# North Park Primary School


## Years 4, 5 and 6

## A Guide for Parents

At North Park Primary, we believe that children should be confident and proficient mathematicians. We have a 'Can do' attitude towards maths and the support of parents in developing this is crucial. When working together as a partnership, parents and school can foster an enthusiasm in maths to support children in their mathematical self-belief. At North Park Primary we follow the White Rose Maths Hub schemes of learning.

When planning lessons, teachers follow the cycle of 'concrete', pictorial, abstract' (CPA approach) and this guidance aims to set out examples of how we develop children's skills of addition, subtraction, multiplication and division using this cycle of teaching.

**'Concrete'-** Each skill is often first modelled with concrete materials (e.g. base ten, cubes, cuisenairre rods). This is the "doing stage". During this stage, students use concrete objects to model problems. The CPA approach brings concepts to life by allowing children to experience and handle physical (concrete) objects. For example, if a problem involves adding pieces of fruit, children can use counters or cubes which represent the fruit.

**'Pictorial'-** Pictorial is the "seeing" stage. Here, visual representations of concrete objects are used to model problems. This stage encourages children to make a mental connection between the physical object they just handled and the abstract pictures, diagrams or models that represent the objects from the problem.

**'Abstract'-** Abstract is the "symbolic" stage, where children use abstract symbols to model problems. Students will not progress to this stage until they have demonstrated that they have a solid understanding of the concrete and pictorial stages of the problem. The abstract stage involves the teacher introducing abstract concepts (for example, mathematical symbols). Children are introduced to the concept at a symbolic level, using only numbers, notation, and mathematical symbols (for example, +, –, x, /) to indicate addition, multiplication or division.

# Addition

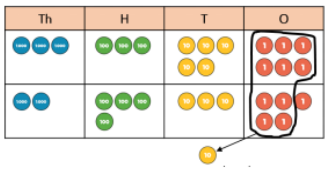
## Year 4

Column method-regrouping, use of place value counters for adding decimals.

**Column method- regrouping (up to 4 digits).**

**Concrete-** Children continue to use base 10 or place value counters to add, exchanging 10 ones for a ten, 10 tens for a hundred, etc.

**Pictorial-** Draw representations using a place value grid, which will then lead to column method.




| | Th | H | T | O |
|---|---|---|---|---|
| | 3 | 3 | 5 | 6 |
| + | 2 | 4 | 3 | 5 |
| | 5 | 7 | 9 | 1 |
| | | | 1 | |

**Abstract-** Continue from previous work to carry hundreds as well as tens. Relate to money and measures.

789 + 642 becomes

| | | | |
|---|---|---|---|
| | 7 | 8 | 9 |
| + | 6 | 4 | 2 |
| 1 | 4 | 3 | 1 |
| | 1 | 1 | |

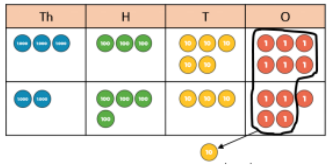
Answer: 1431

## Year 5

Column method- regrouping, use of place value counters for adding decimals.

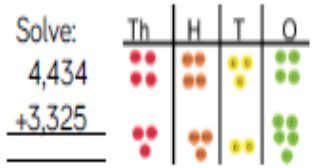
**Column method-regrouping (progressing to more than 4-digits)**

**Concrete-** Children continue to use base 10 or place value counters to add, exchanging 10 ones for a ten, 10 tens for a hundred, etc.




| | Th | H | T | O |
|---|---|---|---|---|
| | 3 | 3 | 5 | 6 |
| + | 2 | 4 | 3 | 5 |
| | 5 | 7 | 9 | 1 |
| | | | 1 | |

**Pictorial/Abstract-** Draw representations using a place value grid, which will then lead to column method.




**Add decimals with 2 decimal places, including money**

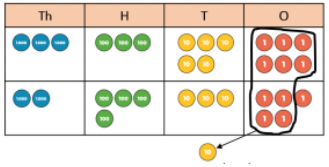
**Concrete-**Introduce decimal place value counters and model exchange for addition.


## Year 6

Column method-regrouping, abstract methods, place value counters to be used for adding decimal numbers.

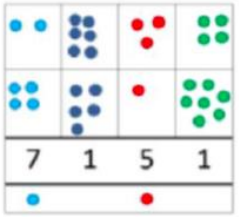
**Column method- regrouping** As year 5, progressing to larger numbers, aiming for both conceptual understanding and procedural fluency with columnar method to be secured.

**Concrete-** Children continue to use base 10 or place value counters to add, exchanging 10 ones for a ten, 10 tens for a hundred, etc.

