Maths Policy

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Vision

At Snape Wood Primary School, we believe that mathematics is an important life skill. Our mathematics curriculum offers a broad range of experiences designed to provide pupils with the mathematical understanding, skills and knowledge needed to deal with everyday situations, learning in other areas of the curriculum and investigations within mathematics itself. We believe that the language of maths is international and the subject transcends cultural boundaries. Therefore, we aim to provide children with opportunities in maths that will broaden their horizons and set them up for the future.

Our aims are:

- To give children the knowledge, understanding, resilience and problem solving skills that help them interpret the world around them
- To support children to have a well-developed number sense, particularly in the early years
- To support children to become fluent in the fundamentals of mathematics through varied and frequent practice with complexity increasing over time
- To develop children's ability to recall and apply knowledge rapidly
- In an increasingly fast-changing world, to develop children's understanding of the importance of maths and its relevance in everyday life
- To develop children's money-sense in order to use money in everyday life

Our Approach to Maths

KS1 and KS2

At Snape Wood, we follow the White Rose Maths schemes of learning. The schemes of learning are broken down into a yearly overview of blocks detailing which maths blocks are taught over the course of the year. This is then broken down further for each block into a small steps overview with more detailed guidance for each small step. Each small step builds on the previous step and at the beginning of a block time is spent recapping learning from the previous year. Each small step provides details of previous learning, key teaching points and manipulatives to use, things to look out for (misconceptions), key questions, sentence stems and links to the national curriculum.

White Rose maths also details a progression document for year 1-6 on each area of maths and how each concept progresses through the school building on content year- by- year. It also shows how each year builds on the statutory national curriculum objectives in maths.

EYFS

In nursery, there is a particular focus on attention and listening to ensure that the children are ready to access learning. Once this is mastered, the daily use of songs, rhymes and rhythm are highly important in the development of language and maths. In F2, we follow the White Rose guidance for F2 with a particular focus on number sense and fluency. Additionally, to maths lessons, fluency is taught every day in a whole class structure.

Times Tables Approach

At Snape Wood Primary School, we understand the important role that times tables play in maths.

Therefore, we use the below strategies to teach the times tables detailed in our progression every day for ten minutes, Monday-Thursday from year 2-6. Reception and Year One will focus on basic maths skills and once embedded Year One will focus on counting in 2's, 5's, and 10's. On Friday, we practice written recall of multiplication and division facts that we have been practising all week using the times table generator (http://www.timestables.me.uk/printable-pdf-quiz-generator.htm). This will be timed using the Big Maths Jingles (ranging from 100s, 90s, 60s, 30s) and these sheets will be recorded in the back of children's maths books.

These can then be self- marked with the teacher using a pink pen or peer marked using purple pen. This is used as a summative assessment for the teacher to understand which times tables a child has learnt and which have been forgotten. The teaching of times tables for the following week can then be adapted following this assessment.

Additionally, one times table session each week can be used for Times Tables Rock Stars (TTRS). The purpose of this session is to support children's rapid recall of times tables. During this session, the class may be split in half while half the children complete a TTRS session while the rest are receiving times tables input with the teacher/TA and then the groups swap.

All children from Y1-6 will have a basic timestable booklet

Assessment

Class teachers must keep their own weekly record of which times tables have been learnt/forgotten each week from the Friday assessment to inform the next weeks teaching**.** On a half termly basis, the Times Tables Whole Class Master must be filled in and completed using the colour code, green, amber, red. Red indicates a child does not know this times table. Amber indicates a child may know some not all or may not know them fluently enough. Green indicates a child knows all of them and can recall them rapidly. This must be given to the Maths Lead every half term.

Resources and Strategies

Snape Wood Primary School Times Tables

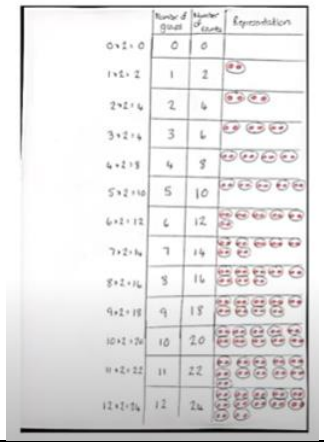
Resource	Strategies
Counting Stick	• Counting back and for gradually taking away digit cards • Making connections between doubles within one times tables and comparing two different (e.g. 4 and 8) Mrs Winfield's times-tables on a broomstick - YouTube https://www.youtube.com/watch?v=4zSxkfpBMiA
Number line	• Counting in jumps of multiples • Using representations alongside a number line (numicon, pairs of shoes etc) https://www.youtube.com/watch?v=BK9tXIiRueY https://www.youtube.com/watch?v=C40sn3CaGto
Hundred square/ times table grid	• Use a times table grid to draw out patterns between times tables e.g. 3,6,9
Ratio Grid	• Making Times Tables grids to compare numbers and spot patterns and relationships
Songs	• Times tables collection - BBC Teach • Three Times Table Song (Cover of Uptown Funk by Mark Ronson and Bruno Mars) - YouTube • Six Times Table Song! (Cover of CHEERLEADER by OMI) - YouTubeSix Times Table Song! (Cover of CHEERLEADER by OMI) - YouTube • Eight Times Table Song (Cover of All About That Bass by Meghan Trainor) - YouTube • Nine Times Table Song (90's Song Mashup) - YouTube • Four Times Table Song (Blurred Lines Cover) with Classroom Instruments - YouTube

×	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42		56	63	70		
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66		88	99	110		
12	0	12	24	36	48	60	72		96	108	120		

Key: new facts in this segment
previously learnt facts
relevant previously learnt facts (commutativity)

Complete ratio chart and three times table:

Number of tricycles	Total number of wheels
0	0
1	3
2	6
3	9
4	12
5	15
6	18
7	21
8	24
9	27
10	30
11	33
12	**36**



Vocabulary

During times table's lessons, vocabulary is important. Below is a list of vocabulary that should be used in lessons.

