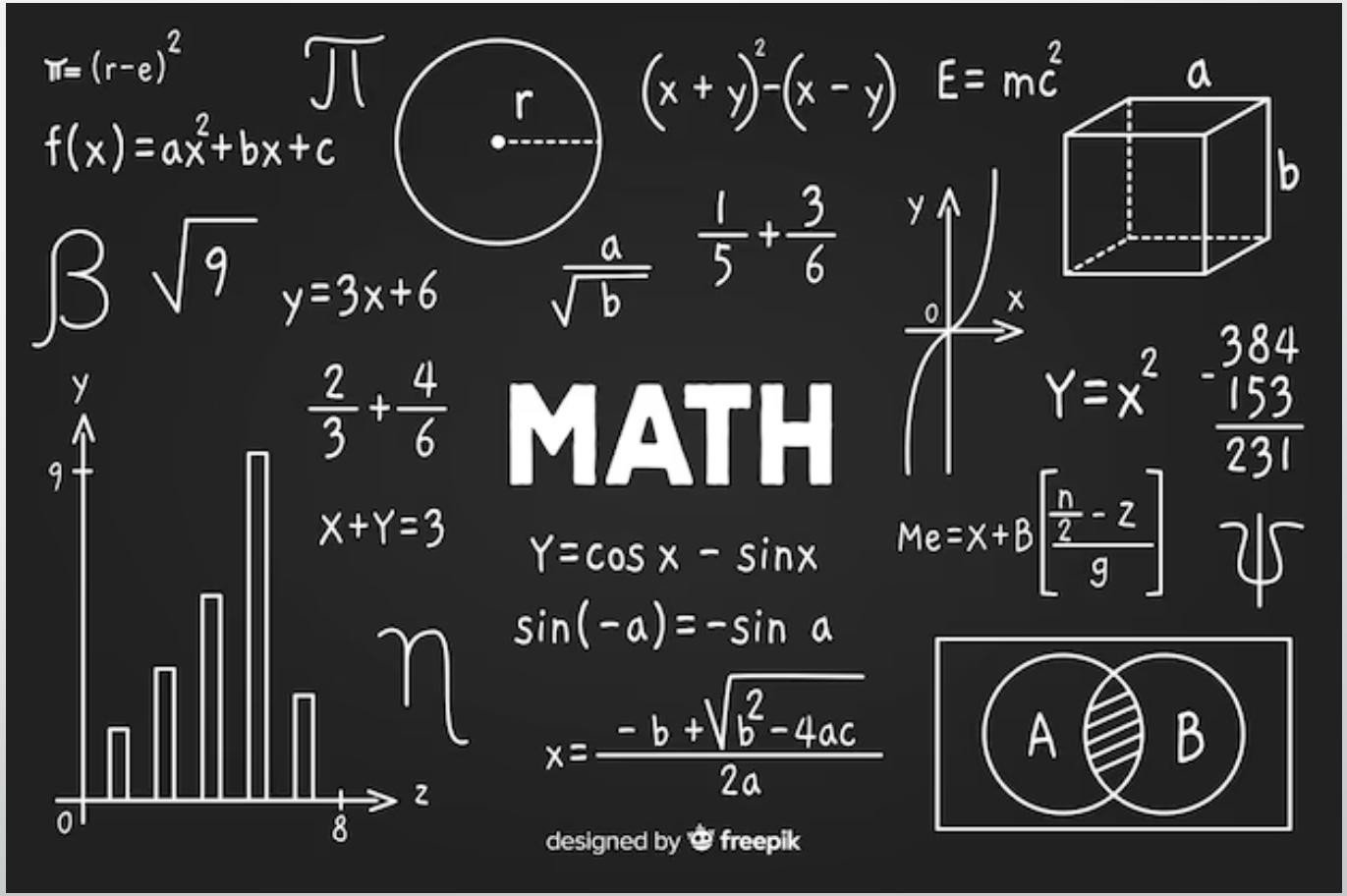
Maths at Winford



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Intention for Maths at Winford

- We believe that **all** children can be successful mathematicians. We will support them to achieve this by providing an ambitious and carefully constructed and connected mastery curriculum in mathematics for all pupils, using the **White Rose Maths** approach. Through **explicit teaching and small steps approach**, pupils gain a **deep understanding of key concepts** and build upon these in order to make sustained progress. We provide opportunities to understand as well as to experience the creativity and connectivity of maths to other areas of life. At the heart of our curriculum is a commitment to develop **resilience, confidence and self-belief**; enabling our children to become fluent in the fundamentals of mathematics as well as developing their ability to reason and solve problems.
- We want our pupils to become high quality mathematicians who are **fluent in the fundamentals** of maths and who can **reason mathematically** and solve problems both in maths and across the curriculum. We introduce new mathematical concepts and develop reasoning and problem-solving skills using **concrete resources; pictorial representations** and finally **numbers and symbols**.
- We aim for pupils to leave our schools ready for the next stage in their life and for the challenges ahead.