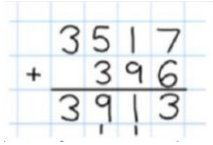



| | Th | H | T | O |
|---|---|---|---|---|
| | 3 | 3 | 5 | 6 |
| + | 2 | 4 | 3 | 5 |
| | 5 | 7 | 9 | 1 |
| | | | 1 | |

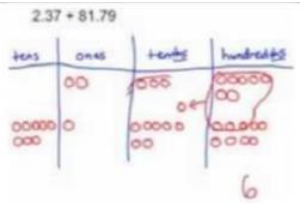
**Pictorial-** Draw representations using a place value grid.



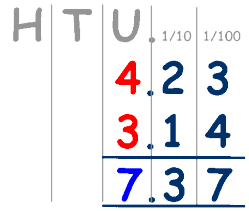

**Abstract-** Continue from previous work to carry hundreds as well as tens.

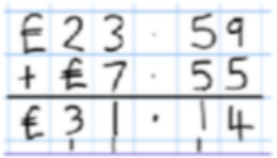


**Pictorial-**




**Abstract-**

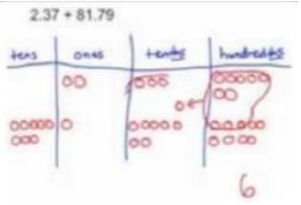



**Add decimals with up to 3 decimal places**

**Concrete-** Continue to use decimal place value counters and model exchange for addition.


**Pictorial-**



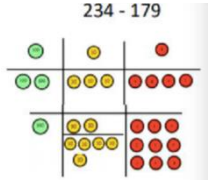
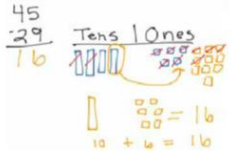
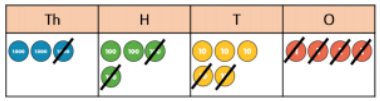
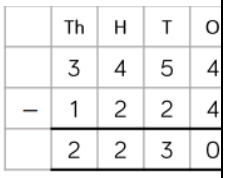
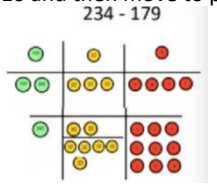
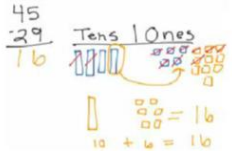
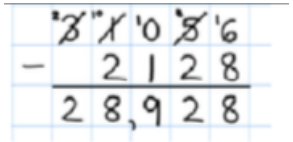
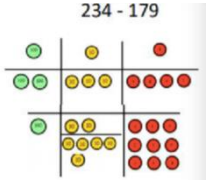
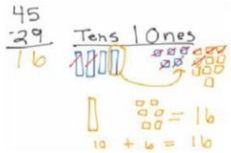
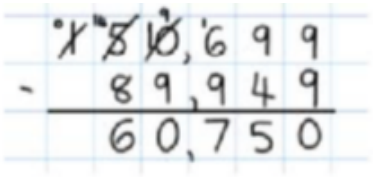

**Abstract-**

| Line up the decimal points | Line up the decimal points |
|---|---|
| 22.3 | 1.234 |
| + 34.1 | + 4.1 |
| 56.4 | 5.334 |

Pupils will also learn to add three decimal numbers.

3.452
9.74
29.338 +

# Subtraction

| Year 4 | Year 5 | Year 6 |
|---|---|---|
| Children will use the column method with regrouping (up to 4 digits). | Children will use the column method with regrouping. They will subtract decimals with the same amount of decimal places. | Column method with regrouping, abstract methods, place value counters for decimals- with different amounts of decimal places. |
| **Column method with regrouping**<br><br>**Concrete-** Model process of exchange using Numicon, base 10 and then move to place value counters.<br>  <br><br>**Pictorial-** Children can draw base 10 or place value counters and cross off.<br>  <br><br>**Abstract-** Use the phrase 'exchange'.<br>  <br>  | **Column method with regrouping**<br><br>**Concrete-** Model process of exchange using Numicon, base 10 and then move to place value counters.<br>  <br><br>**Pictorial-** Children can draw base 10 or place value counters and cross off.<br>  <br><br>**Abstract-**<br>  <br>When subtracting decimals, use zeros for placeholders. | **Column method with regrouping**<br>As year 5, progressing to larger numbers, aiming for both conceptual understanding and procedural fluency with columnar method to be secured.<br><br>**Concrete-** Model process of exchange using Numicon, base 10 and then move to place value counters.<br>  <br><br>**Pictorial-** Children can draw base 10 or place value counters and cross off.<br>  <br><br>**Abstract-**<br>  <br>Continue calculating with decimals, including those with different numbers of decimal places |

