

A guide for teachers/families

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What is a calculation policy?

This calculation guidance helps teachers to identify the preferred methods of mental and written calculations for our school, based on White Rose methodology. This guidance contains the key procedures that will be taught within our school.

Why do we need this?

It is necessary to ensure consistency and progression of methods for calculation throughout the school. This guidance provides teachers with a clear path of progression in calculation, allowing them to help children progress and identify stages of progression that children may find challenging. It is important for children to be able to apply their strategies to everyday situations and wherever possible teachers should use real life context when teaching calculation, including the use of estimations.

The consistent use of colours for place value counters will be used across school to ensure continuity and conceptual understanding.



How to use this guidance?

The guidance is into year group sections; addition and subtraction, multiplication and division. National age expectations are highlighted to show the stages children are expected to reach by the end of the year group (National Curriculum 2014). High expectations will result in above average progression over KS2. When planning for a class it will be necessary to look at the year below to reinforce previous strategies taught.

Range of strategies to be included in all year groups

The calculation policy shows the range of strategies that the children will be introduced to however do not necessarily need to be taught in the order shown.

Establish mental methods based on a good understanding of place value

Use concrete objects to support calculations

Use of informal jottings to aid mental calculations

Develop use of empty number line to help mental imagery and aid recording

Use models and images to promote understanding.

Use partitioning and recombining to aid informal methods

Use inverses to check calculations

Introduce expanded methods

Develop expanded methods into compact standard written form

Children will be encouraged to then select an appropriate method to solve problems. (Do I need to use an expanded or compact written method?)

Before formal written methods can be used it is necessary for the children to have a secure understanding of place value appropriate for the year group

Before carrying out a calculation, children will be encouraged to consider some or all of the following points dependent on their current year group

What size do I expect the answer to be?

Can I calculate in my head?

Could I use jottings to keep track of the calculation?

Vocabulary

Misconceptions will occur, and need to be rectified quickly. It is necessary to use clear, unambiguous language to minimise misconceptions, and this should be consistent across the whole school. Teachers can use the common misconceptions identified in White Rose schemes of learning to plan for addressing misconceptions within their teaching. For example:

When using column methods for subtraction the children should be told to 'exchange' a ten for units, or a hundred for tens, not to 'borrow' a ten or a hundred.

When teaching multiplication / division by 10, 100 etc., the figures move, not the decimal point. The decimal point always resides between the ones and the tenths!

When multiplying an integer by 10 we do not ADD a 0. Adding implies addition and the addition of a number and zero means the original number remains unchanged.

Please note all National Curriculum information:

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Addition

Skill	Year	Representations and models		
Add two 1-digit numbers to 10	1	Part-whole model Bar model Number shapes	Ten frames (within 10) Bead strings (10) Number tracks	
Add 1 and 2-digit numbers to 20	1	Part-whole model Bar model Number shapes Ten frames (within 20)	Bead strings (20) Number tracks Number lines (labelled) Straws	
Add three 1-digit numbers	2	Part-whole model Bar model	Ten frames (within 20) Number shapes	
Add 1 and 2-digit numbers to 100	2	Part-whole model Bar model Number lines (labelled)	Number lines (blank) Straws Hundred square	

Skill	Year	Representations and models		
Add two 2-digit numbers	2	Part-whole model Bar model Number lines (blank) Straws	Base 10 Place value counters	
Add with up to 3-digits	3	Part-whole model Bar model	Base 10 Place value counters Column addition	
Add with up to 4-digits	4	Part-whole model Bar model	Base 10 Place value counters Column addition	
Add with more than 4 digits	5	Part-whole model Bar model	Place value counters Column addition	
Add with up to 3 decimal places	5	Part-whole model Bar model	Place value counters Column addition	

 Combining two parts to make a whole part: part -whole model Use cubes to add two numbers together as a group or in a bar (use other resources too e.g. eggs, shells, teddy bears, cars) Use part whole model. Use part and the whole part of the pa		Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
Starting at the bigger number and counting on Start with the larger number and then count on to the smaller number 1 by 1 1 1 1 1 1 1 1 1 1 1	dditton +	Combining two parts to make a whole part: part -whole model	Use cubes to add two numbers together as a group or in a bar (use other resources too e.g. eggs, shells, teddy bears, cars) Use part whole model.	Use pictures to add two numbers together as a group or in a bar to represent the concrete tool	Use the part-part whole dia- gram as shown above to move into the abstract. 5+3=8 8=5+3 4+3=7 Four is a part, 3 is a part and the whole is seven.
	A IY	Starting at the bigger number and counting on	Start with the larger number and then count on to the smaller number 1 by 1	Start at the larger number on the number line and count on in ones or in one jump to find the answer. 12 + 5 = 17 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 +	Place the larger number in your head and count on the smaller number to find your 5 + 12 = 17 What is 5 more than 12? What is the sum of 5 ? What is the total of 5 and 12?

