#WEAREMATHMATICIANS

Mathematics is both a key skill within school, and a life skill to be utilised throughout every person's day to day experiences.

Mathematics is a whole network of concepts and relationships which provide a way of viewing and making sense of the world. It is used to analyse and communicate information and ideas and to tackle a range of practical tasks and real-life problems. It also provides the materials and means for creating new imaginative worlds to explore.

"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." (National Curriculum, 2014)

At New Silksworth Academy, we believe that all children can and will achieve in mathematics. We believe it is our responsibility, as teachers and leaders, to provide an environment and experiences that enable children to:

- become fluent in the fundamentals of mathematics;
- develop a deep understanding of the fundamentals of mathematics;
- develop the ability to reason and solve problems.

The National Curriculum for mathematics (2014) describes in detail what pupils must learn in each year group. Combined with our Calculation Policy and the Key Performance Indicator document, this ensures continuity, progression and high expectations for attainment in mathematics. The school will follow the requirements of the National Curriculum as set out in: The National Curriculum Programmes of Study.

The use and application of mathematical principles underpins the whole of mathematical teaching and learning. Opportunities are given for pupils to apply their knowledge to a wide range of life situations. They need to be able to choose appropriate equipment and methods for the task and to communicate and justify their findings in a manner appropriate to their age and ability, showing increasing concern for clarity and accuracy of meaning. The children will record their work in appropriate ways for a variety of purposes, with a high emphasis on the quality of presentation.

At New Silksworth Academy, we follow a mastery approach. Children are deemed to have 'mastered' a particular objective when they are able to build on it to develop understanding of new mathematics. For each objective, children must have enough conceptual and procedural fluency to enable them to solve problems in unfamiliar contexts without relying on memorised procedures.

Units of work are extended over several weeks, giving children plenty of time to grasp and rehearse every concept. Each topic is broken down into key skills which are then carefully mapped out into a coherent, logical sequence. These longer units of work allow children time to master each skill before they move onto the next. The longest time is dedicated to key mathematical topics and concepts. Regular retrieval practice takes place; that is, opportunities to revisit and apply content from previous units of work are incorporated into fluency sessions and main maths lessons.

Lessons will commonly be taught using a ‘ping pong’ style approach, so called because the teacher orchestrates a continual back-and-forth dialogue with the children, using questions, short tasks, explanations, demonstrations and discussions. This enables the teacher to vary the pace and direction of the lesson if necessary, and to continuously monitor the progress of the class.

A great deal of emphasis is placed on developing children’s conceptual understanding. The majority of ideas in maths are entirely abstract, generally characterised by a string of symbols that, without an understanding of what they signify, are simply meaningless. In order for children to attach meaning to these abstract ideas, we need to expose them to the underlying mathematical structure. This is done through the use of concrete and pictorial resources, which help children to construct a mental image of the maths. To ensure that children gain a comprehensive understanding of each concept, teachers provide sufficient variation in the representations and examples that they give.

Equal attention is also given to improving children’s procedural fluency; that is their ability to recall core number facts (including addition, subtraction, multiplication and division facts) quickly and efficiently. Children are expected to learn some facts off by heart and they are taught mental strategies to quickly derive others. Much more time, is now dedicated to developing these basic number skills. Children in every class are given daily opportunities in school to practise and develop their procedural fluency, this is called Daily Arithmetic. Children in Years 2 to 6 use Times Tables Rockstars at home and at school to support them to be able to recall rapidly the times tables.

Children are encouraged to communicate what they think. They are expected to use precise mathematical language and to speak in full sentences so that mathematical ideas are conveyed with clarity. Teachers and teaching assistants support children by modelling this way of speaking. Stem sentences will usually also be provided.

Teachers identify children who are struggling with a concept within a lesson and same-day immediate extra support is provided so that they are able to ‘keep up’ with the rest of the class in the next lesson.

Teachers in EYFS follow the yearly overview from Power Maths. The overview sets out the order in which topics should be taught and how much time should be dedicated to each one. On occasion, teachers may identify that a particular cohort requires additional time to achieve mastery of a certain topic or group of objectives. Likewise, it may occasionally be possible for a cohort to develop a deep understanding of a particular topic in less time than is allowed for on the yearly overview. Teachers therefore exercise their professional judgement when deciding when to move onto the next unit of learning.

Children in Nursery have a short, daily maths teaching session and a key-worker group teaching session per week, aimed at developing their understanding of simple mathematical concepts such as counting to 10, maintaining 1 to 1 correspondence and identifying and describing simple 2D shapes. Children explore concepts related to size, weight and capacity in their independent

learning time. Children are taught these concepts using physical resources, pictorial resources, songs, games and role-play. The children also complete two adult led maths task every week.

In Reception, children have daily counting sessions, lasting around 5 minutes. They also have carpet sessions of up to fifteen minutes, where all children are taught by the class teacher. This whole-class input is then consolidated through small group, focus activities led by teachers and TAs and lasting approximately ten to fifteen minutes.

In both, Nursery and Reception, the independent activities link to the focus for the week. In addition to these planned independent activities, children also have the opportunity to self-select resources to consolidate their maths learning during child-initiated activities. We recognise the importance of play-based learning and therefore encourage children to develop their understanding of different areas of maths during their inside and outside play.

