

Stannington Infant School Calculation Policy

This policy is a guide for all staff at Stannington Infant school to support them in their teaching of maths.

It is set out as a progression of mathematical skills and not into year groups to encourage a flexible approach to teaching and learning. It is expected that teachers will use their professional judgement as to when consolidation of existing skills is required or if to move onto the next concept. The focus must always remain on depth of understanding rather than accelerating through concepts. Children should not be extended with new learning before they are ready, they should deepen their conceptual understanding by applying their skills to problems and reasoning activates.

For each of the four approaches to calculation (addition, subtraction, multiplication and division), different strategies are laid out, together with examples of what concrete materials, pictorial and abstract representations could be used. The top darker row shows the preferred approach with the lighter row below showing some alternative approaches.

Running throughout the children's learning is the concept of variation.

Conceptual variation – The children being exposed to different representations of the same idea. E.g. using various equipment and visuals.

Procedural variation – Teachers vary one aspect of a question. By taking small steps it encourages the children to notice patterns and structures of number. E.g. if you know 5 + 5 = 10 how can you use that to help you work out 5 + 6?

ADDITION

EYFS/ National Curriculum

Foundation Stage	Year 1	Year 2
 Finds the total number in 2 groups by counting all of them In practical activities and discussion beginning to use the vocabulary in addition and subtraction Say which number is one more or one less than a given number Using quantities and objects to add and subtract two single digit numbers Count on and count back to find the answer 	 Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs Represent and use number bonds and related subtraction facts within 20 Add and subtract one-digit and two-digit numbers to 20, including zero Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = -9 	 Solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures and applying their increasing knowledge of mental and written methods Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones, a two-digit number and tens, two two-digit numbers and adding three one-digit numbers Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Key Vocabulary

Sum, total, part(s), whole, plus, add, altogether, more, equal to, 'is the same as', greater than.

Progression in ADDITION

1-Adding two 1-digit numbers by combining two parts to make a whole

2-Adding two 1-digit numbers by starting at one number and counting on

- 3-Adding two 1-digit numbers by **regrouping to make 10** (using known facts)
- 4-Adding three 1-digit numbers
- 5-Adding a 2-digit and a 1-digit number using base ten/ partitioning
- 6-Adding ten or adding multiples of ten
- 7-Adding 2-digit and a 2-digit number using base ten/ partitioning
- 8-Adding mentally/ Choosing the most efficient method

Running throughout- Conceptual and procedural variation

Addition 1- Adding two 1-digit numbers by combining two parts to make a whole		
(Count all the objects using 1:1 correspondence)		
Concrete	Pictorial	Abstract
Ch. use cubes to make the two numbers. They count how many they have in total using 1:1 correspondence. (The ch. may use other resources such as shells, counters, teddy bears, cars) E.g. 3 + 4 = 7	Ch. begin to represent the cubes using dots or crosses. They could place them onto a part-part whole model. E.g. 3 + 4 = 7	Ch. then use a part- part whole model to record the numbers. E.g. Ch. may say 4 is a part, 3 is a part and 7 is the whole.
Ch. may put their cubes into a part- part whole model. E.g. $6 + 4 = 10$	Ch. may also use pictures to add two numbers. E.g. 3 balls add 2 ball is 5 balls.	Ch. may also use a bar model to show the two parts. E.g. 5 + 3 = 8 8 5 3
use other resources such as shells, counters, teddy bears, cars) E.g. 3 + 4 = 7 Ch. may put their cubes into a part- part whole model. E.g. 6 + 4 = 10	7 Ch. may also use pictures to add two numbers. E.g. 3 balls add 2 ball is 5 balls.	$\frac{7}{4}$ $\frac{3}{3}$ Ch. may also use a bar model to sho two parts. E.g. 5 + 3 = 8 $\frac{8}{5}$ $\frac{3}{3}$

