

Mathematics at Killigrew Primary and Nursery School

At Killigrew Primary and Nursery School, we believe that mathematics is a powerful universal language and an essential tool needed for everyday life and understanding our world. Through following the National Curriculum, we enable the development of our pupils' natural fascination for mathematical concepts and enhance their ability to think logically and creatively. We teach the National Curriculum statutory objectives and extend these to offer additional challenge to all children regardless of their starting point. This is evident in our detailed progression documents covering all the strands of mathematical learning.

We prioritise **arithmetic** as a key driver. Arithmetic is a fundamental aspect of mathematics, and we firmly believe that the rapid and accurate recall of these core facts is pivotal in establishing secure foundations to build upon. Our daily fluency lessons ensure that our children are confident and efficient mathematicians.

These lessons are in addition to our daily maths lessons where children can revisit and rehearse key arithmetic skills.

We use Herts Essential Maths to support our teaching of the National Curriculum as this planning framework takes a holistic approach to the teaching of mathematics and prioritises developing a pupil's ability to interrogate a maths problem and consider the most efficient way to solve and tackle more complex questions. By using this, we can offer a wealth of opportunities to deepen and extend mathematical thinking for all learners, with a focus on fluency, reasoning and problem solving.

In our curriculum overview, each strand of mathematics is strategically selected to create a spiral curriculum that maximises opportunities to embed concepts into the pupils' long-term memory by revisiting a topic, theme, or subject multiple times throughout their school career. We believe that being able to revisit aspects of mathematics is a vital element of our curriculum as it builds upon children's prior learning to support our children become fluent, efficient and confident mathematicians.

In line with the National Curriculum, the complexity of the learning increases with each revisit. Each learning sequence across the year is progressive and sequential with clearly defined end points. These units are designed to address gaps in knowledge and skills through a range of activities. We have noticed that carefully planning for a wide range of activities, including activities that have a real-life context, embeds children's secure understanding of mathematics, and creates comprehensive mathematicians who are able to apply their mathematical knowledge to the world around them.



Mathematical exploration in Reception

Another key driver for our school is **spoken language and mathematical reasoning**. Our curriculum develops the children's ability to express themselves fluently, talk about a subject with assurance, and use the correct mathematical language and vocabulary when reasoning. To promote effective talk within

lessons, our teachers plan for modelled responses to problems and use age-appropriate speaking frames to facilitate opportunities where the children can talk about maths successfully and confidently.

Through our use of the **concrete, pictorial and abstract** (CPA) approach to all learning, pupils develop a keen sense of number and confident reasoning skills. All our learning sequences for new concepts are introduced with concrete resources and methods as appropriate. As the pupils' conceptual understanding grows, pictorial and abstract methods are taught alongside one another.

We know that this use of varied representations secures deeper **conceptual understanding** and caters for all learning styles and starting points. Because **visualisation** is a core mathematical skill, these opportunities are pivotal for teachers to uncover and address misconceptions and challenge learners.

We communicate our intent to our parents through our calculation policy, by utilising opportunities to talk to them during parent meetings and through the curriculum information available on our school website.

We strive to strengthen our pupils abilities to think clearly and logically with **independence of thought** and **flexibility of mind**. To do this, we enhance our curriculum with regular opportunities to **solve problems** by applying their knowledge and understanding to a variety of problems with increasing sophistication, including in unfamiliar contexts and real-life scenarios. As a team, we identify the key skills needed for problem solving and ensure that staff are confident teaching these. Through excellent **teacher modelling**, we demonstrate efficient strategies to support the children to solve problems with increasing **independence**.

Our classrooms and displays provide a wide range of **mathematical resources and language** to enhance cultural capital and facilitate cross- curricular links. From year 2 to year 6, we have a sharp focus on **multiplication**, which we promote through our use of Times Table Rockstars. This programme supports children with their rapid recall which we have noted as a fundamental skill when ensuring that our learners become efficient mathematicians. We encourage maths learning to continue beyond the school day through this resource, and by providing carefully planned home learning tasks.



