



Maths in LKS2



Calculations Policy for Parents

Wheatcroft Primary School

When teaching Mathematics as Wheatcroft, we intend to use a variety of teaching methods, strategies and resources that support all pupils and allow equal access to Mathematics.

This policy has been created to help you support your child at home with Maths. It shows the progression through different strategies for addition, subtraction, multiplication and division reflecting the Primary National Curriculum (2014). Recording in Mathematics is an important tool both for furthering the understanding of ideas and for communicating those ideas to others. A useful written method is one that helps children carry out a calculation and can be understood by others.

While this policy focuses on written calculation in mathematics, we recognise the importance of mental strategies and known facts that form the basis of all calculations. Pupils are provided with frequent opportunities to compare and evaluate different calculation strategies. This helps them develop an understanding that efficiency is personal and based on the numbers involved. Written methods are complementary to mental methods and should not be seen as separate from them. The aim is that children use mental methods when appropriate, but for calculations that they cannot do in their heads, they use an efficient written method accurately and with confidence.

You can help your child's understanding by using practical methods and experimenting using toys, counters or objects like those illustrated. It is important for children to understand that Maths has a purpose and how it is used in everyday life. You can give them many of these opportunities at home.

Encourage your child to explain what they are doing. This will enhance their mathematical vocabulary as well as helping them to develop deeper understanding through enhancing their reasoning skills.

Addition

Year 3

NC Objectives

- ❖ To add and subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens and three-digit number and hundreds.
- ❖ To add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.
- ❖ To estimate the answer to a calculation and use inverse operations to check answers.
- ❖ To solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.

Models and Examples

Column Addition (expanded)

$$\begin{array}{r} 600 + 50 + 4 \\ + 100 + 20 + 5 \\ \hline 700 + 70 + 9 \\ \hline \end{array} \quad 654 + 125 = 779$$

Column Addition (without regrouping)

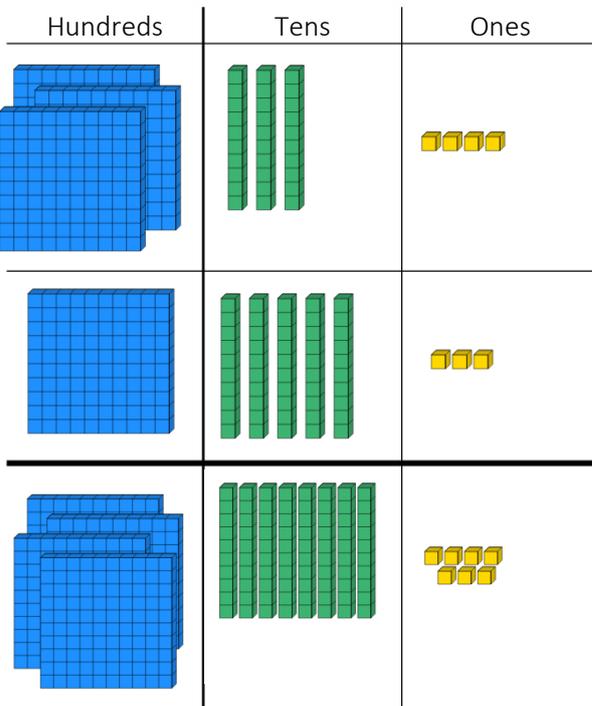
$$\begin{array}{r} 351 \\ + 34 \\ \hline 385 \end{array} \quad \begin{array}{r} 734 \\ + 152 \\ \hline 886 \end{array}$$

Column Addition (with regrouping)

$$\begin{array}{r} 364 \\ + 28 \\ \hline 392 \\ \text{1} \end{array} \quad \begin{array}{r} 495 \\ + 361 \\ \hline 856 \\ \text{1} \end{array}$$

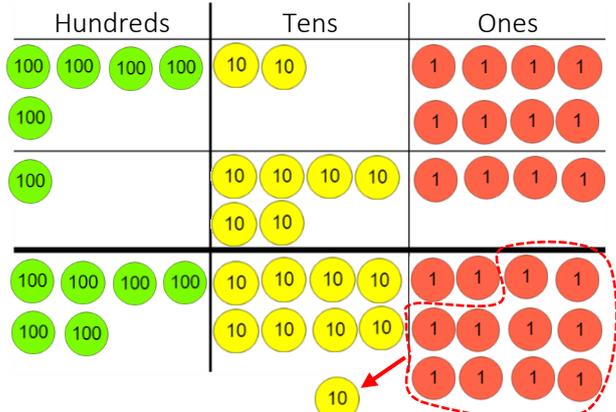
Column Addition using Dienes

$$334 + 153 = 487$$



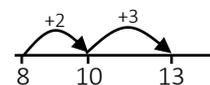
Column addition using Place Value Counters

$$528 + 164 = 692$$

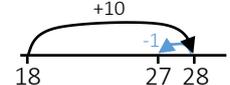


Compensating using a Number Line

$$8 + 5 = 13$$



$$18 + 9 = 27$$



Misconceptions

Understanding of Place Value

1	4	6	1	4	6
+	2	3	+	2	3
3	7	6	1	6	9

The child does not understand what each digit represents.