Vocabulary to use when teaching Times Tables	
Language	**Meaning**
Factor	A factor is a number that divides into another number exactly and without leaving a remainder.
Product	A product is the answer you get when you multiply two numbers (two factors) together.
Pattern/ relationship	A set of numbers arranged in a sequence such that they are related to each other in a specific rule.
Double	A double is a number arrangement where the same number is added twice.
Half	A half is one of two equal parts into which something can be divided Cut it in half.
Multiple	A multiple is the number you get when you multiply a certain number by another number.
Multiplied by Groups of/lots of	To increase in number especially in multiples.
Divided by Divided into	To split into parts of a number.

Stem Sentences and the use of Technical Vocabulary:

In mathematics, the children are taught using the mastery approach to learning, which actively encourages and promotes pupil interaction and mathematical talk, in pairs, groups and with the teacher. During every lesson, children are given opportunities to talk about their learning; their approaches and explain their methodology. Pupil talk and use of vocabulary is supported by the use of classroom working walls, which display key vocabulary for each lesson being taught and support the children by providing, where appropriate sentence stems to enable all children to gain confidence when talking about their learning.

Why are stem sentences in maths important?

Stem sentences are crucial in a child's learning journey as they allow learners to use relevant vocabulary to visualise and understand mathematical concepts and problems.

This forms part of the CPA (concrete, pictorial, abstract) sequence of learning. Stem sentences represent the pictorial phase in the sequence, which allows learners to visualise problems before they start dealing with purely abstract ones.

By verbalising their thinking process, children are also able to gain a deeper understanding of what they're studying. It also allows them to teach their peers by explaining the answer to a problem or by going through their process of thinking.

Stem sentences in maths also improve a learner's wider reading comprehension by encouraging them to break a problem down into smaller chunks that they can understand. The ability to discuss a method or concept is transferable to many more school subjects.

What are stem sentences?

When we talk about stem sentences in maths, we're referring to the explanation of a concept or problem using accurate vocabulary. These can be used to state a fact, explain a thought process or give an answer to a problem. They generally come in three different types:

- Stating a key concept
- Stating a generalised concept
- Explaining thoughts and ideas

Stem sentences are designed to improve the comprehension of maths problems and concepts. This is done by breaking down these problems into smaller chunks and more familiar language that is more accessible to learners.

There are different ways that stem sentences in maths can be used. The first way is by using them to state a key concept:

Example: *"12 is greater than nine."*

This can be followed by a statement that explains why this is correct. This is known as a generalised concept:

Example: *"Two-digit numbers are worth more than a one-digit number."*

Another type of stem sentence can be used to structure thoughts and ideas. It will usually be longer and include a sentence starter, as well 'as' 'because', in order to provide a more thorough explanation.

Example: *"I know that one-quarter of 28 is seven because one-half of 28 is 14, then I half it again to get the right answer."*

Finally, these can then be combined to give more detailed answers that fully explain a thought process and give us the correct answer.

Example: *"One fifth is worth two tenths. I know that one-fifth of 40 is eight because one-tenth is worth four, so I can double it to get the right answer."*

By using these structures, your class will be able to visualise and understand mathematical problems. You can encourage them to do this by using the example sentences above to give them structures to use if they want to explain an answer.

Example: *"The answer is…I know this because..."*

Please see the following documents for examples: (double click on the icons to open)

Sentence-Stems-Part-1.pdf

Sentence-Stems-Part-2.pdf

Enigma-Stem-Sentence-bank-Fractions-wit

Enigma-Stem-Sentence-bank-Number-Adc

Multiplication-and-Division-stem-sentence

Feedback

At Snape Wood we believe that timely feedback is essential to move children's learning forward and we are committed to giving children feedback that deepens their learning. Our verbal feedback enables staff to give purposeful feedback to pupils and reduces teacher workload. We are committed to teacher well-being and our slim-line marking approach ensures excessive marking does not place an unnecessary burden on teachers.

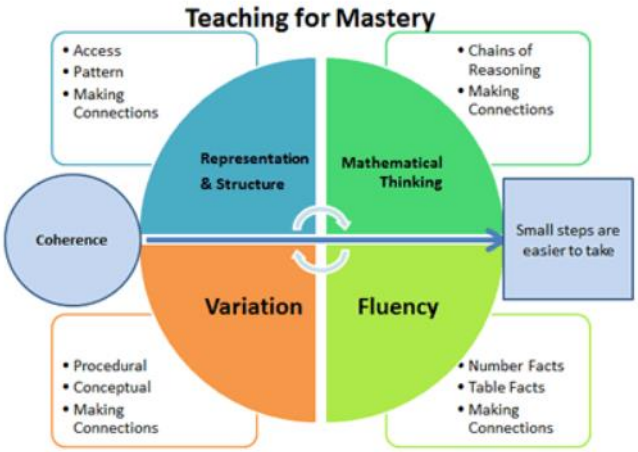
During lessons, teachers must move around the class using AFL to observe children's maths work and maths conversations. Teachers must then pick up on any misconceptions and errors that a child makes in their maths books by using a blue pen to circle/put a squiggle under any errors or misconceptions. At this point within the lesson, the teacher must give the child or children verbal feedback about the error or misconception that has been seen. If it is an error which has occurred with a number of children, then this verbal feedback may be given as a group. During the same lesson, children must then correct this using a pink pen so that progress is instant.

