Our Approach to Teaching Mathematics

At Whitehall Junior School, we are committed to providing our pupils with a well-rounded education. Our curriculum is planned in a logical and well-considered way, to enable pupils to build upon their skills and have a secure knowledge base from which connections in learning are made. We use 'beautiful' resources from credible sources to enrich our lessons.

What is the big picture for mathematics?

The big picture for mathematics is for children to embark upon life-long learning that will have widespread everyday use beyond their time within the education system. We enable children to understand that problem-solving is a fundamental skill by exposing them to accessible and relatable scenarios where mathematics can be applied using critical thinking.

Children learn to become fluent through varied practice, whilst also using their reasoning and explanatory skills to address problems with justification and proof. We also enable children to become confident in segmenting problems systematically. Children are taught to understand the connection between the various domains of Number, Measurement, Geometry and Statistics and explore this interconnection and the links with other curriculum subjects.

As a school, we maintain high expectations towards the pace of learning, ensuring children are individually challenged; we adapt learning to ensure the spectrum of ability is catered for. Children develop a passion and drive to succeed, whilst also understanding that there are often multiple approaches to achieving the same outcome. We enable children to use a variety of tangible resources to accelerate learning and provide opportunities to develop their mental strategies. During learning, children develop the mind-set that every mistake is an opportunity to learn something new.

What is magical about it?

Mathematics is an enormously creative subject; the journey to reach an answer can be varied, complex, unpredictable and beautiful. There may or may not be one answer. The links between mathematics and art, music and design are vast; mathematics is not purely about calculation – it is about the wonders of the world, both man-made and natural.

At Whitehall, we have always had an excitement and buzz around the subject of mathematics. Despite not using a prescribed scheme, teachers are trusted to use their passion for the subject when planning and selecting reputable resources (for example, NCETM, White Rose Maths) signposted by the subject coordinators. In recent years, Maths No Problem! and White Rose Maths materials have been made accessible and used, when necessary. Planning adheres to the short and medium-term objectives assigned to the relevant year group. Therefore, bespoke planning caters for our diverse community and ensures all can make progress and foster a love for the subject.

Oracy continues to develop through mathematics and Number Talk is being adopted throughout the school; children are able to articulate their thought processes. The variety of learning styles and activities adopted during lessons continues to build a love for learning.

Why is mathematics an important subject to learn?

Learning within mathematics provides for the development of problem-solving, quantitative reasoning, the ability to construct logical arguments and expose illogical arguments, as well as

the maturing of communication, time management and organisational skills. If children are not exposed to these skills, the windows of opportunities for their wider life are severely reduced.

'Anyone who has never made a mistake, has never tried anything new.' Albert Einstein.

'Maths is kind of like a puzzle…there's often more than one way to get an answer, which lets you be creative.' Dr Arleen Miller

What do we love about mathematics?

- Adaptation of learning enables all children to progress, regardless of ability, and enables them to grasp their next steps and challenge themselves going forward.
- It is a multi-faceted subject, allowing children who may not consider themselves mathematicians to excel in areas that they did not know existed.
- Mathematics is a subject that evokes discussion, reasoning and countless opportunities for real life application.
- We have a vast amount of resources to supplement all objectives within the curriculum, scaffolding children to the desired outcome.

How do we want our pupils to talk about mathematics?

- We want our children to desire more. Children at Whitehall love mathematics and we want them to be ambitious with their learning; always eager to seek out the next steps on their learning journey and to share this with their peers.
- We want children to recognise that there is a challenge. It can be challenging, and understanding sometimes can involve stress, frustration and struggle over time. But with persistence and perseverance, new concepts can be understood and success achieved.
- Children will recognise that 'maths matters'. By connecting mathematical concepts with applications to reality, lessons bring meaning to life and motivate children to apply themselves at all times. We want children to discuss the 'why factor'. Why it is important to be learning mathematics?
- We want the children to have the desire to be role models and help to facilitate the learning of others.

