

Curriculum Q & A in Maths– updated 03.11.21

<i>Subject Curriculum</i>	<p>Does the subject curriculum match or exceed the breadth of the National Curriculum?</p> <p>Maths has been planned in our school to match the breadth of the National Curriculum. The maths planning has been cross-checked with the national curriculum to ensure full coverage. Maths is taught in all year groups every day in order for teaching to be done in the depth needed for children to become fluent and confident mathematicians who can apply their knowledge to reasoning and problem solving.</p> <p>Senior leaders check weekly that the curriculum is being covered in each class through ‘Curriculum Coverage Checklists’ and senior leaders conduct book scrutinies to check curriculum coverage and quality of work. This also supports quick intervention if needed to support teachers to ensure the full school maths curriculum is being taught.</p>
	<p>Is challenge understood in terms of curriculum end points?</p> <p>Teachers are familiar with the Whole School Curriculum Map and the Maths Progression Document which informs teachers of what the children learn in the previous year group and what they will go on to learn next.</p> <p>Teachers and support staff attend Professional Development Meetings including ones led by the maths leader in which staff see the mathematical understanding and abilities expected in year groups, including by the end of primary school (KS2).</p>
<i>Curriculum components</i>	<p>Do pupils have the prior knowledge necessary to learn new curriculum content?</p> <p>Our maths curriculum has been planned to ensure sequential, layered knowledge acquisition so that children are continuously embedding the key maths knowledge and learning the skills required to become fluent mathematicians who can apply their knowledge to problem solving. As part of this, continuously retrieving prior knowledge is understood by staff as essential for effective teaching in all subjects, but particularly in mathematics, where the development of a secure maths schema is necessary to learn new things in maths, as maths topics connect with one another.</p> <p>To support the embedding of essential prior knowledge, weekly arithmetic sessions including quizzing is timetabled and taught from year 2 upwards. All classes teach mental/oral sessions each day to allow for the continued retrieval of prior knowledge which helps develop the secure maths schemas needed for future maths learning.</p>
	<p>Does curriculum planning identify small enough component steps so that all pupils can ultimately achieve ambitious end points?</p> <p>We have mapped the progression in all areas of mathematics so teachers know what the next step in their learning of that topic is. Our maths curriculum is planned so that relevant prior learning is taught at the start of a sequence of lessons. This allows for children’s prior knowledge to be retrieved and brought to the front of the children’s thinking. This also allows teachers to know what component steps to start teaching relevant to that particular time in the year and for their class. This includes differentiating component steps where needed so that all children can access the learning.</p> <p>The planning the maths curriculum takes into account of not over-loading working memory of children so that the new learning develops prior learning, without overwhelming children.</p> <p>Teachers use mental/oral retrieval activities and weekly arithmetic quizzes (accompanied by teaching of areas identified by the teacher) to progress to fluency in topics which aids the learning of knowledge needed for later learning.</p>