	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
Y1 Addition +	Regrouping to make 10 This is an essential skill for column addi- tion later.	Start with the bigger number and use the smaller number to make 10. Use ten frames. 6+5=11	Use pictures or a number line. Regroup or partition the smaller number using the part part whole model to make 10 3 + 9 = 9 + 5 = 14 1 + 1 1 + 4 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 20 Children to draw the ten frame and counters/cubes.	7 + 4= 11 If I am at seven, how many more do I need to make 10. How many more do I add on $6 + \Box = 11$ $6 + 5 = 5 + \Box$ $6 + 5 = \Box + 4$
	Represent and use number bonds and related subtraction facts	2 more than 5	Diaw 2 more hiss 5 + 2 = 0 1 2 3 4 5 6 7 8 9 10	Emphasis should be on the language '1 more than 5 is equal to 6.' '2 more than 5 is 7.' '8 is 3 more than 5.'

	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Ab	stract
	Adding multiples of 10	Model using Dienes and bead strings	Use representations for base ten	20 + 30 = 50 70 = 50 + 20	
ion +		50=30+20	3 tens + 5 tens = tens 30+60 =		
/2 Addit	Use known number facts Part part whole	Children explore ways of making numbers within 20	20 + = 20 20 - = + = 20 20 - = + = 20 20 - =	+ 1 = 16 1 + = 16	16 – 1 = 16 – 🔤 = 1
	Using known facts	Children draw representations of H,T and O $\Box_{\Box} + \Box_{\Box} = \Box_{\Box} = \Box_{\Box}$ $\Box_{\Box} + \Box_{\Box} = \Box_{\Box} = \Box_{\Box}$	Children draw representations of H,T and O $\therefore + \div =$ (+) =	Leads to Leads to	3+4=7 30+40=70
					300+400=700

	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
Y2 Addition +	Add a two digit number and ones. Continue to develop understanding of partitioning and place value (no exchange)	TO + O using Dienes. 41+8=	Children to represent the Dienes e.g. lines for tens and dots for ones $\frac{10s + 1s}{1111 + 100}$	$ \begin{array}{c} 41 + 8 \\ 1 + 8 = 9 \\ 40 + 9 = 49 \\ \begin{array}{c} 41 \\ 40 \\ 40 \\ 1 \end{array} $
	Add two 2 digit num- bers with no ex- change Column addition in- troduced in the sum- mer term if appropri- ate	Find the sum of 34 and 23	10s 1s	Image: Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system Image of the system
	Add two 2-digit / 2 digit and 1 did Numbers with an ex- change	Model using Dienes , place value counters and Numicon	Draw the tens and ones Draw the tens and ones Use number line and bridge ten using part whole if necessary 47 67 72 47 67 70 72	25 + 47 $20 + 5$ $40 + 7$ $20 + 40 = 60$ $5 + 7 = 12$ $60 + 12 = 72$

	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
+	Add two digit and one digit add two 2- digit numbers with an exchange	Use of straws	Draw a number line +2 $+2138$ 40 61	38 + 23 = 61
Y2 Additio	Add three 1-digit numbers	Combine to make 10 first if possible, or bridge 10 then add third digit	Regroup and draw Representation + $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$	Combine the two numbers that make/bridge ten then add on the third 4 + 7 + 6 = 10 + 7 $= 17$
	Bar model		7 + 3 = 10	23 25 ? 23 + 25 = 48

	Objective / Strategy	Concrete - Tool Model using Dienes or Numicon		Pictorial - Picture			Abstract			
C r r ₽ 3	Column Addition—no egrouping (friendly numbers) Add two or three 2 or 8-digit numbers			Children move to drawing the counters using a tens and one frame		to drawing the a tens and one	Add the ones first, then the tens, then the hundreds		n the Is	
Y3 Aggiuon		Add the t 45 34	together the rens. Tens Tens 7	e ones first, then			+	1 3	59	

