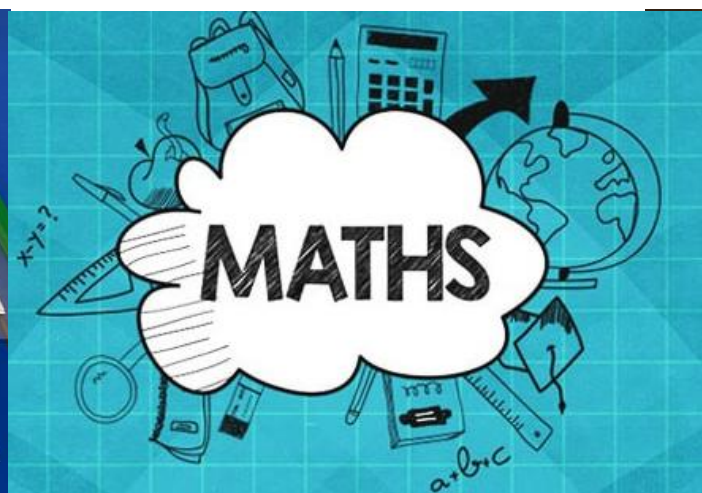


The Maths Curriculum at Brownlow Fold



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Purpose of Study

Mathematics is a rich, creative and highly connected subject that helps us to make sense of the world. Through the White Rose approach, children build fluency, reason mathematically and solve problems in a variety of contexts. Mathematics is essential to everyday life, critical to science, technology and engineering, and underpins financial literacy and most forms of employment. This is why mathematics is a central part of the National Curriculum: it equips pupils with the knowledge and skills they need to succeed in education, work and life. A high-quality mathematics education therefore provides pupils with a secure foundation for understanding the world, the ability to think logically and creatively, and the confidence to apply their knowledge in new and unfamiliar situations. It also fosters an appreciation of the beauty, power and elegance of mathematics, while nurturing a sense of curiosity, perseverance and enjoyment.

Curriculum Aims

White Rose Maths follows the **National Curriculum for Mathematics**, ensuring that all pupils:

Become fluent in the fundamentals of mathematics

- Pupils develop **conceptual understanding** and the ability to recall and apply knowledge rapidly and accurately.
- White Rose uses a **small steps approach** and carefully designed practice to secure fluency through varied and intelligent questioning.

Reason mathematically

- Pupils follow a line of enquiry, **conjecturing relationships and generalisations**, and developing an argument or proof using mathematical language.
- White Rose lessons emphasise **talk, reasoning prompts, and stem sentences** so children can explain and justify their thinking with clarity.

Solve problems

- Pupils apply their mathematics to a variety of **routine and non-routine problems**, breaking them down into simpler steps and persevering in seeking solutions.
- White Rose provides **real-life contexts, open-ended tasks, and problem-solving challenges** that encourage resilience and creativity.

The strategic goal for mathematics is clear: by the end of primary education, all pupils must have a secure knowledge of number, calculation and key mathematical concepts, and be able to apply these fluently and accurately. Achieving this will ensure they are fully equipped to access the wider mathematics curriculum in secondary education and to use mathematical skills confidently in everyday life, enabling them to thrive as independent, problem-solving learners.

White Rose Curriculum Design, Methodology, Pedagogy, Teaching Approaches and Calculation Policy

Curriculum Design: The White Rose Maths curriculum is built on the principle that **secure foundational knowledge** underpins all future learning. It is carefully **sequenced into small steps** so that each new concept builds securely on prior knowledge. This structured progression **reduces cognitive overload, prevents gaps**, and ensures pupils **master the basics** before moving on. The curriculum follows a **spiral structure**, with planned opportunities to **revisit, embed and deepen learning** over time.

A strong emphasis is placed on **number**. Schemes of learning dedicate significant time to **number and place value** in the early stages, ensuring pupils gain **confidence and competence** before applying skills across the wider curriculum. The design prioritises **depth before breadth**, allowing teachers to secure deep understanding before moving to new content.

Methodology: The CPA Approach

A central feature of White Rose is the **Concrete–Pictorial–Abstract (CPA)** model:

- **Concrete:** Pupils use **manipulatives** (e.g. counters, cubes, place value equipment) to **bring maths to life** and build **conceptual understanding**.
- **Pictorial:** Learners use **visual representations** (e.g. bar models, number lines, diagrams) to make **connections** and support **reasoning**.
- **Abstract:** Pupils work with **symbols and formal methods**, applying their knowledge with **fluency** and **flexibility**.

This progression ensures both **conceptual understanding** and **procedural fluency**.

Pedagogical Approach White Rose is rooted in a **mastery approach**. All pupils study the **same core content**, ensuring **equity** and **high expectations**. Teachers use **scaffolding, questioning, and manipulatives** to support those who need more practice, while offering **rich challenges** to extend learning. This **“keep up, not catch up”** model ensures no child is left behind.

The curriculum promotes **whole-class progression**, encouraging **peer support, discussion**, and **shared responsibility for learning**

Teaching Strategies

- **Fluency, Reasoning and Problem Solving:** Every lesson develops these three core strands of the National Curriculum.
- **Guided and Independent Practice:** Lessons are carefully structured to include **modelling, shared exploration, and independent application**.
- **Challenge and Depth:** Carefully planned questions extend reasoning and **stretch problem-solving skills**.
- **Retrieval Practice:** Tools such as **Flashback 4** consolidate prior knowledge, strengthen **recall**, and link to new learning.
- **Assessment for Learning:** Ongoing **assessment through questioning, discussion, and practice tasks** enables teachers to quickly identify and address **misconceptions**

The White Rose Maths curriculum provides a **coherent, inclusive, and research-informed approach** to teaching. By combining **structured progression**, the **CPA model**, **mastery principles**, and consistent opportunities for **fluency, reasoning, and problem solving**, it ensures pupils develop a **deep, long-term, and adaptable understanding of mathematics**. Our commitment is that every child leaves primary education **fluent, confident, and prepared** for the next stage of mathematical learning.

Calculation Policy

Brownlow Fold's calculation policy follows the White Rose Maths Calculation Policy, which is the scheme consistently used across all year groups. This policy provides a structured approach to teaching mathematical operations and ensures continuity in learning. The full policy can be found as Appendix A to this document, where it outlines the key strategies and expectations for teaching calculation across the school.

Principles of Direct Instruction and White Rose

At Brownlow Fold, our teaching is underpinned by the **Principles of Direct Instruction**: clear modelling, guided practice, frequent checking for understanding, and scaffolded support. The White Rose Maths curriculum aligns closely with these principles, ensuring consistency across our whole-school approach.

<u>Review:</u> Each lesson contains a short review of previous learning to strengthen connections and recall. 	<u>Modelling & Explanations:</u> Models and worked examples are provided to demonstrate learning in action (I DO) 	<u>Guided Practice:</u> Practice is guided by the teacher as pupils begin to practice new learning. Teachers offer support and prompts (WE DO) 	<u>Checking for Understanding:</u> The teachers continuously check for understanding by asking questions and giving feedback. 	<u>Independent Practice:</u> The teacher monitors independent practice, ensuring learning become automatic (YOU DO) 
<u>Small Steps:</u> New material, such as a calculation method, is presented in small steps with opportunities to practise, reducing cognitive overload. 	<u>Questioning:</u> Children are asked lots of questions and responses checked for pupil understanding. 	<u>Scaffolding:</u> The teacher provides support and scaffolds for difficult tasks which are gradually removed. 	<u>High Success Rate:</u> Aim for a high success rate during instruction to build confidence and to promote motivation. 	<u>Review:</u> The teacher facilitates daily, weekly and monthly retrieval practice to strengthen knowledge and promote automatic recall. 

At Brownlow Fold, our approach to teaching is built on **clarity, structure, and high expectations** for every learner. The White Rose Maths curriculum reflects this approach and aligns closely with **Rosenshine's Principles of Direct Instruction**, supporting equity and excellence for all pupils, including those who find mathematics more challenging.

Lessons begin with **retrieval practice** to activate prior knowledge and identify gaps before new learning is introduced. New concepts are presented in **small, carefully sequenced steps**, with teachers providing clear modelling and explanations using the **Concrete–Pictorial–Abstract (CPA)** approach. **Targeted questioning** is used throughout to check understanding and address misconceptions as they arise.

Pupils progress from **guided practice** to **independent application**, supported by appropriate scaffolding, ongoing assessment, and immediate feedback. This ensures learning is secure, confidence is built, and a **high success rate** is maintained. Knowledge and skills are revisited through **systematic retrieval** across lessons, units, and terms, strengthening retention and supporting long-term learning.

This structured, research-informed approach underpins our belief that **all pupils can succeed in mathematics** when teaching is explicit, responsive, and appropriately challenging.

Rosenshine's Principles in Maths

- Maths teaching is explicit, structured, and cumulative.
- Prior learning is reviewed at the start of lessons to secure prerequisite knowledge.
- New learning is introduced through clear modelling and worked examples.
- Content is broken into small steps to reduce cognitive load.
- Guided practice supports pupils as new learning is developed.
- Understanding is checked continuously through questioning and formative assessment.
- Independent practice builds fluency and automaticity once learning is secure.
- Scaffolds and representations are used strategically and gradually withdrawn.
- Lessons are designed to ensure high levels of success for all pupils.
- Retrieval practice is embedded daily and over time to secure long-term retention.

White Rose Maths – Teaching Sequence and Delivery in Practice Lesson Structure Overview

White Rose Maths lessons follow a consistent, research-informed structure to support progression, understanding, and mastery. Each lesson is structured to build on prior knowledge, address misconceptions in real time, and develop fluency, reasoning, and problem-solving skills.

1. Retrieval Practice (Lesson Opening)

Key Stage 1:

- Begins with a short retrieval activity to activate prior knowledge and secure number sense.
- This may include:
 - Rote counting (forwards/backwards).
 - Recapping the previous lesson's key concept.
 - Using manipulatives (e.g., "Show me 32 using Dienes").
 - Quick number sense activities to reinforce foundational understanding.

Key Stage 2:

- Retrieval begins with a **metacognitive prompt**, where children:
 - Vocalise their thinking.
 - Identify the knowledge they need.
 - Discuss the strategies or skills they might use.
- This is followed by the **White Rose Starter**, which:
 - Recaps essential prerequisite knowledge for the lesson.
 - Enables teachers to assess understanding and plug any gaps before introducing new content.

2. White Rose Starter / Fluency Activity

- Designed to warm up pupils' thinking and build confidence.
- Focuses on skills directly related to the day's objective.
- Provides formative insight into which pupils may need additional support or intervention.
- Used flexibly to revisit misconceptions from previous lessons or units if needed.

3. Main Teaching Input

Delivered using the '**I do, We do, You do**' model, based on direct instruction principles:

- **I do** – The teacher models the concept clearly, verbalising their thought process and demonstrating strategies.
- **We do** – Guided practice with the class, allowing for scaffolding and questioning.
- **You do** – Independent or partner practice to embed learning, with ongoing monitoring and support.

Teaching is underpinned by the use of:

- Representations and structures (concrete, pictorial, abstract).
- Accurate mathematical vocabulary.
- Stem sentences to support reasoning and explanation

4. Live Marking and AfL (Assessment for Learning)

- Teachers use **live marking** to provide immediate feedback.
- AfL strategies are used throughout, including:
 - Targeted questioning.
 - Mini whiteboards for quick responses.
 - Paired discussion and reasoning prompts.
- Lessons are adaptive – teachers **pause the lesson** to address misconceptions **at the point of learning**.

5. Review and Reflection (Lesson Close)

- Recap of the learning objective and success criteria.
- Pupils reflect on what they have learned and how they have learned it.
- May include:
 - A final challenge question.
 - Sharing strategies or solutions.
 - Identifying common misconceptions and how they were overcome.