Curriculum Q & A in Maths– updated 03.11.21

<p><i>Curriculum sequencing</i></p>	<p>Does planning consider the sequencing of content at different scales to create readiness for future learning:</p> <p>a) Within the lesson sequence Maths lessons are sequenced to follow on distinctly from relevant prior learning. At the start of lessons, prior learning is reviewed with the class. Throughout the lessons, questioning and formative assessments are woven into teachers’ practice. At the end of the independent practising part of the lesson, teacher’s review what has been taught in the lesson, helping to lead on appropriately to the learning which will take place in the next lesson.</p> <p>b) Within the topic Lessons within a topic in maths are planned to ensure sequential, layered knowledge acquisition. At the start of a topic, it is identified what the children have been taught previously in the topic, perhaps in that year or the previous year(s). This is reviewed at the start of the new topic and the maths progression document supports this. Lessons are then taught in components which lead to the composite task of being able to apply the new learning in a range of ways in order to develop fluency, reason and solve mathematical problems. This is on top of the daily interweaving of reasoning and problem solving which is part of every maths lesson and recognised as an essential part of everyday maths.</p> <p>c) Within the year or phase? The sequence in which topics are taught is progressive so they are in an order which allows the relevant prior learning to be taught in previous topics that year/phase. For example, the four operations are taught before the order of operations is taught and fractions topic in year 6 is taught before ratio, so that prior knowledge and making connections allows for effective teaching and learning of new topics.</p>
<p><i>Rigour (where relevant)</i></p>	<p>Do pupils gain disciplinary knowledge of how the subject ‘works’ and engage in disciplinary practices?</p> <p>Teachers use and insist upon children using the correct mathematical vocabulary. Maths dictionaries are used in each class to support this and maths vocabulary, like our approach to vocabulary in general as a school, has high priority. Maths working displays show vocabulary, methods and key knowledge relevant to the learning in that class and are used by children in lessons.</p> <p>Children are taught effective methods to solve calculations and problems. Teachers know and use carefully chosen concrete and pictorial representations of amounts that are well matched to the topic or method, and depending on the level of challenge in that year groups. For example Dienes are used for numbers 3 and 4 digit problems but place value counters are used for larger numbers. Pictorial models are used such as bar models and part-part-whole visual representations are used in instances where these visuals aid the understanding of the concept taught. Teachers, monitored and coached by leaders, choose these aids effectively to support learning.</p> <p>Interwoven within this, is the teaching of the range of ways mathematicians work, such as systematically, trial and improvement, estimating, using the inverse to check answers etc. Children are also taught that qualities such as determination is essential in maths to persevere through problems and the schools golden rule regarding the idea that it is OK to make mistakes, for that is how we learn, is intrinsic to their work in maths.</p> <p>Fluency is understood as an essential component of maths, and key knowledge such as times tables and division facts has high priority in maths in the school. Times tables stars and awards celebrate the learning of all times tables and division</p>

Curriculum Q & A in Maths– updated 03.11.21

	<p>facts up to 12 x 12 and class times tables charts celebrate the learning of a new times table. Teachers and leaders are aware of who the children are who do not know the times tables required for each year group and plans are actioned to help these children catch up.</p> <p>Do teachers ensure pupils are drawing on enough knowledge to answer subject-specific questions or engage meaningfully in subject disciplinary practices? In maths, problem solving is taught in all lessons and reasoning is required throughout lessons. However, the component areas of maths knowledge needed is ensured before a specific reasoning or problems solving task is given to children so that they have to correct level of knowledge to access each problem. Within a topic, the level of prior knowledge will alter or increase in breath and/or depth, as children develop their knowledge and understanding of an area of mathematics.</p> <p>Do teachers confuse ‘learning through doing’ (a pedagogy) with the curriculum goal of acquiring disciplinary knowledge? In lessons, new knowledge is taught in small steps and modelled explicitly by teachers, this allows disciplinary knowledge to be taught prior to children practising what has been taught to them.</p>
<i>Memory</i>	<p>Do teachers identify crucial components, emphasise and repeat these and ensure they are remembered long term? Teachers teach daily mental/oral sessions in which children recall different key components of maths such as number bonds, times tables and division facts, fraction, decimal and percentage equivalents etc. Children (year 2 up and some year 1 children) have an arithmetic lesson each week to practice (through quizzing) calculations they have learnt previously. Teachers embed practices of teaching for fluency and make connections between areas of maths where possible. This is seen in pupils books and lesson visits and coaching. This is also monitored by senior leaders conducting maths pupil voice sessions with children from each year group and the Head of School awarding Times Tables Stars personally to children who have gained this area of fluency. This also raises the profile of fluency in mathematics.</p> <p>When pupils struggle, do teachers check which prior knowledge components are missing/not automatic? Teachers work alongside pupils in lessons. We recognise that the most valuable way to identify an individual pupil’s misconceptions or missing prior knowledge is by seeing how they work. This may be as part of a class, group or on their own. When a teacher identifies the barrier to automaton or understanding, they can work with the child to teach them the correct method or, if a longer-term approach is required, they can organise for this to be put in place (for example, if a child does not know their times tables required for their year group, the teacher will ensure they have daily opportunities to learn and practise their times tables to become fluent in them, such as by the teaching of the tables then the use of times tables quizzes and the online program Times Tables Rockstars to ensure learning becomes secure).</p>
<i>Pedagogy</i>	<p>Do teaching decisions achieve curricular intent?</p> <p>Do teachers apply generic pedagogies, e.g. differentiation, feedback) without considering curricular intent? Teachers tailor their pedagogies depending on what is being taught and the particular children in their class, however all teachers teach and model new knowledge explicitly before children practise it.</p>