	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
+	Column Addition with regrouping	Exchange ten ones for a ten. Model using Numicon, Dienes and place value counters.	Children can draw a representation of the grid to fur- ther support their understanding, carrying the ten underneath the	Add the ones first, then the tens, then the hundreds. Con- tinue to reference the concrete the resources.
3 Addition		Hundreds Tens Ones	Hundreds Tens Ones Hundreds Ones O O O O O O O O O O O O	265 + 164 429 1



Subtraction

Skill	Year	Representations and models		
Subtract two 1-digit numbers to 10	1	Part-whole model Bar model Number shapes	Ten frames (within 10) Bead strings (10) Number tracks	
Subtract 1 and 2-digit numbers to 20	1	Part-whole model Bar model Number shapes Ten frames (within 20)	Bead string (20) Number tracks Number lines (labelled) Straws	
Subtract 1 and 2-digit numbers to 100	2	Part-whole model Bar model Number lines (labelled)	Number lines (blank) Straws Hundred square	
Subtract two 2-digit numbers	2	Part-whole model Bar model Number lines (blank) Straws	Base 10 Place value counters	

Skill	Year	Representations and models		
Subtract with up to 3- digits	3	Part-whole model Bar model	Base 10 Place value counters Column subtraction	
Subtract with up to 4- digits	4	Part-whole model Bar model	Base 10 Place value counters Column subtraction	
Subtract with more than 4 digits	5	Part-whole model Bar model	Place value counters Column subtraction	
Subtract with up to 3 decimal places	5	Part-whole model Bar model	Place value counters Column subtraction	

Objec Strat	tive / egy	Concrete - Tool	Pictorial - Picture	Abstract
Taking away	/ ones	Physically taking away and removing objects from a whole (ten frames, Numicon, cubes and other items such as beanbags could be used) 4-3=1	Children to draw the concrete re- sources they are using and cross out the correct amount AAA AAA 15-3 = 12	4 - 3 = -3
Counting ba	ack	Move objects away from the group, counting backwards Move the beads along the bead string as you count backwards	Count back in ones using a number line $5 - 3 = 2$	Encourage children to use an empty number line Put 13 in your head, count back 4. What number are you at?
Find the difference		Finding the difference (using cubes, Numicon or Dienes) Calculate the difference between 8 and 5.	Count on using a number line to find the difference $*^{6}$ 0 1 2 3 4 5 6 7 8 9 10 11 12	Find the difference between 8 and 5 Hannah has 12 sweets and her sister has 5. How many more does Hannah have?

	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract					
raction -	Represent and use number bonds and related subtraction facts within 20 Part Part Whole model	Link to addition. Use Part Part Whole model to model the Inverse 10-6=4 If 10 is the whole and 6 is one of the parts, what 's the other	Use pictorial representations to show the part	Move to using numbers within the part whole model					
Subt	Counting back by bridging 10	Using ten frames. 14 – 5	Children to present the ten frame pictorially and discuss what they did to make 10	Children to show how they can make 10 by partitioning 14 - 5 = 9					
Υ1		$\begin{array}{c} \bullet \bullet$		4 1 14 - 4 = 10 10 - 1 = 9					
	Bar model	5−2 = 3		8 2 10 = 8 + 2 10 = 2 + 8 10-2 = 8 10-8 = 2					

	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
- ion	Regroup a ten into ten ones	Use Dienes to show how to change a ten into ten ones, use the term 'take and make'	20-4=	30 — 5 = 25
'2 Subtract	Partitioning to subtract without regrouping	Use Dienes to show how to partition the number when subtracting without regrouping 34—13 = 21	Children draw representations of Dienes and cross off 43-21 = 22	58—25 =
≻	Finding the difference by bridging ten Progression should be crossing one ten, crossing more than one ten, crossing the hundreds.	Use a bead bar or bead strings to model counting to next ten and the rest $2 + \frac{2}{28 30} + \frac{4}{34}$	Use a number line to count on to next ten and then the rest $\boxed{\underbrace{44}_{76}, \underbrace{80}_{90}, \underbrace{90}_{93}, \underbrace{90}_{93}}$	93—76 = 17

