Randlay Primary School and Nursery
Calculation policy
Stages A & B

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

Addition

Stage A

Counting objects, partitioning and recombining sets using practical apparatus.

Understand that the number gets bigger.

Addition is commutative.

Use number tracks to develop counting skills, forwards and backwards.

COUNTING ITP

Pictorial recording of practical experiences.

Teacher modelling of number sentences and addition as commutative.

1 + 1 = 2
double 1 is 2

2 − 1 = 1
half of 2 is 1

2 + 2 = 4
double 2 is 4

4 − 2 = 2
half of 4 is 2

Subtraction

Stage A

Know that the number gets smaller because objects have been removed from the set.

Practical models of subtraction

Counting back on fingers, orally, number lines.

Find the difference, counting on.
MODELS AND IMAGES CHARTS

(To be used for lots of oral examples)

5 + ? = 10 10 − 5 = ?

6 + ? = 10
10 − 6 = ?

? + 6 = 10
10 − 4 = 6

9 + ? = 10
10 − 9 = ?

? + 9 = 10
10 − ? = 9

Multiplication

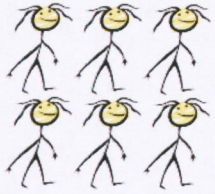
Stage A

Jumping along number lines in jumps of 1, 2, 5 & 10.

Repeated addition, practical demonstrations.
(*Models and Images charts)*

Doubles and grouping
Grouping is a random arrangement of a quantity into equal groups.

Arrays are a rectangular arrangement to show the equal groups.



This is an array

Use of arrays to show that multiplication is commutative. Changing the order does not affect the answer. Peg boards are a useful model.

Use the language of 'lots of', 'groups of' and 'sets of' for 'x'.

Division

Stage A

Counting on and back in steps of 1, 2, 5 and 10.

Sharing equally and halving objects in practical contexts.

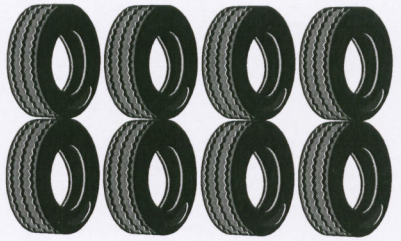
Pictorial recording.

Grouping, in practical contexts.

GROUPING ITP

Use cross curricular links (PE) and purposeful objects such as sock and shoes/ animals in the ark to get into groups.
Sharing models such sharing an apple or a Satsuma.

How many cars can you make if you have 8 wheels?



Randlay Primary School and Nursery
Calculation policy
Stages A & B

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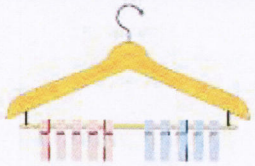
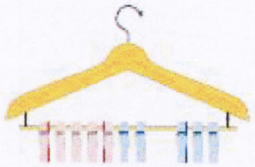


10 = 5 + 5



10 = 7 + 3

10 = 3 + 7

We have 10 pegs on the coathangers, how can we split them into 2 groups? Is there another way? How can you be sure you have got them all?

Once numbers can be written, number sentences can be recorded.

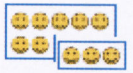
Modelling of commutative layout.

To have experience of '=' sign as last stage in calculation.

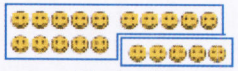
ADDITION AND SUBTRACTION EXCEL

8 + ? = 10

7 + ? = 10



7 + 3 = 10



15 + 5 = 20

NUMBER FACTS ITP

Practical demonstrations of take away.

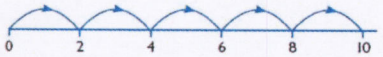
There were 9 balloons. Two popped. How many are left?

9 – 2 = 7

Find the difference where numbers are close together.

"How many more do I add to 7 to get to 9?"

DIFFERENCE ITP



2 + 2 + 2 + 2 + 2 = 10

2 × 5 = 10

2 multiplied by 5

5 pairs

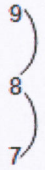
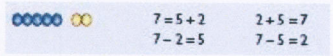
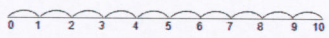
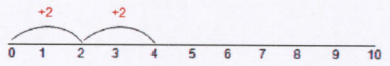
5 hops of 2

GROUPING ITP

Pictures to show 2 lots of 3 or 3 lots of 2.