On occasions where teachers may not be able to get around the whole class to do this, teachers must put a tag in the children's books and use blue pen to do this before the next lesson. If the maths questions that a child answers are correct, they must be ticked to indicate that teachers have acknowledged the child's work. No written feedback comment is needed however this is on the understanding that there will be pink pen/blue pen evident in children's maths book so it is clear where a teacher has intervened. When a child has achieved the objective fully, the learning objective must be golden penned in yellow and all correct answers ticked in blue pen. The learning objective should not be golden penned if a child has used pink pen within a lesson as this will have indicated that a child has not fully understood an aspect of the lesson.

Planning

We follow White Rose Maths notes and guidance for each block. This details previous learning, key teaching points and manipulatives to use, things to look out for (misconceptions), key questions and sentence stems. Teachers must annotate this planning to show how they will bespoke this to the needs of their class. Annotations must include how there will be challenge and how there will support children who are struggling. Questions and sentence stems from the notes and guidance must be annotated and used for every lesson. This approach aims at reducing teacher workload so although lessons follow a planned approach, the majority of planning time is spent carefully thinking about the resources, manipulatives, representations and calculations to use. The teacher must be clear on exactly what they want the children to learn, what might be barriers to them learning this (prior learning), what resources/representations/ scaffolds you will use to help children understand a concept and how you will move them on if they understand it.

What is Teaching for Mastery?



Representation and structure:

- To provide concrete and pictorial experiences so that pupils acquire a sound understanding of mathematical skills and concepts.

• To use concrete and pictorial approaches to access the maths and reveal the 'big ideas'. Additionally, to see patterns and make connections.
• To develop pupil's confidence in mathematical understanding so they see the relevance of mathematics in the outside world.

Variation:
• To enable pupils to think logically and work in a systematic way.
• To allow pupils to apply what they have learnt in a variety of ways, e.g. systematic, imaginative, independent and co-operative.

Fluency:
• To ensure that pupils become fluent and accurate at rapid recall of number facts.
(Number facts, times tables, making connections.)

Mathematical Thinking:
• To enable pupils to communicate through mathematics by discussion, so developing their conceptual understanding and verbal reasoning.
• To give opportunities for pupils to investigate and make discoveries for themselves.
• To follow chains of reasoning and make connections.

• To ensure that pupils have an in-depth knowledge of mathematical vocabulary and its meaning.
• To enable pupils to make links within mathematics and with other areas of the curriculum.

Within the terms mastery and greater depth mastery, all pupils require depth in their learning and understanding. All pupils are required to:
• Use mathematical concepts and facts and procedures fluently.
• Recall key number facts with speed and accuracy and calculate unknown facts.
• Use understanding to reason and explain a mathematical problem.

Mastery:
• The child can describe in his/her own words.
• The child can represent their learning in a variety of ways- concrete, pictorial, abstract.
• Explain it to someone else.
• Make up his/her own examples.
• Make links and see connections between facts/ideas/patterns etc.
• Recognise it in a new context.

Mastery with Greater Depth:
• Solve problems of greater complexity (where the approach is not immediately obvious) and they can demonstrate creativity in their approach.
• Independently exploring and investigating mathematical contexts and structures.
• Communicating results clearly and systematically.
• Explain and generalise about mathematics.

What does Teaching for Mastery look like at Snape Wood?

- At the start of every maths lessons, there will be 4 questions. This will consist of questions from previous learning. This supports the development of previous learning being transferred from short term to long term memory. This will last no longer than five to ten minutes and the purpose of this is for the teacher to assess the children's gaps.
- Then we follow a mastery approach using the White Rose Maths booklets working our way through teaching (fluency>) varied fluency> reasoning and problem solving.
- Teaching is episodic (ping pong questioning/tasks back and forth) which provides an opportunity for teachers to use deeper questioning and check pupils understanding as they go along. E.g. Can you explain? What did you notice? Can you compare? What is the same/different? How do you know? Can you prove it? What is the odd one out? True or false? This also supports assessment for learning which results in rapid intervention.
- Differentiation is provided through the level of time and support a child need. Additional support may be provided in the following ways: use of equipment, more practise/time, direct questioning, paired work, guided group with CT or TA.
- SEND pupils who have been identified as needing something different will be following their personalised Bsquared targets.
- Challenge is provided in every lesson for all children. Challenge in lessons may be provided in the following ways: rich sophisticated problems rather than acceleration through new content, solving problems of greater complexity, probing questions and questions that deepen thinking, explaining and generalising about maths, independently exploring and investigating mathematical contexts and structures with or without manipulatives. Classroom secrets 'discussion problems' can be used for additional challenge.
- Talk partners and use of paired discussions should be used at every point to encourage children to explain their mathematical thinking and reason their answers.

- Symbols are used to support children to understand how to approach a maths question. These symbols include use of concrete manipulatives, thinking deeply, drawing a picture, use a bar model, discuss your thinking and investigate.
- Sentence stems are embedded onto slides in green bubbles to encourage mathematical reasoning and talk.
- Yellow bubbles/stars will be used on the slides to stretch and challenge.
- Alongside the White Rose Maths booklets, we use a maths book to record prior learning, jottings and fluency.

SEND Pupils

Although we follow a mastery approach and aim for all children to keep up, there are some pupils who made need something that is different from the rest of their class. We follow the SEND Code of Practise that states that,

"1.24 High quality teaching that is differentiated and personalised will meet the individual needs of the majority of children and young people. Some children and young people need educational provision that is additional to or different from this. This is special educational provision under Section 21 of the Children and Families Act 2014. Schools and colleges must use their best endeavours to ensure that such provision is made for those who need it. Special educational provision is underpinned by high quality teaching and is compromised by anything less. " Pg 25 SEN Code of Practise 2015.