Miscalculations when Regrouping

4	3	7	4	3	7
+	1	9	+	1	9
5	2	9	6	2	9
1			1		

The child has forgotten to add the regrouped hundred.

Notes

Children should be secure in their knowledge of place value (hundreds, tens, ones)
Children should be encouraged to estimate first and check their answer using a mental method.

Key Vocabulary

sum hundreds tens ones equal

Subtraction

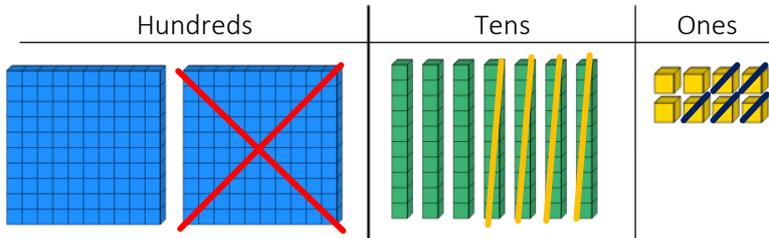
Year 3

NC Objectives

- ❖ To add and subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens and three-digit number and hundreds.
- ❖ To add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.
- ❖ To estimate the answer to a calculation and use inverse operations to check answers.
- ❖ To solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.

Models and Examples

Column Subtraction using Dienes (without regrouping)
 $278 + 145 = 133$



Column Subtraction (expanded)

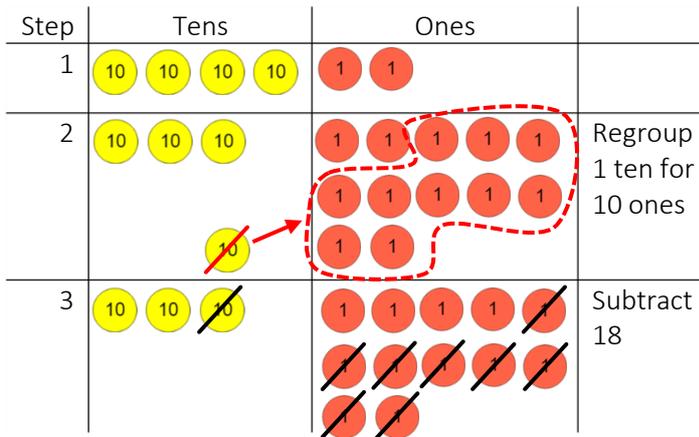
$$849 - 316 = 533$$

$$800 + 40 + 9$$

$$- 300 + 10 + 6$$

$$500 + 30 + 3$$

Column Subtraction using Place Value Counters (regrouping)
 $42 - 18 = 24$



Column Subtraction (without regrouping)

$$\begin{array}{r} 84 \\ - 61 \\ \hline 23 \end{array} \quad \begin{array}{r} 438 \\ - 316 \\ \hline 122 \end{array}$$

Column Subtraction (with regrouping)

$$80 - 24 =$$

$$\begin{array}{r} 7810 \\ - 24 \\ \hline 56 \end{array}$$

There aren't enough ones to be able to subtract 4 without regrouping. 80 has been regrouped into 70 and 10. It is important for children to start to identify where regrouping is necessary.

Misconceptions

Putting the Smaller Number First

$$\begin{array}{r} 278 \\ - 716 \\ \hline 562 \end{array}$$
 The child has put the smaller number on top before subtracting and then has not been able to subtract the hundreds digits. Children must remember to put the larger number on top.

$$\begin{array}{r} 6710 \cancel{1} 16 \\ - 278 \\ \hline 438 \end{array}$$

Not Regrouping

$$\begin{array}{r} 52 \\ - 27 \\ \hline 35 \end{array}$$
 The child has not identified that numbers need to be regrouped. They have subtracted 2 from 7 instead of regrouping 52 into 40 and 12.

$$\begin{array}{r} 4812 \\ - 27 \\ \hline 25 \end{array}$$

Notes

Children should be secure in their knowledge of place value (hundreds, tens, ones). Children should be encouraged to estimate first and check their answer using a mental method.
Key Vocabulary
 difference subtract less minus take away column subtraction exchange estimate inverse

Multiplication

Year 3

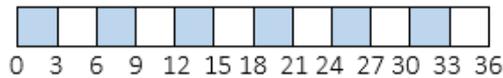
NC Objectives

- ❖ To recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.
- ❖ To write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.
- ❖ To solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Models and Examples

