2022 - 2023

Success in Maths

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St. Cuthbert's
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Subject audit

Successful learners

Date	Jan 2021	April 2022	
Quality of Education			
Intent			
Does your subject reflect a coherent rationale for the school's broad and balanced curriculum?	G		
Is there a carefully sequenced progression of Maths knowledge/concepts/skills to end of KS1/2	G		
Does your unique Mathematics curriculum meet your pupils' needs & meet N.C standards?	G		
Curriculum coverage allows all pupils to access content & make progress	G		
Clear identified targets are shown through the Curriculum Development plan	G		
Implementation			
Teachers can explain what children learn/why it's important in your subject's curriculum	A		
Subject leader's review / quality assure LTP and Unit Plans and check against in book looks to ensure implantation of intent	A		
Teachers understand what the depth of knowledge expected is at the end of every unit / year through knowledge organisers/progression ladders	A		
Subject leaders show knowledge and expertise to design, support and deliver the curriculum through the development of knowledge organisers and support given to teachers	G		
Book looks, working walls, pupil voice and school trips, show that your subjects' curriculum is implemented fully	G		
Teachers organize and sequence learning appropriately – shown in unit plans and LTPs	G		
There are opportunities for CPD support to upskill teachers in knowledge and skills for your subject	A		
Subject leaders, teachers and pupils are clear on how units are assessed and how progress is shown	A		
Differentiation is appropriate to enhance all pupils' capacity to access the full curriculum	G		
Use of the locality are maximized to provide firsthand experience within your subject.	N/A		
Pupils use appropriate resources for your subject to build knowledge and skills	G		
Clear understanding of what progression looks like in and across each year group – progression of vocabulary is explicit	G		
Opportunities for all staff to moderate/ share / feedback on work	A		
Impact			
Pupils have embedded and retained fluent knowledge and skills in your subject's knowledge, skills and vocabulary (in and across years)	A		
Children have progressed in different strands of your subject and this is clear from book look and pupil voice	G		
Subject Portfolio shows children voice, learning and progress through examples of work, images etc	G		

Behaviours and Attitudes		
Pupil voice shows learners are positive towards your subject	G	
All groups are committed to learning, know how to learn and take pride in the work for your subject	G	
Personal Development		
Builds knowledge, skills and critical thinking that helps prepare for next stage	G	
Provides opportunities to help learners discover wider interests	G	
Supports learners to develop their character through a Growth Mindset	G	
Prepares learners to be responsible and active citizens	G	
Supports the development of an understanding of British values and appreciate commonality and diversity	G	
Leadership and Management		
Subject leader is effective and has an ambitious vision to provide a high quality and inclusive subject curriculum	G	
Subject leader provides opportunities and focus on improving staff subject and content knowledge	G	
Practice and knowledge of staff is building overtime	G	
Assessment is used appropriately to help support all pupils to make progress and achieve	A	
Subject leader plans opportunities for work to be showcased and celebrated in whole school exhibitions with parents and the wider community	G	

Why is Mathematics important at our school?

Intent

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

At the Federation of St Cuthbert's and St Mary's we follow the National Curriculum combined with White Rose Mastery programme to plan, deliver and teach Mathematics. We truly believe that every aspect of day-to-day life involves maths in one context or another. Whether that be paying for your shopping in a local supermarket, reading a bus timetable or baking a cake with your family. At the Federation of St Cuthbert's and St Mary's, we enable children to understand what numbers are, how they came to be and how we manipulate them in order to be successful at these everyday tasks.

However, not only do we 'teach the maths', we teach the application, conceptual understanding, links and reasoning behind the numbers, shapes and statistics. This means our learners become curious, seek patterns, hypothesise, prove or disprove and are confident and able to justify. So not only are they successful at maths, they thrive within maths and all its possible applications.