Consistency Across the School

This approach ensures:

- A consistent lesson structure across year groups.
- A focus on developing deep, secure mathematical understanding.
- Responsive teaching that meets the needs of all learners.

Strategic Focus: Prioritising and securing strong foundational knowledge and the development of fluency, reasoning, and problem-solving skills.

Our strategy reflects a moral and professional commitment to equity in mathematics. We recognise that secure mathematical foundations are the gateway to the wider curriculum, and we are determined to close gaps for our most vulnerable learners. By prioritising core knowledge, embedding essential number skills, and providing targeted support for the bottom 20% of readers to access their mathematical learning, we ensure that every child has the opportunity to succeed. Our commitment is that all pupils leave primary education fluent, confident, and fully prepared for the next stage of mathematical learning.

Foundational Knowledge in White Rose Maths: At the heart of the White Rose Maths curriculum is the belief that **secure foundational knowledge is the key to long-term mathematical success**. From the earliest stages, the curriculum places a strong emphasis on **developing number sense**, including a deep understanding of place value, number bonds and multiplication facts. These core skills are treated as the **building blocks of all future learning** and are revisited frequently to ensure they become automatic.

The curriculum is designed so that **learning is broken into small, connected steps**, enabling pupils to master one concept fully before moving on. This reduces the risk of gaps developing and allows children to build confidence gradually. Concepts are not taught in isolation but are carefully sequenced so that new ideas grow from what pupils already know, reinforcing connections and strengthening recall.

To secure this foundation, White Rose employs the **concrete–pictorial–abstract approach**, allowing pupils to first explore ideas practically, then visualise them, and finally apply them in symbolic and formal ways. This ensures that children understand not just *how* to carry out a procedure but also *why* it works, giving them flexibility and depth of understanding.

Another way that foundational knowledge is prioritised is through **planned opportunities to revisit and embed learning**. Retrieval strategies such as Flashback 4 and the spiral structure of the curriculum mean that prior knowledge is constantly drawn upon and strengthened. By revisiting earlier content in new contexts—such as linking fractions to division or ratio to multiplication—children deepen their understanding and retain it more securely.

Through these approaches, White Rose ensures that **every child develops a secure and lasting foundation** in mathematics. This allows pupils not only to recall facts and methods with confidence but also to apply their knowledge effectively to reasoning and problem-solving, preparing them for the increasing complexity of mathematics as they progress through school.

Basic Skills The teaching of basic mathematical skills is a non-negotiable priority, as these foundations underpin all future learning. Fluency in number, confidence in written and mental methods, and accurate use of mathematical language are essential for pupils to access the wider curriculum. High expectations, consistent routines, and carefully structured practice ensure pupils secure these skills and apply them with independence.

Basic Maths Skills – Non-Negotiable Priorities

- **Number sense and place value** – developing secure understanding of numbers, their relationships, and the number system.
- **Number formation** – ensuring digits are written clearly, accurately, and consistently.
- **Calculation and fluency** – embedding efficiency, flexibility, and accuracy in mental and written methods.
- **Mathematical vocabulary** – explicitly teaching and revisiting precise language to strengthen reasoning, explanation, and communication.
- **High expectations and consistent methods** – reducing misconceptions and supporting progression across year groups.
- **Structured practice and routines** – enabling pupils to consolidate skills and apply them independently across mathematical contexts.

Addressing the Needs of the Bottom 20% Readers in Maths At Brownlow Fold we place a particular emphasis on supporting the lowest 20% of readers. We offer targeted support for the bottom 20% in reading because fluency is essential for accessing the wider curriculum. Without secure reading skills, pupils risk falling behind across all subjects. Early identification and intervention ensure that children receive the support they need to close gaps, build confidence, and develop positive attitudes towards reading.

Key features of our approach to support the bottom 20% readers:

- **Systematic use of assessment** – to monitor progress closely and highlight gaps in knowledge and skills.
- **Structured interventions** – including additional phonics, precision teaching, and guided reading tailored to need.
- **Skilled adult support** – deploying trained staff to deliver intensive, high-quality teaching.
- **Motivation and engagement** – fostering positive attitudes to reading through carefully chosen texts that are both accessible and enjoyable.

We recognise that pupils in the bottom 20% for reading may face additional barriers in accessing maths. To ensure equity, we provide targeted support so that weak reading does not limit mathematical progress. Key strategies focus on reducing language barriers, supporting comprehension of tasks, and ensuring that all pupils can access the curriculum with confidence.

Key features of our approach in Maths to overcome barriers:

- **Systematic use of assessment** – to identify where reading difficulties impact understanding of mathematical vocabulary, problem-solving, or written tasks.
- **Structured support** – simplifying and scaffolding text in questions, pre-teaching key mathematical vocabulary, and using visual/pictorial representations to reduce reliance on reading alone.
- **Deployment of skilled adults** – providing guided support in reading questions aloud, explaining terminology, and modelling how to extract information from texts.
- **Daily classroom practice** – teachers explicitly teach and revisit mathematical language, use stem sentences, and provide opportunities to discuss reasoning verbally before recording in writing.
- **Motivation and engagement** – offering accessible, clearly structured tasks and ensuring success builds confidence in both reading and mathematics.

Adaptive Teaching

At Brownlow, we are committed to providing every pupil with the opportunity to experience success. Our whole-school approach ensures that:

- **Lessons are adapted**, while maintaining **high expectations**, so that all pupils are supported to meet the same ambitious outcomes.
- **New content is carefully balanced**, enabling pupils to secure mastery of key concepts before progressing.
- **Learning support staff are deployed effectively**, maximising the impact of targeted support.
- **Provision is quality assured**, with external validation including DAQM (November 2024) and BPTAA (July 2025).

All pupils access the **same broad and ambitious curriculum**, with **scaffolds provided where needed** to ensure equity and high achievement. This approach not only raises attainment but also raises aspirations for all learners.

Teachers use a range of strategies tailored to pupils' needs, while also making **in-the-moment adaptations**—for example, adjusting language, clarifying tasks, re-explaining concepts, or presenting information in a different way.

The White Rose Maths curriculum is designed to provide **equity and excellence** for all learners. Its **small-step, carefully sequenced design** supports adaptive teaching by ensuring that new content builds securely on prior knowledge and allows teachers to respond to the needs of individual pupils.

Key Features of Adaptive Teaching in White Rose

- **Mastery for all:** The curriculum follows a **whole-class mastery approach**, where all pupils study the same core content. Adaptive teaching ensures that while the learning goals remain consistent, the *journey to get there* is adjusted to meet pupil needs.
- **Scaffolding and support:** Teachers use **manipulatives, representations, and stem sentences** to make learning accessible. Struggling pupils are given additional guided practice, targeted questioning, and support to secure understanding.
- **Challenge and depth:** Pupils ready to go further are provided with **rich and complex tasks** that extend their reasoning and problem-solving, ensuring they are challenged without accelerating into new content prematurely.
- **Retrieval practice:** Tools such as **Flashback 4** enable teachers to identify misconceptions and address them quickly, while also reinforcing prior knowledge for pupils who need extra consolidation.
- **Assessment for learning:** Ongoing assessment is embedded through **questioning, discussion, and practice tasks**, allowing teachers to make real-time adjustments. This ensures that interventions are immediate, targeted, and prevent pupils from falling behind.

Adaptive Teaching – Classroom Practice to support SEND learners:

At Brownlow, we are committed to ensuring that all pupils, including those with SEND and those who find maths challenging, can access the full White Rose curriculum. Adaptive teaching strategies provide scaffolding, targeted support, and structured opportunities to secure foundations, while maintaining high expectations for every learner.

Key Approaches for Support

- **Concrete–Pictorial–Abstract support:** Pupils are given regular access to manipulatives (counters, cubes, place value equipment) and visual models to strengthen understanding before moving to abstract methods. Concrete and pictorial supports are used consistently to reduce cognitive load and build confidence.
- **Pre-teaching and scaffolding:** Key vocabulary, concepts, and processes are introduced in small groups before the lesson. Equipment, sentence stems, and worked examples are provided to support accuracy and independence.
- **Explicit instruction:** Teachers model strategies step by step, followed by guided practice before pupils attempt tasks independently. Clear language and repetition help pupils retain key ideas.
- **Targeted questioning and discussion:** Teachers check understanding regularly, simplify or rephrase questions where needed, and use paired talk to give pupils extra thinking time before responding.
- **Guided practice and intervention:** Pupils who struggle rehearse methods alongside an adult before working alone. Misconceptions are addressed immediately so pupils can “keep up, not catch up.”
- **Short, structured tasks:** Work is broken into manageable chunks with frequent reinforcement and opportunities to revisit key skills.
- **Retrieval practice:** Tools such as *Flashback 4* strengthen recall of prior learning, ensuring that essential knowledge is not forgotten.
- **Flexible grouping:** Pupils may work in small focus groups for targeted intervention, with skilled adults providing additional support where needed.
- **Use of resources and technology:** Adapted materials, ICT tools, and visual prompts are available to reduce barriers to learning. Resource boxes provide equipment for independent access. **LBQ (Learning by Questions)** is used to promote fluency, providing adaptive question sets, immediate feedback, and opportunities for independent practice.
- **Supportive environment:** Classrooms are organised, clutter-free, and display key mathematical vocabulary with visual prompts to aid recall and understanding.

Adaptive Teaching in Maths – Challenge for Higher Ability Pupils

Within the White Rose Maths curriculum, adaptive teaching ensures that higher ability pupils are challenged while engaging with the same core content as their peers. The emphasis is on **depth before acceleration**, extending understanding rather than moving prematurely into new content.

Key Approaches for Challenge

- **Challenge through depth:** Pupils tackle multi-step problems, unfamiliar contexts, and open-ended investigations that require them to think critically and apply knowledge creatively.
- **Reasoning and problem solving:** Pupils justify, explain, and prove solutions using precise mathematical vocabulary and structured reasoning.
- **Targeted questioning:** Teachers use probing questions to extend thinking, encourage multiple strategies, and deepen understanding.
- **Rich tasks and extensions:** Activities encourage pupils to generalise, make links across topics, and explore “what if?” scenarios.

- **Use of LBQ (Learning by Questions):** Higher attainers use LBQ to access **adaptive questioning sets** that extend fluency, reasoning, and problem solving in real time. Instant feedback challenges misconceptions and promotes independent learning.
- **Collaborative learning:** Pupils work in pairs or groups to discuss, debate, and refine their reasoning, supporting deeper conceptual understanding.
- **Independent application:** Confident learners apply their knowledge flexibly across a range of problems, including real-life and cross-curricular contexts.
- **Use of representations:** Even at higher levels, abstract ideas are connected to concrete and pictorial models to reinforce depth and avoid superficial learning.

Explicit Teaching of Vocabulary

Purpose

The use of **accurate mathematical vocabulary** is essential for pupils to understand, articulate, and communicate mathematical concepts. Without secure command of key terms, children may develop misconceptions, struggle to explain their reasoning, and find it difficult to make connections between ideas.

Explicit teaching of vocabulary supports:

- **Conceptual understanding** – pupils attach meaning to terms and link them to representations and methods.
- **Reasoning and problem solving** – children explain their thinking clearly, use precise language, and justify solutions.
- **Confidence and independence** – accurate use of terms allows pupils to engage fully with the curriculum and wider discussions

How it supports learning

- **Vocabulary is introduced in context** at the point of learning a new concept, e.g. “sharing” in Reception or “denominator” in Key Stage 2.
- **Concrete and pictorial resources** (manipulatives, bar models, diagrams) are used alongside new vocabulary, so pupils connect words with meaning.
- **Repetition and application** across tasks and discussions reinforce accurate usage.
- **Stem sentences and teacher modelling** provide structures for children to practise using language confidently in reasoning.