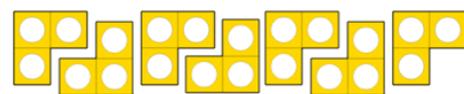
Counting Stick

$12 \times 3 = 36$



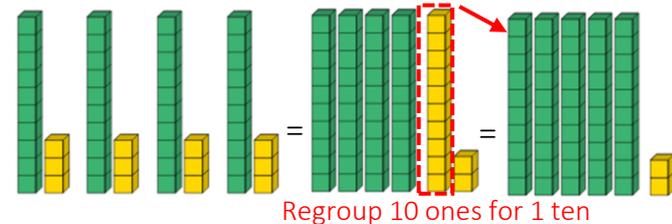
Numicon

$7 \times 3 = 21$



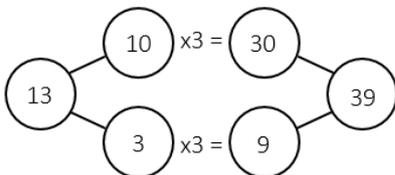
Dienes

$13 \times 4 = 52$

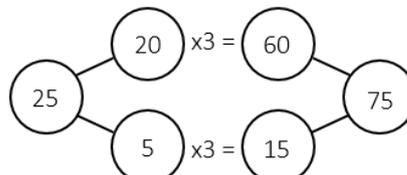


Cherry Trees

$13 \times 3 =$



$25 \times 3 =$



Short Multiplication

$$\begin{array}{r} 13 \\ \times 3 \\ \hline 39 \end{array}$$

$3 \times 3 = 9$

$1 \times 3 = 3$

$$\begin{array}{r} 25 \\ \times 3 \\ \hline 75 \end{array}$$

$5 \times 3 = 15$

$2 \times 3 = 6 \quad 6 + 1 = 7$

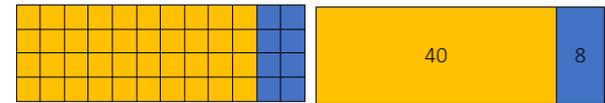
$$\begin{array}{r} 36 \\ \times 4 \\ \hline 144 \end{array}$$

$6 \times 4 = 24$

$3 \times 4 = 12 \quad 12 + 2 = 14$

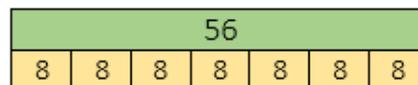
Arrays

$12 \times 4 = (10 \times 4) + (2 \times 4) = 48$



Bar Model

$7 \times 8 = 56$

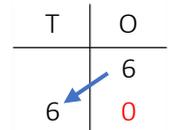


Multiplying by 10

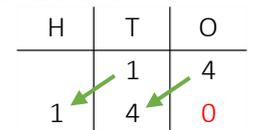
When multiplying by 10, digits move in place value. As the number is getting bigger, we move the digits to the left. Digits move ONE place as we are multiplying by 10. We have to put a zero in the gaps as a place holder (keeping other digits in the correct place).

$6 \times 1 = 60$

6 ones become 6 tens and a zero is used as a place holder.



$14 \times 10 = 140$



1 ten becomes 1 hundred, 4 ones become 4 tens and a zero is used as a place holder.

Misconceptions

Calculating

$$\begin{array}{r} 36 \\ \times 3 \\ \hline 39 \end{array}$$

The child has added instead of multiplying.

$$\begin{array}{r} 26 \\ \times 3 \\ \hline 68 \end{array}$$

The child has forgotten to add the carrying digit.

$$\begin{array}{r} 51 \\ \times 4 \\ \hline 24 \end{array}$$

The child is not secure in knowledge of place value ($51 \times 4 = 204$)

$$\begin{array}{r} 52 \\ \times 8 \\ \hline 418 \end{array}$$

The child is not secure in knowledge of times tables ($2 \times 8 = 16$).

$$\begin{array}{r} 30 \\ \times 3 \\ \hline 93 \end{array}$$

The child does not understand what happens when multiplying by zero ($0 \times 3 = 0$)

Notes

Children need to be secure in their knowledge of recalling 2, 3, 4, 5, 8 and 10 times table by the end of the year. Children not secure in this will find it difficult to apply this to bigger numbers.

Key Vocabulary

multiply times product groups of equal groups of multiple of multiplied by estimate inverse

Division

Year 3

NC Objectives

- ❖ To recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.
- ❖ To write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.
- ❖ To solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Models and Examples

Grouping using a Number Line

$$30 \div 6 = 5$$



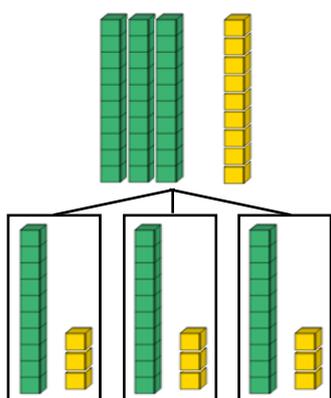
Grouping using a Number Line (with remainders)

$$34 \div 6 = 5 \text{ r}4$$



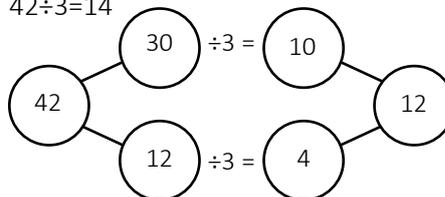
Dienes

$$39 \div 3 = 13$$



Cherry Tree

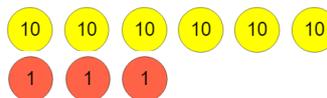
$$42 \div 3 = 14$$



Short Division (supported by place value counters)

$$63 \div 3 = 21$$

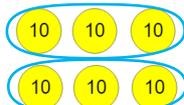
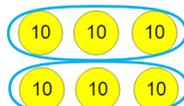
$$3 \overline{) 63}$$



Create the dividend (number you are dividing) using place value counters.