Purpose of study

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

Aims

- 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 nonroutine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Maths Rationale

At our school, we aim to inspire all children to reach their full academic potential. In mathematics, this means ensuring we have a curriculum that is fully inclusive for all children which:

- Develops children's fluency, reasoning and problem-solving skills – all of which are inextricably linked.
- Develops children's knowledge and understanding of mathematical concepts whilst enabling them to practice and hone skills and methods.
- Enables them to think critically and communicate their understanding to others.
- Gives them opportunities to apply learned mathematical skills, in different contexts, across the curriculum.
- Provides opportunities to develop problem solving skills useful for maths and in other areas of the curriculum.

As a result of their learning in mathematics and across the curriculum children will:

- Be prepared for applying their skills effectively in everyday life situations, in their future learning and in the work place.
- Have the building blocks in place to provide a solid foundation to lead onto secondary, further and higher education.

Through teaching which uses the Mastery approach, children will learn to understand, distil and clarify information, consider what they know that will help them to reason and solve problems (closed and open), realising what they need to know next, create systems and strategies, organizing information in a way that helps find patterns and ultimately solutions and to communicate and present their findings effectively. Our school facilitates this approach by following the Singapore maths approach which allows the children to think more deeply about Key Mathematical concepts and to explore and represent them in different ways.

Using the core content from the National Curriculum Programmes of Study (2014), we aim to provide children with a deeper knowledge and understanding of mathematical procedures and related concepts. Our school has identified the key learning for each year group/age range and are supporting teachers to plan their work effectively to ensure our children reach the expected standards. Learning sequences are developmental and, depending on the concept, a good proportion of time will be spent securing key learning. Although we follow the Whiterose maths scheme, Teachers are encouraged to use their judgement about when it is the right time to move on and to organise the sequence of maths 'blocks' in a way that is purposeful and related to the wider curriculum. As we secure this approach, it is envisaged that a large majority of pupils will progress through the curriculum content at broadly the same pace. This will be closely monitored to identify any issues.

Principles

Planning

- Planning begins from a thorough understanding of children's needs gleaned through effective and rigorous formative assessment and tracking, combined with high expectations and ambition for all children to achieve.
- Medium term planning will outline the areas of mathematics that will be taught during the term to ensure coverage of the National Curriculum. (we will use the White Rose Hub materials and the DFE Exemplification guidance and any relevant LA documentation and advice to help our planning)
- Our weekly plans follow the Whiterose small steps sequences. The sequencing of each day's lessons is based on prior learning and include the steps needed to reach and exceed the age related objective. This will enable the class teacher to follow a clear and systematic teaching sequence, where children, on the whole, progress together.
- In the EYFS, short term maths planning is completed on a weekly and daily basis – informed by observation and assessment of pupils' needs/interests. These are then collated into a 'Possible Lines of Development' grid, to inform the next steps in planning and teaching to 'close the gaps'.
- If some individual children are working significantly below the majority of the class, and the learning objectives seem inappropriate, objectives from lower age-groups will be planned and taught.
- Planning, where possible, should involve real life contexts for maths, where children are reasoning and problem solving with a purpose in mind. New blocks begin with the teacher contextualising the maths on discussion days.
- Class teachers should regularly plan for opportunities for children to apply their maths skills to different problems within maths lessons and across the curriculum. This will also allow children to revisit, practise and consolidate different maths skills and apply them in different contexts. Maths across the curriculum is planned for and monitored through the formulation and review of the Curriculum Development PLan (CDP).

Teaching

- In the EYFS, children are given the opportunity to develop their understanding of number, shape, space and measure through a combination of child initiated, adult led and supported experiences consisting of small group and whole class teaching. This is in addition to a range of planned structured play situations, both independent, and supported by teachers as play partners, where there is plenty of scope for exploration. Not a moment is wasted throughout the day, as maths is emphasised in all aspects of the daily routine eg snack-time /lining up etc. Maths through real-life and meaningful experiences, using practical hands-on resources is key here. Numicon and other equipment such as counters and unifix is used to support teaching and learning across EYFS and into KS1. Using Numicon ensures that children develop a common imagery of the number system, which is then used in the various modelling techniques that teachers use. The range of equipment allows children the chance to represent numbers in a range of ways and in different contexts which supports the mastery approach. After initial assessment in the Early Years, areas of need are identified and maths interventions take place throughout the teaching week. This may be during focussed partner time, or through organised small group interventions.
- All children will need to become very competent 'counters' so that their fluency with the number system provides a foundation for mathematical understanding. Counting forwards and backwards in many different sized steps as well as from different starting and ending points is essential.

