Maths at Edale Rise

from EYFS to KS2

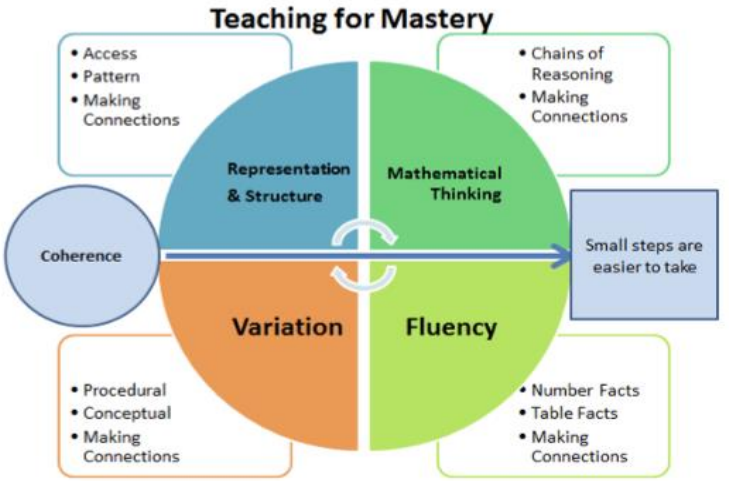
EDALE RISE
Primary & Nursery School

Our VISION (intent)

All children are able to experience and achieve success in mathematics. At Edale we use a mastery approach to teaching maths to ensure that all children can access the powerful knowledge of the maths curriculum. We use a DfE approved scheme (Power Maths) to ensure our curriculum is ambitious and progresses in a structured and coherent manner. We strive for all children to become confident mathematicians who possess a strong understanding of mental and written fluency with number and calculations and confidence with reasoning and problem solving.

Our implementation

At Edale, in Y1-Y6, children access a minimum of 1 hour per day of maths. In F1 children access a minimum of 5 x 15 minutes per fortnight. In F2 children access a minimum of 20 minutes per day of maths.
We follow a mastery approach outlined in this document. Across school we follow Power Maths, a DfE approved maths curriculum. All teachers have access to the online curriculum and children complete independent work in the Power Maths work books. In EYFS children complete a focused activity once per week, as well as accessing maths provocations provided in the continuous provision.
In addition to this, children in Y1-Y6 are offered retrieval blasts in daily DO NOW activities. These take place in the register time and are often used to consolidate mental and written fluency and/or previously taught content.



Outcomes

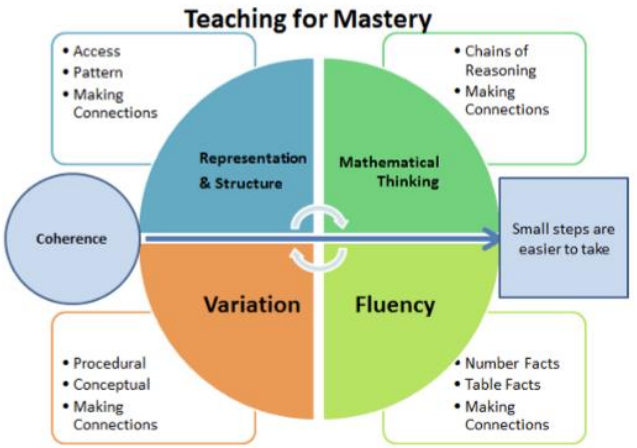
Our outcomes are recorded in the following ways:
In EYFS, Power Maths journals, class floorbooks and ELGs.
In KS1, Power Maths work books, DO-IT-NOW books, weekly arithmetic tests, termly NTS tests and end of Key Stage SATs.
In KS2, Power Maths work books, DO-IT-NOW books, weekly arithmetic tests, termly NTS tests, Year 4 Multiplication Tables Check and end of Key Stage SATs.