Addition 2 – Adding two 1-digit numbers by starting at one number and counting on		
(Ch. to begin by starting at an	y number before moving onto	starting at the larger number)
Concrete	Pictorial	Abstract
Once ch. can recognise the larger number they use equipment to find or make the larger number and then count on the smaller number. They may use cubes alongside a number line. E.g. 4 + 2 = 6	Ch. may then draw a bar model which encourages them to count on from the larger number. E.g. 4 + 2 = 6	Ch. will then use an empty number line and put the larger number at the start before counting on the smaller number. E.g. 4 + 2 = 6
Ch. may use other resources to do this such as finding the larger number on a bead string and counting on the smaller number in ones. E.g. 9 + 1 = 10	Ch. may start at the larger number on a number line or hundred square and counting on in ones to find the answer. E.g. 5 + 3 = 8	Ch. may also put the larger number in their head and count on in ones. They may use/ draw part of a number line rather than starting at 0. E.g. 4 + 3 =7
	AAA O O I I I I I I I I	4 567

Addition 3 — Adding two 1-digit numbers by regrouping to make 10 (using known facts)		
Concrete	Pictorial	Abstract
Ch. use counters or cubes to make both numbers and place on a tens frame. They start with the larger number and use the smaller number to make up to ten. E.g. 6 + 5 = 11 because 6 + 4 = 10 and 10 + 1 = 11.	Ch. will move onto draw their own tens frame to represent this pictorially. E.g. 6 + 5 = 11 because 6 + 4 = 10 and 10 + 1 = 11	The ch. will begin to record this as a jotting to support them calculating mentally. E.g. $4 + 8 = 12$ 4 + 8 = 12 6 2
Ch. may also do this on a bead string or using numicon. E.g. 9 + 3 = 12 because 9 + 1 = 10 and 10 + 2 = 12	Ch. may also draw a number line to show they can partition the smaller number to add to the next ten first. E.g. $8 + 5 = 13$ because $8 + 2 = 10$ and $10 + 3 = 13$	They may progress to doing this completely mentally. E.g. 8 + 4 = 12 I need to add 2 to get to 10 and then another 2 to get to 12.

Addition 4 – Adding three 1-digit numbers		
Concrete	Pictorial	Abstract
Ch. will make all three numbers using practical equipment. They will use the strategies they have developed above to add the two larger numbers together first before adding the third smaller number. E.g. $3 + 8 + 7 = 18$ because $8 + 7 = 15$ and 15 + 3 = 18	Ch. move onto draw objects or recognise using pictures to calculate the total of 3 single digits. E.g. $3 + 5 + 7 = 15$ because 7 + 5 = 12 and $12 + 3 = 15$	Finally the ch. will represent this using numerals and drawing lines to show the number bond they have identified. E.g. 4 + 7 + 6 = 17 because 4 + 6 = 10 and 10 + 7 = 17 4 + 7 + 6 = 17 10
They will progress to look for easier numbers to add first such as bonds to 10 or doubles. E.g. 7 + 3 = 10 and 10 + 8 =18	They may do a second drawing to show how they have recombined the groups by finding bonds to 10. E.g. $3 + 5 + 7 = 15$ because $7 + 3 = 10$ and $10 + 5 = 15$	Ch. may be able to calculate mentally and explain this approach orally. E.g. 4 + 7 + 6 = 17 The easiest way to calculate this is to add 4 + 6 first because it is a number bond to 10.

Addition 5 — Adding a 2-digit and a 1-digit number using base ten/ partitioning (Ch. to begin by working within a ten before moving onto crossing the ten)		
Concrete	Pictorial	Abstract
Ch. add a 2-digit number and ones using base ten equipment. They make both numbers and count their total. E.g. 41 + 8 = 49	Ch. represent tens and ones by drawing lines and dots. E.g. $31 + 7 = 38$ 31 + 7 = 38 $111 \cdot 7 = 38$	Ch. use known number facts to support them adding a 1 digit number to a 2 digit number. They may use a small jotting. E.g. 51 + 7 = 58 $\frac{+7}{51}$ 58 "I know 1 + 7 = 8 so 51 + 7 = 58"
Ch. may place their base ten onto a calculation mat. If they ones total more than 10 they regroup them for one stick of ten. E.g. $32 + 6 = 38$	Ch. may also draw this in or on a calculation mat. E.g. 41 + 8 = 49 $\frac{10s}{111}\frac{1s}$	Ch. partition the 1 digit number if crossing over a ten boundary. They may use a small jotting to support their mental method. E.g. $45 + 8 = 53$ because $45 + 5 =$ 50 and then I add 3 more to make 53

