

Whybridge Junior School



MATHEMATICS

New Curriculum: Planning Document

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1. PROGRESSION THROUGH CALCULATIONS FOR ADDITION

MENTAL CALCULATIONS

These are a selection of mental calculation strategies. On an additional document you will find year group expectations for mental starters. Each week teachers must cover rapid recall, mental strategies and mental calculations.

Mental recall of number bonds

$6 + 4 = 10$

$\square + 3 = 10$

$25 + 75 = 100$

$19 + \square = 20$

Use near doubles

$6 + 7 = \text{double } 6 + 1 = 13$

Addition using partitioning and recombining

$34 + 45 = (30 + 40) + (4 + 5) = 79$

Counting on or back in repeated steps of 1, 10, 100, 1000

$86 + 57 = 143$ (by counting on in tens and then in ones)

$460 - 300 = 160$ (by counting back in hundreds)

Add the nearest multiple of 10, 100 and 1000 and adjust

$24 + 19 = 24 + 20 - 1 = 43$

$458 + 71 = 458 + 70 + 1 = 529$

Use the relationship between addition and subtraction

$$36 + 19 = 55$$

$$19 + 36 = 55$$

$$55 - 19 = 36$$

$$55 - 36 = 19$$

MENTAL CALCULATION STRATEGIES WILL CONTINUE TO BE USED THROUGHOUT YEAR GROUPS. THEY ARE NOT REPLACED BY WRITTEN METHODS.

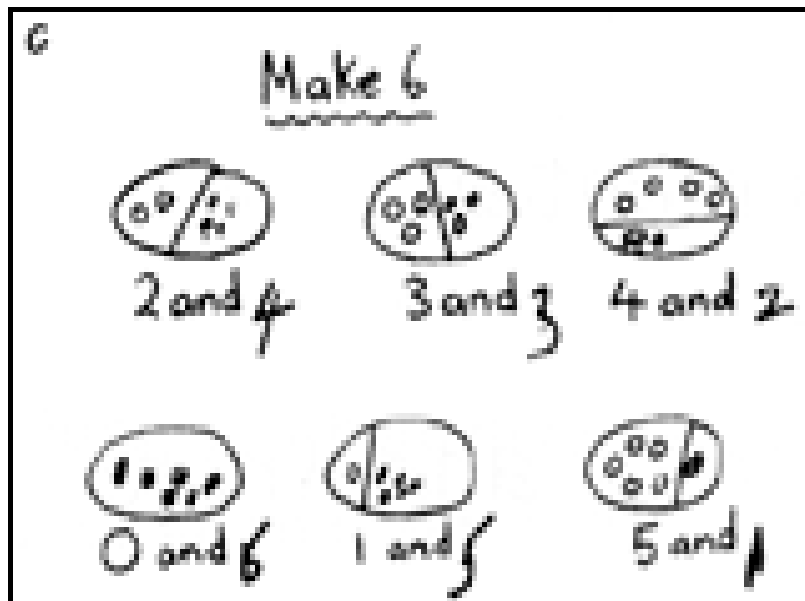
THE FOLLOWING ARE MINIMUM STANDARDS THAT WE EXPECT THE CHILDREN TO ACHIEVE - SOME WILL ACHIEVE BEYOND THIS EXPECTATION AND THE CHILDREN MUST NOT BE LIMITED

'THERE IS NO LID ON LEARNING!'

YR and Y1

When using a hundred square, Whybridge will use a fly to add ones and a spider to add or take away tens.

Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures and by writing number statements which include, =, + and - accurately

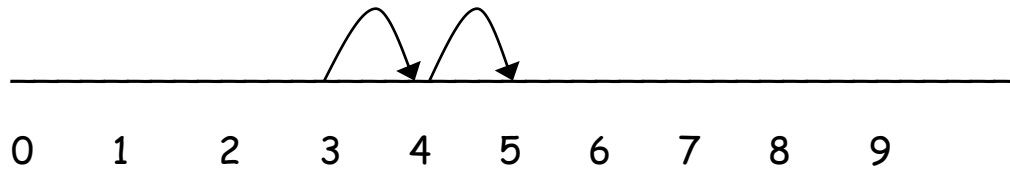


When using a number line Whybridge will use a frog to jump along the line.

They use number lines and practical resources to support calculation and teachers *demonstrate* the use of the numberline.

$$3 + 2 = 5$$

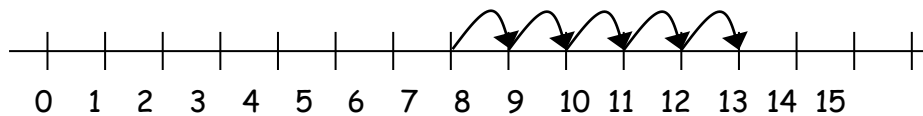
+1 +1



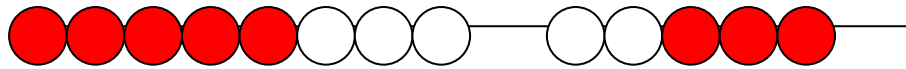
Children then begin to use numbered lines (which include 0) to support their own addition and subtraction calculations using a numbered line to count on in single digit and two digit numbers to 20.

$$8 + 5 = 13$$

+1 +1 +1 +1 +1



Bead strings or bead bars can be used to illustrate addition including bridging through ten by counting on 2 then counting on 3.



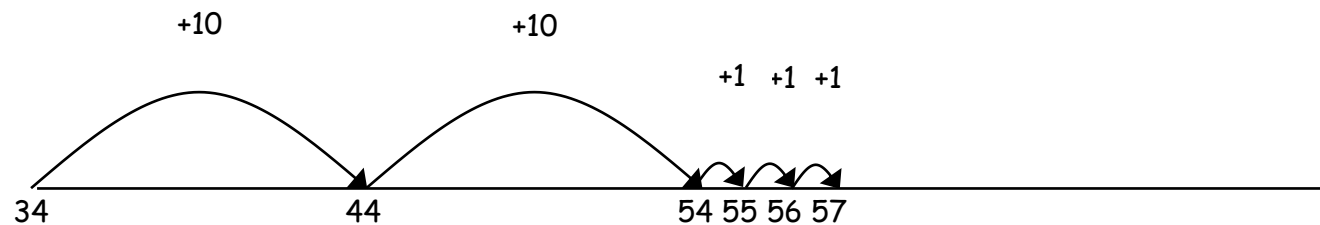
Children solve simple worded problems involving addition and subtraction. They are able to recall number bonds to 20.

Y2

Children will begin to use 'empty number lines' themselves starting with the larger number and counting on.

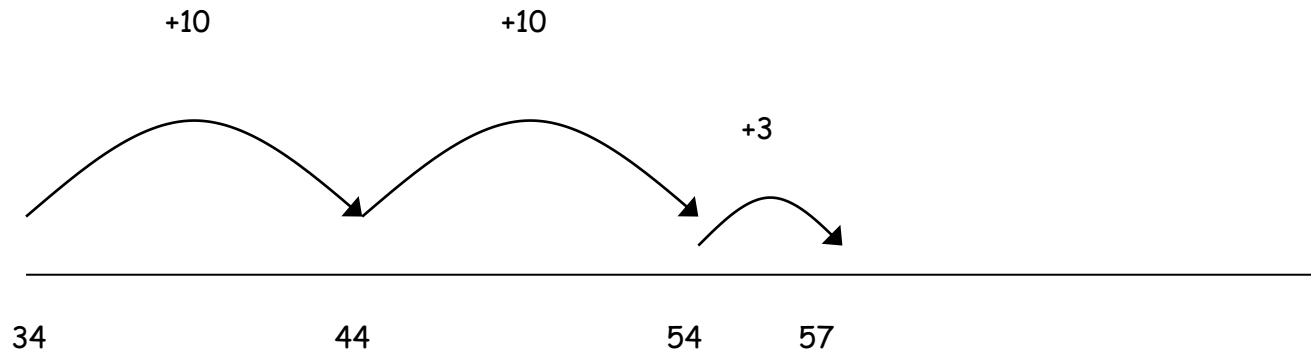
- ✓ First counting on in tens and ones.

$$34 + 23 = 57$$



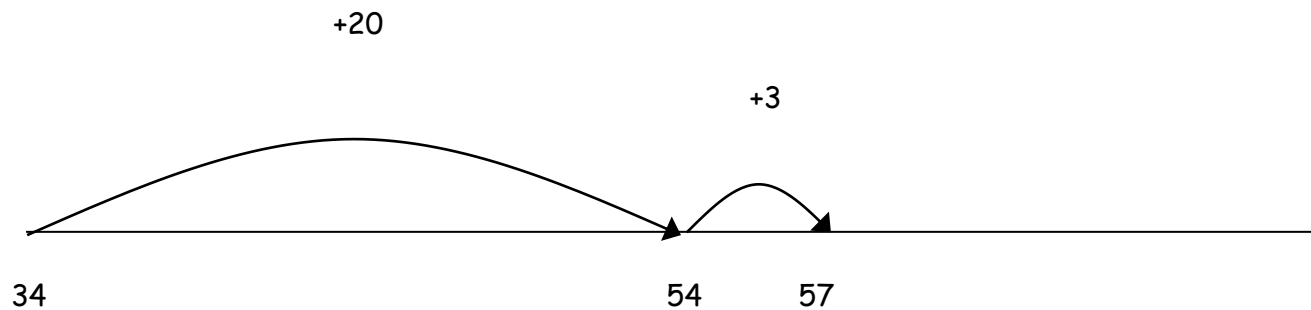
- ✓ Then helping children to become more efficient by adding the ones in one jump (by using the known fact $4 + 3 = 7$).

$$34 + 23 = 57$$



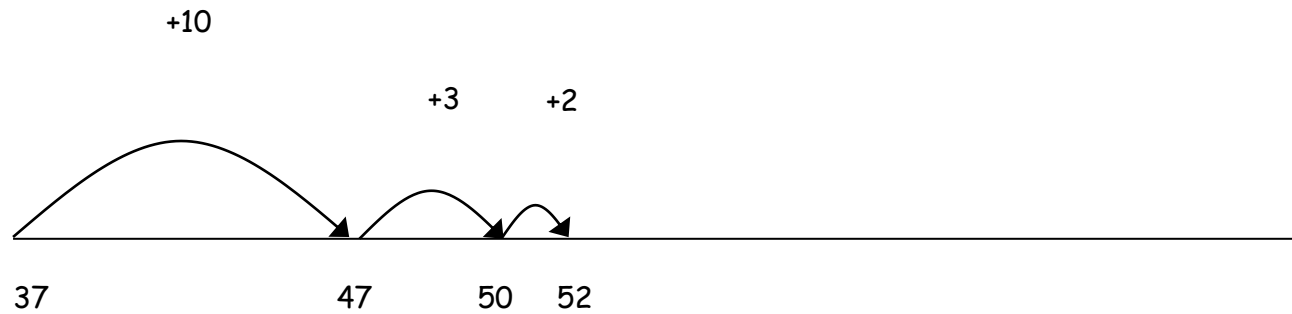
✓ Followed by adding the tens in one jump and the ones in one jump.

$$34 + 23 = 57$$



✓ Bridging through ten can help children become more efficient.

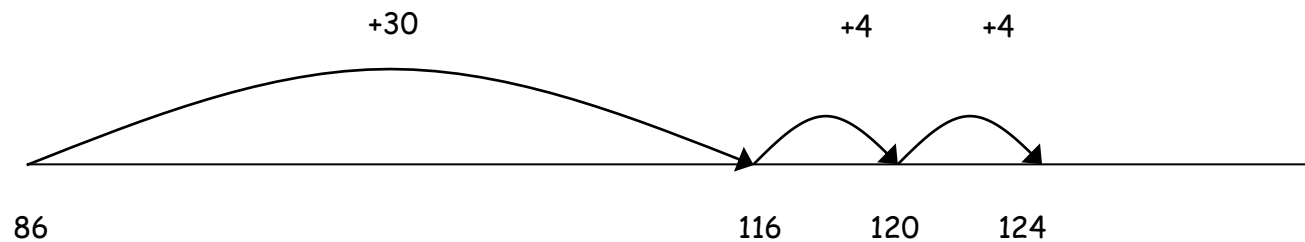
$$37 + 15 = 52$$



Children will continue to use empty number lines with increasingly large numbers, including compensation where appropriate.

✓ Count on from the largest number irrespective of the order of the calculation.

$$38 + 86 = 124$$



Children are able to recall and use + and - facts to 20 (building on previous work)

Children will begin to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies. Addition and subtraction calculations, for up to two digit numbers, should not involve carrying and/or borrowing.

Children are introduced to 'find the difference' and 'take away' problems, including solving worded problems, and recognise that addition is commutative and that subtraction is not.

Children use inverse operations for addition and subtraction.

Children will use place value cards to partition numbers and add one or ten more.

Children will use the expanded column addition method to add

Children will be able to add and subtract numbers using concrete objects, pictorial representations, and mentally, including:

- a two-digit number and ones
- a two-digit number and tens
- two two-digit numbers

- adding three one-digit numbers

Children should begin to record addition sums using the expanded addition method to support place value. Between each column children must leave two squares.

300 50 7

400 20 6

700 70 13 = 783

Y3

Children use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies. They are able to accurately add and subtract mentally pairs of:

- a three-digit number and ones
- a three-digit number and tens
- a three-digit number and hundreds

And solve word problems - including problems involving missing numbers.

Children use column addition and subtraction for numbers with up to three digits.

Adding or subtracting the least significant digits first

Moving digits across columns will be above the line. Children will be taught from the infants to leave a line between the sum and the answer box.

$$\begin{array}{r} 625 \\ + 48 \\ \hline 1 \\ \hline 673 \end{array}$$

$$\begin{array}{r} 783 \\ + 42 \\ \hline 1 \\ \hline 825 \end{array}$$

$$\begin{array}{r} 367 \\ + 85 \\ \hline 11 \\ \hline 452 \end{array}$$

Y4

Using similar methods, children will:

- ✓ *add several numbers with different numbers of digits;*
- ✓ *begin to add two or more three-digit sums of money, with or without adjustment from the pence to the pounds;*

- ✓ *know that the decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. £3.59 + 78p.*

Children should extend the carrying method to numbers with at least four digits.

Moving digits across columns will be above the line. Children will be taught from the infants to leave a line between the sum and the answer box.

$$\begin{array}{r} 587 \\ + 475 \\ \hline 11 \\ \hline 1062 \end{array}$$
$$\begin{array}{r} 3587 \\ + 675 \\ \hline 111 \\ \hline 4262 \end{array}$$

And use estimation and the inverse to check answers for accuracy.

Y5

Using similar methods, children will:

- ✓ *add several numbers with different numbers of digits;*

- ✓ *begin to add two or more decimal fractions with up to three digits and the same number of decimal places;*
- ✓ *know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 3.2 m - 280 cm.*

Y6

Children should extend the carrying method to number with any number of digits.

Moving digits across columns will be above the line. Children will be taught from the infants to leave a line between the sum and the answer box.

$$\begin{array}{r}
 7648 \\
 + 1486 \\
 \hline
 111 \\
 \hline
 9134
 \end{array}$$

$$\begin{array}{r}
 6584 \\
 + 5848 \\
 \hline
 111 \\
 \hline
 12432
 \end{array}$$

$$\begin{array}{r}
 42 \\
 6432 \\
 786 \\
 3 \\
 + 4681 \\
 \hline
 121 \\
 \hline
 11944
 \end{array}$$

Using similar methods, children will

- ✓ *add several numbers with different numbers of digits;*
- ✓ *begin to add two or more decimal fractions with up to four digits and either one or two decimal places;*

- ✓ *know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. $401.2 + 26.85 + 0.71$.*

+ - + - + - + - + - + - +

By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.

Children should not be made to go onto the next stage if:

- 1) they are not ready.
- 2) they are not confident.

Children should be encouraged to approximate their answers before calculating.

Children should be encouraged to check their answers after calculation using an appropriate strategy.

Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.

2. PROGRESSION THROUGH CALCULATIONS FOR DIVISION

MENTAL CALCULATIONS

These are a selection of mental calculation strategies. On an additional document you will find year group expectations for mental starters. Each week teachers must cover rapid recall, mental strategies and mental calculations.

Doubling and halving

Knowing that halving is dividing by 2

Deriving and recalling division facts

Tables should be taught everyday from Y1 onwards, either as part of the mental oral starter or other times as appropriate within the day.

Year 1 2 times table
 5 times table
 10 times table

Year 2 2 times table
 5 times table
 10 times table

Year 3 2 times table
 3 times table
 4 times table
 5 times table
 8 times table
 10 times table

Year 4 Derive and recall all division facts up to 12×12

Years 5 & 6 Derive and recall quickly all division facts up to 12×12 .

Using and applying division facts

Children should be able to utilise their tables knowledge to derive other facts.

e.g. If I know $3 \times 7 = 21$, what else do I know?

$30 \times 7 = 210$, $300 \times 7 = 2100$, $3000 \times 7 = 21\,000$, $0.3 \times 7 = 2.1$ etc

Dividing by 10, 100, 1000,

Knowing that the effect of dividing by 10 is a shift in the digits one place to the right.

Knowing that the effect of dividing by 100 is a shift in the digits two places to the right.

Year 3 Divide whole numbers by 10

Year 4 Divide any number to 10 000 by 10 and 100

Year 5 Divide whole numbers and decimals by 10, 100, 1000,

Year 6 Divide whole numbers and decimals up to 3DP by 10, 100, 1000 giving answers to 3DP

Use of factors

$378 \div 21$ $378 \div 3 = 126$ $378 \div 21 = 18$

$126 \div 7 = 18$

Use related facts

Given that $1.4 \times 1.1 = 1.54$

What is $1.54 \div 1.4$, or $1.54 \div 1.1$?

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'THERE IS NO LID ON LEARNING!'

YR and Y1

Children will understand equal groups and share items out in play and problem solving. They will count in 2s and 10s and 5s.

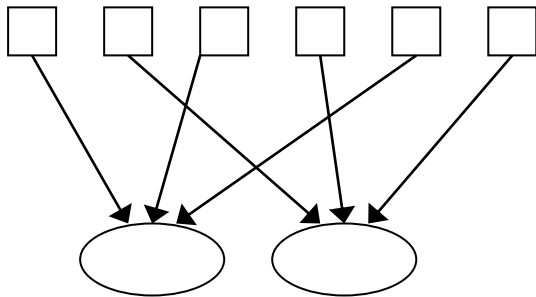


Y2

Children will develop their understanding of division and use jottings to support calculation

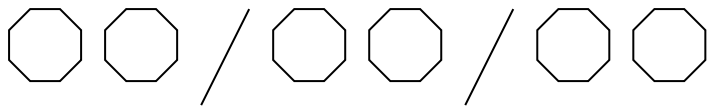
✓ **Sharing equally**

6 sweets shared between 2 people, how many do they each get?



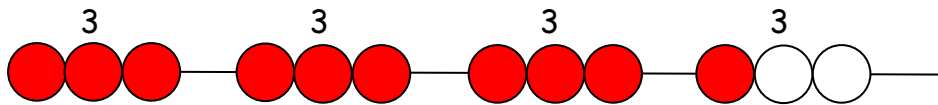
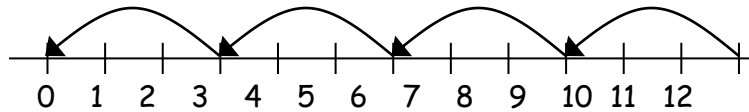
✓ **Grouping or repeated subtraction**

There are 6 sweets, how many people can have 2 sweets each?



- ✓ Repeated subtraction using a number line or bead bar

$$12 \div 3 = 4$$



The bead bar will help children with interpreting division calculations such as $10 \div 5$ as 'how many 5s make 10?'

- ✓ Using symbols to stand for unknown numbers to complete equations using inverse operations

$$\square \div 2 = 4 \quad 20 \div \triangle = 4 \quad \square \div \triangle = 4$$

Y3

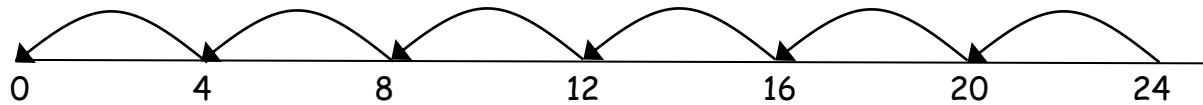
Ensure that the emphasis in Y3 is on grouping rather than sharing.

Children will continue to use:

✓ **Repeated subtraction or addition using a number line**

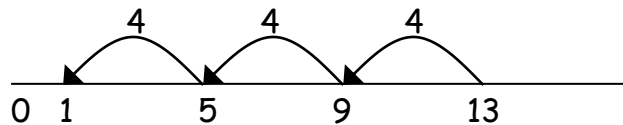
Children will use an empty number line to support their calculation. When jumping along a number line the children will use the monkey to jump.

$$24 \div 4 = 6$$



Children should also move onto calculations involving remainders.

$$13 \div 4 = 3 \text{ r } 1$$



✓ **Using symbols to stand for unknown numbers to complete equations using inverse operations**

$$26 \div 2 = \square \quad 24 \div \triangle = 12 \quad \square \div 10 = 8$$

✓ **Chunking**

Children will develop their use of repeated addition to be able to add multiples of the divisor. Initially, these should be multiples of 10s, 5s, 2s and 1s - numbers with which the children are more familiar. Children will work on dividing a two digit

number by a one digit number. They will create a key facts box with 10 x, 5 x, 2x the divisor. Children should be encouraged to add the biggest multiple first.

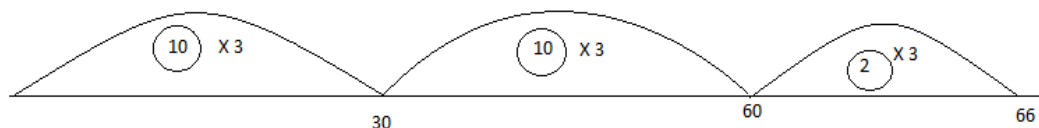
$$66 \div 3 =$$

KF

$$2 \times 3 = 6$$

$$5 \times 3 = 15$$

$$10 \times 3 = 30$$



✓ Children should be introduced to the formal short division method

$$\begin{array}{r} 97 \\ 3 \overline{) 291} \end{array}$$

Y4

✓ **Chunking**

Initially children add several chunks, but with practice they should look for the biggest multiples of the divisor that they can find to add.

When dividing a three digit number they should be able to add multiples of 20, 30 etc.

✓ **Vertical Chunking**

When the children write the division calculation, they need to be able to write it as a multiplication calculation with a hole in it.

$$72 \div 3 = \quad \square \times 3 = 72$$


| | |
|----------|-----|
| 3) 72 | 10x |
| - 30 | 10x |
| 42 | 2x |
| - 30 | 2x |
| 12 | |
| - 6 | |
| 6 | |
| - 6 | |
| 0 | |
| Answer : | 24 |

Leading to subtraction of other multiples.

$$96 \div 6$$

$$\begin{array}{r} 16 \\ 6 \overline{) 96} \\ \underline{- 60} \\ 36 \\ \underline{- 36} \\ 0 \end{array}$$

Answer : 16



Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2.

Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division. For example $62 \div 8$ is 7 remainder 6, but whether the answer should be rounded up to 8 or rounded down to 7 depends on the context.

e.g. I have 62p. Sweets are 8p each. How many can I buy?

Answer: 7 (the remaining 6p is not enough to buy another sweet)

Apples are packed into boxes of 8. There are 62 apples. How many boxes are needed?

Answer: 8 (the remaining 6 apples still need to be placed into a box)

✓ Children will use the formal short division method:

$$\begin{array}{r} 97 \\ 3 \overline{) 291} \end{array}$$

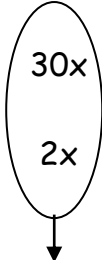
Y5

- ✓ Children will divide numbers up to 4 digits by a one digit number using the formal written method of short division and interpret remainders.
- ✓ Children will practise and extend their use of the formal written short division method.

Children can start to subtract larger multiples of the divisor, e.g. 30x

✓ Long division method $HTO \div O$

$$196 \div 6$$

$$\begin{array}{r} 32 \text{ r } 4 \\ 6 \overline{) 196} \\ \underline{- 180} \\ 16 \\ \underline{- 12} \\ 4 \end{array}$$


Answer : 32 remainder 4 or 32 r 4

Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2.

Children need to record answers for non-integer division in different ways, including: with remainders, fractions, decimals or with rounding, for example: $98 \div 4 = 24 \text{ r } 2 = 24\frac{1}{2} = 24.5 = 25$.

Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division. For example $240 \div 52$ is 4 remainder 32, but whether the answer should be rounded up to 5 or rounded down to 4 depends on the context.

Children need to be able to divide ThHTO by O.

✓ Formal short division method when dividing numbers by up to 4 digits:

98 ÷ 7 becomes

$$\begin{array}{r} 14 \\ 7 \overline{) 98} \\ \underline{7} \\ 20 \\ \underline{14} \\ 6 \end{array}$$

Answer: 14

432 ÷ 5 becomes

$$\begin{array}{r} 86 \text{ r} 2 \\ 5 \overline{) 432} \\ \underline{40} \\ 32 \\ \underline{30} \\ 2 \end{array}$$

Answer: 86 remainder 2

496 ÷ 11 becomes

$$\begin{array}{r} 45 \text{ r} 1 \\ 11 \overline{) 496} \\ \underline{44} \\ 56 \\ \underline{55} \\ 1 \end{array}$$

Answer: $45 \frac{1}{11}$

Y6

- ✓ Children will divide numbers up to 4 digits by a two digit number using the formal written method of long division.
- ✓ Children will divide numbers up to 4 digits by a two digit number using formal short division.


Children will continue to use written methods to solve short division $HTO \div O$ and $ThHTO \div O$.

✓ Long division $HTO \div TO$

$$972 \div 36$$

$$\begin{array}{r} 27 \\ 36 \overline{) 972} \\ \underline{- 720} \\ 252 \\ \underline{- 252} \\ 0 \end{array}$$


Answer : 27



Any remainders should be shown as fractions, i.e. if the children were dividing 32 by 10, the answer should be shown as $3 \frac{2}{10}$ which could then be written as $3 \frac{1}{5}$ in its lowest terms.

Extend to decimals with up to two decimal places. Children should know that decimal points line up under each other.

$$87.5 \div 7$$

$$\begin{array}{r} 12.5 \\ 7 \overline{) 87.5} \\ \underline{- 70.0} \\ 17.5 \\ \underline{- 14.0} \\ 3.5 \\ \underline{- 3.5} \\ 0 \end{array}$$


$$\begin{array}{r}
 0 \\
 \downarrow \\
 \text{Answer : } 12.5
 \end{array}$$

✓ Children can express remainders as fractions or decimals

$$456 \div 5 = 91.2$$

$$\begin{array}{r}
 091.2 \\
 5 \overline{) 456.10}
 \end{array}$$

+ - + - + - + - + - + - +

By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.

Children should not be made to go onto the next stage if:

- 3) they are not ready.
- 4) they are not confident.

Children should be encouraged to approximate their answers before calculating.

Children should be encouraged to check their answers after calculation using an appropriate strategy.

Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.

3. PROGRESSION THROUGH CALCULATIONS FOR MULTIPLICATION

MENTAL CALCULATIONS

These are a selection of mental calculation strategies. On an additional document you will find year group expectations for mental starters. Each week teachers must cover rapid recall, mental strategies and mental calculations.

Doubling and halving

Applying the knowledge of doubles and halves to known facts.

e.g. 8×4 is double 4×4

Using multiplication facts

Tables should be taught everyday from Y1 onwards, either as part of the mental oral starter or other times as appropriate within the day.

Year 1 2 times table
 5 times table
 10 times table

Year 2 2 times table
 5 times table
 10 times table

Year 3 2 times table
 3 times table
 4 times table
 5 times table
 8 times table
 10 times table
 Count in multiples of 50 and 100

Year 4 Derive and recall all multiplication facts up to 12×12
 Count in multiples of 6,7, 9, 25 and 1000

Years 5 & 6 Derive and quickly recall all multiplication facts up to 12×12 .
 Count in steps of powers of 10 for any given number up to 1000 000

Using and applying multiplication facts

Children should be able to utilise their tables knowledge to derive other facts.

e.g. If I know $3 \times 7 = 21$, what else do I know?

$30 \times 7 = 210$, $300 \times 7 = 2100$, $3000 \times 7 = 21\ 000$, $0.3 \times 7 = 2.1$ etc

Use closely related facts already known

$$\begin{aligned} 13 \times 11 &= (13 \times 10) + (13 \times 1) \\ &= 130 + 13 \\ &= 143 \end{aligned}$$

Multiplying by 10, 100, 1000

Knowing that the effect of multiplying by 10 is a shift in the digits one place to the left.

Knowing that the effect of multiplying by 100 is a shift in the digits two places to the left.

Year 3 Multiply a one digit or two digit number by 10

Year 4 Multiply any one or two digit number by 10 and 100

Year 5 Multiply whole numbers and decimals by 10, 100, 1000,

Year 6 Multiply whole numbers and decimals up to 3DP by 10, 100, 1000, and give the answer to 3DP

Partitioning

$$\begin{aligned}23 \times 4 &= (20 \times 4) + (3 \times 4) \\ &= 80 + 12 \\ &= 102\end{aligned}$$

Use of factors

$$8 \times 12 = 8 \times 4 \times 3$$

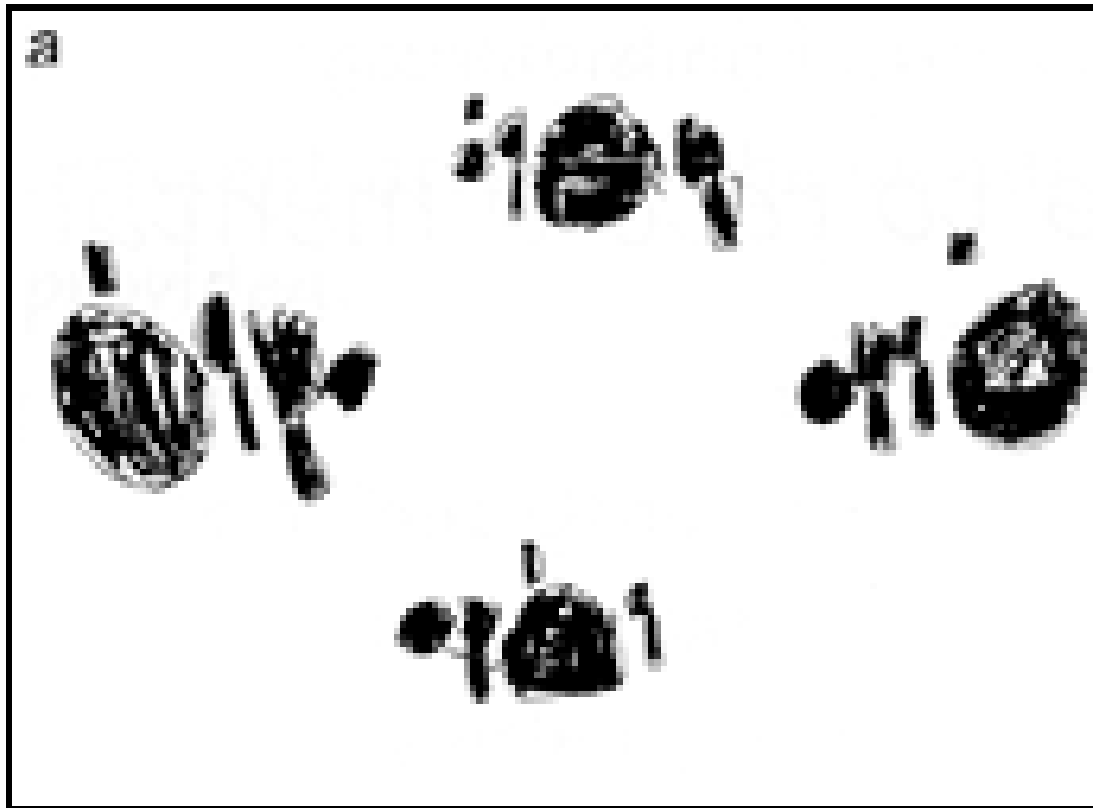
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'THERE IS NO LID ON LEARNING!'