Progression across year groups

- Vocabulary is listed **only where it is first introduced** to avoid unnecessary repetition. For example, “sharing” is introduced in Reception but revisited throughout subsequent years in new contexts.
- **Revisiting and embedding:** Key terms reappear across units, ensuring children recall and apply them as learning progresses.
- **Building complexity:** New terms are layered onto prior knowledge, e.g. moving from “part” and “whole” in Reception to “numerator” and “denominator” in later years.

- **Consistency across the school:** Teachers use the **progression document** to ensure children encounter the correct vocabulary at the right stage, securing continuity and progression.

Example of vocabulary progression for Place Value:

<u>Nursery</u>	<u>Reception</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
• amount, • backwards, • collection, • count, • few, • fewer (than), • forwards, • how many, • largest, • lot(s), • more (than), • number, • numeral, • same, • smallest, • subitise	• after, • before, • different, • represent, • zero	• compare, • count on, • digit, • fewest, • greater than, • greatest, • less than, • most, • one(s), • order, • partition, • represent, • ten(s), • ordinal numbers (first, second, third, etc)	• exchange, • interval, • least, • multiple, • value,	• ascending, • descending, • hundred(s), • part, • whole	• place holder, • roman, numeral, • round, • thousands	• hundred • thousand(s), • integer, • negative number, • millions, • power of 10, • ten thousand	• ten million

N.B. – Vocabulary is listed only at the point of introduction. In subsequent year groups, pupils are expected to recall and apply previously taught vocabulary as part of their ongoing learning.

Summary

Explicit teaching of vocabulary within White Rose Maths ensures that pupils do not just “do” maths, but can **talk about it, reason with it, and apply it**. By carefully sequencing when words are introduced, revisiting them regularly, and embedding them through practice, pupils build a strong foundation for **deep, long-term understanding** of mathematical ideas.

The Importance of Retrieval Practice

Retrieval practice — the act of recalling previously learned information — is one of the most effective strategies for strengthening memory and improving long-term learning. Research shows that knowledge is forgotten rapidly if not revisited, a process described by **Ebbinghaus' Forgetting Curve**, which illustrates how retention drops steeply over time without reinforcement. Retrieval interrupts this decline: every time pupils recall information, the memory trace strengthens, making it easier to access in the future. This not only improves recall but also helps pupils transfer knowledge to new situations.

At Brownlow Fold, **retrieval practice is a high priority across all areas of the curriculum**. We believe that remembering more leads to knowing more, and we have embedded strategies to ensure pupils revisit and apply prior learning regularly.

Whole-School Approaches

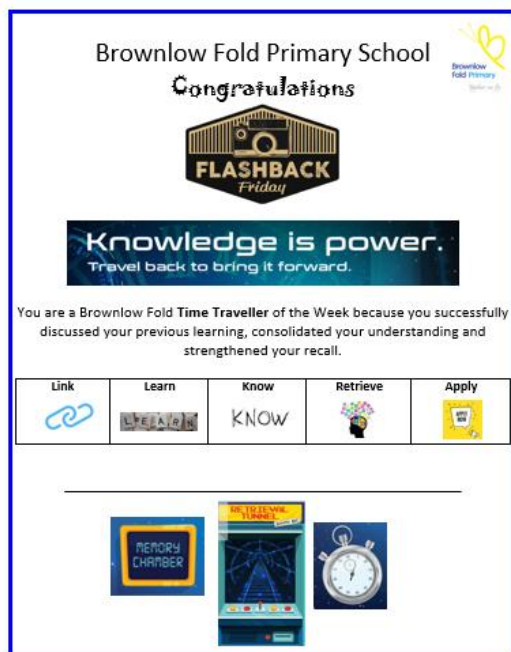
➤ Retrieval Alley

To support retrieval, we have created a **Retrieval Alley** – a corridor that acts as a “memory chamber,” bringing key learning to the forefront of pupils’ minds. Each half term, one year group fills the alley with essential knowledge in an interactive way. Other classes create their own ‘mini chambers or displays within their classrooms’, ensuring retrieval is embedded throughout the school. Each class has a **‘Key Knowledge Box’** containing essential facts, concepts, and vocabulary pupils are expected to retain. These boxes provide clarity on core learning, strengthen long-term retention, and ensure curriculum continuity across the school.



Brownlow Time Traveller

Each class celebrates a 'Time Traveller of the Week' to reward pupils who excel in retrieval activities.



Teachers look for children who:

- Connect current lessons to previous units.
- Recall key facts, vocabulary, and methods with increasing accuracy.
- Explain how prior knowledge has supported their learning today.
- Show effort and positivity in retrieval activities.

Curriculum-Based Retrieval

- **End of unit checks:** At the end of each unit, pupils complete a post-learning task to showcase their knowledge and demonstrate depth of understanding.
- The **Learning Cycle (Learn – Know – Retrieve – Apply)** ensures pupils build on prior knowledge, develop understanding, recall and strengthen key concepts, and confidently apply them to future learning.

<u>Link</u>	<u>Learn</u>	<u>Know</u>	<u>Retrieve</u>	<u>Apply</u>

Focus on prior knowledge through pre learning questions ▪ Within the same subject ▪ Within another subject ▪ From personal experience	Use the prime learning challenge, expressed as a question. Use the information gained from pre-learning tasks and our school context, to answer the subsidiary questions	Use the Knowledge Organisers and the Green for Growth Check	Link ideas to existing knowledge and organise into mental models/schemata	Apply knowledge to future learning
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These approaches ensure pupils are consistently **learning, knowing, retrieving, and applying** knowledge, making connections across the curriculum and strengthening long-term memory.

The White Rose Maths curriculum naturally complements this by embedding retrieval at multiple levels:

Daily Retrieval

- **White Rose:** *Flashback 4* revisits concepts from the previous lesson, last week, last unit, and last term.
- **Whole-School Link:** Mirrors **Retrieval Alley** and classroom mini-chambers, where pupils revisit and display prior learning regularly

Weekly Retrieval

- **White Rose:** Teachers revisit key concepts and vocabulary through problem-solving, fluency checks, and reasoning discussions.
- **Whole-School Link:** Aligns with **Brownlow Time Traveller of the Week**, celebrating pupils who connect current maths learning to prior knowledge and recall facts with accuracy

Unit Retrieval

- **White Rose:** End-of-unit **assessments and challenges** revisit essential knowledge and ensure mastery before moving forward.
- **Whole-School Link:** The **Green for Growth check** allows pupils to showcase understanding, retrieving and applying key concepts highlighted in knowledge organisers.

Termly / Curriculum Retrieval

- **White Rose:** Spiral curriculum design ensures prior topics (e.g. fractions, place value) are revisited and built upon in later units and year groups.
- **Whole-School Link:** Whole-school knowledge organisers and **Retrieval Alley** displays support progression, consistency, and long-term retention across year groups.

Oracy

At **Brownlow Fold**, we view **oracy** as a fundamental skill that underpins learning, social development, and future success. Through deliberate teaching across all subjects, pupils are supported to develop strong speaking and listening skills, use vocabulary and grammar accurately, and communicate with clarity and respect. Oracy at Brownlow Fold not only supports academic achievement, critical thinking, and deeper understanding, but also builds confidence, empathy, and positive relationships. By providing language-rich experiences, we help close attainment gaps, ensuring every child has the opportunity to thrive in school and beyond.

At Brownlow Fold, oracy is deliberately embedded within the **White Rose Maths curriculum** to ensure pupils not only master mathematical concepts but also develop the confidence and precision to communicate their thinking effectively.

- **Mathematical vocabulary:** Each unit introduces and revisits key terminology. Teachers explicitly model its use, and pupils are expected to apply precise language when reasoning, explaining, and justifying solutions.
- **Stem sentences:** Structured sentence frames (e.g. *"I know this because..."*, *"The denominator shows..."*) scaffold pupils' talk, supporting clarity, accuracy, and fluency in communication.
- **Reasoning and discussion:** Lessons are designed to promote high-quality dialogue where pupils explain strategies, justify methods, and respectfully challenge alternative viewpoints, deepening conceptual understanding.
- **Collaborative learning:** Paired talk and group tasks cultivate active listening, respectful dialogue, and constructive questioning, enabling all pupils to rehearse and refine their ideas verbally.
- **Guided questioning:** Teachers use targeted questioning to elicit extended, full-sentence responses that demand explanation and justification, encouraging pupils to verbalise the steps in their thinking.
- **Presenting learning:** Pupils regularly share their strategies and solutions with the class, developing confidence, self-awareness, and the ability to communicate mathematical reasoning to different audiences.
- **Questioning to Strengthen Mathematical Thinking:** Pupils are regularly encouraged to explaining their reasoning and thought process.

At **Brownlow Fold**, we believe that mathematics should be more than simply arriving at the correct answer — it should be about developing children as confident, reflective problem-solvers, further supporting our push on Oracy. Asking children to *"prove it"* by explaining their reasoning, or responding to prompts such as *"How do you know?"* and *"Can you explain?"*, is a powerful teaching strategy that supports this vision. This approach shifts the focus from answer-getting to deeper thinking, reasoning, and communication. It encourages children to make sense of mathematical ideas, articulate their understanding, and engage fully in the process of problem-solving rather than just the outcome.

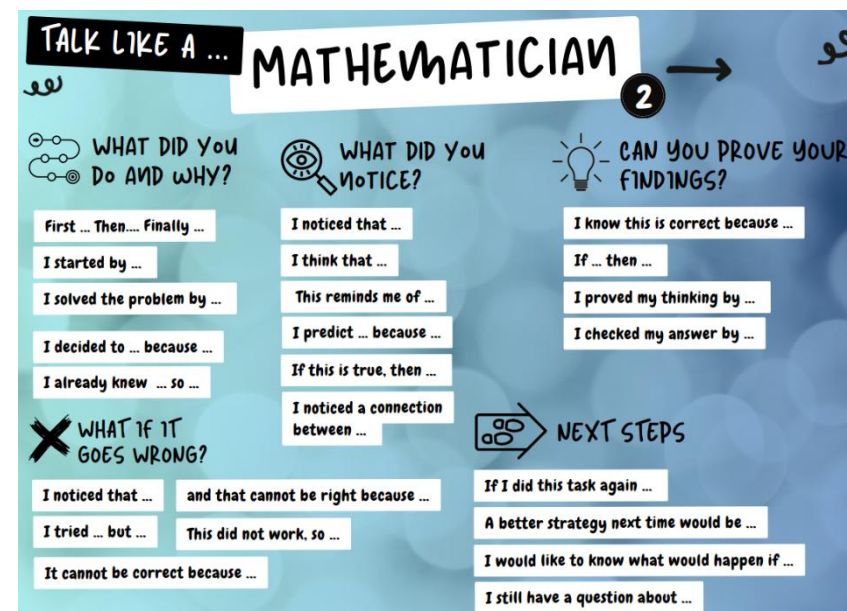
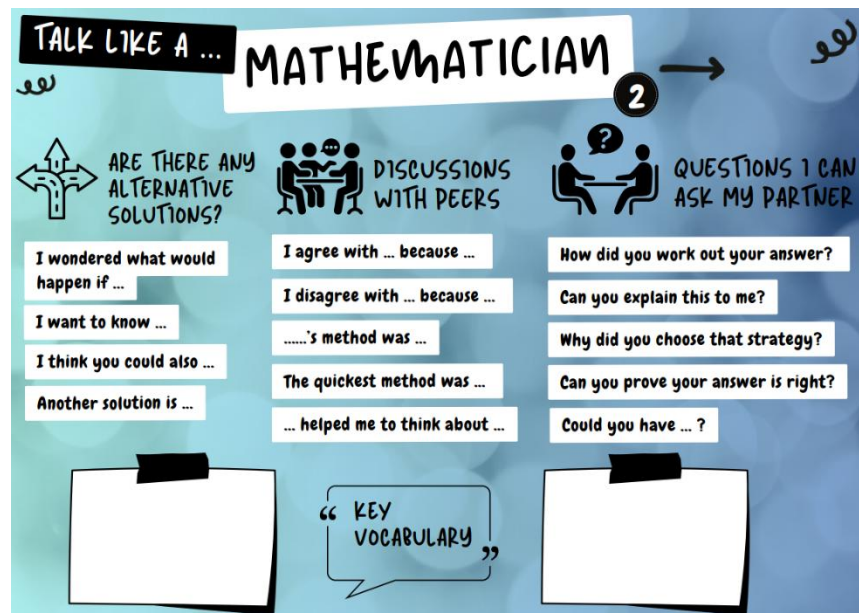
By embedding purposeful questioning into our practice, we:

- **Develop reasoning skills** – enabling children to think logically and justify their ideas.
- **Deepen conceptual understanding** – ensuring pupils understand *why* methods work, not just *how*.
- **Promote mathematical talk** – helping learners use and apply precise vocabulary.