- Maths learning builds from a concrete understanding of concepts where children are manipulating objects. When children are able to see concepts this way, they then need to understand the same concepts represented pictorially. Children are then ready for abstract representation before being able to apply their knowledge to different situations.
- The maths boxes in each class provide the children with the opportunity to independently select the equipment that they think will help them solve a given problem.
- Children should be encouraged at all times to communicate their understanding of maths so that it clarifies their thoughts and opportunities for written and verbal reasoning are habitually built into each lesson through our collaborative approaches to learning and our embedded AfL strategies.
- Children's arithmetic is of great importance, with number bonds, times tables facts and various strategies for calculation taught and practised during discretely taught arithmetic sessions each week.
- A progression towards efficient written calculations should be developed and applied consistently in each year-group. The school Calculation Policy should be followed.
- When teaching reasoning and problem solving skills across the curriculum , time (and sometimes whole lessons) should be given to each aspect of problem solving ensuring children receive thorough practice at: 'preparing for problem solving', 'thinking through problems to establish what they know and don't know so far', actually 'doing the problem solving' effectively and 'communicating the answer effectively'. They should evaluate the process too. Over time, children will improve in each aspect of the process.
- SEND children should be personally catered for in relation to their needs and where possible they will access the same curriculum and expectations as the other children.

Assessment

- Assessment for learning should occur throughout the entire maths lesson, enabling teachers/teaching assistants to adapt their teaching/input to meet the children's needs. This feedback should be incisive and regular. Teacher led mini-plenaries help in this process.
- In the Early Years, assessment for learning is an on-going process throughout the day. This takes place in routine daily activities, such as lining-up, during snack-time, as well as in discrete learning sessions. This is used to inform ongoing planning and teaching.
- On a daily basis children should self-assess against the learning objectives and WALTs, giving them a sense of achievement. Children should know when they are making progress through a range of peer, self and teacher feedback strategies.
- Pupils' work should be marked in line with the School Marking Policy. Teachers should model how corrections should be made, giving children a chance to learn from their misconceptions or incorrect methods. A green pen will be used to show improvements.
- Future lesson design should depend on class success, this having been evaluated through marking and observations/assessments made during the lesson.
- Assessment of pupils' work and progress is always ongoing by the class teacher and must inform future planning. Teachers mark work in mathematics in line with the school marking policy. Teachers use the new NC Year group POS expectations and this allows teachers to level children's progress in mathematics by gathering evidence over the course of each half term. This builds over the course of the academic year to provide a full picture of where each child is 'at'. Teachers use this information to inform planning for groups and individual pupils.
- Summative assessments are made at least once per half term in order to provide further understanding of the level a child is working at and to ensure teachers have a more rounded judgement of each pupils' abilities. We use end of block assessments from Whiterose and end of term assessments to track progress and attainment. Regular Pupil progress meetings ensure

that children who are not making expected progress are focused on and necessary interventions are put in place to support their progress.

- In the Early Years, individual pupils are tracked and assessed on an ongoing basis. The results from this are collated every half-term and are used to inform planning and 'next steps' learning to enable learning to be progressed and gaps closed.
- Y6 will use previous KS2 SATS questions, in addition to new fluency, reasoning and problem solving materials to help prepare pupils for their end of key stage tests.

Display

- In classrooms, there should be a clear maths display which helps children to develop their fluency, reasoning and problem solving skills.
- Mathematical vocabulary may also be displayed so that children use this in the communication of their understanding of concepts to other pupils.

Monitoring

Monitoring of children's progress begins with Pupil Progress meetings but continues with the Numeracy coordinator evaluating further evidence to ensure children are making progress through the monitoring calendar. This monitoring happens through book scrutinies, pupil voice, analysis of assessment results and other assessments used, lesson walks and lesson observations.
Following monitoring activities feedback is given to staff about how they can strengthen their practice. CPD opportunities are built in where it would be deemed valuable. These might take the shape of inputs during staff meetings or by a variety of other means e.g. LEA run INSET courses or other recognised training provider courses.
Where specific initiatives have been put in place through action planning for school development, these are monitored by the subject leader in order to evaluate their impact. Findings are reported to the Curriculum coordinator and Headteacher in the Curriculum Development Plan and in the Maths action plan which is monitored and RAG rated to demonstrate progress towards objectives.
The success of interventions is also monitored by the SEN co-ordinator and helps to inform the future planning of SEN intervention work.

Parents and Homework

At our school, we recognise that parents make a significant difference to children's progress in Maths and we encourage this vital partnership. Homework in maths should be set 'little and often' linked to the work that is being covered in class that day/week rather than as a large block to be done over the weekend. Tables work, number bond work, revision of agreed written strategies etc. should be revisited regularly – but particularly when maths work **not requiring these skills** is being taught e.g. some shape and space work etc. Reasoning and problem solving work should be set as this gives parents concrete examples of the type of work that children are covering in lessons. Apps such as MyMaths and TimesTables Rockstars are used to engage children to encourage them to access their maths practice and consolidation activities independently.

Summary

What a visitor might typically see in maths lessons in our school

- Whole class direct teaching with clear and progressive modelling of concepts and procedures with sequences of varied examples.
- The use of concrete representations to help support understanding e.g. use of Numicon, counters etc...
- Rehearsal of core facts and strategies through frequent revisiting.
- Real contexts to be used to support/develop learning/key concepts
- Emphasis being placed on 'learning' through reasoning / problem solving.
- Pupils 'grappling' with learning mathematical concepts – 'sticking at it'/resilience building/Growth mindset.
- Misconceptions being addressed quickly.
- Use of good questioning techniques.
- Use of Active Learning strategies.
- Maths games to develop concepts/motivate pupils. (including Computer Games/online apps.)
- Challenge for pupils grasping concepts quickly is provided through depth and breadth of experiences – not new content.
- A few areas of learning returned to if the key learning objectives haven't been met.
- Teachers that have high expectations of all pupils, not just the select few.
- Scaffolding and support for the children who are not achieving at age related expectation
- Teachers and TA's constantly referring to WALTs and Success Criteria.
- Some 'More Able' pupils supporting 'Less able' pupils.
- 'More able' pupils setting their own questions.
- A variety of 'Closed' and 'Open' tasks. (see NRICH website or the NCETM website).

What are the key knowledge concepts in mathematics at St Mary's?

Conceptual understanding	**Reasoning**	**Problem solving**	**Fluency**
Represent ideas in many different ways. Use objects and pictures to represent abstract concepts Fluency Increasingly complexed problem solving Recall knowledge Display knowledge	Polygons Number Multiplication Division Addition Subtraction Analyse Relationships between	Applying knowledge Routine problems Non routine problems Using simple steps Complex problems Number problems One step Two step Multi step Concrete objects Pictorial Abstract Multiplication Division Addition Subtraction Shapes Objects Quantities Place value Number steps Missing numbers Integers	Number bonds Times tables Multiplication Division Addition Subtraction Make connections Counting Place Value Problem solving Partitioning Fractions Decimals

What are the key mathematics subject discipline skills?

- Becoming 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.

- Reasoning mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language

- Solving 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.

- Children are able to move fluently between representations of mathematical ideas.

- Children can make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.

- Children can apply their mathematical knowledge to science and other subjects.

How does St Mary's ensure progression in our key knowledge and concepts in mathematics?

