Date Palm Primary
Building foundations for life

MATHS POLICY

DATE PALM STATEMENT of INTENT

At Date Palm our vision is for the School to ensure our pupils grow like a Date Palm tree – with **strong foundations, lofty branches and produce fresh fruit**:

- ✓ To build **Strong Foundations for Character Development** that:
  Instil values; inspire each pupil; display best manners.
- ✓ To have **Lofty Branches of Educational Excellence** that will:
  Provide a broad and varied range of experiences and learning opportunities; help each pupil progress and develop in all aspects; support their skills and talents.
- ✓ To produce **Fresh Fruit that provides services to their Communities** in order to:
  Become responsible and confident citizens; make a positive difference; commit to charitable endeavours; become effective contributors towards Britain's future.

Reviewed by	Position	Signature
Saira Karim	Assistant Head	
Kiran Rahman	External Governor	

Reviewed: July 2021
Next review date: July 2024

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Teaching and Learning of Mathematics Policy

Introduction

These days it is common to hear people say they are, 'no good at maths' or state that they, 'can't do maths!" People are far less likely to admit that they can't read or write.

At Date Palm Primary School we aim to foster a 'can do' attitude towards maths. If we feel we can't do it, the sentence is always followed with YET!
"I can't do it yet!" This makes us believe we will be able to do it, we just haven't quite learnt all the skills we need to solve the problem. This growth mind-set approach towards maths helps us all to achieve more than we believe we can.

Learning maths and the language of mathematics is a little like learning a foreign language. All the pieces need to connect and fit together for something to make sense as a whole. As children become fluent in the language of mathematics and become increasingly able to reason and explain their thinking mathematically they become increasingly able to solve problems in a range of contexts, noting connections between areas of maths and proving their answers by using a wide range of mathematical thinking.

School Policy and the National Curriculum

The New National Curriculum states:

"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."

The national curriculum for mathematics aims to ensure that all pupils:

- 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.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language

- 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.

Intent

Our Curriculum has been designed to ensure each and every child can 'live life in all its fullness'. With this purpose in mind, our Maths curriculum plays an integral part in our pupils' education, both as a standalone subject and also incorporated into other areas to enhance learning throughout the curriculum.

At Date Palm, we encourage children to have a 'Mastery' approach to mathematics, by being collaborative, creative, and resilient. We encourage children to foster a growth mathematical mindset by having a positive attitude to making mistakes and being determined to seeking solutions. We encourage all children to develop a secure mathematical understanding through arithmetical proficiency, reasoning and problem-solving skills. We strive for our pupils to be confident mathematicians who understand the relevance of the subject in their everyday lives.

The teaching of maths at Date Palm Primary School is geared towards enabling each child to develop their learning and achieve their full potential. We endeavour to not only develop the mathematics skills and understanding required for later life, but also to foster an enthusiasm and fascination about maths itself. We aim to increase pupil confidence in maths so they are able to express themselves and their ideas using the language of maths with assurance. We want the children to see mathematics as being relevant to their world and applicable to everyday life as well as being something that they will need as they move on through their school life and ultimately to the world of employment.

Our aim is to ensure that all children:

- Become **FLUENT**
- **REASON** and **EXPLAIN** mathematically
- Can **SOLVE PROBLEMS**

Children need to be regularly exposed to increasingly complex problems to solve, which allow them to apply their maths knowledge. In doing so they are encouraged to develop an argument and line of enquiry which they can prove and justify using mathematical vocabulary. This includes the ability to break down problems, both routine and non-routine, into a series of steps.

Research Links

Our Maths curriculum is based mainly on the Collaborative learning theory developed by Vygotsky which involves peer-to-peer learning that fosters deeper thinking in the classroom. Collaborative learning theory suggests that group learning helps students develop their higher-level thinking, oral communication, self-management and leadership skills.

Our Maths curriculum is implemented using current research and pedagogy.