Implementation At Edale

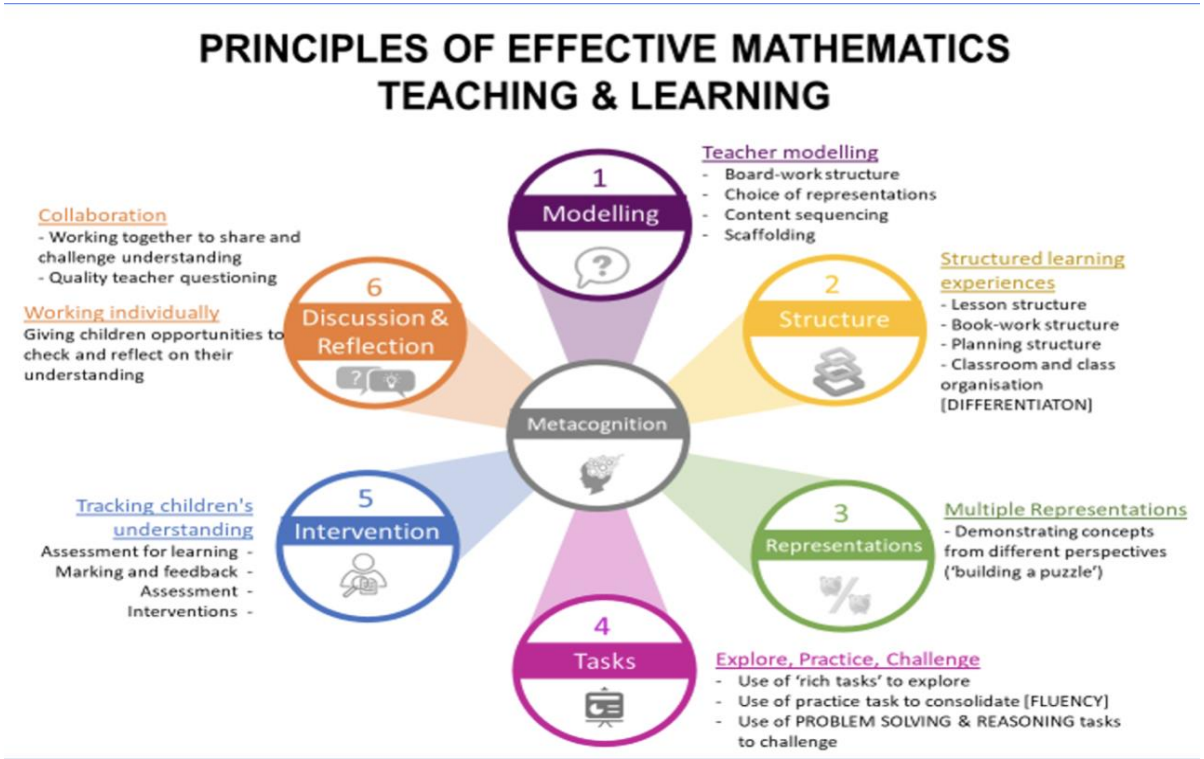
What do we mean by 'teaching for mastery'?

To support our vision, we will make sure of the 5 big ideas from the NCETM.
Each mathematical concept will be designed using small, coherent steps that allow the children to make the connections needed to have deep conceptual understanding.

Variation and mathematical thinking will be built into each lesson to ensure that the children become flexible and resilient in their approach to problem-solving. Finally, this will be underpinned by developing a strong recall of arithmetic facts from EYFS to Year 6.



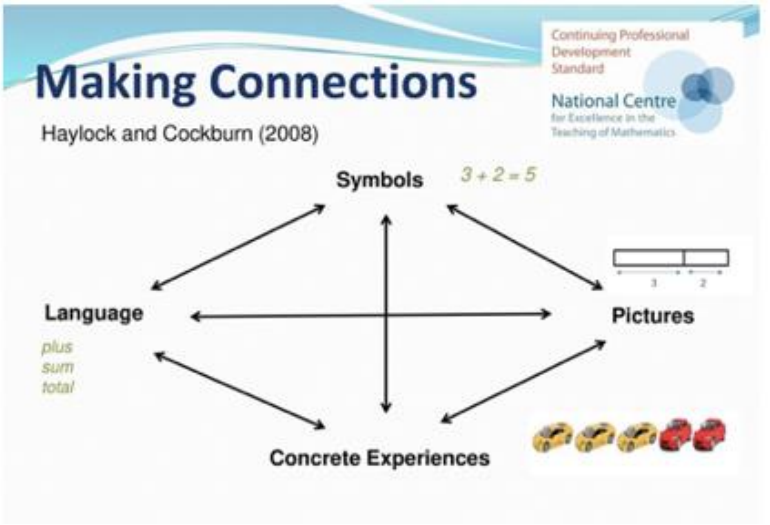
6 Guiding principles for the teaching and learning of mathematics