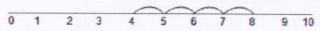
Randlay Primary School and Nursery
Calculation policy
Stages A & B

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

	9 – 7 = 2  **Vertical number line to show the difference. Number ladders.** 9 – 7 = 2  		
Stage B **Key skills of knowing number bonds to 10 and within 20.** **Develop knowledge of fact families, e.g. 2, 5, 7.**  **EXCEL ADDITION AND SUBTRACTION TRIOS** **Counting forwards and recording on a number line.** **All answers to be recorded in a number sentence following any informal recording.**  	**Stage B** **Subtraction sentences and jumps (backwards for take away – left and forwards for difference – right) along number lines.** **EXCEL ADDITION AND SUBTRACTION TRIOS** **Check with the inverse.** **Understand the effect of adding and subtracting zero** **Know that 6 can be thought of as 5 and 1.**  6 is 5 and 1 more	**Stage B** **Pictorial repeated addition.** **Grouping is a random arrangement of a quantity into equal groups.** **Arrays are a rectangular arrangement to show the equal groups.**	**Stage B** **With practical equipment:** **Counting on and back in 2s, 5s and 10s and begin counting in 3s.** **Grouping as repeated addition along the number line.** **Introduce the ÷ symbol once repeated addition (grouping) is understood.** **GROUPING ITP** If I have got 4, how many groups of 2 have I got? 

Randlay Primary School and Nursery
Calculation policy
Stages A & B

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)



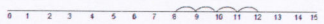
COUNTING ON AND BACK ITP
NUMBER LINE ITP

4 + 8 =

Reordering – biggest number first.

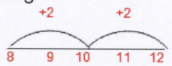
8 + 4 =

Recording in number sentences and communication along number lines or with informal written methods.



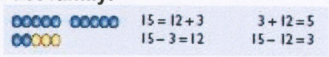
leading to

leading to



Children to show notation

Addition is the inverse of subtraction. Fact family.



Using shapes to represent a missing number.

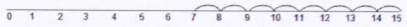
□ + ○ = △ □ + □ = △
5 + 4 = 9 6 + 6 = 12

Adding more than two numbers

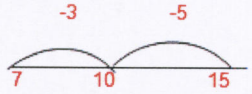
Strategy to include looking for facts or bonds that are useful e.g. bonds up to and including 10, doubles or adding 10 to a given number.

Know that 8 is 5 and 3, therefore subtract 5 then 3.

15 – 8 =7



leading to

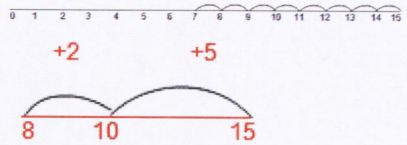


Children to show notation

Find the difference by counting on along a number line.

15 – 8 =

Reinforce the role of the number sentence.



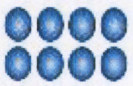
Children to show notation

Use patterns to find answers to subtractions

10 + 4 =
10 – 4 =
20 + 4 =
20 – 4 =

EXCEL PATTERNS OF CALCULATION

Decision making



4 × 2 = 8

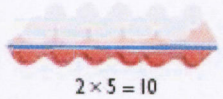
2 × 4 = 8

2 × 4 = 8

4 × 2 = 8

Counting in 2s, 5s and 10s and begin counting in 3s.

Introduce the x symbol once repeated addition is understood.

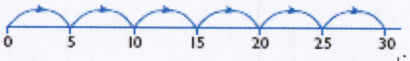


5 × 2 = 10

2 × 5 = 10

2 × 5 = 10

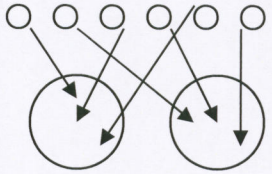
5 × 2 = 10



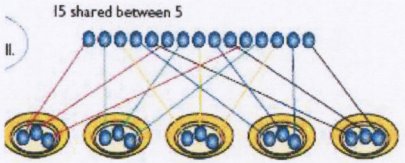
Grouping and sharing practically.
(NB If the answer is in the same units as the dividend, it is sharing. If the answer is in different units, it is grouping.)
For example:
£20 ÷ 5 people = £4 (sharing because the units are the same)
£20 ÷ £4 = 5 people (grouping because the units are different)

Record sharing by using pictorial notation

There are 6 cakes and 2 children. How many cakes will they each get?
One for you and one for you.



5 hops in 15. How big is each hop?



Randlay Primary School and Nursery
Calculation policy
Stages A & B

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

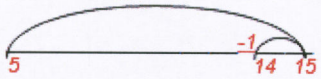
$6 + 3 + 4 = 13$ (10)

$6 + 3 + 4 + 7 + 2 = 22$ (10, 10)

Children to show notation

Compensation strategy

5 + 9 =
5 + 10 – 1



Children to show notation

Doubles then near doubles

5 + 6 =
5 + 5 + 1 = 11

7 + 8 =
8 + 8 - 1 = 15

Decision making

Using statements such as

Ben did 14 + 9 = 23
How could he have done it?

To know that the = sign means 'the same as' and can appear in a different place within a calculation; 14 = 8 + 6, 7+6=8+5

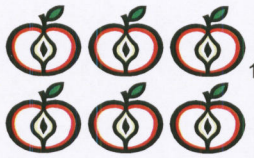
$17 - \square = 12$

Sam works out

17 – 5 = 12.