Starting with the tens counters, group them according to the divisor. Write the number of groups above the line in the tens column.



Next, group the ones counters according to the divisor. Write the number of groups above the line in the ones columns.



Long Division

$$74 \div 2 = 37$$

$$\begin{array}{r} 37 \\ 2 \overline{) 74} \\ \underline{- 6} \\ 14 \\ \underline{- 14} \\ 0 \end{array}$$

$7 \div 2 = 3$ equal groups and 1 left over. ($2 \times 3 = 6$)
We have 1 ten remaining and 4 ones. $14 \div 2 = 7$

$$3 \overline{) 63} \begin{array}{l} 2 \\ 1 \end{array}$$

$$3 \overline{) 63} \begin{array}{l} 2 \\ 1 \end{array}$$

Short Division

$$64 \div 2 = 32$$

$$\begin{array}{r} 32 \\ 2 \overline{) 64} \end{array}$$

Misconceptions

Known Multiplication Facts

$$\begin{array}{r} 42 \\ 3 \overline{) 96} \end{array}$$

The child is not secure in their knowledge of the $3 \times$ table.

Calculation Errors

$$\begin{array}{r} 21 \text{ r}1 \\ 3 \overline{) 84} \\ \underline{- 6} \\ 04 \\ \underline{- 03} \\ 01 \end{array}$$

The child has not subtracted the known multiplication fact ($2 \times 3 = 6$). The child needs should have divided 28 by 3 instead of 4.

Notes

Key Vocabulary

divided by divide divided into grouping divisor short division remainder inverse

Fractions, Decimals Percentages

Year 3

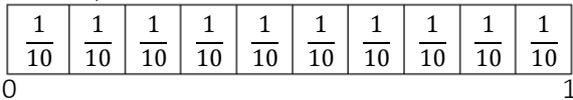
NC Objectives

- ❖ To count up and down in tenths, and recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10.
- ❖ To recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.
- ❖ To recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators.
- ❖ To recognise and show, using diagrams, equivalent fractions with small denominators.
- ❖ To add and subtract fractions with the same denominator within one whole ($\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$)
- ❖ To compare and order unit fractions, and fractions with the same denominators.
- ❖ To solve problems that involve all of the above.

Models and Examples

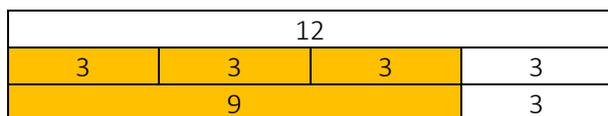
Counting in Tenths

$$1 \div 10 = \frac{1}{10}$$



Fractions of Numbers (Bar Model)

$$\frac{3}{4} \text{ of } 12 = 9$$



Fractions of Numbers

$$\frac{2}{10} \text{ of } 40 = 8$$

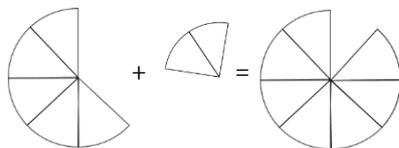
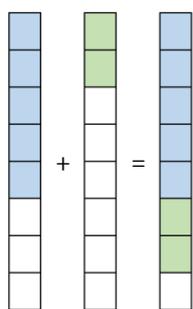
$$1. \text{ Find } \frac{1}{10} \text{ of } 40 \rightarrow 40 \div 10 = 4$$

$$2. \text{ Now find } \frac{2}{10} \text{ of } 40 \rightarrow 4 \times 2 = 8$$

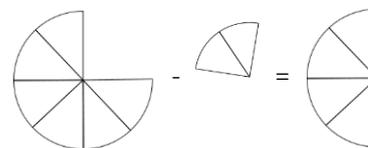
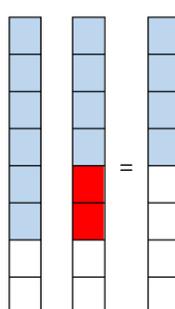
1. Divide the **number** by the **denominator** (bottom number).
2. Multiply the **answer** by the **numerator** (top number).

Adding and Subtracting

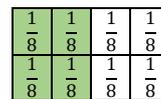
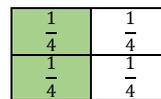
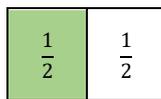
$$\frac{5}{8} + \frac{2}{8} = \frac{7}{8}$$



$$\frac{6}{8} - \frac{2}{8} = \frac{4}{8}$$



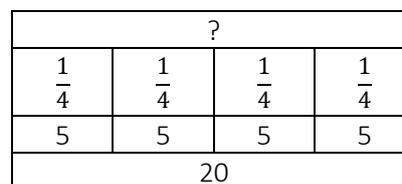
Equivalent Fractions



$$\frac{1}{2} = \frac{2}{4} = \frac{4}{8}$$

Fraction of Numbers (total unknown)

Sam bought some apples. He ate 5, which was $\frac{1}{4}$ of how many he bought. How many apples did he start with?



