



Why you teach it - your purpose of study

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

1. 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.
2. Reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
3. 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.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. Our curriculum ensures children apply mastery skills in their maths and in Science and other subjects. We follow the White Rose maths scheme and are part of the Cheshire and Wirral Maths Hub as a 'Sustaining Mastery' school.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich mastery and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

INTENT

What you teach - your programme(s) of study

When teaching mathematics at Audlem St. James, we intend to provide a curriculum which caters for the needs of all individuals and sets them up with the necessary skills and knowledge for them to become successful in their future adventures. We aim to prepare them for a successful working life. We provide teaching on financial literacy so that the children know how to manage their money as they mature, including how to save, manage a bank account and how to pay for things. We incorporate sustained levels of challenge through varied and high-quality activities with a focus on fluency, reasoning and problem solving. Using a Mastery model, pupils are required to explore mathematics in depth, using mathematical vocabulary to reason and explain their workings. A wide range of mathematical resources are used and pupils are taught to show their workings in a concrete, pictorial and abstract form wherever suitable. They are taught to explain their choice of methods and develop their mathematical reasoning skills. We encourage resilience, adaptability and acceptance that struggle is often a necessary step in learning. Our curriculum allows children to better make sense of the world around them relating to the pattern between mathematics and everyday life. Lessons may include collaboration, but sustained focus and concentration are key to success. We intend to reduce any gaps resulting from school closures through recapping and teaching objectives from previous year groups, where necessary.

We intend to provide all children with the mathematical skills and knowledge to reach their potential in life. We aim to ensure that children with special educational needs are at the heart of our teaching, and that all children are encouraged to become automatic with the facts and methods to solve problems. We therefore aim to have a systematic approach using a mastery model so that children are taught the mathematics they need for the next stage so that they do not stay behind their peers.

Fluency: We intend for all pupils to 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. We intend that children are secure in their knowledge of number facts and in their recall and use of calculation strategies, through regular retrieval so that they do not forget key knowledge. Our pupils are encouraged to use the most efficient methods of mathematics, and only use informal methods for as long as is necessary to achieve conceptual understanding.

Reasoning: We intend for all pupils to reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language. We intend that they speak in complete sentences and use accurate mathematical explanations in their responses. This is supported by the use of stem sentences provided to the children.

Problem solving: We intend for all pupils to 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. We intend to explicitly teach children problem-solving skills by ensuring that the necessary facts and methods are secure first, followed by sufficient practice so that solving problems does not cause cognitive overload.

Vocabulary: We intend for all pupils to be immersed in a vocabulary-rich environment where discussion allows for understanding and deeper thinking. We intend that children use the vocabulary on display, and used by their teachers, in their own sentences when explaining their thinking.

EYFS: We intend that our EYFS teaching will include greater clarity to counting and comparing quantities in the Numerical Patterns ELG in line with the Government's focus on these as the strongest predictor for later maths outcomes. We intend to strengthen the teaching of early numeracy so that all children, particularly those from disadvantaged backgrounds, are able to start year 1 with a strong and confident foundation in number. Learning will continue to cover shape, space and measures, as part of a well-rounded curriculum, as set out in the revised mathematics educational programme.

Parental engagement: Throughout lockdowns, parents were given free access to the White Rose home learning videos which enabled them to see how methods are taught in school. We intend that parents continue to access these videos to support their child at home. We also intend to develop a maths page on our new website so that parents are provided with resources and signposted to ways to support their child. Parents are also updated on their child's progress through parent consultation meetings twice a year, and termly for SEND children. We also intend to provide greater clarity on what is taught each year and provide guidance and updates on how best to support children at home.

CPD: We intend that all teachers are kept up to date with relevant current research and methods, and that new staff are inducted into the mastery model. We also intend that staff learning needs are taken into consideration when planning CPD to ensure that all staff involved in the teaching of maths, have a deep subject and pedagogical knowledge.

Outdoor learning: We have been continuously improving our provision for outdoor learning since our last Ofsted inspection and have developed outdoor learning environments for EYFS, Y1 and Y2. We intend that Y3 develop their own dedicated outdoor learning space, but that all class teachers use suggestions within the White Rose scheme as and when they are identified.

Greater depth: We intend to increase the number of children who are attaining at the highest level and reach their fullest potential.

IMPLEMENTATION

How you teach it - your delivery of the above

Maths is taught daily and include retrieval of previously taught content.

