St Paul's C of E Primary School

MATHS POLICY

1. Purpose of the policy

This policy reflects the aims and values of St. Paul's CE Primary School. It ensures all stakeholders, including staff, governors, parents and pupils, are working towards the same goals.

The purpose of this policy is to:

- Set out a framework for all teaching and non-teaching staff, giving guidance on planning, teaching and assessment
- Demonstrate adherence to the National Curriculum objectives and guidelines
- Provide clear information to parents and carers about what their children will be taught
- Allow the governing board to monitor the curriculum
- Provide Ofsted inspectors with evidence of curriculum planning and implementation

2. Subject vision

At St. Paul's, we endeavour to teach a rich and progressive mathematics curriculum personalised to our children's needs which begins to build a love for the subject. We believe that mathematics teaches the children how to make sense of the world around them, through developing their ability to calculate, reason and solve problems. We encourage the children to understand and appreciate how number and space is used in their everyday lives in and out of school and their growing knowledge and understanding will support them in our developing society and their future lives.

3. Intent: Aims and outcomes

By the time our pupils leave St. Paul's, they should:

- 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
- 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.

Early Years

The Early Learning Goals (ELG) for mathematics are split into:

- Number:
    - Have a deep understanding of number to 10, including the composition of each number;
    - Subitise (recognise quantities without counting) up to 5;
    - Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.
- Numerical Patterns:
    - Verbally count beyond 20, recognising the pattern of the counting system;
    - Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;
    - Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Development Matters guidance for mathematics explains that developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding – such as using manipulatives – children will develop a secure base of knowledge and vocabulary from which mastery of

mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

Key Stage 1

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the 4 operations, including with practical resources. At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money. By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency. Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Lower Key Stage 2

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the 4 operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers. At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number. By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work. Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word-reading knowledge and their knowledge of spelling.

Upper Key Stage 2

The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio. At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them. By the end of year 6, pupils should be fluent in written methods for all 4 operations, including long multiplication and division, and in working with fractions, decimals and percentages. Pupils should read, spell and pronounce mathematical vocabulary correctly.

4. Implementation: Teaching and learning

At St. Paul's, we use a variety of teaching and learning styles in mathematics lessons. Our principle aim is to enable pupils to think as mathematicians. Lessons are planned using White Rose Maths resources with objectives and activities adapted to suit the stage of development for the pupils in each class. The principles of teaching for mastery are followed with lessons being carefully designed to include fluency, reasoning and problem solving opportunities. The teaching of mathematics might involve:

- Whole-class teaching
- Small group work
- The children asking, as well as answering, problem solving questions, such as 'How do we know…?'
- ICT to enhance their learning

At St. Paul's, we recognise that in all classes children have a wide range of abilities, and we ensure that we provide suitable learning opportunities for all children by matching the challenge of the task to the ability of the child. We achieve this in a variety of ways:

- We set tasks which can be adapted for different children either to increasing difficulty or support them
- We group children by ability for some tasks, in mixed ability groups for others and independently for some tasks. Sometimes each type of grouping will have different activities, other times this may just include having additional support offered to them

- We provide resources of different complexity, matched to the ability of the child
- We use adults in the classroom to support the work of individual children or groups of children.

All children regardless of their race, sex, religion or ability will be given equal opportunities to develop their knowledge, skills and understanding of mathematics.

5. Curriculum overview

Here at St. Paul's, pupils will follow a rich, balanced and progressive mathematics curriculum that allows children to reason, solve problems and develop fluent conceptual understanding in each area. Our curriculum allows children to better make sense of the world around them by making connections between mathematics and everyday life. Children will know more, remember more and do more. Mathematics is taught and planned as a discrete subject. We carry out our curriculum planning in three phases: yearly overview, schemes of work and short-term plans/powerpoints.

The curriculum overview for EYFS and Years 1 to 6 can be found in Appendix 1.

The structure of a mathematics lesson can be found in Appendix 2.

6. Impact: Assessment and recording

Assessment

St. Paul's uses assessment to enable staff to understand what pupils have learnt before, what they need to learn now and what they will learn next.