Our intent focuses on equipping pupils with the Mathematics they need to master for each year group, which requires pupils to:

- *Recall key number facts with speed and accuracy and use them to calculate and work out unknown facts*
- *Develop their ability to apply mathematical skills with confidence and understanding when solving problems*
- *Apply mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of smaller steps and persevering in seeking solutions*
- *Express themselves and their ideas using the language of mathematics with assurance*
- *Have sufficient depth of knowledge and understanding to reason and explain mathematical concepts and procedures and use the, to solve a variety of problems.*
- *Develop positive attitudes to mathematics, recognising that mathematics can be both useful and enjoyable*
- *Nurture a fascination and excitement of mathematics*
- *Use and apply the skills in other curricular areas*

- The majority of pupils will move through the programmes of study at roughly the same pace. Decisions about when and how to progress will be based on the security of the pupils understanding and their readiness to progress to the next stage. Pupils who master concepts faster than the majority are offered opportunities to deepen and richen their understanding rather than accelerating through new content. Those who are not fluent will revisit and consolidate before moving on to new learning.

- Our school vision is WINFORD SCHOOL~WHERE CHILDREN FLOURISH. This is true for our intention for Maths, we strive for children to flourish in their understanding, confidence and knowledge in Mathematics.

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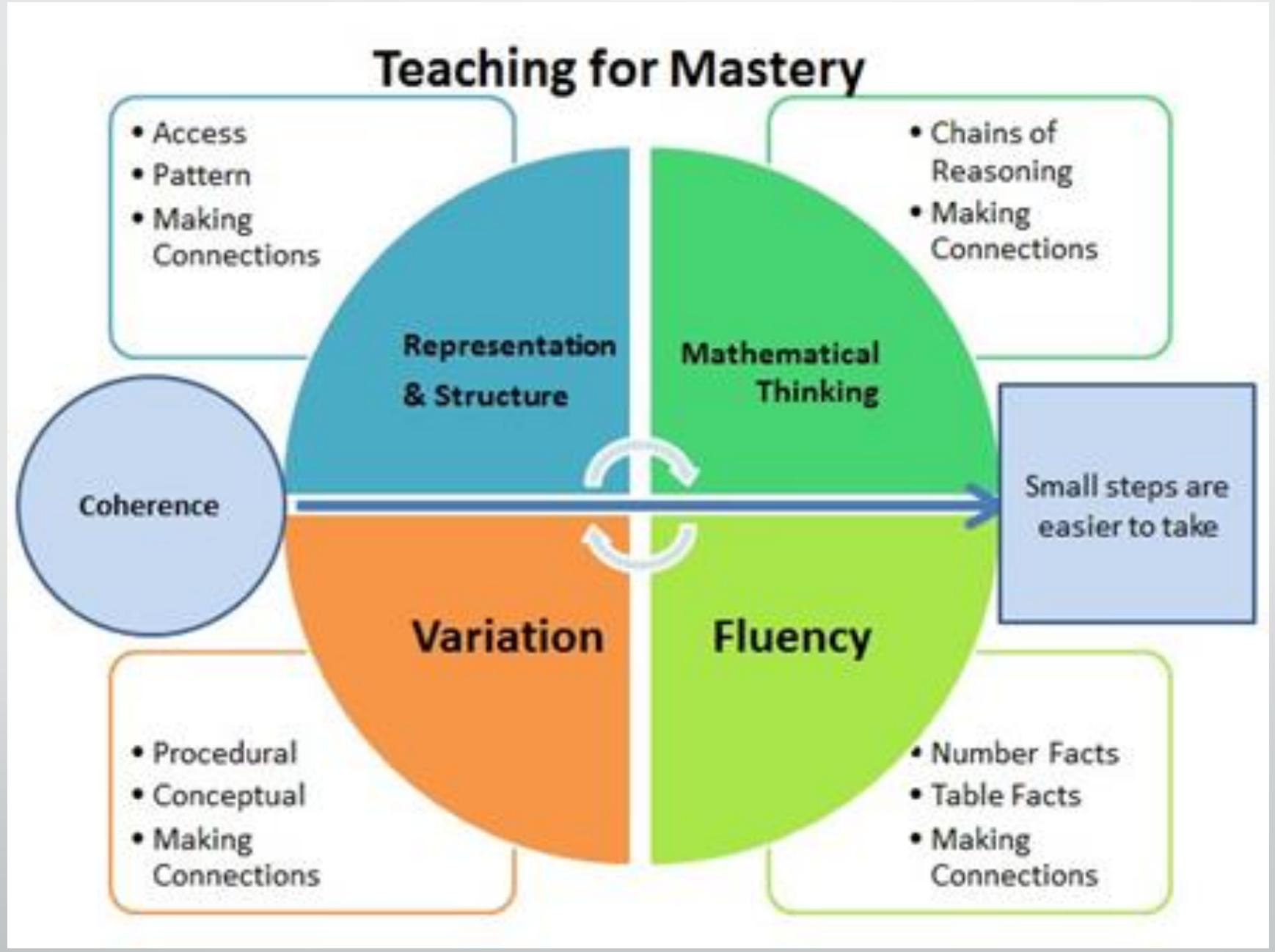

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Maths Implementation

In EYFS pupils experience daily mathematics learning through whole class teacher input; teacher / TA directed tasks and child-initiated play. Opportunities for mathematics is developed through daily routines and all areas of learning.