Our approach to teaching mathematics

All lessons within mathematics stem from our medium term plan, adapted from the National Curriculum. The medium term plan incorporates a mental maths objective (taught at the beginning of the lesson) and an objective which is developed in further detail throughout the lesson and written into the child's book. At the beginning of every lesson, the teacher will decide whether the content for the lesson requires a full page or half page layout structure. Children will follow the school guidelines for DUMTUMs and written calculations. When referring to objectives, children will also write the objective code, found within our rainbow target cards, which complement the NCETM progression booklet. Whilst objectives are organised by topic blocks, good practice demonstrates interleaving and frequent rehearsal of a range of skills.

At Whitehall Junior School, we teach themed weeks, which follow the same pattern in each year group, every term. They are: **number and place value, number and place value to include addition and subtraction, multiplication and division, fractions, geometry (properties of shape), measurement, measurement (time), statistics, fractions and geometry (position and direction).**

Once these units have been taught, we have an **assessment unit** whereby we carry out mathematical investigations to assess pupils' application of skills and progression in reasoning. It is also a good opportunity for teachers to see how children are developing their problem-solving skills and allows them the opportunity to understand how to approach these investigations in a systematic way.

Following this week, class teachers identify areas of mathematical learning that need reviewing and plan activities based on the requirements of their class.

A typical weekly lesson follows the pattern of an introductory lesson at the start of the week, which introduces the unit and important vocabulary and elicits prior knowledge. The next three lessons are based on the direct teaching of new knowledge, skills and concepts; practise and consolidation. The last lesson of the week will bring all of their learning together and consolidate their understanding of the objectives assigned to the week.

Children also take part in **'Fortnightly Fridays'**. This is problem-based lesson, enabling children to apply the skills learnt during the previous two weeks and it builds upon their articulation of learning and maths oracy. The structure of the lesson is as follows:

- **Retention Grids** – Upon entering the class, children complete a retention grid. This grid has four questions within each quadrant labelled: *'last lesson', 'last week', 'last topic' and 'last term'*. These questions enable children to recall prior learning, with the intention of retaining the content so a secure knowledge base can be further built upon.
- **Initial Problem-Solving Task** – Children complete an initial problem-solving task which utilises the skill that will be needed during the main task of the lesson.
- **Problem-Solving Investigation** – After practising their initial problem-solving skills, children will begin to use their reasoning skills to accomplish the task. During this task, there is sufficient time for reflection and challenge to extend those who can go above and beyond the age related expectation.
- **Connections Conference** – Whilst moments of reflection will take place throughout the lesson, the plenary of the lesson will elicit the skills used throughout the task and identify the links between mathematical skills and the application of these skills in a real-world setting. Children will produce mind maps to visualise the skills used throughout the lesson as research suggests the brain can process visual information most efficiently.

Outside of the mathematics hour that each class receives, children complete:

- Tri-weekly times tables tests. Children complete a 60-question test within three minutes. Children have designated times tables booklets which are tailored to the expectations of their year group.
- Flashback 4. This is a three-minute exercise which forms part of the registration period in the afternoon; children answer four questions, focusing on retaining objectives which have been taught during and prior to the academic year.
- Friday Mental Maths. Children complete a mental maths assessment every Friday at the beginning of the day.
- Across the school, 'Fluent in Five' is used in the first half of the autumn term on a daily basis, which enables our pupils to practise their fluency. 'Rapid Reasoning' follows this in the second half of the autumn term. The spring and summer terms have a similar daily task which again focus on the children's mental skills, fluency and reasoning, so that the children's skills are always being refreshed and utilised.
- We exploit opportunities to celebrate 'Barvember' challenges in November (a White Rose Maths initiative using the bar model) and regularly participate in Times Tables Rock Stars challenges. All opportunities to read, reason, rehearse, recall, refine and review are taken; we encourage pupils to build connections across mathematics and to make learning 'stick'.
- In addition to this, the pupils are set weekly homework, which matches the unit being taught each week.