YR

Children will experience equal groups of objects and will count in 2s, 5s and 10s. They will work on practical problem solving activities involving equal sets or groups.



Y1

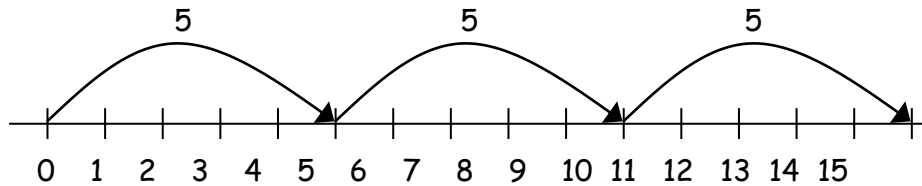
Children will develop their understanding of multiplication and use jottings to support calculation:

✓ Repeated addition

3 times 5 is $5 + 5 + 5 = 15$ or 3 lots of 5 or 5×3

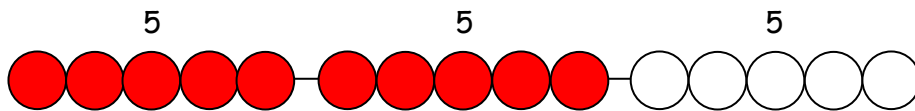
Repeated addition can be shown easily on a number line:

$$5 \times 3 = 5 + 5 + 5$$



and on a bead bar:

$$5 \times 3 = 5 + 5 + 5$$



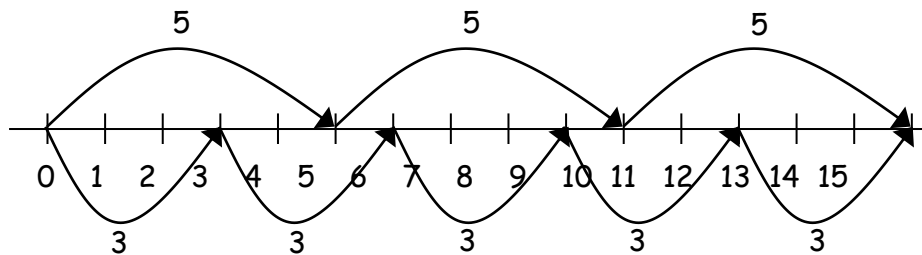
✓ **Mathematical statements**

Children will be able to read and write number sentences using the multiplication and equals symbol and answer the question with the teacher using concrete objects.

Y2

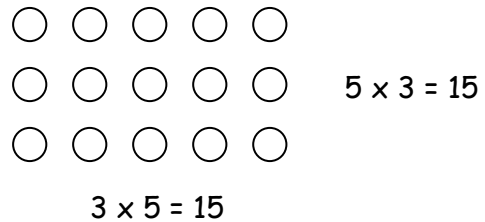
✓ **Commutativity**

Children will know that 3×5 has the same answer as 5×3 . This can also be shown on the number line.



✓ **Arrays**

Children will be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method.



✓ **Mathematical statements**

Children will be able to record and interpret number sentences using the multiplication and equals symbol.

✓ **Finding missing numbers**

Children will be able to calculate the value of an unknown in a number sentence,
eg $3 \times \square = 15$

Y3

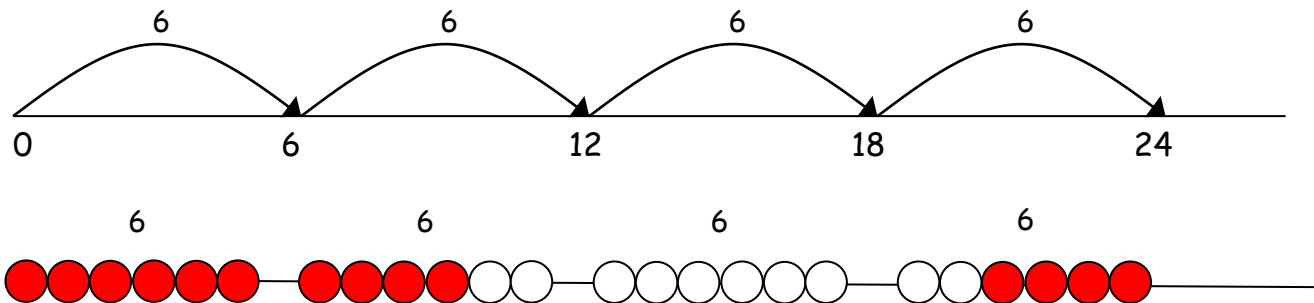
The children will be developing written methods to multiply a one digit number by a two digit number.

Children will continue to use:

✓ **Repeated addition**

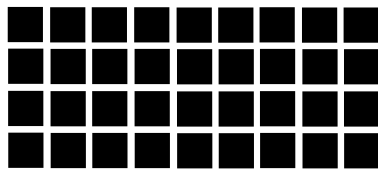
4 times 6 is $6 + 6 + 6 + 6 = 24$ or 4 lots of 6 or 6×4

Children could use number lines or bead bars to support their understanding.



✓ **Arrays**

Children will be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method.



$$9 \times 4 = 36$$

$$9 \times 4 = 36$$

Children will also develop an understanding of

✓ **Scaling**

e.g. Find a ribbon that is 4 times as long as the blue ribbon



5 cm



20 cm

✓ **Using symbols to stand for unknown numbers to complete equations using inverse operations**

$$\square \times 5 = 20$$

$$3 \times \triangle = 18$$

$$\square \times \circ = 32$$

✓ **Grid method**

Children should progress to using formal written methods

TO x O

(Progressing to formal short multiplication method for multiplication by a single digit)

23×8

Children will approximate first

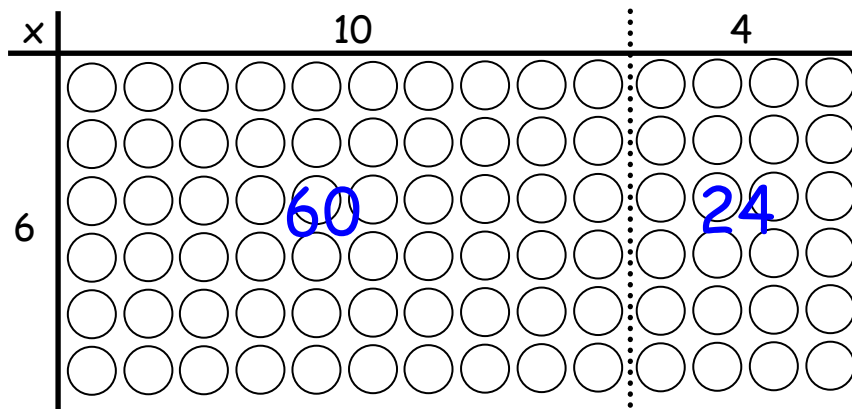
23×8 is approximately $25 \times 8 = 200$

$$\begin{array}{r} \times \quad 20 \quad 3 \\ 8 \quad \boxed{160} \quad \boxed{24} \end{array}$$

$$\begin{array}{r} 160 \\ + \quad 24 \\ \hline 184 \end{array}$$

Y4

Children will continue to use arrays where appropriate leading into the grid method of multiplication.



$$(6 \times 10) + (6 \times 4)$$

$$60 + 24$$

$$84$$

✓ **Grid method**

HTO × O

$$426 \times 9$$

Children will approximate first

426×6 is approximately $400 \times 6 = 2400$

| | | | | |
|---|------|-----|----|-------------|
| × | 400 | 20 | 6 | |
| 6 | 2400 | 120 | 36 | 2400 |
| | | | | + 120 |
| | | | | + <u>36</u> |
| | | | | <u>2556</u> |

✓ **Short multiplication**

(Short multiplication - multiplication by a single digit)

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

Moving digits into another column needs to go above the answer.

Y5

Children will work on multiplying ThHTO \times O, ThHTO \times TO and TO \times TO using formal short multiplication and formal long multiplication.

Grid method

ThHTO \times O

$$3462 \times 9$$

Children will approximate first

$$3462 \times 9 \text{ is approximately } 3500 \times 10 = 35000$$

| | | | | |
|----------|-------|------|-----|----|
| \times | 3000 | 400 | 60 | 2 |
| 9 | 27000 | 3600 | 540 | 18 |

$$\begin{array}{r} 27000 \\ +3600 \\ + 540 \\ + 18 \\ \hline 1 \quad 1 \\ \hline \underline{\underline{31158}} \end{array}$$

TO x TO

72×38

Children will approximate first

72×38 is approximately $70 \times 40 = 2800$

| | | | |
|----|------|----|-------|
| x | 70 | 2 | |
| 30 | 2100 | 60 | =2160 |
| 8 | 560 | 16 | = 576 |

$$\begin{array}{r} 2160 \\ 576 \\ \hline 2736 \end{array}$$

Formal Long multiplication - multiplication by more than a single digit)

THTO X TO , HTO X TO, TO X TO

Children will begin by multiplying the digit in the ones column then move to the tens column.

$$\begin{array}{r} 56 \\ X 24 \\ \hline 224 \\ 1120 \\ \hline 1344 \end{array}$$

Short Multiplication:

24 × 6 becomes

$$\begin{array}{r} 2 \ 4 \\ \times 6 \\ \hline 1 \ 4 \ 4 \\ 2 \\ \hline \end{array}$$

Answer: 144

342 × 7 becomes

$$\begin{array}{r} 3 \ 4 \ 2 \\ \times 7 \\ \hline 2 \ 3 \ 9 \ 4 \\ 2 \ 1 \\ \hline \end{array}$$

Answer: 2394

2741 × 6 becomes

$$\begin{array}{r} 2 \ 7 \ 4 \ 1 \\ \times 6 \\ \hline 1 \ 6 \ 4 \ 4 \ 6 \\ 4 \ 2 \\ \hline \end{array}$$

Answer: 16 446

Using similar methods, they will be able to multiply decimals with one decimal place by a single digit number, approximating first. They should know that the decimal points line up under each other.

e.g. 4.9 × 3

Children will approximate first
 4.9×3 is approximately $5 \times 3 = 15$

$$\begin{array}{r} \times \quad 4 \quad 0.9 \\ 3 \quad \boxed{12} \quad \boxed{2.7} \end{array}$$

$$\begin{array}{r} 12 \\ + \quad 2.7 \\ \hline 14.7 \end{array}$$

$$372 \times 24$$

Children will approximate first
 372×24 is approximately $400 \times 25 = 10000$

$$\begin{array}{r} \times \quad 300 \quad 70 \quad 2 \\ 20 \quad \boxed{6000} \quad \boxed{1400} \quad \boxed{40} \quad =7440 \\ 4 \quad \boxed{1200} \quad \boxed{280} \quad \boxed{8} \quad =1488 \end{array}$$

$$\begin{array}{r} 7440 \\ 1488 \\ \quad 1 \\ \hline 8928 \end{array}$$

Y6

Children will work on multiplying multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.

Children will multiply one-digit numbers with up to two decimal places by whole numbers.

Children will be confident using short and long multiplication methods.

Decimals:

$$4.92 \times 3$$

Children will approximate first
 4.92×3 is approximately $5 \times 3 = 15$

| | | | |
|---|----|-----|------|
| x | 4 | 0.9 | 0.02 |
| 3 | 12 | 2.7 | 0.06 |

$$\begin{array}{r} 12 \\ + 0.7 \\ + 0.06 \\ \hline 12.76 \end{array}$$

✓ **Column method**

$$\begin{array}{r} 7 \\ \times 3.8 \\ \hline 56 \\ 264 \\ \hline 266.6 \end{array}$$

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
|--|--|--|--|--|--|

By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.

Children should not be made to go onto the next stage if:

- 5) they are not ready.
- 6) they are not confident.

Children should be encouraged to approximate their answers before calculating.

Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.

4. PROGRESSION THROUGH CALCULATIONS FOR SUBTRACTION

MENTAL CALCULATIONS

These are a **selection** of mental calculation strategies. On an additional document you will find year group expectations for mental starters. Each week teachers must cover rapid recall, mental strategies and mental calculations.

Mental recall of addition and subtraction facts

$$10 - 6 = 4$$

$$17 - \square = 11$$

$$20 - 17 = 3$$

$$10 - \square = 2$$

Find a small difference by counting up

$$82 - 79 = 3$$

Counting on or back in repeated steps of 1, 10, 100, 1000

$$86 - 52 = 34 \text{ (by counting back in tens and then in ones)}$$

$$460 - 300 = 160 \text{ (by counting back in hundreds)}$$

Subtract the nearest multiple of 10, 100 and 1000 and adjust

$$24 - 19 = 24 - 20 + 1 = 5$$

$$458 - 71 = 458 - 70 - 1 = 387$$

Use the relationship between addition and subtraction

$$36 + 19 = 55$$

$$19 + 36 = 55$$

$55 - 19 = 36$

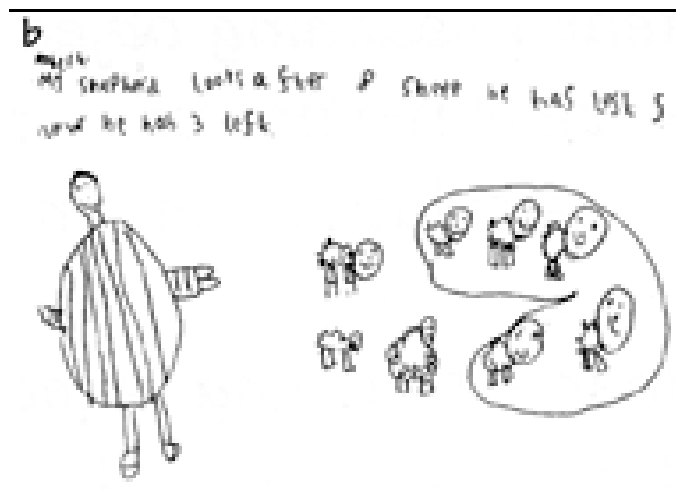
$55 - 36 = 19$

MANY MENTAL CALCULATION STRATEGIES WILL CONTINUE TO BE USED THROUGHOUT YEAR GROUPS. THEY ARE NOT REPLACED BY WRITTEN METHODS.

THE FOLLOWING ARE STANDARDS THAT WE EXPECT THE MAJORITY OF CHILDREN TO ACHIEVE.

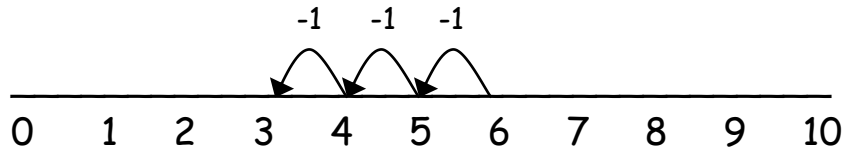
YR and Y1

Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures etc.

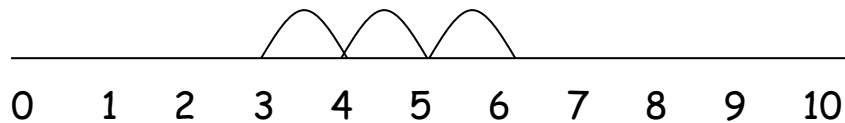


They use numberlines and practical resources to support calculation. Teachers *demonstrate* the use of the numberline.

$$6 - 3 = 3$$

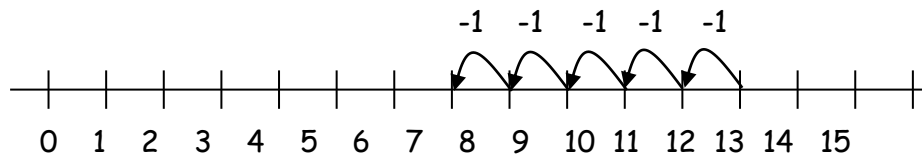


The numberline should also be used to show that $6 - 3$ means the 'difference between 6 and 3' or 'the difference between 3 and 6' and how many jumps they are apart.