Addition 6 – Adding ten or adding multiples of ten		
Concrete	Pictorial	Abstract
Ch. use base 10 equipment to recognise that a ten is worth 10x a one/ 10x its size/ value. Ch. make their starting number and then count in 10s practically moving a ten each time. E.g. 22 + 20 = 42 22 32 42 110 110 110 110 110 110 110 110 110 11	Ch. will move onto add multiples of ten by jumping down on a hundred square. E.g. 35 + 30 = 65 $\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Ch. will be able to record this using numerals. They use their knowledge of counting on in tens mentally. E.g. 45 + 20 = 65 Counting 455565 Or add the tens digits before adding the ones back on. 40 + 20 = 60 and 60 + 5 = 65
Ch. may move onto do this using place value counters. E.g. 22 + 20 = 42 22 32 42	They can also use a number line to show that they can count in 10s. E.g. 22 + 30 = 52	They will be able to look for and describe patterns. E.g. When I add multiples of 10 the ones digit stays the same
	+10 +10 +10 22 32 42 52	38 + 10 = 48 38 + 20 = 58 38 + 30 = 68 48 58 68

Addition 7 – Adding 2-digit and a 2-digit number using base ten/ partitioning		
Concrete	Pictorial	Abstract
Ch. add two 2-digit numbers using base ten equipment using their understanding of place value. They make both numbers and move the tens and ones together. They count the tens then the ones to find the total. E.g. $62 + 24 = 86$	Ch. represent tens and ones by drawing lines and dots. Ch. count the tens then the ones to find the total. E.g. $46 + 12 =$ 58 46 + 12 = 58 IIII • I•	Ch. partition both of the numbers. They add the tens together, then the ones. After they add the tens to the ones. E.g. 45 + 24 = 69 45 + 24 = 69 45 + 24 = 69 40 + 20 = 60 5 + 4 = 9 (60 + 9 = 69) They may do this last step mentally.
Ch. may place their base ten onto a calculation mat. If they ones total more than 10 they regroup them for one stick of ten. E.g. $36 + 25 = 61$	Ch. may also represent this by drawing it on a calculation mat. If the ones total more than 10 they regroup them for one stick of ten. E.g. $36 + 25 = 61$	If the ones total more than ten, they may need to use a jotting to for the final step. E.g. 44 + 28 = 72 44 + 28 = 72 $40 + 20 = 60$ $4 + 8 = 12$ $(60 + 12 = 72)$ $410 + 20 = 72$

Addition 8 – Adding mentally/ Choosing most efficient method

- Ch. can choose the most efficient methods to solve a calculation. (E.g. when adding 39 + 39 they would calculate 40 + 40 and adjust after).
- Where possible ch. can solve addition calculations mentally, drawing on known facts to improve their speed and accuracy. They may use jottings to support them.
- Ch. can explain how they have reached their answer and the reasons for using their chosen method. Ch. are also able to estimate and use the inverse calculation to check their answer is correct.

Running throughout- Conceptual variation

Ch. can solve addition calculations using a range of equipment, when shown in a variety of representations, using different vocabulary and in a range of contexts. (e.g. missing number, word problems and tables)

Examples for solving 21 + 34 could include...



SUBTRACTION

Key Vocabulary

Foundation Stage	Year 1	Year 2
 Finds the total number in 2 groups by counting all of them In practical activities and discussion beginning to use the vocabulary in addition and subtraction Say which number is one more or one less than a given number Using quantities and objects to add and subtract two single digit numbers Count on and count back to find the answer 	 Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs Represent and use number bonds and related subtraction facts within 20 Add and subtract one-digit and two-digit numbers to 20, including zero Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = -9 	 Solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures and applying their increasing knowledge of mental and written methods Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones, a two-digit number and tens, two two-digit numbers and adding three one-digit numbers Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Take away, less than, the difference, subtract, minus, fewer, decrease, left, equal to.