Maths specialists at Transform Trust have developed 6 guiding principles for the effective teaching of mathematics. It draws on evidence and research from NCETM, Craig barton, Tom Sherrington and Mark Mccourt. Each stage is further outlined in this document.

Implementation - the six principles in detail

1 Modelling



When modelling, teachers have fidelity to the scheme and consider how the concept is represented (e.g. concrete, pictorial, or abstract).

It is not the case that these are hierarchical, rather they are connected as shown in the model above. Teachers carefully consider why the scheme places its models and representations in the order it does i.e. how does one lead to the next?

2 Structure

Based upon our learning form the NCTEM, recent cognitive science, and Transform's own work on good practice in lesson structure, we follow this outline plan for a lesson. All children should move through these tages at roughly the same pace, but the teacher considers how to challenge those who have understood quickly and support those who need it.

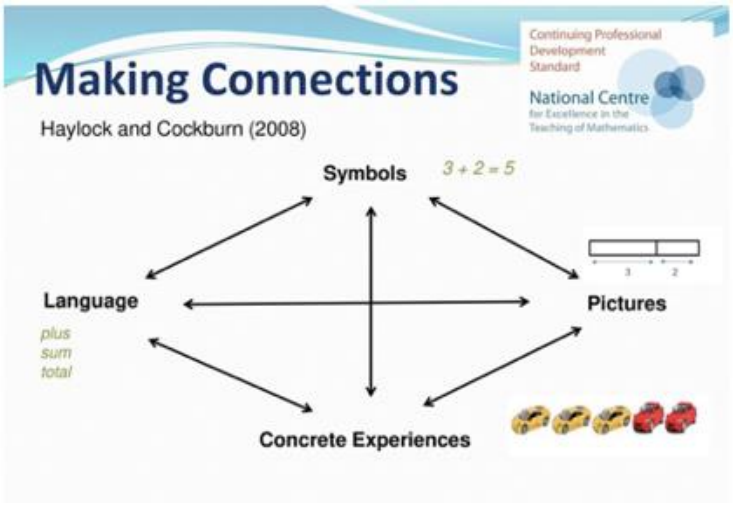
Review	Assess	Model	Guide	Independent
Review	Assess: Children understand quickly	Less time can be spent modelling	Guide	More time can be spent on independent work hopefully moving toward greater depth.
Review	Assess: Children don't understand	More time can be spent modelling	More time guiding the children	Less time spent on independent work

The lesson design is adapted to meet the needs of all learners in any given lesson.

(An example of this is shown opposite.)

Implementation - the six principles in detail

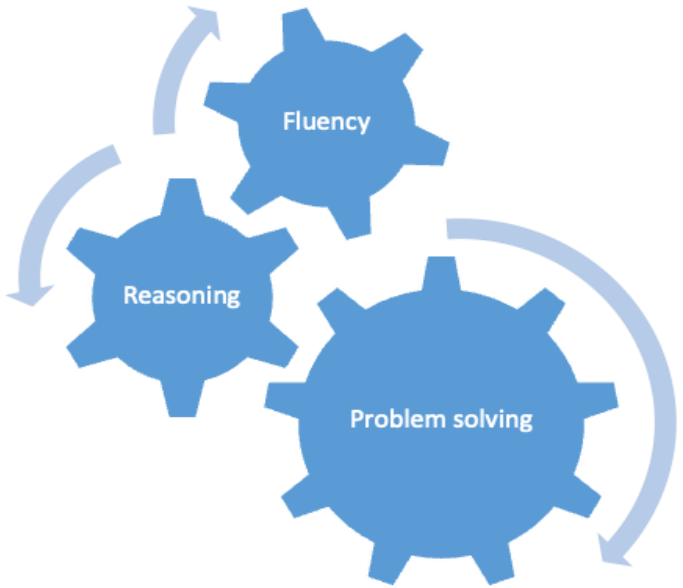
3 Representations



Power Maths will be used to provide calculation guidance on what representation to use and when. By using multiple representations it will allow the children to make connections e.g. Tens frame being used in EYFS to count to ten and in Y5 to count in to one in tenths.

