Maths Vision

At St Helen's, our vision is 'Flying high together, soaring on wings like eagles'. We believe that every child is entitled to a high-quality mathematics education, which will provide a foundation for them understanding the world. As a result, they will have an appreciation of the beauty and power of mathematics, plus a sense of enjoyment and curiosity about the subject.

At St Mary's, our vision is 'Enjoy, Explore, Excel together; be amazing.' Therefore, we aim for our children to enjoy their mathematics learning, have the opportunity to explore mathematical concepts with a natural curiosity and achieve their very best.

Our teaching follows the National Curriculum with these aims:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

We are on an exciting journey of embedding teaching for mastery to ensure that children of all ages are 'flying high' and 'being amazing' by acquiring a deep, long-term, secure and adaptable understanding of the subject. Our approach is framed around the Five Big Ideas (NCETM) which underpin teaching for mastery. The children are taught through whole-class interactive teaching where the focus is on all children working together on the same lesson content at the same time, as happens in Shanghai and several other regions that teach maths successfully. This means that the children are on a journey together, allowing no child to be left behind, by following a small step sequence which is reviewed daily to respond to the needs of the children. Small group interventions are used to build in smaller steps to minimise the risk of any child falling behind to ensure that misconceptions are overcome and gaps are closed. This enables the children to be ready to progress onto the next concept.

Five Big Ideas in Teaching for Mastery:

Coherence

Lessons are broken down into small connected steps that gradually unfold the concept, providing access for all children and leading to a generalisation of the concept and the ability to apply the concept to a range of contexts.

Representation and Structure

Representations used in lessons expose the mathematical structure being taught, the aim being that students can do the maths without recourse to the representation

Mathematical Thinking

If taught ideas are to be understood deeply, they must not merely be passively received but must be worked on by the student: thought about, reasoned with and discussed with others

Fluency

Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics

Variation

Variation is twofold. It is firstly about how the teacher represents the concept being taught, often in more than one way, to draw attention to critical aspects, and to develop deep and holistic understanding. It is also about the sequencing of the episodes, activities and exercises used within a lesson and follow up practice, paying attention to what is kept the same and what changes, to connect the mathematics and draw attention to mathematical relationships and structure.

The Five Big Ideas were first published by the NCETM in 2017 - https://www.ncetm.org.uk/teaching-for-mastery/mastery-explained/five-big-ideas-in-teaching-for-mastery/

What does 'Coherence' look like within our partnership?

Yearly overview

At the start of an academic year, teachers map out a yearly overview for maths by using White Rose, NCETM Curriculum Prioritisation and the DfE Ready-to-Progress Guidance. The Ready-to-Progress Guidance can be used to ensure that the most important elements that underpin the curriculum are covered at the right time, and to ensure that there is continuity and consistency for pupils as they progress from one year group to the next. Teachers can use the guidance to inform decisions on how

Mathematics Term by Term Yearly Overview Plan

Year 2 Year Overview 2021 – 2022

<table>
<tr><td></td><td>Week 1</td><td>Week 2</td><td>Week 3</td><td>Week 4</td><td>Week 5</td><td>Week 6</td><td>Week 7</td><td>Week 8</td><td>Week 9</td><td>Week 10</td><td>Week 11</td><td>Week 12</td><td>Week 13</td><td>Week 14</td></tr>
<tr><td>Autumn</td><td colspan="6">RTP Number: Place Value</td><td>RTP Number: Addition and Subtraction</td><td colspan="7">RTP Number: Addition and Subtraction</td></tr>
<tr><td>Spring</td><td colspan="2">RTP Number: Addition and Subtraction

(Mental strategy – partitioning)</td><td colspan="5">RTP Number: Multiplication and Division

Term 3 & 4: Teach Statistics through ICT (Data handling)</td><td colspan="2">Measurement: Money

Big Maths: Revisit Number through Calculation strand</td><td colspan="4">Number: Fractions</td></tr>
<tr><td>Summer</td><td colspan="2">Measurement: Time

(EXP: Nearest 15 minutes.
GD: Nearest 5 minutes)</td><td colspan="2">RTP Geometry: Properties of shape (2D & 3D)</td><td colspan="2">Measurement: Mass, Capacity and Temperature</td><td colspan="2">Measurement: Length and Height</td><td>Revisit Statistics</td><td>Geometry: Position and Direction</td><td>SPACE</td><td></td></tr>
</table>

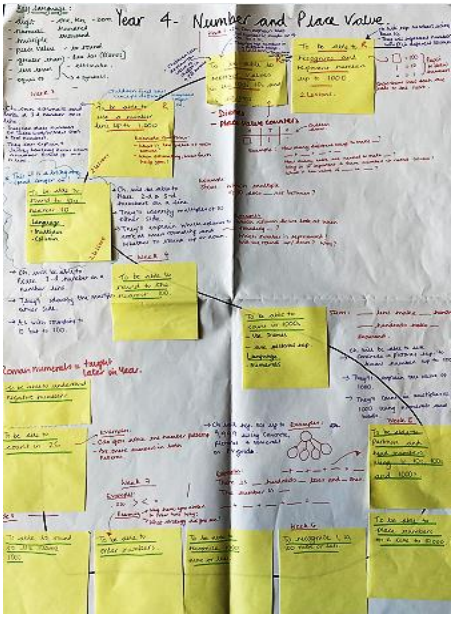
much teaching time to set aside for the different parts of the curriculum.