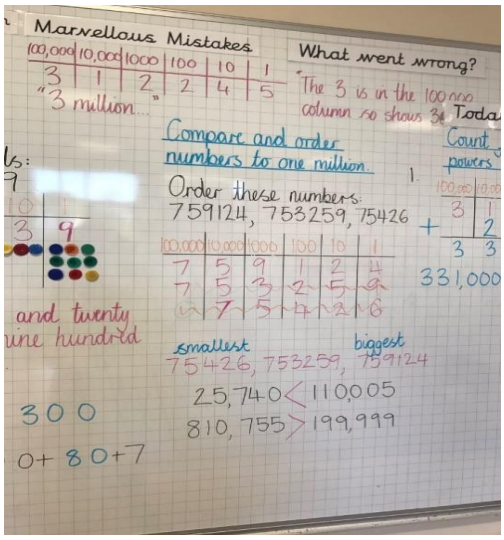
Pupils who have been identified as needing something that is different, will be assessed, tracked and planned for using Bsquared Small Steps. This will still follow the same aspects as the class (e.g. place value, shape, addition and subtraction) to ensure a shared approach to language but in a more personalised way. Targets will be set in a timely manner and monitored each term by the SENCO and maths lead.

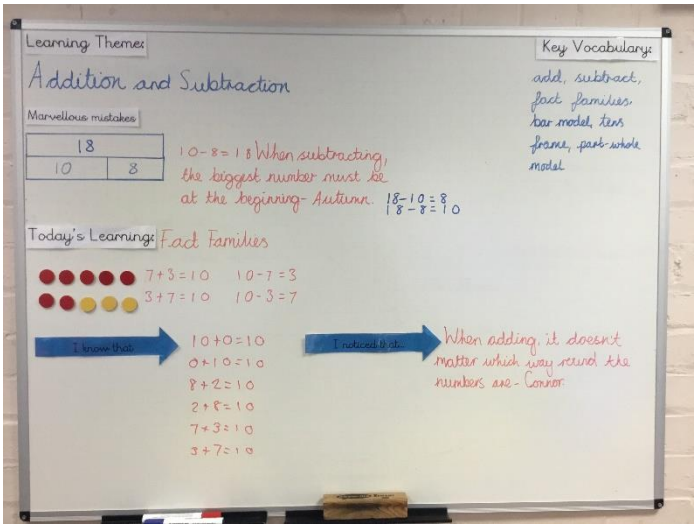
Displays

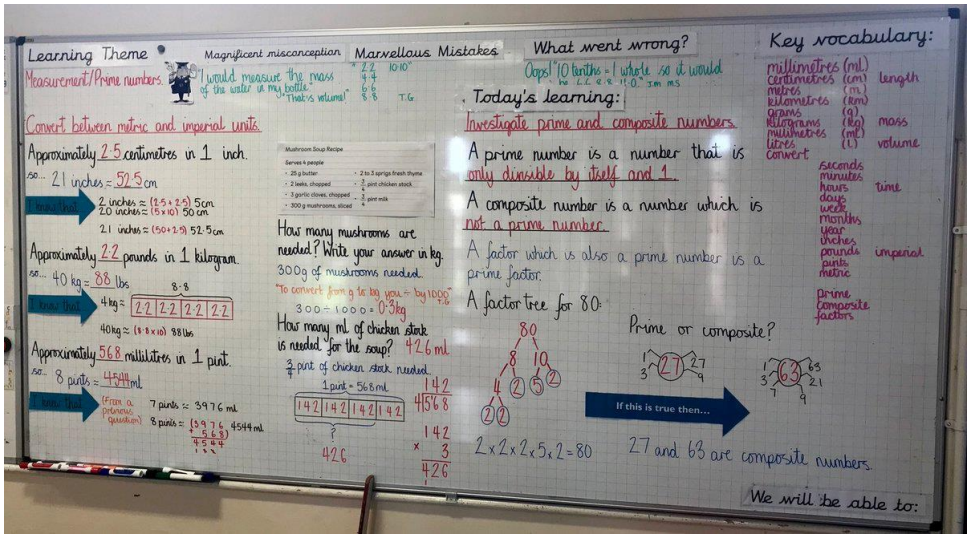
Every class must have a maths area for manipulative resources. The resources must include part whole models, number lines, place value counters and grids, hundred squares, ten frames, cubes or counters, base ten and numicon (one shared per phase). These must be displayed below the maths area and must be on display, visible and accessible for any adult or child to access and not put away in draws. Shared resources such as shapes, money, measures, scales, mirrors and dice will be kept in a central location outside Year One and Year Six.

Maths displays will have a whiteboard working wall on them, which will be built up over a unit to show progression over time. The whiteboard on the maths area must have the following titles - unit focus, key vocabulary, fluency skill, success criteria, reasoning/problem solving, and misconceptions. The unit focus should be the overall focus e.g. place value, division. The key vocabulary will list technical language that the children will need to know in that unit. This may include pictures for the younger children and explanations for the older children. The fluency skill will show the basic skills that the children will need to access that unit. It may be more than one skill that is built up over time. This must include modelled examples of how to practise that skill. The success criteria must show children how to break down the fluency skill so that children know the smaller steps that will help them complete the skill. The reasoning/problem solving part should reference how to apply the fluency skill in a problem or reasoning approach. The misconceptions area must focus on a misconception that is either pertinent to your class (that you have picked up during AFL) or common misconceptions that children make during that focus. There must be at least one evident although you may build in several depending on the needs on the class.

The maths working wall is for children to refer to in lessons. Below are some examples.







