Bursley Academy - Mathematics Teaching and Learning Processes

Mathematics at Bursley

At Bursley Academy, Maths is taught through our skills based curriculum, with fluency, reasoning and problem solving at its core. The application of maths in real life contexts enriches the children's learning of Maths skills, making them relevant and meaningful. Discrete Maths teaching is taught daily in every class, ensuring that the National Curriculum expectations are met.

In line with the Collective Vision Trust, we have adapted the White Rose Maths Scheme as the basis of our mathematics curriculum. White Rose is a carefully sequenced scheme that builds up children's mathematical knowledge through clear, explicit teaching. It makes good use of developing mathematical knowledge through using concrete apparatus to pictorial representation and, then, to abstract thinking. It is designed to support the development of reasoning and problem solving alongside fluency to support challenge and ambition. White Rose is a tool to support the teaching for Maths at Bursley, but not the main driving force. Children's understanding of the Crucial Knowledge is at the core of the teaching and learning, therefore additional resources and learning opportunities can be incorporated where needed.

We have used this curriculum to draw out the crucial knowledge that is the foundation of mathematical learning that gives children the fundamental building blocks to develop their mathematical understanding and progress. We have ensured that we build in lots of opportunities for children to recap their knowledge in order to ensure it is firmly embedded and, that, their learning is part of their long term memory.

White Rose Maths scheme has a clear rationale for the sequence of the topics. Maths learning requires some things to be learned before others, for example place value needs to be understood before working with addition and subtraction. Similarly, addition needs to be learnt before looking at multiplication. White Rose, quite rightly, puts the emphasis on number skills first in all year groups. Number is the crucial building block for all areas of mathematics and, so, must be prioritised.

For some topics (e.g. shape and statistics) the order is not crucial – they need to come after number, but don't depend on each other, and, so, they can be taught in any order. The sequencing of these is planned to give as wide a variety of topics for pupils as possible in each term and year.

Maths Fluency

Mathematical fluency skills help pupils think faster and more clearly, giving them the energy, attention and focus to tackle complex problem-solving and reasoning questions. Fluency builds the foundations children use to tackle more complex, multi-step questions in problem-solving and reasoning activities, and it's crucial to their success.

As part of the lesson sequences, pupils should be given the opportunities to explore fluency type questions within the progressive steps/ questions provided. Once pupils show understanding at the fluency level, they can then progress to reasoning and problem solving questions and challenges. Lessons may have a fluency focus to ensure that skills are embedded effectively; However, even in these fluency sessions, pupils should be exposed to varying steps with an increased level of difficulty.

Maths Reasoning and Problem Solving

After exploring the Crucial Knowledge through fluency questions, pupils will be provided with reasoning and problem solving challenges to complete. These will allow pupils to demonstrate their understanding and

apply it in new and varied ways. Reasoning and problem solving underpins the deepening of understanding. Fluency alone doesn't give pupils the chance to delve deeper into the mathematics.

Planning Expectations

In Maths, the progression of skills is key. There are a number of documents to be followed, which support teachers in their planning of Maths.

There is the-

- **Long Term plan-** There are some alterations on the Bursley LTP compared to the LTP found on the WRM website. Changes have been made where needed to best support the progression of our pupils. For example, in Year 1, the number related topics have been grouped first. In Year 2, the teaching weeks and content have been reduced to ensure the necessary coverage before SATS. In Year 3/4, fractions units have been moved to follow multiplication and division, so that skills can be applied from the previous unit with good understanding. In Year 6, recap lessons have been reduced and any consolidation and recap will take part at the start of the unit through an 'explore' session/ lesson starter. It is essential that teachers refer to the Bursley Maths long term plan, rather than the one found on WRM, to ensure that planning sequences are taught in the correct order and that consolidation weeks are adhered to.
- **National Curriculum Objectives Overview-** This document provides a useful overview of the programme of study for the age group and the necessary objectives that need to be covered throughout the year in the different areas eg number, statistics etc.
- **Medium Term Plan Overview-** This document shows the programme of study broken down into the teaching weeks. This provides a useful overview of the content that needs to be taught and the allocated time frame that has been given. It also blocks in the consolidation weeks.
- **Small Steps Document-** This document breaks the teaching objectives down into the smaller steps. There is space to date when steps have been taught. It enables teachers to ensure that topics are covered thoroughly and within the given time shown on the LTP. *This would also be a useful reference document for Year 2 moderation.* There is a space given for a brief evaluation, so for example, if a step has taken longer than expected/ if reactive teaching sessions have been required/ if changes have been made to the plan etc, this can be noted down. Teachers are encouraged to use the WRM to support them in their planning and resourcing of lessons and these 'small steps'. They should remember that topics, and therefore the small steps, maybe in a different order on the WRM (in some cases) where topics have been moved and re- ordered to best aid progression.
- **Short Term Plan-** Teachers should use the small steps document to guide their short term planning. They should follow the agreed school format for the short term planning of maths.