S planning

Prior to a block of learning, S planning is used to think deeply about the small steps needed to be taken ('the journey') to enable all pupils to succeed and meet the year group objectives. It is used as a professional development opportunity by exploring recommended resources to further enhance

teachers' subject knowledge and understanding of ways of teaching concepts. S planning can be approached in the following way:

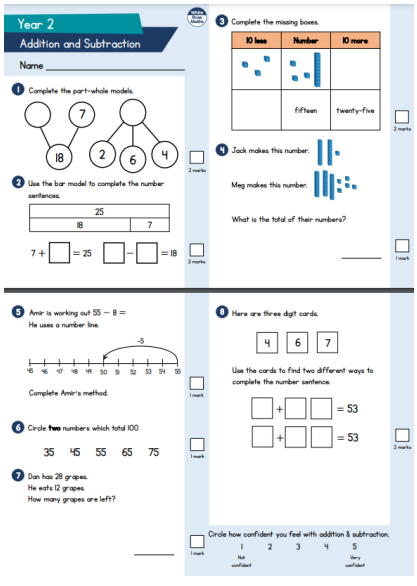
1. Start by using White Rose, NCETM Professional Development Materials and/or Curriculum Prioritisation Materials to identify each small step on post it notes -
2. Cross reference with DfE Ready-to-Progress criteria to find your priority teaching points - Code RTP.
3. Build in any smaller steps and discuss the sequencing until you have an 'S' progression you are happy with.
4. Use different colour pens (if preferred) to map out the following:
   -Revisit prior learning - Code R for 'revisit', in response to the entry assessment.
   -Previous or potential misconceptions/ tricky points
   -Core representations
   -Language focus (key vocabulary, stem sentences and generalisations)
   -Connections with other RTP criteria within your year group

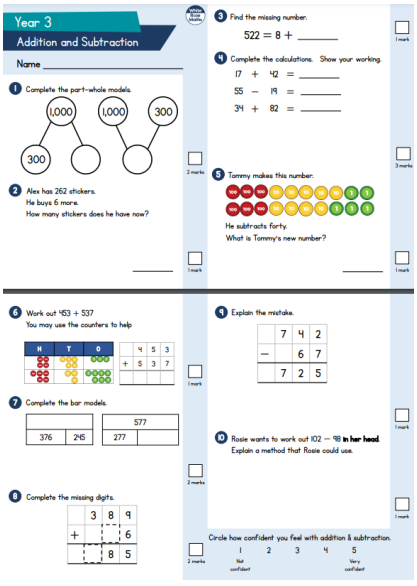


Assessment (to aid S planning)

Prior to a block of learning (at St Helen's only), the children engage with an entry assessment from the previous year group to identify what they remember and what they need to revisit.

At the end of a block of learning (a week later), the children engage with an exit assessment to show whether or not they are secure with the year group objectives. This informs teacher assessment for tracking objectives.





Lesson sequence

St H: Big Maths CLIC/ St M: Flashback 4	Learning objective Steps to success	Review	Explore/ I do-we do-you do	Check point/ Hinge	Independent learning/ small group work/ continuous provision

Steps to success:

5.5.22
L.O. Find two quarters.

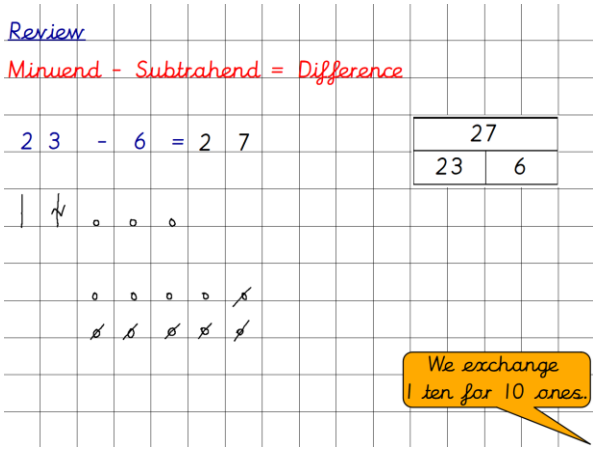
Steps to Success:
1. Identify the whole amount.
2. Find two quarters of the whole amount by using a bar model to half the whole and half it again. Two quarters are equivalent to a half if the whole is the same.
3. Explain using the stem sentences.

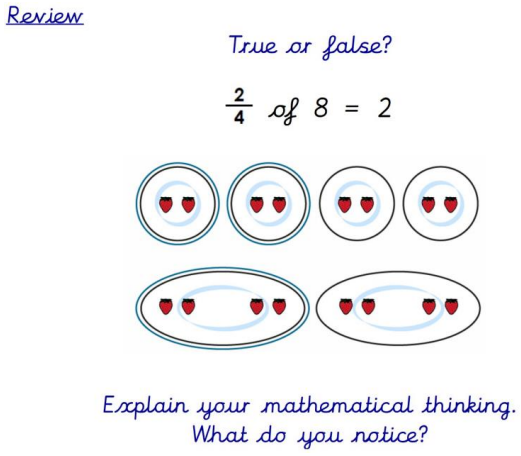
8.11.21
LO: simplify fractions

Steps to Success:
1) Look at the numerator and the denominator
2) What is the highest common factor of the numerator and the denominator? You could draw a T-chart to help you.
3) Divide the numerator and the denominator by the highest common factor

Review:

Following assessment from the previous lesson, the review phase is used to overcome an identified misconception. However, if all children have achieved a secure understanding, this phase is used to deepen their knowledge through a reasoning and problem solving context. The review phase supports the children to make connections between small steps and strengthen retention by revisiting prior learning.



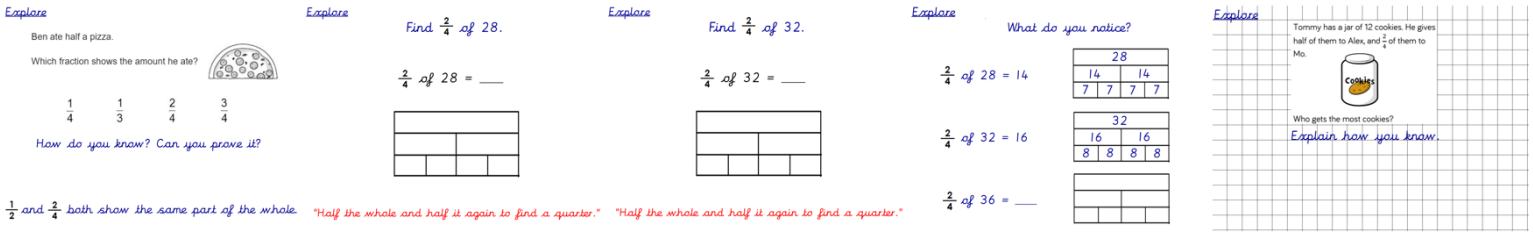


Explore/ I do-we do-you do:

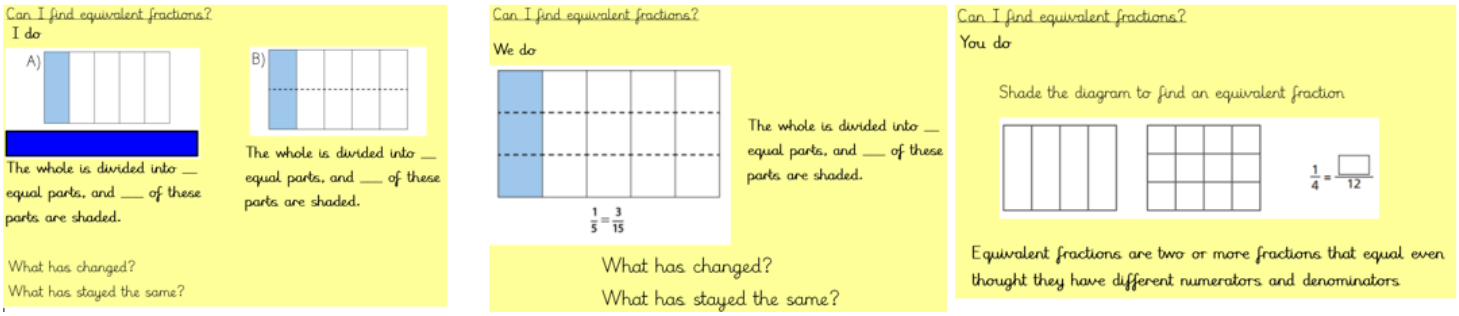
During the explore phase, a concept is broken down into small connected steps with variation included to deepen the children's understanding. The role of the adult is to facilitate mathematical discussion, rather than lead it. The aim of this approach is to ensure that the learning is in the children's hands to promote deep thinking with a goal to achieve concepts embedded in their long-term memory. There is a real emphasis on the answer being just the beginning so that the children are constantly given the opportunity to develop their verbal and written reasoning skills. Stem

sentences and generalisations are used throughout daily maths lessons with an aim that the language focus is understood deeply, not just passively received. This means the language focus is thought about, reasoned with and discussed with others. We have a culture of encouraging the children to ask questions and to not worry if they get things wrong as we all learn from mistakes. Therefore, we aim for mathematical discussion to always be present in the classroom, including when the children are working independently, showing that they are 'flying high' and 'being amazing' in maths.

St Helen's example:

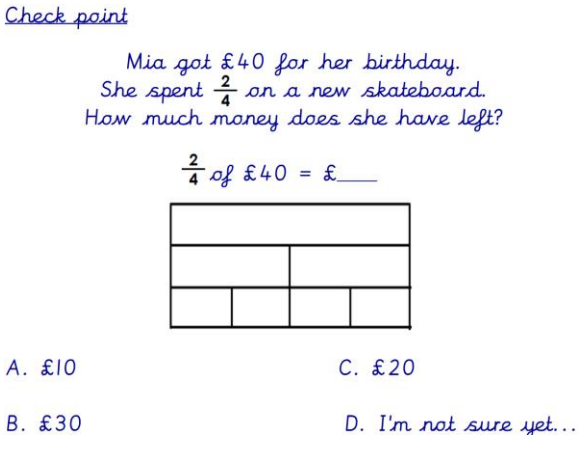


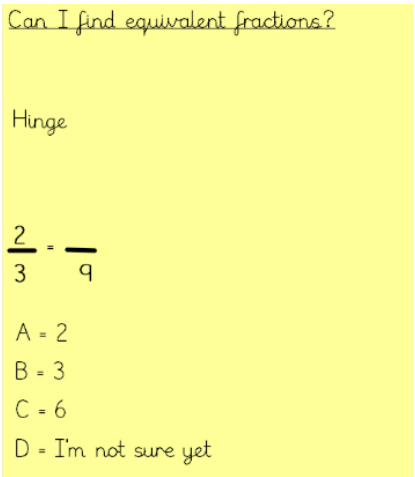
St Mary's example:



Check point/hinge question:

After the explore phase, a check point/hinge question is used to assess what the children know and identify any misconceptions - this informs what happens next in terms of starting points and the focus of teacher and TA support. The check point/hinge question should involve multiple choice with some responses including misconceptions and an 'I'm not sure yet…' as option D.