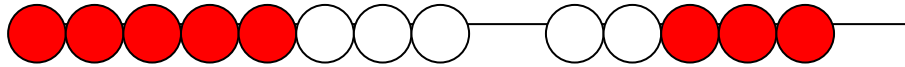
Children then begin to use numbered lines to support their own calculations - using a numbered line to count back in ones.

$$13 - 5 = 8$$



Bead strings or bead bars can be used to illustrate subtraction including bridging through ten by counting back 3 then counting back 2.

$$13 - 5 = 8$$



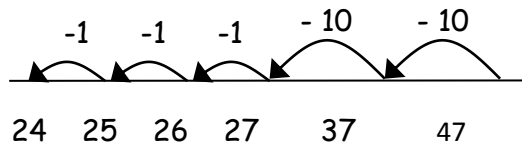
Y2

Children will begin to use empty number lines to support calculations.

Counting back

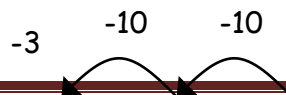
- ✓ First counting back in tens and ones.

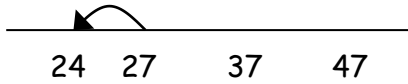
$$47 - 23 = 24$$



- ✓ Then helping children to become more efficient by subtracting the ones in one jump (by using the known fact $7 - 3 = 4$).

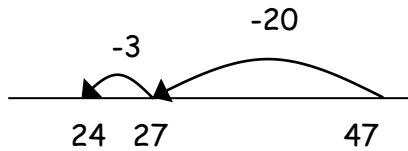
$$47 - 23 = 24$$





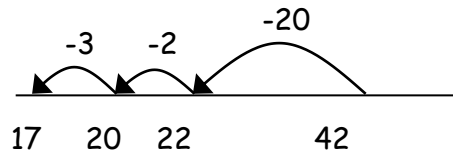
✓ Subtracting the tens in one jump and the ones in one jump.

$$47 - 23 = 24$$



✓ Bridging through ten can help children become more efficient.

$$42 - 25 = 17$$



Counting on

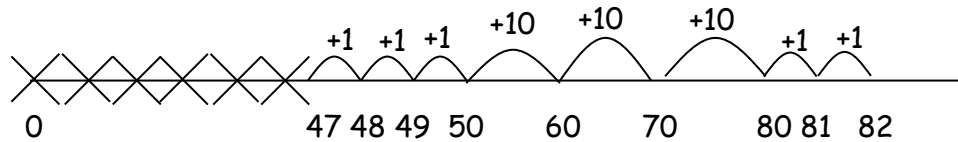
When counting on, on a number line children will use a frog.

If the numbers involved in the calculation are close together or near to multiples of 10, 100 etc, it can be more efficient to count on.

Count up from 47 to 82 in jumps of 10 and jumps of 1.

The number line should still show 0 so children can cross out the section from 0 to the smallest number. They then associate this method with 'taking away'.

$$82 - 47$$



Help children to become more efficient with counting on by:

- ✓ Subtracting the ones in one jump;
- ✓ Subtracting the tens in one jump and the ones in one jump;
- ✓ Bridging through ten.

Children will need to be able to partition numbers using place value cards to support subtraction.

Y3

Children will continue to use empty number lines with increasingly large numbers.

Children will begin to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies.

Partitioning and decomposition

This process should be demonstrated using arrow cards to show the partitioning and base 10 materials to show the decomposition of the number.

NOTE When solving the calculation $89 - 57$, children should know that 57 **does NOT EXIST AS AN AMOUNT** it is what you are subtracting from the other number. Therefore, when using base 10 materials, children would need to count out only the 89.

$$\begin{array}{r} 89 \\ - 57 \\ \hline \end{array} = \begin{array}{r} 80 \\ \underline{50} \\ 30 \end{array} \begin{array}{r} 9 \\ \underline{7} \\ 2 \end{array} = 32$$

When setting out the above calculation children must leave 2 squares between the columns.

Initially, the children will be taught using examples that do not need the children to exchange.

From this the children will begin to exchange.

$$\begin{array}{r} 71 \\ - 46 \\ \hline \end{array} = \quad =$$

Step 1

$$\begin{array}{r} 70 \\ - 40 \\ \hline \end{array} \begin{array}{r} 1 \\ 6 \end{array}$$

Step 2

$$\begin{array}{r} 60 \\ - 40 \\ \hline 20 \end{array} \begin{array}{r} 11 \\ 6 \\ 5 \end{array} = 25$$

The calculation should be read as e.g. take 6 from 1.

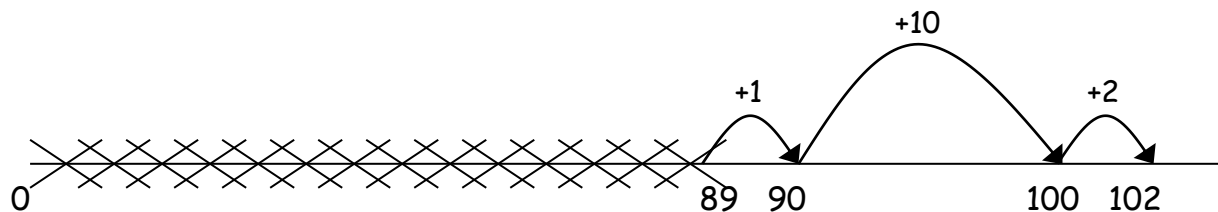
This would be recorded by the children as

$$\begin{array}{r} 60 \\ \cancel{70} \quad 11 \\ - 40 \quad 6 \\ \hline 20 \quad 5 = 25 \end{array}$$

Children should know that ones line up under ones, tens under tens, and so on.

Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a frog on the number line should be used.

$$102 - 89 = 13$$



Y4

Partitioning and decomposition

$$\begin{array}{r} 754 = \\ - 86 \\ \hline \end{array}$$

$$\begin{array}{r} \text{Step 1} \quad 700 \quad 50 \quad 4 \\ - \quad \quad \quad 80 \quad 6 \\ \hline \end{array}$$

$$\begin{array}{r} \text{Step 2} \quad 700 \quad 40 \quad 14 \quad (\text{adjust from } T \text{ to } O) \\ - \quad \quad \quad 80 \quad 6 \\ \hline \end{array}$$

$$\begin{array}{r} \text{Step 3} \quad 600 \quad 140 \quad 14 \quad (\text{adjust from } H \text{ to } T) \\ - \quad \quad \quad 80 \quad 6 \\ \hline 600 \quad 60 \quad 8 = 668 \end{array}$$

This would be recorded by the children as

$$\begin{array}{r} \overset{600}{\cancel{700}} \quad \overset{140}{\cancel{50}} \quad 14 \\ - \quad \quad \quad 80 \quad 6 \\ \hline 600 \quad 60 \quad 8 = 668 \end{array}$$

When setting out the above calculation children must leave 2 squares between the columns.

Decomposition

$$\begin{array}{r} 614 \text{ 1} \\ 754 \\ - 86 \\ \hline 668 \end{array}$$

Children should:

- ✓ be able to subtract numbers with different numbers of digits;
- ✓ using this method, children should also begin to find the difference between two three-digit sums of money, with or without 'adjustment' from the pence to the pounds;
- ✓ know that decimal points should line up under each other.

For example:

$$\begin{array}{r} \text{£}8.95 = 8 \quad 0.9 \quad 0.05 \\ \underline{-\text{£}4.38} \quad - \quad \underline{4 \quad 0.3 \quad 0.08} \end{array} \quad \text{leading to}$$

$$\begin{array}{r} = 8 \quad 0.8 \quad 0.15 \quad (\text{adjust from } T \text{ to } O) \\ - 4 \quad 0.3 \quad 0.08 \\ \hline 4 \quad 0.5 \quad 0.07 \end{array} \quad \begin{array}{r} 1 \\ 8.85 \\ - 4.38 \\ \hline \end{array}$$

$$= \text{£}4.57$$

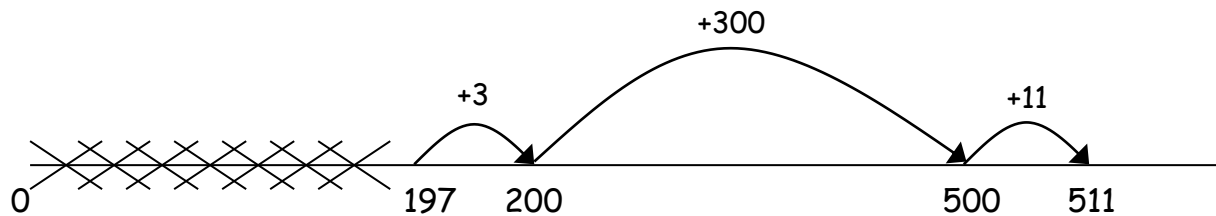
When setting out the above calculation children must leave 2 squares between the columns.

Alternatively, children can set the amounts to whole numbers, i.e. 895 - 438 and convert to pounds after the calculation.

NB If your children have reached the concise stage they will then continue this method through into years 5 and 6. They will not go back to using the expanded methods.

Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used.

$$511 - 197 = 314$$



Y5

Partitioning and decomposition

$$\begin{array}{r} \text{Step 1} \quad 754 = 700 \quad 50 \quad 4 \\ \quad \quad \quad - 286 \quad = \quad - 200 \quad 80 \quad 6 \end{array}$$

$$\begin{array}{r} \text{Step 2} \quad \quad \quad 700 \quad 40 \quad 14 \quad (\text{adjust from } T \text{ to } O) \quad \quad \quad - \underline{200} \\ \underline{80} \quad 6 \end{array}$$

Step 3

$$\begin{array}{r}
 600 \quad 140 \quad 14 \quad (\text{adjust from H to T}) \\
 - 200 \quad 80 \quad 6 \\
 \hline
 400 \quad 60 \quad 8 = 468
 \end{array}$$

This would be recorded by the children as

$$\begin{array}{r}
 \overset{600}{\cancel{700}} \quad \overset{140}{\cancel{50}} \quad 14 \\
 - 200 \quad 80 \quad 6 \\
 \hline
 400 \quad 60 \quad 8 = 468
 \end{array}$$

Decomposition

$$\begin{array}{r}
 614 \quad 1 \\
 \cancel{764} \\
 - 286 \\
 \hline
 468
 \end{array}$$

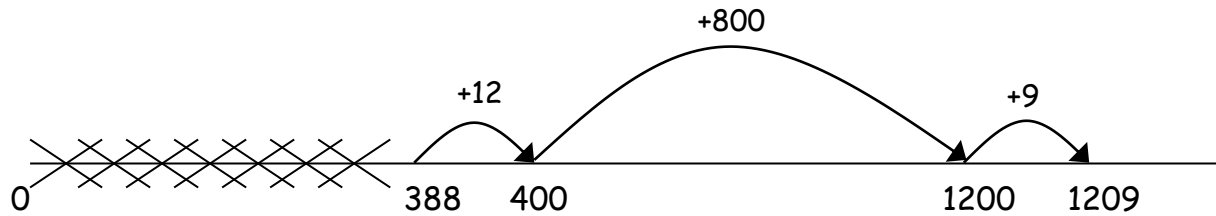
Children should:

- ✓ be able to subtract numbers with different numbers of digits;
- ✓ begin to find the difference between two decimal fractions with up to three digits and the same number of decimal places;
- ✓ know that decimal points should line up under each other.

NB If your children have reached the concise stage they will then continue this method through into year 6. They will not go back to using the expanded methods.

Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used.

$$1209 - 388 = 821$$



Y6

Decomposition

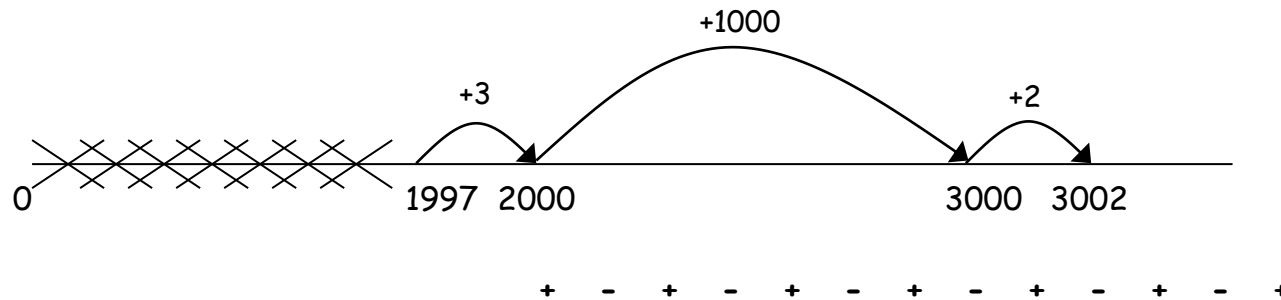
$$\begin{array}{r} 5 \ 13 \ 1 \\ // \\ 6467 \\ - \underline{2684} \end{array}$$

Children should:

- ✓ be able to subtract numbers with different numbers of digits;
- ✓ be able to subtract two or more decimal fractions with up to three digits and either one or two decimal places;
- ✓ know that decimal points should line up under each other.

Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used.

$$3002 - 1997 = 1005$$



By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.

Children should not be made to go onto the next stage if:

- 7) they are not ready.
- 8) they are not confident.

Children should be encouraged to approximate their answers before calculating.

Children should be encouraged to check their answers after calculation using an appropriate strategy.

Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.