- **Manipulatives**: The theory of experiential education revolves around the idea that learning is enhanced when students acquire knowledge through active processes that engage them (Hartshorn and Boren, 1990). Manipulatives can be key in providing effective, active, engaging lessons in the teaching of mathematics. Manipulatives help students learn by allowing them to move from concrete experiences to abstract reasoning (Heddens, 1986; Reisman, 1982; Ross and Kurtz, 1993). Experts in education posit that this learning takes place in three stages. The use of manipulatives helps students hone their mathematical thinking skills. According to Stein and Bovalino (2001), "Manipulatives can be important tools in helping students to think and reason in more meaningful ways. By giving students concrete ways to compare and operate on quantities, such manipulatives as pattern blocks, tiles, and cubes can contribute to the development of well-grounded, interconnected understandings of mathematical ideas." When students work with manipulatives and then are given a chance to reflect on their experiences, not only is mathematical learning enhanced, math anxiety is greatly reduced (Cain-Caston, 1996; Heuser, 2000).
- **Visual Representations**: Although there are a number of problem solving strategies that students use in mathematics, good problem solvers usually construct a representation of the problem to help them comprehend it (van Garderen & Montague, 2003). Developing both external (Zhang et al., 2012) and internal (van Garderen, 2007) visual representation strategies is important for students as both help support student learning in mathematics for different types of problems. In a ground breaking new study Joonkoo Park & Elizabeth Brannon (2013), found that the most powerful learning occurs when we use different areas of the brain. When students work with symbols, such as numbers, they are using a different area of the brain than when they work with visual and spatial information, such as an array of dots. The researchers found that mathematics learning and performance was optimized when the two areas of the brain were communicating (Park & Brannon, 2013). Additionally, they found that training students through visual representations improved students' math performance significantly, even on numerical math, and that the visual training helped students more than numerical training.

Implementation

At Date Palm Primary School we teach maths in a way that:

- creates a lively, exciting and stimulating environment in which the children can learn maths

- promotes the concept that acquiring maths knowledge and skills provides the foundation for understanding the world around the children
- develops mental strategies
- encourages children to use mathematical vocabulary to reason and explain
- allows time for partner/group talk in order to stimulate and develop a curiosity for maths
- challenges children to stretch themselves and take risks in their learning
- creates a sense of awe and wonder surrounding maths

Teaching for Mastery

In April 2021, Date Palm Primary School transitioned towards a Mastery approach to the teaching and learning of mathematics. We understand that this will be a gradual process and take several years to embed.

Teacher's Role

- The curriculum is delivered by class teachers. Children are taught in class groups from Foundation Stage to Year 6. In all classes children are taught in a variety of groupings (whole class, groups, pairs, one to one) relevant to the task in hand and work is differentiated in order to make it accessible and challenging. Where appropriate groups/individual children are supported by Teaching Assistants.
- Teachers use their professional judgement and use of formative assessment to ensure a flexible approach is adopted which recognises the need for pace of learning within the classroom. Children are given the opportunity to engage in fluency, reasoning and problem-solving activities to demonstrate their understanding.
- Staff are kept up to date on current thinking, new teaching pedagogies and ideas by the subject leader through staff meetings and Inset. CPD is available where possible for staff who need to improve their understanding of the requirements of the new national curriculum, new pedagogy and assessment/testing arrangements.
- In order to inform planning and to assess children's progress, teachers carry out a range of summative and formative assessments.
- Plenary sessions are used to consolidate students' learning or celebrate mistakes.

Curriculum Design

To ensure consistency and progression across school, in April 2021 we decided to use the DfE approved Power Maths scheme for Reception to Year 6. The scheme fully supports a mastery approach and rejects the notion that some people simply 'can't do maths'. Instead, it develops growth mindsets and encourages hard work, practice, collaboration and a willingness to see mistakes as learning tools.

To develop Mastery in maths, children need to acquire a deep understanding of maths concepts, structures and procedures, step by step. Complex mathematical concepts are built on simpler components and when children understand every step in the learning sequence, maths becomes transparent and makes sense. Interactive lessons establish deep understanding in small steps, as well as fluency in key facts, such as times tables and number bonds. The whole class works on the same content and no child is left behind.

The Power Maths approach fully supports these beliefs, and at the heart is a clearly structured teaching and learning process that ensures every child masters each maths concept securely and deeply. For each year group, the curriculum is broken down into core concepts, taught in units. A unit divides into smaller learning steps – lessons. Step by step, strong foundations of cumulative knowledge and understanding are built.

Lesson Structure

Each Power Maths lesson follows the same sequence and is designed to empower children to understand core concepts and grow in confidence.

- **Discover** – each lesson begins with a problem to solve, often a real-life example, sometimes a puzzle or a game. These are engaging and fun, and designed to get all children thinking and generate curiosity. Children may use manipulatives (practical apparatus) to help them understand the maths and explain their method.
- **Share** – the class shares their ideas and compares different ways to solve the problem, explaining their reasoning with hands-on resources and visual representations to make their ideas clear. Children are able to develop their understanding of the concept with input from the teacher.
- **Think together** – the next part of the lesson is a journey through the concept, digging deeper and deeper so that each child builds on secure foundations, while being challenged to apply their understanding in different ways and with increasing independence.
- **Practice** – now children practise individually, rehearsing and developing their skills to build fluency, understanding of the concept and confidence.
- **Reflect** – finally, children are prompted to reflect on and record their learning from each session and show how they have grasped the concept explored in the lesson. Teachers may decide to use this time to reflect on and celebrate mistakes instead.