Misconceptions

Understanding of Fractions

$$\frac{1}{4} + \frac{1}{4} = \frac{2}{8}$$

$$\frac{1}{4} + \frac{1}{4} = \frac{2}{4}$$

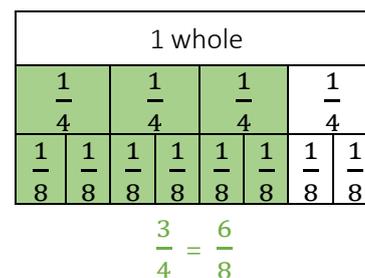
The child believes the numerators and denominators can be treated as separate whole numbers rather than a fraction being part of a whole.

Understanding of Fractions

$$\frac{3}{4} =$$

$$\frac{6}{8} =$$

When comparing fractions, children must see 1 whole as the same size



$$\frac{3}{4} = \frac{6}{8}$$

Notes

When adding and subtracting fractions with the same denominator, the denominator will always stay the same

Key Vocabulary

numerator denominator divide equivalent part whole half quarter tenth

Addition

Year 4

NC Objectives

- ❖ To add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.
- ❖ To estimate and use inverse operations to check answers to a calculation.
- ❖ To solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Models and Examples

Column Addition

$$\begin{array}{r} 5 \ 1 \ 8 \\ + 3 \ 6 \ 1 \\ \hline 8 \ 7 \ 9 \end{array} \quad \begin{array}{r} 5 \ 8 \ 4 \\ + 3 \ 7 \ 9 \\ \hline 9 \ 6 \ 3 \\ \text{1} \ \text{1} \end{array}$$

Column Addition (Decimal Numbers)

$$\begin{array}{r} 5 \ 4 \ 8 \ . \ 0 \ 4 \\ + \quad 6 \ 7 \ . \ 8 \ 5 \\ \hline 6 \ 1 \ 5 \ . \ 8 \ 9 \\ \text{1} \ \text{1} \end{array}$$

The decimal point always stays in line. As with normal column addition, starting with the column on the right, add each column in turn. Regroup/exchange as required.

Column Addition (Money)

$$\begin{array}{r} \text{£} \ 2 \ 4 \ . \ 5 \ 7 \\ + \text{£} \ 1 \ 3 \ . \ 3 \ 8 \\ \hline \text{£} \ 3 \ 7 \ . \ 9 \ 5 \\ \text{1} \end{array}$$

T O . t h

6 7 . 3

8 . 0 9

7 5 . 3 9

1

T O . t h

6 7 . 3 0

0 8 . 0 9

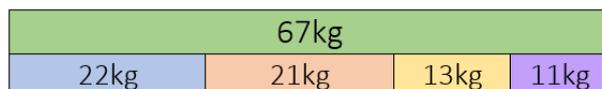
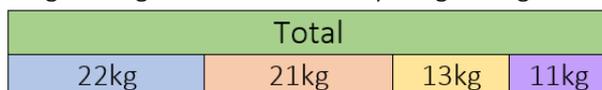
7 5 . 3 9

1

Digits must be placed in the correct place value columns. Zeros can be used in blank spaces as place holders (keeping the other digits in their correct places).

Bar Model

The Bolton family are going on holiday. Mr Bolton's suitcase weighs 21kg, Mrs Bolton's suitcase weighs 22kg, Sarah's suitcase weighs 13kg and Peter's weighs 11kg. How much do they weigh altogether?



$$22\text{kg} + 21\text{kg} + 13\text{kg} + 11\text{kg} = 67\text{kg}$$

Misconceptions

Understanding of Place Value

	4	5	2	1		4	5	2	1
+	1	1	7		+		1	1	7
	5	6	9	1		4	6	3	8

The child does not understand the place value of each digit.

Notes

Children are able to use manipulatives such as dienes and place value counters to support regrouping in column addition

Key Vocabulary

add total plus sum more altogether column addition regroup exchange estimate inverse

Subtraction

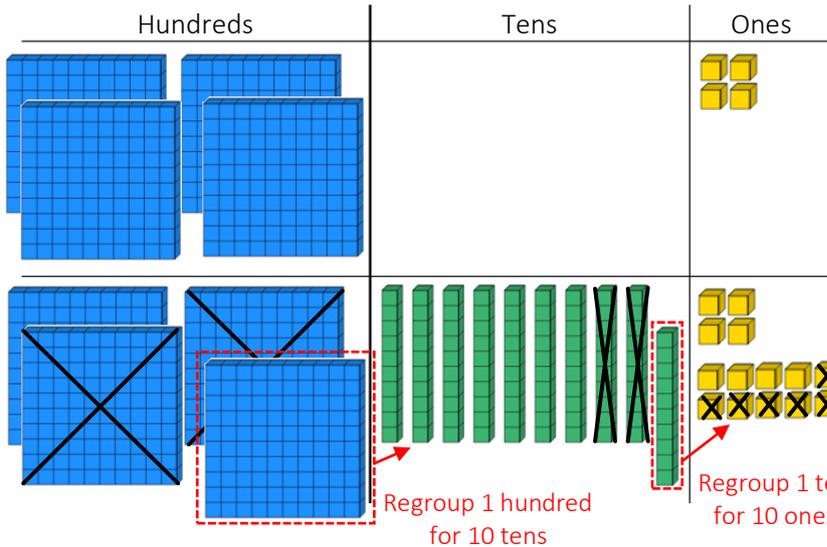
Year 4

NC Objectives

- ❖ To add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.
- ❖ To estimate and use inverse operations to check answers to a calculation.
- ❖ To solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Models and Examples

