POLICY STATEMENT & GUIDELINES
FOR MATHS AT PARK HILL 2017

National Curriculum Statement

'Mathematics is a creative and highly interconnected 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.

It is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.'

The aims of teaching maths at Park Hill are:

- For pupils to become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- To enable pupils to **reason** mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- Pupils can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions
- To give pupils **enjoyment**, through a wide variety of experiences featuring practical activity, exploration and discussion in which they learn and relate this learning in both a personal and wider context.
- For pupils to learn through the concrete, pictorial and abstract approach
- Pupils to know their times tables, be able to calculate mentally
- To promote confidence and competence with **numbers, the number system**, including **algebra, ratio** and **proportion** in Y6, and rules with which to manipulate numbers
- To enable children to make sense of: the form, construction and measurement of shapes and the quality of movement through space in **geometry**
- To build pupils' mathematical vocabularies
- To develop pupils' ability to **measure** and quantify: mass, capacity, length, area and time. To enable pupils to understand and use money.
- To provide opportunities for children to develop the skills working with **statistics**, to gather, organise, record and interpret information in various forms
- Maths is taught everyday, with a focus on interactive oral work with the whole class and groups.

PLANNING

Long Term Plans

Long term planning can be found in year folders and the maths folder on staff shared and originate from a scheme developed by White Rose. Reception and Year 1 follow the Mathematics Mastery Programme of teaching of maths.

It should be stressed that **these are only a guide** and staff are encouraged to take into consideration the requirements of cohort/setting. The duration of the units should be modified as informed by assessment for learning.

Medium Term Plans

The medium term plans set out the order, length and regularity of the teaching of numeracy objectives within a unit. Teachers can access medium term objectives from their year folder on staff shared from the MATHS folder. The practitioner prioritises the objectives and determines an overview of areas to be covered within the unit. Consequently priorities are set based on knowledge of the children's competency of concepts being covered. However it is imperative that there is scope for flexibility within this overview so as to make allowances for children's learning in situ.

To facilitate higher and lower achievers, the previous and subsequent years' planning is available, so that a practitioner may dip into parallel objectives to provide more support or challenge, as best suit the needs of their learners.

Short Term Plans

The short term planning pro forma is a document, which sets out the order of objectives for a week or longer period. Key to the document is the review (or anchor task)>teach/practise>apply>close the gap >review cycle which maps out the assessment of children's prior learning, action for what they will be learning, the application of that learning and evaluative review. Practitioners use their professional judgement to combine or extend elements of the cycle dependent on the needs of the children.

Encompassment of a wide range of learning styles in conjunction with more formal instruction is encouraged, in order to facilitate children's preferred form of learning and different stages of development.

FOUNDATION STAGE

Mathematics is taught in reception and nursery, with reference to the Early Years Foundation Stage document. Reception follow the planning of the Mathematics Mastery Scheme. Children are given opportunities to develop their understanding of: numbers, patterns, shape & space, comparative measurement and to discuss their understanding of maths in an everyday context, through a variety of activities. In the summer term more able children will be taught more formally, in order to meet their needs and aid transition to year 1.

TEACHING AND LEARNING

The teaching and learning of maths at Park Hill follows a cycle of Review/Anchor Task – Teach & practise – Apply – Close the Gap for each objective or set of objectives.

The aim of the review or anchor task is for the teacher to ascertain the stage of understanding of pupils in each objective cycle. Reviews may form part or all of a lesson depending on the volume of content being taught in the cycle.

The teach/practise aspect of the cycle provides pupils with the opportunity to undertake calculation process rehearsal, to the point of mastery in the first instance as well as presenting alternative presentations of question types which might include problems in a written format with contexts, puzzles or questions which pull in other aspects of maths (hybrid questions) and opportunities for pupils to develop their reasoning skills.

Following the teach/practise part of a cycle, pupils should be given an opportunity to apply their understanding, independently and without help from the environment or working walls. Apply lessons may take the form of a short test where there is some variety in question types and in the level of cognitive

demand or targeted practical work where teachers interact with pupils to assess their learning through observation of their success with the task and through discussion.

Close-the-gap parts of lessons may take the form of a whole class review of a significant general misconception or as individual tasks focussing on specific errors assessed in the apply lesson.

