Care – Opportunity – Success

Asquith Primary School Mathematics Policy

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Contents

At Asquith, our mathematics curriculum follows the Programme of Study and Aims of the national curriculum.

Aims

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.

Our vision

We intend on delivering a curriculum which:

- Recognises that mathematics underpins much of our daily lives.
- Allows children to develop their understanding of numbers through 'number sense'.
- Makes rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.
- Allows children to be a part of creative and engaging lessons that will give them a range of opportunities to enjoy and explore mathematics following a mastery curriculum approach.
- Allows children to develop understanding and reasoning through a Concrete, Pictorial, Abstract (CPA) approach.
- Engages all children and entitles them to the same quality of teaching and learning opportunities, allowing them to achieve their potential.
- Gives each pupil a chance to develop confidence in themselves as mathematicians and develop the power of resilience and perseverance when faced with mathematical challenges.

At Asquith, we follow the White Rose Maths schemes of learning through school from EYFS to year 6. The schemes are supplemented with the premium resources and on-demand CPD videos.

Rationale

We have chosen to use the White Rose Maths schemes for the reasons listed below.

- The schemes are consistent with the aims and objectives of the national curriculum.
- They heavily promote a mastery approach to teaching and learning.
- The curriculum content is delivered via a small steps approach which meets the needs of our children.
- White Rose is constantly evolving to ensure up-to-date content, CPD and resources are available.

A MASTERY APPROACH

The White Rose maths schemes outline a mastery approach as having four strands that we adopt at Asquith as part of our fidelity to the scheme.

1. Putting number first

Number is 'at the heart' of the White Rose schemes. There is a large focus on number, particularly in the schemes for the beginning of the year. This reinforcement of number builds competency and allows children to access the rest of the curriculum. It is important that pupils secure these key foundations of mathematics before being introduced to more difficult concepts.

2. Depth before breadth

Ensuring that children have a deeper understanding of mathematics is a major part of our curriculum at Asquith. The White Rose schemes of learning allow children to acquire depth of knowledge in all topics whilst supporting teachers to stay within the National Curriculum objectives for each year group. Once a topic is taught there are opportunities to revisit and draw upon previously learned skills throughout the rest of the year.

3. Working together/mathematical talk

Children are taught through a whole class approach to ensure progression through the schemes are consistent for all children. Children are encouraged to support each other through the schemes and mathematical talk is a key component of lessons at Asquith, through the repetition of stem sentences along with the use of talk partners and group discussions. A mastery classroom should never be a quiet one.

4. Fluency, reasoning and problem solving

The White Rose schemes encourage the development of all three key strands of the National Curriculum to provide children with the knowledge and skills needed to be confident mathematicians.

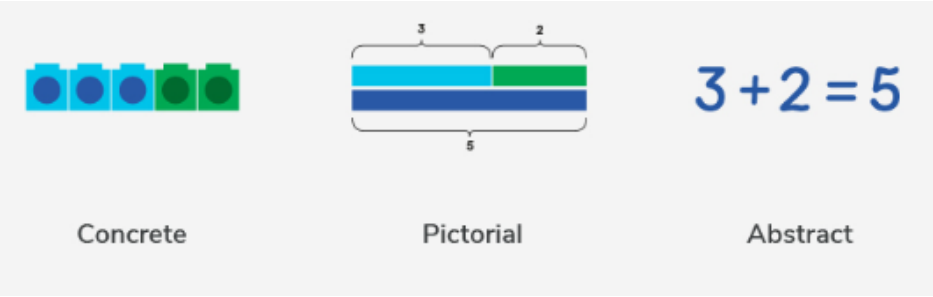
- The key to fluency is deep knowledge and practice and making connections at the right time for a child. Fluency includes conceptual understanding, accuracy, rapid recall, retention and practice.

- Verbal reasoning demonstrates that pupils understand the mathematics. Talk is an integral part of mastery as it encourages students to reason, justify and explain their thinking. The way in which pupils speak and write about mathematics transforms their learning and strengthens understanding.

- When solving mathematical problems pupils are encouraged to identify, understand and apply relevant mathematical principles and make connections between different ideas. This builds the skills needed to tackle new problems, rather than simply repeating routines without a secure understanding.