Year Group	General Question Stems	Curriculum-Linked Examples
Early Years / Reception	• Can you show me how you worked it out? • What do you notice? • Is there another way to do it? • How can we check? • Which is the same? Which is different?	<i>Number:</i> “You said there are 8 teddies. How do you know you’ve counted them all?” <i>Shape:</i> “These two shapes look different – what is the same about them?” <i>Pattern:</i> “What comes next in your pattern? How do you know?”
Key Stage 1 (Years 1–2)	• How do you know that is correct? • Can you explain it to a partner? • Is there a pattern? • What happens if we change this number? • Can you prove your answer with objects/pictures/numbers?	<i>Addition/Subtraction:</i> “You said $12 - 7 = 5$. Can you prove it using counters or a number line?” <i>Multiplication/Division:</i> “Is $15 \div 3$ the same as 3×5? How do you know?” <i>Fractions:</i> “If half of 10 is 5, what happens if we halve 12? How do you know?” <i>Geometry:</i> “How do you know this shape is a rectangle?”
Lower Key Stage 2 (Years 3–4)	• Why does this method work? • Can you convince me? • Can you use another strategy to check? • What is the same and what is different about these methods? • Can you create your own example to show this?	<i>Multiplication:</i> “You said $23 \times 4 = 92$. Can you prove it by splitting into $(20 \times 4) + (3 \times 4)$?” <i>Fractions:</i> “You said $3/6$ is the same as $1/2$. How do you know? Can you show it on a diagram?” <i>Measures:</i> “If $100 \text{ cm} = 1 \text{ m}$, how could you prove it with equipment?” <i>Statistics:</i> “Does this bar chart match the data in the table? How do you know?”
Upper Key Stage 2 (Years 5–6)	• Can you explain why this always works/never works? • Is this the most efficient method? Why? • Can you generalise this rule? • What if we used a larger/smaller number – would it still work? • How could you prove this to someone who didn’t believe you?	<i>Fractions/Decimals:</i> “Is it always true that dividing by 10 makes a number smaller? Can you prove it with decimals?” <i>Algebra:</i> “If $n + n = 2n$, can you prove it with numbers and then with a general rule?” <i>Geometry:</i> “The angles in a triangle always add up to 180°. How could you convince someone who doesn’t believe you?” <i>Ratio & Proportion:</i> “If 2 pencils cost £1, does 10 pencils always cost £5? How do you know?”

- **Encourage multiple strategies** – showing that problems can be solved in more than one way.
- **Support formative assessment** – giving teachers valuable insight into pupils’ understanding and misconceptions.

At Brownlow Fold, our aim is to nurture independence, resilience, and curiosity in mathematics, creating learners who can not only solve problems but explain, prove, and reason with confidence. ‘Talk like a ...’ is used throughout the whole school curriculum enable pupils to articulate their learning effectively using appropriate vocabulary and terminology.



By combining **White Rose's mastery approach** with Brownlow Fold's commitment to oracy, pupils learn not just to *do* mathematics but to **talk mathematically**. This strengthens reasoning, secures understanding, and equips pupils with the communication skills essential for academic success and life beyond school.

The Importance of Learning Times Tables

Times tables are a fundamental building block of mathematics. Quick and accurate recall of multiplication and division facts frees up working memory, allowing pupils to concentrate on more complex concepts without being held back by basic calculations. This fluency provides the strong foundation that underpins almost every area of the maths curriculum.

Secure knowledge of times tables supports efficiency in calculation and underlies fluency across all four operations. It is essential for simplifying fractions, finding equivalents, working with ratios, and converting between fractions, decimals, and percentages. Fluent recall also strengthens algebra and problem solving, where processes such as expanding brackets or solving equations depend on multiplication facts. In measures and geometry, times tables enable accurate work with units, area, perimeter, and volume.

Beyond procedural accuracy, times tables help pupils recognise patterns and relationships, deepening conceptual understanding and strengthening reasoning. Mastery also builds confidence by reducing cognitive overload, enabling children to engage with new learning more effectively. Quick recall further develops resilience, allowing pupils to tackle multi-step problems with independence and perseverance.



At Brownlow, the school uses *Times Table Rock Stars* to promote independent practice of times tables beyond the classroom, supporting pupils in developing fluency through engaging, personalised learning.



Learning by Questions (LbQ) is an interactive, digital platform that supports pupils in developing mathematical fluency, reasoning, and problem-solving through carefully structured sequences of questions. Each activity is designed to progress in small steps, giving pupils the chance to practise, apply, and deepen their understanding while receiving instant feedback.

At **Brownlow Fold**, we are committed to using LbQ to give pupils regular opportunities to consolidate prior learning, address misconceptions in real time, and build confidence in tackling new concepts. It is used both **within lessons to extend and challenge learning** and **outside lessons to support retrieval and practice**, ensuring that knowledge is secured and retained over time.

The aims of LbQ in maths are to:

- **Build fluency and accuracy** in core number facts and calculation.
- **Develop reasoning and problem-solving** by guiding pupils through structured challenges.
- **Promote independence and resilience**, encouraging pupils to learn from mistakes and persevere with increasingly complex tasks.
- **Challenge all learners**, providing opportunities to grapple with mathematical ideas, apply knowledge and skills, and reason to solve problems.
- **Support personalised learning**, with immediate feedback that helps pupils to close gaps and extend their understanding.
- **Enhance teaching**, by reducing workload and giving teachers valuable data to inform next steps.

Through its focus on real-time feedback, challenge, and carefully designed question sets, LbQ helps pupils at Brownlow Fold strengthen their mathematical knowledge, apply skills in new contexts, and achieve sustained progress across the curriculum.

Intent:

At Brownlow Fold, our intent is to provide a high-quality mathematics education that is ambitious, inclusive, and fully aligned with the **National Curriculum aims**: to ensure all pupils become fluent in the fundamentals of mathematics, reason mathematically, and solve problems with increasing sophistication.

Guided by the **White Rose Maths curriculum** and our mastery approach, we aim for all pupils to develop deep conceptual understanding, secure fluency, and the confidence to apply their knowledge in real-life and cross-curricular contexts.

We want our children to:

- See themselves as **capable mathematicians** who enjoy challenge, persevere, and learn from mistakes.

- Build secure knowledge of mathematical facts and procedures that supports reasoning and problem solving.
- Use **precise mathematical language and vocabulary** to explain and justify their thinking.
- Access an **inclusive curriculum**, where scaffolds support SEND and disadvantaged learners, while challenge encourages all pupils to think deeply.

Implementation

At Brownlow Fold, the teaching and learning of mathematics is underpinned by a clear and consistent methodology that reflects both the **National Curriculum aims** and the **principles of White Rose Maths**. Our approach is carefully designed to provide pupils with the knowledge, skills, and confidence to become fluent mathematicians who can reason and solve problems effectively. Through coherent curriculum design, evidence-based pedagogy, and a strong learning culture, we ensure that every child is supported and challenged to achieve success in mathematics. The following key features outline how this vision is put into practice in our classrooms.

- **Curriculum design:** We follow the **White Rose Maths scheme of learning**, which provides a carefully sequenced, small-step progression across all year groups. This ensures coherence, coverage of the National Curriculum, and smooth transitions between year groups.
- **Pedagogy:** Teaching follows the principles of **Concrete–Pictorial–Abstract (CPA)** to secure deep understanding. Teachers use **direct instruction**, explicit modelling, and guided practice before moving pupils to independence.
- **Fluency, reasoning & problem solving:** Each lesson balances these three elements. Variation in examples exposes misconceptions, while reasoning and problem-solving tasks encourage children to explain, justify, and generalise.
- **Retrieval practice:** Flashbacks, daily reviews, and interleaving are embedded to strengthen long-term memory and help children make connections.
- **Questioning & assessment:** Teachers use skilled questioning, hinge questions, and mini-whiteboards to assess learning in real time and adapt teaching accordingly. End-of-block White Rose assessments are used to track progress and inform planning.
- **SEND provision:** Pupils with additional needs are supported through pre-teaching, scaffolds, manipulatives, and structured tasks, ensuring access to the same core learning.
- **Challenge & depth:** All pupils are encouraged to move beyond procedural fluency to explore multiple strategies, reason deeply, and tackle non-routine problems.
- **Mathematical language:** Vocabulary is explicitly taught and modelled, with stem sentences used consistently to support precision and clarity in pupil explanations.
- **Learning culture:** Classrooms promote high expectations, resilience, and positive attitudes to maths. Mistakes are seen as opportunities for growth, fostering a climate of curiosity and perseverance.

Impact

At Brownlow Fold, the impact of our mathematics curriculum is seen not only in pupils' outcomes but also in their attitudes and confidence as learners. Our approach ensures that children develop strong knowledge and fluency, while also becoming flexible, resilient problem-solvers who are well prepared for the next stage of their education. We measure success through both academic progress and the development of a positive mathematical mindset, where pupils value mathematics, embrace challenge, and recognise its relevance in the wider world.

- Pupils develop **secure and connected mathematical knowledge** which they can recall and apply with confidence.
- Children are **fluent in fundamental skills** and flexible in applying strategies to reason and solve problems.
- Assessment shows that all pupils, including SEND and disadvantaged, make strong progress from their starting points and achieve outcomes in line with, or above, national expectations.
- Pupils leave Brownlow Fold with the skills and confidence to apply mathematics in the next stage of their education and in their everyday lives.
- Beyond outcomes, pupils demonstrate a **positive mathematical mindset**: they enjoy challenge, value mathematics, and see its importance in the wider world.