Environment

Practitioners are aware of the variety of learning styles (visual, auditory, kinaesthetically - VAK) and the impact of the learning environment on accelerating and consolidating understanding. A stimulating maths environment should form part of any Park Hill room where maths is taught and consist of: working walls, interactive resources, readily accessible vocabulary and conceptual displays to promote independent learning.

Learning Activities

Staff are advised to provide children with opportunities to explore and develop and apply their knowledge, skills and understanding in a variety of ways using a range of resources, e.g: number lines, squares, digit cards, number tracks, dice, spinners, bar modelling, whole–part-part method and other small apparatus to complete mathematical tasks and investigations as well as with written work. The purpose of this is to appeal to the different learning styles of children. Concepts are presented using concrete apparatus, pictorial and abstract images.

Computing

Computing provides a medium through which teachers can model strategies and methods, simulate physical mathematical concepts, manipulate shapes, model measurement techniques and display the various ways in which information can be presented.

There are a number of programs available for use on each year groups' computer desktop and in the computer suite. Computing should be used as often as is appropriate in the daily maths lesson, as part of teaching phases and pupil activities to offer an alternative learning style to further reinforce and develop understanding of concepts therefore, specially designated sessions are available in the Computing suite.

Programmes are available for pupils at home through the school's *Mathletics* subscription as well as within school, which children of all years can use to help practise their maths through fun interactive programmes.

Calculators should not be used as a substitute for good written and mental arithmetic. They only introduced near the end of key stage 2 to support pupils' conceptual understanding and exploration of more complex number problems, if written and mental arithmetic are secure.

Differentiation

At Park Hill we are aware of the different learning needs of pupils and so children from Y2 upwards, are grouped into sets according to their requirements. However it is recognised that there is still wide variation in abilities within the sets, therefore challenging work is set within the range of all pupils' capabilities. This may take the form of alternative activities or organising children in pairings or groups to suit the purpose of a particular activity. In some settings, team teaching may take place and classroom assistants may be used to support designated groups of learners.

According to the National Curriculum, "The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based

on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on."

Presentation Of Work

KS2 children are required to write the learning objective for that lesson followed by the short date at the top right of their work for that day. All written work should be done in pencil.

KS1 children are also required to write the short date at the top of their work and if appropriate in year 2, the learning objective. In their marking, KS1 teachers might refer to the learning objective. Again, only pencils should be used.

Children are taught to work neatly and systematically.

Central and Class Resources

Central maths resource cupboards are situated upstairs outside the staff room. Practical pupil resources are stacked and clearly labelled in strand boxes, along with models, posters and images stored in large drawers. It is the responsibility of the maths leader to audit these resources and the responsibility of the class teacher to return resources where they found them and as they found them.

Classrooms are equipped with some basic resources. In each classroom there should also be a working maths board with maths vocabulary, models and images and enquiry questions (see environment). There should also be number lines and other number charts around the room. Classrooms may have small working apparatus to support children in their work.

ASSESSMENT AND REPORTING

Targets

Years 1-6 are routinely issued with a themed target with the intention of developing pupils' core mathematical abilities, thereby contributing to the raising of standards. The cycle runs over a two to three week period with some oral starters allocated to addressing the target objective and a further session dedicated to evaluating the progress made by pupils. Teachers share targets; it is expected that all/the majority of pupils are able to achieve 'working towards, expecting and exceeding' targets respectively.

Daily Assessment

Each class/set teacher monitors children's daily progress. This assessment informs teachers' future action, regarding the following days' lesson, which may require annotation or entire adjustment (AfL). Feedback to pupils should be clear and follow Park Hill marking policy.