Column Subtraction using Dienes(multiple regrouping)
404-226=178



Column Subtraction (1 regrouping)

$$\begin{array}{r} 74\cancel{8}13 \\ - 4265 \\ \hline 3228 \end{array}$$

Column Subtraction (multiple regrouping)

$$\begin{array}{r} 7810\cancel{4}514 \\ - 3249 \\ \hline 4805 \end{array}$$

$$\begin{array}{r} \pounds 4\cancel{5}\cancel{15} \cdot 125 \\ - \pounds 28 \cdot 70 \\ \hline \pounds 27 \cdot 55 \end{array}$$

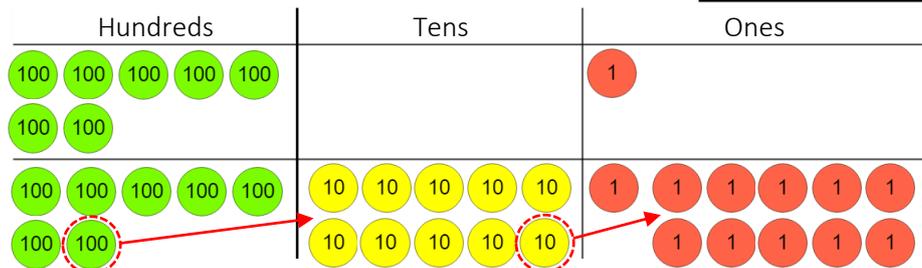
Column Subtraction (regrouping with zero)

$$\begin{array}{r} 5701 \\ - 3258 \\ \hline \end{array}$$

It is not possible to subtract 8 from 1 and regrouping is needed, but there are no tens. Regroup the next column (hundreds) before regrouping the tens.

701 has been regrouped into 600, 90 and 11

$$\begin{array}{r} 567\cancel{9}1011 \\ - 3258 \\ \hline 2443 \end{array}$$



Misconceptions

Calculations involving Zero as a Place Holder

$$\begin{array}{r} 407 \\ - 265 \\ \hline 262 \end{array}$$

$$\begin{array}{r} 3\cancel{1}07 \\ - 265 \\ \hline 142 \end{array}$$

The child has not identified that they cannot subtract from zero and need to regroup. They need to regroup the 400 into 300 and 100.

$$\begin{array}{r} 59\cancel{1}4 \\ - 78 \\ \hline 526 \end{array}$$

$$\begin{array}{r} 5\cancel{9}104 \\ - 78 \\ \hline 426 \end{array}$$

The child has perceived the zero to represent 10 and tried to regroup it. They need to understand that it means there are zero tens present, so they need to move onto the hundreds column and regroup 1 hundred as 10 tens.

Notes

As the children move on, decimals with the same number of decimal places can be introduced. This method can also be used when adding money.

Key Vocabulary

difference subtract less minus take away column subtraction exchange estimate inverse

Multiplication

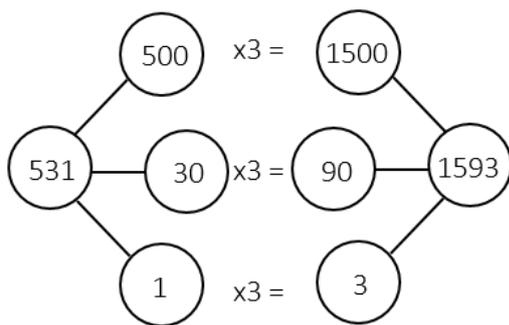
Year 4

NC Objectives

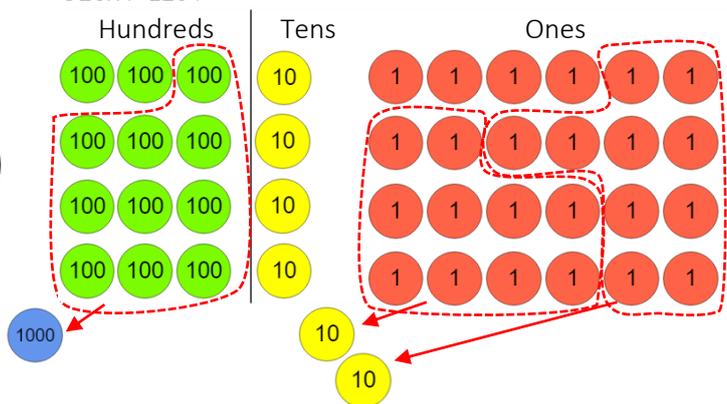
- ❖ To recall multiplication and division facts for multiplication tables up to 12x12.
- ❖ To use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers.
- ❖ To recognise and use factor pairs and commutativity in mental calculations.
- ❖ To multiply two-digit and three-digit numbers by a one-digit number using a formal written layout.
- ❖ To solve problems involving multiplying and dividing, including using the distributive law to multiply two-digit numbers by one-digit numbers, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Models and Examples