Formative assessment
Formative mathematics assessment is ongoing and will be used to inform teachers in relation to their planning, lesson activities and differentiation. During lessons, teachers will make informal judgements continuously. At the end of the lesson, the teacher assesses the pupil's work and will make a judgement to inform future planning. Feedback (either written or verbal) is given to each child to help guide their progress. Feedback will be noted in the teacher's daybook to ensure misconceptions are addressed and to show the next steps required for focus pupils or which children will require a focused intervention before the following lesson.

Summative assessment
Summative assessment is completed at the end of a mathematical unit and at the end of each term, based on the mathematical skills and knowledge found in that unit/term. This will include an arithmetic and reasoning assessment. This will be completed to track pupil's progress and attainment against school or national expectations.

Each term, pupils will be assessed within 1 of the following bands for their end of year group expectations:

- PKS – Pre Key Stage Standard
- WTS – Working Towards the Standard
- EXS – Working at the Expected Standard
- GDS – Working at Greater Depth with the expected Standard

Statutory assessment

Statutory national assessments are completed in the summer term of Year 6 in arithmetic and reasoning and in the summer term of Year 4 with the multiplication check. Results are monitored, analysed and published.

Further assessment and reporting information can be found in the school's assessment policy.

Marking

Children receive regular verbal and written feedback and marking follows the school's marking policy.

Further marking information can be found in the school's marking policy.

Recording

In mathematics, pupils will record their learning in the following ways:

- Mathematics books
- CGP Maths books
- Task books
- Seesaw

This may take the form of photographs, pictures, notes or written work, and may be worksheet-based or fully independent.

7. Roles and responsibilities

Headteacher

The headteacher at our school will:

- Support the subject leader but also hold them to account for the effectiveness of the subject
- Support staff through the provision of training and resources
- Monitor the planning and delivery of the subject
- Ensure the requirements of the National Curriculum are met
- Ensure this policy is reviewed according to the timescales set out

Subject leader

The subject leaders at our school will:

- Prepare and review subject policy and curriculum plans
- Promote the study of the subject throughout the school
- Monitor the teaching and assessment of the subject (using subject leader journal)
- Attend appropriate CPD
- Stay informed regarding developments in the study and teaching of the subject
- Evaluate resources
- Provide support, training and CPD to staff on the subject curriculum and its delivery, and keep them informed about subject developments nationally
- Assess the impact of the subject curriculum on pupils' learning and development
- Make presentations to governors on the subject and how it is being taught
- Provide the Headteacher with a summary report in which the strengths and weaknesses of science are evaluated and indicated areas for further development

Classroom teacher

Classroom teachers at our school will:

- Plan, teach and assess the subject according to the principles laid out in this policy
- Report to the subject leader
- Maintain subject knowledge and appropriate CPD

Parents

The parent community at our school will:

- Make sure their children are prepared for learning
- Support their children to complete project book activities

8. Inclusion

At St. Paul's, teachers set high expectations for all pupils in mathematics, whatever their ability and individual needs. Mathematics forms part of the school curriculum policy to provide a broad and balanced education to all children and we acknowledge that learners with additional needs are likely to experience difficulties within their learning which may act as barriers. Through our mathematics teaching, we provide learning opportunities that enable all pupils to make good progress by adapting the teaching of mathematics to suit the needs of all pupils. We strive hard to meet the needs and will use appropriate assessment to set ambitious targets and plan challenging work for all groups, including:

- More-able pupils
- Pupils with low prior attainment
- Pupils from disadvantaged backgrounds

- Pupils with special educational needs (SEN)
- Pupils with English as an additional language (EAL)

Teachers carefully consider these adaptations as shown below:

Cognition and Learning	
Barriers	**Provision**
Information may not be understood or retained Accessing and understanding multi-step problems Memory-consolidation skills	➢ Retrieval practice to support through mental oral starters. ➢ Explicit link and reactivation of prior learning as 'way in' to new learning. ➢ Pre-teach new concepts and key knowledge. Use the working walls and whiteboard to show the focus of each lesson. How do lessons link together to develop knowledge? ➢ Use symbols, images or objects to make it more accessible. ➢ Referring to working/enquiry wall. ➢ Use of concrete, pictorial and abstract learning. ➢ Adapt pace of delivery to processing speeds. ➢ Mixed-ability pairings to support discussion where identified. ➢ Worked examples used to support and remind pupils. ➢ Encourage the use of mind maps/pictures/flow charts. ➢ Opportunities to apply maths skills and knowledge in other areas of the curriculum.
Communication and Interaction	
Barriers	**Provision**
Understanding mathematical language Understanding mathematical concepts Understanding abstract concepts Processing multistep problems	➢ Recognise that the language of maths may be challenging for many children – for example: The specific scientific use of everyday words such as 'square', or terms specific to maths, such as 'fraction'. ➢ Pre-teach key vocabulary, then ensure multiple and regular exposure to these words and make them clearly visual in the classroom environment. ➢ Label equipment with a symbol and word (dual coding) ➢ Explicitly teach the meaning of key mathematical vocabulary in lessons. ➢ Provide flashcards with key vocabulary – with visual cues. ➢ Check children's understanding by inviting them to reformulate reasoning in their own words or in other ways. For example, after articulating 3x5=15, reference to repeated addition, use of number line etc ➢ Use real objects as a starting point for developing the concepts and the language needed to describe, discuss and explain what pupils have observed or experienced. ➢ Give children time to process and formulate their answers to questions before responding. ➢ Use of manipulatives. ➢ Use of worked examples and sharing these with pupils as a frame. ➢ Provision of x-table squares to support pupils in conducting calculations. ➢ Chunking up word problems and supporting pupils to identify steps in multi-step problems.
Physical and Sensory	
Barriers	**Provision**
Difficulties impacting eyesight, hearing, movement, touch etc.	➢ Label new equipment and processes to help develop vocabulary. ➢ Use of concrete manipulatives to support e.g Numicon. ➢ Use of dual coding (symbols and words). ➢ Choice and size of font. ➢ Consider ventilation and positioning of children for anything that may have an odour.

Sensory processing difficulties.	➢ Pre-teach showing/experiencing anything that may have sensory implications. ➢ Ask for specialist advice on equipment for children with particular SEND e.g. tactile ridges on measuring glassware for children with a visual impairment. ➢ Consider children hard of hearing when reading aloud, sit them in front of you so they can see your face. ➢ Use of sensory aids as part of usual provision e.g. gloves, audio/visual support. ➢ Consider pupil sensory audits and adaptations. ➢ Use of technology including iPads and laptops. ➢ Use of concentration aids. ➢ Finger-strengthening exercises and busy fingers tasks
Social, Emotional and Mental Health	
Barriers	**Provision**
Anxiety Participation/ safety/ practical work	➢ Consider carefully the groupings – prepare the children by ensuring they are aware of the group they will be working in. Assign roles to each member of the group with a clear outline of job roles. ➢ You may need to specifically teach the skills of cooperation and interaction for practical work. ➢ Controlled choices. ➢ Clear expectations. ➢ Use of adult scribe, my turn your turn, paired work ➢ Deliver task in short achievable bursts rather than all at once such as cutting-up question sheets. ➢ Use of whiteboards/ paper for working – pupils may be anxious about committing errors to paper. ➢ Opportunities to develop social skills including being taught these discretely to support engagement in group work and collaborative learning. ➢ Use of PSHE to discuss healthy relationships, promote

Further information can be found in our statement of equality information and objectives, and in our SEN policy and information report.

9. Health and Safety

Children at St. Paul's are taught how to use equipment/resources safely and with respect. They are taught how to use materials economically and to clean up after themselves with regard to the needs of other people.

10. Links to other policies

This subject policy links to the following policies and procedures:

- Curriculum policy
- Assessment policy
- Marking policy
- SEN policy

11. Monitoring and review

This policy will be reviewed by staff and governors annually.