5. Year 3 overview

| Year 3 | Term 1 - Unit 1 | Term 2 - Unit 2 | Term 3 - Unit 3 |
|---|--|---|--|
| 4: Counting, partitioning and calculating | <ul style="list-style-type: none"> • Add or subtract mentally combinations of one-digit and two-digit numbers where the answer exceeds 100; 3 digit numbers and ones; 3 digit numbers and tens; 3 digit numbers and hundreds • For mental calculations with 2 digit numbers, answers should exceed 100 | | |
| | <ul style="list-style-type: none"> • Describe and explain methods, choices and solutions to puzzles and problems, orally and in writing, using pictures and diagrams • Read, write and order whole numbers to at least 1000 in numerals and words and position them on a number line; count on from and back to zero in multiples of 2, 3, 4, 5, 8, 10, 50 and 100 • Recognise the place value of a given digit in a 3 digit number • Compare and order numbers up to 1000 • Add and subtract numbers with up to 3 digits, including using column addition and subtraction • Solve worded problems including missing number problems, using number facts, place value and more complex addition and subtraction • Write and calculate mathematical statements for x and divide for multiplication and division within the multiplication tables and for 2 digit numbers x 1 digit numbers using mental and written methods • Solve worded problems involving the 4 operations, including missing number problems • Partition three-digit numbers into multiples of 100, 10 & 1 in different ways • Derive and recall all addition and subtraction facts for each number to 20, sums and differences of multiples of 10 & number pairs that total 100 • Estimate the answer to a calculation and use the inverse. • Find 10 or 100 more or less than a given number. • Identify, represent and estimate numbers using different representations. | <ul style="list-style-type: none"> • Describe and explain methods, choices and solutions to puzzles and problems, orally and in writing, using pictures and diagrams • Read, write and order whole numbers to at least 1000 and position them on a number line; count on from and back to zero in multiples of 2, 3, 4, 5, 8, 10, 50 and 100 • Recognise the place value of a given digit in a 3 digit number • Compare and order numbers up to 1000 • Add and subtract numbers with up to 3 digits, including using column addition and subtraction • Solve worded problems involving all four operations including missing number problems, using number facts, place value and more complex addition and subtraction • Write and calculate mathematical statements for x and divide for multiplication and division within the multiplication tables and for 2 digit numbers x 1 digit numbers using mental and written methods • Ensure pupils continue to develop efficient mental methods for e.g. pupils should use commutativity such as in $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$; and multiplication and division facts • Ensure pupils develop reliable written methods for x and division, starting with calculations with 2 digit by 1 digit numbers and progressing to formal written methods. This helps prepare pupils for long multiplication from year 4 and short and long division in years' 5 and 6 • Ensure pupils continue to recognise the value of coins; add and subtract amounts, including compound units and give change • Partition three-digit numbers into multiples of 100, 10 and 1 in different ways • Round two-digit or three-digit numbers to the nearest 10 or 100 and give estimates for their sums and differences -NS • Derive and recall all addition and subtraction facts for each number to 20, sums and differences of multiples of 10 and number pairs that total 100 • Derive and recall multiplication facts for the 2, 3, 4, 5, 8 and 10 times-tables and the corresponding division facts; recognise multiples of 2, 5 or 10 up to 1000 • Multiply one-digit and two-digit numbers by 10 or 100, and describe the effect - NS • Find 10 or 100 more or less than a given number. | <ul style="list-style-type: none"> • Solve one-step and two-step problems involving numbers, money or measures, including time, choosing and carrying out appropriate calculations • Read, write and order whole numbers to at least 1000 and position them on a number line; count on from and back to zero in multiples of 2, 3, 4, 5, 8, 10, 50 and 100 • Recognise the place value of a given digit up to 1000, $897 = 800 + 90 + 7$ • Compare and order numbers up to 1000 • Add and subtract numbers with up to 3 digits, including using column addition and subtraction • Solve worded problems involving all four operations including missing number problems, using number facts, place value and more complex addition and subtraction • Write and calculate mathematical statements for x and divide for multiplication and division within the multiplication tables and for 2 digit numbers x 1 digit numbers using mental and written methods • Ensure pupils continue to develop efficient mental methods for e.g. pupils should use commutativity such as in $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$; and multiplication and division facts • Ensure pupils develop reliable written methods for x and division, starting with calculations with 2 digit by 1 digit numbers and progressing to formal written methods. This helps prepare pupils for long multiplication from year 4 and short and long division in years' 5 and 6 • Ensure pupils continue to recognise the value of coins; add and subtract amounts, including compound units and give change • Round two-digit or three-digit numbers to the nearest 10 or 100 and give estimates for their sums and differences -NS • Develop and use formal written column methods to record, support or explain addition and subtraction of two-digit and three-digit numbers • Derive and recall multiplication facts for the 2, 3, 4, 5, 6 and 10 times-tables and the corresponding division facts; recognise multiples of 2, 5 or 10 up to 1000 • Use practical and informal written methods to multiply and divide two-digit numbers (e.g. $13 \times 3, 50 \div 4$); round remainders up or down, depending on the context • Find 10 or 100 more or less than a given number. • Solve +ve integer scaling problems and correspondence problems where n objects are connected to m objects. |
| | <ul style="list-style-type: none"> • Represent the information in a puzzle or problem using numbers, images or diagrams; use these to find a solution and present it in context, where appropriate using £.p notation or units of measure • Identify patterns and relationships involving numbers or shapes, and use these to solve problems • Derive and recall all addition and subtraction facts for each number to 20, sums and differences of multiples of 10 and number pairs that total 100 • Derive and recall multiplication facts for the 2, 3, 4, 5, 8 and 10 times-tables and the corresponding division facts; recognise multiples of 2, 5 or 10 up to 1000 • Relate 2-D shapes and 3-D solids to drawings of them; describe, visualise, classify, draw and make the shapes | | |

| | | | |
|--|--|---|---|
| <p style="writing-mode: vertical-rl; transform: rotate(180deg);">B: Securing number facts, understanding shape</p> | <ul style="list-style-type: none"> Use knowledge of number operations and corresponding inverses, including doubling and halving, to estimate and check calculations Draw 2D shapes and make 3D shapes using modelling materials; recognise in different orientations and describe with increasing accuracy and using correct vocabulary including polygon, non polygon and polyhedron Recognise angles as a property of shape and associate angle as an amount of turn Identify and name right angles; recognise that 2 x right angles make a half turn and that 4x make a full turn and that 3 x right angles make three quarters of a turn. Identify whether angles are greater or smaller than a right angle; use the vocabulary obtuse and acute angle Identify horizontal, vertical perpendicular, parallel and curved lines Recognise symmetrical and non symmetrical polygons and polyhedra. Relate decimals and rounding to drawing and measuring straight lines in cm in a variety of contexts. | <ul style="list-style-type: none"> Solve one-step and two-step problems involving numbers, money or measures, including time, choosing and carrying out appropriate calculations Read and write proper fractions (e.g. $\frac{3}{7}$, $\frac{9}{10}$), interpreting the denominator as the parts of a whole and the numerator as the number of parts; identify and estimate fractions of shapes; use diagrams to compare fractions and establish equivalents <i>Draw and complete shapes with reflective symmetry; draw the reflection of a shape in a mirror line along one side - NS</i> Draw 2D shapes and make 3D shapes using modelling materials; recognise in different orientations and describe with increasing accuracy and using correct vocabulary including polygon, non polygon and polyhedron Recognise angles as a property of shape and associate angle as an amount of turn Identify and name right angles; recognise that 2 x right angles make a half turn and that 4x make a full turn and that 3 x right angles make three quarters of a turn. Identify whether angles are greater or smaller than a right angle Identify horizontal, vertical perpendicular, parallel and curved lines | <ul style="list-style-type: none"> Solve one-step and two-step problems involving numbers, money or measures, including time, choosing and carrying out appropriate calculations Read & write proper fractions (e.g. $\frac{3}{7}$, $\frac{9}{10}$), interpreting the denominator as the parts of a whole & the numerator as the number of parts; identify and estimate fractions of shapes; use diagrams to compare fractions and establish equivalents Use knowledge of number operations and corresponding inverses, including doubling and halving, to estimate and check calculations Use a set-square to draw right angles and to identify right angles in 2-D shapes; compare angles with a right angle; a straight line is equivalent to two right angles - NS Draw 2D shapes and make 3D shapes using modelling materials; recognise in different orientations and describe with increasing accuracy and using correct vocabulary including polygon, non polygon and polyhedron Recognise angles as a property of shape and associate angle as an amount of turn Identify and name right angles; recognise that 2 x right angles make a half turn and that 4x make a full turn Identify whether angles are greater or smaller than a right angle Identify horizontal, vertical perpendicular, parallel and curved lines |
| <p style="writing-mode: vertical-rl; transform: rotate(180deg);">C: Handling data and measures</p> | <ul style="list-style-type: none"> Follow a line of enquiry by deciding what information is important; make and use lists, tables and graphs to organise and interpret the information Know the relationships between kilometres and metres, metres and centimetres, kilograms and grams, litres and millilitres; choose and use appropriate units to estimate, measure and record measurements <i>Read, to the nearest division and half-division, scales that are numbered or partially numbered; use the information to measure and draw to a suitable degree of accuracy</i> Answer a question by collecting, organising and interpreting data; use tally charts, frequency tables, pictograms and bar charts to represent results and illustrate observations; use ICT to create a simple bar chart <i>Use Venn diagrams or Carroll diagrams to sort data and objects using more than one criterion NS</i> Read, interpret and present data using pictograms, tables and bar charts with scales Solve one and two step problems using information presented in pictograms, scaled bar charts and tables (in horizontal and vertical formats) | <ul style="list-style-type: none"> Calculate time intervals and find start or end times for a given time interval Tell and write the time from an analogue clock, including using Roman numerals from I to XII and 12hour and 24hour digital clocks Estimate and read time with increasing accuracy to the nearest minute, record and compare time in terms of seconds, minutes, hours and o'clock. Use vocabulary such as am/pm, noon, midnight Know the number of seconds in a minute and the number of days in each month, year and leap year Compare durations of events, e.g. by calculating the time taken up by particular events or tasks Ensure pupils use analogue and digital clocks throughout the day so that they are fluent in time telling Read, interpret and present data using pictograms and bar charts with scales Solve one and two step problems using information presented in pictograms, bar charts and tables (in horizontal and vertical formats) <i>Use Venn diagrams/Carroll diagrams to sort data and objects using more than one criterion NS</i> | <ul style="list-style-type: none"> Describe and explain methods, choices and solutions to puzzles and problems, orally and in writing, using pictures and diagrams Read, interpret and present data using pictograms and bar charts with scales Solve problems using information presented in pictograms, bar charts and tables (in horizontal and vertical formats) |

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| <p style="text-align: center;">D: Calculating, measuring and understanding shape</p> | <ul style="list-style-type: none"> Solve one-step and two-step problems involving numbers, money or measures, including time, choosing and carrying out appropriate calculations Add or subtract mentally combinations of one-digit and two-digit numbers Identify, name and write unit fractions up to 1/12 Find unit fractions of numbers and quantities (e.g. $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ & $\frac{1}{6}$ of 12 litres) Compare and order unit fractions and fractions with the same denominators Recognise fractions which are equivalent to 1 and pairs of fractions that add to one whole Perform calculations with addition and subtraction of fractions with the same denominator and within one whole ($\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$) Count up and down in tenths; recognise that 1/10s arise in dividing an object into tenths and in dividing single digit numbers or quantities by 10 Read and record the vocabulary of position, direction and movement, using the four compass directions to describe movement about a grid -NS Know the relationships between kilometres and metres, metres and centimetres, kilograms and grams, litres and millilitres; choose and use appropriate units to estimate, measure and record measurements; use full names for metric measurements Measure, compare, add and subtract lengths (m/cm/mm); mass (kg/g); volume and capacity (l/ml) and time (hours/minutes and seconds) Ensure pupils continue to practise measuring and drawing lines using the appropriate tools and units of measure. They should progress to using a wider range of measures, including comparing and using mixed units accurately and simple comparisons of mixed units (e.g. 5m = 500cm) Measure the perimeter of simple 2D shapes Read, to the nearest division and half-division, scales that are numbered or partially numbered; use the information to measure and draw to a suitable degree of accuracy Calculate time intervals and find start or end times for a given time interval Tell and write the time from an analogue clock, including using Roman numerals from I to XII and 12hour and 24hour digital clocks Estimate and read time with increasing accuracy to the nearest minute, record and compare time in terms of seconds, minutes, hours and o'clock. Use vocabulary such as am/pm, noon, midnight Know the number of seconds in a minute and the number of days in each month, year and leap year Compare durations of events, e.g. by calculating the time taken up by particular events or tasks Ensure pupils use analogue and digital clocks throughout the day so that they are fluent in time telling Add and subtract amounts of money to give change, using £ and p in practical contexts and record £ and p separately. | <ul style="list-style-type: none"> Represent the information in a puzzle or problem using numbers, images or diagrams; use these to find a solution and present it in context, where appropriate using £, p notation or units of measure Add or subtract mentally combinations of one-digit and two-digit numbers Develop and use written methods to record, support or explain addition and subtraction of two-digit and three-digit numbers Use practical and informal written methods to multiply and divide two-digit numbers (e.g. 13×3, $50 \div 4$); round remainders up or down, depending on the context Find unit fractions of numbers and quantities (e.g. $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{1}{6}$ of 12 litres) Draw and complete shapes with reflective symmetry; draw the reflection of a shape in a mirror line along one side Read and record the vocabulary of position, direction and movement, using the four compass directions to describe movement about a grid Use a set-square to draw right angles & identify right angles in 2-D shapes; compare angles with a right angle; recognise that a straight line is equivalent to two right angles Know the relationships between kilometres and metres, metres and centimetres, kilograms and grams, litres and millilitres; choose & use appropriate units to estimate, measure & record measurements Identify, name and write unit fractions up to 1/12 Find, recognise and write unit and non unit fractions of numbers and quantities (e.g. $\frac{1}{2}$, $\frac{2}{3}$, $\frac{1}{3}$, $\frac{1}{4}$ & $\frac{1}{6}$ of 12 litres) Compare and order unit fractions and fractions with the same denominators Recognise fractions which are equivalent to 1 and pairs of fractions that add to one whole Perform calculations with addition and subtraction of fractions with the same denominator and within one whole ($\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$) Count up and down in tenths; recognise that 1/10s arise in dividing an object into tenths and in dividing single digit numbers or quantities by 10 Tell and write the time from an analogue clock, including using Roman numerals from I to XII and 12hour and 24hour digital clocks Solve fraction word problems | <ul style="list-style-type: none"> Solve one-step and two-step problems involving numbers, money or measures, including time, choosing and carrying out appropriate calculations Use knowledge of number operations and corresponding inverses, including doubling and halving, to estimate and check calculations Develop and use written methods to record, support or explain addition and subtraction of two-digit and three-digit numbers Use practical & informal written methods to multiply & divide two-digit numbers (e.g. 13×3, $50 \div 4$); round remainders up or down, depending on the context Understand that division is the inverse of multiplication and vice versa; use this to derive and record related multiplication and division number sentences Use a set-square to draw right angles and to identify right angles in 2-D shapes; compare angles with a right angle; a straight line is equivalent to two right angles Read, to the nearest division and half-division, scales that are numbered or partially numbered; use the information to measure and draw to a suitable degree of accuracy Calculate time intervals & find start or end times for a given time interval Tell and write the time from an analogue clock, including using Roman numerals from I to XII and 12hour and 24hour digital clocks Estimate and read time with increasing accuracy to the nearest minute, record and compare time in terms of seconds, minutes, hours and o'clock. Use vocabulary such as am/pm, noon, midnight Know the number of seconds in a minute and the number of days in each month, year and leap year Compare durations of events, e.g. by calculating the time taken up by particular events or tasks Ensure pupils use analogue and digital clocks throughout the day so that they are fluent in time telling Identify, name and write unit fractions up to 1/12 Find, recognise and write unit and non unit fractions of numbers, objects and quantities (e.g. $\frac{1}{2}$, $\frac{2}{3}$, $\frac{1}{3}$, $\frac{1}{4}$ & $\frac{1}{6}$ of 12 litres) Compare and order unit fractions and fractions with the same denominators Recognise fractions which are equivalent to 1 and pairs of fractions that add to one whole Perform calculations with addition and subtraction of fractions with the same denominator and within one whole ($\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$) Count up and down in tenths; recognise that 1/10s arise in dividing an object into tenths and in dividing single digit numbers or quantities by 10 |
| <p style="text-align: center;">E: Securing number facts, calculations and relationships</p> | <ul style="list-style-type: none"> Derive and recall multiplication facts for the 2, 3, 4, 5, 8 and 10 times-tables and the corresponding division facts; recognise multiples of 2, 5 or 10 up to 1000 Use practical and informal written methods to multiply and divide two-digit numbers (e.g. 13×3, $50 \div 4$); round remainders up or down, depending on the context Find unit fractions of numbers and quantities (e.g. $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ & $\frac{1}{6}$ of 12 litres) Follow a line of enquiry by deciding what information is important; make and use lists, tables and graphs to organise and interpret the information Identify patterns and relationships involving numbers or shapes, and use these to solve problems Derive and recall all addition and subtraction facts for each number to 20, sums & differences of multiples of 10 and number pairs that total 100 | <ul style="list-style-type: none"> Solve one-step and two-step problems involving numbers, money or measures, including time, choosing and carrying out appropriate calculations Read and write proper fractions (e.g. $\frac{1}{7}$, $\frac{2}{10}$), interpreting the denominator as the parts of a whole and the numerator as the number of parts; identify and estimate fractions of shapes; use diagrams to compare fractions and establish equivalents Multiply one-digit and two-digit numbers by 10 or 100, and describe the effect Understand that division is the inverse of multiplication and vice versa; use this to derive and record related multiplication and division number sentences | <ul style="list-style-type: none"> Solve one-step and two-step problems involving numbers, money or measures, including time, choosing and carrying out appropriate calculations Follow a line of enquiry by deciding what information is important; make and use lists, tables and graphs to organise and interpret the information Identify patterns and relationships involving numbers or shapes, and use these to solve problems Partition three-digit numbers into multiples of 100, 10 and 1 in different ways Read and write proper fractions (e.g. $\frac{1}{7}$, $\frac{2}{10}$), interpreting the denominator as the parts of a whole and the numerator as the number of parts; identify and estimate fractions of shapes; use diagrams to compare fractions and establish equivalents Develop and use written methods to record, support or explain addition and subtraction of two-digit and three-digit numbers |