Cherry Tree
531x3=1593



Place Value Counters
316x4=1264



Grid Method
64x8=512

X	60	4
8	480	32

187x3=561

X	100	80	7
3	300	240	21

Short Multiplication (Expanded)

$$\begin{array}{r}
 472 \\
 \times \quad 9 \\
 \hline
 18 \text{ (} 2 \times 9 \text{)} \\
 630 \text{ (} 70 \times 9 \text{)} \\
 3600 \text{ (} 400 \times 9 \text{)} \\
 \hline
 4248 \\
 \text{1}
 \end{array}$$

Distributive Law
24x7=168

$$\begin{array}{r}
 20 \\
 \times \quad 7 \\
 \hline
 140 \\
 + \quad 28 \\
 \hline
 168
 \end{array}$$

Short Multiplication

$$\begin{array}{r}
 312 \\
 \times \quad 3 \\
 \hline
 936
 \end{array}
 \quad
 \begin{array}{r}
 140 \\
 \times \quad 6 \\
 \hline
 840 \\
 \text{2}
 \end{array}
 \quad
 \begin{array}{r}
 534 \\
 \times \quad 7 \\
 \hline
 3738 \\
 \text{3 2 2}
 \end{array}$$

Misconceptions

Calculating

$$\begin{array}{r}
 651 \\
 \times \quad 8 \\
 \hline
 659
 \end{array}$$

The child has added instead of multiplying.

$$\begin{array}{r}
 174 \\
 \times \quad 5 \\
 \hline
 570 \\
 \text{3 2}
 \end{array}$$

The child has forgotten to add the carrying digit.

$$\begin{array}{r}
 51 \\
 \times \quad 4 \\
 \hline
 24
 \end{array}$$

The child is not secure in knowledge of place value (51x4=204)

$$\begin{array}{r}
 835 \\
 \times \quad 6 \\
 \hline
 5015 \\
 \text{5 2 3}
 \end{array}$$

The child is not secure in knowledge of times tables (5x6=30).

$$\begin{array}{r}
 310 \\
 \times \quad 7 \\
 \hline
 2177 \\
 \text{2}
 \end{array}$$

The child does not understand what happens when multiplying by zero (0x7=0)

Notes

Key Vocabulary

multiply multiplied by product short multiplication partition distributive law groups of times multiples inverse

Division

Year 4

NC Objectives

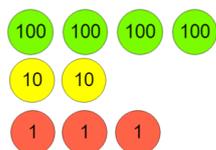
- ❖ To recall multiplication and division facts for multiplication tables up to 12x12.
- ❖ To use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers.
- ❖ To recognise and use factor pairs and commutativity in mental calculations.
- ❖ To multiply two-digit and three-digit numbers by a one-digit number using a formal written layout.
- ❖ To solve problems involving multiplying and dividing, including using the distributive law to multiply two-digit numbers by one-digit numbers, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Models and Examples

Short Division with Regrouping (supported by place value counters)

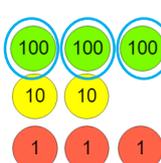
$$423 \div 3 = 141$$

$$3 \overline{) 423}$$



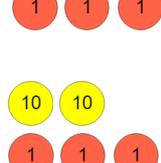
Create the dividend (number you are dividing) using place value counters.

$$3 \overline{) 423} \quad 1$$



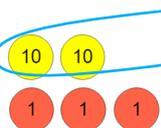
Group the hundreds counters according to the divisor. Write the number of groups above the line in the hundreds column.

$$3 \overline{) 4 \overset{1}{2} 3}$$



Exchange the left over hundreds counters for tens counters and represent this beneath the line in the tens column.

$$3 \overline{) 4 \overset{1}{2} 3} \quad 14$$



Group all the tens counters according to the divisor. Write the number of groups above the line in the tens column.

$$3 \overline{) 4 \overset{1}{2} 3} \quad 141$$



Group all the ones counters according to the divisor. Write the number of groups above the line in the ones column.

3

Short Division (with regrouping)

$$97 \div 6 = 16 \text{ r}1$$

$$6 \overline{) 97} \quad 16 \text{ r}1$$

$$272 \div 8 = 34$$

$$8 \overline{) 272} \quad 034$$

Long Division

$$426 \div 3 = 142$$

$$3 \overline{) 426} \quad 142$$

$4 \div 3 = 1$ equal group and 1 left over. ($1 \times 3 = 3$)
We have 1 hundred remaining and 2 tens. ($12 \div 3 = 4$)
We have 6 ones remaining. ($6 \div 3 = 2$)

Misconceptions

Forgetting to carry the remainder over

$$64 \div 4 = 12$$

$$4 \overline{) 64} \quad 12$$

$$64 \div 4 = 16$$

$$4 \overline{) 64} \quad 16$$

$$146 \div 2 = 23$$

$$2 \overline{) 146} \quad 23$$

$$146 \div 2 = 73$$

$$2 \overline{) 146} \quad 73$$

Ignoring 0 so losing place value

$$408 \div 2 = 24$$

$$2 \overline{) 408} \quad 24$$

$$408 \div 2 = 204$$

$$2 \overline{) 408} \quad 204$$

Forgetting to subtract $582 \div 3 = 194$

$$582 \div 3 = 120$$

$$3 \overline{) 582} \quad 120$$

$$3 \overline{) 582} \quad 194$$

Notes

Key Vocabulary

factor divisor divided by divided into remainders divisible by equivalent short division
 derive quotient inverse remainder multiples exchange