Progression in SUBTRACTION

1-Subtracting a 1-digit from a 1-digit by removing objects (part of) from a whole

2-Subtracting a 1-digit from a 1-digit by **starting at one number and counting back**

3-Subtracting a 1-digit from a 1-digit by **finding the difference**

- 4-Subtracting by **making 10** (using known facts)
- 5-Subtracting a **1-digit from a 2-digit number** using base ten/ partitioning
- 6-Subtracting ten or multiples of ten
- 7-Subtracting a 2-digit from a 2-digit number using base ten/ partitioning
- 8-Subtracting mentally/ Choosing the most efficient method

Running throughout- Conceptual and procedural variation

Subtraction 1- Subtracting a 1-digit from a 1-digit by removing objects (part of) from a whole (using 1:1 correspondence)

Concrete	Pictorial	Abstract
Ch. use objects to make a given number. They then practically remove some of the objects and count how many they have left. (Objects such as cubes, beanbags, shells, counters, teddy bears, cars) E.g. 4- 1 = 3	Ch. draw a picture of the concrete resources and cross out the amount they are taking away. They could how many they have left uncrossed. E.g. 4 – 3 = 1	Ch. begin to write a number sentence to go with their drawing. E.g. $6 - 2 = 4$
	0000	Child writes 6 – 2 = 4
Ch. may put their objects into a part- part whole model. They move them into two parts. They take away one of the parts and count how many are left in the	Ch. may draw this into a bar model. E.g. 4 - 3 = 1	They will also recognise number sentences and draw a picture to help them solving it.
remaining part. E.g. $4 - 1 = 3$	XXX	Child is given 7 – 3 =
		They draw
		0000000

Subtraction 2- Subtracting a 1-digit from a 1-digit by starting at one number and counting back		
Concrete	Pictorial	Abstract
Ch. count back starting at the larger number using a number line or number track. They place cubes alongside each number on the number line. E.g. 6 – 2 = 4	Ch. use a number line without any concrete objects to support them. They show each jump as they count back. E.g. 6 -2 = 4	Ch. may also put the larger number in their head and count back in ones. They may use/ draw part of a number line rather than starting at 0. E.g. 6 - 2 =4
1 2 3 4 5 6 7 8 9 10	1 1 1 1 1 1 1 1 0 1 2 3 4 5 6 7 8 9 10	6 54
Ch. may do this using a bead string. E.g. 12 – 3 = 9	Ch. may progress to show this on a bar model alongside their number line. E.g. 8 - 2 = 6	The ch. use an empty number line to support them counting back. E.g. $6 - 2 = 4$
1 9 12	0 1 2 3 4 5 6 7 8 9 10 8 6 2	46

Subtraction 3- Subtracting a 1-digit from a 1-digit by finding the difference		
Concrete	Pictorial	Abstract
Ch. recognise that another way to subtract is to find the difference between two numbers. They make both numbers using cubes and calculate the difference between them. E.g. $8 - 5 = 3$	Ch. draw cubes to show both amounts. They compare the amounts to find the difference. E.g. 8 – 5 = 3 8 and 5 have a difference of 3	Ch. can mentally calculate the difference. They may use a small section of a number line to help them find the difference. E.g. 8-5=3 $time{1}{6}$ 8 and 5 have a difference of 3
Ch. may use other objects and try to place them in order. They compare the amounts to calculate the difference. E.g. 6 – 2 = 4 6 and 2 have a difference of 4	Ch. may use a bar model to find the difference between the two numbers. E.g. 8 – 5 = 3	Ch. begin to learn that it if the numbers are close together it is easier to find the difference than count back. Child is given 9 – 7 = They say they have a difference of 2.

Subtraction 4- Subtracting by making 10 (using known facts)			
Concrete	Pictorial	Abstract	
Ch. use counters or cubes to make the larger number and place it in a tens frame. They subtract the smaller number by firstly getting to the previous ten before subtracting the rest. E.g. $14 - 5 = 9$ because $14 - 4 = 10$ and $10 - 1 = 9$.	Ch. will move onto draw their own tens frame to represent this pictorially. E.g. 14 - 5 = 9 because 14 - 4 = 10 and 10 - 1 = 9.	The ch. will begin to record this as a jotting to support them calculating mentally. E.g. 14 - 5 = 9 14 - 5 = 9 14 - 5 = 9 4 - 1	
Ch. may also do this on a bead string or using numicon. E.g. 14 - 5 = 9 because 14 - 4 = 10 and 10 - 1 = 9. - 4 -1	Ch. may also draw a number line to show they can partition the smaller number to subtract to the previous ten first. E.g. 14 - 5 = 9 because 14 - 4 = 10 and 10 - 1 = 9 $\begin{array}{r} -1 & -4 \\ \hline 9 & 10 & 14 \end{array}$	They may progress to doing this completely mentally. E.g. 14 - 5 = 9 I've split 5 into 4 and 1. I need to subtract 4 to get to 10 and then another 1 to get to 9.	