- White Rose schemes of learning are designed to support a mastery approach to teaching and learning, as well as to support the aims and objectives of the National Curriculum.

- A Mastery approach ensures children develop the following skills
- Mathematical language
- Mathematical Thinking
- Multiple Representations
- Problem Solving
- Deeper Thinking

- Each day, Maths starters take place in every class for 10 to 15mins in order to consolidate key areas of mathematics or introduce new topics in your class
- Cover sheets are to be stuck in at the beginning of each topic. These inform the children of the skills they will learn throughout the unit and ensure that teachers have covered all objectives by the end of the year. The children then revisit this document at the end of the unit and have the opportunity to RAG the objectives, showing how confident they feel at applying these skills. They discuss what they have learnt and what they used to support them.

- On the first day of the new topic we have a discussion day. This is where the teacher links the new learning to real life, putting the children's learning into context. This is done through picture cues and then the children discuss why they would need to use this particular skill in day-to-day life. This gives meaning behind the learning and helps engage the children as they feel it is purposeful and will help them in the future.

- Adaptive teaching ensures that it meets the needs of all learners whilst using our RAG system (red being the most challenging activity). This allows the children to progress throughout the lesson and move to the more difficult challenge. It also supports children who are finding this particular challenge difficult as they can start on the green challenge. Children record which activity they completed by writing 'RAG' underneath their WALT and circling the activity they chose. The children are then given the opportunity to 'traffic light' their walt, showing the teacher how they found todays learning.

- Throughout each lesson in every year group, the children have access to these maths baskets. These include a range of resources to support all learners during each lesson. Children access these independently throughout the session.

- Testbase is used regularly throughout each unit. These activities are colour coded (red = wt, Green = Exp, Purple = GD). These are used to assess the children's application of previously taught skills during or at the end of a unit. It is sometimes used to access prior knowledge and children's starting points in order to inform future planning.

- Skills are then transferred to other curriculum areas such as Topic and Science. This gives children the opportunity to independently apply previously taught skills to a different context, deepening their understanding.

- Times Tables Rock Stars – children use either paper form or go online, Times Tables Rock Stars has a carefully sequenced programme of daily times tables which our children practice

- Each week, teachers set Maths homework on our online system 'MyMaths'. This might be used to help consolidate previous learning or introduce new learning to the children. There is an online lesson to support each objective and the teacher can access a report stating how each child has done and objectives they need further support on.

How do we know our children have made progress?

End points Foundation Stage

Children can

- count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.
- use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems, including doubling, halving and sharing.
- Recognise, create and describe patterns and explore characteristics of everyday objects and shapes and use mathematical language to describe them.
- use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects to solve problems.

End point Year 1

Children can

- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number
- count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens
- given a number, identify one more and one less
- identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least
- read and write numbers from 1 to 20 in numerals and words
- read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- Using quantities and objects, they can add and subtract two single-digit numbers and count on and back to find an answer
- add and subtract one-digit and two-digit numbers to 20, including zero

- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ____ – 9.
- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.
- count in multiples of twos, fives and tens
- recognise, find and name a half as one of two equal parts of an object, shape or quantity
- recognise, find and name a quarter as one of four equal parts of an object, shape or quantity
- compare, describe and solve practical problems for:
- lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]
- mass/weight [for example, heavy/light, heavier than, lighter than]
- capacity and volume [for example, full/empty, more than, less than, half, half full, quarter]
- time [for example, quicker, slower, earlier, later] measure and begin to record the following:
- lengths and heights
- mass/weight
- capacity and volume
- time (hours, minutes, seconds)
- recognise and know the value of different denominations of coins and notes
- sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]
- measure and begin to record the following:
- **lengths and heights**
- **mass/weight**
- **capacity and volume**
- **time** (hours, minutes, seconds**)**
- recognise and use language relating to dates, including days of the week, weeks, months and years
- tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.
- recognise and know the value of different denominations of **coins and notes**
- explore characteristics of everyday objects and shapes and use mathematical language to describe them.
- recognise and name common 2-D and 3-D shapes, including:
- 2-D shapes [for example, rectangles (including squares), circles and triangles] 3-D shapes [for example, cuboids (including cubes),

pyramids and spheres].