EYFS and Year 1 pupils access Mastering number as a vehicle for understanding number at a deep and meaningful level

A typical daily 45 - 60 minute lesson (Y1-Y6) is likely to include many of the following elements:

- *opportunity to address any whole class misconceptions from the previous lesson;*
- *revisiting prior learning;*
- *open-ended questioning;*
- *children being encouraged to explain and justify their thinking using precise mathematical language, modelled by the adults;*
- *children making links in their learning;*
- *children engaged in mathematical talk;*
- *children 'taking risks' and recognising making mistakes as part of the learning process;*
- *new concepts introduced using approaches such as concrete resources / pictorial representations / live modelling / out-loud thinking / I, WE, YOU.*
- *'real' activities used (where possible) to introduce concepts and reinforce learning objectives;*
- *guided and live modelled examples with children working on whiteboards;*
- *reasoning and problem-solving skills taught explicitly;*
- *consolidation of new concepts guided by an adult;*
- *children engaged in varied fluency and intelligent practice (questions typified by their mathematical variation and designed to extend pupil's thinking rather than just being lots of examples presented in the same kind of way);*
- *children working individually on a task, in pairs or in a small group*

In KS2children engage with TTRS outside of the daily Maths lesson to help understand and recall multiplication and division with accuracy and speed. Progress is monitored with individual maths challenges, at least once a term.

All children engage in Flashback 4 retrieval daily engaging with low risk, high threshold questions, fostering mathematical talk and reasoning that develops long term memory.

Children in Key Stage 2 regularly participate in arithmetic practice, based on individual need, embedding their understanding and developing their confidence to use age-appropriate formal and informal written methods.

Our research basis

- We have used the EEF Improving Maths in the Early Years and KS1 and Improving Maths in Key stages 2 and 3 as the research basis for our approach. The research guidance is woven through all of these slides and forms the basis for the Maths offer at Winford.

- We also analyse trends in data to identify where additional strategies or measures may be needed

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EYFS and KS1

1

Develop practitioners'understanding of how children learn mathematics

- Professional development should be used to raise the quality of practitioner' knowledge of mathematics, of children's mathematical development and of effective mathematical pedagogy.
- Developmental progressions show us how children typically learn mathematical concepts and can inform teaching.
- Practitioners should be aware that developing a secure grasp of early mathematical ideas takes time, and specific skills may emerge in different orders.
- The development of self-regulation and metacognitive skills are linked to successful learning in early mathematics.

2

Dedicate time for children to learn mathematics and integrate mathematics throughout the day

- Dedicate time to focus on mathematics each day.
- Explore mathematics through different contexts, including storybooks, puzzles, songs, rhymes, puppet play, and games.
- Make the most of moments throughout the day to highlight and use mathematics, for example, in daily routines, play activities, and other curriculum areas.
- Seize chances to reinforce mathematical vocabulary.
- Create opportunities for extended discussion of mathematical ideas with children.

3

Use manipulatives and representations to develop understanding

- Manipulatives and representations can be powerful tools for supporting young children to engage with mathematical ideas.
- Ensure that children understand the links between the manipulatives and the mathematical ideas they represent.
- Ensure that there is a clear rationale for using a particular manipulative or representation to teach a specific mathematical concept.
- Encourage children to represent problems in their own way, for example with drawings and marks.
- Use manipulatives and representations to encourage discussion about mathematics.
- Encourage children to use their fingers—an important manipulative for children.

4

Ensure that teaching builds on what children already know

- It is important to assess what children do, and do not, know in order to extend learning for all children.
- A variety of methods should be used to assess children's mathematical understanding, and practitioners should check what children know in a variety of contexts
- Carefully listen to children's responses and consider the right questions to ask to reveal understanding.
- Information collected should be used to inform next steps for teaching. Developmental progressions can be useful in informing decisions around what a child should learn next.

5

Use high quality targeted support to help all children learn mathematics

- High quality targeted support can provide effective extra support for children.
- Small-group support is more likely to be effective when:
- children with the greatest needs are supported by the most experienced staff;
- training, support and resources are provided for staff using targeted activities;
- sessions are brief and regular; and
- explicit connections are made between targeted support and everyday activities or teaching.
- Using an approach or programme that is evidence-based and has been independently evaluated is a good starting point.

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KS2 and 3

1 Use assessment to build upon pupils' existing knowledge and understanding

- Assessment should be used not only to track pupils' learning but also to provide teachers with information about what pupils do and do not know.
- This should inform the planning of future lessons and the focus of targeted support.
- Effective feedback will be an important element of teachers' response to assessment.
- Feedback should be specific and clear, encourage and support further effort, and be given sparingly.
- Teachers not only have to address misconceptions but also understand why pupils may persist with errors.
- Knowledge of common misconceptions can be invaluable in planning lessons to address errors before they arise.

