KS4 Maths

Properties of number including addition, subtraction and early algebra

Subject curriculum intent:	This half term, pupils will develop their core number skills through counting, partitioning, adding and subtracting. Mathematic lessons will that where the pupil is at; building on knowledge and skills gained in KS3. Throughout the academic year, they will continue to develop, use and apply their number skills in all other mathematical topics. For example, statistics, measure, multiplication. There will always be a key link to number skills. In addition to this, pupils will also be using and applying their number skills in other areas of the curriculum but also in their day to day lives as functional maths skills. **Pupils:** 1. develop **fluency** in the fundamentals of mathematics so that they are efficient in using and selecting the appropriate strategies to **calculate number problems** including mental methods, underpinned by mathematical concepts 2. can **solve problems by** applying their mathematics to a variety of problems with increasing sophistication, including in unfamiliar contexts and to model real-life scenarios 3. can **reason mathematically** by following a line of enquiry and develop and present a justification, argument or proof using mathematical language. **In all math lessons, teachers plan engaging lessons with the aim that pupils:** • master skills in maths which they are then able to apply to a range of contexts within the school and home context • embed their new skills and understanding to a range of contexts; thus supporting application and progress in learning • acquire core mathematical skills to support their independence as they progress through the school • are able to apply their understanding; supporting them in other areas of the curriculum

End of KS3 intent/outcome	End of KS4 intent/outcome	End of KS5 intent/outcome
Pupils will revisit number skills from the previous year. They will use identified strategies that utilise concrete and pictorial representation to be able to master these skills. Pupils will be introduced to conceptual and procedural variation to support them in using and applying their number skills in different ways.	Pupils will revisit their number skills from the previous year, ensuring they have maintained skills. Pupils will revisit the topics within number at higher 'levels' where the knowledge and skills related to the number topic are more complex. Pupils will also be using and applying their number skills in other areas of the vocational curriculum such as in café baking.	Pupils will use and apply their number skills in functional ways, ready for adulthood as they are approaching the end of their time at North Ridge. For example, pupils will be calculating stock needed in the café, shop and manufacturing as well as calculating the number of items needed when shopping for items in the super market.

Intent for this topic:	We want our pupils to develop functional number skillls throughout their time at North Ridge. Whatever the ability of the pupil, we want them to be able to use and apply their core number skills in a range of ways to support them in being as independent as possible. This may be being able to count required items in a shopping list, pack items of clothing for a trip away, setting the table and so on.

Key vocabulary taught within this topic:	Number, count, more than, less than, how many?, quantity, add, addition, subtract, subtraction, minus, plus, equal, number sentence, ~~partition, tens, ones, hundreds, thousands, sum, total, altogether~~ + - = < >
Links to other subjects:	-Café baking -DofE -P.E -Design Technology -Science Note: number skills are built on throughout the school day, including being in every-day routines.

Number: number and place value

	B2 P 5	B2 P 6-8	B2step 1c-1b	B2Step 1b-2c	B2Step 2c-2a	B2Step 2a-3a
Subject specific knowledge **What do pupils need to know?**	To know numbers to 5 inc. their name and shape To know the order of numbers to 5 To know to only touch each object once as they count To know re-arranging objects does not change the quantity To know the last number counted represents the total number of objects	To know numbers to 10 inc. their name and shape (then numbers to 20 – PS8) To know the order of numbers to 10 (then numbers to 20 – PS8) To know one more and one less of a given number 1-20 To know ordinal numbers 1st 2nd and 3rd	To know the order of numbers 1-20 To know key words 'more' and 'less' To know one more and one less of a given number 1-20 To know which direction to move along the number line to find one more and one less of a number	To know numbers 1-100 including their name and shape To know 2s, 5s and 10s times tables; counting on and knowing their corresponding multiplication number sentences To know and use the language 'equal to, more than and less than (fewer) correctly	To know 3s, 4s and 6s times tables; counting on and their corresponding multiplication number sentence.. To know how many tens and ones a 2-digit number has. To know comparative symbols: < = and >	To know 7, 8, 50 and 100 times tables. To know 10 or 100 more and less than a given number; knowing to use partitioning method or times tables To know and identify any 3 digit/4-digit number. To know how many hundreds tens and ones are needed for a 3-digit

						number **HTO** <u>To know</u> how many thousands, hundreds ,tens and ones are needed for a 4-digit number **ThHTO**
<u>Subject specific skills</u> **What do pupils need to be able to do?**	<u>Is able to</u> rote count to 5 fluently <u>Is able to</u> count given quantities to 5 <u>Is able to</u> count out a quantity asked for to 5 <u>Is able to</u> find numbers to 5 <u>Is able to</u> represent numbers to 5 using objects or fingers <u>Is able to</u> write numbers to 5	<u>Is able to</u> count to 10 fluently (then to 20) <u>Is able to</u> identify any mistakes when counting or recognise a missing number <u>Is able to</u> order a full set of numbers to 10 (then 20) <u>Is able to</u> order a random set of numbers to 10 e.g. 2-6-10 (then to 20) <u>Is able to</u> state the order of objects in a range of scenarios e.g. I came 1st in the race	<u>Is able to</u> read and write numerals to 20 <u>Is able to</u> represent numbers using quantity of objects <u>Is able to</u> move forwards and backwards along a number line	<u>Is able to</u> count to 100 <u>Is able to</u> count forwards and backwards from any given number <u>Is able to</u> read and write any numeral 1-100 <u>Is able to</u> count in multiples of 2s, 5s, and 10s	Is able to count in 3s, 4s and 6s; starting from 0. <u>Is able to</u> partition tens and ones in a 2 digit number. **TO** <u>Is able to</u> count forwards and backwards in 10s from any number <u>Is able to</u> compare and order numbers 0-100 using: < > = symbols	<u>Is able to</u> count 7, 8, 50 and 100 times tables. <u>Is able to</u> count 10 or 100 more and less than a given number. <u>Is able to</u> read and write numbers to 1000 (including words) <u>Is able to</u> compare and order 3-4 digit numbers using words and mathematical symbols

