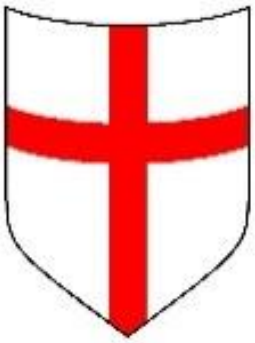
St. George's C of E Primary School

Mathematics Policy



Our Vision Statement

Our school vision and value is COURAGE

By the time our children leave us, we want them to show or have experienced the following attributes: Communicate, Opportunity, Understanding, Respect, Achievement, Growth, Enjoyment

As a school we are committed to providing an education in which children feel confident about their work and enjoy belonging to a community which encourages independence and respect. The vision for the future of our school clearly shows that the children are at the heart of everything that we do at St. George's CE Primary. We are ensuring that the community that was built on respect and achievement continues to be shaped through our school value 'COURAGE'.

Rationale/Intent

At St. George's CE Primary it is our intent that our children are provided with a mathematics curriculum which is broad, balanced and fully inclusive, helping all our pupils gain coherent knowledge and understanding of core mathematical concepts. We aim to equip our children for their life long mathematics journey, much as St George's experienced a journey both physically and also with his faith. We encourage our children to challenge themselves, ask questions, develop curious minds and resilience. We provide a wide range of practical and active maths experiences centred around the mastery approach. Our curriculum is built around the White Rose Maths programme and follows the small steps of progression with lessons adapted in order to suit the learning styles of all our pupils throughout the key stages. It is then supplemented with a variety of teaching and learning resources such as NCETM and Fluent in 5 to build a deeper level of the mathematics concepts. Our curriculum is driven by four of our key learning behaviours to encourage our pupils to become courageous, resilient, collaborative and inquisitive lifelong mathematical learners because *we believe that Mathematics is a key skill that helps us to make sense of the world around us.* As our pupils progress they will become equipped to confidently approach reasoning and problem-solving challenges, which will benefit them in maths and in other areas of the curriculum. Our children will learn to love themselves, believe in their potential to achieve and find inner strength and resilience when facing challenges. In developing curiosity our children will learn from Jesus' readiness to use questions to challenge assumptions and arrive at their own conclusions when solving mathematical problems. We recognise the importance of mathematics in every aspect of daily life; *enabling children to understand and appreciate relationships and pattern in both number and space.* We aim to support learners in becoming confident and articulate in the ability to apply their knowledge to solve a range of problems whilst using mathematical language. In line with the aims of the National Curriculum, we believe that mathematics is essential for everyday life and that it forms a necessary part in the building of stable financial futures and the aspirational career choices that our learners strive for across various forms of employment; *science and technology, medicine, the economy, the environment and development and in public decision-making.* We encourage our children to seek and keep seeking and to knock and keep knocking as He promised that the door to a brighter future will be opened.

AIMS

- *Have a sense of the size of a number and where it fits into the number system*
- *Know by heart number facts, such as number bonds, multiplication tables*
- *Use what they know by heart to figure out answers mentally*
- *Calculate accurately and efficiently, both mentally and with pencil and paper, drawing on a range of calculation strategies*
- *Make sense of number problems, including non-routine problems, and recognise the operations needed to solve them*
- *Explain their methods and reasoning, using correct mathematical terms*
- *Judge whether their answers are reasonable, and have strategies for checking them where necessary*
- *Suggest suitable units for measuring, and make sensible estimates of measurements*
- *Explain and make predictions from the numbers in graphs, diagrams, charts and tables.*

Early Years Foundation Stage

At St. George's CE Primary School, children follow the Early Years Foundation Stage curriculum, which is supported by the White Rose Maths programme we are following as a whole school. We give all children the opportunity to talk and communicate in a widening range of situations and to practise and extend their range of vocabulary (appendix ii) and numeracy skills. They have the opportunity to explore, enjoy, learn about, and use mathematics in a range of situations. Mathematics is planned on a half termly basis and assessed using the criteria from the early learning goals. Mathematics is taught both as a discrete subject and within the whole Early Years curriculum to give children opportunities to use their Numeracy skills in real life situations.

Key Stages 1 and 2

Children have daily maths lessons between 45 minutes and one hour long. The sequencing of this planning is provided by White Rose Maths and follows a four-part structure. These are adapted and differentiated by Class Teachers according to the needs to the children, in order to ensure that they deepen their existing understanding and make progress.