2 Use manipulatives and representations

- Manipulatives (physical objects used to teach maths) and representations (such as number lines and graphs) can help pupils engage with mathematical ideas.
- However, manipulatives and representations are just tools: how they are used is essential.
- They need to be used purposefully and appropriately to have an impact.
- There must be a clear rationale for using a particular manipulative or representation to teach a specific mathematical concept.
- Manipulatives should be temporary; they should act as a 'scaffold' that can be removed once independence is achieved.

3 Teach strategies for solving problems

- If pupils lack a well-rehearsed and readily available method to solve a problem they need to draw on problem solving strategies to make sense of the unfamiliar situation.
- Select problem solving tasks for which pupils do not have ready-made solutions.
- Teach them to use and compare different approaches.
- Show them how to interrogate and use their existing knowledge to solve problems.
- Use worked examples to enable them to analyse the use of different strategies.
- Require pupils to monitor, reflect on, and communicate their problem solving.

4 Enable pupils to develop a rich network of mathematical knowledge

- Emphasise the many connections between mathematical facts, procedures, and concepts.
- Ensure that pupils develop fluent recall of facts.
- Teach pupils to understand procedures.
- Teach pupils to consciously choose between mathematical strategies.
- Build on pupils' informal understanding of sharing and proportionality to introduce procedures.
- Teach pupils that fractions and decimals extend the number system beyond whole numbers.
- Teach pupils to recognise and use mathematical structure.

5 Develop pupils' independence and motivation

- Encourage pupils to take responsibility for, and play an active role in, their own learning
- This requires pupils to develop metacognition—the ability to independently plan, monitor and evaluate their thinking and learning
- Initially, teachers may have to model metacognition by describing their own thinking.
- Provide regular opportunities for pupils to develop metacognition by encouraging them to explain their thinking to themselves and others.
- Avoid doing too much too early.
- Positive attitudes are important, but there is scant evidence on the most effective ways to foster them.
- School leaders should ensure that all staff, including non-teaching staff, encourage enjoyment in maths for all children.

6 Use tasks and resources to challenge and support pupils' mathematics

- Tasks and resources are just tools—they will not be effective if they are used inappropriately by the teacher.
- Use assessment of pupils' strengths and weaknesses to inform your choice of task.
- Use tasks to address pupil misconceptions.
- Provide examples and non-examples of concepts.
- Use stories and problems to help pupils understand mathematics.
- Use tasks to build conceptual knowledge in tandem with procedural knowledge.
- Technology is not a silver bullet—it has to be used judiciously and less costly resources may be just as effective.

7 Use structured interventions to provide additional support

- Selection should be guided by pupil assessment.
- Interventions should start early, be evidence-based and be carefully planned.
- Interventions should include explicit and systematic instruction.
- Even the best designed intervention will not work if implementation is poor.
- Support pupils to understand how interventions are connected to whole-class instruction.
- Interventions should motivate pupils—not bore them or cause them to be anxious.
- If interventions cause pupils to miss activities they enjoy, or content they need to learn, teachers should ask if the interventions are really necessary.
- Avoid 'intervention fatigue'. Interventions do not always need to be time-consuming or intensive to be effective.

8 Support pupils to make a successful transition between primary and secondary school

- There is a large dip in mathematical attainment and attitudes towards maths as children move from primary to secondary school.
- Primary and secondary schools should develop shared understandings of curriculum, teaching and learning.
- When pupils arrive in Year 7, quickly attain a good understanding of their strengths and weaknesses.
- Structured intervention support may be required for Year 7 pupils who are struggling to make progress.
- Carefully consider how pupils are allocated to maths classes.
- Setting is likely to lead to a widening of the attainment gap between disadvantaged pupils and their peers, because the former are more likely to be assigned to lower group.

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Pedagogy and teaching strategies

Good progress in maths is likely where we:

Use explicit instruction

Explicit instruction refers to a range of teacher-led approaches, focused on teacher demonstration followed by guided practice and independent practice. Explicit instruction is not just "teaching by telling" or "transmission teaching" (I do, We do, You do)

One popular approach to explicit instruction is Rosenshine's 'Principles of Instruction'.

Examples:

Worked examples with the teacher modelling thought processes is helpful. A teacher might teach a pupil a strategy for finding a fraction of an amount by 'thinking aloud' while identifying a visual representation that would be helpful and then giving the pupil the opportunity for guided practice followed by the opportunity to practise the strategy independently.

How does the teacher check that the maximum number of pupils 'show what they know'?

How effectively is this information used to decide whether to move on quicker in the lesson or stay on the learning point longer?