Appendices

Appendix 1

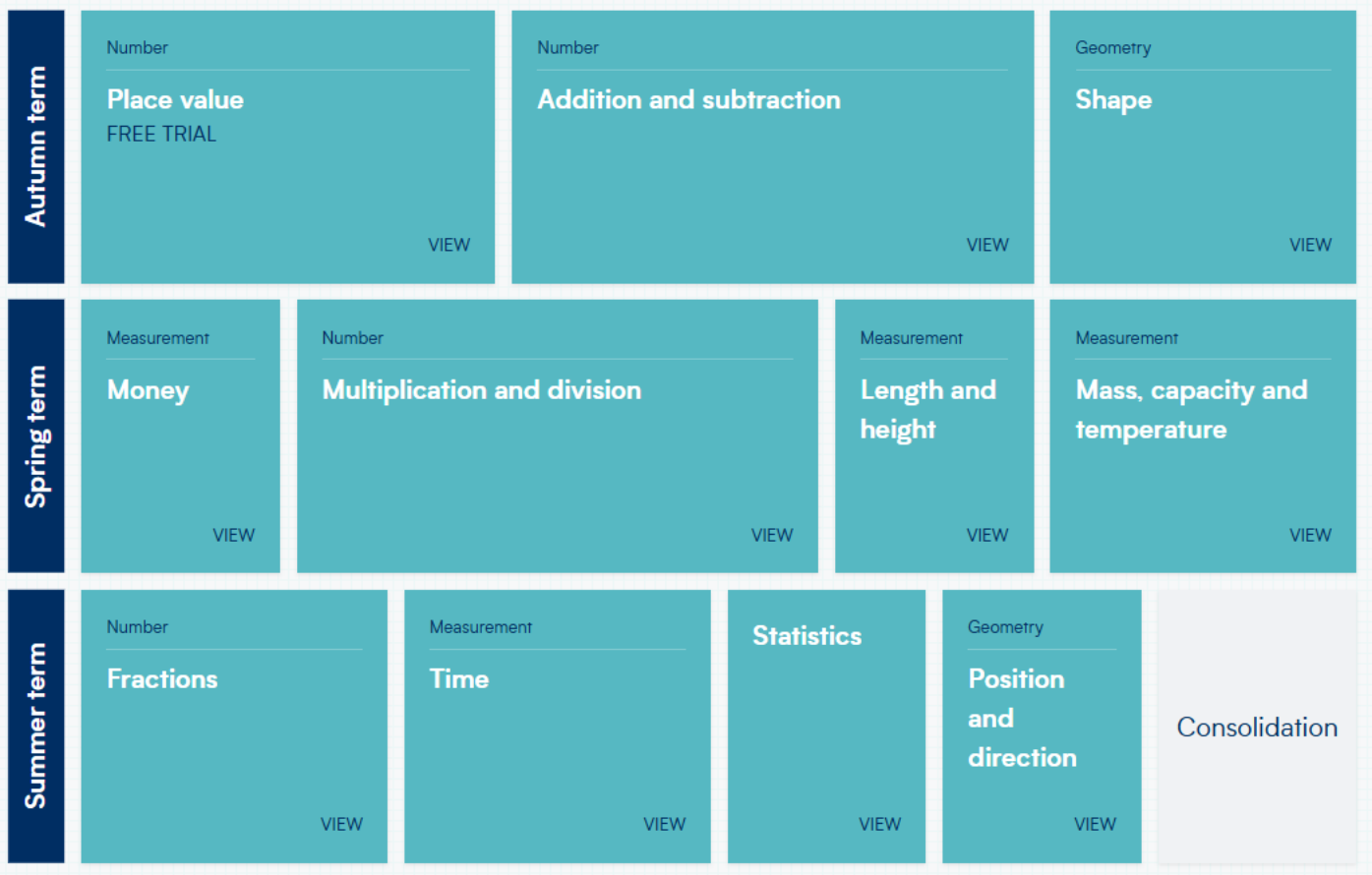
At St. Paul's, we use the White Rose Maths overviews to show when topics are taught across the terms in each year group. We also use their scheme to break the year group objectives into smaller steps that are more manageable for the children to master. These small steps progress through a topic in a logical way, but we do not follow the time scales on White Rose in order for teachers to adapt lessons to suit their children's needs. This allows teachers to spend more time or less time on certain objectives when required.