Curriculum Q & A in Maths– updated 03.11.21

	<p>Teachers consider the differentiation needed in a lesson depending on the individual children that make up the class in tandem with the learning intended; as a result in some lessons there may be more levels of differentiation than in others. Teachers use differentiation thoughtfully and purposefully.</p> <p>Is ‘challenge’ misunderstood as generic activity types? Teachers understand that challenge in maths relates to the depths of knowledge required in an activity, rather than ‘more of the same’ activity. Documents such as NCETM Teaching for Mastery support the understanding of the types of challenge appropriate for topics in different year groups.</p> <p>Do activities require confident knowledge of too many ‘fragile’ components, overloading working memory? Maths is planned to be taught in a way the does not overload working memory, including of specific children who have known working memory difficulties. Lesson include scaffolds to allow children to access the learning so that they are not reliant on too many ‘fragile’ components. For example, in a lesson on finding equivalent fractions, if a child lacks automaton in their times tables, the work may be differentiated so that the child can still convert fractions using the tables they do know, or they may be given aids (e.g. times tables charts) to help them convert fractions without their lack of fluency in times tables stopping them from learning how to find equivalent fractions. Teachers understand how schemas work in the brain and that component knowledge must be secure for children to develop confident knowledge in maths. This understanding is incorporated into the planning and delivery of lessons for all children, and takes into consideration of specific children with SEND and working memory difficulties.</p>
<i>Assessment</i>	<p><i>Timely feedback on component learning?</i></p> <p>Is formative assessment fit for purpose, e.g. a timely check that curriculum components have been remembered, rather than, more problematically, a summative test of composites being used to identify components? Within lessons and between lessons in a sequence, component aspects of knowledge are checked and re-taught if necessary, so that children are able to develop secure schemas of knowledge. Next lessons are planned based on formative assessments made by the teacher in prior lessons so that sequential, layered knowledge acquisition is gained and lessons are informed by previous learning in the class.</p> <p>Is summative data collection disproportionate, inefficient or unsustainable for staff? We have two summative assessment points in the year, January and July. Here teachers assess each child against fundamental statements linked to the National Curriculum. This is an effective, efficient and non-arduous process for staff to complete. In January, it provides an ‘on track’ grade and in July, an end of year grade relating to meeting the expected standard for a year group or being below, working towards or working at greater depth.</p> <p>Are pupils who fall behind identified within the lesson sequence, or less helpfully, are interventions based on data from a summative assessment? During a lesson, teachers work alongside the children to assess understanding and misunderstandings, move learning on and teach away from misconceptions. Therefore, pupils who fall behind are identified in the lesson or immediately after prior to the next lesson, so that interventions and support are given in a timely fashion and do not exacerbate misconceptions.</p>