Topic:			Week Commencing:		
RRM:					
Resources	CK	Input	Differentiated activities	Plenary	Evaluation

Sequence of Work

Start of the half term- consolidation week- recap of number and place value Crucial Knowledge

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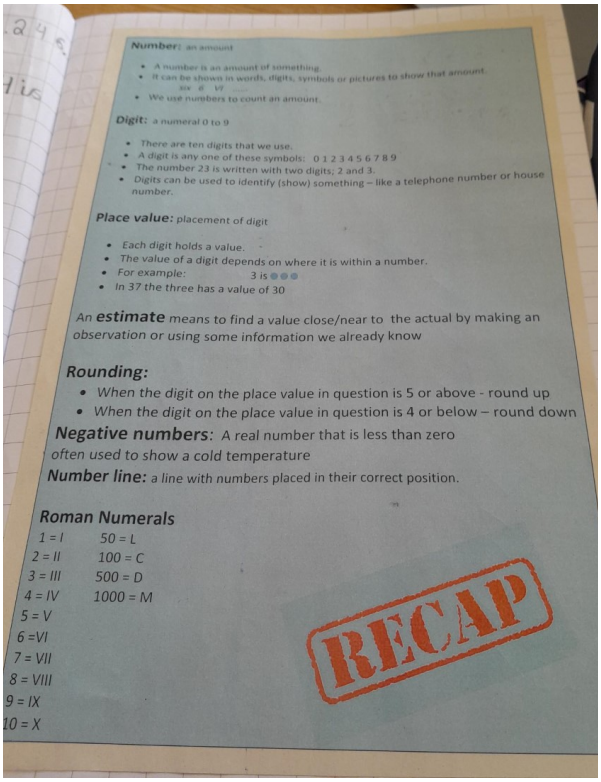
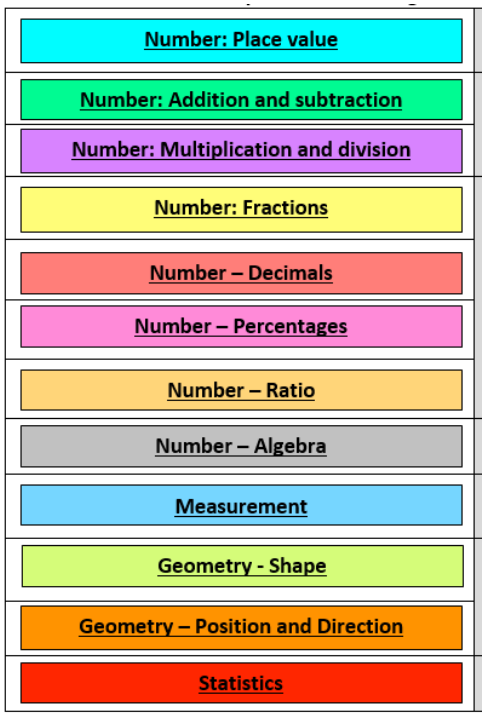
At the start of a new unit –

Introduce the new unit- share with the pupils the Crucial Knowledge for the unit. This will be taken from the Collective Vision Trust document.

For example-



Ensure the coloured background for each strand of learning is the same colour from CVT document.



Ensure that the Crucial Knowledge for consolidation weeks is clearly labelled with the word ‘recap’.

- Exploration activity to assess prior learning/ knowledge
- Work through small steps- these must be varying levels of ability, but do not necessarily have to cover the Concrete- Pictorial- Fluency and then abstract within the same session. These elements maybe broken down over a number of sessions.
- Frequent recaps to assess understanding of small steps covered

(Reactive sessions for individual pupils where needed- in afternoon Rapid Recall Maths sessions/ Interventions for up to 6 weeks at a time for target pupils- identified from gap analysis).

- Assessment

Daily Lesson Sequence

- Share Crucial Knowledge for the lesson- a starter is not essential. The starter is the sharing of the Crucial Knowledge and discussing the related vocabulary, using the definitions provided in the Collective Vision document.

Do not ask open ended questions about the Crucial Knowledge eg What can you tell me about the array strategy? Simply, share the Crucial Knowledge and explain using the terminology stated in the Collective Vision document. Otherwise, if children give an incorrect explanation from the onset, this may lead others to develop misconceptions. As a result, pupils would risk not making the progress that they would have been capable of within the lesson.