NS - NOT STATUTORY

6. Year 4 overview

| Year 4 | Term 1 – Unit 1 | Term 2 – Unit 2 | Term 3 – Unit 3 |
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| A: Counting, partitioning and calculating | <ul style="list-style-type: none"> Recognise and continue number sequences formed by counting on or back in steps of constant size Add or subtract mentally pairs of two-digit whole numbers (e.g. $47 + 58$, $91 - 35$) Derive and recall multiplication facts up to 12×12, the corresponding division facts and multiples of numbers to 10 up to the tenth multiple Use knowledge of rounding, number operations and inverses to estimate and check calculations Ensure pupils continue to count regularly so that they become fluent in the order and place value of numbers beyond 1000; include regular practice counting in tens and hundreds Ensure pupils say, read and write four digit numbers accurately and understand the use of 0 as place holder | | |
| | <ul style="list-style-type: none"> Read, write, order and compare numbers beyond 1000 Recognise the place value of digits in four digit numbers Count in multiples of 6,7,9,25,1000 from any given number and 10, 100 or 1000 less from any given number Report solutions to puzzles and problems, giving explanations and reasoning orally and in writing, using diagrams and symbols - including for number sequences Partition, round (to nearest 10, 100 or 1000) and order five digit whole numbers; use positive and negative numbers and position them on a number line; state inequalities using the symbols $<$ and $>$ (e.g. $-3 > -5$, $-1 < +1$) Use knowledge of addition and subtraction facts and place value to derive sums and differences of pairs of multiples of 10, 100, 1000 and 10,000 Multiply and divide numbers to 10,000 by 10 and then 100 (whole-number answers), understanding the effect; relate to scaling up or down Identify the doubles of two-digit numbers; use these to calculate doubles of multiples of 10 and 100 and derive the corresponding halves Read Roman numerals I to C and understand how Hindu-Arabic numerals included the concept of zero and place value Count backwards through zero to include negative numbers Count up and back in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. Recognise and use factor pairs and commutativity in mental calculations | <ul style="list-style-type: none"> Report solutions to puzzles and problems, giving explanations and reasoning orally and in writing, using diagrams and symbols Use decimal notation for tenths and hundredths and partition decimals; relate the notation to money and measurement; position one-place and two-place decimals on a number line and compare decimals Refine and use efficient written methods to add and subtract up to 4 digit whole numbers and $\pounds.p$ Multiply and divide numbers to 10,000 by 10 and then 100 (whole-number answers), understanding the effect; relate to scaling up or down Develop and use formal written methods to record, support and explain multiplication and division of two-digit numbers and three digit numbers by a one-digit number, including division with remainders (e.g. 15×9, $98 \div 6$) Round decimals with one decimal place to the nearest whole number. Recognise and use factor pairs and commutativity in mental calculations Count forwards and backwards using simple fractions and decimals. | <ul style="list-style-type: none"> Solve worded problems involving all four operations with increasing complexity and which involve negative numbers and increasingly large positive numbers Solve problems including the distributive law, integer scaling problems and correspondence problems. Solve one-step and two-step problems involving numbers, money or measures, including time; choose and carry out appropriate calculations, using calculator methods where appropriate Partition, round (to nearest 10, 100 and 1000) and order five digit whole numbers; use positive and negative numbers and position them on a number line; state inequalities using the symbols $<$ and $>$ (e.g. $-3 > -5$, $-1 < +1$) Use decimal notation for tenths/hundredths and partition decimals; relate notation to money and measurement; position one-place and two-place decimals on number line Refine and use efficient written methods to add and subtract pairs of number up to 4 digit whole numbers and $\pounds.p$ Develop & use written methods to record, support and explain multiplication and division of two-digit numbers by a one-digit number, including division with remainders (15×9, $98 \div 6$) Estimate, the answer to calculations and use the inverse to check Recognise and use factor pairs and commutativity in mental calculations To write statements about the equality of expressions eg $39 \times 7 = 30 \times 7 + 9 \times 7$ or $(2 \times 3) \times 4 = 2 \times (3 \times 4)$ |
| B: Securing number facts, understanding shape | <ul style="list-style-type: none"> Identify and use patterns, relationships and properties of numbers or shapes; investigate a statement involving numbers and test it with examples Use knowledge of rounding, number operations and inverses to estimate and check calculations Report solutions to puzzles and problems, giving explanations and reasoning orally and in writing, using diagrams and symbols Derive and recall multiplication facts up to 12×12, the corresponding division facts and multiples of numbers to 12 up to the twelfth multiple Draw polygons and classify them by identifying their properties, including their line symmetry including different triangles (scalene, isosceles, equilateral) and quadrilaterals (parallelogram, rhombus, trapezium) | | |

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| | <ul style="list-style-type: none"> Solve one-step and two-step problems involving numbers, money or measures, including time: choose and carry out appropriate calculations, using calculator methods where appropriate Use knowledge of addition and subtraction facts and place value to derive sums and differences of pairs of multiples of 10, 100 or 1000 Add and subtract numbers using formal written methods with up to four digits | <ul style="list-style-type: none"> Identify the doubles of two-digit numbers; use these to calculate doubles of multiples of 10 and 100 and derive the corresponding halves | <ul style="list-style-type: none"> Solve one-step and two-step problems involving numbers, money or measures, including time: choose and carry out appropriate calculations, using calculator methods Use knowledge of addition and subtraction facts and place value to derive sums and differences of pairs of multiples of 10, 100 or 1000 Identify the doubles of two-digit numbers; use these to calculate doubles of multiples of 10 and 100 and derive the corresponding halves |
| C: Handling data and measures | <ul style="list-style-type: none"> Suggest a line of enquiry and the strategy needed to follow it; collect, organise and interpret selected information to find answers Interpret and present discrete and continuous data, using appropriate methods, including bar charts and time graphs Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs Relate the graphical representation of data to recording change over time. Answer a question by identifying what data to collect; organise, present, analyse and interpret the data in tables, diagrams, tally charts, pictograms and bar charts, using ICT where appropriate Report solutions to puzzles and problems, giving explanations and reasoning orally and in writing, using diagrams and symbols Choose and use standard metric units and their abbreviations when estimating, measuring and recording length, weight and capacity; know the meaning of 'kilo', 'centi' and 'milli' and, where appropriate, use decimal notation to record measurements (e.g. 1.3 m or 0.6 kg) Interpret intervals and divisions on partially numbered scales and record readings accurately, where appropriate to the nearest tenth of a unit | | |
| | <ul style="list-style-type: none"> Convert between different units of measure for example km to m; m to cm; cm to mm; kg to g; litre to ml; hr to min; min to second; year to month; week to day Measure and calculate the perimeter of a rectilinear figure where each side is labelled in cm and m Continue to practise finding perimeters of shapes Find the areas of composite shapes Find the areas of squares and rectangles, initially by counting squares and then by using perimeter measurements to calculate: give answer as cm² etc Read and tell the time on an analogue and digital clock and convert between 12 hour and 24 hour time Estimate, compare and calculate different measures, including money, in £ and p Express perimeter algebraically as 2(a+b) Relate area to arrays and multiplication | <ul style="list-style-type: none"> Compare the impact of representations where scales have intervals of differing step size Convert between different units of measure for example km to m; m to cm; cm to mm; kg to g; litre to ml; hr to min; min to second; year to month; week to day Measure and calculate the perimeter of a rectilinear figure where each side is labelled in cm and m Find the areas of squares and rectangles, initially by counting squares and then by using perimeter measurements to calculate: give answer as cm² etc Continue to practise finding perimeters of shapes Find the areas of composite shapes Read and tell the time on an analogue and digital clock and convert between 12 hour and 24 hour time Estimate, compare and calculate different measures, including money, in £ and p . | <ul style="list-style-type: none"> Compare the impact of representations where scales have intervals of differing step size Convert between different units of measure for example km to m; m to cm; cm to mm; kg to g; litre to ml; hr to min; min to second; year to month; week to day Measure and calculate the perimeter of a rectilinear figure where each side is labelled in cm and m Find the areas of squares and rectangles, initially by counting squares and then by using perimeter measurements to calculate: give answer as cm² etc Continue to practise finding perimeters of shapes Find the areas of composite shapes Read and convert between 12 hour and 24 hour time Estimate, compare and calculate different measures, including money, in £ and p . |
| D: Calculation | <ul style="list-style-type: none"> Solve one-step and two-step problems involving numbers, money or measures, including time; choose and carry out appropriate calculations. Choose and use standard metric units and their abbreviations when estimating, measuring and recording length, weight and capacity; know the meaning of 'kilo', 'centi' and 'milli' and, where appropriate, use decimal notation to record measurements (e.g. 1.3 m or 0.6 kg) Interpret intervals and divisions on partially numbered scales and record readings accurately, where appropriate to the nearest tenth of a unit | | |

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| | <ul style="list-style-type: none"> • Add or subtract mentally pairs of increasingly large whole numbers e.g. 12,462 - 2,400 • Read time to the nearest minute on a digital and analogue clock; use am, pm and 12-hour and 24-hour clock notation; choose units of time to measure time intervals; calculate time intervals from clocks and timetables • Recognise horizontal and vertical lines; use the eight compass points to describe direction; describe and identify the position of a square on a grid of squares • Identify lines of symmetry in 2D shapes presented in different orientations • Compare and classify geometric shapes, including squares, rectangles and triangles based on their properties and size; including congruency • Identify acute and obtuse angles and compare the size of different angles up to 180 degrees • Describe positions and movements between positions on a 2D grid and as coordinates in the first quadrant • Plot specified points and draw sides to complete a given polygon • Recognise a symmetric figure and complete a symmetric figure with respect to a specific line of symmetry • Add and subtract with up to four digits using the column method • Decide if a polygon is regular or irregular | <ul style="list-style-type: none"> • Refine and use efficient written methods to add and subtract pairs of up to 4 digit whole numbers and £,p • Derive and recall multiplication facts up to 12×12, the corresponding division facts and multiples of numbers to 12 up to the twelfth multiple • Develop and use written methods to record, support and explain multiplication and division of two-digit and three digit numbers by a one-digit number, including division with remainders (e.g. 15×9, $98 \div 6$) using a short method • Use decimal notation for tenths and hundredths and partition decimals; relate the notation to money and measurement; position one-place and two-place decimals on number line • Draw rectangles and measure and calculate their perimeters; find the area of rectilinear shapes drawn on a square grid by counting squares • Know that angles are measured in degrees and that one whole turn is 360°; compare and order angles less than 180°; identify acute and obtuse angles; in preparation to use a protractor to measure angles • Recognise horizontal and vertical lines; use the eight compass points to describe direction; describe and identify the position of a square on a grid of squares • Compare and classify geometric shapes, including squares, different types of quadrilaterals (parallelogram, rhombus, trapezium) and different types of triangles (scalene, isosceles, equilateral) based on their properties and size; including congruency • Describe positions and movements between positions on a 2D grid and as coordinates in the first quadrant • Plot specified points and draw sides to complete a given polygon • Recognise a symmetric figure and complete a symmetric figure with respect to a specific line of symmetry • Solve problems involving converting from hours to minutes, minutes to seconds, years to months and weeks to days • Draw a pair of axes in one quadrant with equal scales and integer labels. • Read, write and use pairs of coordinates. | <ul style="list-style-type: none"> • Refine and use efficient written methods to add and subtract pairs of up to 4 digit whole numbers and £,p • Use decimal notation for tenths and hundredths and partition decimals; relate the notation to money and measurement; position one-place and two-place decimals on a number line • Read time to the nearest minute on a digital and analogue clock; use am, pm and 12-hour and 24-hour clock notation; choose units of time to measure time intervals; calculate time intervals from clocks and timetables • Draw rectangles and measure and calculate their perimeters; find the area of rectilinear shapes drawn on a square grid by counting squares • Compare and classify geometric shapes, including squares, different types of rectangles and different types of triangles based on their properties and size; including congruency • Know that angles are measured in degrees and that one whole turn is 360°; compare and order angles less than 180°; identify acute and obtuse angles; in preparation to use a protractor to measure angles • Describe positions and movements between positions on a 2D grid as translations of a given unit to the left/ right and up/down and as coordinates in the first quadrant • Plot specified points and draw sides to complete a given polygon • Recognise a symmetric figure and complete a symmetric figure with respect to a specific line of symmetry • Ensure pupils regularly practise recognising line symmetry in a variety of diagrams. Extend to rotational symmetry |
| L1: Securing number facts, calculations and relationships | <ul style="list-style-type: none"> • Represent a puzzle or problem using number sentences, statements or diagrams; use these to solve the problem; present and interpret the solution in the context of the problem • Derive and recall multiplication facts up to 12×12, the corresponding division facts and multiples of numbers to 10 up to the tenth multiple • Recognise the equivalence between decimal and fraction forms of one half, quarters, tenths and hundredths • Use diagrams to identify equivalent fractions (e.g. $\frac{1}{2}$ and $\frac{3}{6}$, or $\frac{20}{100}$ and $\frac{2}{10}$); interpret mixed numbers and position them on a number line (e.g. $3\frac{1}{2}$) • Find fractions of numbers, quantities or shapes (e.g. $\frac{1}{5}$ of 30 plums, $\frac{2}{3}$ of a 6 by 4 rectangle) • Ensure pupils continue practising formal written methods and mental methods with increasingly large numbers and include the vocabulary 'sum' and 'difference' • Include increasingly large numbers in mental calculation e.g. $12,462 - 2,400$ or $12,462 + 600$ • Ensure pupils say and write numbers correctly so that they are clear about place value and confident when working with mental calculation • Recall multiplication and division facts up to 12×12 and including \times by 0 and by 1 • To multiply 3 numbers together mentally using known facts. • Solve problems involving fractions to calculate quantities and fractions to divide quantities including non unit fractions. • • | <ul style="list-style-type: none"> • Identify pairs of fractions that total 1 • Ensure pupils practise recalling and using \times tables and division tables until they are confident in using them and able to quickly recall known facts mentally. • Recognise and use factor pairs within 144 • Solve worded problems using all 4 operations • Compare numbers with the same number of decimal places to 2DP (2 decimal places or up to 1/100ths) • Find the effect of dividing a 2 digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths and thousandths • Recognise, know and write decimal equivalents of $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{2}$, $\frac{3}{4}$ and any number of tenths • • | <ul style="list-style-type: none"> • Develop & use written methods to record, support and explain multiplication and division of two-digit numbers by a one-digit number, including division with remainders (e.g. 15×9, $98 \div 6$) • Use the vocabulary of ratio and proportion to describe the relationship between two quantities (e.g. 'There are 2 red beads to every 3 blue beads, or 2 beads in every 5 beads are red'); estimate a proportion (e.g. 'About one quarter of the apples in the box are green') • Multiply or divide 2 and 3 digit numbers by a 1 digit number using formal written methods and interpret remainders appropriately as integers • Ensure pupils continue to practise mental methods and extend this to 3 digit numbers to derive facts, e.g. $300 \times 2 = 600$ into $600 \div 3 = 200$. Pupils should also understand distributive law to derive facts, e.g. $30 \times 7 + 9 \times 7 = 39 \times 7$ • Compare numbers with the same number of decimal places to 2DP (2 decimal places or up to 1/100ths) • Find the effect of dividing a 1 or 2 digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths and thousandths. • Recognise, know and write decimal equivalents of $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{2}$, $\frac{3}{4}$ and any number of tenths |