Concrete – Pictorial – Abstract (CPA)

The teaching and learning of mathematics at Asquith primary school includes aspects of the following mastery-based approach in all lessons or across a series of lessons. White Rose also promotes the use of a CPA approach when following their schemes. They state that research has shown that all children, when introduced to a new mathematical concept, should be allowed to develop competency through the CPA approach.



Concrete

Concrete is the use of objects and physical resources to bring the mathematics to life. Children manipulate the provided resources to support and develop understanding of new concepts. The White Rose calculation policies, which we use at Asquith, outline the appropriate resources for each year group and identify which resources are better suited for different skills.

Pictorial

The pictorial stage allows children to use pictorial representations of mathematics to visualise the concepts being taught. These representations should be used alongside concrete objects to help children make links between the concrete and the abstract. Building or drawing a model helps children to visualise problems and concepts that traditionally are difficult to grasp making mathematics accessible to all. The White Rose calculation policies, which we use at Asquith, outline the appropriate pictorial representations for each year group.

Abstract

Abstract is the written mathematics; calculations including the numerals and the symbols. Children rely upon skills learnt in the concrete and pictorial stages to further develop methods needed in the abstract stage and grow in confidence of solving mathematical problems. The White Rose calculation policies, which we use at Asquith, outline the appropriate methods to use for each year group's skills.

Staff at Asquith are supported in using the CPA approach in lesson planning through the on demand CPD packages offered by White Rose alongside focused staff meetings to target certain aspects of the approach. The packages include videos on the CPA approach, bar modelling and year group specific training for each topic and new concept.

Lesson structure

At the heart of every lesson taught at Asquith is modelling, engagement, questioning, challenge, thinking and assessment. At Asquith the lesson structure of mathematics will differ as children progress through school.

EYFS

- Mathematics knowledge and skills are taught predominantly through play.
- In Foundation, there is a daily 'skills carousel' in which one teacher-led activity is always maths based.
- The children are then able to reinforce this skill later in the day as the activity is available for children to use in the provided provision.

Y1

- At the beginning of the academic year, to ease the transition from Foundation, children are taught in small groups.
- Children access a maths area as part of the continuous provision within the classroom.
- Learning moves onto whole class teaching during the Spring term.

Y2

- In year two, mathematics is taught whole class from September.
- Lessons begin with a recap of key skills that have been recently taught if relevant to the topic.
- Children then move through a carefully planned sequence of small steps to achieve an objective.

KS2

- Lessons start with a 'flashback 4' recap of previously taught skills. Flashback 4 is part of the mathematics curriculum in key stage one too but this is carried out separately to a maths lesson.
- Lessons then progress through a carefully planned sequence of small steps to achieve an objective.

'10 in 10' is an arithmetic programme that we follow to build upon and practice fluency skills. Starting in spring term year two, '10 in 10' sees the class teacher model fluency skills before the children answer ten arithmetic calculations practicing the taught skills.

Planning

Long-term planning

At Asquith teachers use the yearly overview for Mathematics which can be found at the following link or QR code.

https://primarysite-prod-sorted.s3.amazonaws.com/asquith-primary-school/UploadedDocument/eaa239f2-5bb1-4d7c-82f0-3399bf8b0de8/maths-grid-whole-school-overview-updated-2022.pdf

The yearly overview follows the blocks within the White Rose schemes with a slight adaptation in years two and six. The order of some blocks in these year groups has been rearranged to ensure coverage of key topics before the SATs in May.

Short term planning

Teachers at Asquith plan lessons using a planning format they are comfortable with. Lesson plans will include a sequence of thought-out activities. Teachers use the 'notes and guidance', 'possible stem sentences', 'key questions', 'things to look out for', 'key learning' and 'reasoning and problem' sections from the White Rose schemes to further supplement planning along with using the premium resources and online CPD package.

Calculation policies

At Asquith we follow the White Rose schemes of learning, buy into the White Rose premium resources and the White Rose online CPD packages. White Rose have also published two separate calculation policies for addition & subtraction and multiplication & division. Staff at Asquith refer to the White Rose published calculation policies to support with their teaching of mathematics. We have agreed to adopt the White Rose calculation policies at Asquith. These policies outline the progression through the CPA approach for each year group, starting with age-appropriate resources, then pictorial representations and written formal methods. They also include a breakdown of each curriculum objective and the corresponding White Rose small steps and the supporting CPA methods that can be used.