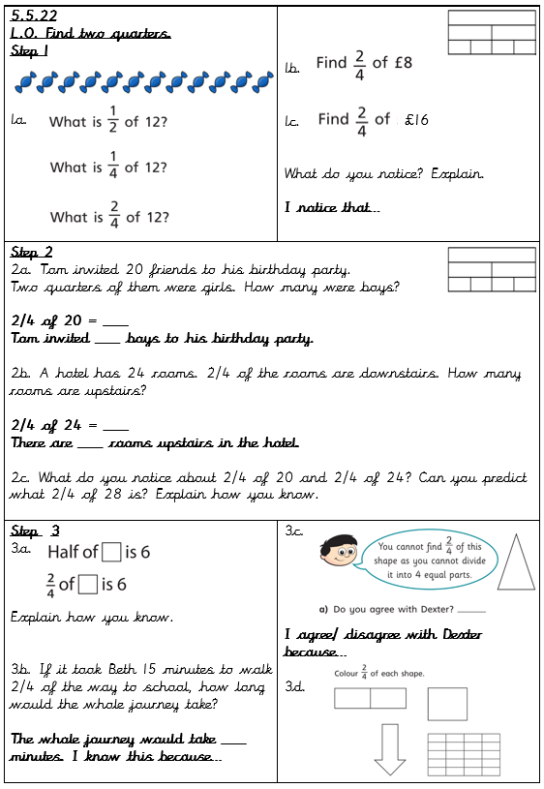


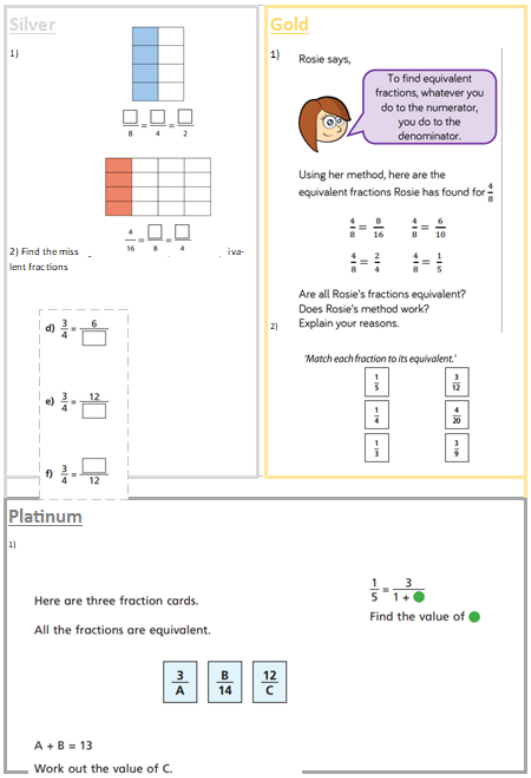
Worksheets

Step 1/Silver: Fluency – Trying the skill with a scaffold provided e.g. pictorial representation

Step 2/Gold: Fluency – Deepening understanding of the skill, becoming more flexible and fluid through variation and the scaffold removed

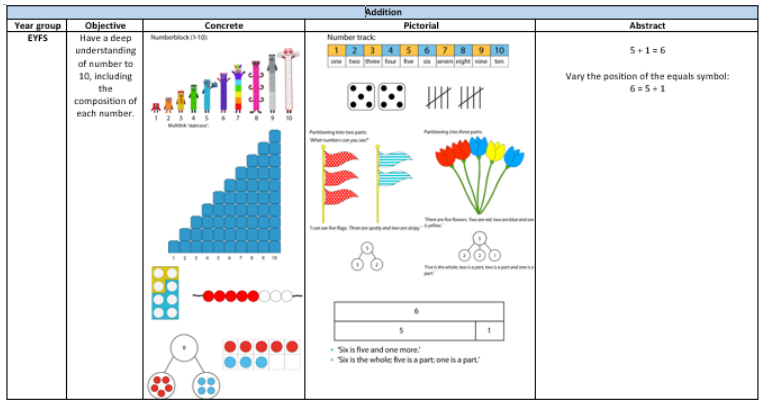
Step 3/Platinum: Application in a reasoning and problem solving context

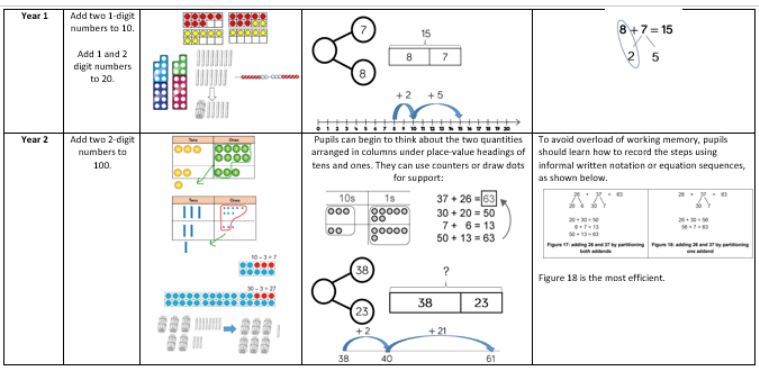


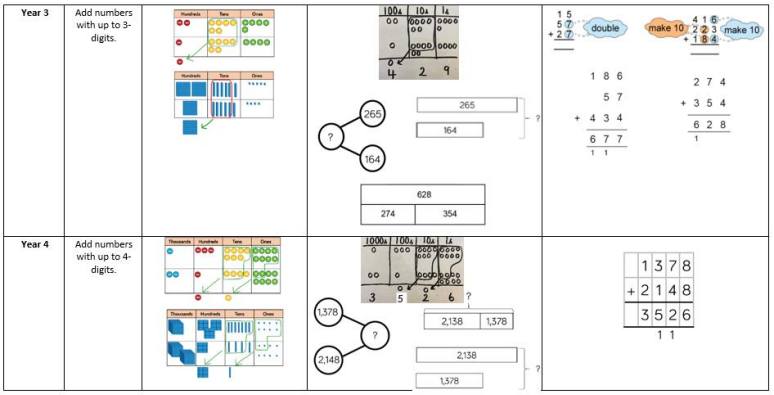


What does 'Representation and Structure' look like within our partnership?

Please see our calculation policy for Addition, Subtraction, Multiplication and Division which shows the progression from concrete – pictorial – abstract (EYFS-Year 6). Here is a snapshot of Addition:







What does 'Mathematical Thinking' look like within our partnership?

NRICH identify these features as being at the heart of mathematical thinking:

- exploring
- questioning
- working systematically
- visualising
- conjecturing
- explaining
- generalising
- justifying
- proving

Please see NRICH to include investigations within a block of learning: https://nrich.maths.org/9084 and https://nrich.maths.org/8767

Mathematical vocabulary, stem sentences and generalisations

We expect children to use correct mathematical terminology and to express their reasoning in complete sentences.

The quality of children's mathematical reasoning and conceptual understanding is significantly enhanced if they are consistently expected to use correct mathematical terminology (e.g. saying 'digit' rather than 'number') and to explain their mathematical thinking in complete sentences.

I say, you say, you say, you say, we all say is a technique which enables the teacher to provide a sentence stem for children to communicate their ideas with mathematical precision and clarity. These sentence structures often express key conceptual ideas or generalities and provide a framework to embed conceptual knowledge and build understanding.

For example: '*If the rectangle is the whole, the shaded part is one third of the whole'*.