White Rose Maths Yearly Overviews

Nursery:

Comparison 1	Shape, space and measure 1	Pattern 1	Counting 1	Counting 2	Subitising 1
More than, fewer than, same	Explore and build with shapes and objects	Explore repeats	Hear and say number names	Begin to order number names	I see 1, 2, 3
Pattern 2	Shape, space and measure 2	Subitising 2	Counting 3	Shape, space and measure 3	Pattern 3
Join in with repeats	Explore position and space	Show me 1, 2, 3	Move and label 1, 2, 3	Explore position and routes	Explore patterns
Counting 4	Shape, space and measure 4	Subitising 3	Comparison 2	Pattern 4	Shape, space and measure 5
Take and give 1, 2, 3	Match, talk, push and pull	Talk about dots	Compare and sort collections	Lead on own repeats	Start to puzzle
Pattern 5	Subitising 4	Counting 5	Pattern 6	Counting 6	Comparison 3
Making patterns together	Make games and actions	Show me 5	My own pattern	Stop at 1, 2, 3, 4, 5	Match, sort, compare

Reception:

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Getting to know you	Match, sort and compare FREE TRIAL	Talk about measure and patterns	It's me 1, 2, 3	Circles and triangles	1, 2, 3, 4, 5	Shapes with 4 sides					
Spring	Alive in 5	Mass and capacity	Growing 6, 7, 8	Length, height and time	Building 9 and 10	Explore 3-D shapes						
Summer	To 20 and beyond	How many rows?	Manipulate, compose and decompose	Sharing and grouping	Visualise, build and map	Make connections	Consolidation					

Year 1:

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value (within 10)					Number Addition and subtraction (within 10)					Geometry Shape	Consolidation
Spring	Number Place value (within 20)			Number Addition and subtraction (within 20)			Number Place value (within 50)		Measurement Length and height	Measurement Mass and volume		
Summer	Number Multiplication and division			Number Fractions		Geometry Position and direction	Number Place value (within 100)		Measurement Money	Measurement Time		Consolidation

Year 2:

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value				Number Addition and subtraction				Geometry Shape			
Spring	Measurement Money	Number Multiplication and division						Measurement Length and height	Measurement Mass, capacity and temperature			
Summer	Number Fractions			Measurement Time			Statistics		Geometry Position and direction	Consolidation		

Year 3:

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value			Number Addition and subtraction					Number Multiplication and division A			
Spring	Number Multiplication and division B			Measurement Length and perimeter			Number Fractions A			Measurement Mass and capacity		
Summer	Number Fractions B		Measurement Money	Measurement Time			Geometry Shape		Statistics			Consolidation

Year 4:

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value				Number Addition and subtraction			Measurement Area	Number Multiplication and division A			Consolidation
Spring	Number Multiplication and division B			Measurement Length and perimeter	Number Fractions				Number Decimals A			
Summer	Number Decimals B		Measurement Money	Measurement Time		Consolidation		Geometry Shape	Statistics	Geometry Position and direction		

Year 5:

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value			Number Addition and subtraction		Number Multiplication and division A			Number Fractions A			
Spring	Number Multiplication and division B			Number Fractions B		Number Decimals and percentages			Measurement Perimeter and area	Statistics		
Summer	Geometry Shape			Geometry Position and direction		Number Decimals			Number Negative numbers	Measurement Converting units	Measurement Volume	

Year 6:

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value		Number Addition, subtraction, multiplication and division					Number Fractions A		Number Fractions B		Measurement Converting units
Spring	Ratio		Algebra		Number Decimals		Number Fractions, decimals and percentages		Measurement Area, perimeter and volume		Statistics	
Summer	Geometry Shape		Geometry Position and direction	Themed projects, consolidation and problem solving								

Whole School Concepts/Golden Threads

At Brownlow, we have identified a set of **key mathematical concepts**—our *Golden Threads*—that run through our curriculum from **EYFS to Year 6**. These threads underpin every aspect of mathematics teaching and learning, supporting teachers to deliver learning in a more coherent and impactful way, and enabling children to **build deep, connected understanding** over time.

Through these threads, pupils continually revisit and extend their knowledge, making links between **prior, current, and future learning**. Our approach aligns closely with the principles of **White Rose Maths** and the **Mastery approach**, ensuring that all children develop fluency, reasoning, and problem-solving skills within a coherent and progressive framework.

Our Golden Threads of Mathematical Learning and National Curriculum links

Golden Thread	Linked NC Aims & Domains	Description of Connection
Number Sense & Place Value	<i>Number – Number and Place Value (EYFS–Y6)</i>	The foundation of all calculation and reasoning. Pupils understand how our number system works, recognising patterns and relationships between numbers and their values.
Calculation Fluency	<i>Number – Addition & Subtraction; Multiplication & Division; Fractions</i>	Ensures pupils can efficiently and accurately carry out the four operations using both mental and written methods, building fluency and flexibility.
Part–Whole Relationships	<i>Number – Number and Place Value; Fractions; Algebra</i>	Supports understanding of how numbers are composed and decomposed; develops reasoning about equivalence, factors, multiples, and later algebraic generalisation.
Representation & Structure (CPA)	Embedded across all NC strands	The Concrete–Pictorial–Abstract approach reveals mathematical structures, ensuring pupils understand <i>why</i> methods work before abstracting them.
Reasoning & Problem Solving	One of the <i>three NC aims</i> (Reason mathematically; Solve problems)	Encourages children to explain, justify, and generalise, building deeper understanding and resilience in unfamiliar contexts.
Mathematical Language & Vocabulary	<i>All domains</i> – integral to communication and reasoning	Ensures pupils use accurate mathematical vocabulary, verbalising thinking and supporting precision in reasoning.
Connections & Coherence	Cross-links all domains (esp. Number ↔ Geometry ↔ Measure ↔ Algebra)	Highlights relationships between areas of maths, ensuring that learning is cumulative, coherent, and transferable.
Metacognition & Mathematical Habits	Embedded across all aims	Encourages pupils to think about their thinking, reflect on efficiency, and develop a growth mindset.

Progression of Golden Threads: EYFS → Year 6 (Linked to National Curriculum Domains)

Thread	EYFS (Statutory Framework)	KS1 (Y1–Y2)	LKS2 (Y3–Y4)	UKS2 (Y5–Y6)	National Curriculum Link
Number Sense & Place Value	Counting, comparing, ordering, subitising	Place value to 100; tens and ones	Place value to 10 000; rounding	Place value to 10 000 000; decimals	<i>Number – Number & Place Value</i>
Calculation Fluency	Combining sets, early addition/subtraction	Add/subtract within 100; early multiplication	Formal written methods; tables to 12×12	Long multiplication/division; mental strategies	<i>Number – Addition, Subtraction, Multiplication & Division</i>
Part–Whole Relationships	Composing/decomposing numbers	Number bonds, doubles, inverse facts	Factors, multiples, derived facts	Fractions, percentages, algebraic structure	<i>Number – Fractions; Algebra</i>

Thread	EYFS (Statutory Framework)	KS1 (Y1–Y2)	LKS2 (Y3–Y4)	UKS2 (Y5–Y6)	National Curriculum Link
Representation & Structure (CPA)	Manipulatives, pictures, informal marks	Base-10, tens frames, bar models	Arrays, number lines, fraction walls	Algebraic, ratio models, double number lines	<i>All domains (CPA embedded)</i>
Reasoning & Problem Solving	Compare, explain, justify in play	Explain methods, choose operations	Multi-step reasoning, patterns	Proof, generalisation, evaluating efficiency	<i>NC Aims: Reason mathematically; Solve problems</i>
Language & Vocabulary	Informal comparison words	Mathematical terms (add, equal, total)	Formal vocabulary (product, quotient)	Abstract vocabulary (variable, ratio)	<i>All domains</i>
Connections & Coherence	Linking number, shape, pattern	Connecting number & measure	Multiplication $\leftrightarrow$ area; fractions $\leftrightarrow$ division	Ratio $\leftrightarrow$ proportion $\leftrightarrow$ algebra	<i>All domains</i>
Metacognition & Habits	Curiosity, confidence, pattern spotting	Checking, correcting, perseverance	Self-monitoring, reasoning choices	Strategic thinking, evaluating efficiency	<i>NC Aims: Fluency; Reasoning; Problem solving</i>

Embedding the Golden Threads through White Rose Maths

The **Golden Threads of Learning** are fully embedded within the *White Rose Maths* small steps of progression, ensuring a consistent, coherent, and mastery-based approach across the whole school.

White Rose Maths provides the **conceptual spine** for mathematics at Brownlow, ensuring that each unit and lesson contributes directly to pupils' long-term mathematical development.

- Each year group builds directly on what has come before, ensuring clear **coherence and progression** from EYFS through to Year 6.
- Learning follows a **concrete → pictorial → abstract (CPA)** journey, allowing pupils to develop secure conceptual understanding before moving to formal methods.
- Core knowledge and skills are **revisited and deepened** over time, not repeated superficially, enabling genuine mastery.
- Teachers use **consistent models, images, and language** throughout the school, supporting familiarity and fluency.
- Units from **EYFS to Year 6** are built around the same **conceptual progression** (Number → Calculation → Application), reinforcing understanding of structure across domains.
- **Fluency, reasoning, and problem solving** are embedded within every lesson, ensuring a balanced and connected approach to mathematical learning.
- Ongoing **assessment through Ready to Progress criteria and end-of-block checks** tracks the development of each Golden Thread, supporting both teacher planning and pupil progress.

By the end of Year 6, pupils at **Brownlow** will:

- Demonstrate **secure number sense** and **fluency** in calculation across all operations.
- Apply **reasoning skills** confidently and independently across all areas of mathematics.
- Make **meaningful connections** between mathematical ideas, recognising how concepts link across domains such as number, geometry, measure, and algebra.
- Communicate their understanding using **precise mathematical language**, articulating reasoning clearly both verbally and in writing.
- Show **conceptual fluency, confidence, and curiosity**, approaching mathematical challenges with resilience and enjoyment.
- Be **fully prepared for the next stage of mathematical learning** at Key Stage 3 and beyond, equipped for lifelong mathematical thinking and problem solving.

Example of Progressive Learning: Fractions & Proportional Reasoning (EYFS → Year 6)

(Demonstrating cumulative knowledge and skill development)

Phase / Year	Key Knowledge & Concepts	Skills Developed	Representation & Models	Mathematical Language
EYFS	- Understands the idea of sharing and grouping through play. - Recognises when things are “the same” or “different” in size or quantity. - Uses early experiences with shape and pattern to explore “part” and “whole”.	- Shares objects fairly between two groups. - Begins to describe equal and unequal groups. - Notices halves in shapes or sets informally.	Concrete play: food, playdough, pattern blocks, sharing toys.	half, share, equal, same, fair
Year 1	- Understands half and quarter as equal parts of a whole (shape, object, quantity). - Links fractions to sharing and grouping.	- Finds halves and quarters of shapes and small sets of objects. - Begins to connect division and fractions through sharing.	Shapes cut into parts, folding paper, fraction mats.	half, quarter, part, whole, equal
Year 2	- Recognises and names $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{3}{4}$. - Understands fractions as equal parts of a whole or set. - Begins to recognise simple equivalence (e.g., $\frac{2}{4} = \frac{1}{2}$).	- Finds fractions of numbers and shapes. - Represents fractions on a number line. - Compares unit fractions.	Fraction walls, number lines, bar models.	numerator, denominator, fraction, equal parts
Year 3	- Understands that fractions are numbers on the number line. - Recognises and uses unit and non-unit fractions (e.g., $\frac{1}{4}$, $\frac{3}{4}$). - Finds fractions of quantities.	- Adds/subtracts fractions with the same denominator. - Connects fractions with division and scaling.	Bar models, fraction strips, part-whole models.	unit fraction, non-unit fraction, whole, equal parts
Year 4	- Recognises equivalent fractions and converts between them. - Understands fractions as division ($\frac{3}{4} = 3 \div 4$). - Introduces decimals (tenths and hundredths).	- Compares, orders, and simplifies fractions. - Converts between mixed numbers and improper fractions.	Place value grids, decimal-fraction walls, number lines.	equivalent, improper, mixed number, tenths, hundredths

Phase / Year	Key Knowledge & Concepts	Skills Developed	Representation & Models	Mathematical Language
Year 5	- Deepens understanding of equivalence and relationships between fractions, decimals, and percentages. - Connects scaling, ratio, and proportion to fraction concepts.	- Adds/subtracts fractions with different denominators. - Converts between FDP. - Solves scaling and proportion problems.	Bar models, double number lines, ratio tables.	percentage, ratio, proportion, convert, scale factor
Year 6	- Extends proportional reasoning to algebraic contexts. - Understands ratio as a multiplicative relationship. - Applies fraction and ratio knowledge in problem solving and real-life contexts.	- Solves complex problems involving ratio, proportion, and percentages. - Uses algebra to generalise relationships.	Algebraic models, formulae, ratio tables, pie charts.	ratio, proportion, variable, formula, algebraic relationship

Golden Thread in action: The **Fractions and Proportional Reasoning** thread begins in EYFS with simple sharing and fairness, builds in KS1 through halving, quartering, and recognising parts of a whole, and expands in KS2 into equivalence, scaling, and percentage relationships. By Year 6, pupils apply proportional thinking in algebraic and real-world contexts. This progression illustrates deepening understanding of part–whole relationships and multiplicative reasoning, sustained by consistent representations, mathematical language, and the concrete–pictorial–abstract model.