White Rose mastery model: Every class from EYFS to Y6 follows the White Rose scheme of learning which is based on the National Curriculum. Lessons may be personalised to address the individual needs and requirements for a class but coverage is maintained. In order to further develop the children's fluency, reasoning and problem-solving, we use a range of planning resources including those provided by the NCETM and NRICH to enrich our children's maths diet. We teach through the mastery model which has five key ideas:

- Coherence –our curriculum has a coherent progression between concepts and between year groups
- Representation and structure – we use the CPA approach to make the structure of the mathematics visible and accessible
- Mathematical thinking – we intend that children make links and see relationships
- Fluency – we practise and rehearse to ensure knowledge is retained and to a level of automaticity
- Variation – we intend that procedural variation is used to enable children to make connections and see patterns, and intend that conceptual variation is used to present the same concept in different ways to ensure the concept is embedded.

Children answer questions and solve problem using their individual White Rose workbook which covers all the small steps needed to secure a concept e.g. Calculation. The children also have a maths books for recording their working out, for investigations set to deepen the learning or for their daily retrieval questions. Teachers may choose to supplement the learning with extension activities or for further practice; these are recorded in the maths books.

Concrete Pictorial Abstract (CPA): We implement our approach through high quality teaching, delivering appropriately challenging work for all individuals. To support us, we have a range of mathematical resources in classrooms including Numicon, Base 10 and counters (concrete equipment) and number lines. These are placed on the maths 'enable tables' or in a maths area accessible to the children. When children have grasped a concept using concrete equipment, images and diagrams are used (pictorial) prior to moving to abstract questions. Abstract maths relies on the children understanding a concept thoroughly and being able to use their knowledge and understanding to answer and solve maths without equipment or images. How a child has accessed the maths is recorded on the layered learning objectives. Suggestions for models and images are shown within the White Rose planning. The maths lead and class teachers ensure that we invest in our maths equipment so that we are able to deliver our intended curriculum using a CPA approach.

Variation: Within our scheme of work, children are presented with carefully sequenced questions which scaffolds their learning so that they can see connections and make links. Concepts are also presented in a variety of ways and representations so that the concept is fully explored. The White Rose plans make links to the DfE ready-to-progress materials to support and deepen the concept.

Mastering Number: Research shows that children need to develop good 'number sense' between the ages of 4 and 7. We have therefore introduced 'Mastering Number' which is delivered through the NCETM. This programme is taught in EYFS, Year 1 and Year 2 and is also delivered to those children in lower key stage two who are significantly behind their peers. We are now in our second year of 'Mastering Number' as the scheme has proved successful in improving children's number sense. In Y1 and Y2, class teachers deliver a discrete 15-minute session four days a week which focuses on the five key areas of:

- Subitising
- Cardinality, ordinality and counting
- Composition
- Comparison
- Addition, subtraction and number facts

In EYFS, mastering number constitutes the main part of the directed teaching four days a week, and on the fifth day, content is drawn from the White Rose programme to cover the areas not within Mastering Number. The school uses Rekenreks to provide a hands-on experience to deepen the learning.

Maths Hub: Our school has been delivering a mastery model through the maths hubs for six years. We are now considered a 'sustaining mastery' school and are members of the Cheshire and Wirral Maths Hub. The focus for this year will be to improve an area of the mastery model which may need to be embedded further and, for this year, we shall be improving fluency across the school. We shall do this by explicitly teaching number facts every day and measuring attainment closely each term using data on Times Tables Rockstars (referred to as heatmaps) following an assessment period within class. Class teachers in Years 5 and 6 will also assess which numbers facts still need to be secured and design a programme to enable children to learn and secure them. Children will be rewarded for effort and progress through certificates and badges throughout the year. Another area of focus is retrieval practice (see below).

Retrieval practice: All classes engage in daily retrieval of previously-taught content to ensure that knowledge is retained and embedded. This time should include retrieval of declarative knowledge such as keys facts and language from the previous lessons, as well as procedural knowledge such as a strategy previously taught. This will be evidenced through a combination of recording in books as well as on whiteboards or through games. Teachers may make use of the daily 'Flashback four' retrieval questions from within the White Rose scheme at the start of each lesson or at another part of the day. Teachers will also update their maths display to help the children to remember and do more independently, and these will also serve as a form of revision.