- Thumbs
- White boards – Show me
- Talk partners
- Open-ended questions to elicit conceptual understanding
- Children modelling understanding by explaining their thinking
- Cold calling
- Fluid seating – children move to the front of the class if they are feeling less confident, sit at the back of the class if they are really confident.
- Annotated plans (TAR) to inform next days planning

Typically we would also:

- Encourage independence, but scaffold where necessary (I, WE, YOU model)
- Use models and manipulatives to illustrate concepts (though these must be chosen carefully and for a reason)
- Use teachers to support those who are not achieving the learning objective, as they may be the best qualified to do the job.
- Build on what pupils already know…but we must keep checking for understanding at every stage to establish this.
- Actually *teach* concepts, using live modelling and thinking out loud
- Use interventions when necessary that are regular and brief
- Use Age-Related-Expectation levelled materials for the majority of pupils
- Write worked examples on flipchart paper so this can be easily shared on the walls of the classroom

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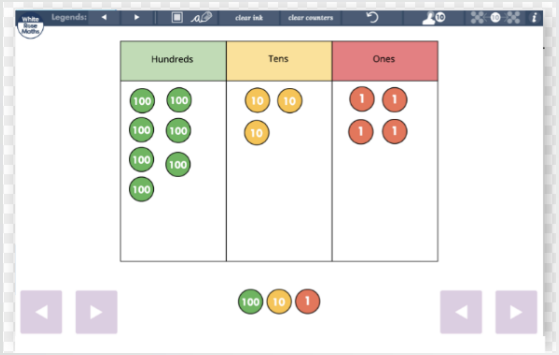
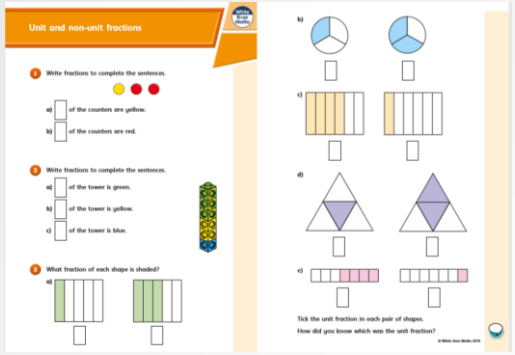
Generic resources to scaffold



White Rose teaching slides



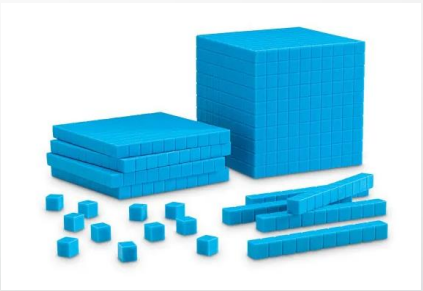
White Rose tasks

Whiteboard and pen

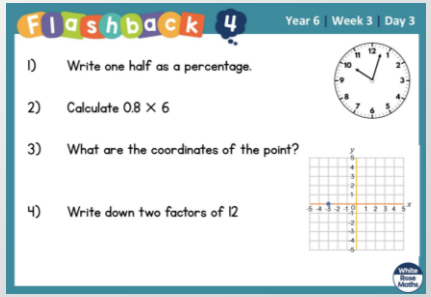
Flipchart

Rekenreks

Numicon

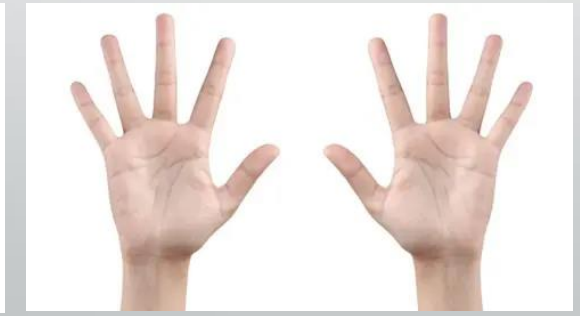


Base 10

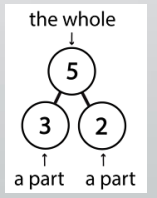


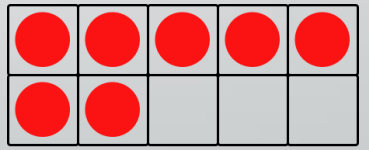
Flashback 4

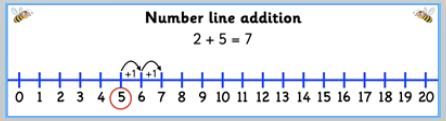
Counters

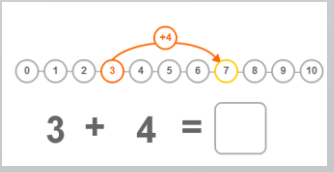


Fingers









2-D Visual scaffolds

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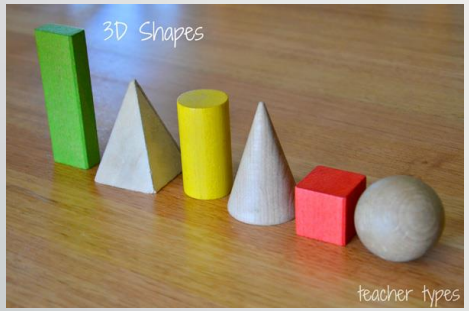
Specific resources to scaffold