Problem solving and Reasoning

As a school we feel that problem solving and reasoning is a fundamental skill that our child need. As part of the WRMs curriculum children have access to problem and reasoning but we will also deliver specific sessions on a Friday.

Teaching Methods and Approaches

Lessons are to follow a 4-part structure:

1) Twice weekly Flashback 4 (5/10mins) 3 x weekly times tables challenges.
2) Intro - L.O and state WHY we are learning this – RELATE TO REAL LIFE SKILLSET IF POSSIBLE (ie. We are learning about percentages so you can calculate discounts when you are shopping or budgeting). Follow White Rose power points as a class.
3) **BE COURAGEOUS, RESILIENT and INQUISITIVE**: White Rose workbooks. (Varied timings, dependant on age and need of pupils) Extension challenges/problem solving available to deepen understanding.
4) **BE COLLABORATIVE**: What have we learnt today? What do we know now that we did not know at the start of the lesson? Could use tps here. Formative assessment eg exit pass. Then tell the children how we are building on today's learning tomorrow.

Parental Involvement

At St. George's CE Primary School we recognise that parental involvement is an important factor in helping children achieve their best and actively encourage parents to become involved with their children's development in Mathematics.

Maths Working walls

We recognise the important role, display has in the teaching and learning of mathematics by having maths work displayed in the school. Every class has a 'Maths Working Wall' which is a visual aid to support children with their work. These should be updated based on the classes current topic and continually added to reflect the pace of learning. All staff will have a list of non-negotiables to inform them of working wall expectations and a vocabulary list. (Appendix ii)

Working walls should include:

- Topic title/focus
- Vocabulary
- Modelling of current learning each day/step
- Question prompts.
- Problem solving/reasoning questions on display where applicable.
- Photos of children showing learning if applicable.

Resources

At St. George's Primary School, resources for the delivery of the maths curriculum are stored both centrally and in classrooms. Everyday basic equipment is kept in classrooms. Additional equipment and topic-specific items are stored centrally.

We use a variety of materials to facilitate the teaching of mathematics but recognise the need for the teaching of maths to be investigative and grounded in real life circumstances wherever possible.

Times tables starter sessions

The children in Years 1-6 will be completing times tables sessions, this will be done through counting, songs, rapid recall, online times table games or maths games. Children will learn their times tables as 1x2 2x2 3x2 etc and the inverse. They will also learn the divisions to go with each times table. Below is an outline of which times tables each year group needs to cover across the year.

Assessment and Record Keeping

We are continually assessing our children and recording their progress. We see assessment as an integral part of the teaching process and endeavour to make our assessment purposeful, allowing us to match the correct level of work to the needs of the children, thus benefiting the children and ensuring progress. For each unit of learning children will complete the WRM end of the unit assessment and then complete a PUMA end of term assessments at the end of autumn, spring and summer terms. Standardised scores will be generated to see if pupils are working at age expectations. Data will be analysed to look at gaps in understanding and teaching amended accordingly (inc any required interventions etc). Statutory Assessment Tests (SATs) are used for children in Year 6 in the Summer Term. Children in Year 4 are also required to take a multiplication tables check (MTC) in the Summer Term. The purpose of the check is to determine whether pupils can fluently recall their times tables up to 12, which is essential for future success in mathematics.

Equal Opportunities

As a staff we maintain an awareness of, and to provide for, equal opportunities for all our children in mathematics. No pupil will be discriminated against by age, sex, disability, religion or belief, or sexual orientation.

Special Educational Needs

Wherever possible we aim to fully include SEND children in the daily mathematics lesson so that they benefit from the emphasis on oral and mental work and by listening and participating with other children in demonstrating and explaining their methods.

Where necessary teachers will, in consultation with the SENCO, draw up a target within an Individual Educational Plan for a child. If a child's needs are particularly severe, they will work on an individualised programme written in consultation with the appropriate staff.
When planning teachers will try to address the child's needs through simplified or modified tasks or the use of support staff.

Where appropriate a group educational plan is developed with common objectives and learning targets for a group.