Example of Progressive Learning: Place Value & Number Sense (EYFS → Year 6)

(Demonstrating cumulative knowledge and skill development)

Year / Phase	Knowledge & Conceptual Focus	Skill Development	Linked Golden Threads	Representation & Models	Mathematical Language
EYFS	Understands that numbers represent quantity; counts with one-to-one correspondence; compares sets.	Counts to 10, orders small numbers, subitises to 5.	Number Sense & Place Value Representation & Structure	Counters, tens frames, numicon, number tracks.	count, more, fewer, same, order, how many
Year 1	Understands tens and ones; represents numbers to 100 using objects and images.	Reads, writes, orders, and compares numbers to 100; counts in 2s, 5s, 10s.	Number Sense Representation Reasoning	Base-10 blocks, bead strings, number lines.	digit, tens, ones, compare, order
Year 2	Understands place value to 1000; groups in tens and hundreds.	Counts forwards/backwards in 10s and 100s; understands value of each digit.	Number Sense Reasoning	Place-value charts, part–whole models.	hundreds, partition, regroup, value
Year 3	Understands 100s, 10s, 1s; begins rounding and comparing 3-digit numbers.	Estimates, rounds to nearest 10/100; recognises patterns.	Number Sense Reasoning	Number lines, base-10, digit cards.	round, estimate, pattern, sequence
Year 4	Understands 4-digit numbers; introduces decimals (tenths).	Reads, writes, compares up to 10 000; links decimals to fractions.	Number Sense Part–Whole	Place-value counters, decimal grids.	thousands, tenths, decimal point, value

Year / Phase	Knowledge & Conceptual Focus	Skill Development	Linked Golden Threads	Representation & Models	Mathematical Language
Year 5	Place value to 1 000 000; decimals to thousandths; negative numbers.	Rounds, scales, and interprets number patterns; uses powers of 10.	Number Sense Representation	Place-value charts, number lines, scales.	thousandths, power of ten, negative, scale
Year 6	Place value to 10 000 000; understands relationships between whole numbers and decimals.	Uses rounding for estimation; scales and compares magnitudes.	Number Sense Reasoning & Problem Solving	Place-value grids, abacuses, bar models.	millions, magnitude, estimate, decimal place

Golden Thread in Action: The **Place Value and Number Sense** thread begins in EYFS with children recognising quantity, comparing amounts, and understanding that numbers represent ‘how many’. It develops through structured counting, partitioning, and an understanding of tens and ones in KS1, before expanding to thousands, decimals, and negative numbers in KS2. By Year 6, pupils are confidently working with numbers to ten million and scaling by powers of ten. This thread demonstrates a clear progression from concrete counting experiences to abstract place-value reasoning, underpinned by consistent models, precise language, and the CPA approach.

Example of Progressive Learning: Multiplication, Division, Scaling & Area (EYFS → Year 6)

(Demonstrating cumulative knowledge and skill development)

Year / Phase	Knowledge & Conceptual Focus	Skill Development	Linked Golden Threads	Representation & Models	Mathematical Language
EYFS	Repeats patterns, counts equal groups in play.	Begins skip counting; arranges equal groups.	Calculation Fluency Part–Whole	Grouping objects, arrays, pattern play.	group, same, altogether, equal
Year 1	Introduced to repeated addition and equal groups.	Makes arrays; doubles and halves numbers to 20.	Calculation Fluency Representation	Counters, arrays, bead strings.	double, half, group, repeat, array
Year 2	Understands multiplication as repeated addition and division as sharing/grouping.	Recalls 2s, 5s, 10s tables; divides by grouping.	Calculation Fluency Reasoning	Arrays, bar models, number lines.	multiply, divide, share, equal groups
Year 3	Develops 3, 4, 8 tables; links to area and scaling.	Uses arrays and bar models to represent problems.	Calculation Part–Whole Representation	Arrays, area grids, bar models.	factor, multiple, scale, row, column
Year 4	Masters all tables to 12×12; uses formal methods.	Solves problems with scaling and correspondence.	Calculation Fluency Reasoning	Place-value counters, area models.	product, quotient, factor, inverse
Year 5	Applies multiplication/division to scaling, area, and volume.	Uses long multiplication/division; interprets remainders contextually.	Calculation Connections & Coherence	Area/volume models, grid methods.	remainder, square, area, volume, scale

Year / Phase	Knowledge & Conceptual Focus	Skill Development	Linked Golden Threads	Representation & Models	Mathematical Language
Year 6	Extends multiplicative reasoning to ratio, proportion, and algebraic contexts.	Solves complex multi-step problems using efficient strategies.	Calculation Connections Reasoning	Ratio tables, double number lines, algebraic expressions.	ratio, proportion, variable, expression

Golden Thread in action: The **Calculation and Scaling** thread begins with grouping and doubling in EYFS, develops through repeated addition, times tables, and written methods in KS1 and lower KS2, and extends into proportional reasoning, ratio, and algebra in Year 6 — showing conceptual continuity through the CPA approach and consistent reasoning language. Pupils move from manipulating real objects to interpreting abstract multiplicative relationships, demonstrating fluency, reasoning, and problem-solving at increasing levels of sophistication.

Key Pedagogical Principles across all three examples:

Concrete → Pictorial → Abstract (CPA)

- **Universal Principle:**
The CPA approach underpins *all* mathematical learning in the White Rose Maths and mastery framework.
- **In Place Value:** pupils handle counters or Numicon (concrete), move to base-10 and number lines (pictorial), then interpret digits and columns (abstract).
- **In Multiplication & Division:** pupils group counters and arrays (concrete), draw area/bar models (pictorial), then use formal written methods (abstract).
- **In Fractions:** pupils share shapes or objects (concrete), move to fraction walls and bar models (pictorial), then to symbolic notation ($\frac{1}{2}$, $\frac{3}{4}$, etc.).
- **Linked Golden Threads:**
Representation & Structure · Number Sense · Part–Whole Relationships

Fluency, Reasoning, Problem Solving

- **Universal Principle:**
These are the *three core National Curriculum aims* and are integral to every strand of mathematical learning.
- **In Place Value:** reasoning about magnitude (“Which number is larger?”), explaining place value shifts ($\times 10 \div 10$).
- **In Multiplication/Division:** exploring factor relationships, scaling patterns, and interpreting remainders contextually.
- **In Fractions:** comparing sizes, solving “what fraction of” problems, and reasoning about equivalence.
- **Linked Golden Threads:**
○ *Reasoning & Problem Solving · Calculation Fluency*

Consistent Language and Models

- **Universal Principle:**
Consistent representations and vocabulary enable children to recognise connections between topics as they progress.
- **In Place Value:** “tens” and “ones” evolve into “tenths” and “hundredths” in decimals — same linguistic structure, deepened meaning.
- **In Multiplication/Division:** arrays, bar models, and “groups of” language are used continuously from EYFS to Y6.
- **In Fractions:** “part-whole”, “equal parts”, “denominator” — developed with precision each year.
- **Linked Golden Threads:**
 Representation & Structure ·  Mathematical Language

Interconnected Learning

- **Universal Principle:**
Mathematics is taught as an interrelated discipline; learning in one domain strengthens understanding in others.
- **In Place Value:** connects to scaling ($\times 10$, $\div 10$), decimals, and metric conversions.
- **In Multiplication/Division:** connects to area, ratio, fractions, and algebraic representation.
- **In Fractions:** connects number, measure, and algebra as part of a unified number system.
- **Linked Golden Threads:**
 Connections & Coherence ·  Reasoning & Problem Solving

Summary Table: Universal Application of Key Pedagogical Principles

Pedagogical Principle	Applies to	Key Golden Threads	Impact
Concrete → Pictorial → Abstract	All three examples	Representation & Structure; Number Sense	Deepens conceptual understanding before abstraction
Fluency, Reasoning, Problem Solving	All three examples	Calculation Fluency; Reasoning & Problem Solving	Balances skill, understanding, and application
Consistent Language and Models	All three examples	Mathematical Language; Representation & Structure	Ensures conceptual continuity and reduced cognitive load
Interconnected Learning	All three examples	Connections & Coherence; Part-Whole	Promotes schema-building and transfer of knowledge

Curriculum Content:

Year 1 Number and Place Value

Number and Place Value

- 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 2s, 5s and 10s. Given a number, identify 1 more and 1 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.

Addition and Subtraction

- Read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs.
- Represent and use number bonds and related subtraction facts within 20.
- Add and subtract one-digit and two-digit numbers to 20, including 0.
- Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = ? - 9$.

Multiplication and Division

- 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.

Fractions

- Recognise, find and name a half as 1 of 2 equal parts of an object, shape or quantity.
- Recognise, find and name a quarter as 1 of 4 equal parts of an object, shape or quantity.

Year 1 Geometry and Measures

Measures

- 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

Geometry – Properties of Shape

- Recognise and name common 2-D and 3-D shapes, including:
- 2-D shapes [for example, rectangles (including squares), circles and triangles]

Geometry – Position and Movement

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

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] • 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.	• 3-D shapes [for example, cuboids (including cubes), pyramids and spheres].		
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Year 2 Number and Place Value

Number and Place Value

- 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.

Addition and Subtraction

- 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.
- Add 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

Multiplication and Division

- 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 ($\times$), division ($\div$) 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.

Fractions

- Recognise, find, name and write fractions $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$ of a length, shape, set of objects or quantity.
- Write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$.

and solve missing number problems.

Year 2 Geometry and Measures

Measures

- 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.

Geometry – Properties of Shape

- 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.

Geometry – Position and Movement

- 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).

Statistics

- 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.

- 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.			
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Year 3 Number and Place Value

Number and Place Value	Addition and Subtraction	Multiplication and Division	Fractions
- 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 and 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.	- 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 numbers times by 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 denominator.

			• Add and subtract fractions with the same denominator within one whole [for example, $5/7 + 1/7 = 6/7$]. • Compare and order unit fractions, and fractions with the same denominators. • Solve problems that involve all of the above • .
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Year 3 Geometry and Measures

• Measures	• Geometry – Properties of Shape	• Geometry – Position and Movement	• Statistics
• 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. • Tell and write the time from an analogue clock, including using Roman numerals from I	• 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	• 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 present data using bar charts, pictograms and tables solve one-step and two-step questions [for example, ‘How many more?’ and ‘How many fewer?’]. • Use information presented in scaled bar charts and pictograms and tables.

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. • Compare durations of events [for example to calculate the time taken by particular events or tasks].	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.		
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Year 4 Number and Place Value

Number and Place Value

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.

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.

Addition and Subtraction

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.

Multiplication and Division

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.

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.

Fractions

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 $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$.

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 decimals with one decimal place to the nearest whole number.

			Compare numbers with the same number of decimal places up to two decimal places.
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			Solve simple measure and money problems involving fractions and decimals to two decimal places.
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Year 4 Geometry and Measures

Measures

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.

Geometry – Properties of Shape

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.

Geometry – Position and Movement

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.

Statistics

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.

Year 5 Number and Place Value

• Number and Place Value

- 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.

• Addition and Subtraction

- 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.

• Multiplication and Division

- 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 & 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

• Fractions

- 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 & write mathematical statements > 1 as a mixed number [$2/5 + 4/5 = 6/5 = 1 \frac{1}{5}$].
- 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.