Vocabulary: Teachers expect children to answer in complete sentences and use taught mathematical vocabulary and sentence structures. Examples of the sentence structures or stems as well as maths vocabulary are displayed in all classrooms for children to refer to. The displays are updated as learning progresses.

Number facts: In order to reinforce individual children's recall of key number facts, we utilise Times Tables Rock Stars for multiplication practice, application and consolidation. We also utilise Numbots for recall of addition and subtraction facts. Children are provided with logins in order to practise in class, but are also set challenges and homework to practise at home. The order which children learn the facts are:

- Year 1: Count in multiples of 2, 5 and 10. Recall and use all doubles to 10 and corresponding halves.
- Year 2: Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.
- Year 3: Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.
- Year 4: Recall and use multiplication and division facts for the multiplication tables up to 12x12.
- Years 5 & 6: Revision of all multiplication tables and division facts.

Number facts are also taught daily in each class in KS2; in KS1 this is included as part of the Mastering Number programme.

The school will also be utilizing the app 'One-minute maths' from White Rose to help develop mental calculation with all four operations including subitising. The app can be used in the classroom, but also set as homework. It will be advertised to parents by the maths lead. Children are also rewarded with star badges in praise assemblies for attainment in recall of each set of times tables, e.g. for recall of the 2,5 and 10 times table, a child would be awarded with a bronze star badge; for the 3, 4 and 8, a silver star; and for recall of all times tables, a gold badge.

Enrichment activities: We invite visitors from local banks and building societies to work with the children to develop their financial literacy. This is also included in our RSE curriculum where we teach children about the world of work and the idea of enterprise, as well as how to use money and pay for things. We also organise trips to apply mathematical thinking such as visits to Newcastle-under-Lyme College to build and programme Lego robots and to Cheshire College as part of their Primary College programme. We take part in mathematics competitions such as the 'Primary Maths Challenge' to stretch our most able children, but we include all children in upper key stage children so that they can work together to solve challenging problems. The children also take part in national initiatives such as the census, to learn how mathematics plays a role in our democracy.

Assessment and narrowing gaps: Over the past two years, teachers have prioritized areas of the ready-to-progress materials, but have endeavored to cover the full curriculum despite significant disruption due to absences caused by Covid throughout 2021 and 2022. For 2023, all teachers will ensure that maths is taught every day and this will be monitored by the SLT. The school has moved to the updated White Rose planning version 3.0 from 2022 and coverage of this will be monitored by SLT.

In Year 6, catch-up funding is used to provide an extra teacher for half a day a week to work with targeted children. Teachers assess formatively throughout the lesson, but also at the end of each unit using the end-of-unit White Rose assessment for that year group. Our online tracking system, Educater, is updated half-termly. At the end of each term, children either complete the NFER test, past SATs test or White Rose end-of-term tests, depending on their year group. Data is collected and discussed with the headteacher, and children are identified for further stretch or support. The maths lead analyses the termly data and identifies trends which need addressing, and suggests actions to be taken to improve attainment and progress. Teachers may provide written feedback in maths books or in the WR workbooks, which identifies and addresses misconceptions, or highlights errors. Feedback may also be verbal which is annotated as 'VF' in books.

Misconceptions: Emphasis will be made on anticipating and addressing misconceptions, and these are identified within the teacher guidance provided in the White Rose scheme. Misconceptions are threaded throughout every lesson, often using the cartoon character 'Tiny' the turtle, and are displayed on the classroom maths wall.

Parental engagement: A new page on the school website will be developed, this year, to provide parents with resources they can use to enhance their own knowledge of current teaching methods and therefore support their child at home. Parents may also be provided with 'maths boxes' which contain various manipulatives and may help vulnerable children with their learning at home. Teachers identify who may benefit from borrowing these boxes and provide them on loan for short periods. This year, the maths lead will also begin a termly newsletter for parents which will highlight a teaching method and provide further resources and support to parents to develop their knowledge of the maths taught to their child. The maths page on the website will also provide greater clarity on what maths is taught in each year group.

CPD: The maths lead is a member of a teacher research group as part of the school's involvement in the maths hub. Information is then disseminated through staff meetings and INSETs to teachers and teaching assistants. Teachers in EYFS, Year 1 and Year 2 are also attending online research groups through their participation in the Mastering Number programme, which will enhance their skills and knowledge in teaching Number. In 2022-2023, specific teachers and teaching assistants will be beginning a new CPD

programme through the NCETM Maths Hubs on developing their maths subject and pedagogical knowledge. The programme will last one year and will involve face-to-face training sessions. The maths lead will also be delivering training on problem solving and on the importance of identifying misconceptions.