The assessment of mathematics in EYFS is part of the overall assessment of the complete child and should be seen alongside all the other areas of development. Assessment in mathematics should reflect the general principles and procedures laid down in the Assessment Policy.

Regular observations and assessments help to ensure that children who need additional intervention to consolidate their mathematical understanding are identified and supported by appropriate interventions.

At the end of every term, teachers refer to Development Matters and identify at which stage pupils are currently working. Pupils who are struggling with specific concepts are picked up through continuous assessments and given additional support. Evidence towards these assessments is collected throughout the year. Towards the end of the academic year, teachers in Reception also make a judgement as to whether or not each child has met the level of development expected at the end of the EYFS for each Early Learning Goal.

In Years 1-6, The National Curriculum for England: Mathematics programmes of study (2014) provides the basis for all mathematics planning.

To ensure whole-school consistency and progression, teachers follow the yearly overview for their year group. These overviews set out the order in which topics should be taught and how much time should be dedicated to each one. On occasion, teachers may identify that a particular cohort requires additional time to achieve mastery of a certain topic or group of objectives. Likewise, it may occasionally be possible for a cohort to develop a deep understanding of a particular topic in less time than is allowed for on the yearly overview. Teachers therefore exercise their professional judgement when deciding when to move onto the next unit of learning.

Each unit of learning is broken down into small, connected steps, building from what the children already know. Teachers refer to the ‘Power Maths’ materials and/or the White Rose schemes of learning.

Teachers think carefully about which representations best expose the mathematical structures being taught. They consider how they will provide extra support and challenge throughout the unit, supporting children to overcome anticipated misconceptions and enabling them to go deeper in their understanding of the ideas.

In Years 1 to 6, the children are assessed each term using PUMA to identify specific gaps in their learning. From both the tests and the teacher assessment, teachers will break down the unit of work to ensure new knowledge is taught in small steps, links with previous mathematical concepts that the children have learned and fill any gaps the assessments may have identified. Learning objectives are mapped out across the whole unit to clearly show the learning journey and the expectations for children's end goal.

To map out the topics, teachers use White Rose, NCETM and Power maths materials to ensure that the lessons are tailored to meet the needs of all children within the class. Fluency questions are portrayed in a variety of different ways and reasoning and problem-solving skills are built within the learning in each lesson.

Independent work consists of varied fluency, reasoning and problem-solving so each lesson deepens children's mathematical understanding. These questions are adapted when needed based on formative assessment of previous learning. When necessary, children will use manipulatives to show their knowledge of concepts before learning abstract methods and they are encouraged to continue to use them if they are not confident on new skills.

Teachers carry out formative assessment continually and, at times, in responding to this, they will alter the pace of progression through the planned material in order to better meet the needs of children.

Problem-solving is not seen as a separate activity but rather is embedded in every lesson. Carefully chosen contexts are provided for the abstract mathematical concepts being taught to provide extra scaffolding and so that children can develop their reasoning skills. In addition to the Power Maths resources, teachers refer to the NCETM materials, White Rose resources and the Nrich website for additional examples of rich contexts.

Teachers in Years 1 to 6 create short, independent tasks for children to complete on most days to consolidate learning and to assist with formative assessment. Teachers ensure that tasks are opportunities for “intelligent practice” (i.e. that they develop and embed fluency and conceptual knowledge). Children who grasp concepts rapidly are challenged through the provision of rich and sophisticated tasks rather than being accelerated onto new content. Additional support may be given in the following ways: further use of representations, carefully directed questioning, additional time and activities to consolidate understanding and the use of flexible focus groups.

Assessment will take place at three connected levels: short-term, medium-term and long-term. These assessments will be used to inform teaching in a continuous cycle of planning, teaching and assessment.

Short- term assessment will be an informal part of every lesson. This is a necessary part of assessment for learning and helps the children take ownership for their own learning. It is done on a daily basis and takes the form of annotations on the teacher’s plan, where they make a note of any children that need access to same-day ‘keep up’ intervention.

Medium Term Assessment takes the form of assessing pupil progress through the use of the Programme of Study (POS) sheet and PUMA analysis.

Long term assessments are made towards the end of the school year, and are used to assess progress against school and national targets. New targets are set for the next academic year and progress is discussed with parents.

Each class has a stock of core resources that reflect the children's range of abilities. Resources accessible in classrooms are directly linked to the calculation policy and are accessed by all children to support their mathematical thinking, reasoning and problem solving.

Teachers are aware of children with identified special educational needs and disabilities and plan for their needs accordingly and on the basis of advice and guidance from the SENDco and external professionals.

All staff access regular professional development to support them with the teaching of mathematics. All new staff receive appropriate support and initial training from the Maths Lead.

We recognise that parents and carers have a valuable role to play in supporting their child's mathematical learning. An overview of the curriculum, as well as guidance on end-of-year expectations and the calculation methods used across the school are shared with parents and carers.

The school also provides a number of opportunities for parents and carers to learn about the mathematics curriculum through parent workshops and online videos.