How could he have done this?

5 + 5 + 5 + 5 + 5 + 5 = 30
5 × 6 = 30
5 multiplied by 6
6 groups of 5
6 hops of 5

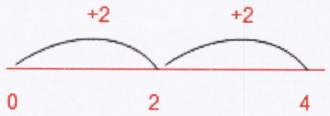


1 group of 3 = 3

2 groups of 3 = 6

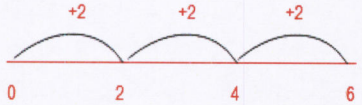
Doubles and grouping recorded on number lines

2 + 2 =



Children to show notation

2 + 2 + 2 =

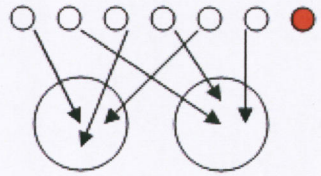


Children to show notation

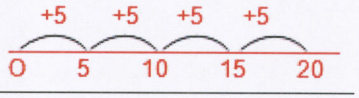
3 x 2 =6

3 multiplied by 2 equals 6.
3 times 2 equals 6

There are 7 cakes and 2 children. How many cakes will they each get?
'Leftovers' introduced.



There are 20 sweets in a bag. How many children can have 5 each?

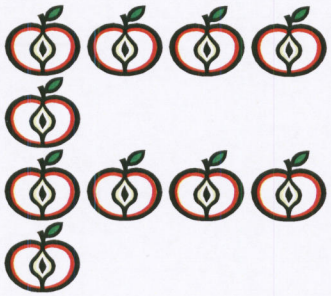
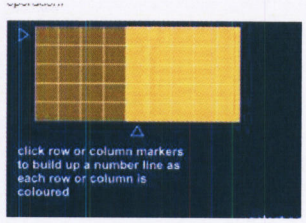


20 ÷ 5 = 4

"How many groups of 5 are there in 20?"

Randlay Primary School and Nursery
Calculation policy
Stages A & B

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

		Finding simple fractions of quantities. Finding half of 10 apples.   In the example above with 5 rows and 9 columns, when you select to count along the columns the given calculation is: 5 x 9 = 45 [the 5 is multiplied by 9]. Selecting to count along rows gives: 9 x 5 = 45 [the 9 is multiplied by 5].	

Randlay Primary School and Nursery
Calculation policy
Stages C & D

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

Addition

Stage C (Y2/3)

Emphasis on mental calculation.

Combining sets to make a total.

Progression in use of informal recording including the number line.

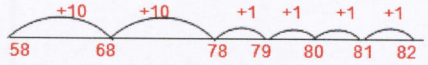
Answers to be recorded as part of a number sentence.

Reordering strategy.

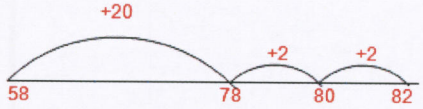
COUNTING ON AND BACK ITP
NUMBER LINE ITP

Adding:
TU + TU = TU
and when secure moving on to
TU + TU = HTU
HTU +TU = HTU

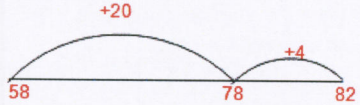
24 + 58



adding in 10s and 1s



add 20, bridge the 10



Subtraction

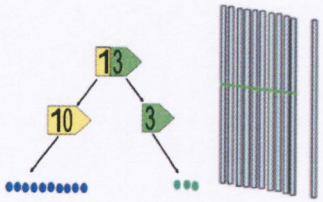
Stage C

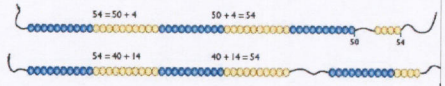
Place value, partitioning and recombining.

Rearranging of numbers so that 36 can be seen as 30 and 6 or as 20 and 16.

Partitioning of numbers into T and U then HTU. Know what each digit represents.

TU – TU
HTU – TU





PLACE VALUE ITP

Partitioning the second number strategy
76 – 43 =
76 – 40 = 36
36 – 3 = 33
When it is a subtraction calculation, underline the second number – this is the only number that can be partitioned.

73 – 46 =

Multiplication

Stage C

Using tables facts 2s, 10s and 5s and begin 3s and 4s.

Be able to partition a 2 digit number.

MULTIPLICATION BOARD ITP

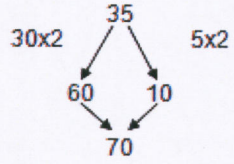
MULTIPLICATION TABLES ITP

Doubles are same as x2.

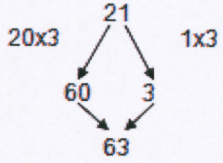
Vocabulary of double, multiply, groups of, sets of, lots of etc.

Partitioning strategy for doubling.

Double 35



A lolly costs 21p. How much do 3 cost?