7. Year 5 overview

| YEAR 5 | Term 1 - Unit 1 | Term 2 - Unit 2 | Term 3 - Unit 3 |
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| A: Counting, partitioning and calculating | <ul style="list-style-type: none"> Explain reasoning using diagrams, graphs and text; refine ways of recording using images and symbols Count from any given number in whole-number and decimal steps, extending beyond zero when counting backwards; relate the numbers to their position on a number line, including through zero. Explain what each digit represents in whole numbers and decimals with up to three places, and partition, round and order these numbers Use knowledge of place value and addition and subtraction of two-digit numbers to derive sums and differences and doubles and halves of decimals (e.g. 6.5 ± 2.7, half of 5.6, double 0.34) Recall quickly multiplication facts up to 12×12 and use them to multiply pairs of multiples of 10 and 100; derive quickly corresponding division facts Use knowledge of rounding, place value, number facts and inverse operations to estimate and check calculations in the context of a problem using levels of accuracy. | | |
| | <ul style="list-style-type: none"> Use efficient formal written column methods to add and subtract whole numbers and decimals with up to THREE places Practise using formal written methods of short multiplications and short division. Identify multiples and factors, including finding all factor pairs of a number and common factors and multiples of two numbers. Identify the place value in large whole numbers. Use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 and 1000 Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents Read, write, order and compare numbers with up to 3 decimal places Add and subtract numbers with up to 3 decimal places and solve problems. Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000 Round decimals with 2 decimal places to the nearest whole number and to one decimal place. Read, write, order and compare numbers to at least 1,000,000; determine the value of each digit Count forwards and backwards in steps of 100, 1000, 10,000, 100,000 and 1,000,000 for any given number Extend mental methods for whole-number calculations, for example to multiply a two-digit by a one-digit number (e.g. 12×9), to multiply by 25 (e.g. 16×25), to subtract one near multiple of 1000 from another (e.g. $6070 - 4097$) Add and subtract whole numbers with more than 4 digits, including using formal written column methods Recognise and read Roman numerals to 1000 (M); recognise years written in Roman numerals Interpret negative numbers in context. Solve multi step number problems and practical problems, deciding which operation to use and why. | <ul style="list-style-type: none"> Solve problems involving multiplication and division including scaling by simple fractions and problems involving rates. Solve problems involving all four operations and a combination of these including understanding the meaning of the equals sign. Estimate the answers to calculations involving addition, subtraction, multiplication and division Use written methods to add and subtract whole numbers and decimals up to THREE places Identify multiples and factors, including finding all factor pairs of a number and common factors and multiples of two numbers. Know and use the vocabulary of prime numbers, prime factors and composite numbers (non prime numbers) Establish whether numbers up to 100 are prime and recall the prime numbers to 19 Use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 and 1000; ensure practise of reading and saying numbers of up to 6 digits (including decimals and understand the value of each digit) Extend mental methods for whole-number calculations, for example to multiply a two-digit by a one-digit number (e.g. 12×9), to multiply by 25 (e.g. 16×25), to subtract one near multiple of 1000 from another (e.g. $6070 - 4097$) Refine and use efficient written (including formal long multiplication for two digit numbers and short division) methods to multiply and divide THHTO \times O and THHTO \times TO, TO \times TO, O.t \times O and THTO \div O; interpret remainders appropriately in division Add and subtract numbers mentally with increasingly large numbers Ensure pupils continue to practise fast responses for mental calculations with increasingly large numbers so that they are fluent and precise ($12,462 - 2,300$) Recognise and describe number sequences, including those involving fractions and decimals, and find the term to term rule. | <ul style="list-style-type: none"> Solve problems involving multiplication and division including scaling by simple fractions and problems involving rates. Solve problems involving all four operations and a combination of these including understanding the meaning of the equals sign. Refine and use efficient written (including formal long multiplication for two digit numbers and short division) methods to multiply and divide THHTO \times O and THHTO \times TO, TO \times TO, O.t \times O and THTO \div O; interpret remainders appropriately in division Ensure remainders are recorded in different ways ($98/4 = 24r2$ or 24 and $\frac{2}{4}$ or 24.5) Accurately multiply and divide numbers mentally by drawing upon known tables facts Recognise and use square numbers and cube numbers and the notation for square and cubed. Use and explain the equals sign to indicate equivalence including missing number problems. Understand that distributivity can be expressed as $a(b+c) = ab+ac$ Recognise and describe number sequences, including those involving fractions and decimals, and find the term to term rule. |

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| <p>Securing number facts, understanding shape</p> | <ul style="list-style-type: none"> Explore patterns, properties and relationships and propose a general statement involving numbers or shapes; identify examples for which the statement is true or false Recall quickly multiplication facts up to 12×12 and use them to multiply pairs of multiples of 10 and 100; derive quickly corresponding division facts Use knowledge of rounding, place value, number facts and inverse operations to estimate and check calculations Identify, visualise and describe properties of rectangles, triangles, regular polygons and 3-D solids; use knowledge of properties to draw 2-D shapes and identify and draw nets of 3-D shapes Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. Apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations. | <ul style="list-style-type: none"> Identify multiples and factors, including finding all factor pairs of a number and common factors and multiples of two numbers. Use efficient written methods to add and subtract whole numbers and decimals with up to THREE places Understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence statements ($4 \times 35 = 2 \times 2 \times 35$ or $3 \times 270 = 3 \times 3 \times 9 \times 10 = 9^2 \times 10$) Solve problems involving multiplication and division including their knowledge of factors and multiples, squares and cubes. | <ul style="list-style-type: none"> Represent a puzzle or problem by identifying and recording the information or calculations needed to solve it; find possible solutions and confirm them in the context of the problem Use knowledge of place value and addition and subtraction of two-digit numbers to derive sums and differences and doubles and halves of decimals (e.g. 6.5 ± 2.7, half of 5.6, double 0.34) Use efficient written methods to add and subtract whole numbers and decimals up to THREE places Solve problems involving multiplication and division including their knowledge of factors and multiples, squares and cubes. |
| <p>Handling data and measures</p> | <ul style="list-style-type: none"> Plan and pursue an enquiry; present evidence by collecting, organising and interpreting information; suggest extensions to the enquiry Explain reasoning using diagrams, graphs and text; refine ways of recording using images and symbols Answer a set of related questions by collecting, selecting and organising relevant data; draw conclusions, using ICT to present features, and identify further questions to ask Construct frequency tables, pictograms and bar and line graphs to represent the frequencies of events and changes over time Read, choose, use and record standard metric units to estimate and measure length, weight and capacity to a suitable degree of accuracy (e.g. the nearest centimetre) Convert between different units of metric measure e.g. km to m, cm to mm, g to kg, l to ml. Interpret a reading that lies between two unnumbered divisions on a scale Solve comparison, sum and difference problems using information in a line graph. | <ul style="list-style-type: none"> Add and subtract, multiply and divide units of measure (length, mass, volume and money using decimal notation Understand and use approximate equivalences between metric and common imperial units such as inches, pounds and pints. Calculate, estimate and compare the area of squares, rectangles and related composite shapes using standard units, square cm and square m. Measure and calculate the perimeter of composite rectilinear shapes in cms and ms. Use multiplication and division as inverses to support the introduction of ratio in year 6, for example by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of 1000 in converting between units of measure such as m and km. | <ul style="list-style-type: none"> Calculate, estimate and compare the area of squares, rectangles and related composite shapes using standard units; recognise volume in practical contexts and calculate volume Find and calculate perimeter including for composite shapes and where dimensions have to be calculated using the information given Complete tables and bar graphs from given information and solve data presented in bar graphs, tables and timetables Identify, describe and represent the position of a shape following a reflection or translation using the appropriate vocabulary and initially in the first quadrant and then those ready, into the 4 quadrants Ensure pupils continue to practise regularly drawing lines with a ruler and measuring with a protractor and become confident when using and interpreting conventions for marking parallel lines, right angles and angles given on a triangle ($AB^{\wedge}C$) Extend knowledge of fractions to thousandths and connect to decimals and measure. |
| <p>Calculating, measuring and understanding shape</p> | <ul style="list-style-type: none"> Solve one-step and two-step measure and time problems involving whole numbers, decimals, scaling and all four operations, choosing and using appropriate calculation strategies, with increasing complexity Read and plot coordinates in the first quadrant; recognise parallel and perpendicular lines in grids and shapes; use a set-square and ruler to draw shapes with perpendicular or parallel sides Read, choose, use and record standard metric units to estimate and measure length, weight and capacity to a suitable degree of accuracy (e.g. the nearest centimetre); convert larger to smaller units using decimals to one place (e.g. change 2.6 kg to 2600 g) Interpret a reading that lies between two unnumbered divisions on a scale Draw and measure lines to the nearest millimetre; measure and calculate the perimeter of regular and irregular polygons; use the formula for the area of a rectangle to calculate the rectangle's area Ensure pupils make connections between percentages, fractions and decimals. They should recognise that percentages are operators Ensure pupils count on and back in decimals and fractions and that in mental calculation they use mental addition and subtraction of tenths and 1 digit whole numbers and tenths Recognise decimal complements of 1 using addition and subtraction e.g. 0.37 and $0.63 = 1$ Connect equivalent fractions that exceed one, that simplify to integers with division and other fractions that exceed 1 to division with remainders, moving to improper and mixed numbers. | <ul style="list-style-type: none"> Use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 and 1000 Can say, read and write decimal fractions and related tenths, hundredths and thousandths. Read, write, order and compare numbers with up to 3 decimal places Add and subtract numbers with up to 3 decimal places and different numbers of decimal places. Read and write decimal numbers as fractions Read timetables and time using 24-hour clock notation; use a calendar to calculate time intervals Identify and name the following: parallelogram, rhombus and trapezium Construct shapes from given dimensions; state and use properties of a square and rectangle (area of a square is 81cm^2. What is the perimeter?) Identify 3D shapes including cubes and cuboids from 2D representations and construct nets Solve problems involving converting between units of time. Calculate the area from scale drawings using given measurements. <ul style="list-style-type: none"> Use angle sum facts and other properties to make deductions about missing angles. | <ul style="list-style-type: none"> Use knowledge of rounding, place value, number facts and inverse operations to estimate and check calculations Use written methods to add subtract whole numbers/decimals with two places Refine and use efficient written (including formal long multiplication for two digit numbers and short division) methods to multiply and divide $\text{THHTO} \times \text{O}$ and $\text{THHTO} \times \text{TO}$, $\text{TO} \times \text{TO}$, $\text{O.t} \times \text{O}$ and $\text{THTO} \div \text{O}$; interpret remainders appropriately in division. Estimate, draw and measure acute and obtuse angles using an angle measurer or protractor to a suitable degree of accuracy; calculate angles in a straight line Read timetables and time using 24-hour clock notation; use a calendar to calculate time intervals Identify, describe and represent the position of a shape following a reflection or translation using the appropriate vocabulary and initially in the first quadrant and then those ready, into the 4 quadrants Ensure pupils continue to practise regularly drawing lines with a ruler and measuring with a protractor and become confident when using and interpreting conventions for marking parallel lines, right angles and angles given on a triangle ($AB^{\wedge}C$) Use the properties of rectangles to deduce related facts find missing lengths and angles. Use the term diagonal and make conjectures about the angles formed between sides and between diagonals and parallel sides and other properties of quadrilaterals for example using ICT tools. |

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Securing number facts, calculations and relationships | <ul style="list-style-type: none"> Represent a puzzle or problem by identifying and recording the information or calculations needed to solve it; find possible solutions and confirm them in the context of the problem Express a smaller whole number as a fraction of a larger one (e.g. recognise that 5 out of 8 is $\frac{5}{8}$); find equivalent fractions (e.g. $\frac{7}{10} = \frac{14}{20}$, or $\frac{19}{10} = 1\frac{9}{10}$); relate fractions to their decimal representations Find fractions using division (e.g. $\frac{1}{100}$ of 5 kg), and percentages of numbers and quantities (e.g. 10%, 5% and 15% of £80) | |
| | <ul style="list-style-type: none"> Solve one-step and two-step problems involving whole numbers and decimals and all four operations, choosing and using appropriate calculation strategies, with increasing complexity Explain reasoning using diagrams, graphs and text; refine ways of recording using images and symbols Recall quickly multiplication facts up to 12×12 and use them to multiply pairs of multiples of 10 and 100; derive quickly corresponding division facts Identify multiples and factors, including finding all factor pairs of a number and common factors and multiples of two numbers. Extend mental methods for whole-number calculations, for example to multiply a two-digit number by a one-digit number (e.g. 12×9), to multiply by 25 (e.g. 16×25), to subtract one near-multiple of 1000 from another (e.g. $6070 - 4097$) Refine and use efficient written methods to multiply and divide TH HTO \times TO, TO \times TO, O.t \times O and THTO \div O, interpret remainders appropriately in division. Write remainders as fractions and decimals Compare and order fractions whose denominators are all multiples of the same number. Recognise mixed numbers and improper fractions and convert from one to the other Write mathematical statements that exceed 1 as a mixed number ($2\frac{1}{5} + 4\frac{1}{5} = 6\frac{2}{5} = 1$ and $1\frac{1}{5}$) Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths. | <ul style="list-style-type: none"> Explain reasoning using diagrams, graphs and text; refine ways of recording using images and symbols Multiply proper fractions and mixed numbers by whole numbers Add and subtract fractions with the same denominator and denominators that are multiples of the same number, answers to exceed 1 as a mixed number. Understand percentage as the number of parts in every 100 ($1\% = 1/100$) and write percentages as a fraction with the denominator 100 and as a decimal. Read and write decimal numbers as fractions Use sequences to scale numbers up or down; solve problems involving proportions of quantities (e.g. decrease quantities in a recipe designed to feed six people) Use knowledge of place value and addition and subtraction of two-digit numbers to derive sums and differences and doubles and halves of decimals (e.g. 6.5 ± 2.7, half of 5.6, double 0.34) Solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $1/5$, $4/5$ and those fractions with a denominator of a multiple of 10 or 25. |

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8. Year 6 overview

| Year 6 | Term 1 - Unit 1 | Term 2 - Unit 2 | Term 3 - Unit 3 |
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| : Counting, partitioning and calculating | <ul style="list-style-type: none"> Explain reasoning and conclusions, using words, symbols or diagrams as appropriate Use decimal notation for tenths, hundredths and thousandths; partition, round and order decimals with up to three places, and position them on the number line Calculate mentally with integers and decimals: O.t \pm O.t, TO \times O, TO \div O, O.t \times O, O.t \div O Solve addition and subtraction multi step problems in contexts, deciding on operations and methods. Solve problems which require answers to be rounded to specified degrees of accuracy. Use approximations, inverse operations and tests of divisibility to estimate and check results Carry out combined operations involving the four operations accurately and state the order of operations (BODMAS) Use estimation to check answers to calculations and determine, in the context of the question, an answer to the appropriate degree of accuracy. Ensure pupils regularly practise saying, reading and writing numbers accurately Ensure pupils practise fast responses for mental calculation problems with increasingly large numbers and more complex calculations Ensure pupils continue to maintain fluency of tables knowledge to support calculation methods up to 12×12 Recognise and use division in the context of fractions, decimals, percentages and ratios Ensure pupils are introduced to and use the ratio notation symbol a:b in the context of comparing quantities, sizes and scale drawings Perform mental calculations, including with mixed operations and large numbers. Solve problems involving addition, subtraction, multiplication and division. Use addition and subtraction, multiplication and division for larger numbers, using the formal written methods of column addition and subtraction, short and long multiplication and short and long division. | | |

