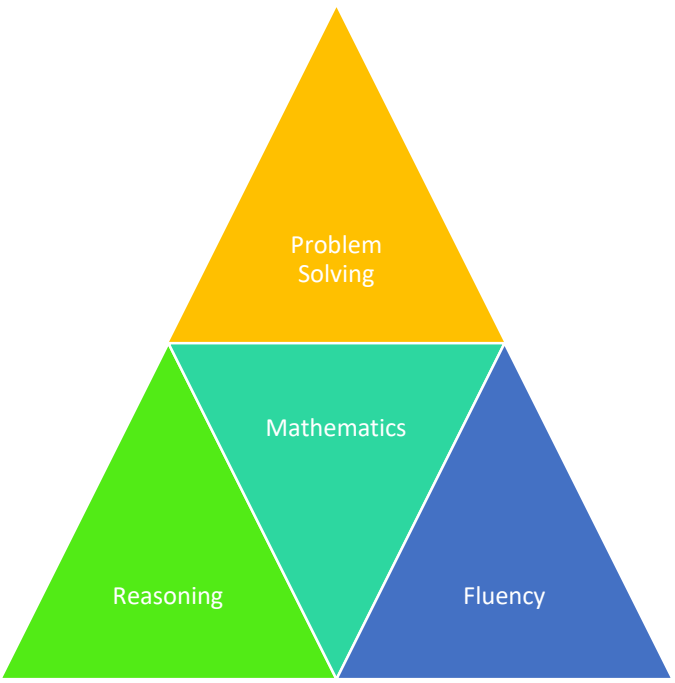
THURSBY PRIMARY SCHOOL

MATHEMATICS POLICY

Approved by:	
Position:	
Signed:	
Date:	April 2025
Next review:	September 2027

At Thursby Primary School we see Maths very much as a multi-discipline, cross curricular, interconnected subject which should encourage creativity. As much revolves around the discussion about Maths between talk partners as it does the completion of calculations. We want the children to see Mathematics as being relevant to their world and applicable to everyday life as well as being something that they will need as they move on through their school life and ultimately to the world of employment. To that end, a high-quality, inter-related and creative Maths experience should be one that develops the children's ability to think mathematically and one which allows them to apply the tools to which they have been exposed in a variety of ways.

Following the introduction of the new National Curriculum in 2014 the emphasis has been to ensure that all children have access to the following strands of Mathematics:



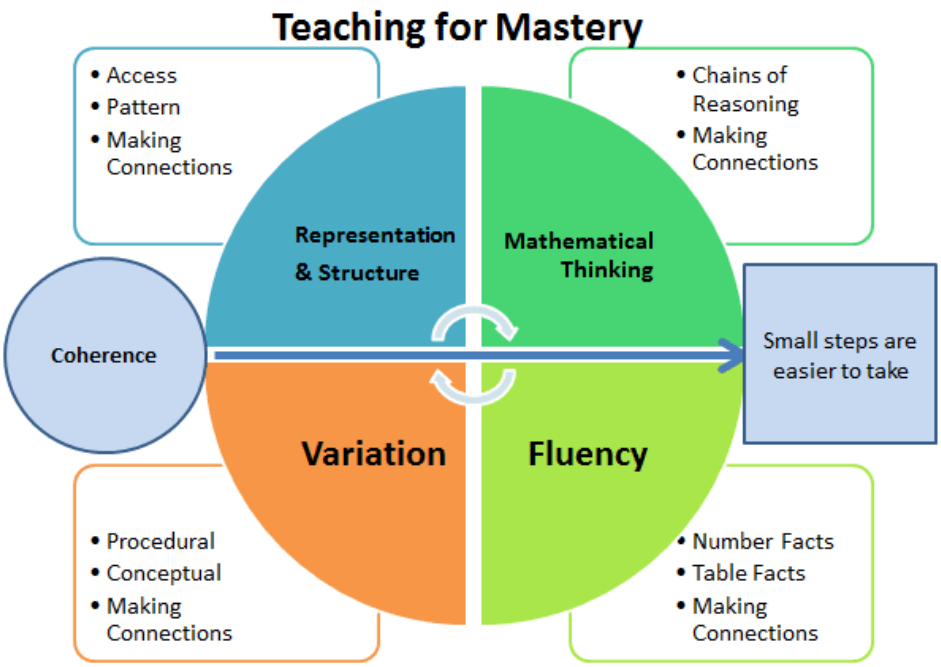
This means that children need to be regularly exposed to opportunities involving increasingly complex problem solving which allows them to apply their Maths knowledge. In doing so, they should be encouraged to develop an argument and line of enquiry that they can prove and justify using mathematical vocabulary. This includes the ability to break down problems, both routine and non-routine, into a series of steps.