Decision making
Children investigate statements and solve word problems using appropriate methods such as mental/ jottings/ numberline.

Division

Stage C

Understand division as repeated addition, grouping.

Table facts (see multiplication).

Division facts corresponding to the 2, 10, 5, 3 and 4 times tables.

Use x and ÷ signs.

MULTIPLICATION AND DIVISION TRIOS SPREADSHEET

Count a handful of beads by grouping them in fives. How many groups of 5 are there? How many are left? Can you write a division sentence to describe this?

How many lengths of 6 m can you cut from 48m of rope? Write the number fact that represents this. How did you work it out?

(OVERCOMING BARRIERS L2-L3 knowing and using number facts)

Record using the correct division symbol.

Use of number lines to record repeated addition.

Practical apparatus to support concept. Introduce the vocabulary of remainder.

Practical contexts to be used so that the calculation is not in the abstract.

Randlay Primary School and Nursery
Calculation policy
Stages C & D

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

add 20 and then 4

Record partitioned steps in number sentences underneath each other and add mentally.

24+58=
20+50=70
4+ 8=12
70+12=82

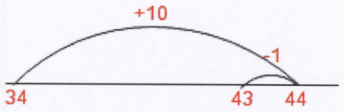
Introduce column addition without crossing the boundary

24 (20+4)
+53 (50+3)
77 (70 + 7)

Check answers by repeating addition in different order or by an equivalent calculation.

Compensation strategy

34 + 9 =



Near doubles

13 + 14 = ☐

Double 14 = 28

28 – 1 = 27

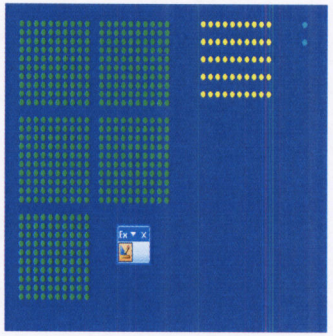
or

Double 13 = 26

26 + 1 = 27

EXCEL MISSING SIGNS AND NUMBERS

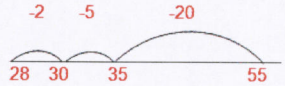
73 – 40 = 33
33 – 6 = 27



PLACE VALUE DOTS EXCEL SPREADSHEET

Counting back (left) from the larger number in partitioned steps of the smaller number to reach the unknown.

55 – 27
Rearranging strategy
Partitioning the 27 into 20, 5 and 2.



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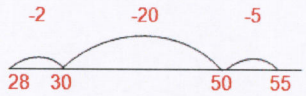
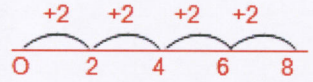


or

Grouping

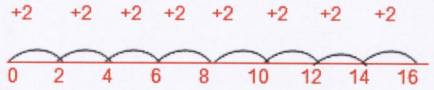


"How many groups of 2 are there in 8?"

The number of jumps tells you the number of groups.

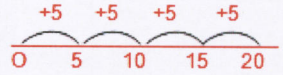
DOUBLING AND HALVING SPREADSHEET

16 ÷ 2 =
"How many groups of 2 are there in 16?"
"I know that dividing by 2 is the same as halving."

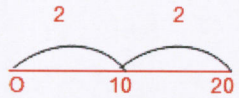


Jump size depends on knowledge and confidence of child. (See D)

20 ÷ 5 =



4 jumps
or moving away from + notation



2 double jumps because 5x2 =10

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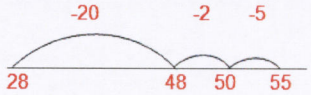
Calculation policy
Stages C & D

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

Adding zero leaves a number unchanged/ adding ten to a number keeps units digit constant.

Decision making (mental, jottings, numberline)
Statements and word problems.

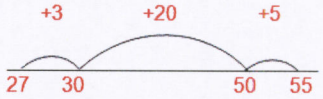


55 – 27 = 28

Find the difference (counting on to the right) Model with numbers that are close together.

55 – 27 = 28

"How many more do I need to add to 27 to get to 55?"



Subtract mentally pairs of multiples of 10 and 100, using known facts

60 – 20 = 40 because 6 – 2 = 4

700 – 300 = 400

Continue to use the vertical number line.

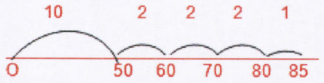
Use of apparatus (Diennes) to understand rearrangements, e.g. 55 as 40 and 15, not as part of calculations.

BEADSTICKS ITP to be used with Diennes to develop concept of exchange.

(Beadstick and other place value ITPS)

Decision making
Statements and word problems.

85 ÷ 5 =



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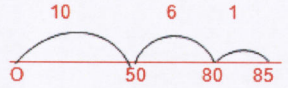

Decision making
Children investigate statements and solve word problems using appropriate methods such as mental/ jottings/ numberline.