All children will have the opportunity to experience a range of representations to develop deep conceptual and procedural understanding that gives them the flexibility to know what representation will be the most efficient in any given scenario.

4 Tasks



During independent work, children are to face a mix of questions that allow them to become increasing fluent, reason mathematically and apply their understanding to solve problems. It is not the case that this should be seen as a method of differentiation. By offering pupils a diet of all three, they will develop their schema so that they can draw upon different areas of maths to find solutions to problems.

Implementation - the six principles in detail

4 Tasks

Category	Type 1	Type 2
Declarative 'I know that'	Facts and formulae	Relationship between facts (conceptual understanding)
Procedural 'I know how'	Methods	Relationship between facts, procedures and missing facts (principles/mechanisms)
Conceptual 'I know why'	Connections	How concepts link together. Being able to see and use different representations.
Conditional 'I know when'	Strategies	Relationship between information, strategies and missing information (reasoning). Using the right strategy at the right time

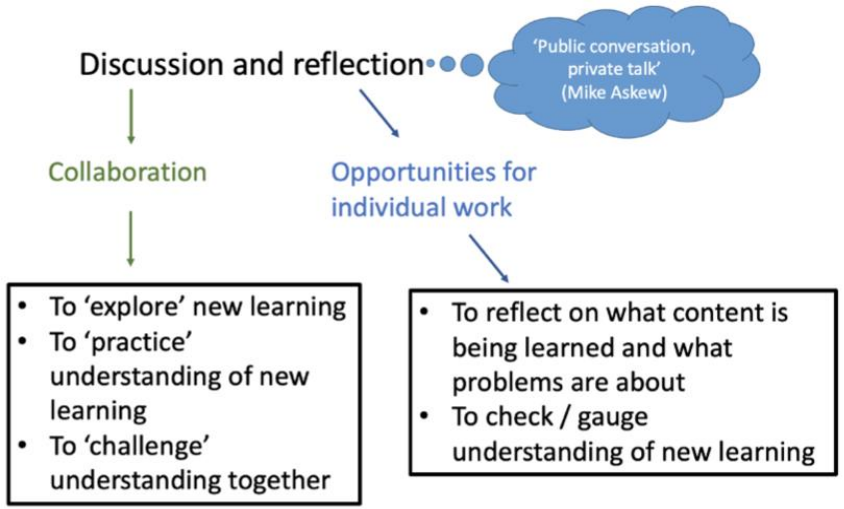
When pupils learn and use declarative, procedural, conceptual and conditional knowledge, their knowledge of relationships between concepts develops over time.

We will look to develop all 4 strands of knowledge within our teaching sequences and it is conditional knowledge that will allow the children to gain deep understanding of the subject.

Implementation - the six principles in detail

Assessment for learning & Responsive teaching

Edale's feedback policy emphasises the importance of in the moment 'live-feedback'. Adults in the room are constantyl reviewing children's learning and adapting insturction approrpriately. Teachers may choose to group children prior to lessons based on assessments or within lessons based on live feedback. Pre and post teaching sessions are organised for children who have not secured objective or who have developed misconceptions.



Discussion and reflection serves a dual purpose.
During the 'Discover' part of the sessions, it allows children to explore concepts. This will be done through asking children what they notice and what they might know from given information. All children will be given time to think before joining in discussion. Once children have an understanding, they will be challenged to explain their thinking in a elegant way so that all children can understand their thought processes. Stem sentences will be used to support them in this.

Discussion will also be a vital tool for teachers to assess a pupil's understanding of a concept. Further questions will be asked of a pupil to either strengthen or deepen their understanding as necessary.

Mental Maths Fluency Curriculum

Additive Fluency: all key stages starting in EYFS.

