to support staff with advice concerning any aspect of special needs.

Gifted and Talented

Gifted and Talented children are identified using a range of criteria, their progress is measured by identifying concepts that show a greater depth of understanding. Challenging and enriching activities are provided to stretch more able children. Their progress is monitored using INSIGHT.

Equal Opportunities

The mathematics curriculum is accessible to all children irrespective of age, ability, gender and cultural background. Children are encouraged to respect and value the diversity of other cultures and lifestyles.

Health & Safety

Staff should refer to the Health and Safety Guidelines.

All school visits are carefully planned with safety in mind and consideration of the age and ability of the children. Field trips are well supervised.

British Values

Democracy

- Take into account the views of others in shared activities.
- Voting when collecting data.

The Rule of Law

- Undertake safe practices, following class rules during tasks and activities for the benefit of all.
- Understand the consequences if rules are not followed.

Individual Liberty

- Work within boundaries to make safe choices during practical activities.
- Make own choices within data handling activities.
- Tolerance of those with different faiths and beliefs
- Use maths to learn about different faiths and cultures around the world. Eg. looking at patterns/shapes within Islam / Hindu religions.

Mutual Respect

- To behave appropriately, allowing all participants the opportunity to work effectively.
- Take turns and share equipment.
- Review each other's work respectfully.
- Work collaboratively on projects/problems, help and advise others.

Role of the Subject Leader

Please refer to the policy on the role of the Curriculum Leader.

Parental Involvement

As co-educators of children parents have an important role to play. They should be kept informed about the areas of study within mathematics so that they can make the most of any opportunities to apply the mathematical concepts learnt at school. Children's targets are shared at parents evenings.

Homework is based on the children's key facts. Children are given weekly key facts to learn as the foundation to their learning, these are sent home weekly for children to practice, ready for their test on a Friday.

Role of the Governing Body

The School Improvement Committee has the role of approving all curriculum policies.