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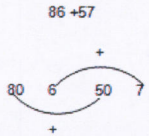
Calculation policy
Stages C & D

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

Stage D (Y3/4)

Counting on in multiples of 100s, 10s or units using a number line.

HTU + TU
Cross the 10s/100s boundary.



NUMBER BOARDS (all stages onwards) for range of numbers

Start with least significant digit

67
+ 24
11 (7+4)
+ 80 (60+20)
91

"7 add 4 equals 11 and 60 add 20 equals 80. 1+ 0 = 1 and 1 ten + 8 tens = 9 tens"

625
+ 48
13 (5+8)
60 (20 + 40)
+ 600 (600 + 0)
673

All language in the context of the place value and the mental addition of the totals to be done in any order.

625
+ 48
673

Stage D

Counting backwards and forwards beyond zero, negative and positive numbers. (Y4)

-5 is negative 5 and minus 5

TU – TU, HTU – TU, HTU – HTU.

Lead on to decomposition method in expanded format.

Ensure understanding of number partitioning and exchange.

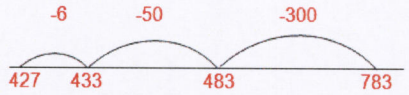
Least significant digit is always dealt with first to establish if the exchange is needed.

Check for mental approach first before written method. "Can I do this in my head?"

NUMBER BOARDS (all stages onwards) for range of numbers

Partitioning the second number strategy

783 – 356
Partitioning the 356 into 300, 50 and 6.



783 – 356 = 427

Difference strategy

"How many more do I need to get from 356 to

Stage D

Known table facts 2, 3,4,5,6, 8 and 10. Use doubling to connect the tables, eg the 4s are doubled to make the 8s.

NUMBER DIALS ITP

Refer to multiplication tables ITPs above.

Refer to Page 60 Overcoming barriers L2-L3 for further guidance.

Multiply by 10 / 100, understanding the shift in the digits.

Know what each digit represents, partition a three digit number.

Commutative law (the principle that the order of two numbers in a multiplication calculation makes no difference, e.g. 5x7=7x5).

MOVING DIGITS

Consolidate arrays and repeated addition. Recalling facts.
4 x 5 = 20, 5 x 4 = 20.

Informal recording of partitioned numbers
15 x 5 = 75

10 x 5 = 50
5 x 5 = 25

27 x 3 = 81

20x3 = 60
7x3 = 21

"20 **multiplied by** 3 equals 60 and 7

Stage D

Understand division as repeated addition.

Know all corresponding tables facts for 2, 3,4,5,6, 8 and 10.

Know what each digit represents in a HTU number.

Use numbers that will generate remainders. r notation for the remainder.

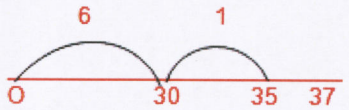
21 ÷ 5 = 4 r 1

Record using a number line,
30 ÷ 5 = 6

"What do I know about the number I am dividing by?"'
" I know that 5 x 6 = 30"

Repeated addition along a number line with jumps representing number of groups.

37 ÷ 5 =



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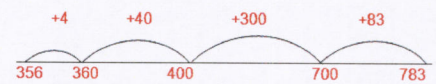
Calculation policy
Stages C & D

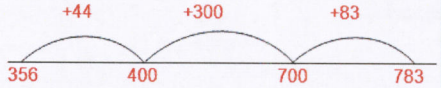
Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

Decision making.

783?"



leading to



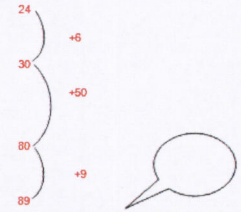
Both strategies need to record the answer in a number sentence.

783 -356 = 427
"783 subtract 356 equals 427"

89	=	80	9
- 24	=	20	4
		60	5 = 65

"9 subtract 4 equals 5 and 80 subtract 20 equals 60. 60 and 5 make 65"

Vertical number line



"Add 6 to 24 to make 30. Add 50 to 30 to make 80. Add 9 to 80 to make 89. So 6 add 50 add 9 equals 65."

multiplied by 3 equals 21. 60 add 21 equals 81."

Unifix model for the array (image TBA)

23 x 8 =
20 x 8 =160
3 x 8 = 24

x	20	3
8		

23
x 8
24 (8 x3)
160 (8 x20)
184

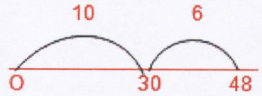
Decision making

Use partitioning/re-arranging to find multiples of the divisor.

Partitioning method
48 ÷ 3 =
'What do I know about 3 x tables?'
"I know 3 x 10 = 30."

