Maths handbook for parents

This booklet has been written to show you the stages that your child will go through in learning how to add, subtract, multiply and divide.

At Roebuck Primary School and Nursery we teach methods for calculations in addition, subtraction, multiplication and division. Methods are taught in progression as set out in our policy. The correct use of vocabulary is reinforced from Early Years to Year 6. By the end of Year 6, children will have a range of calculation methods, both mental and written in all four operations. When solving problems, children are taught to select the most efficient and appropriate method. To secure mathematical understanding, we use concrete resources, manipulatives, visual representations and abstract symbols when teaching calculation methods.

Children should be encouraged to:

- ✓ Approximate their answers before calculating.
- ✓ Check their answers after calculation using an appropriate strategy.
- ✓ Consider if a mental calculation would be appropriate before using written methods.

We hope you find this useful when supporting your child with their learning at home. Please see the class teacher if you need further assistance.

Nursery

Recognising numbers, counting and ordering

Count objects, claps, actions such as jumps.

Recite numbers through songs and rhymes.

Place number cards (0-30) in the correct order.

Match number cards to an amount of objects.
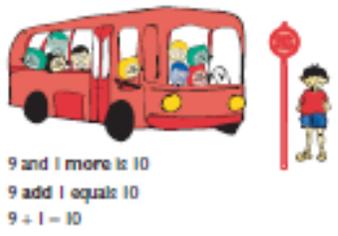
Practically record numbers in sand, paint, foam, etc.

Sorting sets of objects

Sort objects according to colour, size, shape, animals, material.

Group objects and identify how objects are grouped.

Addition

Find one more using objects such as unifix, small counters, animals or buttons.

9 and 1 more is 10
9 add 1 equals 10
9 + 1 = 10

Reception

Number recognition and counting

Count up to 100 using a 100 square and using objects.

Recognise and sequence numbers.

Learn and use counting songs and rhymes.

Write numbers 1-20 and beyond.

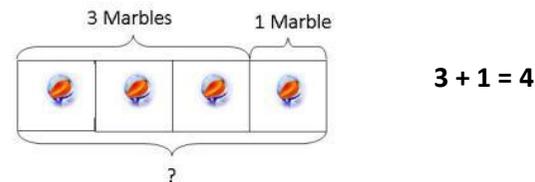Use one to one counting-emphasis on moving objects as we count.

Addition and Subtraction

Find one more, two more, three more, etc.

7 is 5 and 2 more
7 = 5 + 2

Use vocabulary 'most' and 'least'. Which container holds the least number of counters?

Record using as a number sentence.

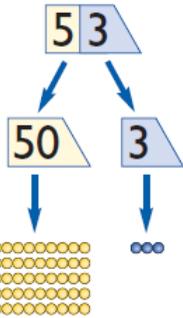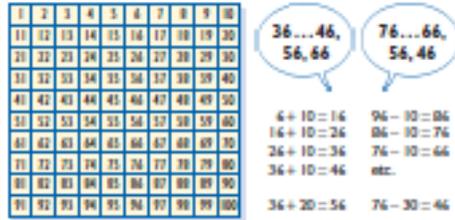3 Marbles   1 Marble

$3 + 1 = 4$

?

Multiplication

Use number sequences and start to count in 2s, 5s and 10s.

Year 1 and 2 (Key Stage 1)

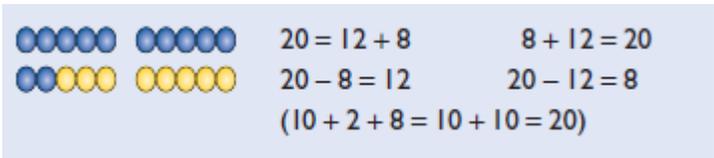## Number and Place Value

Use and understand a
hundred square.

| 36...46, | 76...66, |
| 56, 66 | 56, 46 |

6 + 10 = 16   96 − 10 = 86
16 + 10 = 26   86 − 10 = 76
26 + 10 = 36   76 − 10 = 66
36 + 10 = 46   etc.

36 + 20 = 56   76 − 30 = 46

Recognise the place value of digits by
partitioning.

Know and use number bonds to 10.

10 = 7 + 3

$7 + 3 = 10$

Know and use number bonds to 20.

$20 = 12 + 8$ $8 + 12 = 20$
$20 - 8 = 12$ $20 - 12 = 8$
$(10 + 2 + 8 = 10 + 10 = 20)$

Addition

Solve missing number problems.