Starting in Key Stage 1 and EYFS, we aim to improve pupils' fluency with the 121 additive facts that support all calculation involving addition or subtraction, in order to develop their mathematical literacy. It is essential that these are practised regularly (not just in EYFS and Key Stage 1) as they form the building blocks to being able to solve larger calculations from Year 2 onwards.

Strategies for facts within 10	Examples
Adding one	(e.g. 7 + 1 & 1 + 7)
Adding two to even numbers	(e.g. 4 + 2 & 2 + 4)
Adding two to odd numbers	(e.g. 5 + 2 & 2 + 5)
Adding zero	(e.g. 3 + 0 & 0 + 3)
Number bonds to ten	(e.g. 8 + 2 & 2 + 8)
Near number bonds to ten	(e.g. 6 + 3, 3 + 6)
Doubles of numbers to five	(e.g. 3 + 3, 4 + 4 & 5 + 5)
Near doubles of numbers to five	(e.g. 3 + 4, 4 + 3, 4 + 5 & 5 + 4)
Number in the middle	(e.g. 3 + 5, 5 + 3)
Strategies for bridging 10	**Examples**
Adding ten to a single-digit number	(e.g. 5 + 10 and 10 + 5)
Doubles of numbers to ten	(e.g. 6 + 6, 7 + 7, 8 + 8, 9 + 9 & 10 + 10)
Near doubles	(e.g. 5 + 6 or 6 + 5 'Double 5 and add one.')
Bridging	(e.g. 8 + 5 or 5 + 8 'Regroup to make a ten.')
Number in the middle	(e.g. 6 + 8 or 8 + 6 'Double the number in the middle: double 7')
Compensating	(e.g. 7 + 9 'Add ten to 7 and subtract one.')

By year 2 children should have automatic recall of the facts below and their corresponding subtraction facts.

+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8		
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7			
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6				
5	5+0	5+1	5+2	5+3	5+4	5+5					
6	6+0	6+1	6+2	6+3	6+4						
7	7+0	7+1	7+2	7+3							
8	8+0	8+1	8+2								
9	9+0	9+1									
10	10+0										

Mental Maths Fluency Curriculum

Edale Rise Mental Fluency Curriculum: Rapid Recall

	Facts	Examples	
Year 1	• Number pairs with a total of 10	3 + 7	3 + ♦ = 10
	• Addition and subtraction facts within 10.	2 + 3, 4 + 1	
	• Doubles of all numbers to 10	Double 7	
	• Odd and even numbers to 20	Is 15 odd or even?	
Year 2	• Addition and subtraction facts for all numbers up to at least 10	3 + 4	8 – 5
	• Number pairs with totals to 20	16 + 4	17 + ♦ = 20
	• All pairs of multiples of 10 with totals up to 100	30 + 70	60 + ♦ = 100
	• What must be added to any two-digit number to make the next multiple of 10	52 + ♦ = 60	43 + ♦ = 50
	• Doubles for all numbers to 20, multiples of 10 to 50 and corresponding halves	17 + 17	Double 40
	• Odd and even numbers to 100	Is 35 odd or even?	
	• Recognise multiples of 2, 5, and 10	Is 75 a multiple of 5?	
Year 3	• Multiplication and division facts for 2, 3, 4, 5, 6, 8 and 10 times tables	6 x 8	40 ÷ 5
	• Recognise multiples of 2, 3, 4, 5, 6, 8 and 10	Is 38 a multiple of 4?	
	• Addition and subtraction facts for all numbers to 20	9 + 8	17 – 9
	• Sums and differences of multiples of 10 where the answer is between 0 and 100	70 + 30,	120 - 90
	• Pairs of two-digit numbers with a total of 100	56 + 44 = ♦	32 + ♦ = 100
	• Double and halves of multiples of 10 to 100	Double 80	Half 70
	• Multiplying two-digit number by 10	24 x 10	49 x 10
Year 4	• Multiplication and division facts to 12 x 12	7 x 8	63 ÷ 9
	• Recognise multiples of 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12	Is 71 a multiple of 9?	
	• Addition and subtraction of multiples of 10	70 + 30	80 + 90
	• Addition and subtraction of multiples of 100 where the answer is 1,000 or less	300 + 400	1400 - 800
	• Doubles and halves of any whole number to 100	Half 70	Double 51
	• Doubles of multiples of 10 and 100 and corresponding halves	Double 800	Half of 1600
	• Halves of any even number to 100	Half 22	Half 96
	• Recall fraction and decimal equivalents for one-half, quarters, tenths and hundredths	0.3 = $\frac{3}{10}$	$\frac{1}{4}$ = 0.25,
Year 5	• Addition and subtraction of multiples of 10, 100 and 1000	70 + 30,	1100 - 300
	• Quadruples (x4) of all numbers to 10	Quadruple 7	
	• Doubles and halves of any two-digit number to 1 decimal place	Half of 3.5	Double 98
	• Multiplying and dividing any number by 10, 100 and 1000	45 ÷ 100	3.4 x 10
	• Identify factor pairs of two-digit numbers	Factors of 36	
	• Recall fraction and decimal equivalents for one-half, three-quarters, tenths and hundredths	0.56 = $\frac{56}{100}$	$\frac{3}{4}$ = 0.75,
	• Identify prime numbers less than 100	Is 89 prime?	
	• Squares of all number up to 12	11^2	8^2
	• Cubes of 2,3,4 and 5	4^3	5^3
Year 6	• Doubles and halves of any two-digit number to 1 decimal place	Half of 3.5	Double 98
	• Decimal number bonds to any whole number up to 10	3.4 + ♦ = 7	
	• Unit fraction of any number where the answer is a whole	$\frac{1}{7}$ of 56 = 56 ÷ 7	
	• Equivalent fraction, decimal and percentages facts for one-half, one-quarter, three-quarters, one-fifth and one-third	$\frac{1}{5}$ = 20% = 0.20	
	• Equivalent fraction, decimal and percentages facts for tenths and hundredths	$\frac{4}{10}$ = 40% = 0.40 = $\frac{40}{100}$	