Having modelled the sentence, the teacher then asks individual children to repeat this, before asking the whole class to chorus chant the sentence. This provides children with a valuable sentence for talking about fractions. Repeated use helps to embed key conceptual knowledge.

Another example is where children fill in the missing parts of a sentence; varying the parts but keeping the sentence stem the same. For example:

There are 12 **stars**. $\frac{1}{3}$ of the **stars** is equal to **4 stars**

Children use the same sentence stem to express other relationships. For example:

There are 12 **stars**. $\frac{1}{4}$ of the **stars** is equal to **3 stars**

There are 12 **stars**. $\frac{1}{2}$ of the **stars** is equal to **6 stars**

When talking about fractions it is important to make reference to the whole and the part of the whole in the same sentence. The above examples help children to get into the habit of doing so. Another example is where a mathematical generalisation or 'rule' emerges within a lesson.

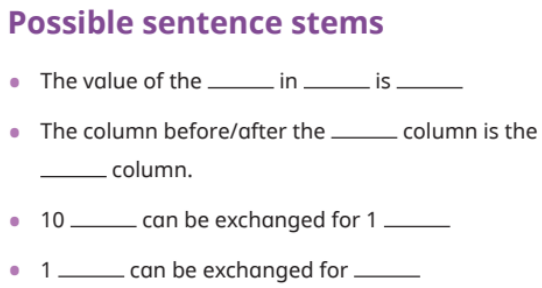
For example: *'When adding 10 to a number, the ones digit stays the same.'*

This is repeated in chorus using the same sentence which helps to embed the concept.

Source: https://www.ncetm.org.uk/media/k20boquz/ncetm-calculation-guidance-october-2015.pdf

Please access the following recommended resources/links to gain an understanding of mathematical vocabulary, stem sentences and generalisations used within each block of learning:

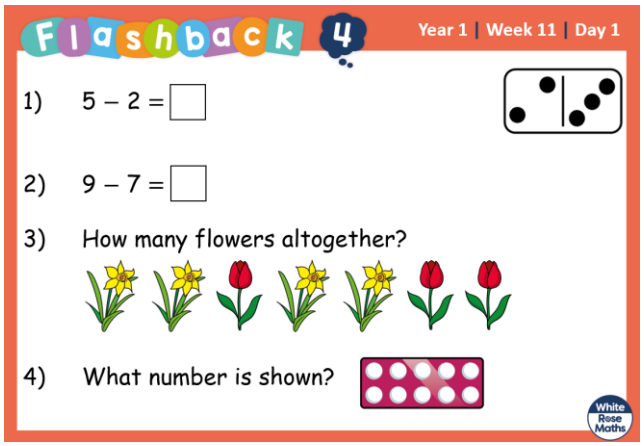
- NCETM Professional Development Materials - https://www.ncetm.org.uk/teaching-for-mastery/mastery-materials/primary-mastery-professional-development/
- Enigma Maths Hub Stem Sentence Banks (Number, Addition and Subtraction/ Multiplication and Division/ Fractions) - https://enigmamathshub.co.uk/primary-tfm-in-practice/
- Ready-to-Progress Guidance 'Language Focus' - https://www.gov.uk/government/publications/teaching-mathematics-in-primary-schools
- NCETM Curriculum Glossary - https://www.ncetm.org.uk/media/hpihrj3s/national-curriculum-glossary.pdf
- New White Rose Scheme of Learning. For example:

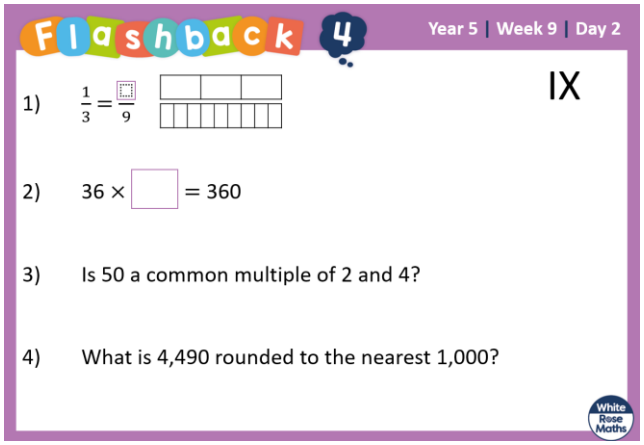


What does 'Fluency' look like within our partnership?

Flashback 4

As a morning activity on arrival to school at St Helen's or at the start of a maths lesson at St Mary's, the children engage with Flashback 4 (White Rose) which consists of a series of quick questions, covering something from the previous lesson, last week and topics from earlier in the year – maybe even last year! The reason for this is to ensure essential skills are regularly revisited and retrieved to strengthen retention.

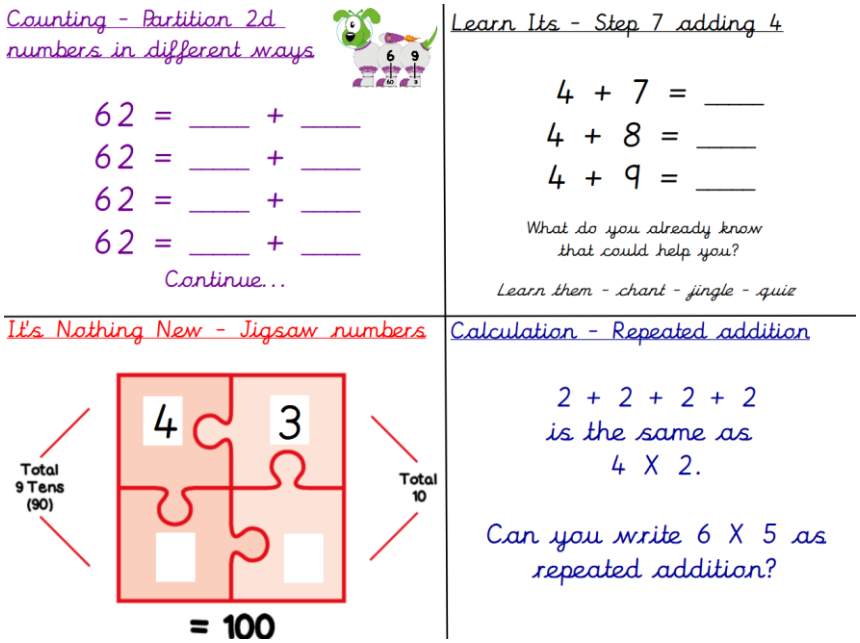




Big Maths at St Helen's

At the start of every Maths lesson at St Helen's, Big Maths is used to dedicate 10-15 minutes each day to 'flying high' with core skills and improving fluency. The CLIC session involves focusing on the following areas:

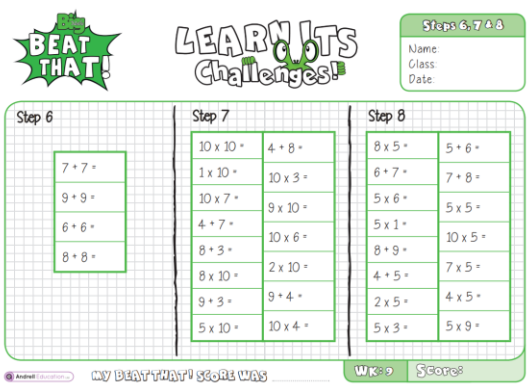
- Counting – exploring the number relationship of a fact, counting it out and deriving it for themselves
- Learn Its – spending time simply practising and recalling the fact (quiz every Friday)
- It's Nothing New! – applying that fact to new contexts such as everyday objects, units of measure
- Calculation – finally those elements of number knowledge and skills can be applied to larger procedures as pre-requisite background knowledge



Learn Its explained in more detail:

Learn Its are facts that are vitally important for the children to learn and be able to recall instantly, with no thinking time. The title perfectly describes what we want the children to do, 'Just learn it!' There are 36 addition Learn Its (all the 1 digit add 1 digit facts from 2+2 through to 9+9) and 36 multiplication Learn Its (all of the 1 digit times 1 digit facts).

Every Friday at St Helen's, the children engage with a Learn Its test. The children answer a number of Learn Its questions within a set time which is 1 minute (unless they are on 'Ultimate' which is 1.5 minutes) and there is a Big Maths Jingle for this. The children aim to complete as many questions as they can within the time available. Once the children have finished the test and marked their answers, they highlight three facts which either they didn't complete, found tricky to answer or got incorrect to practise over the upcoming week as home learning. If the children complete all questions correctly within the time provided, they move up a Learn Its level and this is updated on the progress tracking document.



Mastering Number at St Mary's (Mark to add)

Times Tables

The focus of times tables teaching and learning is on developing fluent step counting and conceptual understanding of what multiplication and division facts represent and how times tables are structured. Times tables are taught daily or three times a week with slightly longer sessions to ensure that learning is revisited regularly to enable the children to retain and 'fly high'/'be amazing' with factual fluency. Our approach involves using FunKey Maths step counting PowerPoints and playing games with cards which provides a safe, fun and sociable space to learn times tables. Times Tables Rock Stars is also used to compliment the teaching of times tables during short bursts of time at school and at home. Times tables on Times Tables Rock Stars are set to the times tables that the children have already learnt or are currently learning in class, but only after the initial teaching phase has been completed. This is an important strategy to keep the cohort together in their times tables learning.

By the end of KS1, we want all children to be able to step count forwards and backwards in steps of 1, 2, 5 and 10 to 100. This will hugely strengthen their number sense between 0-100 and will set them up to succeed in KS2 in developing number sense beyond 100. We also want children to have rapid recall of 2, 3, 5 and 10 times table facts by the end of KS1, but the mechanism for developing 'automaticity' in these facts should in the first instance be developed through knowledge of doubling facts to 20 for 2 times table and strong conceptual understanding of place value for 10 times table. Our aim is for the children to be fluent in describing the links between a product and its factors in terms of two models of multiplication and two models of division.

In KS2, there is a dual focus on deepening conceptual understanding and the ability to reason around multiplication and division structures, and also the acquisition of key facts to automaticity. By the end of Year 3, we want the children to also have rapid recall of the 4, 8 and 6 times tables prior to consolidating the 7, 9, 11 and 12 times tables in Year 4.

Please see our times tables policy to read the following guidance:

Contents

What does 'Variation' look like within our partnership?

Variation involves deepening the way children think through:

- What we keep the SAME.
- What we CHANGE.

Our aim is to support children in becoming mathematically observant.

Conceptual variation

As a teacher you need to be clear about:

- varying the representation to extract the essence of the concept
- supporting the generalisation of a concept, to recognise it in any context
- drawing out the structure of a concept – what it is and what it isn't.

Procedural variation

As a teacher are you providing the opportunity:

- for practice (intelligent rather than mechanical)
- to focus on relationships, not just the procedure
- to make connections between problems
- to use one problem to work out the next
- to create other examples of their own.

The questions that are asked are important, as they develop mathematical thinking.

Please see how variation can be included by looking at the flipchart and worksheet examples within the 'Lesson sequence' section.

Maths displays

Maths displays should be fluid and updated in light of a change in concept during the maths sequence, which may mean adding to a display to show how it builds on prior learning, as part of the learning journey.