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| | <ul style="list-style-type: none"> Calculate the perimeter and area of rectilinear and composite shapes; estimate the area of an irregular shape by counting squares Find missing perimeter dimensions and derive unknown angles using information provided Compare and classify geometric shapes based on their properties and sizes. Find unknown angles and lengths in any triangles, quadrilaterals and regular polygons using known measurements. Recognise describe and build 3D shapes including making nets Describe properties of cuboids and other common 3D shapes including prisms and identify parallel planes and symmetries Know properties of 2D and 3D shapes Identify common factors, common multiples and prime numbers. Draw shapes and nets accurately using measuring tools and conventional markings and labels for lines and angles. Express shape relationships algebraically eg $d = 2 \times r$, $a = 180 - (b+c)$ | <ul style="list-style-type: none"> Tabulate systematically the information in a problem or puzzle; identify and record the steps or calculations needed to solve it, using symbols where appropriate; interpret solutions in the original context and check their accuracy Use a calculator to solve problems involving multi-step calculations Use estimation to check answers to calculations and determine, in the context of the question, whether an answer should be rounded or written as a fraction or a decimal Carry out combined operations involving the four operations accurately and state the order of operations (BODMAS) Illustrate and name parts of circles, including radius, diameter, and circumference and know that the diameter is twice the radius. Know the properties of 2d and 3D shapes Estimate the size of given angles Using rules of geometry, recognise angles where they meet at a point, on a straight line, or are vertically opposite angles and be able to find missing angles. Identify common factors, common multiples and prime numbers. Draw shapes and nets accurately using measuring tools and conventional markings and labels for lines and angles. | <ul style="list-style-type: none"> Tabulate systematically the information in a problem or puzzle; identify and record the steps or calculations needed to solve it, using symbols where appropriate; interpret solutions in the original context and check their accuracy Use a calculator to solve problems involving multi-step calculations Use estimation to check answers to calculations and determine, in the context of the question, whether an answer should be rounded or written as a fraction or a decimal Carry out combined operations involving the four operations accurately and state the order of operations (BODMAS) Calculate the perimeter and area of rectilinear and triangular shapes and circles; estimate the area of an irregular shape by counting squares |
| <p style="writing-mode: vertical-rl; transform: rotate(180deg);">C: Handling data and measures</p> | <ul style="list-style-type: none"> Solve problems by collecting, selecting, processing, presenting and interpreting data, using ICT where appropriate; draw conclusions and identify further questions to ask Construct and interpret frequency tables, bar charts with grouped discrete data, and line graphs; interpret pie charts Describe and interpret results and solutions to problems using the mode, range, median and mean Select and use standard metric units of measure and convert between units using decimals to two places (e.g. change 2.75 litres to 2750 ml, or vice versa) Read and interpret scales on a range of measuring instruments, recognising that the measurement made is approximate and recording results to a required degree of accuracy; compare readings on different scales, for example when using different instruments Solve problems involving the calculation and conversion of units and measure, using decimal notation up to 3dp. Suggest, plan and develop lines of enquiry; collect, organise and represent information, interpret results and review methods; identify and answer related questions Describe positions on the full co-ordinate grid (all four quadrants) Draw and label a pair of axes in all 4 quadrants with equal scaling. Construct, translate, reflect and rotate simple shapes on the co-ordinate plane, including reflective symmetry in the x and y axis Use read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger one and vice versa with decimals up to 3dp. Ensure pupils use, add and subtract positive and negative integers for measures such as temperature and for money Draw, read construct and interpret line graphs and pie charts, and use these to solve problems Ensure pupils use a range of graphs such as temperature comparisons, distance time and currency conversion. Apply knowledge in other subject areas such as science Calculate the mean as an average and know when it is appropriate to find the mean of a data set. Link %, fractions and angles to interpreting pie charts and calculating angles. Convert between miles and kilometres | <ul style="list-style-type: none"> Describe and predict outcomes from data using the language of chance or likelihood Use estimation to check answers to calculations and determine, in the context of the question, whether an answer should be rounded or written as a fraction or a decimal Describe positions on the full co-ordinate grid (all four quadrants) Construct, translate, reflect and rotate simple shapes on the co-ordinate plane, including reflective symmetry in the x and y axis Pupils draw and label rectangles, squares, parallelograms and rhombuses, specified by coordinates in the four quadrants and that they measure the lengths of sides and diagonals including calculating perimeters Find missing coordinates using knowledge of shape and limited information supplied Understand that the x axis controls how far along a point is (the x co-ordinate) and y axis controls how far up and down a point is (the y coordinate) Draw graphs relating to two variables, arising from their own enquiry. Draw, read, construct and interpret line graphs and pie charts, and use these to solve problems. Apply knowledge in other subject areas such as science Calculate the mean as an average and know when it is appropriate to find the mean of a data set. Use the language associated with probability to describe the likelihood of events Use read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger one and vice versa with decimals up to 3dp. Know approximate conversions and be able to tell if an answer is sensible. | <ul style="list-style-type: none"> Describe and predict outcomes from data using the language of chance or likelihood Use estimation to check answers to calculations and determine, in the context of the question, whether an answer should be rounded or written as a fraction or a decimal Find missing coordinates using knowledge of shape and limited information supplied Understand that the x axis controls how far along a point is (the x co-ordinate) and y axis controls how far up and down a point is (the y coordinate) Calculate the perimeter and area of rectilinear (including rhombus and parallelogram) and triangular shapes and circles; include identifying the base and its corresponding height Recognise that shapes with the same area can have different perimeters and vice versa Use read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger one and vice versa with decimals up to 3dp. |
| <p style="writing-mode: vertical-rl; transform: rotate(180deg);">D: Calculating, measuring and understanding shape</p> | <ul style="list-style-type: none"> Solve multi-step problems, and problems involving fractions, decimals and percentages; choose and use appropriate calculation strategies at each stage, including calculator use Calculate mentally with integers and decimals: $0.\dot{t} \pm 0.\dot{t}$, 10×0, $10 \div 0$, $0.\dot{t} \times 0$, $0.\dot{t} \div 0$ Use efficient written methods to add and subtract integers and decimals, to multiply and divide integers and decimals by a one-digit integer AND DIVIDE NUMBERS OF UP TO 4 DIGITS BY A 2 DIGIT NUMBER, and to multiply two-digit, three-digit AND GREATER THAN FOUR DIGIT integers by a two-digit integer AND INTERPRET REMAINDERS AS DECIMALS, FRACTIONS, WHOLE NUMBERS OR BY ROUNDING Carry out combined operations involving the four operations accurately and state the order of operations (BODMAS) Use approximations, inverse operations and tests of divisibility to estimate and check results Use estimation to check answers to calculations and determine, in the context of the question, whether an answer should be rounded or written as a fraction or a decimal Ensure pupils practise drawing shapes and nets regularly and accurately, using measuring tools and conventional markings and labels for parallel lines etc Select and use standard metric units of measure and convert between units using decimals to THREE places (e.g. change 2.75 litres to 2750 ml, or vice versa) | | |

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| | <ul style="list-style-type: none"> Solve problems by measuring, estimating and calculating; measure and calculate using imperial units still in everyday use; know their approximate metric values Read and interpret scales on a range of measuring instruments, recognising that the measurement made is approximate and recording results to a required degree of accuracy; compare readings on different scales, for example when using different instruments Calculate the perimeter and area of rectilinear and composite shapes; estimate the area of an irregular shape by counting squares Find missing perimeter dimensions and derive unknown angles using information provided Compare and classify geometric shapes based on their properties and sizes. Find unknown angles in any triangles, quadrilaterals and regular polygons Recognise describe and build 3D shapes including making nets Describe properties of cuboids and other common 3D shapes including prisms and identify parallel planes and symmetries Know properties of 2D shapes (including lines of symmetry and order of rotational symmetry) and 3D shapes (vertices, vertex, apex, edges, faces) Calculate, estimate and compare volume of cubes and cuboids using standard units, including cm cubed, m cubed, mm cubed and km cubed Use decimal notation to 3DP to solve problems involving calculation and conversion of measures Calculate the area of parallelograms and triangles. | <ul style="list-style-type: none"> Estimate angles, and use a protractor to measure and draw them, on their own and in shapes; calculate angles in a triangle or around a point Use coordinates in the first quadrant to draw, locate and complete shapes that meet given properties Visualise and draw on grids of different types where a shape will be after reflection, after translations, or after rotation through 90° or 180° about its centre or one of its vertices Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius. Know the properties of 2d and 3D shapes Find the volume of 3D shapes Estimate the size of given angles Using rules of geometry, find angles at a point, on a straight line, in a triangle, regular quadrilateral, pentagon and hexagon. Find angles on an intersecting line across a set of parallel lines and vertically opposite angles Calculate, estimate and compare volume of cubes and cuboids using standard units, including cm cubed, m cubed, mm cubed and km cubed Calculate speed from distance and time; use derivatives of the formula to find distance and find speed Use decimal notation to 3DP to solve problems involving calculation and conversion of measures Relate the area of rectangles to parallelograms and triangles, for example by dissection and calculate the areas, understanding and using the formulae. | <ul style="list-style-type: none"> Solve problems by measuring, estimating and calculating; measure and calculate using imperial units still in everyday use; know their approximate metric values Carry out combined operations involving the four operations accurately and state the order of operations (BODMAS) Read and interpret scales on a range of measuring instruments, recognising that the measurement made is approximate and recording results to a required degree of accuracy; compare readings on different scales, for example when using different instruments Calculate the perimeter and area of rectilinear and triangular shapes and circles; estimate the area of an irregular shape by counting squares Draw triangles, angles and circles accurately using a compass and ruler Calculate speed from distance and time; use derivatives of the formula to find distance and find speed; apply knowledge in other subjects such as science and PE Recognise when it is possible to use formulae for area and volume of shapes. Solve problems involving similar shapes where the scale factor is known or can be found. |
| <ul style="list-style-type: none"> Securing number facts, calculations and relationships | <ul style="list-style-type: none"> Tabulate systematically the information in a problem or puzzle; identify and record the steps or calculations needed to solve it, using symbols where appropriate; interpret solutions in the original context and check their accuracy Express a larger whole number as a fraction of a smaller one (e.g. recognise that 8 slices of a 5-slice pizza represents $\frac{8}{5}$ or $1\frac{3}{5}$ pizzas) Use common factors to simplify fractions, use common multiples to express fractions in the same denominator. Relate fractions to multiplication and division (e.g. $6 \div 2 = \frac{1}{2}$ of 6 = $6 \times \frac{1}{2}$); express a quotient as a fraction or decimal (e.g. $67 \div 5 = 13.4$ or $13\frac{2}{5}$); find fractions and percentages of whole-number quantities (e.g. $\frac{3}{8}$ of 96, 65% of £260) Compare and order fractions, including fractions greater than one. Find common denominators in order to compare fractions. Solve simple problems involving direct proportion by scaling quantities up or down Recognise and use division in the context of fractions, decimals, percentages and ratio In algebra, solve linear missing number problems ($18 - _ = 36$), and find pairs of numbers that satisfy number sentences involving two unknowns ($_ \times _ = 360$) Explore converting simple fractions to a decimal eg. $3 \div 8 = 0.375$ and with recurring decimals round to 3dp. . | | |

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| <ul style="list-style-type: none"> • Explain reasoning and conclusions, using words, symbols or diagrams as appropriate • Solve multi-step problems, and problems involving fractions, decimals and percentages; choose and use appropriate calculation strategies at each stage, including calculator use • <i>Use knowledge of place value and multiplication facts to 12×12 to derive related multiplication and division facts involving decimals (e.g. 0.8×7, $4.8 \div 6$)</i> • <i>Use efficient written methods to add and subtract integers and decimals.</i> • <i>Divide numbers up to 4 digits by a two digit number using the formal written method of short division, interpreting remainders.</i> • <i>Use the formal written method of long division.</i> • <i>Multiply multi digit numbers up to 4 digits by a two digit whole number using the formal written method of long multiplication.</i> • Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions. • Multiply simple pairs of proper fractions - writing answers in their simplest form $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$. Use images to support understanding. • Divide proper fractions by whole numbers e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$ • Associate a fraction with division to calculate decimal fraction equivalents for simple fractions ($\frac{1}{5} = 0.2$) • Ensure pupils are able to use their understanding of the relationship between unit fractions and division to work backwards. For instance if $\frac{1}{2}$ of a length is 36cm then the whole length is $36 \times 2 = 72$cm • Recognise and use division in the context of fractions, decimals, percentages and ratio • In algebra, solve linear missing number problems ($18 - _ = 36$) and find pairs of numbers that satisfy number sentences involving two unknowns ($_ \times _ = 360$) • Use simple formulae • Generate and describe linear number sequences • Use common factors when finding equivalent fractions. • Express missing number problems algebraically. • Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples. • List equivalent fractions to identify fractions with common denominators. • | <ul style="list-style-type: none"> • Explain reasoning and conclusions, using words, symbols or diagrams as appropriate • <i>Express one quantity as a percentage of another (e.g. express £400 as a percentage of £1000); find equivalent percentages, decimals and fractions</i> • Identify the value of each digit to 3DP and multiply and divide numbers up to 3DP by 10, 100, 1000 giving answers to 3dp. • Multiply and divide numbers with up to 2DP by 1 digit and 2 digit whole numbers; ensure that pupils recognise division calculations as the inverse of multiplication and that they are able to use rounding and estimation to check their answers for sense • Use percentages for comparison and calculate percentages of whole numbers or measures to include finding sale prices • Calculate mentally 1% of a given number and use this to find a percentage e.g. 12% of £30 = $1\% = 0.3 \times 12 = \text{£}3.60$p • Recall and use equivalences between %, decimals and fractions • Recognise and use division in the context of fractions, decimals and percentages • In algebra, solve linear missing number problems ($18 - _ = 36$) and find pairs of numbers that satisfy number sentences involving two unknowns ($_ \times _ = 360$) • Ensure children interpret word problems as statements about number and record them as a mathematical statement • Pupils write missing number problems algebraically e.g. $2x - 4 = 8$ and use this method to represent missing lengths, missing angles and for co-ordinates and numbers. • Generate and describe linear number sequences • Pupils find possible solutions for equations with two unknown variables e.g. $x + y = 5$ • Use simple formulae • Express missing number problems algebraically. • Solve problems involving the calculation of percentages (for example 15% of 360) and the use of percentages for comparison. • Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. • <i>Use symbols and letters to represent formulae in maths and science, equivalent expressions eg $a+b = b+a$, generalisations of number patterns and in number puzzles.</i> • | <ul style="list-style-type: none"> • Solve multi-step problems, and problems involving fractions, decimals and percentages; choose and use appropriate calculation strategies at each stage, including calculator use • <i>Use knowledge of place value and multiplication facts to 10×10 to derive related multiplication and division facts involving decimals (e.g. 0.8×7, $4.8 \div 6$)</i> • <i>Use efficient written methods to add and subtract integers and decimals.</i> • <i>Divide numbers up to 4 digits by a two digit number using the formal written method of short division, interpreting remainders.</i> • <i>Use the formal written method of long division.</i> • <i>Multiply multi digit numbers up to 4 digits by a two digit whole number using the formal written method of long multiplication.</i> • <i>Express one quantity as a percentage of another (e.g. express £400 as a percentage of £1000); find equivalent percentages, decimals and fraction</i> • Use ratios to show the relative sizes of 2 quantities • Understand the difference between ratio and proportion and apply knowledge of each equally well • Ensure pupils are introduced to and use the ratio notation symbol a:b in the context of comparing quantities, sizes and scale drawings and solve a variety of problems. • Recognise and use division in the context of fractions, decimals, percentages and ratio • In algebra, solve linear missing number problems ($18 - _ = 36$) and find pairs of numbers that satisfy number sentences involving two unknowns ($_ \times _ = 360$) • Ensure children interpret word problems as statements about number and record them as a mathematical statement • Generate and describe linear number sequences • Pupils find possible solutions for equations with two unknown variables e.g. $x + y = 5$ • Use simple formulae • Express missing number problems algebraically. • <i>Solve problems involving unequal quantities eg 1 egg for every 3 spoons of flour.</i> • <i>Solve ratio problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.</i> • Pupils are introduced to the use of symbols and letters to represent variables and unknowns such as missing numbers, lengths, co-ordinates and angles. • |
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