874 – 523 becomes

$$\begin{array}{r} 8\ 7\ 4 \\ -\ 5\ 2\ 3 \\ \hline 3\ 5\ 1 \end{array}$$

Answer: 351

932 – 457 becomes

$$\begin{array}{r} {}^{8}\not{9}\ {}^{12}\not{3}\ {}^{1}\not{2} \\ -\ 4\ 5\ 7 \\ \hline 4\ 7\ 5 \end{array}$$

Answer: 475

932 – 457 become

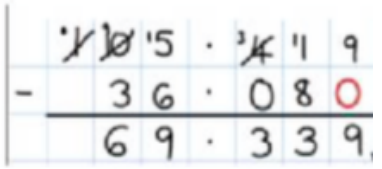
$$\begin{array}{r} {}^{1}9\ 3\ {}^{1}2 \\ -\ \not{4}\ \not{5}\ 7 \\ \hline 4\ 7\ 5 \end{array}$$

Answer: 475

Find the missing numbers.
What methods did you use?

| | |
|---|---|
| 3465 | |
| 2980 | |





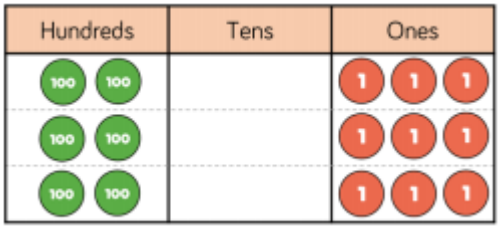

# Multiplication

## Year 4

Column multiplication- introduced with place value counters (2 and 3 digit multiplied by 1 digit)

**Column method (2 and 3 digit multiplied by 1 digit)**

**Concrete-** Begin by using counting objects and resources.
203 x 3=




**Pictorial/Abstract-** Children will draw place value counters and use their knowledge of exchanging ten ones for one ten

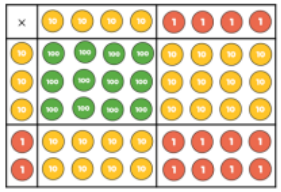
## Year 5

Column multiplication.
Abstract only but might need a repeat of year 4 first(up to 4 digit numbers multiplied by 1 or 2 digits).

**Column method (3 and 4 digits x 1 or 2 digits)**

**Concrete-** Manipulatives may still be used with the corresponding long multiplication modelled alongside.

**Pictorial-** Introduce long multiplication alongside the grid method to show the relationship between the answers in each row.



| × | 40 | 4 |
|---|---|---|
| 30 | 1,200 | 120 |
| 2 | 80 | 8 |

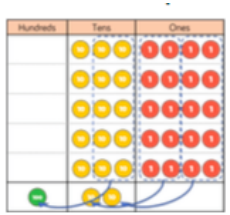
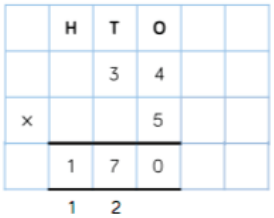
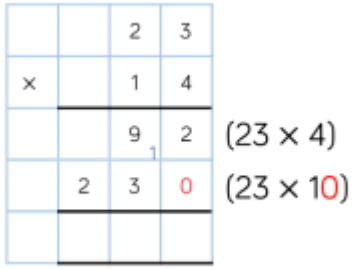
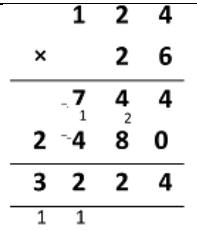
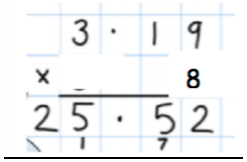
## Year 6

Column multiplication.
Abstract methods (multi-digit up to 4 digits by a 2 digit number).

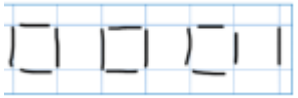
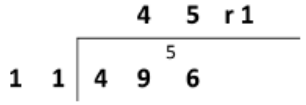
**Column method**

Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the efficient written method of long multiplication.
Start with long multiplication, reminding the children about lining up their numbers clearly in columns.