Subtraction 5- Subtracting a 1-digit from a 2-digit number using base ten/ partitioning			
Concrete	Pictorial	Abstract	
Ch. subtract a 1-digit from a 2-digit number using base ten equipment. They make the 2-digit number and then remove the 1-digit number. They count what is remaining. E.g. 49 - 8 = 41	Ch. represent the calculation by drawing tens and ones as lines and dots. They cross out the amount they are taking away. E.g. $38 - 5 = 33$ 38 - 5 = 33 $111 \cdot 2$	Ch. use known number facts to support them subtracting a 1-digit number from a 2-digit number. They may use a small jotting. E.g. 59 - 6 = 53 6 = 53 "I know 9 - 6 = 3 so 59 - 6 = 53"	
Ch. may place their base ten onto a calculation mat. If they need to remove more ones than they have, they swap a stick of ten for ten ones. E.g. 49 - 8 = 41	Ch. may also draw this in or on a calculation mat. If they need to remove more ones than they have, they cross out a stick of ten and replace it with ten ones E.g. 43 - 8 = 35	Ch. partition the 1-digit number if crossing over a ten boundary. They may use a small jotting to support their mental method. E.g. 43 - 7 = 36 because 43 - 3 = 40 and then I subtract 4 more to make 36	

Subtraction 6- Subtracting ten or multiples of ten					
Concrete	Pictorial	Abstract			
Ch. use base 10 equipment to recognise that a ten is worth 10x a one/ 10x its size/ value. Ch. make the larger number and then count back in 10s practically moving a ten away each time. E.g. 42 - 20 = 22 42 32 22	Ch. will move onto subtract multiples of ten by jumping up on a hundred square. E.g. $63 - 20 = 43$	Ch. will be able to record their calculation using numerals using their knowledge of counting back in tens mentally. E.g. 74 - 20 = 54 Counting 746454 Or subtract the tens digits before putting the one back in. 70 - 20 = 50 so 74 - 20 = 54			
Ch. can move onto using this method with place value counters. E.g. $22 + 20 =$ 42 42 32 22 10 1 10 1 10 1 10 1 10 1 10 1 10 10 1 10 1 10 1 10 10 1 10 1 10 1 10 1 10 10 10	Ch. can also use a number line to show that they can count back in 10s. E.g. 78 – 30 = 48	They will be able to look for and describe patterns. E.g. When I subtract multiples of 10 the ones digit stays the same 92 - 10 = 82 92 - 20 = 72 92 - 30 = 62 928272			

Subtraction 7- Subtracting a 2-digit from a 2-digit number using base ten/ partitioning					
Concrete	Pictorial	Abstract			
Ch. subtract two 2-digit numbers using base ten equipment. They make the larger number and remove the smaller number. They count how many they have left. E.g. 86 - 24 = 62	Ch. represent tens and ones by drawing lines and dots. Ch. count the tens then the ones to find the total. E.g. $46 + 12 = 58$ 53 - 12 = 58 IIII*•	Ch. partition the smaller numbers. They subtract the tens from the larger number, then the ones. They use their knowledge of counting back in tens. E.g. $78 - 34 = 44$ 78 - 34 = 44 78 - 30 = 48 48 - 4 = 44			
Ch. may place their base ten onto a calculation mat. If they ones total more than 10 they regroup them for one stick of ten. E.g. $67 - 24 = 43$	Ch. may also represent this by drawing it on a calculation mat. If they need to remove more ones than they have, they cross out a stick of ten and replace it with ten ones E.g. $53 - 17 = 36$	If when subtracting the ones it crosses the ten boundary ch. partition the 1-digit number if crossing over a ten boundary. They may need to use a jotting to for the last step. E.g. 52 - 27 = 25 52 - 27 = 25 $52 - 27 = 25$ $52 - 27 = 25$ $52 - 27 = 25$ $32 - 7 = 25$			

Subtraction 8 – Subtracting **mentally**/ Choosing **most efficient method**

- Ch. can choose the most efficient methods to solve a calculation. (E.g. when subtracting 56 from 62 they would calculate the difference).
- Where possible ch. can solve subtraction calculations mentally, drawing on known facts to improve their speed and accuracy. They may use jottings to support them.
- Ch. can explain how they have reached their answer and the reasons for using their chosen method. Ch. are also able to estimate and use the inverse calculation to check their answer is correct.