Role and Responsibilities of Mathematics Subject Leader

- *Monitor planning, teaching and learning in mathematics, to ensure continuity and progression.*
- *Ensure there is well sequenced and progressive curriculum map which contains the key knowledge, skills and vocabulary children need to be procedurally fluent in mathematics.*
- *Monitor standards in mathematics throughout the school, including SEND, more able, LAC, etc.*
- *Identify strengths and areas for improvement and to lead and drive improvements within the school.*
- *Keep up to date with new initiatives and train staff on these (also to facilitate in or out of school training for staff).*

- *Feed back to the Headteacher on standards in mathematics*

Monitoring and Review

The subject leader supports colleagues in their teaching, by keeping informed about current developments in mathematics, and by providing a strategic lead and direction for this subject; gives the headteacher an annual summary report in which he evaluates the strengths and weaknesses in mathematics and indicates areas for further improvement.

Allocated management time is used to review evidence of the children's work, and to observe mathematics lessons across the school. The quality of teaching and learning in mathematics is monitored and evaluated by the headteacher as part of the school's agreed cycle of lesson observations. A named member of the school's governing body is briefed to oversee the teaching of mathematics. The mathematics link governor meets regularly with the subject leader to review maths in school.

This policy will be reviewed at least once in each academic year.

Any questions or concerns regarding this policy should be made to Maths SL in the first instance.

Appendix i

Models and Representations Used Y1-6 For Addition:

Skill	Year	Representations and models	
Add two 1-digit numbers to 10	1	Part-whole model Bar model Number shapes	Ten frames (within 10) Bead strings (10) Number tracks
Add 1 and 2-digit numbers to 20	1	Part-whole model Bar model Number shapes Ten frames (within 20)	Bead strings (20) Number tracks Number lines (labelled) Straws
Add three 1-digit numbers	2	Part-whole model Bar model	Ten frames (within 20) Number shapes
Add 1 and 2-digit numbers to 100	2	Part-whole model Bar model Number lines (labelled)	Number lines (blank) Straws Hundred square

Skill	Year	Representations and models	
Add two 2-digit numbers	2	Part-whole model Bar model Number lines (blank) Straws	Base 10 Place value counters Column addition
Add with up to 3-digits	3	Part-whole model Bar model	Base 10 Place value counters Column addition
Add with up to 4-digits	4	Part-whole model Bar model	Base 10 Place value counters Column addition
Add with more than 4 digits	5	Part-whole model Bar model	Place value counters Column addition
Add with up to 3 decimal places	5	Part-whole model Bar model	Place value counters Column addition

Models and Representations Used Y1-6 For Subtraction:

Skill	Year	Representations and models	
Subtract two 1-digit numbers to 10	1	Part-whole model Bar model Number shapes	Ten frames (within 10) Bead strings (10) Number tracks
Subtract 1 and 2-digit numbers to 20	1	Part-whole model Bar model Number shapes Ten frames (within 20)	Bead string (20) Number tracks Number lines (labelled) Straws
Subtract 1 and 2-digit numbers to 100	2	Part-whole model Bar model Number lines (labelled)	Number lines (blank) Straws Hundred square
Subtract two 2-digit numbers	2	Part-whole model Bar model Number lines (blank) Straws	Base 10 Place value counters Column addition

Skill	Year	Representations and models	
Subtract with up to 3-digits	3	Part-whole model Bar model	Base 10 Place value counters Column addition
Subtract with up to 4-digits	4	Part-whole model Bar model	Base 10 Place value counters Column addition
Subtract with more than 4 digits	5	Part-whole model Bar model	Place value counters Column addition
Subtract with up to 3 decimal places	5	Part-whole model Bar model	Place value counters Column addition

Models and Representations Used Y1-6 For Multiplication:

Skill	Year	Representations and models	
Solve one-step problems with multiplication	1/2	Bar model Number shapes Counters	Ten frames Bead strings Number lines
Multiply 2-digit by 1-digit numbers	3/4	Place value counters Base 10	Short written method Expanded written method
Multiply 3-digit by 1-digit numbers	4	Place value counters Base 10	Short written method
Multiply 4-digit by 1-digit numbers	5	Place value counters	Short written method

Skill	Year	Representations and models	
Multiply 2-digit by 2-digit numbers	5	Place value counters Base 10	Short written method Grid method
Multiply 2-digit by 3-digit numbers	5	Place value counters	Short written method Grid method
Multiply 2-digit by 4-digit numbers	5/6	Formal written method	

Models and Representations Used Y1-6 For Division:

Skill	Year	Representations and models	
Solve one-step problems with division (sharing)	1/2	Bar model Real life objects	Arrays Counters
Solve one-step problems with division (grouping)	1/2	Real life objects Number shapes Bead strings Ten frames	Number lines Arrays Counters
Divide 2-digits by 1-digit (no exchange sharing)	3	Straws Base 10 Bar model	Place value counters Part-whole model
Divide 2-digits by 1-digit (sharing with exchange)	3	Straws Base 10 Bar model	Place value counters Part-whole model