48 ÷ 3 = 16

10 x 3 = 30 6 x 3 = 18



Decision making

Randlay Primary School and Nursery
Calculation policy
Stages C & D

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

	81 = 80 1 - 57 50 7 — _____ = 24 81 = 70 11 - 57 50 7 — _____ = 24 "1 to subtract 7 is tricky so I will rearrange 81 into 70 and 11. 11 subtract 7 equals 4 and 70 subtract 50 equals 20. 20 and 4 make 24." BEADSTICKS ITP **Decision making**		

Randlay Primary School and Nursery
Calculation policy
Stages E & F

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

Addition

Stage E (Y4/5)

Continue with HTU + HTU, then extend to ThHTU + ThHTU.

Approximate using the most significant digit, rounding skills.

Check using the inverse.

Refer to the carried digit as a ten or a hundred.

```
  587
+ 475
 1062
 1 1
```

"7 add 5 equals 12. That's 2 units and 1 ten to carry over.
80 add 70 equals 150 and the one ten to carry makes 160. That's 6 tens and 100 to carry over. 500 add 400 equals 900 and the one hundred to carry makes 1000"

```
  7648
+ 1486
    14
   120
  1000
 +8000
  9134
```

```
  7648
+ 1486
  9134
  1 1 1
```

Subtraction

Stage E

HTU – TU, then HTU – HTU.
(ThHTU – ThHTU)
(THHTU – HTU)

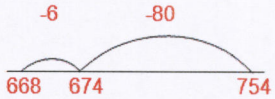
Extend to simple decimals with or without exchange from pence to pounds.

Ensure that all calculation is checked before started for any other possible 'tricky' bits.

Ensure that the setting out is accurate.

754 – 86 = 668

Take away (left)



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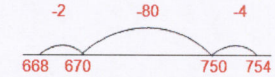

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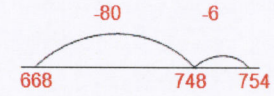


Find the difference (right)

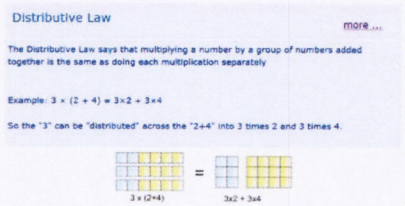
Multiplication

Stage E

Know table facts up to 12 x 12

Approximate first.

Partitioning / distributive law, e.g. 28x4 can be split up into 25x4 add 3x4 or 30x4 subtract 2x4.



Pupils to explain the effect of multiplying by 10 and 100.

Addition to be done mentally.

HTU and TU x U.

Record using grid notation and expanded short multiplication.

346 x 9

x	300	40	6
9			

Division

Stage E

Know division facts corresponding to tables up to 12 x 12

Approximate first using multiplication facts.

Divide any integer up to 1000 by 10.

"900 ÷ 10 = 90 because the digits move one place to the right"

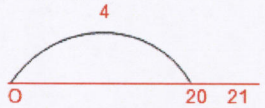
MOVING DIGITS ITP

Recap the finding of remainders on the number line first.

21 ÷ 5

"What do I know? I know that 21 is not a multiple of 5, so there will be a remainder."

21 ÷ 5 = 4r1



Jump size depends on knowledge and confidence of child. (See D)
This could also be shown as jumps of +5 along the number line resulting in 4 jumps

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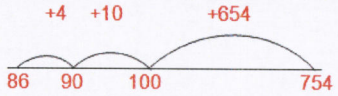
Calculation policy
Stages E & F

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

12·45 7·36 + 24·50 0·11 1·20 13·00 30·00 44·31 **NUMBER BOARDS**	 **Decomposition** **(Continue with Diennes and/or money as appropriate)** 754 700 50 4 - 86 80 6 600 60 8 =668 754 600 140 14 - 86 80 6 600 60 8 =668 *"It's tricky to take 6 from 4 and 80 from 50. I need to rearrange the number. I will exchange one ten from 50 which leaves 40 and makes 14 in the units. 40 to subtract 80 is tricky. I will **exchange** one hundred from 700 and make 140. 14 subtract 6 equals 8. 140 subtract 80 equals 60 and 600 subtract 0 equals 600."* **Decomposition** £ £ 8·95 8 . 90 5 -4·38 4 · 30 8 4 · 50 7 = 4.57 £ £ 8·95 7 · 80 15 -4·38 4 · 30 8 4 · 50 7 = 4.57	346 x 9 54 (9 x 6) 360 (9 x 40) 2700 (9 x 300) 3114 **Short multiplication with compact notation to be introduced once the expanded method is secure.** **Decision making** **Children investigate statements and solve word problems using appropriate methods. Children are also given examples of x9 and encouraged to think about using methods such as x10 and subtracting x1.**	and a remainder of 1. **Use problems in contexts that require the answer to be rounded up or down following the remainder.** **Eg 35 children to sleep four to a tent. How many tents do we need?** **Continue to use partitioning/re-arranging method.** 69 ÷ 3 = 'What do I know about 3 x tables?' "I know 3 x 10 = 30." 30 30 9 ↓ ↓ ↓ 10 10 3 69 ÷ 3 = 23 or 30 ÷ 3 = 10 30 ÷ 3 = 10 9 ÷ 3 = 3 69 ÷ 3 = 23 **Fractions relate to division. ÷ 4 is the same as halve and halve again.** **Recognise that division is non-commutative.** **Know that a number cannot be divided by 0.**