Nursery

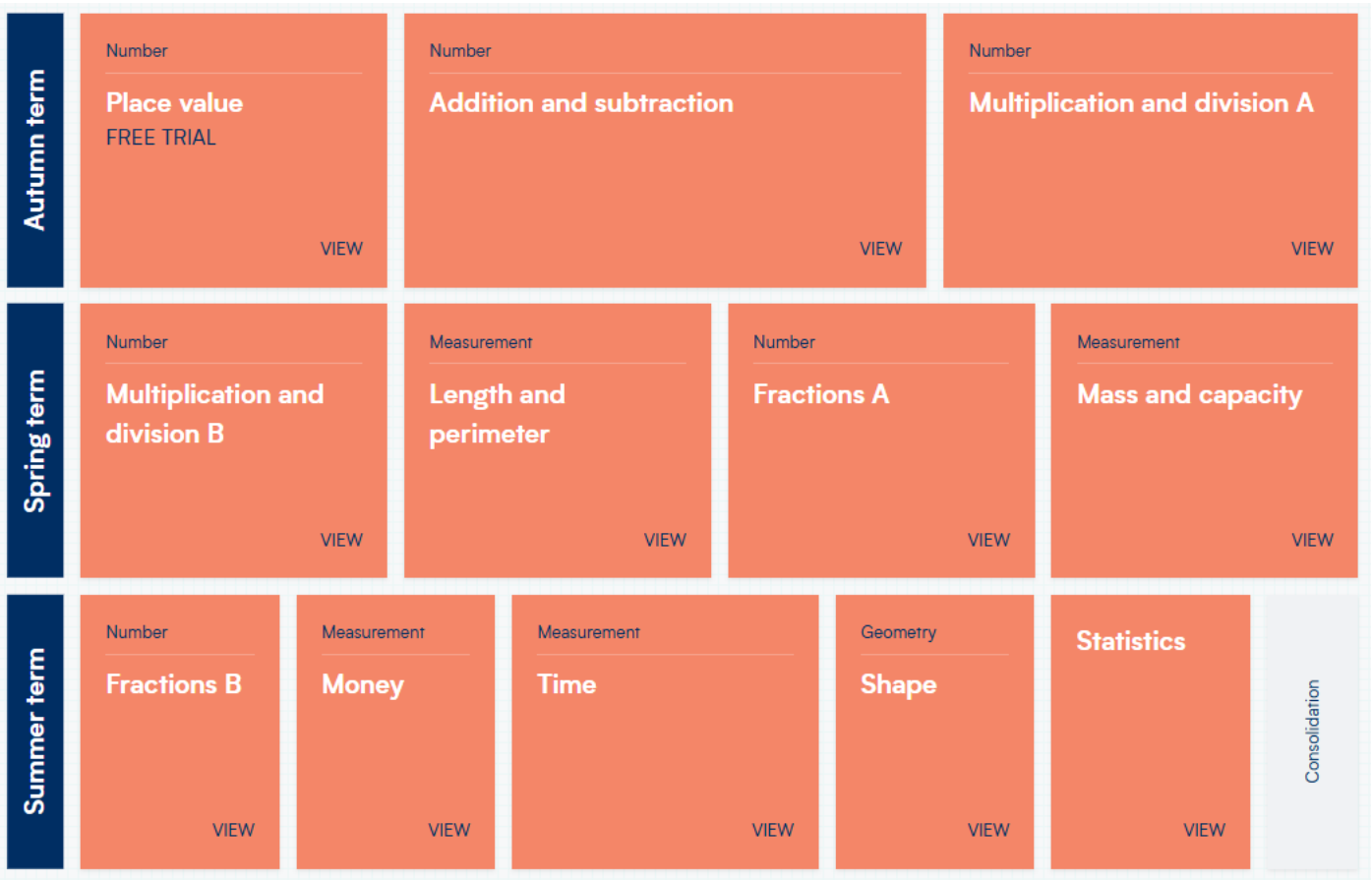
Reception

Year 1

Year 2


Autumn term
Number
Place value
FREE TRIAL
VIEW
Number
Addition and subtraction
VIEW
Geometry
Shape
VIEW
Spring term
Measurement
Money
VIEW
Number
Multiplication and division
VIEW
Measurement
Length and height
VIEW
Measurement
Mass, capacity and temperature
VIEW
Summer term
Number
Fractions
VIEW
Measurement
Time
VIEW
Statistics
VIEW
Geometry
Position and direction
VIEW
Consolidation