Successful mathematicians have rapid recall of number and calculation facts. If children have a rapid recall of the facts opposite then their cognitive load is reduced when calculating, problem solving or reasoning.

Mental Maths Fluency Curriculum

Edale Rise Mental Fluency Curriculum: Progression of Key Strategies

Addition and Subtraction Strategies			
1	Count on or back in ones from any two digit number	12, 13, __	17, 16, ___
1	Near doubles to 10	6 + 7	7 + 8
2	Calculations with whole numbers which do not involve crossing place value boundaries	30 + 47 23 + 45	34 + 23
2	Counting on or back in tens from any number	23 + 10	27 + 60
2	Compensating and adjusting to 10	34 + 9 (34 + 10 – 1)	37 – 9 (37 – 10 + 1)
3	Calculations with whole numbers to 100 which involve crossing place value boundaries	42 – 24	
3	Compensating and adjusting near multiples of 10	38 + 68 (38 + 70 – 2) 45 – 29 (45 – 30 + 1)	
3	Counting on or back in hundreds from any number	570 + 300	
4	Compensating and adjusting near multiples of 10 or 100	138 + 69 (138 + 70 – 1) 299 – 48 (300 – 48 – 1) 235 + 198 (235 + 200 – 2) 607 – 588 (607 – 600 + 12)	
4	Near doubles of multiples to 10 beyond 100	60 + 70 160 + 170	
4	Calculations with whole numbers beyond 100 which involve crossing place value boundaries	276 - 189	
5	Counting on or back in tenths and/or hundredths	3.2 + 0.6	1.7 + 0.55
5	Calculations with decimal numbers which do not involve crossing place value boundaries	5.6 + 3.2 4.7 – 3.5	21.34 + 3.12
5	Calculations with decimal numbers which involve crossing place value boundaries	1.4 + 1.7 5.7 + 6.9	0.8 + 0.35