Times Table Rock Stars online learning resource

As a teaching team, we enjoy looking at maths work from different classes and we plan moderation opportunities throughout the school year.

We carefully timetable maths teaching and learning, considering our key drivers, and the detailed analysis of our current school assessment information. We teach the National Programme of Study for maths daily through the Herts Essential Maths learning sequences.

Each sequence identifies what objectives are required to meet at least age-related expectations, offers additional challenge activities and spotlights which objectives may need to be reviewed to remain accurate. Considering this, each unit of work begins with tasks that allow teachers to assess prior learning and knowledge, ensuring that objectives and language that have been previously taught are secure. Learning sequences build upon each other, and these steps may be taught over a number of lessons.

Within all units of work, there are opportunities to sharpen fluency in varied contexts, see modelled and worked examples, explore exemplification of mathematical talk and reasoning and independent rehearsal and problem solving. We regularly use 'destination' questions and reasoning tasks such as 'odd one out', 'prove it' or 'error spotters' for pupils to showcase their learning over a lesson, or when exploring a concept at greater depth.



Year 1 representing numbers using Numicon

Every day, all classes have fluency sessions where key facts and learning are rehearsed and revised in a variety of practical and interactive ways. In Lower Key Stage 2, we teach multiplication as part of our everyday maths learning and within dedicated lessons. We prioritise small group work for any children who are finding arithmetic learning more difficult.

From Year 3 onwards, classes have designated weekly slots where they can access Times Table Rockstars on iPads and computers to practise their multiplication recall in a fun, interactive and motivating way.

All pupils from year 2 upwards are provided with their own individual log in so they can access Rockstars on any electronic device at home. Therefore, within a process of regular review and repetition, both in fluency sessions, during home learning and as an integral part of maths lessons, we make sure that our children become proficient in the statutory requirements for mastering multiplication facts in the curriculum.



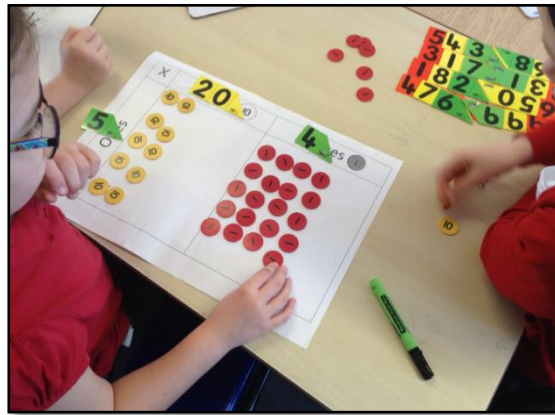
Exploring ratio using manipulatives in Year 6

Outcomes in our books evidence a challenging, comprehensive and engaging maths curriculum, which supports our children in making excellent progress regardless of their starting point.

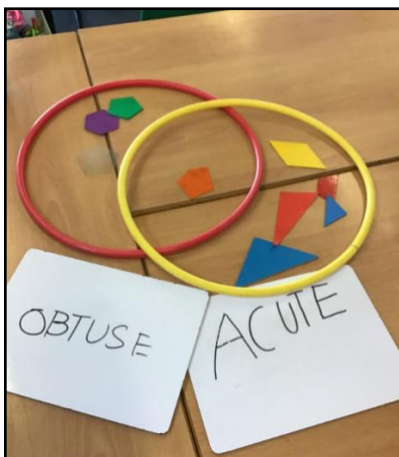
A whole school approach to planning means that our maths teaching builds very effectively on prior learning and systematically reviews and checks previously taught content. Because objectives are specifically identified, and linked to concepts and strands of maths, progression is evident within planned objectives and outcomes.

In lesson observations, children show high levels of engagement and are curious about their learning. The teachers' subject knowledge is excellent and their enthusiasm for the subject is evident.

Our pupils talk confidently about their maths curriculum and share their natural curiosity and fascination for maths. We weave maths throughout the curriculum and concepts are tracked across different subjects. Pupils are proud of their achievements and know what they need to do to improve and move their learning on.



Year 2 exploring multiplication using place value counters



Year 4 exploring angles



An example of a maths learning wall