- Teaching input
- Progressive, numbered steps- (this may or may not begin with concrete and then pictorial/ or pictorial)
- CPA approach does not need to be in every session. Sessions may focus on practical/ pictorial, then following sessions on fluency, before building up to reasoning and problem solving. However, the steps/ challenges in each session do need to progressive and of increasing difficulty. Differentiated tasks can be given; However, progressive steps need to be still provided for each ability level.
- Plenary- Recap over Crucial Knowledge for the session. Can the children recall the Crucial Knowledge? End the session with a reasoning and problem solving challenge. This will be particularly useful for those children who have not progressed to this step within the lesson.

Assessment

Assessment will take place frequently. It can be in a variety of forms-

Summative assessment- There has been a week blocked in to the long term plans (week 10) when summative assessment can take place. During this week, teachers can administer the end of term White Rose assessment that is appropriate to the year group and ability of the pupils. Twinkl assessments have also been added to the assessment timetable below, and can be used as optional/ additional evidence to support end of term judgements.

Recap week assessments-

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After each half term, teacher's will plan for a consolidation week in which number and place value Crucial Knowledge will be recapped. The focus is on these areas, as these are the key areas that are integral to all aspects of the maths curriculum. This Crucial Knowledge should be consolidated frequently to ensure that it is fully embedded and so that pupils can understand, use and apply the knowledge with fluency and with a deeper understanding.

'Mathematics skills become strong when they're done regularly. After a concept has been introduced, you should look to have activities planned to cement students' knowledge until you're confident they can work on it or use it independently.' (3P learning)

GL assessments-

These will be also planned into the assessment timetable to analyse key areas of strength and areas in need of development.

Formative assessment- Explore sessions have been added to the small steps planning document. This 'exploration' may be a quiz at the start of a unit of work and may take place in the 'starter' of a session. Alternatively, teachers may wish to utilise a full session to fully explore children's depth of understanding. Concrete manipulatives maybe explored, or progressive challenges and questions provided, to identify the starting point for pupils at the beginning of a new unit. Additional mini assessment activities and quizzes can be planned in at frequent intervals to assess pupils developing understanding of the small steps covered up to that point.

Assessment Timetable

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn 1 **Baseline Assessments**	➢ GL – PTM 5 (paper)	➢ Twinkl Y1 Term 3 paper 1 – as a baseline ➢ GL – PTM6	➢ Twinkl Y2 2019 paper ➢ GL – PTM7	➢ Twinkl Y3 Term 3 ➢ GL – PTM8	➢ Twinkl Y4 Term 3 ➢ GL – PTM9	➢ SATs past paper Maths 2016 ➢ GL – PTM10
Autumn 2	➢ End of term WRM assessment	➢ SATs past paper Mathematics 2016 ➢ End of term WRM assessment ➢ Twinkl Y2 Term 1	➢ Twinkl Y3 Term 1 ➢ End of term WRM assessment	➢ Twinkl Y4 Term 1 ➢ End of term WRM assessment	➢ Twinkl Y5 Term 1 ➢ End of term WRM assessment	➢ SATs past paper Maths 2017 ➢ Twinkl Y6 Term 1 ➢ End of term WRM assessment
Spring 1		➢ SATs past paper Mathematics 2017				
Spring 2	➢ End of term WRM assessment	➢ SATs past paper Mathematics 2018 ➢ End of term WRM assessment ➢ Twinkl Y2 Term 2	➢ Twinkl Y3 Term 2 ➢ End of term WRM assessment	➢ Twinkl Y4 Term 2 ➢ End of term WRM assessment	➢ Twinkl Y5 Term 2 ➢ End of term WRM assessment	➢ SATs past paper Maths 2018 ➢ Twinkl Y6 Term 2 ➢ End of term WRM assessment
Summer 1		➢ SATs past paper				➢ SATs past paper

Y2 and Y6 SATs		Mathematics 2019 ➢ SATs paper Mathematics 2022				Maths 2019 ➢ SATs paper Reading 2022
Summer 2	➢ End of term WRM assessment ➢ GL – PTM 6 (paper)	➢ GL – PTM7 (computer) ➢ End of term WRM assessment ➢ Twinkl Y2 Term 1	➢ Twinkl Y3 Term 3 ➢ GL – PTM8 ➢ End of term WRM assessment	➢ Twinkl Y4 Term 3 ➢ GL – PTM9 ➢ End of term WRM assessment	➢ Twinkl Y5 Term 3 ➢ GL – PTM10	➢ GL – PTM11 ➢ Twinkl Y6 Term 3 ➢

Differentiation-

Differentiated tasks with progressive steps maybe given to pupils. Alternatively, pupils may work from the same set of progressive steps and challenges; However, teachers will identify the starting point for pupils in order to best challenge and stretch them. Some children may be able to choose their starting point for themselves. Pupils with additional needs will be catered for and supported using a personalised and tailored curriculum that meets the needs of the individual.