Number Sense

Number sense is the ability to be flexible with numbers such that pupils can visualise problem solving, perform calculations accurately, and are flexible in their mathematical strategies. The number talks toolkits is used throughout the school to develop children's number sense.

Number talks are five-to-fifteen-minute conversations around purposefully crafted computation problems, which are a productive tool that we incorporate into classroom instruction to combine the essential processes and habits of mind of doing maths. During number talks, pupils are asked to communicate their thinking when presenting and justifying solutions to problems they solve

mentally. These exchanges lead to the development of more accurate, efficient, and flexible strategies (Parrish, 2011). Number Talks help create classroom communities where everyone knows that discussions around maths problems are richer when more voices and points of view are shared, and where everyone develops a deeper understanding of numbers and operations that are foundational to so much of mathematics (Parker, 2019).

Low Floor High Ceiling Tasks

At Date Palm, we provide pupils with Low Floor High Ceiling (LFHC) tasks on a weekly basis. A LFHC task means everyone can get started, and everyone can get stuck. Working on such tasks helps learners develop into competent, confident mathematicians. The low threshold may mitigate against the development of maths anxiety by making sure that learners do not fail at the first hurdle. The high ceiling on the other hand, offers everyone the opportunity to develop their resilience. Furthermore, LFHC tasks give pupils a sense of agency as there is more than one pathway available to them, with plenaries giving everyone a chance to hear how others in the classroom have worked on the same activity in different ways (Nrich, 2013).

Calculations

See our Calculations Policy

SEND: Inclusive Maths

In line with the School's Inclusion Policy each child has an equal entitlement to all aspects of the maths curriculum and to experience the full range of maths activities. Therefore, in delivering maths, care will be taken to ensure that all learning needs are met to ensure all children keep up with the learning and catch-up needs are also met. Intervention sessions will take outside of the classroom where needed. These sessions may be delivered by the teacher or teaching assistant and may involve individual or small group work to support learners.

We use the following strategies when teaching Maths:

- Manipulatives
- Visual representations
- Number talks
- Low floor high ceiling tasks
- Collaboration

Impact

After the implementation of our Maths curriculum, pupils of Date Palm will have developed their knowledge, understanding and skills relative to their starting points. They will be equipped with mathematical understanding, confidence and resilience which will aid them in continuing their mathematical journey in the next phase of their education. Some of our pupils will be inspired to pursue a career in Maths.

In order to assess the impact of the Maths curriculum we assess pupils' attainment against the National Curriculum at the end of each term. Records are kept on an assessment tracker. Achievement is reported to parents twice each academic year as part of formal reporting procedures.

All assessment is used to inform teaching and learning. We identify children's understanding and then focus interventions to overcome misconceptions. At Date Palm we assess children in the following ways:

- Self/peer/teacher assessment
- Termly summative assessments
- Teacher judgement assessments

Towards the end of the school year we assess and review pupils' overall progress and attainment by drawing upon summative assessments and their class record of attainment against benchmarks. Accurate information is then reported to parents and the child's next teacher.

Parents

It is important that parents and carers are actively involved in the children's education. In order to help keep them informed of what is happening within school we communicate with them regularly regarding current developments within the school, projects in which we are involved and new pedagogies for delivering the maths curriculum.

Homework

The whole of Key Stage 1 and Key Stage 2 have times tables to learn as a part of homework, so that fluency may be attained. We also set weekly maths homework via either an online platform or paper-based. There is an expectation that homework will be completed and handed in on time. Homework club runs every Friday after school to enable children to access support for homework and there is an expectation that all homework will be attempted and not left until after the deadline to be done. Homework will usually consolidate and support current classwork.

Leadership

The Head, in consultation with the Maths subject leader and SLT:

- Embrace new initiatives and support the implementation of whole school approaches
- Ensure the use and development of the scheme of work is used consistently throughout the school.
- Manage the provision and deployment of resources.
- Encourage and support colleagues.
- Co-ordinate the evaluation and review of the school's Maths policy.
- Ensure school displays are maintained with up to date information intended to support children's understanding and experience of Maths.