Skill	Year	Representations and models	
Divide 2-digits by 1-digit (sharing with remainders)	3/4	Straws Base 10 Bar model	Place value counters Part-whole model
Divide 2-digits by 1-digit (grouping)	4/5	Place value counters Counters	Place value grid Written short division
Divide 3-digits by 1-digit (sharing with exchange)	4	Base 10 Bar model	Place value counters Part-whole model
Divide 3-digits by 1-digit (grouping)	4/5	Place value counters Counters	Place value grid Written short division

Skill	Year	Representations and models	
Divide 4-digits by 1-digit (grouping)	5	Place value counters Counters	Place value grid Written short division
Divide multi-digits by 2-digits (short division)	6	Written short division	List of multiples
Divide multi-digits by 2-digits (long division)	6	Written long division	List of multiples

Appendix ii

Maths Vocabulary for the New National Curriculum.

This document sets out Key Stage 1 (KS1) and Key Stage 2 (KS2) maths vocabulary under the new National Curriculum as well as vocabulary for EYFS. The tables can be used to check pupils' understanding of new vocabulary introduced in years 1- 6. The lists are intended as a guide as to what pupils should know, and are not exhaustive. Of course, key terms may be introduced earlier as a challenge for our learners, although it is also important to ensure that learning is 'new' and carries an 'element of surprise'. It is expected that key vocabulary is displayed on 'Maths Learning Walls' at appropriate times during the academic year and in line with the current topic area being taught within the class and is promoted through mathematical talk in lessons.

New maths vocabulary for EYFS							
Number and Place Value	**Addition and Subtraction**	**Multiplication and Division**	**Measure**	**Geometry (position and direction)**	**Geometry (Properties of shape)**	**Fractions**	**General/problem solving.**
Number One, two, three to twenty and beyond. None Count on/up/to/from/down Before, after More, less, many, few, fewer, fewest, smaller, smallest Equal to, the same as Odd, even Digit Numeral Compare Order Size Value Between, halfway between	Number line Add, more, plus, make, sum, total, altogether Double Half, halve Equals, is the same (including equals sign) How many more to make…? How many more is,,, then,,,? How much more is…? Subtract, take away, minus.	Odd, even Double, halve Share, share equally Group in pairs Equal groups of Divide	Full, half, empty Holds Container Weigh, weighs, balance Heavy, heavier, heaviest, light, lighter, lightest Scales Time Days of the week: Monday, Tuesday etc. Seasons: Spring, Summer, Autumn, Winter Days, week, month, year, weekend Birthday, holiday Morning, afternoon, evening, night Bedtime,	Over, under, underneath, above, below, top, bottom, side On, in, outside, inside In front, behind Front, back Before, after Beside, next to Middle Up, down, forwards, backwards. Sideways Close, far Through Towards, away from Side, roll, turn	Sort Cube, cuboid, pyramid, sphere, cone, cylinder, circle, triangle, square Shape Flat, curved, straight, round Solid Corner Face, side Make, build, draw	Whole Equal One half	Listen, join in Say, think, imagine, remember Start from Look at, point to Put What comes next? Find, use, make, build Tell me, describe, pick out, talk about, explain, show me Read, write Tick, draw a line, ring Cost Count, work out Number line, number track, number square, number cards
			dinnertime, playtime Today, yesterday, tomorrow Before, after, next, last Quickest, fastest, slowest Clock Once First, second, third Estimate Too many, too few Length, height Longer, longest, shorter, shortest, taller, tallest, higher, highest Money, coin, penny, pence, pound, price, cost, buy, sell, spend, spent, pay, change How much? How many? Total				Counters, cubes, blocks, die, dice, dominoes, pegs, peg board Same way, different way In order, in a different order