Multiplication and Division Strategies			
1	Count forwards and backwards in 2s, 5s and 10s.	2, 4, 6, __, ___	100, 90, 80, ___
2	Double multiples of 5 and 10 to 50 and the corresponding halves	Double 35	Half 70
2	Find half of any even number to 40 or multiple of 10 to 100	Half 80	Half 26
3	Multiply a one or two-digit number by 10 or 100	37 x 10	47 x 100
3	Double multiples of 5 and 10 to 100 and the corresponding halves	Double 85	Half 170
3	Find half of any multiple of 10 up to 200 and even number up to 200.	Half 170	Half 196
4	Multiply numbers to 1000 by 10 and then 100	325 x 10	54 x 100
4	Divide numbers to 1000 by 10 and then 100 (whole number answers)	500 ÷ 100	850 ÷ 10
4	Multiply a multiple of 10 to 100 by a single-digit number	60 x 3	50 x 7
4	Find unit fractions and simple non-unit fractions of whole numbers	$\frac{3}{8}$ of 24	$\frac{1}{5}$ of 35
4	Doubles and halves of any two-digit number and any multiple of 10 or 100	Half 680	Double 73
4	Form equivalent calculations and use doubling and halving: multiply by 4 by doubling twice, multiply by 8 by doubling three times, divide by 4 by halving twice, divide by 8 by halving three times	16 × 4 = 32 × 2 = 64 12 × 8 = 24 × 4 = 48 × 2 = 96	104 ÷ 4 = 52 ÷ 2 = 26 104 ÷ 8 = 52 ÷ 4 = 26 ÷ 2 = 13
4	Multiply a 2-digit number by a single digit by partitioning	26 x 3	17 x 3
5	Use multiplication facts to derive products and related division facts to multiply and divide by multiples of 10 and 100	900 x 8 60 x 30 300 x 500	600 ÷ 20 800 ÷ 400 2100 ÷ 300
5	Multiply and divide whole numbers and decimals by 10, 100 or 1000	4.3 x 100	25 ÷ 10
5	Form equivalent calculations and use doubling and halving: multiply by 5 by multiplying by 10 then halving multiply by 20 by doubling then multiplying by 10 multiply by 50 by multiplying by 100 and halving	18 × 5 = 180 ÷ 2 = 90 45 x 20 = 90 x 10 8 x 50 = 8 x 100 ÷ 2	5
5	Find $\frac{1}{10}$ of any given number where answers are up to 1 decimal places	$\frac{1}{10}$ of 365	$\frac{1}{10}$ of £284
5	Use place value to derive multiplication and division facts involving decimals	0.6 x 8	3.5 ÷ 7
6	Find 10% or multiples of 10% of whole numbers and quantities	30% of £50	40% of 200g
6	Find 50% by halving and 25% of numbers and quantities	25% of 150kg	50% of £900
6	Double and half decimal number with up to one decimal place by partitioning	Half 8.4	Double 9.6
6	Divide a multiple of 25 by 25 dividing by 100 then multiplying by 4	350 ÷ 25 = 350 ÷ 100 x 2 x2	
6	Divide a multiple of 50 by 50 by dividing by 100 then doubling	450 ÷ 50= 450 ÷ 10 x 2	
6	Find the doubles and halves of any number up to 10,000 by partitioning	Half 32, 022	
6	Multiply decimals numbers up to 2 decimals places by whole numbers	3.42 x 4	

Successful mathematicians make use of an extensive repertoire of mental approaches to calculation. They exhibit a fluency and dexterity with number and calculation which allows them to approach problems without always relying on formal written methods. Equally, having a strong understanding of mental approaches helps when completing complex written methods such as long division (e.g. by being able to mentally multiply TU x U and +/- TU and U's)

To ensure knowledge progression, we use several high quality resources made by experts.

	Edale uses Power Maths, a DfE approved maths curriculum. It provides a coherent and cumulative curriculum that progresses in line with a mastery approach. Experts who have designed the curriculum have considered how representations and tasks design builds and develops effectively to ensure schools using the scheme are offering the best available curriculum for their children.
	The NCETM documents are linked to The National Curriculum and can be found here. These resources can be used to explore concepts in more detail and/or provide materials to implement support and challenge.
	Edale also subscribes to White Rose Maths to provide additional resources/guidance for challenge/support within our curriculum
	Numbots is an excellent tool for developing fluency in number for all children.
	TT Rocks is used regularly across school to help children develop secure understanding and fluency of their times tables facts and recall.