Suggested teaching activities	Counting songs Counting stories Passing objects around the classroom Collecting and counting items needed for a task Statistics – sorting and counting information	Counting songs/stories Numicon number lines Ordering number cards Counting food harvested from the allotment Numicon Statistics – sorting and counting information Counting how many items sold at Café baking / how many customers entered the café.	Numicon number lines Number flashcards Write numbers in foam/sand/gloop Collecting correct number of objects/leaves/fruit/veg Statistics – sorting and counting information	Number square – find the number game Count on using fingers (large number in head and count on small number using fingers) Timetable songs/storiesCounting wheels on number of bikes (x2) representing times tables visually Give a colour / shape a specific number e.g. 2 = green …. Count up in 2s for number of green balls found- link to multiples Statistics – sorting and counting information	Counting wheels on bike (x2) lights on traffic light (x3) or wheels on car (x4) – visual representation of timetables Number squares to count on and backwards in 10s and find patterns Overlapping partition cards ITP partitioning (google) Crocodile teeth for < and > symbols Count crop from two different patches/bushes/plants. Decide which has more/less using '< and >' symbols Count down timer in 10s from given number to find object in the room – competition Numicon	Place value counters Cuisenaire

Number: addition and subtraction

	B2 P 5	B2 P 6-8	B2step 1c-1b	B2Step 1b-2c	B2Step 2c-2a	B2Step 2a-3a
Subject specific knowledge **What do pupils need to know?**	To know and be familiar with the word 'add' To know 'add' means the same as 'more'	To know symbols: +, - & =, To know to count altogether / how many left **after** a	To know what a number bond is To know and recall all number bonds to 10	To know and recall all number bonds to 20 To know how to use the counting on method (for either	To know addition of numbers can be done in any order To know the inverse of addition	To know how to use formal written methods for addition and subtraction of 3 or 4 digit numbers

	To know and be familiar with the word 'take' To know and be familiar with the word 'subtract' To know 'subtract/take' means the same as 'less' To be familiar with appearance of symbols + and -	calculation using concrete resources To know to count on from first number being added (not starting from the beginning) To know to count on from the largest number being added (for efficiency)	To know what strategy to use to calculate a missing number bond. e.g. 7 + ? = 10	addition or subtraction) e.g. 11 + 7 = 12,13,14,15,16,17,18 Or 21 – 19 = 20,21 (=2) To know how to use the counting backwards method for subtraction To know which strategy to use to calculate an addition or subtraction number sentence and which is the most efficient.	is subtractionand vice versa	**ThHTO** (right to left)
Subject specific skills **What do pupils need to be able to do?**	Is able to connect (add) cubes to a tower Is able to take off (subtract) cubes from a tower Is able to place more items onto a pile Is able to remove items from a pile Is able to pick up numerous objects when asked for 2 (understanding it is more than one)	Is able to use concrete resources, to add two single digit numbers Is able to use language: add, subtract, more, less, altogether Is able to count on to calculate addition of two single digits Is able to remove an and objects and count how many now to 10 Is able to read an addition / subtraction number sentence	Is able to read and write number sentence using the correct symbols (+, - and =) Is able to represent number bonds to 10 using a variety of concrete resources. Is able to add and subtract one digits numbers from 1-2 digit number to 20	Is able to represent number bonds to 20 Is able to add and subtract 1-2 digit numbers from 1-2 digit numbers to 20 including 0 Is able to solve one step problems in number sentences e.g. 7 = 9 - ? Is able to solve one step worded problems	Is able to add and subtract: - 1digit from 2digit or 2digit from 2digit e.g.: 63 – 9 = 75 + 21 = Is able to solve simple problems using mental arithmetic Is able to solve addition and subtraction problems using pictorial / jotting methods independently	Is able to use mental arithmetic to add and subtract: 3/4-digit numbers and ones, 3-digit number and tens, 3/4-digit number and hundreds e.g. 514 + 200 Is able to use formal written methods for addition and subtraction of 3 digit numbers **ThHTO**

		Is able to represent a calculation using a simple addition/subtraction number sentence. (P8-1C)			Is able to use knowledge inverse of addition and subtraction to find missing numbers in a number sentence (early algebra)	Is able to estimate calculations Is able to use inverse operations to check answers Is able to solve problems including: missing number, number facts and place value (early algebra)

Suggested teaching activities	Make towers by adding bricks together Destroy towers by taking bricks away Collect MORE leaves/fruit/veg/soil from outside Placing more items into showing trolley Taking items out of a showing trolley "add" or "subtract"balls into ball suction tube	Adding objects together (can be done using leaves/fruit/veg) Use addition box to add objects Add numicon pieces together Use fingers to count on Frog jumps on number line (on floor or numicon number line) Subtraction dentist teeth Subtract number of leaves/veg/fruit from a patch Algebra number sentences Statistics – combining information / comparing information	Numberbond rainbow Numicon pieces to represent number bonds to 10 (photocopy 10 piece for underneath) Bead strings for number bonds – can make bead string using large seeds Subtract objects Frog jumps backwards on numberline Create number sentences with shape blocks Statistics – combining information / comparing information	Numicon numberbonds to 20 Numicon addition/subtraction Frog jumps on number line Create number bonds with shape blocks	Place value counters Cuisenaire Early algebra number sentences	Place value counters Cuisenaire Early algebra number sentences