Calculation Policy

See White Rose Maths Policy. (Appendix 1)

Assessment

Assessment forms a fundamental part of teaching and learning. Every term, formal NTS standardised maths assessments are carried out. These standardised tests provide teachers with a scaled score., allowing teachers to identify which children are on track to achieve age-related expectations and who needs extra support in order for the child to make progress. The gap analysis from this assessment must inform teachers planning of which math's concepts need to be revisited or which groups or children may need interventions.

Short -term assessments are made from day to day observation within maths lessons. This will inform future planning and give personalised targets for individual children. This allows teachers to identify which children are on track to achieve age-related expectations and who needs extra support in order for the child to make progress.

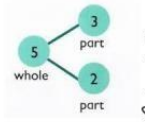
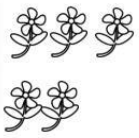
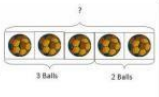
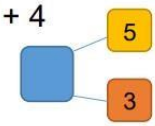
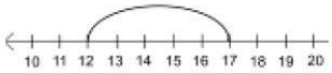
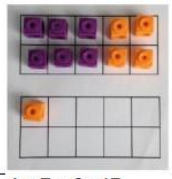
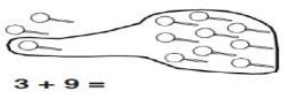
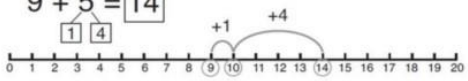
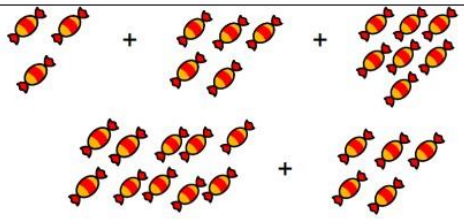
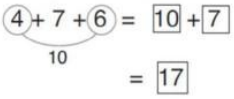
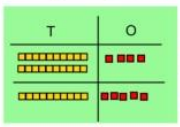
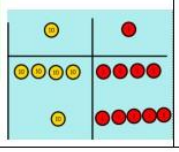
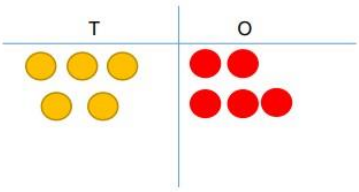
Each term, teachers, alongside the maths coordinator, moderate the children's work in their math's books to ensure that assessment levels are accurate. This is moderated against the National Curriculum Programmes of Study.

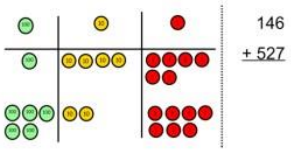
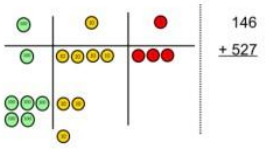
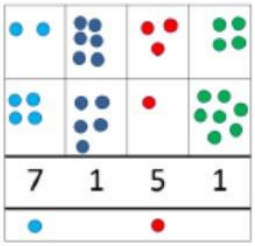
APPENDIX 1

WHITE ROSE CALCULATION POLICY

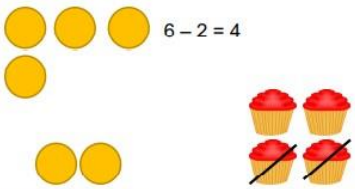
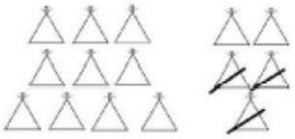
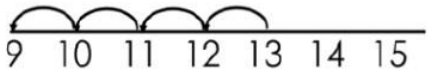
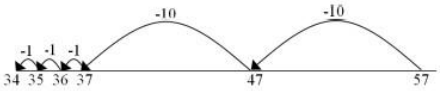
Progression in Calculations

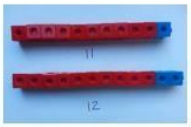
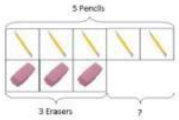
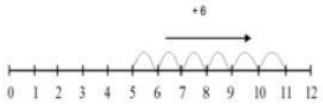
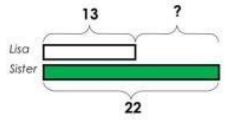
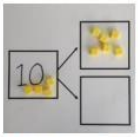
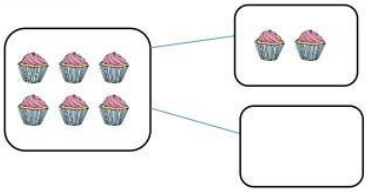
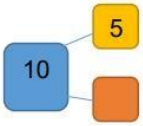
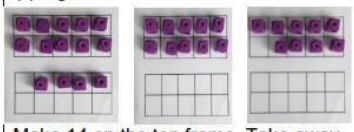
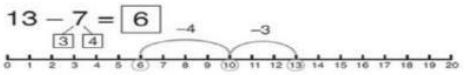
Addition