The programmes of study set out within each domain in the new National Curriculum will be used to ensure children get the learning experiences that is required.

It is important that children can explore Maths and present their findings not only in a written form but also visually and verbally; to that end the school will adopt the CPA approach: concrete, pictorial, abstract. This will allow the children to experience the physical aspects of Maths before finding a way to present their findings and understandings in a visual form before relying on the abstract numbers.

Our approach to planning and delivery of HQTL is based around the 5 Big Ideas of Mastery in Mathematics produced by the NCETM.

Opportunities for Mathematical Thinking allow children to make chains of reasoning connected with the other areas of their mathematics. A focus on Representation and Structure ensures concepts are explored using concrete, pictorial and abstract representations, the children actively look for patterns as well as specialise and generalise whilst problem solving. Coherence is achieved through the planning of small connected steps to link every question and lesson within a topic. Teachers use both procedural and conceptual Variation within their lessons and there remains an emphasis on Fluency with a relentless focus on number and times table facts.



6 Teaching Principles of High-Quality Teaching and Learning in Mathematics

- Teachers believe in the importance of mathematics and that the vast majority of children can succeed in learning mathematics in line with national expectations.

- The whole class is taught mathematics together. We do not group children by ability. The learning needs of individuals are addressed through careful scaffolding, questioning and appropriate rapid intervention where necessary, to provide the appropriate support and challenge.

- The reasoning behind mathematical processes is emphasized. Teacher/pupil interaction explores how answers were obtained as well as why the method worked and what might be the most efficient strategy.

- Precise mathematical language, often couched in full sentences, is used by teachers so that mathematical ideas are conveyed with clarity and precision (STEM Sentences are used to reinforce correct language use). We value 'mathematical talk' and children get lots of opportunity to talk about and evaluate their mathematics during lessons.

- Conceptual variation and procedural variation are used extensively throughout teaching. This helps to present the mathematics in ways that promote deep, sustainable learning.

A. Conceptual variation is where the concept is varied and there is intelligent practice. Positive variation is showing what the concept is, and negative variation is showing what the concept isn't. This clears away misconceptions at the very start. Within positive variation, both standard and non- standard representations are shown.

B. Procedural variation is where different procedures and/or representations are used to bring about understanding. For example, teachers may collect several solutions for a problem (some right, some wrong) before guiding the class towards the most efficient method. It also involves highlighting the essential features of a concept or idea through varying the non-essential features. Variation is not the same as variety – careful attention needs to be paid to what aspects are being varied (and what is not being varied) and for what purpose.

- Sufficient time is spent on key concepts to ensure learning is well developed and deeply embedded before moving on.

8 Classroom Norms to Establish in Mathematics

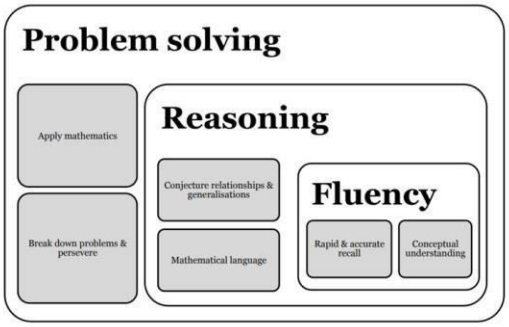
1. Everyone can learn mathematics to the highest levels.
2. If you **'can't do it'**, you **'can't do it yet'**.
3. Mistakes are valuable.
4. Questions are important.
5. Mathematics is about creativity and problem solving.
6. Mathematics is about making connections and communicating what we think.
7. Depth is much more important than speed.
8. Maths lessons are about learning, not performing.

Assessment

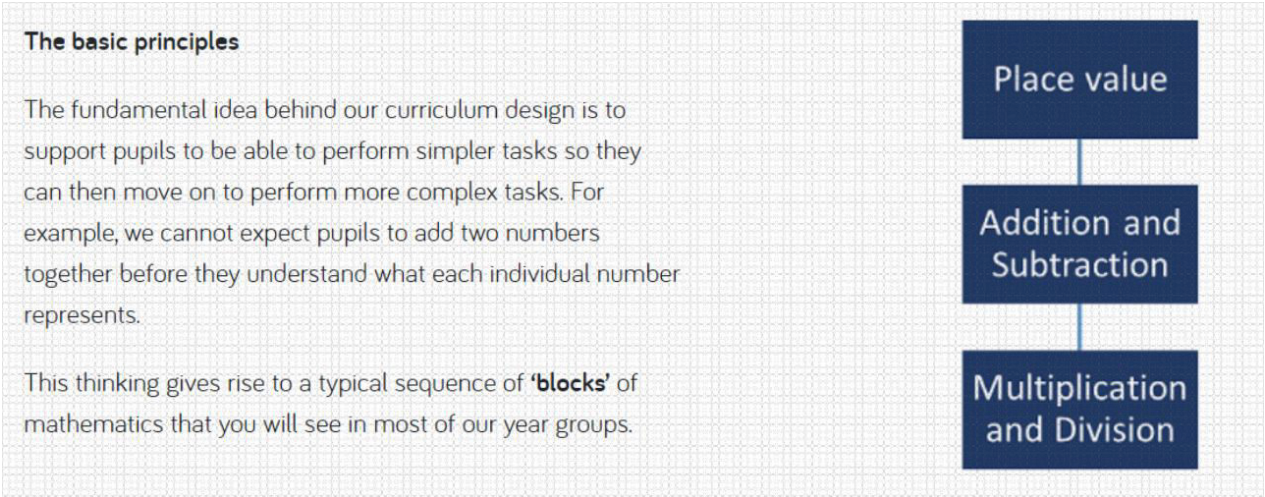
See Assessment Policy and Feedback Policy

Fluency, Reasoning and Problem Solving

These key components of learning mathematics are included in all our small steps. We certainly don't advocate that all the fluency in a block is done first, then the reasoning and then the problem solving. We believe these should be integrated into classroom practice as much as possible in the order that is appropriate for the step, e.g. the process of division may be introduced by a problem about sharing or grouping for which we need to become fluent at the procedure.



The importance of sequencing



What Mathematics looks like at Thursby Primary School…

What a Maths lesson looks like in our school:

- Mixed ability groupings / seating which allows children to work with different people over the course of time.
- Lots of talk—Reasoning/Mathematical Inquiry/Maths Talk/Use Mathematical Vocabulary
- Problem solving throughout – puzzles/investigations/misconceptions/corrections and mistakes
- Mini plenaries to share misconceptions, pose questions, challenge ideas
- Free access to manipulatives/concrete resources
- Feedback given to pupils at point of need, usually within the lesson – allowing teacher to adapt/extend/challenge or support immediately;
- Children freely accessing work/tasks that challenges their thoughts and ideas – free movement between task to ensure challenge is sustained (Key Stage 2)

This is our philosophy:

- All pupils can succeed
- All children will be challenged
- Mastery
- CPA approach
- Problem solving & Reasoning at the heart of everything
- Cross-curricular links wherever possible

This is how it works:

- Focus on mathematical language-key vocabulary displayed for children to see/teacher models use of key vocabulary/methods/strategies and pupils encouraged to use throughout lessons. See Appendix 1 for the language used in each year group across school.
- Many opportunities to talk mathematically
- Prove It! Convince me!
- Children given time they need –may return to a task in following lesson – not 'compartmentalised' sessions but 'fluid'
- TA's sometimes used to pre-teach a concept ahead of the lesson

This is what we do:

- Planning document includes discrete focus on 3 aims of curriculum- Fluency, Reasoning and Problem Solving; reflection to drive next steps learning and planning.
- Positive use of mistakes/misconceptions- learning environment
- Regular book scrutiny, learning walks, planning audits, pupil perceptions
- Whole school CPD
- Raised profile of Mathematics- STEM week, NSPCC Number Day, World Maths Day, whole school displays-celebration of learning

This is what you might typically see:

- Open ended investigations- low threshold/high ceiling tasks
- Problems/Puzzles/Investigations
- Different representations of mathematical concepts
- Paired/group work
- Active maths where children move around the room
- Engagement and perseverance
- Children challenging themselves
- Children talking about, sharing and reflecting on their learning

This is what differentiation looks like:

- Effective and well-thought out use of concrete resources
- Probing questions to support struggling learners
- Learners show more than one way of representing their ideas
- Well-thought out learning environment, including placement of learners

This is how we know how well our pupils are doing:

- Tracking
- Pupil progress meetings

- Teacher assessment – Smartgrade assessments – completed to QLA at the end of each year to inform strengths and areas for development moving year groups.
- Marking and feedback – Live Marking – misconceptions/corrections and teaching completed during the lesson so progress is sustained.
- Photo evidence of practical maths through Earwig – this will include an explanation of the learning and activity taking place.
- Targeted use of TAs- TA's noting and recording observations of individual children

This is the impact of the teaching:

- Children demonstrate a quick recall of facts and procedures. This includes the recollection of the times table.
- Children show confidence in believing that they will achieve in maths.
- Each child achieves objectives (expected standard) for year group.
- The flexibility and fluidity to move between different contexts and representations of maths.
- The chance to develop the ability to recognise relationships and make connections in maths lessons.
- Mathematical concepts or skills are mastered when a child can show it in multiple ways, using the mathematical language to explain their ideas, and can independently apply the concept to new problems in unfamiliar situations.
- Children show a high level of pride in the presentation and understanding of the work.
- All children will have the skills and the resilience to solve problems by applying their mathematics to a variety of situations with increasing sophistication, including in unfamiliar contexts and to model real-life scenarios.

This is how we use intervention:

- Targeted intervention for children identified through monitoring by TA/Teacher/SENCO
- Rapid Intervention during the lesson by Teacher/TA/High Achiever pupil to ensure learning does not stop and method/strategies discussed to enable progress by struggling pupil;
- Intervention sessions during assembly or after school

This is how we challenge the higher attainers/rapid graspers:

- Problem solving/puzzles/investigations that promote perseverance and Growth Mindset in different contexts
- Further reasoning and justification – Prove it/Convince Me
- Follow on
- Another and Another
- Generalising and testing rules

APPENDIX 1

How do children develop their understanding of mathematical vocabulary?

Teachers often use informal, everyday language in mathematics lessons before or alongside technical mathematical vocabulary. Although this can help children to grasp the meaning of different words and phrases, you will find that a structured approach to the teaching and learning of vocabulary is essential if children are to move on and begin using the correct mathematical terminology as soon as possible. Some children may start school with a good understanding of mathematical words when used informally, either in English or their home language. Find out the extent of their mathematical vocabulary and the depth of their understanding, and build on this. You need to plan the introduction of new words in a suitable context, for example, with relevant real objects, mathematical apparatus, pictures and/or diagrams. Explain their meanings carefully and rehearse them several times. Referring to new words only once will do little to promote learning. Encourage their use in context in oral sessions, particularly through your questioning. You can help sort out any ambiguities or misconceptions your pupils may have through a range of open and closed questions. Use every opportunity to draw attention to new words or symbols with the whole class, in a group or when talking to individual pupils. The final stages are learning to read and write new mathematical vocabulary in a range of circumstances, ultimately spelling the relevant words correctly.