$10 = \Box + 6$

6 and how many
more make 10?
$6 + \Box = 10$
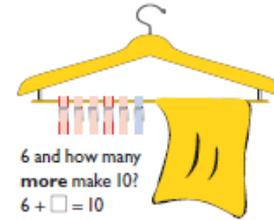
Use empty number lines to count on.

47 + 25 = 72

or
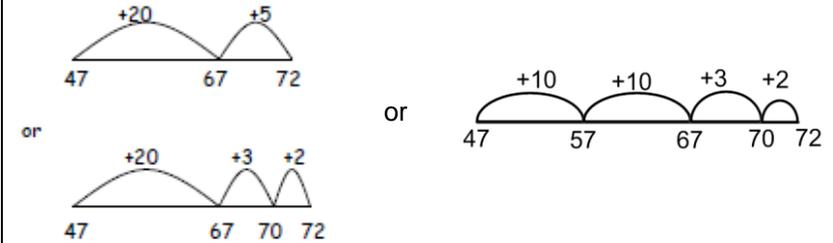
Use diennes to model partitioning of larger numbers to add them

47+25

Leading to exchanging:
72

$40 + 7$
$+ \underline{20 + 5}$
$60 + 12 = 72$
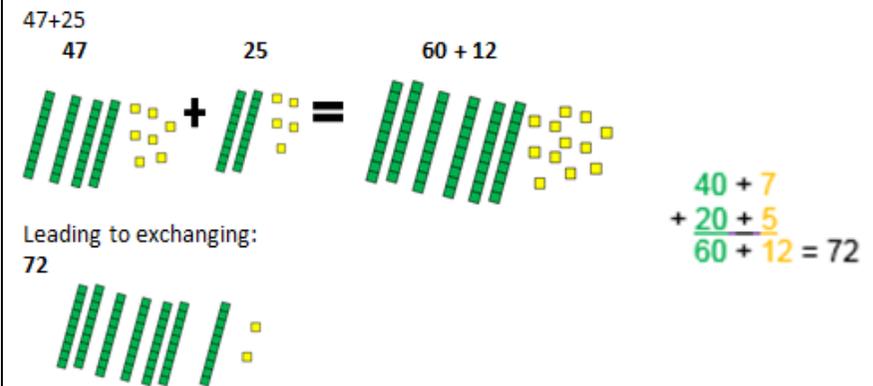
Subtraction

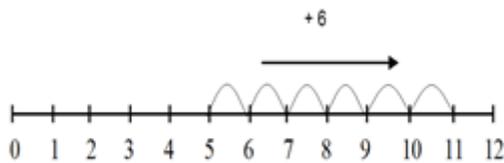Understand subtraction as take-away.

$$6 - 1 = 5$$

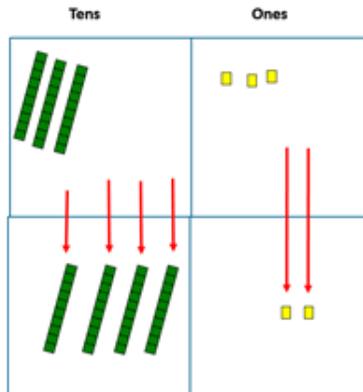Use a number line to count backwards to subtract.

$$19 - 5 = 14$$

Understand subtraction as finding the difference by counting on.

$$11 - 5 = 6$$

Difference between 11 and 5
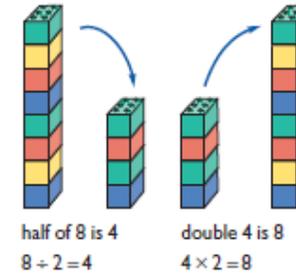
Use diennes to model subtraction of larger numbers

$$75 - 42 = 33$$

Tens   Ones

70 5
- 40 2
30 3

Multiplication and division

Double single digit numbers.

half of 8 is 4   double 4 is 8
$8 \div 2 = 4$ $4 \times 2 = 8$

Use arrays to multiply.

$4 \times 2 = 8$

$2 \times 4 = 8$
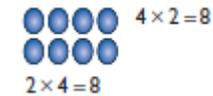
Relate multiplication to addition

$10p + 10p + 10p + 10p + 10p = 50p$
$10p \times 5 = 50p$
5 hops of 10
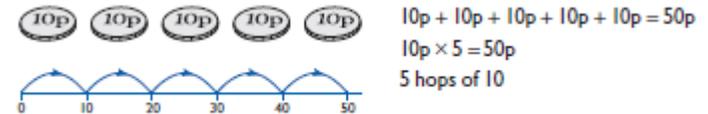
Begin to understand multiplication as scaling.