The calculation policies we use can be found by following the below web address or QR code. Asquith does not take any credit for the following documents and all publishing rights go to White Rose Maths.

Addition and subtraction

https://primarysite-prod-sorted.s3.amazonaws.com/asquith-primary-school/UploadedDocument/ff897c0e-f021-482c-a2fb-f8c93cfc9234/addition-and-subtraction-calculation-policy-july-2022.pdf

Multiplication and division

https://primarysite-prod-sorted.s3.amazonaws.com/asquith-primary-school/UploadedDocument/b5c2ae0a-1d70-4517-b547-07a9daa6d984/multiplication-and-division-calculation-policy-july-2022.pdf

Times Tables

Times tables are part of the national curriculum and are taught in line with our yearly overview for each group. Once taught multiplication skills and facts need to be practiced and rehearsed regularly to ensure that children are fluent in the recall of times tables facts.

The progression of times tables knowledge through the school is as follows:

- Year 1 – Count in 2s, 5s and 10s.
- Year 2 – Recall 2, 5 and 10 times tables.
- Year 3 – Recall 3, 4, and 8 times tables.
- Year 4 – Recall all times tables from 2-12.
- Year 5 & 6 – Application of times tables facts to support other areas of the curriculum.

Pupils in year 4 will take an official Department for Education online times tables check which will be a timed assessment testing the recall of multiplication facts from the 2-12 times tables.

Times Tables Rockstars

Times Tables Rockstars is an online resource that can be used from years 2 – 6 (at home and at school) and supports the development of quick recall of times tables facts. Class teachers are responsible for ensuring each child in their class has access to their login details, are set the correct tables for their year group (as per the progression above) and are monitoring the children who are frequently playing and challenging those who are not accessing it at home. Times Tables Rockstars is versatile as it can be accessed via a web browser or as a free application on smart devices.

https://play.ttrockstars.com/

Children in KS2 are expected to access for **20 minutes a week** at home as well as accessing in class during timetabled sessions to the teacher's discretion.

Numbots

Numbots is an online resource that can be used from years R – 4 (at home and at school) and supports the development of mathematical fluency in place value, addition and subtraction. Class teachers are responsible for ensuring each child in their class has access to their login details, are set the correct levels for their year group (as per the Asquith Mathematics Progression Map) and are monitoring the children who are frequently playing and challenging those who are not accessing it at home. Numbots is versatile as it can be accessed via a web browser or as a free application on smart devices.

https://play.numbots.com/#/intro

Children in KS1 are expected to access for **20 minutes a week** at home as well as accessing in class to the teacher's discretion.

Recording

Mathematics work for every small step is evidenced and children should show they have understood the small step taught before their learning is moved onto the next step. The way in which evidence is represented differs throughout school.

- EYFS - No maths books. Any work, written or practical, is uploaded onto tapestry (nursery) or Seesaw (Foundation).
- Y1-6 any written work is evidenced within maths books.
- If practical work is done then photographic or video evidence is sufficient. These will be uploaded onto Seesaw, tagged into the Maths folder and a learning object written in the comments for that piece of evidence. Any photographic evidence should clearly show the learning that has taken place for that child or in some cases a group of children.

All books will have recorded evidence of the three key strands of mathematics outlined in the national curriculum, **fluency**, **reasoning** and **problem-solving**. In early years and KS1 the majority of reasoning work is done verbally and this is indicated in books with a 'V' symbol in line with the 'Asquith Marking & Feedback policy'. There may be some examples of written reasoning within year 2 and then it is expected that reasoning is recorded more often by children in books within KS2, although there may be some cases where verbal reasoning and a 'V' symbol is more appropriate.

Staff at Asquith use White Rose Maths premium resources to enhance and support their teaching. The questions from these resources need to be carefully selected during the lesson planning process to ensure that the activities chosen cater to the needs of all individuals and classes. The White Rose premium resources are not be printed in full and stuck in books.

Presentation

At Asquith, we expect children to act and think like mathematicians, this means recording like mathematicians also. Whilst adhering to general school expectations regarding presentation including DUMTUMS (Date, Underline, Miss a line, Title (LO), Underline, Miss a line, Start)

There are some subject specific presentation expectations that will enable children to record like a mathematician.