Running throughout- Conceptual variation

Ch. can solve subtraction calculations using a range of equipment, when shown in a variety of representations, using different vocabulary and in a range of contexts. (e.g. missing number, word problems and tables)

Examples for solving 68 - 24 could include...

68			Calculate the difference	
\varkappa		Raj spent £68, Timmy spent	between 67 and 59.	What is missing?
? 24		£24.	? = 67 - 59	_ = 34 - 20
68		How much more did Raj spend?		24 - 34 -
24	?			24 - 34

MULTIPLICATION

EYFS/ National Curriculum

Foundation Stage	Year 1	Year 2
 Solve problems including doubling, halving and sharing 	 Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher 	 Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

Key Vocabulary

Double, times, multiplied by, groups of, lots of, equal groups, equal to, repeated addition (product of).

Progression in MULTIPLICATION

1-Doubling

2-Recognise and make equal groups (count all using 1:1 correspondence)

- **3-Count in multiples**
- 4-Repeated addition
- 5-Use arrays (exploring commutativity)
- 6-Multiplying mentally/ recalling and deriving known facts

Running throughout- Conceptual and procedural variation

Multiplication 1- Doubling				
Concrete	Pictorial	Abstract		
Ch. make a number using cubes twice and count how many they have altogether. E.g. double 4 is 8	Ch. draw pictures to show how they double a number. E.g. double 4 is 8	Ch. partition a number into tens and ones. They double each part and then add the totals. E.g. double 16 is 32 16 10 6 10 10 6 20 12 double 16 is 32		
Ch. may use a variety of objects to practically double; such as counters, play dough or shells. E.g. double 3 is 6	Ch. may use other picture visuals such as ladybirds, butterfly's or dominos to encourage them to realise a double means to add the same number twice. E.g. double 2 is 4	Ch. may be able to recall doubles mentally, particularly doubles to 20. Ch. can quickly recall orally; Double 5 is 10 Double 6 is 12 Double 7 is 14		

Multiplication 2- Recognise and make **equal groups** (count all using 1:1 correspondence)

Concrete	Pictorial	Abstract
Ch. begin by using cubes to make equal groups. They recognise that each group must have the same amount in. Once they have made the groups they count how many they have in total. E.g. I have 3 equal groups with 3 in each I have 3 equal groups of 3	Ch. can draw equal groups. They can say how many equal groups they have drawn as well as saying how many are in a group and how many times they have it. E.g. I have 4 equal groups of 5	Ch. can read statements and understand that the x symbol means lots of/times. E.g. 2 x 3 Child would read 2 x3 as 2, 3 times
I have 3, 3 times	Ch. can recognise when groups are equal from a set of pictures. I.e. there are three equal groups with four in each	

Multiplication 3- Count in multiples							
Concrete	Pictorial	Abstract					
Ch. can count in multiples supported by cubes arranged in equal groups. E.g. 2, 4 times 2468	Ch. use visual aids to support them counting in multiples, such as socks for 2's, hands for 5's and 10ps for 10's. E.g. 2, 3 times 246	Ch. can count in multiples aloud. E.g. counting in 5s Counting in 5s 5101520					
Ch. embed this using a range of practical objects. E.g. 5, 3 times	They may also represent this on a number line. E.g. 5, 6 times	They may use a hundred square to highlight the numbers and look for patterns when counting. E.g. counting in 5s					
		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50					
		All the numbers end in 5 or 0					

Multiplication 4- Repeated addition

Concrete	Pictorial	Abstract
Ch. continue to practically make equal groups. They can explain that they are adding the same number each time. E.g. to work out 4, 3 times I do 4 + 4 + 4	Ch. move onto represent the practical resources by drawing a picture. They may put this into a number line. E.g. 4, 3 times is 12	Ch. can rewrite multiplication statements as repeated addition sentences. E.g. 5, 6 times
	100001000100001 0 4 8 12	5 x 6 = 5 + 5 + 5 + 5 + 5 + 5
Ch. may use numicon or Cuisenaire rods alongside a number line to show that they can repeatedly add the same number. E.g. 4 + 4 + 4=16	Ch. could also represent this on numbered number line. E.g. 5, 3 times is 15	They may also show this on an empty number line. E.g. 4 x 3 = 12
	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	
	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	