Fractions, Decimals Percentages

Year 4

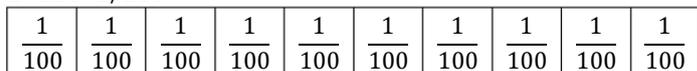
NC Objectives

- ❖ To recognise and show, using diagrams, families of common equivalent fractions.
- ❖ To count up and down in hundredths, recognising that hundredths arise when dividing an object by a hundred and dividing tenths by ten.
- ❖ To solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number.
- ❖ To add and subtract fractions with the same denominator.
- ❖ To recognise and write decimal equivalents of any number of tenths or hundredths.
- ❖ To recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$.
- ❖ To find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.
- ❖ To round decimals with one decimal place to the nearest whole number.
- ❖ To compare numbers with the same number of decimal places up to two decimal places.
- ❖ To solve simple measure and money problems involving fractions and decimals to two decimal places.

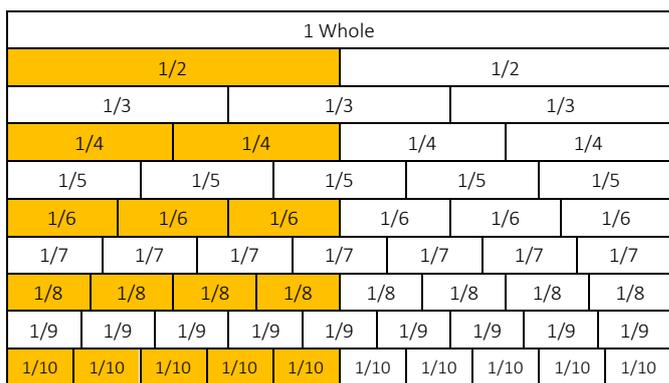
Models and Examples

Counting in Hundredths

$$1 \div 100 = 1/100$$



Equivalent Fractions



$$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10}$$

Rounding Decimals

3.248 rounded to **1d.p** = 3.2

3.248 (The 2 is worth 2 tenths and is the first decimal place.)

3.248 (Look at the next digit-hundredths. 4 rounds down – stay at 3.2)

3.248 rounded to **2d.p** = 3.25

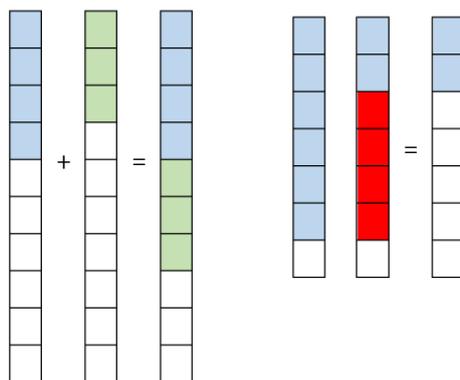
3.248 (The 4 is worth 4 hundredths and is the second decimal place.)

3.248 (Look at the next digit-thousandths. 8 rounds up – go to 3.25)

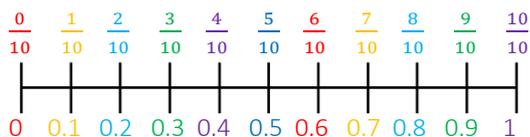
Adding and Subtracting Fractions with the same Denominator

$$\frac{4}{10} + \frac{3}{10} = \frac{7}{10}$$

$$\frac{6}{7} - \frac{4}{7} = \frac{2}{7}$$



Decimal Fraction Equivalents



$$\frac{1}{2} = 0.5 \quad (1 \div 2 = 0.5)$$

$$\frac{1}{4} = 0.25 \quad (1 \div 4 = 0.25)$$

$$\frac{3}{4} = 0.75 \quad (3 \div 4 = 0.75)$$

Misconceptions

Understanding of Fractions

$$\frac{2}{8} + \frac{5}{16} = \frac{7}{24} \quad \frac{2}{8} = \frac{4}{16} \quad \frac{4}{16} + \frac{5}{16} = \frac{9}{16}$$

The child believes the numerators and denominators can be treated as separate whole numbers rather than a fraction being part of a whole.

Understanding of Fractions

$$\frac{1}{4} = 0.4 \text{ or } 1.4 \quad \frac{2}{6} = 0.26 \text{ or } 2.6$$

The child may misunderstand the function of the dividing line. They may add digits, combine them or get confused about the position of the decimal point.

Place Value of Decimals

$$0.2 < 0.19$$

The child sees '2' as bigger than '19'. Encourage use of extra 0s in spaces
0.20 > 0.19

Notes

Children should recognise 2/2, 3/3, 4/4... etc. is equal to 1 whole.

Key Vocabulary

numerator denominator divide equivalent part whole half quarter tenths hundredths
convert round compare