New maths vocabulary for year 1							
Number and Place Value	**Addition and Subtraction**	**Multiplication and Division**	**Measure**	**Geometry (position and direction)**	**Geometry (Properties of shape)**	**Fractions**	**General/problem solving.**
Greater, lesser Pair Units, ones, tens Ten more/less Figure (s) In order/ A different order Above, below	Number bonds Inverse Near doubles Difference between How many fewer is…than…? How much less is…?	Once, twice, three times. Five times. Count in tens (forwards from/ backwards from) How many times? Lots of, groups of Multiple of, times, multiply, multiply by Repeated addition Array, row, column Group in twos, threes, etc Divided by, left, left over	Midnight Now, soon, early, late Quick, quicker, quickly, fast, slow, slower Old, older, oldest, new, newer, newest Takes longer, takes less time Hour, o'clock, half past Watch, hands How long ago? How long will it be to…? How long will it take to…? How often? Always, never, often, sometimes, usually Once, Twice… First, second, third, etc	Position Around Opposite Apart Between, edge, centre Corner Direction Journey Left, right Across Near Along To, from Movement Whole turn, half turn Stretch, bend	Group Hollow Point, pointed Edge	Equal parts, four equal parts Two halves A quarter, two quarters	Place, fit Arrange, rearrange Change, change over Split, separate Carry on, continue, repeat Choose, collect Record, trace, copy, complete, finish, end Fill in, shade, colour, cross, draw, draw a line between, join (up), arrow Answer, check, same number(s), different number(s), missing number(s) Number facts Abacus, rods Best way, another way

			Close to, about the same as, just over, just under Enough, not enough Width, depth Long, short, tall, high Low, wide, narrow, deep, shallow, thick, thin Far, near, close Metre, ruler, metre stick Costs more, costs less, dear(er), cheaper, costs the same as				Not all, every, each

New maths vocabulary for year 2

Number and place value	Measure	Geometry (position and direction)	Geometry (properties of shape)	Fractions	Data/statistics	General/problem solving
Numbers to one hundred Hundreds Partition, recombine Hundred more/less	Quarter past/to m/km, g/kg, ml/l Temperature (degrees)	Rotation Clockwise, anticlockwise Straight line Ninety degree turn, right angle	Size Bigger, larger, smaller Symmetrical, line of symmetry Fold Match Mirror line, reflection Pattern, repeating pattern	Three quarters, one third, a third Equivalence, equivalent	Count, tally, sort Vote Graph, block graph, pictogram, Represent Group, set, list, table Label, title Most popular, most common, least popular, least common	Predict Describe the pattern, describe the rule Find, find all, find different Investigate

New maths vocabulary for year 3

Number and place value	Addition and subtraction	Multiplication and division	Measure	Geometry (position and direction)	Geometry (properties of shape)	Fractions	Data/statistics
Numbers to one thousand	Column addition and subtraction	Product Multiples of four, eight, fifty and one hundred Scale up	Leap year Twelve-hour/twenty-four-hour clock Roman numerals I to XIII	Greater/less than ninety degrees Orientation (same orientation, different orientation)	Horizontal, vertical, perpendicular and parallel lines	Numerator, denominator Unit fraction, non-unit fraction Compare and order Tenths	Chart, bar chart, frequency table, Carroll diagram, Venn diagram Axis, axes Diagram

New maths vocabulary for year 4

Number and place value	Multiplication and division	Measure	Geometry (position and direction)	Geometry (properties of shape)	Fractions and decimals	Data/statistics
Tenths, hundredths Decimal (places) Round (to nearest) Thousand more/less than Negative integers Count through zero Roman numerals (I to C)	Multiplication facts (up to 12x12) Division facts Inverse Derive	Convert	Coordinates Translation Quadrant x-axis, y-axis Perimeter and area	Quadrilaterals Triangles Right angle, acute and obtuse angles	Equivalent decimals and fractions	Continuous data Line graph

New maths vocabulary for year 5						
Number and place value	Addition and subtraction	Multiplication and division	Measure	Geometry (position and direction)	Geometry (properties of shape)	Fractions, decimals and percentages
Powers of 10	Efficient written method	Factor pairs Composite numbers, prime number, prime factors, square number, cubed number Formal written method	Volume Imperial units, metric units	Reflex angle Dimensions	Regular and irregular Polygons	Proper fractions, improper fractions, mixed numbers Percentage Half, quarter, fifth, two fifths, four fifths Ratio, proportion

New maths vocabulary for year 6							
Number and place value	Addition and subtraction	Multiplication and division	Geometry (position and direction)	Geometry (properties of shape)	Fractions, decimals and percentages	Algebra	Data/statistics
Numbers to ten million	Order of operations	Order of operations Common factors, common multiples	Four quadrants (for coordinates)	Vertically opposite (angles) Circumference, radius, diameter	Degree of accuracy Simplify	Linear number sequence Substitute Variables Symbol Known values	Mean Pie chart Construct