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Calculation policy
Stages E & F

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

	6 14 1 ~~7~~ ~~8~~ 4 - 2 8 6 4 6 8 **Emphasis on language of place value, i.e. 14 units subtract 6 units, 14 tens subtract 8 tens, and 6 hundreds subtract 2 hundreds.**		96 ÷ 6  *"What do I know? 6 x 10 = 60"* 60 36 ↓ ↓ 10 6 96 ÷ 6 = 16 Division as repeated subtraction/addition of multiples of the divisor. 132 ÷ 3 Write a partial table 3 x 10 = 30 3 x 20 = 60 3 x 40 = 120 Number line subtraction

Randlay Primary School and Nursery
Calculation policy
Stages E & F

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

Stage F (Y5)

Add with increasingly large numbers using the compact method.

Extend methods to include decimals to two decimal places.

Stage F

Subtract with increasingly large numbers using the compact method.

Extend methods to include decimals to two decimal places.

Stage F

Th HTU , HTU , TU x TU and U

28 x 27

x	20	8
20		
7		

Addition to be done mentally or across followed by column addition

28
x 27
56 (7x8)
140 (7 x20)
160 (20x8)
400 (20x20)
756

Long multiplication with compact notation to be introduced once the expanded method is secure.

Stage F

Know division facts corresponding to tables up to 12 x 12 and be able to apply them.

Use the relationship between multiplication and division.

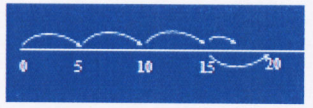
Extend chunking (subtraction/addition of multiples of the divisor, towards the dividend) method to include ThHTU by U, with an integer remainder.

Dividing up to 10,000 by 10/100.

Check with inverse operation. Use of calculator.

Use the number line to find remainders and express the quotient as a fraction or decimal.

DIVISION WITH REMAINDERS PPT
(example given below)
17 ÷ 5
"What do I know? 17 is not a multiple of 5".



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Calculation policy
Stages E & F

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

28 X 27 = 756

Multiply in different contexts

£2.73 x 3
£2.73 x 3 = 273p x 3

x	200	70	3
3			

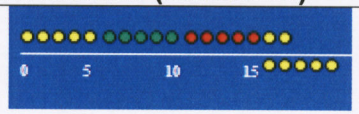
Followed by appropriate addition calculation.
273p x 3 = 819p
= £8.19

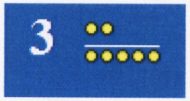
x	4000	300	40	6
8				

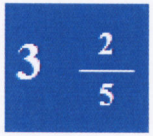
4346 x 8 = 34768

32000
2400
320
+ 48
34768

4346
x 8
48 (8x6)
320 (8x40)
2400 (8 x300)
32000 (8x4000)
34768



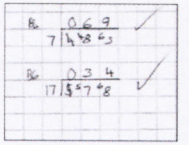


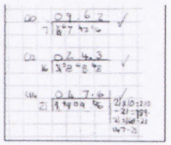


3 2/5 = 3.4

From knowledge of decimal/fraction equivalents or by converting 2/5 into 4/10

Short division with 'bus stop' notation





"483 divided by 7. 4 hundreds cannot be shared equally between 7, so exchange the 100s for 40 tens. I now have 48 tens which shared equally between 7 is 6 with a remainder of 6 tens. Exchange the 6 tens for 60 units, we now have 63 units. 63 divided equally between 7 equals 9. The answer is 69."

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Calculation policy
Stages E & F

Policy reflects: concrete (do it!) abstract (see it!) visual (remember it!) communication (record it!)

		Decision making **Children investigate statements and solve word problems using appropriate methods.** **Children investigate alternative methods such as compensation strategies and doubling and halving and discuss when these might be most appropriate and efficient.** **Examples:** **24x99 could be done using the grid method, but could also be calculated by x100 and subtracting 24x1.** **24 x25 could be done using the grid method, but could also be calculated by 24x100, halving to find x50 and halving again to find x 25.** **or using doubling and halving,** **24 x25=12x50** **=6 x100**	Use Diennes or place value equipment to model. **Decision making** (OVERCOMING BARRIERS Level 4 to Level 5 – Questions.) Word problems, e.g. 200 people attended a concert. $^1/_5$ of the people had complimentary tickets. The rest paid £7.50 each. How much money was collected from selling tickets? Money and measures, e.g. Which is longer: $^3/_4$ of an hour or 2500 seconds? **Partitioning method for HTU.** 847 ÷ 7 "What do I know? I know 7x12 = 84 so 7 x120 = 840" 847 840 7 ↓ ↓ 120 1 847 ÷ 7 = 121 (OVERCOMING BARRIERS Level 4 to Level 5 typical questions) Work out 575 ÷ 25, explaining your method.