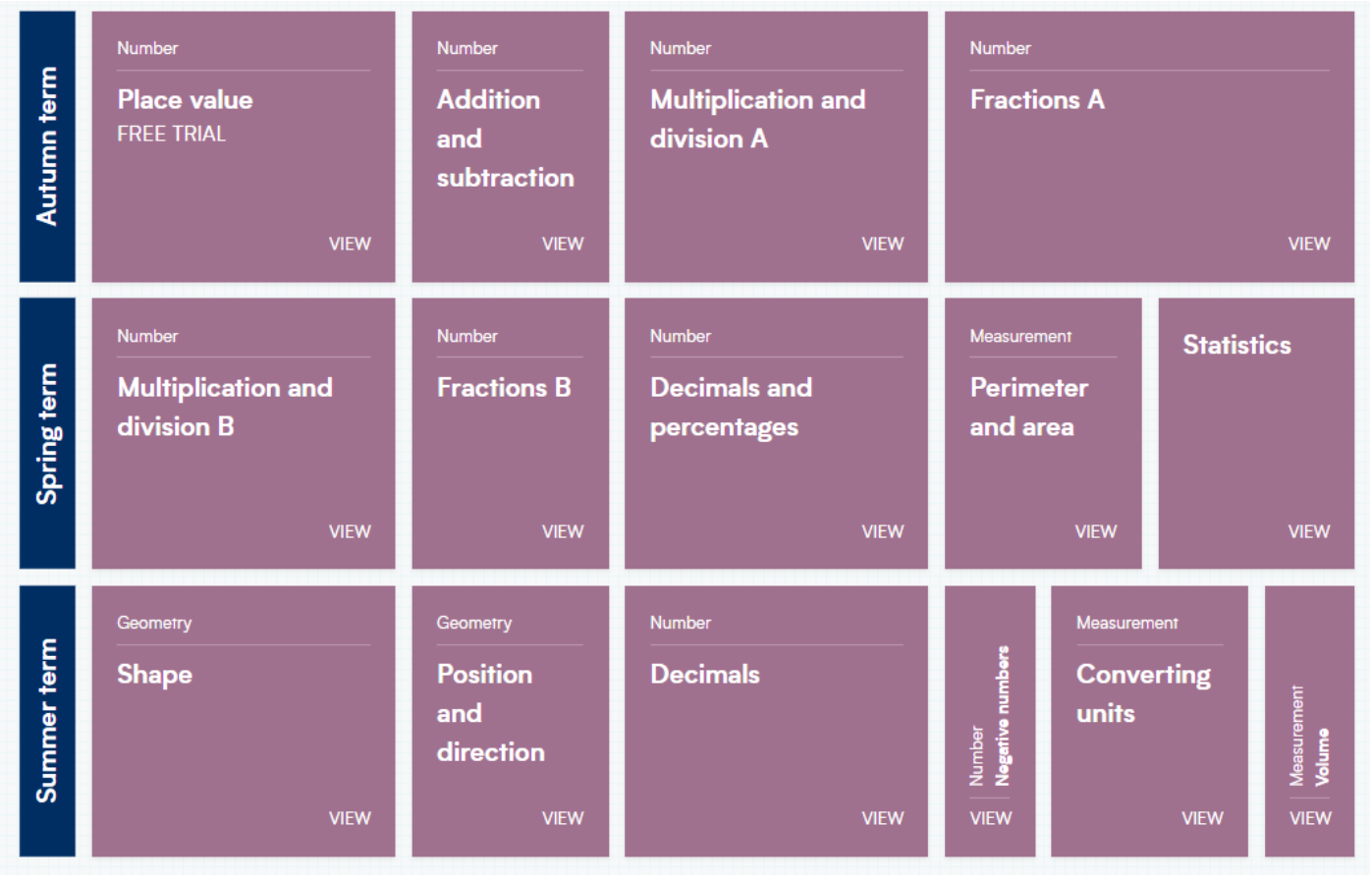
Year 3


Autumn term
Number
Place value
FREE TRIAL
VIEW
Number
Addition and subtraction
VIEW
Number
Multiplication and division A
VIEW
Spring term
Number
Multiplication and division B
VIEW
Measurement
Length and perimeter
VIEW
Number
Fractions A
VIEW
Measurement
Mass and capacity
VIEW
Summer term
Number
Fractions B
VIEW
Measurement
Money
VIEW
Measurement
Time
VIEW
Geometry
Shape
VIEW
Statistics
VIEW
Consolidation