	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
- U	Column subtraction without regrouping	Use Dienes or Numicon to model Work out 63 – 51	Draw representations to support understanding Work out 769 – 147 <u>Hundreds Tens Ones</u> @@@@@@@0000 1110	No exchanges - <u>3 5</u> <u>6 3</u>
Y3 Subtractic	Column subtraction with regrouping	Begin with Dienes or Numicon. Move to place value counters, modelling the exchange of a ten into ones. Use the phrase 'take and make' for exchange I = I = I = I = I = I = I = I = I = I =	Children may draw bars, part part wholes or place value counters and cross off $\frac{ undreds }{2} \frac{ v }{2} $	Extend to one exchange $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$

	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
ubtraction -	Y4 Subtract with up to 4 digits Introduce decimal subtraction through context of money	Model process of exchange using Numicon, Dienes and then move	Represent the base 10 pictorially, remembering to show the exchange	Formal column method. Chil- dren must understand what has happened when they have crossed out digits using the term exchange. Up to 3 exchanges $200 \ 30 \ 2 \ 4357$ - 100 10 4 - 2735 100 10 8 1622
, 5 and 6 Su	Y5 Subtract with at least 4 digits, including money and measures Subtract with decimal values	As Year 4	Represent the base 10 pictorially, remembering to show the ex- change $\frac{1005 + 105 + 15}{1000 + 26}$	Use zeros for place-holders 6232 -4814 1418 777696 $-372 \cdot 5$ $6796 \cdot 5$
Υ4	Y6 Subtract with large and more complex numbers and decimal values		Bar models to support learning	$ \begin{array}{c} $

Multiplication

Skill	Year	Representations and models					
Solve one-step problems with multiplication	Solve one-stepBar modelproblems with1/2Number shapesmultiplicationCounters		Ten frames Bead strings Number lines				
Multiply 2-digit by 1- digit numbers 3/4		Place value counters Base 10	Expanded written method Short written method				
Multiply 3-digit by 1- digit numbers	4	Place value counters Base 10	Short written method				
Multiply 4-digit by 1- digit numbers 5		Place value counters	Short written method				

Skill	Year	Representation	ns and models
Multiply 2-digit by 2- digit numbers	5	Place value counters Base 10	Short written method Grid method
Multiply 2-digit by 3- digit numbers	5	Place value counters	Short written method Grid method
Multiply 2-digit by 4- digit numbers	5/6	Formal written method	

	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
lication x	Doubling	Use practical activities using manipulatives including cubes and Numicon to demonstrate doubling 1 + 1 = 1 1 + 1 = 1	Draw pictures to show how to double numbers Double 4 = 8	
Y1 Multipl	Counting in multiples	Count the groups as children are skip counting, children may use their fingers as they are skip counting	Children make representations to show 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
	Making equal groups and counting the total	Use manipulatives to create equal groups	Draw and make representations	4 x 5 = 20

	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
Itiplication X	Repeated addition	Use different objects to add equal groups	Use pictorial including number lines to solve problem There are 3 sweets in a bag. How many sweets in 5 bags?	Write addition sentences to describe objects and pictures $3 \times 4 = 12$ $4 + 4 + 4 = 12$
	Understanding arrays	Use objects laid out in arrays to find the answers to 2 lots 5, 3 lots of 2 etc.	Draw representations of arrays to show understanding	3 x 2 = 6 2 x 5 = 10

	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
lication x	Doubling	Model doubling using Dienes and place value counters	Draw pictures and representations to show how to double numbers 40 + 12 = 52	Partition a number and then double each part before recombining it back together $10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\$
Y2 Multip	Counting in multiples of 2, 3, 4, 5, 10 from 0 Repeated addition	Count the groups as children are skip counting, children may use their fingers as they are skip counting 5+5+5+5+5+5+5+5=40 5+5+5+5+5+5+5=40	Number lines, counting sticks and bar models should be used to show representation of counting in multiples	Count in multiples of a number aloud Write sequences with multiples of numbers 0, 2, 4, 6, 8, 10 0, 3, 6, 9, 12, 15 0, 5, 10, 15, 20, 25, 30 $4 \times 3 =$

Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
Multiplication is commutative	 Create arrays using counters and cubes and Numicon 2 lots of 5 2 lots of 5 5 lots of 2 Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer Image: Communication of the multiplication of the multiplication of the answer 	Use representations of arrays to show different calculations and explore commutativity	$12 = 3 \times 4$ $12 = 4 \times 3$ Use an array to write multiplication sentences and reinforce repeated addition. $5 + 5 + 5 = 15$ $3 + 3 + 3 + 3 + 3 = 15$ $5 \times 3 = 15$ $3 \times 5 = 15$
Using the Inverse This should be taught alongside division, so pupils learn how they work alongside each other	Use cubes to show multiplication and division fact families	$\begin{vmatrix} 4 & 2 \\ \hline 4 & 2 \\ \hline \times \\ \hline \\ \hline \\ \times \\ \hline \\ \hline \\ \\ \hline \\ \\ \div \\ \hline \\ \hline \\ \\ \hline \\ \\ \div \\ \hline \\ \\ \hline \\ \\ \hline \\ \\ \\ \hline \\ \\ \\ \\$	Show all 8 related fact families $2 \times 4 = 8$ $2 = 8 \div 4$ $4 \times 2 = 8$ $4 = 8 \div 2$ $8 = 2 \times 4$ $8 \div 4 = 2$ $8 = 4 \times 2$ $8 \div 2 = 4$





	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract						
Multiplication x	Grid method recap from Year 3 for 2 digits x 1 digit Move to multiplying 3 digit numbers by 1 digit.—Year 4 expectation	Use place value counters to show how we are finding groups of a number. We are multiplying $\underbrace{\begin{array}{c} \hline \\ \hline $	Children can represent their work with place value counters in a way that they understand. They can draw the counters using col- ours to show different amounts or just use the circles in the different columns to show their thinking as shown below 245 x 4 = 980 $\underbrace{Hundreds \ \overline{ters} \ 0 res \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ $	Start with multiplying by one digit numbers and showing the clear addition alongside the grid $\begin{tabular}{c} \hline x & 200 & 40 & 5 \\\hline 4 & 800 & 160 & 20 \end{tabular}$						
γ4	Column Multiplication	This is initially done where there is no regrouping. 321 x 2 = 642	×300207412008028Number mes can supportlearners when solving problemswith multiplication alongside theformal written methods	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$						

Objective / Strategy	Objective / Concrete - Tool Strategy					Pictorial - Picture				Abstract					
Column Multiplication for 2, 3 and 4 digits x 2 digit	This is initially done where there is no regrouping. $327 \times 4 = 1308$		× 30 1	20 600 20	2 60 2				н	T 2	0 2				
		Num learn with	ber lin ers wh multip	es can en solv licatior	suppor /ing pro	t oblems side the		、 	6	2	2				
		form Bar n	al writt nodels	en me to be ι	thods used to	support			6	8	2				
				tra er 1605 ml 10 2-204 10 44 + 5 + 16 10 994- 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	I - PictureAbstract 2 3 4 4 4 6 8 2 2 2 4 6 3 2 4 6 3 2 4 6 3 2 4 6 8 2 2 2 2 2 3 4 4 6 8 17 10 2 2 0 7 4 8 8										
Column Multiplication	Manipulatives may still be used with the corresponding long multiplication modelled alongside	Use o	of area 1 1	model 0 00	8			Th ×	H 2 4	T 3 3 6 2	D 4 2 8				
		3	3	0	24			7	4	8	8				

	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
plication x	Multiplying 4 digit number by a 2 digit number Multiplication carry- ing above the col- umns, addition carry- ing below the line			$342 \times 7 \text{ becomes}$ $342 \times 7 \text{ becomes}$ $342 \times 7 \text{ becomes}$ $24 \times 16 \text{ becomes}$ $124 \times 26 \text{ becomes}$ $\frac{1}{2} 2 4$ $\frac{\times 2}{1} 2 4$ $\frac{\times 2}{2} 6$ $\frac{2}{2} 4 8 0$ $\frac{7}{2} 4 4$ $\frac{\times 2}{3} 2 2 4$ $\frac{7}{1} 4 4$ $\frac{3}{3} 2 2 4$ $\frac{7}{1} 1$ Answer: 384 Answer: 3224
Y6 Multi	Multiplying decimals up to 2 decimal places by a single digit			Remind children that the single digit belongs in the units column. Line up the decimal points in the question and the answer $3 \cdot 1 q$ $\times 8$ $2 5 \cdot 5 2$