- describe position, direction and movement, including whole, half, quarter and three-quarter turns.

End point Year 2

Children can

count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward

recognise the place value of each digit in a two-digit number (tens, ones)

identify, represent and estimate numbers using different representations, including the number line

compare and order numbers from 0 up to 100; use and = signs read and write numbers to at least 100 in numerals and in words use place value and number facts to solve problems.

solve problems with addition and subtraction:

using concrete objects and pictorial representations, including those involving numbers, quantities and measures

applying their increasing knowledge of mental and written methods

recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100

add and subtract numbers using concrete objects, pictorial representations, and mentally, including:

a two-digit number and ones

a two-digit number and tens

two two-digit numbers

adding three one-digit numbers

show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot

recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

- solve problems with addition and subtraction:
  using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- applying their increasing knowledge of mental and written methods
- count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward
- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot

- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.
- Pupils should count in fractions up to 10, starting from any number and using the1/2 and 2/4 equivalence on the number line
- recognise, find, name and write fractions 3 1 , 4 1 , 4 2 and 4 3 of a length, shape, set of objects or quantity
- write simple fractions for example, 2 1 of 6 = 3 and recognise the equivalence of 4 2 and 2 1
- choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels
- compare and order lengths, mass, volume/capacity and record the results using >, < and =
- recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value
- find different combinations of coins that equal the same amounts of money
- solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change
- compare and sequence intervals of time
- tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times
- know the number of minutes in an hour and the number of hours in a day.
- identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line
- identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces
- identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]
- compare and sort common 2-D and 3-D shapes and everyday objects.
- order and arrange combinations of mathematical objects in patterns and sequences
- use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise).
- interpret and construct simple pictograms, tally charts, block diagrams and simple tables
- ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity
- ask and answer questions about totalling and comparing categorical data.
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and **missing number** problems.
- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100

End Point Year 3

Children can

- count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
- count from 0 in multiples of 4, 8, 50 and 100
- find 10 or 100 more or less than a given number
- recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
- compare and order numbers up to 1000
- identify, represent and estimate numbers using different representations
- read and write numbers up to 1000 in numerals and in words solve number problems and practical problems involving these ideas
  add and subtract numbers mentally, including:
  - a three-digit number and ones
  - a three-digit number and tens
  - a three-digit number and hundreds
- add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.
- count from 0 in multiples of 4, 8, 50 and 100
- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- estimate the answer to a calculation and use inverse operations to check answers

- numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.
- count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
- recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators

- recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators
- recognise and show, using diagrams, equivalent fractions with small denominators
- add and subtract fractions with the same denominator within one whole (e.g. $^{5}/_{7} + {}^{1}/_{7} = {}^{6}/_{7}$)
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above.
- measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)
- measure the perimeter of simple 2-D shapes
- add and subtract amounts of money to give change, using both £ and p in practical contexts
- compare durations of events, for example to calculate the time taken by particular events or tasks
- tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks
- estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight
- know the number of seconds in a minute and the number of days in each month, year and leap year
- draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them
- recognise angles as a property of shape or a description of a turn
- identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle
- identify horizontal and vertical lines and pairs of perpendicular and parallel lines.
- interpret and present data using bar charts, pictograms and tables
- solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.
- solve problems, including **missing number** problems, using number facts, place value, and more complex addition and subtraction.
- solve problems, including **missing number** problems, involving multiplication and division, including integer scaling

End points Year 4

Children can

- count in multiples of 6, 7, 9, 25 and 1000
- find 1000 more or less than a given number
- count backwards through zero to include negative numbers

- recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)
- order and compare numbers beyond 1000
- compare numbers with the same number of decimal places up to two decimal places
- identify, represent and estimate numbers using different representations
- round any number to the nearest 10, 100 or 1000
- solve number and practical problems that involve all of the above and with increasingly large positive numbers
- read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.
- recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)
- find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as units, tenths and hundredths
- add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.
- count in multiples of 6, 7, 9, 25 and 1 000
- recall multiplication and division facts for multiplication tables up to 12 × 12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- estimate and use inverse operations to check answers to a calculation
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.
- recognise and show, using diagrams, families of common equivalent fractions
- count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.
- solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number

- add and subtract fractions with the same denominator
- recognise and write decimal equivalents of any number of tenths or hundredths

- recognise and write decimal equivalents to $^{1}/_{4}$; $^{1}/_{2}$; $^{3}/_{4}$
- find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
- round any number to the nearest 10, 100 or 1 000
- round decimals with one decimal place to the nearest whole number
- compare numbers with the same number of decimal places up to two decimal places
- solve simple measure and money problems involving fractions and decimals to two decimal places.
- Pupils should be taught to:
- Convert between different units of measure [for example, kilometre to metre; hour to minute]
- measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres
- find the area of rectilinear shapes by counting squares
- estimate, compare and calculate different measures, including money in pounds and pence
- read, write and convert time between analogue and digital 12- and 24-hour clocks
- solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days
- compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes
- identify acute and obtuse angles and compare and order angles up to two right angles by size
- identify lines of symmetry in 2-D shapes presented in different orientations
- complete a simple symmetric figure with respect to a specific line of symmetry.
- describe positions on a 2-D grid as coordinates in the first quadrant
- describe movements between positions as translations of a given unit to the left/right and up/down
- plot specified points and draw sides to complete a given polygon.
- interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs
- solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs

End Point Year 5

Children can

- read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit
- count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
- round decimals with two decimal places to the nearest whole number and to one decimal place
- solve number problems and practical problems that involve all of the above
- read Roman numerals to 1000 (M) and recognise years written in Roman numerals.
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
- add and subtract numbers mentally with increasingly large numbers
- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
- count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
- identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- multiply and divide numbers mentally drawing upon known facts
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
- recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)
- solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
- solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates
- compare and order fractions whose denominators are all multiples of the same number
- identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths

- recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, 5 2 + 5 4 = 5 6 = 1 5 1]
- add and subtract fractions with the same denominator and denominators that are multiples of the same number
- multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
- read and write decimal numbers as fractions [for example, 0.71 = 100 71]
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- round decimals with two decimal places to the nearest whole number and to one decimal place
- read, write, order and compare numbers with up to three decimal places
- solve problems involving number up to three decimal places
- recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal
- Solve problems which require knowing percentage and decimal equivalents of $^{1}/_{2}$, $^{1}/_{4}$, $^{1}/_{5}$, $^{2}/_{5}$, $^{4}/_{5}$ and those with a denominator of a multiple of 10 or 25.
- convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)
- understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints
- measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres
- calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes
- estimate volume [for example, using 1 cm3 blocks to build cuboids
- (including cubes)] and capacity [for example, using water]
- solve problems involving converting between units of time
- use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.
- identify 3-D shapes, including cubes and other cuboids, from 2-D representations
- know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles
- draw given angles, and measure them in degrees (o) identify:
- angles at a point and one whole turn (total 360^{o})
- angles at a point on a straight line and 2 1 a turn (total 180^{o})

- other multiples of 90°
- use the properties of rectangles to deduce related facts and find missing lengths and angles
- distinguish between regular and irregular polygons based on reasoning about equal sides and angles.
- identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.
- solve comparison, sum and difference problems using information presented in a line graph
- complete, read and interpret information in tables, including timetables.