Balances

Clocks

Coins

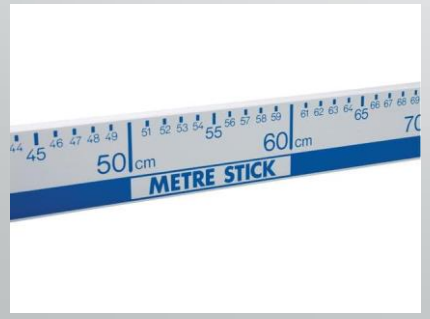


3-D shape

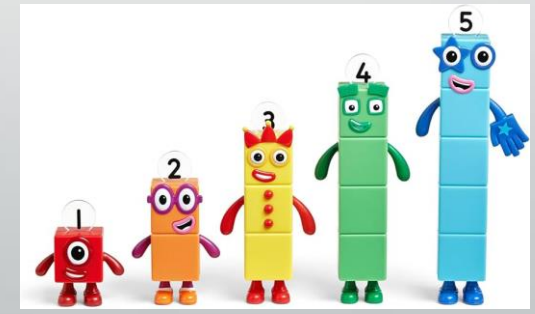
'other' manipulatives

Dice

Rulers



Metre sticks



Numberblocks

Place Value sliders

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Maths Planning

- **Long Term Planning**

Teachers use the long-term planning based on the White Rose Maths resources. All mathematical topics are taught in blocks so that children can master each mathematical concept and apply it across a range of contexts. The White Rose Maths curriculum is a cumulative curriculum, so that once a topic is covered, it is met many times again in other contexts. Spaced repetition of key topics occurs, throughout and between years, through the use of resources such as 'Flashback Four'.

- **Medium Term Planning**

Teachers use a medium-term planning outline based on the requirements of the National Curriculum to teach sequences that build learning over time (based on the planning produced by the White Rose Maths Hub). A strong emphasis on reinforcing number to build competency and opportunities to build reasoning and problem solving is embedded within the curriculum.

The DfE document "Teaching Mathematics in Primary Schools" https://www.gov.uk/government/publications/teachingmathematics-in-primary-schools identifies priority areas of the primary maths National Curriculum that form the essential building blocks necessary for pupils to progress smoothly from Year 1 to Year 6.

For each of these areas, the document also identifies what it calls 'ready-to-progress criteria' which are the concepts children need to master before they progress to the next year group. The White Rose planning resources have identified where teachers might want to spend longer on topics to secure understanding and also suggest any content that children may have missed last year due to Covid 19 school closures. Teachers have links to NCETM spine development materials to support planning of the White Rose medium term overview.

- **Short term planning**

All teachers will produce daily or weekly planning. This may take the form of a detailed plan or the planning may be in the form of the slides created for teaching. Whatever the format, teachers should be aware of and thought carefully about:

- an outline for the week with learning objectives;
- a clear overview of the stages of I, WE and YOU;
- planning for reasoning: including 'maths talk' ;
- reference to source materials;
- clear links and progress across a sequence of lessons;
- new key mathematical vocabulary
- possible misconceptions
- how additional adults will support learning
- how 'rapid graspers' will be challenged

Teachers evaluate their plans / slides daily, making any necessary changes and adaptions in response to assessment for learning and the needs of the class. Where appropriate, additional adults will provide feedback to inform next steps planning.

Teachers will plan for adult-led small groups and pre-teaching sessions for identified children where possible.

White Rose, NCETM will be used to support planning.

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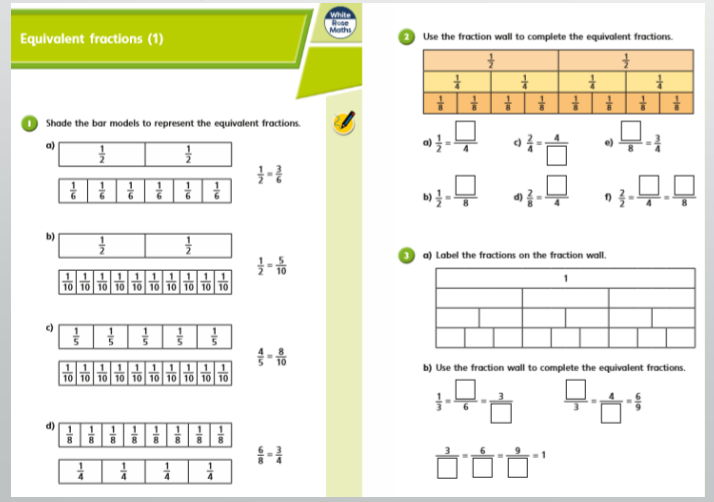
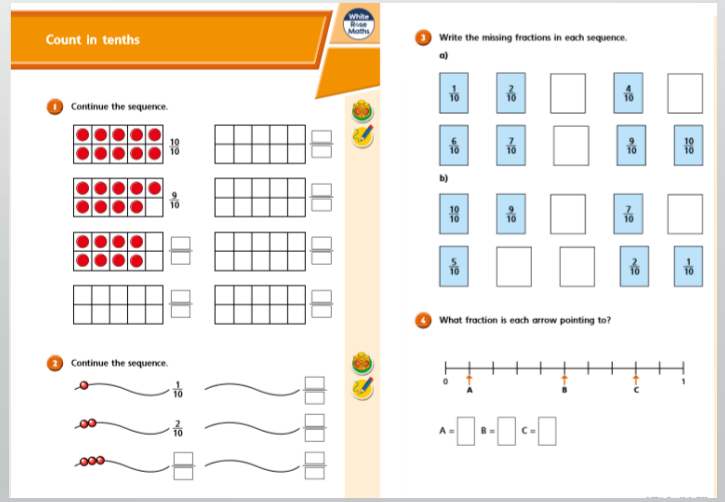
Tasks for learning