Skill Year Representations and models		ns and models	
Solve one-step problems with division (sharing)	1/2	Bar model Real life objects	Arrays Counters
Solve one-step problems with division (grouping)	1/2	Real life objects Number shapes Bead strings Ten frames	Number lines Arrays Counters
Divide 2-digits by 1- digit (no exchange sharing)	3	Straws Base 10 Bar model	Place value counters Part-whole model
Divide 2-digits by 1- digit (sharing with exchange)	3	Straws Base 10 Bar model	Place value counters Part-whole model

Skill	Year	Representatio	ns and models
Divide 2-digits by 1- digit (sharing with remainders)	3/4	Straws Base 10 Bar model	Place value counters Part-whole model
Divide 2-digits by 1- digit (grouping)	4/5	Place value counters Counters	Place value grid Written short division
Divide 3-digits by 1- digit (sharing with exchange)	4	Base 10 Bar model	Place value counters Part-whole model
Divide 3-digits by 1- digit (grouping)	4/5	Place value counters Counters	Place value grid Written short division

Skill	Year	Representatior	ns and models
Divide 4-digits by 1- digit (grouping)	5	Place value counters Counters	Place value grid Written short division
Divide multi-digits by 2-digits (short division)	6	Written short division	List of multiples
Divide multi-digits by 2-digits (long division)	6	Written long division	List of multiples

	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
Division ÷	Division as sharing	Sharing using a range of objects Final of the second seco	Children use pictures or shapes to share quantities 8 shared between 2 is 4 3 = 3 = 3 = 3 = 3 = 3 = 3 = 3 = 3 = 3 =	12 shared between 2 is 6
5	Division as grouping	Divide quantities into equal groups Use objects from real life experi- ences to group e.g. wheels on Lego cars, socks into pairs	Circle groups of 2 mittens and complete the sentence.	

Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
Division as sharing (Provide real life examples where sharing is necessary)	I have 20 apples, can you share them equally between 5 people?	Children use pictures or shapes to share quantities Bar Modelling	20 ÷ 5 = 4 20 sweets shared between 5 people. How many do they get each? 20 20 ? ? ? ? ? ?
			Array to show counters shared between 5 columns.
Division as grouping (Provide real life examples where grouping is neces- sary e.g. eggs in boxes, wheels on cars. Ensure can count in groups)	Divide quantities into equal groups Use cubes, counters, objects or place value counters to aid un- derstanding $0 \ 5 \ 10 \ 15 \ 20 \ 25 \ 30 \ 35 \ 35 \ \div \ 5 = 7$	Children to use pictures or shapes to group quantities $\bigcirc \bigcirc / \bigcirc / \bigcirc \bigcirc \bigcirc$ Use number lines for grouping $12 \div 3 = 4$	20 \div 5 = 4 There are 6 sweets, how many people can have 2 each? 000000000000000000000000000000000000

	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
vision ÷	Division as grouping	Use cubes, counters, objects or place value counters to aid understanding There are 20 apples altogether. They are put in bags of 5. How many bags are there?	Children to use pictures or shapes to group quantities	How many groups of 6 in 24? 24 ÷ 6 = 4
Y3 Di	Division with arrays	Link division to multiplication by creating an array and thinking about the number sentences that can be created $5 \div 3 = 5 \qquad 5 \times 3 = 15$ $15 \div 5 = 3 \qquad 3 \times 5 = 15$	Draw an array and use lines to split the array into groups to make multiplication and division sentences	Find the inverse of multiplica- tion and division sentences by creating eight linking number sentences $7 \times 4 = 28$ $4 \times 7 = 28$ $28 \div 7 = 4$ $28 \div 4 = 7$ $28 = 7 \times 4$ $28 = 4 \times 7$ $4 = 28 \div 7$ $7 = 28 \div 4$

	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
	Divide 2 digits by 1 digit with no ex-	When dividing larger numbers, children can use manipulatives that allow them to partition into tens and ones	Part-whole models can provide children with a clear written method that matches the con- crete representation.	
• •	change (sharing)			$\boxed{48 \div 2 = 24}$
Y3 Division			TensOnes 10 10 11 10 11 11 10 10 11 10 11	

Strategy	ADSTRACT
 Divide 2 digits by 1 digit with exchange (sharing) When dividing larger numbers, children can use manipulatives that allow them to partition into tens and ones Children should start with the quipment outside the place use grid before sharing the tand ones equally between rows. 	the ceval- tens the Flexible partitioning in a part- whole model supports this method. Abstract could be shar- ing or grouping. $\int_{40}^{52} \int_{12}^{12} \int_{12}^{$