Multiplication 5- Use arrays (exploring commutativity)

Concrete	Pictorial	Abstract
Ch. can make a multiplication statement using cubes and arranging them into rows and columns. E.g. 3 x 5 or 5 x 3	Ch. draw circles to represent the cubes. E.g. 5 x 2 or 2 x 5	Ch. have are able to use arrays to calculate multiplication statements. E.g. to calculate 5 x 6 ch. would draw
		0 5 0 10 0 15 0 20 0 25 0 30
Ch. may do this using counters also. E.g. 4 x 6 or 6 x 4	Ch. can write multiplication statements when shown an array pictorially. E.g. 4 x 5 or 5 x 4	They recognise that multiplication can be done in any order and the answer will be the same.
	4 x 5 and 5 x 4	$0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$

Multiplication 6 – Multiplying mentally/ recalling and deriving known facts

- Ch. can choose the most efficient methods to solve a calculation. (E.g. when multiplying 7 by 5 they would know their answer must end in a 5 or a 0)
- Where possible ch. can solve multiplication calculations mentally, drawing on known facts to improve their speed and accuracy. They may use jottings to support them. (E.g. if they know 10 x 5 = 50 they could use that to work out that 10 x 6 = 60)
- Ch. can explain how they have reached their answer and the reasons for using their chosen method. Ch. are also able to estimate and use the inverse calculation to check their answer is correct.

Running throughout- Conceptual variation

Ch. can solve multiplication calculations using a range of equipment, when shown in a variety of representations, using different vocabulary and in a range of contexts. (E.g. missing number, word problems and tables)

Examples for solving 5 x 6 could include...

5 5 5 5 5	Mai had to swim 5 lengths, 6 times a week. How many lengths did she swim in one week?		Wh	at is	mise	sing	?
?	With the counters, prove that $5 \times 6 = 30$	5	_	15	_	_	30

DIVISION

EYFS/ National Curriculum

Foundation Stage	Year 1	Year 2			
 Solve problems including doubling, halving and sharing 	 Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. Recognise, find and name a half as one of two equal parts of a quantity (linked with fractions) 	 Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts 			

Key Vocabulary

Share, group, divide, divide by, half, equal to, repeated subtraction.

Progression in DIVISION

- 1-Halving
- 2-Sharing
- 3-Grouping
- **4-Repeated subtraction**
- 5-Dividing with **remainders**

6-Dividing mentally/ recalling and deriving known facts

Running throughout- Conceptual and procedural variation

Division 1- Halving									
Concrete	Pictorial	Abstract							
Ch. make a number using cubes. They split the cubes into two equal piles and count how many are in one. E.g. half of 10 is 5	Ch. draw pictures to show how they half a number. E.g. half of 10 is 5	Ch. partition a number into tens and ones. They half each part and then add the totals. E.g. half of 28 is 14 $\begin{array}{r} 28\\ 20\\ 1\\ 10\\ 4\\ 10\\ 4\\ 10\end{array}$							
Ch. may use a variety of objects to practically half; such as counters, play dough, money or shells. E.g. half of 8 is 4	Ch. may use other picture visuals such as ladybirds, food or dominos to encourage them to realise to half means to spilt into two equal parts. E.g. half of 4 is 2	Ch. may be able to recall doubles mentally, particularly doubles to 20. Ch. can quickly recall orally; Half of 8 is 4 Half of 10 is 5 Half of 12 is 6							

Concrete	Pictorial	Abstract		
Ch. make an amount using cubes. They share them into a given number of equal piles, putting one out at a time. They may begin by sharing them between people. E.g. 6 ÷ 2= 3	Ch. draw dots to represent the cubes. They draw circles for the number they are dividing by and put a dot in each circle in turn until they have run out. E.g. $15 \div 3$ $15 \div 3 = 5$ 5 5 5 5 5 5 5	Ch. can recall division facts for key divisors (2, 5 and 10). Ch. can calculate mentally 15 ÷ 5 = 3 20 ÷ 5 =4		
Ch. may do this with other objects such as sharing into bowls, pots or circles. E.g. 12 $\div 3 = 4$	Ch. may have a picture of objects and have to share them between a given amount. They may draw lines to show where the objects go. E.g. 10 ÷ 2	Ch. are encouraged to use times tables facts to check their answer is correct. I.e. 20 ÷ 10		
	Share the scissors equally into the pots.	20 ÷ 10 =2 20 ÷ 2 = 10		