Three times as many

$\times 3$ $\times 3$ $\times 3$ $\times 3$

$4 \times 3 = 12$
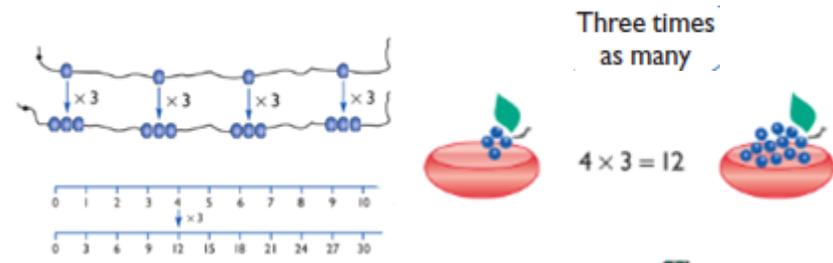
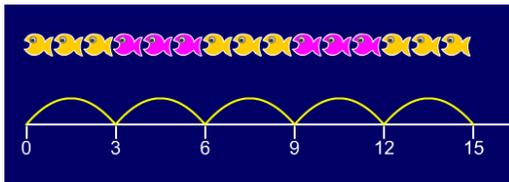Use number lines to model multiplication and division.
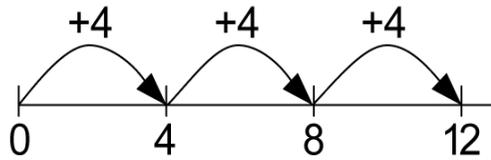
4 + 4 + 4 = 12
3 lots of 4 is 12
3 x 4 = 12

How many groups of 3 in 15?

15 ÷ 3 = 5

Solve one step division and multiplication problems.

How many 3s in 15?

$15 \div 3 = 5$
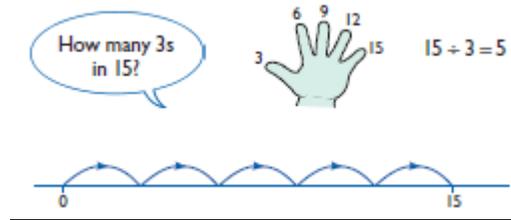
Use inverse understanding to solve missing number problems.

7 x 2 = ☐	☐ = 2 x 7
7 x ☐ = 14	14 = ☐ x 7
14 ÷ ☐ = 7	14 ÷ 2 = ☐

Year 3 and 4 (Lower Key Stage 2)

Addition

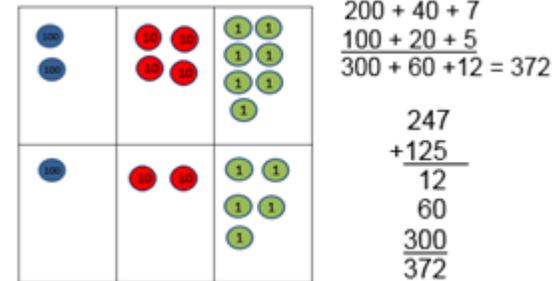Partition and recombine numbers to add.

247 + 125 = 247 + 100 + 20+ 5
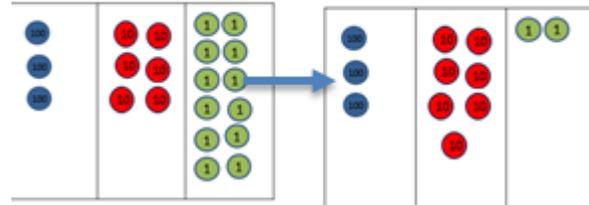   = 347 + 20 + 5
          = 367 + 5
          = 372

247 + 125 =372

Expanded column addition using dienes/place value counters.


```
200 + 40 + 7
100 + 20 + 5
300 + 60 +12 = 372

   247
 +125
    12
    60
   300
   372
```

Leading to children understanding the exchange between tens and ones.

Efficient column addition method.

```
  247
+125
  372
   1
```

Subtraction

Understand column subtraction with no decomposition

98 - 35 = 63

$$\begin{array}{r} 90\ \ 8 \\ -\ 30\ \ 5 \\ \hline 60\ \ 3 \end{array}$$
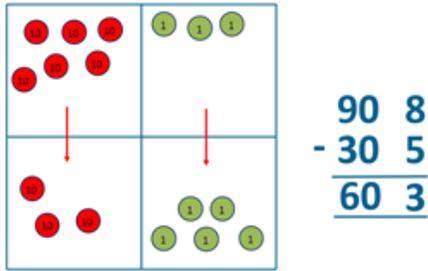
Understand column subtraction where exchange is necessary.