Summative Assessment

Formal tests are undertaken at a designated time each term, from year 2 to year 6. The last of these sessions are the PUMA or SATS tests. These tests are distributed by the maths leader and are completed under test conditions. The data is collated and interrogated by the maths leader, whereby the analysis is directed towards investigating some of the following:

- Pupil tracking data
- Yearly progression analysis
- End of year targets

- Overall KS. progression analysis
- Learner group analysis
- Gaps in learning analysis

Mental Maths Tests / Fact Friday

Weekly testing is undertaken, from year 2 to year 6, in the form of the 'Fact Friday' system. These are a series of tests which sequentially take pupils through the multiplication tables, their related division facts and applied questions, testing speed and accuracy of recall of multiplication and division facts. These are presented in three boxes and should be completed from left to right; starting with the multiplication box, moving to the related division facts box and finishing with the applied questions box. The timeframe in which the children have to complete their Fact Friday sheets always remains the same at ten minutes. In order to successfully achieve each Fact Friday sheet, the children must answer **all** facts correctly in **all three boxes**. If they complete one box correctly, they get one house token. If they complete two boxes correctly, they get two tokens. Completing all three boxes without any mistakes means the children get three tokens and get to move on to the next Fact Friday sheet the following week. They also complete a multiplication wheel and a multiplication grid of the multiplication table. Once the pupil is proficient in all three different presentations of the table, they receive a certificate in the merit assembly.

In addition to the Fact Friday system, teachers should provide arithmetic maths tests once every two weeks in order to enable pupils to rehearse with mental maths strategies and improve calculation speed. It also provides an opportunity for pupils to revise topics covered in other units thus promoting cross-linking of mathematical ideas as well as facilitating the embedding of core concepts. In year 6, arithmetic tests on Fridays will take the place of Fact Friday tests.

The tests are to be done in conjunction with explanation of the key strategies and explanation of range of possible approaches to a question.
Records of arithmetic tests and club tests are to be compiled by the class teacher.

Marking

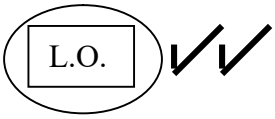
Children should be given immediate feedback with regards to their work this can be presented as verbal comments when working with a focus group or in the form of a 'close the gap' statement. Marking should encompass:

- What they've done right – ticked with at least **one** correct example highlighted
- Correction/identification of process misconceptions – in-text modelling/re-modelling or annotation
- Correction/identification of calculation errors – in-text modelling/re-modelling or annotation
- Acknowledging that sometimes errors maybe due to careless 'slips'
- What their next steps should be

Research into marking has shown that children's learning benefits from more diagnostic marking, by:

- Using set criteria to mark which should be shared with the children before they start work and linked to their specific learning objective (steps for success)
- Highlighting examples, which model correct performance (what they've done right) with a tick or highlighting.
- Annotating examples which accurately model precisely where children went wrong but not a question mark by the whole calculation**,** as this just reinforces that it was all wrong and not which specific part. Pinpoint patterns of specific calculation or conceptual errors and annotate.
- Prioritising which errors need addressing immediately in brief feedback, in what steps and what size of step, in order for the child to move on.

- Indicating whether or not the child has achieved the learning objective with the following symbol, which should be known to the children and perhaps what the next step will be.



Achieved

- Opening a written dialogue which gives children the opportunity to comment on, or reply to comments about their performance, or answer inquiry questions written by the teacher
- Including short close-the-gap tasks to rectify misunderstanding or corrections to be completed

INCLUSION

Equal opportunities

At Park Hill teachers should be aware of the wide variety of ethnic groups within their classrooms. In working sessions teachers should be pro-active in ensuring that all children have equal access to the maths curriculum. This may take different forms, for example; utilising teaching assistants linguistic skills to clarify concepts and support targeted children who may have some difficulty in grasping skills through English; being aware not to exclude groups when questioning, or when making references to wider society. Teachers should be careful not to assign ethnic groups generalised and stereotypical characteristics.

The same ethos as above also applies to teachers' treatment of both genders. Teachers should avoid treating boys and girls differently in any way, other than in exceptional cases, or for working purposes – for example in data collection exercises, where gender may be a point of criteria.

For further guidance please refer to the school's equal opportunities policy.

Tracking of ethnic and gender groups, to ensure equality of access, is undertaken in maths and this system is set out below.

Gifted and talented

Where pupils show an exceptional gift for maths beyond normal extension of a higher achievers' group within the class, the class teacher should notify the maths leader in order to formulate action, in consultation with pupil and parents. One course of action might be withdrawing the child and placing him/her in a higher year group for maths. For further information, consult the schools' gifted and talented policy.

GOVERNORS

It is the responsibility of the maths leader to meet with the maths governor to inform him/her of the direction and progress of maths within the school.

POLICY REVIEW

The maths policy should be reviewed every year.

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