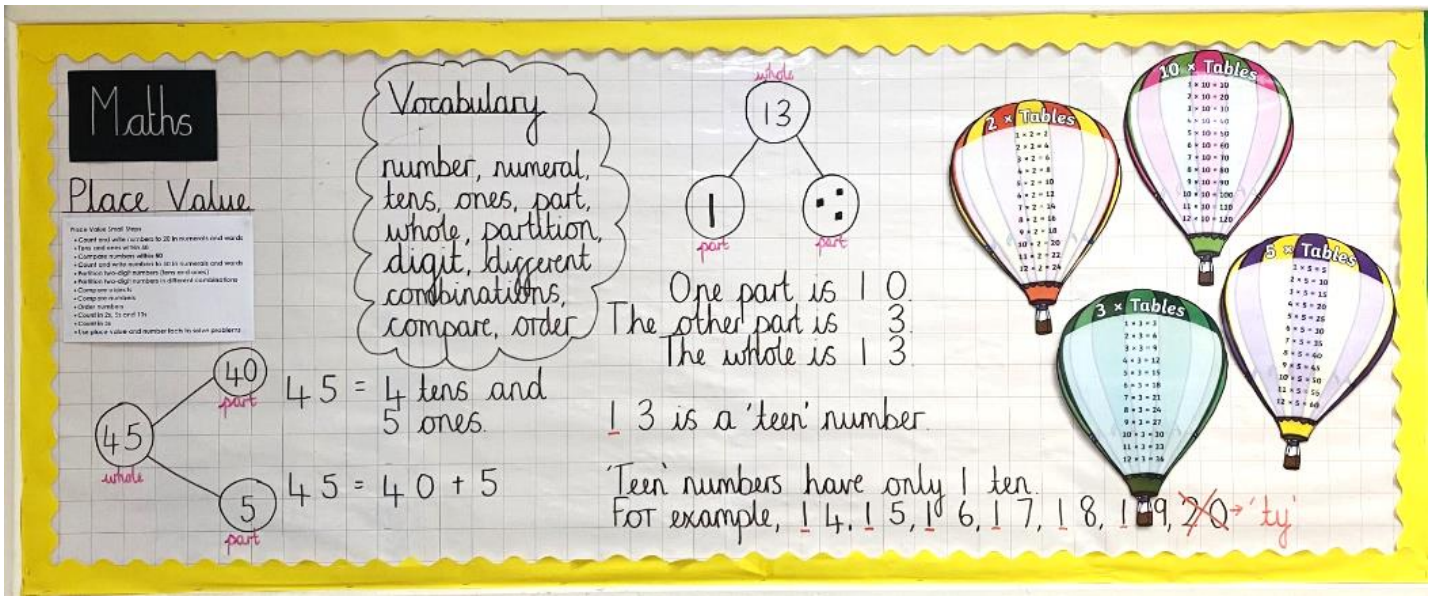
Key features to include:

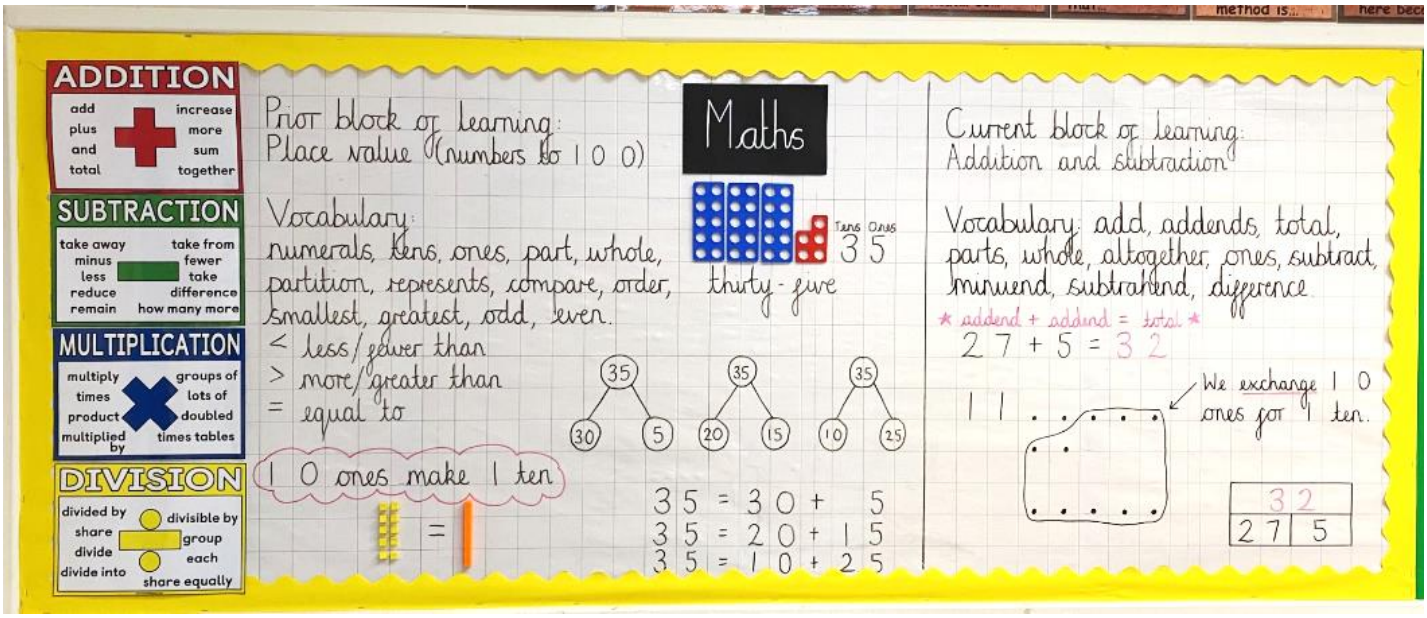
- Vocabulary – to be added to as the sequence develops
- Worked examples (including representations) and associated stem sentences and/or generalisations

