

Harewood Primary School

Mathematics Policy

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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 the Subject at Harewood Primary?

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

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. This 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.

The Daily Mathematics Lesson

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 ten frames daily on a large and small scale to identify patterns within numbers and develop their subitising skills.

- **Numbers:** Children 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 measures:** 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.
- The development of mathematical understanding should include the use of stories, songs, games and imaginative play.

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, +, −, ×, /) 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.

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.

Teaching & Learning Styles

Teachers try to plan a diverse range of activities through which to teach Mathematics skills and knowledge. These activities should reflect the different learning styles of children and encourage enthusiasm and interest in the world around them.

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.

ICT

Class teachers and the ICT team explore the opportunities offered by ICT to enhance teaching and learning. All classrooms have access to an Interactive whiteboard and a wide range of mathematical ICT resources including, Activelearn maths, Maths shed, Mathsframe, Espresso, Numbots, Numbershark, Prodigy maths and TTRockstars to enhance teaching. Individual programmes can be set up for individual children using, Maths shed, TTRockstars, Numbots, Numbershark and Prodigy where appropriate.

Children have individual log ins for Active learn where teachers can set differentiated tasks. 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.

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 are used primarily, although not exclusively, to support children with Special Educational Needs to enable them to have equal access to the learning objectives of the lesson. They may 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. Teaching Assistants develop knowledge and understanding of how the SEN children in their group learn and this experience is valued greatly. 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.

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.

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 and Cuisenaire rods 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.

SEN

Number Connections, a published scheme, may be used to support children with mathematical Special Educational needs. Numicon is also available to develop understanding of place value.

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. PUMA Maths tests 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 PUMA test 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

The children with enhanced mainstream provision are taught mathematics within a lower ability mainstream 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 should support learning in school and the teacher needs to provide parents with enough information to enable them to be clear about the purpose of the activity and their role. Weekly homework is set using the CGP books.

Role of the Governing Body

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

Reviewed: September 2020

Next review date: September 2022