Randlay Primary School and Nursery
Calculation policy
Stages E & F

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			Peter says that, if you want to divide a number by 12, you can divide it by 4 then by 3. Is he right? Explain how you know. Work out 768 ÷ 12 using Peter's method and using another method. Do you get the same answer? How many 35p packets of stickers can I buy with £5? Explain how you know. Coaches have 56 seats for passengers. How many coaches are needed to take 275 people on a trip? Complete this calculation: 943 ÷ 41 = 2 ☐ Work out whether or not 29 is a factor of 811.

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Stage G

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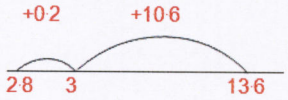
Addition	Subtraction	Multiplication	Division
Stage G (Y6) Promote decision making so that pupils choose an appropriate method/strategy. Continue the use of informal methods and number lines. Ensure understanding of standard written method. Continue ThHTU + ThHTU then calculations with any number of digits. Approximate using the most significant digits and a feel for the 'whole' number. Appropriate teaching/use of the calculator including interpreting the display, e.g. money or measures. *Calculator display 0.37 is then interpreted as 37p in the context of money. Remind 4p = 0.04 Calculator display £1.4 is interpreted as £1.40* 7648 + 1486 9134 1 1 1 Decimal points are fixed on the line with digits in the squares. Decimals, fill 'empty columns' with zeros.	**Stage G** ThHTU – ThHTU then any number of digits. Appropriate use of a calculator including interpretation of displays. Money, measures and real life contexts. 6467 – 2684 5 13 1 ~~6~~ ~~4~~67 - 2684 3783 324·9 – 7·25 1 1 8 1 3 2 4 ·~~9~~ ~~0~~ - 7 ·2 5 3 1 7 ·6 5 13·6 – 2·8 =  13·6 – 2·8 = 10·8	**Stage G** ThHTU x TU and HTU x TU and including decimals. TU x TU 78 x 42 16 (2 x 8) 140 (2 x 70) 320 (40 x 8) +2800 (40 x 70) 3276 Compact (long) 78 x42 156 1 +3120 3276 Involve decimals, money and measures through approximation and appropriate use of the calculator. Addition either mentally or by column addition.	**Stage G** Know all multiplication facts and corresponding division facts to 12 x 12 and beyond and be able to apply them. Explain the effect of dividing by1000. Extend methods to include Th HTU by TU. Continue to use the short division method when the two digit divisor is up to 12 or is a easily recognisable multiple eg 20, 25 or 50. Use a calculator appropriately, approximating first. Use of calculator for interpreting the quotient by entering a fraction to find the decimal equivalent. Mathsonline.org-long division Use long division only with pupils who are secure with number sense and place value. 384 ÷ 16 *"What do I know about the divisor?" Record partial tables.*

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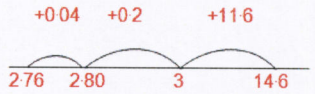
124·9 + 7·25

124·90
+ 7·25
132·15
1 1

leading to

14·6 – 2·76



Decimals. Teach children how to use known facts to build new facts according to the place value required, e.g.
3x4 =12
3x0.4 = 1.2
3x0.04 = 0.12

0.75 x 6

0.7 x 6 = 4.2
0.05 x 6 = 0.3
0.75 x 6 = 4.5

Grid method based upon very secure place value.

x	0.7	0.05
6		

Overcoming Barriers L4/5

Mike works out that 14 × 12 = 168. What is 14 × 1.2? How do you know?

Use a written method to calculate 24 × 13. What do you need to change to show a similar method to work out 2.4 × 13?

Use a written method to find the area of a swimming pool which is 25 m long and 7.5 m wide.

Complete the missing sections to work out 35 × 2.1 :

Long division *(thinking not generally recorded)*

24
16) 38⁶4 *(38÷16=2 r 6; 2x16=32)*
– 32 ↓ *(bring the 4 down)*
64 *(16 into 64=4; 4x16=64)*
– 64
0 *(no remainder)*

Continue to make use of partitioning and the number line for repeated addition where appropriate.

944 ÷ 22 =
What do I know about the divisor?

Express the remainder as a fraction or decimal.

Overcoming Barriers L4/5

Division giving a decimal answer, e.g. Divide 9 by 5 giving your answer as a decimal.

Missing number calculations, e.g.

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		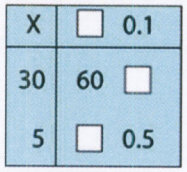 Which is closer to 100: 5.2 × 17 or 7.2 × 15? Use written methods to prove your answer.	☐ ÷ 8 = 0.04; 0.6 × ☐ = 4.2