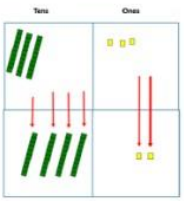
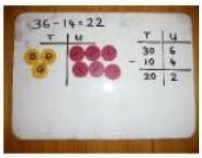
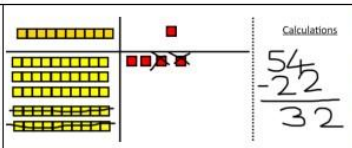
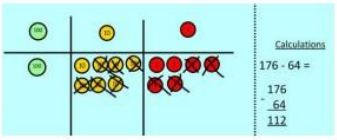
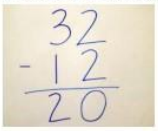
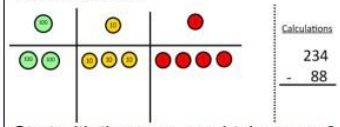
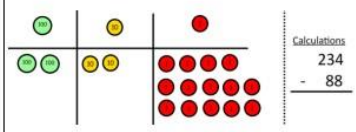
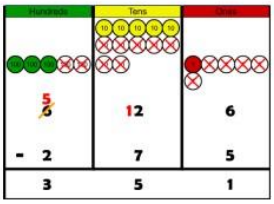
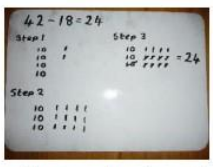
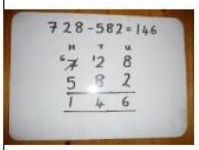
Objective and Strategies	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part-whole model	   Use cubes to add two numbers together as a group or in a bar. 	   Use pictures to add two numbers together as a group or in a bar. 	4 + 3 = 7 10= 6 + 4  Use the part-part whole diagram as shown above to move into the abstract.
Starting at the bigger number and counting on	 Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.	12 + 5 = 17  Start at the larger number on the number line and count on in ones or in one jump to find the answer.	5 + 12 = 17 Place the larger number in your head and count on the smaller number to find your answer.
Regrouping to make 10.	 6 + 5 = 11  Start with the bigger number and use the smaller number to make 10.	 3 + 9 = Use pictures or a number line. Regroup or partition the smaller number to make 10. 9 + 5 = 14 1 4 	7 + 4= 11 If I am at seven, how many more do I need to make 10. How many more do I add on now?
Adding three single digits	4 + 7 + 6= 17 Put 4 and 6 together to make 10. Add on 7.  Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.	 Add together three groups of objects. Draw a picture to recombine the groups to make 10.	 Combine the two numbers that make 10 and then add on the remainder.
Column method- no regrouping	24 + 15= Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters.  	After practically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions. 	Calculations 21 + 42 = 21 + 42

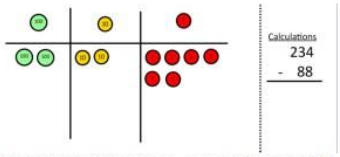
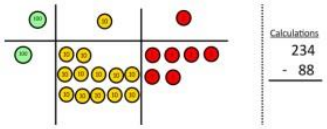
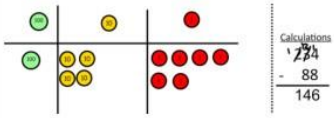
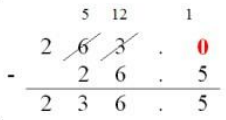
Column method- regrouping	Make both numbers on a place value grid.  146 + 527 Add up the units and exchange 10 ones for one 10.  146 + 527 Add up the rest of the columns, exchanging the 10 counters from one column for the next place value column until every column has been added. This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100. As children move on to decimals, money and decimal place value counters can be used to support learning.	Children can draw a pictoral representation of the columns and place value counters to further support their learning and understanding.  7 1 5 1	Start by partitioning the numbers before moving on to clearly show the exchange below the addition. 20 + 5 40 + 8 60 + 13 = 73 As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here. 536 + 85 621 1 1 72.8 + 54.6 127.4 1 1 £ 2 3 . 5 9 + £ 7 . 5 5 £ 3 1 . 1 4 1 1 1 2 3 . 3 6 1 9 . 0 8 0 5 9 . 7 7 0 + 1 . 3 0 0 9 3 . 5 1 1 2 1 2

Subtraction

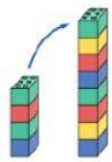
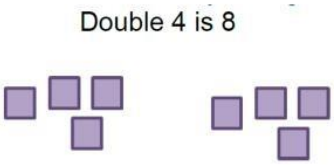
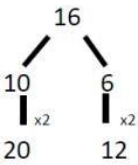
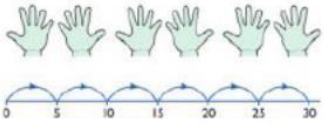
Objective and Strategies	Concrete	Pictorial	Abstract
Taking away ones	Use physical objects, counters, cubes etc to show how objects can be taken away.  6 – 2 = 4	Cross out drawn objects to show what has been taken away.  15 – 3 = 12	18 -3= 15 8 – 2 = 6
Counting back	Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.  13 – 4 Use counters and move them away from the group as you take them away counting backwards as you go. 	Count back on a number line or number track  9 10 11 12 13 14 15 Start at the bigger number and count back the smaller number showing the jumps on the number line.  -1 -1 -1 -10 -10 34 35 36 37 47 57 This can progress all the way to counting back using two 2 digit numbers.	Put 13 in your head, count back 4. What number are you at? Use your fingers to help.

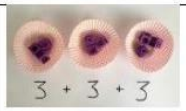
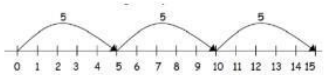
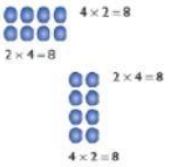
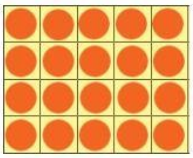
Find the difference	Compare amounts and objects to find the difference.  Use cubes to build towers or make bars to find the difference  Use basic bar models with items to find the difference	 Count on to find the difference. Draw bars to find the difference between 2 numbers. **Comparison Bar Models** *Lisa is 13 years old. Her sister is 22 years old. Find the difference in age between them.* 	Hannah has 23 sandwiches, Helen has 15 sandwiches. Find the difference between the number of sandwiches.
Part Part Whole Model	 Link to addition- use the part whole model to help explain the inverse between addition and subtraction. If 10 is the whole and 6 is one of the parts. What is the other part? 10 - 6 =	Use a pictorial representation of objects to show the part part whole model. 	 Move to using numbers within the part whole model.
Make 10	14 – 9 =  Make 14 on the ten frame. Take away the four first to make 10 and then takeaway one more so you have taken away 5. You are left with the answer of 9.	 Start at 13. Take away 3 to reach 10. Then take away the remaining 4 so you have taken away 7 altogether. You have reached your answer.	16 – 8= How many do we take off to reach the next 10? How many do we have left to take off?