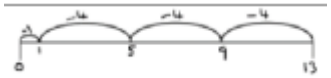
**Compact Vertical Method**

| | | |
|---|---|---|
| in addition and apply this to multiplication, including changing multiples of ten. This will leading to compact vertical method. Eventually multiplying 3-digits by 1:<br>  <br>  <br> | **Abstract**-Progress to using the formal written method for long multiplication.<br>  <br><br>(23 × 4)<br>(23 × 10) |  <br><br>Answer: 3224<br><br>**Multiplying 1 digit numbers with up to 2 decimal places by whole numbers**<br>  <br> |

# Division

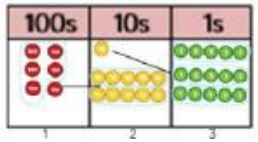
| Year 4 | Year 5 | Year 6 |
|---|---|---|
| Divide up to 3 digit numbers by a 1 digit number (initially without remainders, then with). | Divide up to a 4 digit number by a 1 digit number, including those with remainders. | Divide at least 4 digits by both 1 digit and 2 digit numbers (including decimals). |
| **Division with a remainder**<br>**Concrete-** Use of lollipop sticks to form whole-squares are made because we are dividing by 4. There are 3 whole squares with one left over.<br>  <br>**Pictorial-**Children to represent the lollipop sticks pictorially.<br>  | **Short division (up to 4 digits by a 1 digit number including remainders)**<br>**Concrete-** As year 4 using remainders.<br>**Pictorial/Abstract-**<br>Show the method of short division using place value counters for before introducing short division with and without remainders: | **Short division**<br>As year 5, ensuring that children also exchange into tenths and hundredths column.<br>496 ÷ 11 becomes<br>  <br><br>Answer: $45\frac{1}{11}$<br><br>**Long Division** |

**Abstract**-Children should be encourages to use their times table facts; they could also represent repeated addition on a number line.

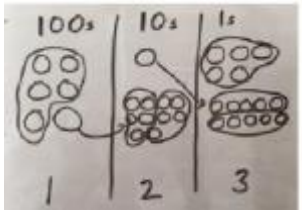


**Division with up to 3 digits by 1digit-concrete and pictorial**

**Concrete**-Use place value counters to group e.g. 615 divided by 5.

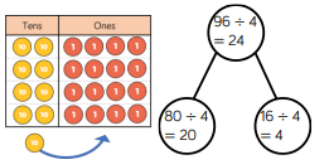



**Pictorial-** Represent the place value counter pictorially.




**Abstract-**

Rosie is calculating 96 divided by 4 using place value counters. First, she divides the tens. She has one ten remaining so she exchanges one ten for ten ones. Then, she divides the ones.

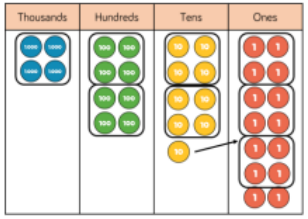


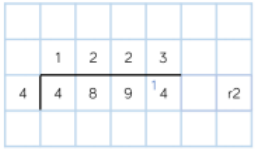


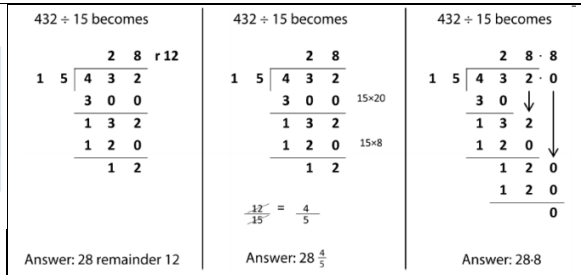


Use Rosie's method to solve
65 ÷ 5
75 ÷ 5
84 ÷ 6

Use the above methods to write answers.

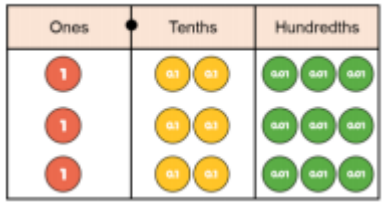


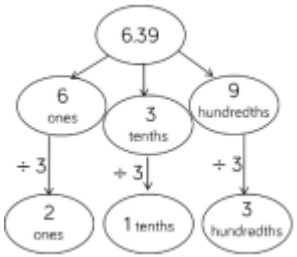




**Dividing decimals**

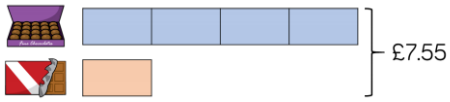
**Concrete-** Use place value counters and group e.g. 3.69 divided by 3




**Pictorial-** Use part-whole and bar models




A box of chocolates costs 4 times as much as a chocolate bar. Together they cost £7.55




**Abstract**-Short division to divide decimals by an integer.