- As soon as children are recording numbers in books the expectation is to record one number per square with two-digit numbers taking up two squares, three-digit numbers taking up three squares etc.
- Calculations are to be recorded in a uniform way with multiple calculations being written horizontally across the page to ensure all the space on a page is used.
- When using the White Rose Premium resource questions, each question used should be trimmed and then stuck in books to the left of the page with students answering the question in the space to right of the question if space or underneath when more suitable. Children can stick in their own questions to the teachers' discretion as this will ease workload of school staff.
- Children need to be taught to use the squares in books to line up questions accurately when sticking in, leaving one full line of squares from the edge of the page to avoid an overhang of paper.

Number formation

Number formation is an area to focus on within KS1 particularly to ensure problems do not carry over into KS2. All inaccuracies with number formation need to be corrected by children in books with further practice being given when applicable. When teaching number formation for the first-time teachers should follow the number formation rhymes. This can then be referred to in future year groups. The number formation posters should also be displayed in classrooms in early years and KS1 with the single poster used on tables and in maths areas.

Assessment

Assessment should be regular and used to inform teacher assessment judgements at the end of each term. Teachers are responsible for ongoing daily assessments of their class to inform their planning. Live marking and targeted questioning are two of many tools that teachers at Asquith use as part of their daily assessments.

At Asquith we use PUMA assessments across school to monitor progress and attainment of children throughout the year. Children complete the assessments during three assessment weeks in each term. The assessments give a standardised score for children similarly to the SATs tests at the end of KS1 and KS2. This will not affect the internal school data as standardised scores can be generated from each of the assessments. Teachers are to use these assessments alongside their own teacher judgements to give an assessment on attainment and progress at the three data points at the end of each term.

Marking & feedback

All staff members are to follow the Asquith Marking Policy when marking work in mathematics lessons using the relevant codes to outline how the work has been completed and what feedback has taken place. Immediate intervention and feedback is the most effective way of addressing misconceptions that arise. A pupil should leave each lesson feeling successful and any concerns or misconceptions are to be addressed immediately to ensure this. On occasion and where appropriate, pupils should have the opportunity to self and peer mark their work but the teacher should always complete their own marking and assessment to check against the peer/self-mark.

Agreed Codes

- *I – independent (needed to show the move from scaffolded modelled or shared work, to independent e.g. on writing days the first paragraph might be AS but then the child moves to I)*
- *P – Peers (partner or group work)*
- *V – Verbal (Verbal feedback has been given here)*
- *AS – Adult Support*
- *CI – Child Initiated (FS only)*
- *AI – Adult Initiated (FS only)*

Resources

When resourcing and planning using the White Rose Planning, teachers should also choose resources which complement it and follow the Mastery Approach: Concrete, Pictorial and Abstract. Teachers have the flexibility to choose resources they feel are most effective to support the needs of all learners (differentiation) and ensure they achieve the aims of fluency, reasoning and problem solving. The White Rose calculation policies that we use as a school break down the individual small steps and outline which concrete or pictorial resource is most appropriate for that age group and small step.

All classrooms contain:

- Rekenreks
- Base 10
- Counting resources (EYFS & KS1)
- Numicon (EYFS & KS1)
- Laminated ten and five frames (EYFS & KS1)
- Laminated part/part/whole models (EYFS & KS1)
- Double sided counters (KS1)
- Place value counters (KS2)
- Laminated bar models (KS2)
- Laminated place value grids (KS2)
- Rulers
- 2D & 3D shapes
- Money

Further resources can be found in the maths cupboards including:

- Bead strings
- Clocks
- Measuring jugs and cylinders
- Games
- Calculators
- Protractors
- Balancing and measuring scales
- Weights
- Dice

Classroom environment

Mathematics should be visible in all classrooms. All classrooms will have a maths display/working wall which only displays information relevant current learning. This will include key vocabulary, pictorial and abstract representations and modelled work done during lessons. Children in every classroom use the maths working wall as reference and support during lessons. Classrooms in EYFS and year 1 will also have a maths table/area for children to access as part of continuous provision. This needs to reference current learning or a recap of skills already taught. Relevant concrete apparatus is readily available for children to refer to and use in lessons.

Other relevant documents

- Maths curriculum & progression map
- Maths yearly overview/long term plan
- White Rose addition and subtraction calculation policy
- White Rose multiplication and division calculation policy
- Number formation posters
- White Rose schemes of learning & White Rose premium resources