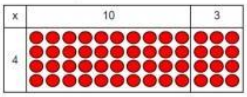
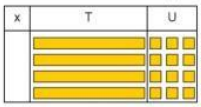
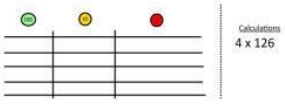
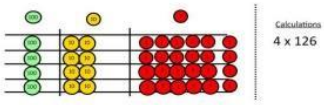
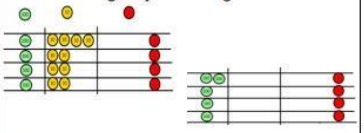
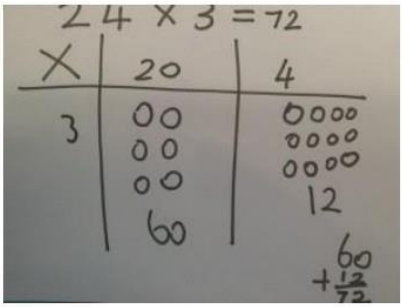
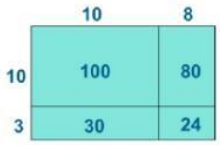
Column method without regrouping	 Use Base 10 to make the bigger number then take the smaller number away. Show how you partition numbers to subtract. Again make the larger number first. 	 Draw the Base 10 or place value counters alongside the written calculation to help to show working. 	47 – 24 = 23 40 + 7 – 20 + 4 20 + 3 This will lead to a clear written column subtraction. 
Column method with regrouping	Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges. Make the larger number with the place value counters  Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones. 	 Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.  When confident, children can find their own way to record the exchange/regrouping. Just writing the numbers as shown here shows that the child understands the method and knows when to exchange/regroup.	 Children can start their formal written method by partitioning the number into clear place value columns.  Moving forward the children use a more compact method.

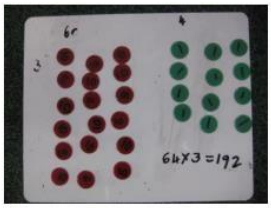
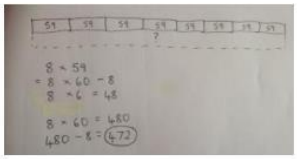
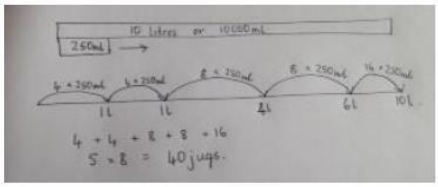
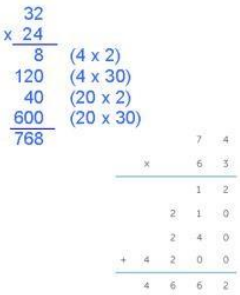
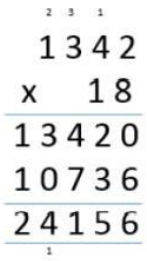
	Now I can subtract my ones.  Now look at the tens, can I take away 8 tens easily? I need to exchange one hundred for ten tens.  Now I can take away eight tens and complete my subtraction  Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.		This will lead to an understanding of subtracting any number including decimals. 

Multiplication

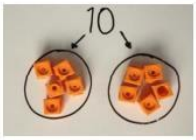
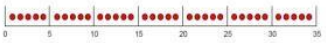
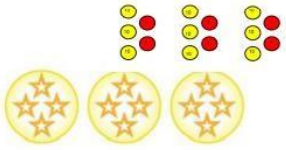
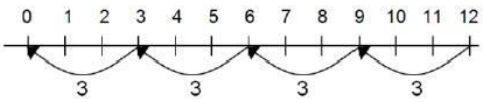
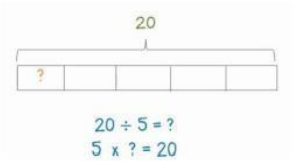
Objective and Strategies	Concrete	Pictorial	Abstract
Doubling	Use practical activities to show how to double a number.  double 4 is 8 4 × 2 = 8	Draw pictures to show how to double a number.  	 Partition a number and then double each part before recombining it back together.
Counting in multiples	  Count in multiples supported by concrete objects in equal groups.	 Use a number line or pictures to continue support in counting in multiples.	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25 , 30

Repeated addition	   Use different objects to add equal groups.	There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?  2 add 2 add 2 equals 6  5 + 5 + 5 = 15	Write addition sentences to describe objects and pictures. 
Arrays- showing commutative multiplication	Create arrays using counters/ cubes to show multiplication sentences.  	Draw arrays in different rotations to find **commutative** multiplication sentences.   Link arrays to area of rectangles.	Use an array to write multiplication sentences and reinforce repeated addition.  5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 5 x 3 = 15 3 x 5 = 15

Grid Method	Show the link with arrays to first introduce the grid method.  4 rows of 10 4 rows of 3 Move on to using Base 10 to move towards a more compact method.  4 rows of 13 Move on to place value counters to show how we are finding groups of a number.We are multiplying by 4 so we need 4 rows.  Fill each row with 126.  Add up each column, starting with the ones making any exchanges needed.  Then you have your answer.	Children can represent the work they have done with place value counters in a way that they understand. They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below. 	Start with multiplying by one digit numbers and showing the clear addition alongside the grid. **×** | **30** | **5** **7** | **210** | **35** **210 + 35 = 245** Moving forward, multiply by a 2 digit number showing the different rows within the grid method.  