• 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.		division and interpret remainders appropriately for the context • Multiply and divide whole numbers and those involving decimals by 10, 100 & 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	• Read and write decimal numbers as fractions [for example, $0.71 = \frac{71}{100}$]. • 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 & compare numbers with up to three decimal places. • Solve problems involving number up to three decimal places. • Recognise the percent symbol (%) and understand that percent relates to 'number of parts per hundred', write percentages as a fraction with denominator 100, & as a decimal. • Solve problems which require knowing percent & decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those fractions with a
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		fractions and problems involving simple rates.	denominator of a multiple of 10 or 25.
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Year 5 Geometry and Measures

Measures

- Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre & 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].

Geometry – Properties of Shape

- 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 (°).
- Identify: angles at a point and one whole turn (total 360°) angles at a point on a straight line & 1/2 a turn (total 180°) and 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.

Geometry – Position and Movement

- 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.

Statistics

- Solve comparison, sum and difference problems using information presented in a line graph.
- Complete, read and interpret information in tables, including timetables.

- 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.

Year 6 Number and Place Value

Number and Place Value

- Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit.
- Round any whole number to a required degree of accuracy.
- Use negative numbers in context, and calculate intervals across zero.
- Solve number and practical problems that involve all of the above.

Addition, Subtraction, Multiplication and Division

- 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.

Fractions

- Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.
- 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, $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$].
- Divide proper fractions by whole numbers. $\frac{1}{3} \div 2 = \frac{1}{6}$
- Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for

Ratio and Proportion

- 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

Algebra

- 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.

	• 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.	a simple fraction [e.g. $\frac{3}{8}$]. • 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.	knowledge of fractions and multiples.	
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Year 6 Geometry and Measures

Measures

- 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 when it is possible to use formulae for area and volume of shapes.
- Calculate the area of parallelograms and triangles.

Geometry – Properties of Shape

- Draw 2-D shapes using given dimensions and angles.
- Recognise, describe and build simple 3-D shapes, including making nets.
- Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons.
- Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.
- Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.

Geometry – Position and Movement

- 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.

Statistics

- Interpret and construct pie charts and line graphs and use these to solve problems.
- Calculate and interpret the mean as an average.

- Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm³) and cubic metres (m³), and extending to other units [for example, mm³ and km³].

ASSESSMENT – END OF UNIT CHECKS.

The table below show what is assessed through the end of unit checks within White Rose Maths, split into Autumn, Spring and Summer terms respectively. Within the EYFS assessments, links have been made to the corresponding Early Learning Goal (ELG).

EYFS	Key ELGs Linked: Number: Counting reliably up to 20 and beyond. Recognising numerals up to 20 and matching them to quantities. Finding one more or one less than a given number (ELG: Number). Shape, Space, and Measures: Recognising and creating simple patterns using shapes and objects (ELG: Shape, Space, and Measures). Assessment: Count objects up to 20. Recognise numbers up to 20. Identify one more or one less than a number. Key ELGs Linked: Number: Counting to 10 and representing numbers in different ways (ELG: Number). Shape, Space, and Measures: Sorting objects by shape, size, or colour (ELG: Shape, Space, and Measures). Assessment: Count and match objects to numerals. Sort objects according to one or more attributes (size, shape, etc.).	Key ELGs Linked: Number: Solving simple problems involving addition and subtraction (ELG: Number). Shape, Space, and Measures: Using language such as ‘more’, ‘less’, ‘greater’, ‘smaller’ to compare quantities (ELG: Number). Assessment: Solve simple problems using addition or subtraction (within 10). Compare quantities and numbers using the terms “more” and “less”. Key ELGs Linked: Number: Recognising numbers to 10 and using them to solve simple addition/subtraction problems (ELG: Number). Shape, Space, and Measures: Recognising and naming 2D shapes, using positional language (ELG: Shape, Space, and Measures). Assessment: Recognise numbers 1–10 and use them in simple addition and subtraction. Identify shapes (e.g., circles, squares) and use positional language (e.g., next to, above).	Key ELGs Linked: Number: Counting beyond 10, and comparing quantities (ELG: Number). Shape, Space, and Measures: Recognising 2D shapes and simple patterns (ELG: Shape, Space, and Measures). Assessment: Count confidently to 20 and beyond. Compare quantities and numbers up to 20 (more, less, equal). Key ELGs Linked: Number: Solving simple problems involving addition and subtraction, using numbers up to 20 (ELG: Number). Shape, Space, and Measures: Describing and naming shapes and their properties (ELG: Shape, Space, and Measures). Assessment: Solve simple addition and subtraction problems within 20. Identify and describe 2D shapes and patterns. Key ELGs Linked: Shape, Space, and Measures: Recognising, creating, and describing patterns (ELG: Shape, Space, and Measures).
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			• Assessment: Identify, create, and describe simple patterns.
Year One	• Number and Place Value: Counting to 100, understanding tens and ones • Addition and Subtraction: Addition and subtraction within 20 • Geometry: 2D shapes and their properties, position and direction	• Number and Place Value: Understanding numbers to 100, comparing numbers • Addition and Subtraction: Solving problems with numbers to 100 • Measurement: Length, weight, capacity in non-standard units	• Multiplication and Division: Solving problems within 2 times table • Geometry: 3D shapes, symmetry • Measurement: Time, ordering events, money. • Fractions: recognising and finding halves and quarters.
Year Two	• Number and Place Value: Understanding numbers to 100, including comparing and ordering numbers, and finding one more or less. • Addition and Subtraction: Solving addition and subtraction problems with numbers up to 100, including with regrouping (carrying or borrowing). • Geometry: Identifying and describing the properties of 2D shapes, including symmetry.	• Multiplication and Division: Understanding the concepts of multiplication and division, including using repeated addition and equal groups. • Measurement: Measuring length, weight, and capacity in standard units. Counting money with pounds and pence and finding change.	• Number: Fractions finding a half, a quarter and a third, unit and non-unit fractions. • Measurement: Telling the time, including using both digital and analogue clocks. • Geometry: using directional language to describe movement and turns of shapes. • Statistics: Using and interpreting tally charts and basic pictograms.
Year Three	• Number and Place Value: Understanding numbers up to 1,000, comparing and ordering • Addition and Subtraction: Adding and subtracting within 3-digit numbers • Multiplication and Division: Times tables facts (3, 4, 8)	• Fractions: Recognising and comparing fractions with the same denominator • Measurement: Length, mass, and capacity • Multiplication and Division: Using times tables facts (3, 4, 8), multiplying and dividing 2 digit numbers by 1 digit.	• Fractions: Adding and subtracting fractions • Measurement: Time (telling the time, time intervals) • Geometry: Properties of 2D shapes, angles • Statistics: Interpret and draw pictograms and bar charts.

Year Four	• Number and Place Value: Understanding 4-digit numbers, rounding to nearest 10, 100, 1,000 • Addition and Subtraction: Adding and subtracting within 4-digit numbers • Multiplication and Division: Times tables facts (6, 7, 9, 11, 12), multiply by 1 and 0.	• Multiplication and Division: Multiply and divide 2 and 3 digit numbers by 1 digit. • Fractions: Adding and subtracting fractions, equivalent fractions • Decimals: Understanding tenths and hundredths • Measurement: Area, perimeter of simple shapes	• Multiplication and Division: Dividing 2-digit numbers by a 1-digit number • Geometry: Identifying lines of symmetry, angles, and properties of shapes • Measurement: Converting between units of measurement • Statistics: interpreting charts, drawing line graphs.
Year Five	• Number and Place Value: Comparing and ordering numbers up to 1,000,000 • Addition and Subtraction: Solving complex problems with larger numbers • Multiplication and Division: Multiplying and dividing by 10, 100 and 1000, factors, multiples, prime and square numbers. • Fractions: Adding, subtracting, multiplying fractions, converting between improper fractions and mixed numbers	• Multiplication and Division: Long multiplication (2 by 2 digit), short division with and without remainders. • Fractions: Finding fractions of amounts and using fractions as operators. • Decimals: Understanding decimal numbers up to three decimal places • Measurement: Finding perimeter and area of compound shapes. • Statistics: Using two way tables, reading and interpreting graphs and timetables.	• Fractions, Decimals, and Percentages: Solving problems with fractions, decimals, and percentages • Geometry: Identifying 2D and 3D shapes, angles, and symmetry • Measurement: Converting between units of length, mass and volume.
Year Six	• Number and Place Value: Working with numbers up to 10,000,000, rounding	• Fractions, Decimals, and Percentages: Converting between fractions, decimals, and percentages	• Geometry: Solving problems involving angles, properties of shapes, and calculating angles

	• Addition and Subtraction: Solving complex problems with large numbers • Multiplication and Division: Division with remainders, multiplication of larger numbers (4 digit by 2 digit numbers) • Fractions: Adding and subtraction fractions (including mixed numbers), multiplying and dividing fractions	• Ratio and Algebra: Introduction to ratios, solving problems using ratio, introduction to basic algebra (solving simple equations) • Measurement: Perimeter, area, volume • Statistics: Interpreting data (line graphs, pie charts)	• Geometry: Position and direction (translations and reflections). • Revision of all units in preparation for end-of-year assessments
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Curriculum Conversation/Retrieval Practice: Maths

Each half term the children are split into mixed year groups and all teachers lead a 'Curriculum Conversation.' This provides the children with the opportunity to share their learning with others and make connections between components. Children are therefore more likely to remember key knowledge in the long term. Our curriculum builds on prior learning and re-visits content, supporting the children to develop.

Can you tell me what you learned in Maths last week?

- What was the most interesting problem you solved recently?
- How do you know your answer is correct?
- What strategies do you use when you're stuck?
- Can you explain this method to a friend?
- What do you notice about the numbers in this question?
- How is today's lesson connected to something you've learned before?

EYFS / Year 1

Curriculum Topics: Counting, Number bonds, Shapes, Measurement

- What number comes before/after ____?
- Can you show me different ways to make 5?
- Which is heavier: the book or the pencil?
- How do you know which shape is a triangle?
- Can you show me a number that is more than 4 but less than 7?

Year 3

Curriculum Topics: Multiplication/Division, Fractions, Measures

- What's the difference between multiplication and repeated addition?
- Can you explain what $\frac{1}{3}$ means using a picture?
- What does perimeter mean? How do you find it?
- Why is 4×3 the same as 3×4 ?
- What is a right angle? Can you find one around you?

Year 5

Curriculum Topics: Fractions, Decimals & Percentages, Long Multiplication, Volume

- How do you convert a fraction into a decimal?
- What is 35% as a fraction and a decimal?
- Can you show how to multiply a 3-digit number by a 2-digit number?
- What's the difference between volume and capacity?
- How do you know if two fractions are equivalent?

Year 2

Curriculum Topics: Place Value, Addition/Subtraction, Time, Money

- What is the value of the digit 3 in the number 34?
- What happens when you add $9 + 7$? Can you explain your method?
- What coins would you use to make 52p?
- How many minutes are there in an hour? In half an hour?
- Can you count in 2s/5s/10s from any number?

Year 4

Curriculum Topics: Times tables (up to 12×12), Decimals, Area

- How do you know if a number is a multiple of 6?
- What's the difference between a tenth and a hundredth?
- Can you explain how to find the area of a shape?
- Which is bigger: 0.5 or 0.25? How do you know?
- How can knowing 6×4 help you work out 60×4 ?

Year 6

Curriculum Topics: Ratio, Algebra, Geometry, Problem Solving

- What does it mean when two ratios are equivalent?
- Can you create a number pattern using an algebraic rule?
- How do you find the angles in a triangle?
- What does BIDMAS mean and how do you use it?
- Can you describe a 3D shape using its properties?

End Point Progression in Maths

EYFS Maths End Points What will the children be able to know and do?