Our approach to task selection

- Pupils will need to practise each step one by one as they learn them, and then in short sequences before attempting to practise the whole sequence. Select the appropriate practice and retrieval tools to support pupils in gaining the level of fluency they need (Sherrington)
- There will be variation across a group of learners, but securing confidence is key for all.
- Rosenshine suggests that it is important for the tasks used for independent practice to mirror those used during the guided phase ie don't guide times tables and then leap straight to long multiplication.
- If practice tasks are more specific, tighter in scope, it is easier to check for success. Avoid letting pupils practise making errors.
- Think about how stages of scaffolding can be removed to increase independence and fluency. Fluency suggests recall from memory with minimal effort and a level of automaticity. Fluency is secured through repeated practice with high success rate.
- To achieve the above, in most cases the use of **White Rose resources** is the approach that fits. For consolidation, sometimes other resources may be chosen, or indeed a practical activity that meets the lesson objective.
- White Rose is influenced, inspired and informed by the work of leading researchers and practitioners across the world. They aim to transform education through innovative approaches leveraging technology and collaboration to ensure that every individual, regardless of background or location, has access to world-class educational opportunities.





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Assessment

- As a school we implement timely and effective formal and informal assessment and monitoring of pupils to ensure gaps are addressed and further opportunities to both support the less able and develop greater depth mathematicians are realised. These assessments include twice yearly NFER assessments, weekly multiplication clubs and in Year 4, the MTC (Multiplication Check). Teachers assess the attainment and progress of pupils through the Year Group specific KPIs (Key Performance Indicators) which are updated at key points throughout the year (Formally January and June). Senior leaders support and monitor staff to ensure teaching is consistent, high quality and the mastery approach is utilised across the entire school.
- Assessment takes place at three connected levels: short-term, medium-term and long-term. These assessments are used to inform teaching in a continuous cycle of planning, teaching and assessment. (For further details on assessment, recording and reporting, please see Assessment policy)

Day-to-day assessments

- As part of the ongoing teaching and learning process, teachers assess children's understanding through a range of Assessment for Learning strategies. Daily annotations (TAR), which inform day to day teaching and learning, are based on observation, questioning, informal testing and the marking and evaluation of work. This will also enable appropriate written and verbal feedback to be given to children and will inform planning for the following day.
- Teachers make use of diagnostic questioning throughout all stages of pupils' learning, to identify misconceptions. Open-ended questioning is central to teacher input, enabling misconceptions to be revealed and explored. Marking and feedback will also identify misconceptions which will either be challenged or inform next steps. Learners will also be taught to assess and evaluate their own understanding by recognising successes, learning from their own mistakes and identifying areas for improvement. (See Feedback and Marking policy for further details.)

Summative assessments

- At the end of the terms 4 and 6, children in years 3-5 complete formal assessments. Pupils in years 2 and 6 complete alternative appropriate tests. This provides a summary of their understanding of the areas of the curriculum taught that term and will inform provision maps and planning. This information is used to track attainment and progress and forms the basis of Pupil Progress meetings, held three times per year.

Pupil Progress Meetings

- he amount of progress made and percentages of those children on track to reach end of year targets is analysed and discussed at data eetings three times per year. Progress from Key Stage 1 will also be closely monitored in Key Stage 2 classes.

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The Environment

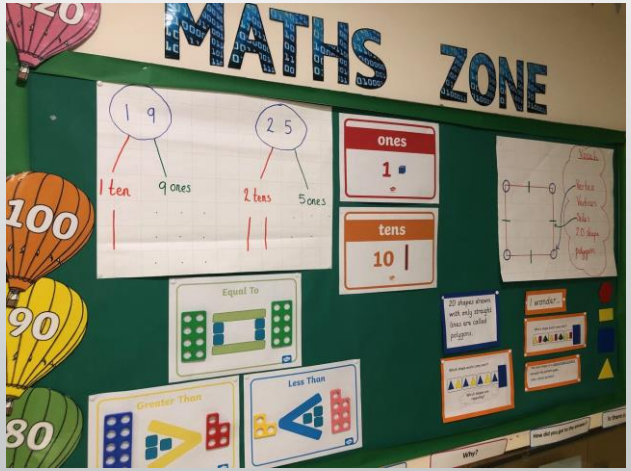
Learning Environment

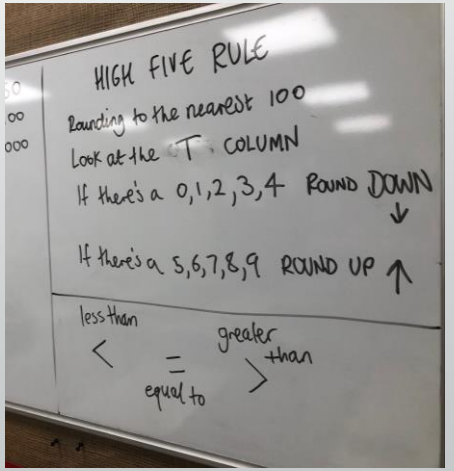
It is important that the classroom environment supports both the learning and teaching of mathematics.