Division	3 -	Grouping
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Concrete	Pictorial	Abstract		
Ch. make an amount using cubes. They put them into equal groups of the number they are dividing by. Finally they count how many groups they have. E.g. 10 ÷ 2= 5	Ch. draw dots to represent the amount they are dividing. They put the dots into groups and count how many groups they can make. E.g. 10 ÷ 2= 5	Ch. can recall division facts for key divisors (2, 5 and 10). Ch. can calculate mentally 15 ÷ 5 = 3		
	I have made 5 groups.	20 ÷ 5 =4		
Ch. may do this with other objects such as numicon. E.g. 12 ÷ 3 = 4	Ch. may use a number line to show groups as jumps. The number of jumps equals the number of groups. E.g. 12 ÷ 3 = 4	Ch. are encouraged to use times tables facts to check their answer is correct. E.g. 20 ÷ 10		
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$20 \div 10 = 2$ $20 \div 2 = 10$		
0000000				

Division 4 - Repeated subtraction							
Concrete	Pictorial	Abstract					
Ch. recognise that you can divide by repeatedly subtracting. They use Cuisenaire rods alongside a ruler to show their calculation. E.g. $6 \div 2 = 3$	Ch. represent this pictorially using a numbered number line. E.g. $6 \div 2 = 3$	Ch. move onto being able to subtract mentally by counting back in steps. E.g. 6 ÷ 2 = 3 Ch. can say mentally 6420 I have taken 3 groups of 2 away.					
Ch. could also do this using cubes. E.g. 6 $\div 2 = 3$	They may do this using an empty number line. E.g. $6 \div 2 = 3$						

Division 5 - Dividing with remainders							
Concrete	Pictorial	Abstract					
Ch. can use their preferred method (dividing by grouping or sharing) to divide with remainders. They make the amount using cube and then arrange into sharing circles or groups. E.g. $16 \div 3 = 5r1$ Sharing: Grouping:	The ch. progress to recording this using dots. E.g. $16 \div 3 = 5r1$ Sharing: Sharing: Grouping: Ch. can also do this on a number line, jumping forward in steps. E.g. $12 \div 4 = 3$ +4 + 4 + 4 4 + 4 + 4	Ch. use their knowledge of division ad multiplication to predict whether a calculation will have a remainder. When given the calculation 27 ÷ 5 = The ch. will say It will have a remainder because it doesn't end in 5 or 0					

Division 5 – Dividing mentally/ recalling and deriving known facts

- Ch. can choose the most efficient methods to solve a calculation. (E.g. when dividing 21 by 5 they would know their is a remainder because it is not a multiple of 5)
- Where possible ch. can solve division calculations mentally, drawing on known multiplication facts to improve their speed and accuracy. They may use jottings to support them.
- Ch. can explain how they have reached their answer and the reasons for using their chosen method. Ch. are also able to estimate and use the inverse calculation to check their answer is correct.

Running throughout- Conceptual variation

Ch. can solve division calculations using a range of equipment, when shown in a variety of representations, using different vocabulary and in a range of contexts. (E.g. missing number, word problems and tables)

Examples for solving 30 ÷ 5 could include...

With 12 matchsticks					
l can make:					
triangles 🛆					
squares 🗌					
pentagons 🔶					

I have £30 and share it equally between purses. How much will be in each purse?

20p + 10p **is the same as** ____ 5ps

Models and images used across school

	Objects	pictures	10 frame/	Number track	Number	Missing	Part-part-	Cubes/counters	Base 10
			numicon		line	boxes	whole		
	5 ⁸ 83			6 8 10	< <u>++++++++</u> +		4 3		
Foundation							In summer		
Year 1									
Year 2									

	Digit cards	Bead strings	straws	100	Arrays	Place value	Bar model	Fraction of shapes
				square		grids		
	4 5	5	A A		••••		? 2,354 750 1,500	
Foundation								
Year 1								
Year 2								