Outdoor learning: Class teachers will continue to develop their dedicated outdoor learning gardens and maths resources are being identified to enhance the provision. The maths lead will also place number facts around the school for children to find and learn. Class teachers will also provide opportunities for outdoor learning where these are identified within the White Rose planning. A specific symbol is used on the planning where learning would be enhanced in this way. The children are also exposed to real-life maths within their Forest Schools learning which each class attends for a half a day for a term.

Greater depth: To improve the number of children attaining at a high level and reaching their full potential, teachers will be provided with CPD from the maths lead on how to teach problem-solving skills. Teachers will then be expected to teach problem-solving skills explicitly to ensure that acquiring these skills is not perceived as incidental learning.

Metacognition: To help the children to build their confidence, improve their focus and engagement, and subsequently their progress, teachers will ensure that prior knowledge is activated through the use of 'Flashback 4'. Teachers will also help the children to identify their goals for the lesson by discussing pre-requisite skills and knowledge needed for the lesson or other skills which are specific to that child. Teachers will also ensure that maths displays help children to remember previously-taught content.

Interventions: Children who need support are identified by the class teacher, the SENCO and the head teacher. Interventions or in-class support are planned so that the children do not miss the maths lesson with their own class teacher, unless a bespoke programme has been recommended by the SENCO. Impact is assessed by the staff delivering the programme with either the SENCO or the class teacher as well as with the head teacher in termly meetings. The SLT then discuss next steps to ensure impact and value for money.

IMPACT

So what - your evaluations of the above

At the end of each year we expect the children to have achieved Age Related Expectations (ARE) for their year group. Some children will have progressed further and achieved greater depth (GD). Children who have gaps in their knowledge receive appropriate support and intervention.

Since the introduction of the mastery model and the White Rose scheme of work, children have been exposed to a wider range of representations and carefully sequenced learning. Most children have become more fluent in using manipulatives and know how to use them to help them to learn maths independently. Teacher workload has also reduced as resources and medium-term plans are provided as well as daily Powerpoint slides which detail the daily learning – these serve as the short-term planning. Teachers adapt the scheme to suit their class and supplement it with high-quality resources. Teachers are clear on the small steps needed to ensure a coherent progression. Teachers are now more knowledgeable of their curriculum and also of the key areas which help the children to progress to the next stage in their education.

New workbooks have recently been introduced so that each child has their own WR booklet to work in. These are colourful booklets which contain questions to develop fluency as well as questions to develop reasoning and problem-solving. These are also beginning to reduce teacher workload as less photocopying is required.

Membership of the maths hub has enabled the school to access high-quality CPD such as observing teachers from China, and to current research which has enhanced the quality of teaching, for example, learning different ways to teach times tables, or questions to use to promote reasoning. It has also enabled staff to network with other schools and compare practice. The maths lead has also been able to network with other maths leads, and discuss the latest research to enhance the school's provision. For example, by analyzing the EEF report on improving maths in KS2 and KS3, the maths lead has been able to determine how well retrieval is embedded within the lesson by carrying out book scrutinies and pupil voice. This is helped to identified areas of practice which needed to be strengthened.

Daily retrieval has always been a part of the maths lesson at our school, but making it explicit and making reference to declarative and procedural knowledge is providing children with dedicated time to practise using specific prior knowledge. This is particularly helpful for children who need more time to secure a concept, fact or procedure. One area of retrieval is the meaning of mathematical vocabulary. Children are beginning to become more fluent in their use and understanding of terminology, and this will continue to be embedded. By using 'Flashback 4' questions at the start of the lesson, children should remember more and build on previous knowledge.

In previous years, the teaching of number facts and the use of TTRS and Numbots was supporting children to develop fluency to automaticity. Teachers can refer to the 'heatmaps' to analyse which times tables need further attention. However, since lockdowns, some gaps have arisen so staff are reinforcing the learning in lessons and through homework. This will be monitored by the maths lead. In Year 4, the children made extensive use of TTRS and achieved well in their Multiplication Check in 2022. The award of star badges are beginning to motivate the children to practise their times tables, and more children are now acquiring them each term.