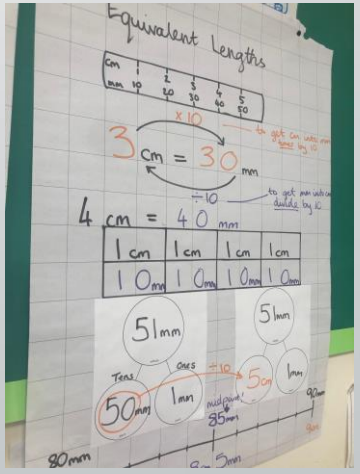
Working walls should be use to:

- provide a reference point, supporting teaching and learning in a lesson or series of lessons;
- promote mathematical thinking and discussion;
- promote key vocabulary;
- include WAGOLLs where appropriate and celebrate achievement

In every classroom, resources such as number lines, hundred squares, place value counters, double-sided counters, place value charts and multiplication squares are displayed as appropriate and used for whole class or individual work. Children are encouraged to access these independently to support their learning.







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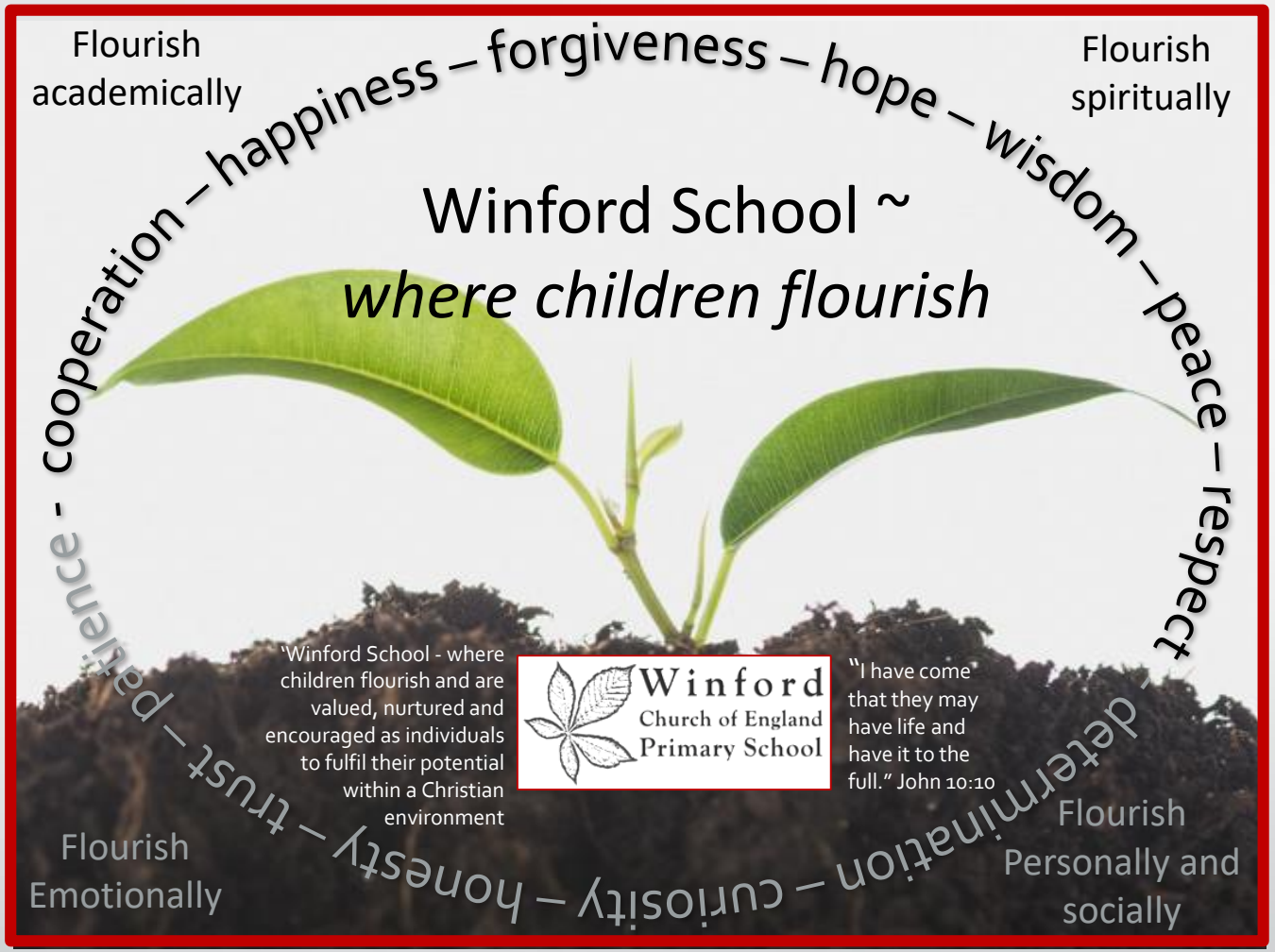

Written by staff at Winford Primary School

2024