Nursery

Number

- Count confidently to 5–10
- Recognise some numbers to 5
- Use language like more, less, same
- Show 1–1 correspondence (one object for one number)
- Begin to understand addition as “finding the total”

Shape, Space & Measure

- Recognise basic shapes: circle, triangle, square
- Talk about big/small, long/short, heavy/light
- Begin simple repeating patterns
- Use positional language: in, on, under

Reception

Number

- Count confidently to 20 and beyond
- Recognise numbers to 20
- Say one more and one less than a number
- Automatically recall:
 - Bonds to 5
 - Some bonds to 10
- Add and subtract within 10

Shape, Space & Measure

- Name 2D & 3D shapes
- Use language of time, money, capacity & weight
- Compare length, height and size
- Continue and create simple patterns

Year One Maths End Points

What will the children be able to know and do by the end of year one?

Number & Place Value

- Read & write numbers to 100
- Count forwards & backwards to 100
- Understand tens and ones
- Compare numbers using $<$ $>$ $=$

Addition & Subtraction

- Add & subtract within 20
- Know number bonds to 10
- Use part-whole models
- Solve simple one-step problems

Multiplication & Division

- Count in 2s, 5s & 10s
- Share objects into equal groups
- Understand doubling & halving

Fractions

- Recognise & find:
 - $\frac{1}{2}$ and $\frac{1}{4}$ of shapes and quantities

Measurement

- Measure length, mass & capacity
- Use coins & recognise time to:
 - o'clock and half past

Geometry

- Name common 2D & 3D shapes
- Describe positions and directions

Year Two Maths End Points
What will the children be able to know and do by the end of year two?

Number & Place Value

- Read & write numbers to 100
- Partition numbers into tens and ones
- Compare and order numbers

Addition & Subtraction

- Add & subtract 2-digit numbers
- Use column methods (no crossing)
- Know bonds to 20

Multiplication & Division

- Recall 2, 5 and 10 times tables
- Use arrays & equal groups
- Solve simple word problems

Fractions

- Find:
 - $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$ and $\frac{3}{4}$ of shapes and numbers

Measurement

- Tell time to:
 - 5 minutes
- Compare length, mass, capacity, temperature
- Use £ and p

Geometry

- Identify right angles
- Recognise symmetry
- Sort shapes by properties

Year Three Maths End Points
What will the children be able to know and do?

Number & Place Value

- Read & write numbers to 1,000
- Partition into hundreds, tens & ones
- Compare and order

Addition & Subtraction

- Add & subtract 3-digit numbers
- Use column methods
- Solve 2-step problems

Multiplication & Division

- Know 3x, 4x, 8x tables
- Use written multiplication
- Divide using known facts

Fractions

- Recognise:
 - unit fractions
 - non-unit fractions
- Add and subtract fractions with the same denominator

Measurement

- Measure length, mass & volume
- Tell time using:
 - 12-hour and 24-hour clock
- Find perimeter

Geometry

- Classify shapes
- Read coordinates (first quadrant)
- Recognise angles as a turn

Year Four Maths End Points
What will the children be able to know and do?

Number & Place Value

- Read & write numbers to 10,000
- Round to nearest 10, 100, 1,000

Addition & Subtraction

- Add & subtract 4-digit numbers
- Solve multi-step problems

Multiplication & Division

- Recall ALL times tables to 12×12
- Use:
 - Short multiplication
 - Written division

Fractions & Decimals

- Add & subtract fractions with same denominator
- Understand decimal equivalents of:
 - $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$
- Round decimals to 1 decimal place

Measurement

- Convert between:
 - km & m
 - g & kg
 - l & ml
- Find area

Geometry

- Identify angles:
 - Right, acute, obtuse
- Compare and classify shapes
- Plot on a coordinate grid

Year Five Maths End Points
What will the children be able to know and do?

Number & Place Value

- Read & write numbers to 1,000,000
- Round to 1,000, 10,000, 100,000
- Use negative numbers

Four Operations

- Add and subtract large numbers
- Multiply:
 - 4-digit $\times$ 1-digit
 - 2-digit $\times$ 2-digit
- Divide using short division

Fractions & Decimals

- Add & subtract fractions with:
 - Different denominators
- Multiply fractions by whole numbers
- Use decimals to 3 decimal places
- Convert between fractions & decimals

Percentages

- Find simple percentages:
 - 10%, 25%, 50%, 75%

Measurement

- Convert units
- Find volume
- Use timetables & time problems

Geometry

- Angles at a point & on straight lines
- Properties of 3D shapes
- Reflection and translation

Year Six Maths End Points
What will the children be able to know and do by the end of year six?

Number & Place Value

- Work with numbers to 10 million
- Use negative numbers in context

Four Operations

- Confident with:
 - Long multiplication
 - Long division
- Solve multi-step word problems

Fractions, Decimals & Percentages

- Confidently convert between all three
- Calculate percentages of amounts
- Solve real-life problems involving F, D & P

Ratio & Algebra

- Use ratio language
- Solve simple algebra equations
- Use formulae

Measurement

- Convert all standard units
- Use scales
- Calculate:
 - Area of triangles & parallelograms
 - Volume of cuboids

Geometry

- Draw accurately with protractors
- Calculate missing angles
- Use coordinates in all four quadrants

Careers in Maths

At Brownlow our aim is to raise aspirations and support career related learning, helping children learn about the world around them broadening their aspirations and challenging stereotypes. There are so many varied pathways to a chosen career it's important that children recognise the opportunities that are available to them. [hashtag#startsmalldreambig](#)

The table below describes ten career paths that children could follow through Mathematics:

Accountant What they do: Accountants work with numbers to manage money, budgets, and accounts for people or businesses. Maths link: • Addition, subtraction, multiplication, and division • Understanding money and percentages • Checking accuracy	Engineer What they do: Engineers use maths to design, build, and improve machines, buildings, and technology. Maths link: • Measuring and calculating • Using shapes and angles • Solving problems	Scientist What they do: Scientists use maths to collect data, measure results, and analyse experiments. Maths link: • Data handling and graphs • Measuring accurately • Working with numbers	Architect What they do: Architects design buildings and spaces, making sure they are safe and fit for purpose. Maths link: • Shape, space, and measure • Scale and proportion • Accurate calculation	Data Analyst What they do: Data analysts study information to find patterns and help people make decisions. Maths link: • Statistics and graphs • Interpreting data • Logical thinking
Computer Programmer What they do: Programmers write instructions that tell computers what to do. Maths link: • Logical reasoning • Patterns and sequences • Problem-solving	Banker or Financial Advisor What they do: They help people save, invest, and manage their money. Maths link: • Money and percentages • Estimating and checking • Understanding risk	Builder or Surveyor What they do: Builders and surveyors measure land and buildings to make sure structures are built correctly. Maths link: • Measuring length, area, and volume • Estimation • Using scale	Game Designer What they do: Game designers use maths to create scores, levels, and movement in games. Maths link: • Coordinates and position • Number patterns • Timing and logic	Teacher What they do: Teachers use maths to plan lessons, assess progress, and help children understand numbers. Maths link: • Explaining methods • Checking answers • Using data to track learning



Retrieval Practice

Retrieval practice involves generating answers to questions about previously learnt information. Retrieval practice provides opportunities for pupils to practise applying the knowledge they have understood to consolidate understanding and strengthen recall.

For example, this could take the form of a past paper, a multiple choice quiz or a verbal question and answer. This requires children recalling information that they have learned throughout the week, term, year, previous years and has several benefits:

- It helps the children make new connections
- It helps strengthen existing connections
- It is reliable under pressure
- It gets information into their long term memory (which also makes it easier to learn new things)
- It provides a foundation for future learning as it prompts feedback

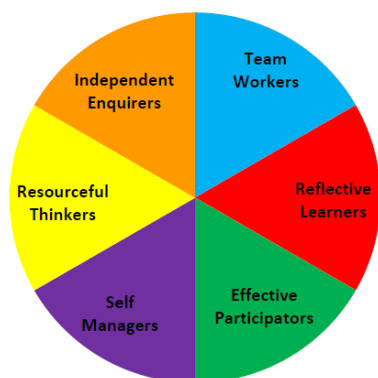
What can you remember about these different pictorial representations from our Maths work last term? How do these images help you work out answers?

The complex block contains several mathematical representations and a navigation bar:

- Bar Model:** A horizontal bar divided into three sections. The top section is red and labeled '30'. The bottom-left section is blue and labeled '12'. The bottom-right section is orange and labeled '?'. This represents the equation $12 + ? = 30$.
- Number Bond:** A central circle labeled '20' with two lines connecting it to two empty circles below, representing a partitioning of 20.
- Place Value Chart:** A chart with two columns: 'Tens' and 'Ones'. Each column has an 'EXCHANGE' label and an arrow pointing to the other column. The 'Tens' column contains three vertical bars of ten units each. The 'Ones' column contains five single units. Below the chart, there are green '+' and red '-' buttons for each column, and a box containing the number '45'.
- Number Line:** A horizontal line with markings at 0, 10, 20, and 30. Above the line, there are two groups of ten units (represented by bars) and a group of five units (represented by small circles). Red curved arrows show jumps from 0 to 10, 10 to 20, and 20 to 25. A yellow box is placed at the 25 mark.
- Coin Problem:** A row of five coins: two silver 10p coins and three red 2p coins.
- Writing Area:** A vertical rectangle on the right side of the complex block containing ten horizontal lines for writing.
- Navigation Bar:** A horizontal bar at the bottom with four buttons: 'Last Week' (blue), 'Last Term' (green), 'Last Year' (orange), and 'Further Back' (grey).

Empowered Learner

Each term the 'Empowered Learner' focus emphasises six areas of personal development. Throughout their time at Brownlow Fold all children are supported to become self-evaluative of their own strengths and areas for development. We recognise the impact that personal skills can have on the academic success and well-being of our children. They play a vital role in developing the ability of our pupils to enjoy and reflect on their learning across the curriculum.



Autumn One - Self Manager
Autumn Two - Effective Participators

Spring One - Resourceful Thinker
Spring Two - Reflective Learner

Summer One - Independent Enquirer
Summer Two - Team Worker

Self Manager: In Maths, children learn to organise their work, choose appropriate equipment (such as rulers or number lines), and manage their time when solving problems.

Effective Participator: Maths lessons encourage children to take part in discussions, explain their thinking, and listen to different strategies used by others to solve problems.

Resourceful Thinker: Children use a range of methods and resources in Maths, such as concrete apparatus, drawings, and mental strategies, to solve problems in different ways.

Reflective Learner: In Maths, children check their answers, reflect on their methods, and think about how they could improve or use a different strategy next time.

Independent Enquirer: Children explore mathematical ideas by asking questions, investigating patterns, and choosing their own approaches to solve problems.

Team Worker: Maths often involves working with others, sharing ideas, comparing answers, and supporting peers to deepen understanding.

Brownlow Bucket List

At Brownlow Fold we have carefully designed a 'Brownlow Bucket List' to provide our pupils with a range of memorable and meaningful experiences during their time with us. Rather than being a list created individually, it is a collection of activities and opportunities chosen by the school, ensuring that every child has the chance to take part. Our aim is for pupils to leave Brownlow Fold having not only achieved academically, but also having enjoyed a wide variety of experiences that will enrich their personal growth, confidence, and sense of community. These activities include opportunities to:

- Try new challenges both in and outside of the classroom.
- Take part in cultural, creative, and sporting experiences.
- Develop life skills that will support them beyond primary school.
- Celebrate important milestones with their peers.

The Bucket List is something we want children to be proud of as they move on to the next stage of their education. Each item ticked off will represent an achievement or special memory that has shaped their journey with us



Appendix

Appendix A

The fully White Rose Maths calculation policy, used across the school, can be found here:

