

Marchwood Junior School – Mathematics Curriculum

Mathematics is a journey and long-term goal, achieved through practice, reasoning and application which allows children to demonstrate a deep, conceptual understanding.



Intent

Number and Place Value

- Read and use numbers up to 10 million
- Identify the value of digits in integers and decimal numbers
- Count up and down in integers, fractions and negative numbers
- Round and estimate integers and decimal numbers
- Calculate intervals across zero
- Estimation to check and ascertain the degree of accuracy

Number: Addition, subtraction, multiplication and division

- Recall with automaticity key number facts including number bonds
- Recall with automaticity multiplication tables and associated division facts
- Associative and distributive law
- Efficient written and mental methods for the four operations
- The rules for multiplying and dividing by 10, 100 and 1,000
- Division, with remainders as fractions, decimals and where rounding is needed
- Use order of operations
- Accurate use of mathematical vocabulary and language. E.g. factor and prime

Number: Fractions (including decimals and percentages)

- Represent fractions in different ways
- Show families of equivalent fractions
- Convert mixed to improper and vice versa
- Add, subtract, multiply and divide fractions
- Find fractions and percentages of amounts
- Recall with automaticity key fraction, decimal and percentage equivalents
- Compare fractions, decimals and percentages

Ratio and proportion

- Solve problems involving the calculation of percentages
- Use scaling and ratios across a variety of contexts involving relative sizes. E.g. recipes and shape

Algebra

- Properties of linear sequences
- Solve linear equations from word problems
- Formulae: units of measurement conversion rules, formula for perimeter, area and volume
- Use symbols and letters to represent algebraic variables
- Find possibilities that satisfy equations and enumerate possibilities

Measurement

- Tell the time and read a variety of scales
- Measure, compare and convert units of measure (metric and imperial) and angles
- Calculate perimeter, area and volume, knowing when formula can be applied

Geometry

- Classify, compare properties and draw 2D and 3D shapes
- Know a variety of angles and angle rules
- Use rotational language, translate and reflect shapes and complete symmetrical patterns
- Describe positions on a four quadrant coordinate grid

Statistics

- Interpret and construct various statistical representations (pictograms, tables, bar charts, line graphs, timetables and pie charts)

Reasoning and problem solving:

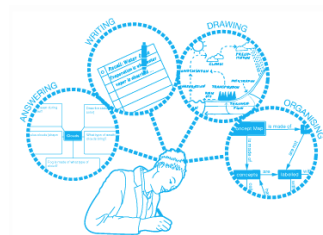
- Solve missing number, length, quantities and angles problems
- Break two-step and multi-step problems into smaller steps, showing perseverance until a solution is found
- Links between words and phrases in word problems and their corresponding operations in mathematics
- Solve contextual and non-contextual problems, deciding which operations to use and why, across mathematical strands (interleaving practice where appropriate)
- Demonstrate an elegant approach to calculation
- Explore mathematical concepts through teacher-led enquiry
- Recognise and use mathematical connections
- Explain and justify mathematical thinking
- Investigate mathematical conjunctures and patterns
- Test mathematical generalisations
- Develop logical and systematic approaches whilst promoting resilience and perseverance

Implementation: CPA approach (Concrete materials and diagrams are used at the appropriate stage to help the learning process and to aid understanding of concepts)

How do we help children develop knowledge into schema in their long-term memory?

Whole – Part – Whole	Regular recall of knowledge	Combine visual with text	Grouping knowledge	Spaced Learning
Challenge resides in the curriculum and not in the individual lesson	The act of retrieval strengthens memory, making information more retrievable.	Images can be more easily remembered than words and provide a memory cue	Understanding is the connections that form between knowledge	Spacing recall helps create defined pathways in memory Knowledge moves from episodic to semantic
AfL is used to assess understanding of declarative and procedural knowledge Knowledge is broken down into their specific components (small steps) Questions are often posed as <i>anchor tasks</i> to engage	Mental starters to activate LT memory Retrieval sessions End of unit reasoning Daily Maths Meeting Arithmetic sessions Reinforcement of prior knowledge if required and progression to rich, sophisticated problems	CPA approach to teaching and learning Instruction includes dual-coding Maths working walls / worked examples X-table booklets	New knowledge is connected to pre-existing knowledge Daily lessons are delivered which are progressive, building schema from content previously taught	Blockers organised progressively – connect concepts within and between topics End of unit reasoning / retrieval lessons and regular interleaving practice Daily Maths Meetings and Arithmetic

Avoid overload	Feedback Loops	Articulate knowledge and understanding
Working memory has a limited capacity. Learners cannot be overwhelmed with too much.	Assessment as feedback ensures teaching matches understanding	Articulating understanding demonstrates individual schema
Prior knowledge is ascertained before new objectives (AfL tasks) to set appropriate starting points Prior knowledge activated at the start of a lesson AfL used in lesson and between lessons for flexible groupings Me, us, you approach Split inputs / cutaways Numberless problems / sense making strategies Intelligent practice (variation theory) Worked examples and working walls	Short AfL tasks before new objectives to inform groupings Plans rule out the acquisition of common misconceptions Direct Teaching develops novice schemas of knowledge Me, us, you approach Think, Pair, Share Reframing t&l in lesson and subsequent lessons Honesty cards – pupil errors immediately highlighted and corrected Mini plenaries Systematic monitoring Gap analysis	Conditional knowledge explicitly taught Regular reasoning opportunities for all (mini-plenaries / HQ) Silent teacher / say it again better End of unit reasoning / problems tasks for all Challenge through rich and sophisticated problems



(January 2023 – review January 2024)

Declarative Knowledge (facts and concepts: I know that...)

Procedural Knowledge (sequence of steps: I know how...)

Conditional Knowledge (strategies to reason and problem solve: I know when...)