Curriculum Q & A in Maths– updated 03.11.21

<p><i>Culture</i></p>	<p><i>A climate of high expectations where pupils’ love of the subject can flourish</i></p>
	<p>How do teachers get the best from pupils? Across the school, a culture of high expectations is fostered. This is therefore the same in maths lessons. Teachers insist on children being focused and engaged in learning, producing a good amount of work in lessons and working hard. Teachers model this constantly in all lessons, including in maths. Teachers’ expectations of how children work, their presentation and work produced is made clear to children in lessons and is celebrated when achieved using positive praise and the school’s reward systems.</p>
	<p>How do teachers enrich the curriculum subject? Teachers enrich mathematics in our school by linking maths to the real world in a way that is relatable to the lives of the children in our cohort. Woven throughout the teaching of maths is ‘real life examples’ such as measuring themselves or things around them. Problems are made to be realistic and can help them in their own lives, e.g. when using money, recipes, timetables etc. Teachers are well practised in the use of concrete and pictorial objects to enrich the teaching and learning of maths and this way of teaching is understood as essential in every day maths lessons. This brings maths ‘to life’ for the children.</p>
	<p>Are there mechanisms for taking action when pupils display low effort, for example in written work and homework? The school’s behaviour policy is clear and understood by children, and is used as needed to maintain a culture of high expectations. Teachers are well-practised in seeking support from senior leaders if needed if an occurrence persists where a child is displaying low effort. Teachers also make effective use of the SENCO if a child’s learning or behaviour and attitude is of concern. The school aims to maintain good communication with parents/carers. If a child’s work or effort is of concern, parents will be invited to discuss this with teachers and next steps will be identified, actioned and monitored.</p>
<p><i>Systems</i></p>	<p><i>Subject processes and staff support</i></p>
	<p>What do the strengths or weaknesses already identified indicate about effective functioning to deliver a quality subject curriculum? Subject pedagogy and processes for maths are systemic. Pedagogical approaches to teaching maths are well-considered so that knowledge is taught explicitly and skills are thus acquired. The school is rigorous in identifying the children who need additional support and plans are actioned in a timely manner and then monitored to ensure children are catching up. E.g. children who do not know the times tables expected for their year group. Furthermore, children with SEND are supported so that they can achieve well in our ambitious curriculum. A culture of high-expectations is fostered across year groups and there is consistency in class of what is expected from the children in lessons and in their work. Reasoning and problem solving has been a previous focus in our school and now teachers are confident in ensuring this is part of every lesson. As an inner-city London school, staff turnover is recognised as a reality as teachers move out of the capital. To address this, one of the benefits of using White Rose Maths as a resource, is that a body of excellent resources are there for new teachers which supports the effective induction of new staff.</p>
	<p>Probe systems for staff support and subject CPD, curriculum construction and to ensure consistent quality of subject education.</p>

Curriculum Q & A in Maths– updated 03.11.21

	<p>When new teachers are recruited, subject leaders lead coaching meetings to induct staff as to the effective teaching of maths and monitor and support the new staff member. Where appropriate guided observations are organised for new staff to observe best practise alongside a senior leader.</p> <p>CPD is led by leaders from across the partnership of schools and is designed to be useful and impactful for teachers.</p> <p>Teachers’ workload is well-considered when planning the maths curriculum. The curriculum is written by some of the most experienced teachers and leaders in our school partnership and informs teachers of how they should teach topics and lessons so that the curriculum is covered in the breadth and depth expected. The use of White Rose Maths as a resource helps to provide high-quality work for teachers to adapt so that planning maths lessons is manageable. A small selection of other resources approved by senior leaders are also provided for teachers to use. The maths marking policy is effective and not onerous on staff, children who make errors are asked to revisit some of their errors in ‘Fix it Time’ (year 2 up). All teachers are coached by senior leaders in professional development days (termly) which includes a maths lesson visit (annually). Book scrutinies by the subject leader and senior leadership are frequent and allow for coaching teachers and monitoring curriculum coverage to be checked and support made available to teachers if needed.</p>
<i>Policy</i>	<p>Impact of whole school-wide policies on subject delivery?</p> <p>How whole-school timetabling, marking, assessment, CPD policies and priorities etc affect the quality of subject education.</p> <ul style="list-style-type: none"> • Timetabling – This is done by a senior leader and ensures maths is taught every day. • Marking – Marking policy in maths is effective and not onerous on staff. Children who make errors are asked to revisit some of their errors in ‘Fix it Time’ (year 2 up). • Assessment – Formative assessment is continuous within and between lessons. Weekly arithmetic quiz scores are recorded by teachers (year 3 up) and times tables fluency is recorded by teachers and monitored by senior leaders so interventions can be timely if needed. There are two summative assessment points each year, January and July. These are based on National Curriculum fundamental statements needed to be learnt in each year group and are not onerous on staff, but are effective. • CPD policies – This is planned according to the needs of the subject in the school at the time in order to be purposeful and impactful.