Objective Strategy	/ Concrete - Tool	Pictorial - Picture	Abstract
Division with remainders	Divide objects by sharing be- tween 3 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	Complete written divisions and show the remainder using r
·I•	14÷3=		26 ÷ 3 = 8 r 2
UNISION		Draw dots and group them to divide an amount and clearly show a remain- der. Could be either $14 \div 3 =$ (grouping) or $14 \div 4 =$ (sharing).	COC C
	Divide objects by grouping and seeing how much is left over. Example without remainder: 40 + 5 Ask "How many 5s in 40?" (Example with remainder: 38 + 6 For larger numbers, when it becijumps can be recorded using kn	5+5+5+5+5+5+5+5=8 5 + 5 + 5 + 5 + 5 + 5 = 8 5 + 6 + 6 + 6 + 6 + 2 = 6 sixes with the size of t	8 fives ith a remainder of 2 multiples, bigger



	Objective / Strategy	Concrete - Tool	Pictorial - Picture	Abstract
Division ÷	Divide at least 3 digit numbers by 1 digit Begin by dividing by tens and ones Short division by grouping Children should be	Short division using place value counters to group $605 \div 5$ $H \qquad T \qquad 0$ $\bigcirc \bigcirc $	Represent the place value counters pictorially	Children to the calculation using the short division scaffold. Begin with no remainders 123 $5 \ 6^{1}1^{1}5$ Move onto divisions with a remainder $\frac{8 \ 6}{3} \ r \ 2$
9	estimating the final answer before calcu-	1. Make 615 with place value counters.	Additive decomposition	5 4 3 2 Move onto expressing the re-
Y5 and	lating	 2. How many groups of 5 hundreds can you make with 6 hundred counters? 3. Exchange 1 hundred for 10 tens. 4. How many groups of 5 tens can you make with 11 ten counters? 5. Exchange 1 ten for 10 ones. 6. How many groups of 5 ones can you make with 15 ones? 	615÷5= 615 500 100 15 How many groups of 5 are in 500? In 100? In 15?	mainder as a fraction $37 \div 3 = 12 \text{ r } 1$ $12 \text{ r } \frac{1}{3}$ Finally move into decimal places to divide the total accurately 1 4 6 16 21 3 5 5 1 1 0



Strategy	Pictoriai - Abstract
Long division	Division using repeated subtraction- removing chunks $ \begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$

becomes
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
/er: 28·8

	Objective / Strategy								A	bstr	act						
	Long division	Division wit	th ren	nain	ider	S											
ivision ÷		372 -	÷ 1	15	_	: 2	4	r12		-	3	0 7 6 1	0 2 0 2			$3 \times 15 = 4$ $4 \times 15 = 6$ $5 \times 15 = 7$ $10 \times 15 = 7$	15 60 75 150
						2	4	$\frac{4}{\pi}$									
Χ		-	1	5	3	7	2	- 5									
			-	-	3	0	0				72	.	_ 16	. –	2	4	
						7	2					-			- 2-	* 5	

Times Tables

Skill	Year	Representatio	ons and models
Recall and use	2	Bar model	Ten frames
multiplication and		Number shapes	Bead strings
division facts for the		Counters	Number lines
2-times table		Money	Everyday objects
Recall and use	2	Bar model	Ten frames
multiplication and		Number shapes	Bead strings
division facts for the		Counters	Number lines
5-times table		Money	Everyday objects
Recall and use	2	Hundred square	Ten frames
multiplication and		Number shapes	Bead strings
division facts for the		Counters	Number lines
10-times table		Money	Base 10

Skill	Year	Representatio	ns and models
Recall and use multiplication and division facts for the 3-times table	3	Hundred square Number shapes Counters	Bead strings Number lines Everyday objects
Recall and use multiplication and division facts for the 4-times table	3	Hundred square Number shapes Counters	Bead strings Number lines Everyday objects
Recall and use multiplication and division facts for the 8-times table	3	Hundred square Number shapes	Bead strings Number tracks Everyday objects
Recall and use multiplication and division facts for the 6-times table	4	Hundred square Number shapes	Bead strings Number tracks Everyday objects