Year 4


Autumn term
Number
Place value
FREE TRIAL
VIEW
Number
Addition and subtraction
VIEW
Measurement
Area
VIEW
Number
Multiplication and division A
VIEW
Consolidation
Spring term
Number
Multiplication and division B
VIEW
Measurement
Length and perimeter
VIEW
Number
Fractions
VIEW
Number
Decimals A
VIEW
Summer term
Number
Decimals B
VIEW
Measurement
Money
VIEW
Measurement
Time
VIEW
Consolidation
Geometry
Shape
VIEW
Statistics
VIEW
Geometry
Position and direction
VIEW

Year 5


Autumn term
Number
Place value
FREE TRIAL
VIEW
Number
Addition and subtraction
VIEW
Number
Multiplication and division A
VIEW
Number
Fractions A
VIEW
Spring term
Number
Multiplication and division B
VIEW
Number
Fractions B
VIEW
Number
Decimals and percentages
VIEW
Measurement
Perimeter and area
VIEW
Statistics
VIEW
Summer term
Geometry
Shape
VIEW
Geometry
Position and direction
VIEW
Number
Decimals
VIEW
Number
Negative numbers
VIEW
Measurement
Converting units
VIEW
Measurement
Volume
VIEW

Year 6

Appendix 2

The Structure of a Maths Lesson

EYFS

Children in Nursery have a short daily maths teaching session, during which time they begin to develop their understanding of simple maths concepts. These are informed by the Development Matters Framework. Teaching and learning might include

- Identifying different amounts of up to three objects so that children are able to recognise amounts without counting them (subitising)
- Activities which expose the composition and cardinality of numbers to five.
- Manipulating shapes and talking about 2D and 3D shapes, using mathematical and informal language.
- Investigating, describing and creating sequences and repeating patterns with different colours and objects.
- Make comparisons between objects relating to size, weight, measure and length.

Children are taught these concepts during daily Maths sessions, using physical resources, pictorial resources, songs, games and role-play. Focus activities are also evidenced in the children's Busy Books.

In Reception, children have a three-part lesson from Autumn 1. This consists of:

1. A song or book to introduce maths session-5 minutes
2. Whole class oral and mental starter - 5 minutes
3. Whole class main teaching - 10 minutes

Throughout the week a child will work with an adult - either a teacher or a supporting adult - on a differentiated task. This activity is completed in 10 - 15 minutes.

This structure to the lesson enables teachers to secure a good balance between whole class work, group teaching and individual practice. It also enables teachers to establish regular routines therefore maximising teaching time. It supports assessment on a daily basis, as well as individual feedback to children, ensuring that children receive

immediate intervention as required during fix-it time in continuous provision. In both Nursery and Reception, the independent activities in the continuous provision link to the focus for the week. For example, if the focus for the week is addition, then the maths challenges/enhancements will often link to this. In addition to these planned independent activities, children also have the opportunity to self-select maths resources to consolidate their learning during child-initiated activities. We recognise the importance of play-based learning and therefore encourage children to develop their understanding during their play. Such opportunities are provided in both the inside and outside environment.

NCETM's 'Mastering Number' programme is also followed. This focusses on the key concepts that underpin children's understanding of number and number fluency. Regular observations and assessments help to ensure that children that need additional intervention to consolidate their mathematical understanding are identified and supported by appropriate interventions.

Years 1 – 6

Starter (1 of the following activities)

- 4-6 arithmetic questions based on prior learning
- Number fluency questions
- Recap of prior knowledge which will be needed in the current lesson

Input

- Teach new learning using CPA approach where appropriate.
- Provide children with fluency questions to practice on whiteboards. Adults to assess who requires support.
- Complete a character reasoning question together based on a misconception. Model using stem sentence.

Independent/group work activity

- Children then practice their new learning in books starting with fluency questions.
- Children who are struggling may work in a guided group with an adult, may have an adapted resource or may have additional resources (concrete/pictorial) to support them.
- Once fluency questions have been completed, children then complete a character misconception question using the practiced stem sentence.
- Children are then given red, yellow and green challenge questions based on reasoning and problem-solving questions.

Appendix 3

Resources

In order to plan lessons which are adapted to suit our children's needs, we use the following resources to find suitable questions:

- White Rose Maths
- Testbase
- Twinkl Diving into Mastery
- Third Space Learning
- Classroom Secrets