Enrichment activities have encouraged children to see mathematics as a subject which can enable them to create, design and take pleasure in. All of the workshops and visits have been well-received by children and staff, and has allowed all children to apply mathematics in a real-life context, as well as promote confidence and enthusiasm. Some of the trips we usually provide were suspended in 2022, but we hope to introduce them in 2023. A STEM week is also planned for March 2023.

The maths lead has created a revised book scrutiny criterion (Flick and Fix) which focuses on current priorities:

- Maths is being taught daily and work shows that pupils are building on core knowledge.
- Misconceptions are being 'picked' up' and addressed.
- Pupils are using and applying subject specific vocabulary, accurately.
- Pupils are being provided opportunities to recap previous learning.

Daily retrieval is developing and teachers have been reminded of this. KS1 have run mastering number sessions for one academic year and are pleased with how it is improving children's ability to calculate. Time for rehearsal is also developing. Teachers are aiming to ensure coverage, but still need to ensure that fluency is developed first. Many classes are using TTRS in class and as homework, but this still needs to be embedded within the lesson.

On the scale below rate where you believe this subject currently stands in terms of your overall curriculum offer:

Developing
Secure
Embedded

** Please ensure you have compared this against judgements from other subjects and that your Headteacher agrees with your judgement.*

Previous Improvement Actions and Impact	Current Improvement Actions	Future Improvement Actions
<ul style="list-style-type: none"> • Mastering Number is becoming embedded and improving basic number skills in KS1 and EYFS. • Knowledge of times tables facts in strong in Year 4 who achieved 78% in their MTC. • Staff prioritized key areas based on the Ready to Progress criteria which means that more children have secured or are working towards securing the key objectives before moving up. • Daily retrieval is becoming embedded enabling the children to build on prior knowledge. • Maths lead has sustained engagement with the Maths Hub ensuring that the maths curriculum continuously evolves to reflect up to date research. 	<ul style="list-style-type: none"> • Metacognition strategies are being used within maths lessons and children are becoming more self-regulated learners. • Maths is taught daily across the school. • Staff have received CPD to improve subject and pedagogical knowledge. • Staff are anticipating and addressing misconceptions when planning and teaching. • The updated White Rose scheme is embedded across the school. • Maths interventions are improving progress and attainment and provide value for money. • The Mastering Number programme is being delivered effectively and consistently across EYFS and KS1. • More children are able to recall their times tables and number bonds with automaticity. • There is an increase in the percentage of children attaining greater depth. • All classes have sufficient manipulatives to effectively deliver the maths curriculum. • The outdoor environment is being used to enhance the maths curriculum. • Parents are well-informed about how maths is taught across the school and feel able to support their child at home. 	<ul style="list-style-type: none"> • Maths lead to deliver training on problem solving and using investigations • Ensure that boosters are put in place for targeted children. • Further develop our Online Learning Platform through Microsoft Team/website so that parents and children have a way of accessing their maths learning and teaching throughout the year. • Maths lead to develop a maths newsletter for parents. • Ensure children develop financial literacy. • Develop further skills in metacognition. • Children to be taught how to solve problems by planning, monitoring and evaluating their progress. • Continue to develop the outdoor learning spaces and ensure they are well-equipped. • Further develop links with high schools and colleges to share expertise and resources, providing depth of knowledge and skills and application opportunities to further enhance the curriculum offer in school. • Ensure that the year-by-year maths curriculum is available on the school website.

		<ul style="list-style-type: none"> • Ensure 'depth' is agreed and moderated across year groups/key stages and partner schools. • Review marking and feedback in maths to ensure it is meaningful and leads to improvement. • Maths lead to implement the guidance provided by the EEF report: 'Improving Mathematics at KS2 and KS3', and 'Ofsted subject review'. • For the majority of all children to have a secure grasp of all addition and multiplication facts appropriate for their year group. <p>QUALITY OF EARLY YEARS EDUCATION</p> <ul style="list-style-type: none"> • Further develop 'mastery' skills through modelling of language. • Ensure the outdoor learning environment enables pupils to access resources and initiate own learning to further develop skills and confidence, and provide experiences that are accessible and open-ended, encouraging children to explore and investigate.
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** The table above should list the actions you have taken, or plan to take, to develop the subject further i.e. a summary of your action plan.*