# KS3 Maths
## Properties of number including addition, subtraction and early algebra skills

| Subject curriculum intent: | This half term, pupils will develop their core number skills through counting, partitioning, adding and subtracting. 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. <br><br>**Pupils:**<br>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<br>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<br>3. can **reason mathematically** by following a line of enquiry and develop and present a justification, argument or proof using mathematical language.<br><br>**In all math lessons, teachers plan engaging lessons with the aim that pupils:**<br>• master skills in maths which they are then able to apply to a range of contexts within the school and home context<br>• embed their new skills and understanding to a range of contexts; thus supporting application and progress in learning<br>• acquire core mathematical skills to support their independence as they progress through the school<br>• 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<br><br>+ - = < > |
|---|---|
| Links to other subjects: | -Food technology<br>-P.E<br>-Design Technology<br>-Science<br>Note: number skills are built on throughout the school day, including being in every-day routines. |

**Suggested flow:**

**This flow is to be used as a guide. Teachers to adapt the flow to meet the needs and abilities of students within their class.**

| Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 |
|---|---|---|---|---|---|
| Pre-assessment. What knowledge and skills do pupils already have?<br><br>Making amounts/ordering numbers. | **Partitioning**<br><br>Partition 2/3-digit numbers.<br><br>Understanding hundreds, tens and ones. | **Addition**<br><br>Finding 1 more of a given number.<br><br>Adding 1-digit numbers to 2-digit numbers.<br><br>Using number lines.<br><br>Include number bonds. | | **Subtraction**<br><br>Finding 1 less of a given number.<br><br>Subtracting 1-digit numbers from 2-digit numbers.<br><br>Using number lines. | |
| Early algebra skills | STEM sentences | Addition skills<br>Early algebra skills | | Subtraction skills<br>Early statistic skills | |

## Number: number and place value

| | B2 PS 1 | B2 PS 2 | B2 PS 3 | B2 PS 4 | B2 PS 5 | B2 PS 6 |
|---|---|---|---|---|---|---|
| **Subject specific knowledge**<br><br>**What do pupils need to know?** | To know numbers to 5 inc. their name and shape<br><br>To know the order of numbers to 5<br><br>To know to only touch each object once as they count<br><br>To know re-arranging objects does not change the quantity<br><br>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 – PS2)<br><br>To know the order of numbers to 10 (then numbers to 20 – PS2)<br><br>To know one more and one less of a given number 1-20<br><br>To know ordinal numbers 1st 2nd and 3rd | To know the order of numbers 1-20<br><br>To know key words 'more' and 'less'<br><br>To know one more and one less of a given number 1-20<br><br>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<br><br>To know 2s, 5s and 10s times tables; counting on and knowing their corresponding multiplication number sentences<br><br>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..<br><br>To know how many tens and ones a 2-digit number has.<br><br>To know comparative symbols: < = and > | To know 7, 8, 50 and 100 times tables.<br><br>To know 10 or 100 more and less than a given number; knowing to use partitioning method or times tables<br><br>To know and identify any 3 digit/4-digit number.<br><br>To know how many hundreds tens and ones are needed for a 3-digit number **HTO**<br><br>To know how many thousands, hundreds ,tens and ones are needed for a 4-digit number **ThHTO** |

| Subject specific skills

What do pupils need to be able to do? | Is able to rote count to 5 fluently

Is able to count given quantities to 5

Is able to count out a quantity asked for to 5

Is able to find numbers to 5

Is able to represent numbers to 5 using objects or fingers

Is able to write numbers to 5 | Is able to count to 10 fluently (then to 20)

Is able to identify any mistakes when counting or recognise a missing number

Is able to order a full set of numbers to 10 (then 20)

Is able to order a random set of numbers to 10 e.g. 2-6-10 (then to 20)

Is able to state the order of objects in a range of scenarios e.g. I came 1st in the race | Is able to read and write numerals to 20

Is able to represent numbers using quantity of objects

Is able to move forwards and backwards along a number line | Is able to count to 100

Is able to count forwards and backwards from any given number

Is able to read and write any numeral 1-100

Is able to count in multiples of 2s, 5s, and 10s | Is able to count in 3s, 4s and 6s; starting from 0.

Is able to partition tens and ones in a 2 digit number.
**TO**

Is able to count forwards and backwards in 10s from any number

Is able to compare and order numbers 0-100 using: < > = symbols | Is able to count 7, 8, 50 and 100 times tables.

Is able to count 10 or 100 more and less than a given number.