End Point Year 6

Children can

- read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
- identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places
- round any whole number to a required degree of accuracy
- solve problems which require answers to be rounded to specified degrees of accuracy
- use negative numbers in context, and calculate intervals across zero solve number and practical problems that involve all of the above.
- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- solve problems involving addition, subtraction, multiplication and division

- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.
- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units such as mm^3 and km^3
- solve problems involving similar shapes where the scale factor is known or can be found
-
- compare and order fractions, including fractions > 1
- add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, 4 1 × 2 1 = 8 1]
- divide proper fractions by whole numbers [for example, 3/1 ÷ 2 = 6/1]
- associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $^3/_8$)
- identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places
- multiply one-digit numbers with up to two decimal places by whole numbers
- use written division methods in cases where the answer has up to two decimal places
- solve problems which require answers to be rounded to specified degrees of accuracy
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.
- solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts
- solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison
- solve problems involving similar shapes where the scale factor is known or can be found
- solve problems involving unequal sharing and grouping using knowledge of fractions and multiples
- use simple formulae
- generate and describe linear number sequences
- express missing number problems algebraically

- find pairs of numbers that satisfy an equation with two unknowns enumerate possibilities of combinations of two variables.
- solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
- use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
- convert between miles and kilometres
- recognise that shapes with the same areas can have different perimeters and vice versa
- recognise, describe and build simple 3-D shapes, including making nets
- recognise when it is possible to use formulae for area and volume of shapes
- illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
- draw 2-D shapes using given dimensions and angles
- compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
- recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles
- calculate the area of parallelograms and triangles
- calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3].
- describe positions on the full coordinate grid (all four quadrants)
- draw and translate simple shapes on the coordinate plane, and reflect them in the axes.
- interpret and construct pie charts and line graphs and use these to solve problems
- calculate and interpret the mean as an average
- express missing number problems algebraically
- enumerate all possibilities of combinations of two variables
- find pairs of numbers that satisfy number sentences involving two unknowns

How well do children learn in Mathematics at our school?

How well do they learn?	Evidence
Children know the skills they have been taught.	Work in books, tests, RAG sheets with list of objectives for each unit, discussion day
Practising new skills.	Work in books, problem solving, reasoning questions, testbase, end of unit tests Cross curricular links, Mymaths, TT rockstars
Children know what they have done well and what their next steps are.	Pupil voice discussions. Feedback in books and verbal feedback Test marks

Maths Subject Overview

Context

Since being appointed maths lead in 2019:

New maths scheme, sequential and progressive, rolled out across school. Moved from INSPIRE maths to Whiterose maths.

Concrete, Pictorial and Abstract (CPA) approach now embedded across the school and evident in teaching and in the books and facilitated by the maths boxes in each classroom to allow children to independently access the concrete approach to improve their conceptual understanding of maths objectives at every stage.

Teaching and learning expectations for maths are consistent across the federation of St Cuthbert's and St Mary's and staff have been targeted for support through the thorough and robust monitoring of the subject.

CPD in maths has been provided to embed the new scheme and to communicate the relevant maths documents such as 'What maths looks like' and 'A journey through a unit'.

Frequent cross federation math moderation allows staff from both schools to network with parallel teachers across the federation to discuss all matters related to teaching maths in their year groups.

Lost learning due to covid has been tracked and a catchup curriculum plan is in place which includes a spiral curriculum and additional maths time in the time table.

Long-Term Plan (2-3 Year Timescale)

- At every assessment point, monitor the progress of key groups to see what impact COVID had had on outcomes and to evaluate the effectiveness of the Spiral curriculum and interventions.
- Reestablish maths links in the community lost due to pandemic to enrich the maths curriculum and to promote the contextualizing of maths.
- Maintain consistent expectations for teaching and learning in maths across the federation.

Priorities (1 Year Timescale)

- COVID recovery curriculum to promote catch-up of lost learning in maths through a spiral curriculum.
- Develop effective and consistent maths intervention to support OL learners to ensure that all learners can make progress.
- Promote home learning in maths by monitoring home learning apps.