Regular, planned opportunities for development It is not just younger children who need regular, planned opportunities to develop their mathematical vocabulary. All children throughout Key Stages 1 and 2 need to experience a cycle of oral work, reading and writing as outlined below. oral work based on practical work so that they have visual images and tactile experience of what mathematical words mean in a variety of contexts other forms of oral work so that they have opportunities to: – listen to adults and other children using the words correctly – acquire confidence and fluency in speaking, using complete sentences that include the new words and phrases, sometimes in chorus with others and sometimes individually – describe, define and compare mathematical properties, positions, methods, patterns, relationships, rules – discuss ways of tackling a problem, collecting data, organising their work… – hypothesise or make predictions about possible results – present, explain and justify their methods, results, solutions or reasoning, to the whole class or to a group or partner – generalise, or describe examples that match a general statement reading aloud and silently, sometimes as a whole class and sometimes individually, for example, reading: – numbers, signs and symbols, expressions and equations in blackboard presentations – instructions and explanations in workbooks, textbooks, CD- ROMs… – texts with mathematical references in fiction and non-fiction books and books of rhymes during the literacy hour as well as mathematics lessons – labels and captions on classroom displays, in diagrams, graphs, charts and tables… – definitions in illustrated dictionaries, including dictionaries that they themselves have made, in order to discover synonyms, origins of words, words that start with the same group of letters (such as triangle, tricycle, triplet, trisect…) writing and recording in a variety of ways, progressing from words, phrases and short sentences to paragraphs and longer pieces of writing, for example: – writing prose in order to describe, compare, predict, interpret, explain, justify… – writing formulae, first using words, then symbols – sketching and labelling diagrams in order to clarify their meaning – drawing and labelling graphs, charts or tables, and interpreting and making predictions from the data in them, in mathematics and other subjects.

The Skill of Questioning

Children cannot learn the meanings of words in isolation. The use of questions is crucial in helping them to understand mathematical ideas and use mathematical terms correctly. It is important to ask questions in different ways so that children who do not understand the first time may pick up the meaning subsequently. Pupils for whom English is an additional language benefit and so will others who are not always familiar with the vocabulary and grammatical structures used in school. It is easy to use certain types of questions — those that ask the listener to recall and apply facts — more often than those that require a higher level of thinking. If you can use the full range of

question types you will find that children begin to give more complex answers in which they explain their thinking.

Types of Question

Recalling facts

What is 3 add 7? How many days are there in a week? How many centimetres are there in a metre? Is 31 a prime number?

Applying facts

Tell me two numbers that have a difference of 12. What unit would you choose to measure the width of the table? What are the factors of 42?

Hypothesising or predicting

Estimate the number of marbles in this jar. If we did our survey again on Friday, how likely is it that our graph would be the same? Roughly, what is 51 times 47? How many rectangles in the next diagram? And the next?

Designing and comparing procedures

How might we count this pile of sticks? How could you subtract 37 from 82? How could we test a number to see if it is divisible by 6? How could we find the 20th triangular number? Are there other ways of doing it?

Interpreting results

So what does that tell us about numbers that end in 5 or 0? What does the graph tell us about the most common shoe size? So what can we say about the sum of the angles in a triangle?

Applying reasoning

The seven coins in my purse total 23p. What could they be? In how many different ways can four children sit at a round table? Why is the sum of two odd numbers always even?

The tables below can be used to check pupils' understanding of new vocabulary introduced in Years 1-6. The lists are a guide to what pupils should know but they are not exhaustive.

It is good practice to display key vocabulary when it is being taught and needs to be promoted and reinforced through mathematical talk in lessons.