Is able to read and write numbers to 1000 (including words)

Is able to compare and order 3-4 digit numbers using words and mathematical symbols |
|---|---|---|---|---|---|---|

| | |
|---|---|
| **Suggested teaching activities** | Counting songs<br>Counting stories<br>Passing objects around the classroom<br>Collecting up to 2 leaves/fruit/veg<br>Count number of coloured balls<br>Counting out plates / cups etc for the table<br>Statistics – sorting and counting information<br>Ordering number cards<br>Collecting correct number of objects/leaves/fruit/veg<br>Counting food harvested/grown on plant<br>Count number of circles/squares/triangles in the room<br>Write numbers in foam/sand/gloop<br>Collecting correct number of objects/leaves/fruit/veg<br>Statistics – sorting and counting information<br>Number square – find the number game<br>Count on using fingers (large number in head and count on small number using fingers)<br>Crocodile teeth for < and > symbols<br>Count crop from two different patches/bushes/plants. Decide which has more/less using '< and >' symbols<br>Numicon<br>Place value counters<br>Cuisenaire |

# Number: addition and subtraction

| | B2 PS 1 | B2 PS 2 | B2 PS 3 | B2 PS 4 | B2 PS 5 | B2 PS 6 |
|---|---|---|---|---|---|---|
| **Subject specific knowledge**<br><br>**What do pupils need to know?** | To know and be familiar with the word 'add'<br><br>To know 'add' means the same as 'more'<br><br>To know and be familiar with the word 'take'<br><br>To know and be familiar with the word 'subtract'<br><br>To know 'subtract/take' means the same as 'less'<br><br>To be familiar with appearance of symbols + and - | To know symbols: +, - & =,<br><br>To know to count altogether / how many left **after** a calculation using concrete resources<br><br>To know to count on from first number being added (not starting from the beginning)<br><br>To know to count on from the largest number being added (for efficiency) | To know what a number bond is<br><br>To know and recall all number bonds to 10<br><br>To know what strategy to use to calculate a missing number bond.<br>e.g. 7 + ? = 10 | To know and recall all number bonds to 20<br><br>To know how to use the counting on method (for either addition or subtraction)<br>e.g. 11 + 7 = 12,13,14,15,16,17,18<br><br>Or 21 – 19 = 20,21 (=2)<br><br>To know how to use the counting backwards method for subtraction<br><br>To know which strategy to use to calculate an addition or subtraction number sentence and which is the most efficient. | To know addition of numbers can be done in any order<br><br>To know the inverse of addition is subtraction and vice versa | To know how to use formal written methods for addition and subtraction of 3 or 4 digit numbers **ThHTO** (right to left) |
| **Subject specific skills**<br><br>**What do pupils need to be able to do?** | Is able to connect (add) cubes to a tower<br><br>Is able to take off (subtract) cubes from a tower | Is able to use concrete resources, to add two single digit numbers<br><br>Is able to use language: add, subtract, more, less, altogether | Is able to read and write number sentence using the correct symbols (+, - and =)<br><br>Is able to represent number bonds to 10 | Is able to represent number bonds to 20<br><br>Is able to add and subtract 1-2 digit numbers from 1-2 digit numbers to 20 including 0 | Is able to add and subtract:<br>- 1digit from 2digit or 2digit from 2digit<br>e.g.: 63 – 9 = 75 + 21 = | Is able to use mental arithmetic to add and subtract:<br>3/4-digit numbers and ones, 3-digit number and tens, 3/4-digit number and hundreds |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Is able to place more items onto a pile<br><br>Is able to remove items from a pile<br><br>Is able to pick up numerous objects when asked for 2 (understanding it is more than one) | Is able to count on to calculate addition of two single digits<br><br>Is able to remove an and objects and count how many now to 10<br><br>Is able to read an addition / subtraction number sentence<br><br>Is able to represent a calculation using a simple addition/subtraction number sentence. (P8-1C) | using a variety of concrete resources.<br><br>Is able to add and subtract one digits numbers from 1-2 digit number to 20 | Is able to solve one step problems in number sentences e.g. 7 = 9 - ?<br><br>Is able to solve one step worded problems | Is able to solve simple problems using mental arithmetic<br><br>Is able to solve addition and subtraction problems using pictorial / jotting methods independently<br><br>Is able to use knowledge inverse of addition and subtraction to find missing numbers in a number sentence (early algebra) | e.g. 514 + 200<br><br>Is able to use formal written methods for addition and subtraction of 3 digit numbers **ThHTO**<br><br>Is able to estimate calculations<br><br>Is able to use inverse operations to check answers<br><br>Is able to solve problems including: missing number, number facts and place value (early algebra) |

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