Column multiplication	Children can continue to be supported by place value counters at the stage of multiplication.  It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.	Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.  	Start with long multiplication, reminding the children about lining up their numbers clearly in columns. If it helps, children can write out what they are solving next to their answer.  This moves to the more compact method. 

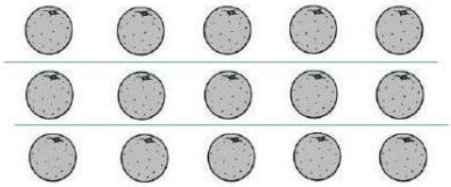
Division

Objective and Strategies	Concrete	Pictorial	Abstract
Sharing objects into groups	  I have 10 cubes, can you share them equally in 2 groups?	Children use pictures or shapes to share quantities.  8 ÷ 2 = 4	Share 9 buns between three people. 9 ÷ 3 = 3
Division as grouping	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.   96 ÷ 3 = 32 	Use a number line to show jumps in groups. The number of jumps equals the number of groups.  Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.  20 ÷ 5 = ? 5 x ? = 20	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?

Division within arrays

Link division to multiplication by creating an array and thinking about the number sentences that can be created.

Eg 15 ÷ 3 = 5 5 x 3 = 15
15 ÷ 5 = 3 3 x 5 = 15



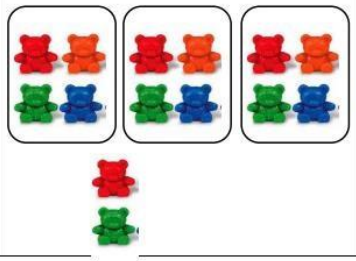
Draw an array and use lines to split the array into groups to make multiplication and division sentences.

Find the inverse of multiplication and division sentences by creating four linking number sentences.

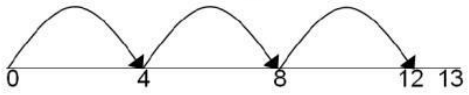
7 x 4 = 28
4 x 7 = 28
28 ÷ 7 = 4
28 ÷ 4 = 7

Division with a remainder

14 ÷ 3 =
Divide objects between groups and see how much is left over



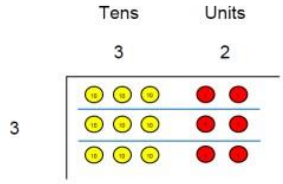
Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.



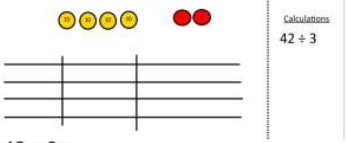
Draw dots and group them to divide an amount and clearly show a remainder.

Complete written divisions and show the remainder using r.

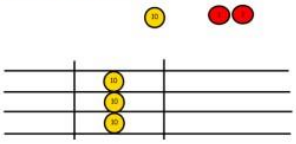
Short division



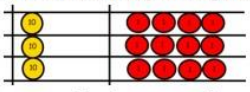
Use place value counters to divide using the bus stop method alongside



42 ÷ 3=
Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.

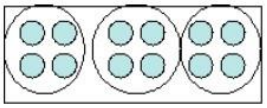


We exchange this ten for ten ones and then share the ones equally among the groups.



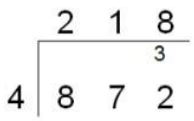
We look how much in 1 group so the answer is 14.

Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.

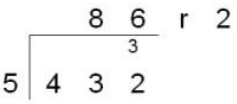


Encourage them to move towards counting in multiples to divide more efficiently.

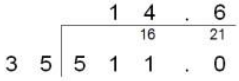
Begin with divisions that divide equally with no remainder.



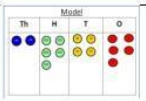
Move onto divisions with a remainder.



Finally move into decimal places to divide the total accurately.

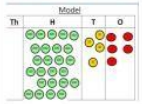


Long division



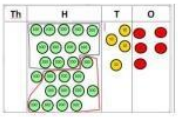
2544 ÷ 12
How many groups of 12 thousands do we have?
None

Exchange 2 thousand for 20 hundreds.



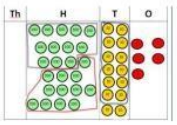
$$12\overline{)2544}\quad 0$$

How many groups of 12 are in 25 hundreds? 2 groups. Circle them.
We have grouped 24 hundreds so can take them off and we are left with one.



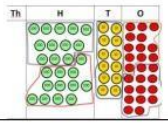
$$\begin{array}{r} 02 \\ 12\overline{)2544} \\ 24 \\ \hline 1 \end{array}$$

Exchange the one hundred for ten tens so now we have 14 tens. How many groups of 12 are in 14? 1 remainder 2



$$\begin{array}{r} 021 \\ 12\overline{)2544} \\ 24 \\ \hline 14 \\ 12 \\ \hline 2 \end{array}$$

Exchange the two tens for twenty ones so now we have 24 ones. How many groups of 12 are in 24? 2



$$\begin{array}{r} 0212 \\ 12\overline{)2544} \\ 24 \\ \hline 14 \\ 12 \\ \hline 24 \\ 24 \\ \hline 0 \end{array}$$

Instead of using physical counters, students can draw the counters and circle the groups on a whiteboard or in their books.

Use this method to explain what is happening and as soon as they have understood what move on to the abstract method as this can be a time consuming process.

$$\begin{array}{r} 0\,3\,1\,8\ r5 \\ 20\overline{)6\,3\,6\,5} \\ -6\,0 \\ \hline 3\,6 \\ -2\,0 \\ \hline 1\,6\,5 \\ -1\,6\,0 \\ \hline 5 \end{array}$$