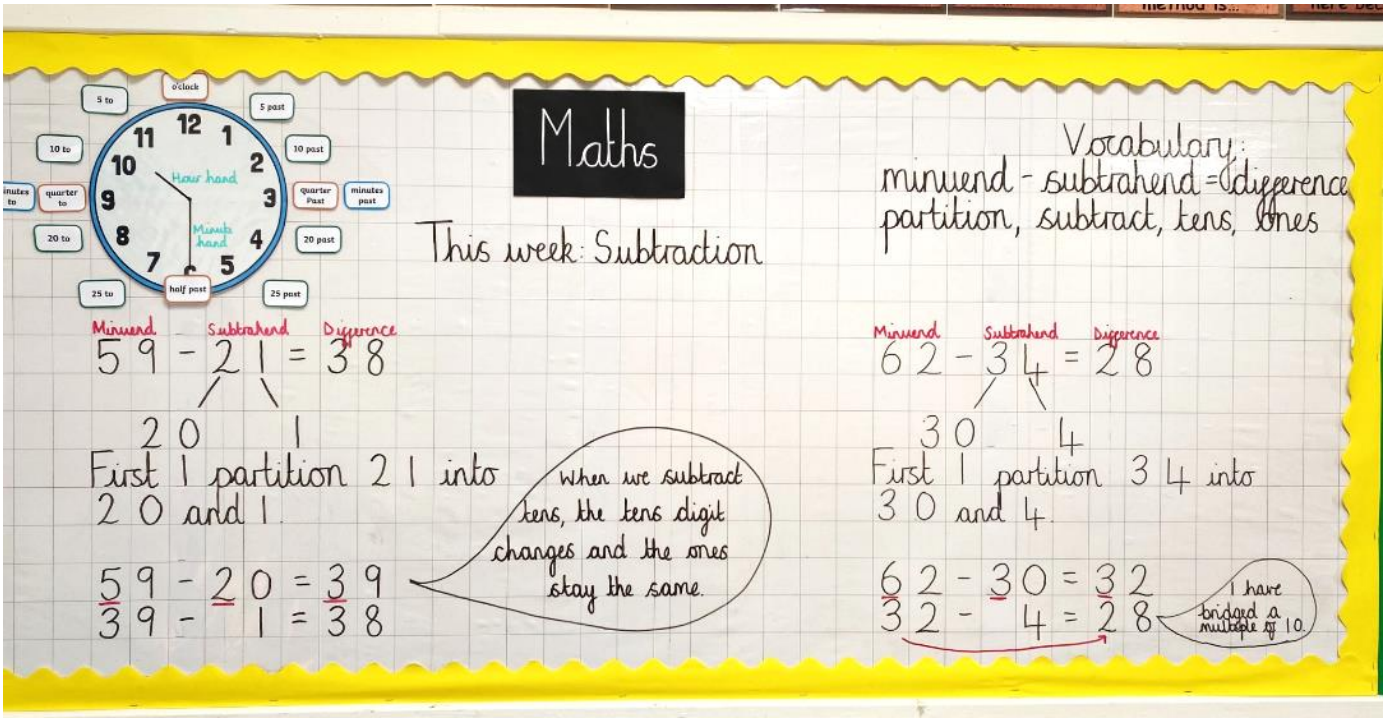
Other features to consider:

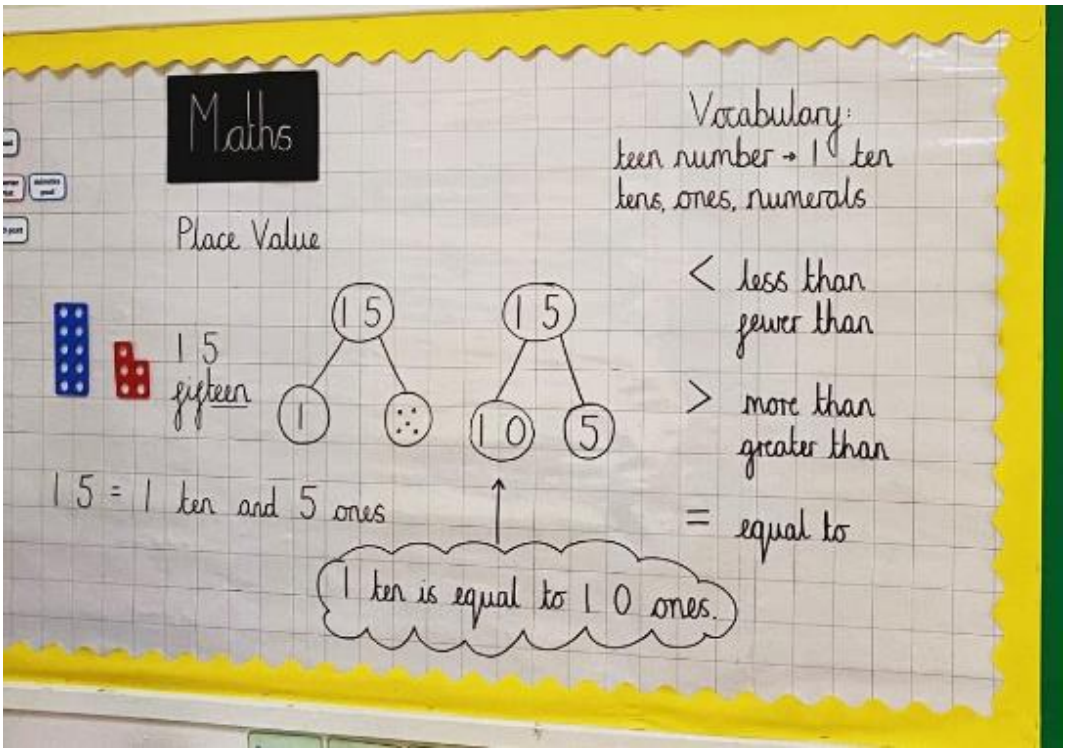
- Steps to success
- Examples of children's learning to celebrate

Some examples:






Maths
This week: Subtraction
Vocabulary:
minuend - subtrahend = difference
partition, subtract, tens, ones
Minuend Subtrahend Difference
59 - 21 = 38
20 1
First I partition 21 into 20 and 1.
59 - 20 = 39
39 - 1 = 38
When we subtract tens, the tens digit changes and the ones stay the same.
Minuend Subtrahend Difference
62 - 34 = 28
30 4
First I partition 34 into 30 and 4.
62 - 30 = 32
32 - 4 = 28
I have bridged a multiple of 10.


Maths
Place Value
15
fifteen
15 = 1 ten and 5 ones
15
1
10
5
1 ten is equal to 10 ones.
Vocabulary:
teen number → 1 ten
tens, ones, numerals
< less than
fewer than
> more than
greater than
= equal to