Skill	Year	Representatio	ons and models
Recall and use multiplication and division facts for the 7-times table	4	Hundred square Number shapes	Bead strings Number lines
Recall and use multiplication and division facts for the 9-times table	4	Hundred square Number shapes	Bead strings Number lines
Recall and use multiplication and division facts for the 11-times table	4	Hundred square Base 10	Place value counters Number lines
Recall and use multiplication and division facts for the 12-times table	4	Hundred square Base 10	Place value counters Number lines





Year: 2

Skill: 10 times	tab	le									Year: 2
	10 2			+0 !					D 100	<i>></i>	Encourage daily counting in multiples both forwards and backwards. This can be supported using a number line or a hundred square.
	1 11 21 31 41 51 61 71 81 91	2 12 22 32 42 52 62 72 82 92	3 13 23 33 43 53 63 73 83 93	4 14 24 34 44 54 64 74 84 94	5 15 25 35 45 55 65 75 85 95	6 16 26 36 46 56 66 76 86 96	7 17 27 37 47 57 67 77 87 97	8 18 28 38 48 58 68 78 88 98	9 1 19 2 29 3 39 4 49 5 59 6 69 7 79 8 89 9		Look for patterns in the ten times table, using concrete manipulatives to support. Notice the pattern in the digits- the ones are always O, and the tens increase by 1 ten each time.

1	22	23	24	25	26	27
1	32	33	34	35	36	37
1	42	43	44	45	46	47
1	52	53	54	55	56	57
61	62	63	64	65	66	67
'1	72	73	74	75	76	77
1	82	83	84	85	86	87
)1	92	93	94	95	96	97



	Ski	l: 4 time	es table				Year: 3
1 2 3 4 11 12 13 14 21 22 23 24 31 32 33 34 41 42 43 44	5 6 7 8 15 16 17 18 25 26 27 28 35 36 37 38 45 46 47 48	9 10 19 20 29 30 39 40 49 50					Encourage daily counting in multiples, supported by a number line or a hundred square. Look for patterns in the four times table, using manipulatives to support. Make links
4 8 24 28 44 48	121632365256	20 40 60	4	8	12	16	seeing how each multiple is double the twos. Notice the pattern in the ones
	→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→	20 24 2	⊃-○○ 28 32 36		○○○ 	⊙– →	within each group of five multiples. Highlight that all the multiples are even using number shapes to support.

			Skill	: 8 times	tab	le									Year: 3
8 8 48 •••	16 16 56 8	24 64	24 32 72 	32 40 80 40 80	1 11 21 31 41 51 61 71 81 91	2 12 22 52 62 92 92	3 13 23 33 53 63 73 83 93	4 14 34 44 54 64 74 84 94	5 15 25 45 55 65 75 85 95	6 16 26 36 46 66 76 86 96 96	7 17 27 37 47 57 67 77 87 97 97	8 18 28 38 49 58 68 78 98	9 19 29 39 69 79 89 99	10 20 30 50 60 70 80 90	Encourage daily counting in multiples, supported by a number line or a hundred square. Look for patterns in the eight times table, using manipulatives to support. Make links to the 4 times table, seeing how each multiple is double the fours. Notice the pattern in the ones within each group of five multiples. Highlight that all the multiples are even using number shapes to support.

			Skil	l: 6 tim	es tal	ole									Year: 4
					1 11 21 31 41 51	2 (12) 22 32 (42) 52	3 13 23 33 43 53	4 14 24 34 44 54	5 15 25 35 45 55	6 16 26 36 46 56	7 17 27 37 47 57	8 (18) 28 38 (48) 58	9 19 29 39 49 59	10 20 30 40 50	Encourage daily counting in multiples, supported by a number line or a hundred square. Look for patterns in the six times table,
6 36 66	12 42 72	18 48 78	24 54 84	30 60 90	61 71 81 91	62 72 82 92	63 73 83 93	64 74 84 94	65 75 85 95	66 76 86 96	67 77 87 97	68 78 88 98	69 79 89 99	70 80 90 100	to support. Make links to the 3 times table,
(2000 - 0 6) - Q + 3 24 3	00 50 36))	 + 54)(C 	+) >		multiple is double the threes. Notice the pattern in the ones within each group of five multiples. Highlight that all the multiples are even using number shapes to support.

9 18 27 36 45 54 63 72 81 90 71