Mathematical Vocabulary for EYFS

Number and Place Value	**Addition and Subtraction**	**Multiplication and division**	**Measure**	**Geometry** (Position and	**Geometry** (Properties of Shape)	**Fractions**	**Problem Solving and Reasoning**
number, zero 1-20 count on/back lots, more, few, fewer, compare, sort, order, before, after, less, many, most, the same as, ones, pair	add, more, altogether, takeaway, number line, one more, one less, equals, equal to, double, half, how many? make, total	times, counting in ones, twos, fives, tens, lots of, groups of, once, twice, five times sharing, share, set, group, left, left over	days of the week, week, month, year, weekend, birthday, holiday, morning, afternoon, evening, night, midnight, bedtime, dinnertime, playtime, today, yesterday, tomorrow, before, after, next, last, now, soon, early, late, quick, fast, slow, old, new, watch, clock, always, never, first, size, weight, capacity, time, money long, longer, longest, short, shorter, shortest, heavy, light, empty, full, tall, small, large, thick, thin, low, deep, ruler, far, near, holds, container, weigh, weighs coin, pound, pence,	position, distance, after, before, in, on, inside, under, on top of, behind, next to, above, below, top, bottom, side, outside, around, underneath, in front, front, back, before, middle, up, down, forwards, backwards, across, close, far, along, to, from, slide, roll, turn, stretch, bend, move.	shape, group, sort, round, flat, straight, make, build, draw. square, circle, triangle, cube, cuboid, sphere	double half whole	listen, join in, say, think, imagine, remember, start from, start with, start at, look at, point to, put, place, fit, change, split, carry on, what comes next? find, choose, collect, use, make, build, tell me, pick out, talk about, explain, show me read, write, finish, copy, colour, tick, cross, draw, draw a line between, join (up), ring, arrow, cost, count, work out, answer, fill in, check, in order, every, each.

Mathematical Vocabulary for Year 1

Number and Place Value	**Addition and Subtraction**	**Multiplication and division**	**Measure**	**Geometry** (Position and	**Geometry** (Properties of Shape)	**Fractions**	**Problem Solving and Reasoning**
number zero, one, two, three to twenty, and beyond none count (on/up/to/from/down) before, after more, less, many, few, fewer, least, fewest, smallest, greater, lesser equal to, the same as odd, even pair units, ones, tens ten more/less digit numera l figure(s)	number bonds, number line add, more, plus, make, sum, total, altogether inverse double, near double half, halve equals, is the same as (including equals sign) difference between how many more to make..?, how many more is…than..?, how much more is..? subtract, take away, minus how many fewer is…than..?, how much less is..?	odd, even count in twos, threes, fives count in tens (forwards from/backward s from) how many times? lots of, groups of once, twice, three times, five times multiple of, times, multiply, multiply by repeated addition array, row, column double, halve share, share equally group in pairs, threes, etc.	full, half full, empty holds, container weigh, weighs, balances heavy, heavier, heaviest, light, lighter, lightest scales time days of the week: Monday,Tuesday, etc. seasons: spring, summer, autumn, winter day, week, month, year, weekend birthday, holiday morning, afternoon, evening, night, midnight bedtime, dinnertime, playtime today, yesterday, tomorrow before, after next, last now, soon, early, late quick, quicker, quickest, quickly , fast, faster, fastest, slow, slower, slowest, slowly old, older, oldest, new, newer, newest takes longer, takes less time hour, o'clock, half past clock, watch, hands always, never, often, sometimes	position over, under, underneath, above, below, top, bottom, side on, in, outside, inside around, in front, behind front, back before, after beside, next to, opposite apart between, middle, edge, centre corner directio n journey left, right, up, down, forwards,	group, sort cube, cuboid, pyramid, sphere, cone, cylinder, circle, triangle, square shape flat, curved, straight, round hollow, solid corner (point, pointed) face, side, edge make, build, draw	whole equal parts, four equal parts one half, two halves a quarter, two quarters	listen, join in say, think, imagine, remember start from, start with, start at look at, point to put, place, fit arrange, rearrange change, change over split, separate carry on, continue, repeat, what comes next? find, choose, collect, use, make, build tell me, describe, pick out, talk about, explain, show me read, write, record, trace, copy,