72 - 47 = 25

$$\begin{array}{r} ^{60}\cancel{70}\ \ ^{1}2 \\ -\ 40\ \ 7 \\ \hline 20\ \ 5 \end{array}$$
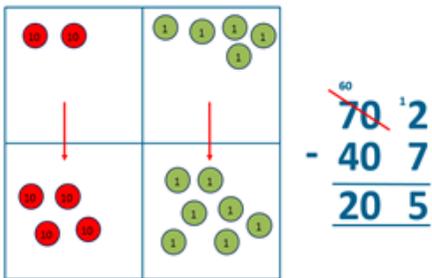
Use an efficient column subtraction method.

232 - 114 =118

$$\begin{array}{r} 2\cancel{3}2 \\ -\ 114 \\ \hline 118 \end{array}$$
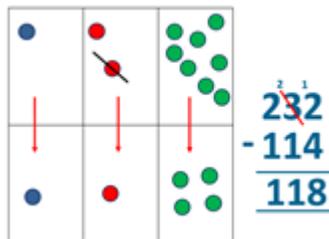
Multiplication

Double 2 digit numbers by partitioning.

16

10   6

x2   x2

20   12
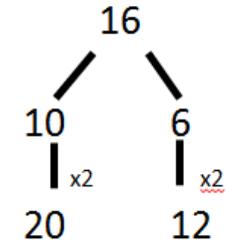
Multiply on a number line – jumping in larger groups of amounts.

13 x 6 = 78

+10 x 6   + 3 x 6

0   60   78
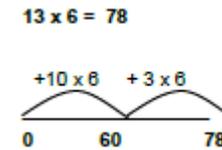
Developing understand of grid method through visuals.   **18 x 3 = 54**

10   8
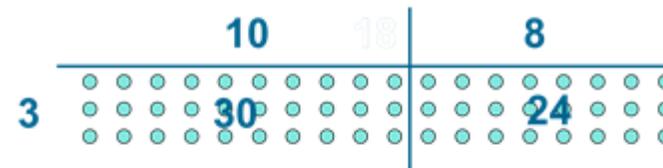
3   30   24

Develop onto the grid method

	10	8
3	30	24

18 x 3 = (10x3) + (8x3)
= 30 + 24
= 54
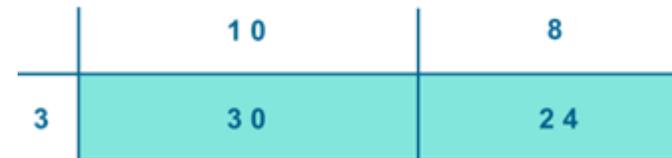
Division

Use grouping on a number line to "chunk up" to a target number.

$$48 \div 4 = 12$$

+40
10 groups
+8
2 groups

Jottings

e.g. $840 \div 7 = 120$

7 x 100 = 700
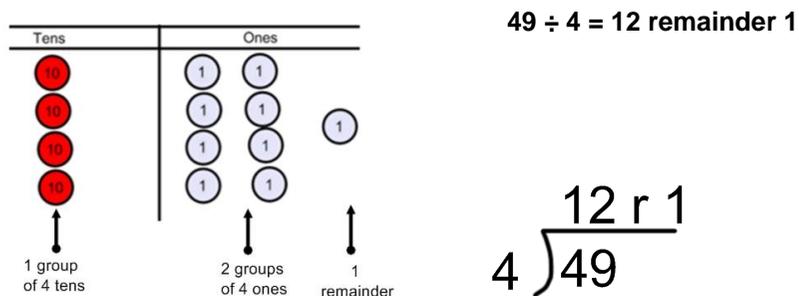7 x 10 = 70
7 x 20 = 140

100 groups   20 groups
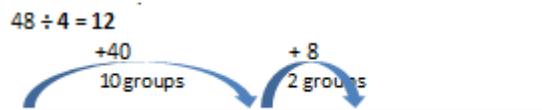
0   700   840

Use grouping with remainders, interpreting remainders according to context. (i.e. rounded up/down to relate to the answer of the problem.)
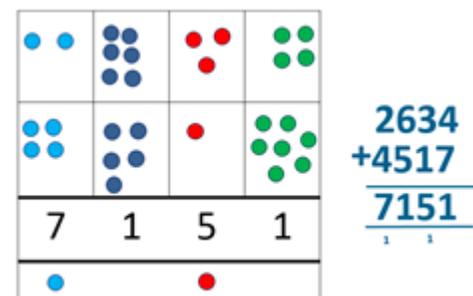
$$49 \div 4 = 12 \, r1$$