order size valu e between, halfway between above, below			estimate, close to, about the same as, just over, just under length, width, height, depth long, longer, longest, short, shorter shortest, tall, taller, tallest, high, higher, highest wide, narrow, deep, shallow, thick, thin far, near, close metre, ruler, metre stick money, coin, penny, pence, pound, price, cost, buy, sell, spend, spent, pay, change, costs more, costs less, cheaper, costs the same as	close, far, near along, through to, from, towards, away from movement slide, roll, turn, whole turn, half turn stretch, bend			number(s)/missing number(s) number facts, number line, number track, number square, number cards abacus, counters, cubes, blocks, rods, die, dice, dominoes, pegs, peg board same way, different way, best way, another way in order, in a different order

Mathematical Vocabulary for Year 2

Number and Place Value	Measure	Geometry (Position and Direction)	Geometry (Properties of Shape)	Fractions	Data / Statistics	Problem Solving and Reasoning
numbers to one hundred hundreds partition, recombine hundred more/less	quarter past quarter to metres /kilometres grams / kilograms, millilitres /litres temperature (degrees)	rotation clockwise, anticlockwise straight line ninety degree turn, right angle	size bigger, larger, smaller symmetrical, line of symmetry fold and 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	predict describe the pattern, describe the rule find, find all, find different investigate

Mathematical 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	formal written methods column addition column subtraction	product multiples of four, eight, fifty and one hundre d scale up	leap year twelve-hour clock twenty-four hour clock roman numerals i to xii	greater / less than ninety degrees orientation same orientation different orientation	horizonta l vertical perpendicular lines parallel lines	numerator denominato r unit fraction non unit fraction compare and order tenths	chart, bar chart, frequency table Carroll diagram Venn diagram axis axes

Mathematical 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 to 100=C	multiplication facts (up to 12x12) division facts inverse derive quotient divisor dividend Integer Scaling	convert analogue and digital 12- and 24-hour clocks convert from hours to minutes; minutes to seconds; years to months; weeks to days area of rectilinear shapes	coordinates translation left/right up/down quadrant x-axis, y-axis perimeter and area	quadrilaterals triangles right angle acute and obtuse angles degrees symmetric	families of common equivalent decimals and fractions numbers with up to 2 decimal places (tenths, hundredths)	continuous data line graph

Mathematical Vocabulary for Year 5

Number and Place Value	Addition and Subtraction	Multiplication and Division	Measure	Geometry (Position and Direction)	Geometry (Properties of Shape)	Fraction, Decimals and Percentages
powers of 10 numbers to 1,000,000 Roman numerals to 1000 = M	efficient written methods	factor pairs composite numbers, prime number, prime factors, square number, cubed number formal written methods	volume imperial units (such as inches, pounds and pints) convert between different metric units (kilometre, metre; centimetre and metre; gram and kilogram; litre and millilitre)	reflex angle dimension s	regular and irregular polygons degrees whole turn = 360°	proper fractions, improper fractions, mixed numbers percentage half, quarter, fifth, two fifths, four fifths ratio, proportion

Mathematical Vocabulary for Year 6

Number and Place Value	Addition and Subtraction	Multiplication and Division	Geometry (Position and	Geometry (Properties of Shape)	Fractions, Decimals and	Algebra	Data / Statistics
numbers to ten million	order of operations	order of operations common factors common multiples interpret remainders common factors common multiples prime numbers	four quadrants in relation to coordinates translate shapes	vertically opposite angles circumferenc e radius diameter	degree of accuracy simplify simplest form same denomination place value in numbers given to 3 decimal places (tenths, hundredths, thousandths	formulae linear number sequence substitute variables symbol Known Values	mean average pie chart construct

Name of person responsible for reviewing policy	Reasons for amendments/review	Date Achieved/Completed
Mr Colombi	New Policy adopted	April 2020
Mr Colombi	Reviewed with examples of what Maths will look like at Thursby	November 2021
Mr Colombi	Full review and update to 'This is how we know' section. Appendix 1 added – progression in vocabulary for each year group.	April 2025