+40
10 groups
+8
2 groups
+ 1
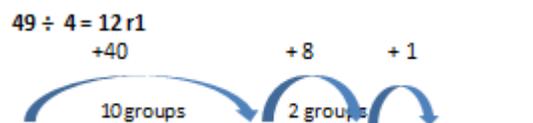
Leading to short division supported by arrays

Tens   Ones

1 group   2 groups   1
of 4 tens   of 4 ones   remainder

49 ÷ 4 = 12 remainder 1

$$12 \, r \, 1$$
$$4 \overline{)49}$$

Addition

Understand and use an efficient column addition method.

7	1	5	1

2634
+4517
7151
1 1

Apply an efficient column addition method to decimal numbers remembering that decimal points should line up under each other.

172.83
+ 54.68
227.51
1 1 1

Use an efficient column addition for several numbers with different numbers of digits (including decimals).

42
6432
786
+ 4684
11944
1 2 1

Subtraction

Use an efficient column subtraction and understand exchange for numbers including decimals.

$$\begin{array}{r} {}^{5}6\,{}^{1}2\,{}^{2}3\,{}^{1}2 \\ -\ 4\,8\,1\,4 \\ \hline 1\,4\,1\,8 \end{array}$$

Multiplication

Use short multiplication to multiply any number (including decimals) by a single digit number.

$$\begin{array}{r} 38 \\ \times\quad 7 \\ \hline 56 \quad (7 \times 8) \\ +\ 210 \quad (7 \times 30) \\ \hline 266 \end{array}$$

As able, digits are carried to further reduce recording.

$$\begin{array}{r} 38 \\ \times\quad 7 \\ \hline 266 \\ {}_{5} \end{array}$$

Use grid method to support understanding of long multiplication.

18 x 13 =

	10	8
10	100	80
3	30	24

$$\begin{array}{r} 18 \\ \times\ 13 \\ \hline 180 \\ +\ 54 \\ \hline 234 \end{array}$$

Use long multiplication.

$$\begin{array}{r} 56 \\ \times\ 27 \\ \hline 392 \quad (56 \times 7) \\ +\ 1120 \quad (56 \times 20) \\ \hline 1512 \end{array}$$

As able, bracket jottings removed to reduce recording.

$$\begin{array}{r} 56 \\ \times\ 27 \\ \hline 392 \\ +\ 1120 \\ \hline 1512 \end{array}$$

Division

Use short division to divide by a single digit number.

$$136 \div 4 = 34$$

How many 4s exactly in 100? 0 so carry the 1.
How many 4s in 13? 3 goes in the answer 1 remainder is carried.
How many 4s in 16? 4 goes in the answer.

Extend to division of decimals by single digit numbers.

$$32.1 \div 3 = 10.7$$

Express remainders as remainders, fractions, decimals in lowest terms or rounded up or down as appropriate to the context.

Understand "Chunking" - repeated subtraction for long division

$$556 \div 24 = 23 \ r4$$

Or record remainders as fractions. Divided by the divisor and simplified.

$$23 \tfrac{4}{24} = 23 \tfrac{1}{6}$$

Use long division to divide by two digit numbers

15, 30, 45, 60, 75, 90, 105, 120,

Use jottings of divisor multiples to support calculations.

$432 \div 15$ becomes

$$432 \div 15 = 28 \text{ remainder } 12$$

or

$$432 \div 15 = 28.8$$

Look at first two digits of the dividend (in this case 43).
How many lots of the divisor are there (2 x 15 = 30)? Write the quotient (2) above the 'bus stop' and the 30 (2 x 15) below the 43.

Take the 30 from 43, leaving the remainder of 13.

Drop down the next digit of the dividend (in this case the 2) to sit next to the remainder from the previous step (the 13). We are now looking at 'how many 15s are there in 132'.

Repeat the above process: 15 x 8 = 120. We write 120 below the 132 and subtract, leaving a remainder of 12.

To find the decimal value of the remainder, add a decimal point and a 0. Drop the 0 down to sit next to the previous remainder of 12, so it becomes 120. How many 15s are in 120? Answer: 8. This is written to the right of the decimal point in the quotient above the bus stop. Final answer: 28.8