Year 6 Calculation Policy

- Addition – Mental Strategies
- Addition – Written Strategies
- Addition – Resources and Vocabulary
- Subtraction – Mental Strategies
- Subtraction – Written Strategies
- Subtraction – Resources and Vocabulary
- Multiplication – Mental Strategies
- Multiplication – Written Strategies
- Multiplication – Resources and Vocabulary
- Division – Mental Strategies
- Division – Written Strategies
- Division – Resources and Vocabulary

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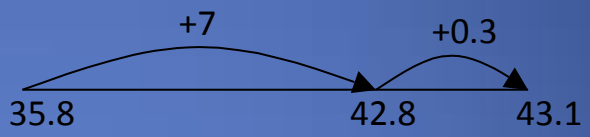
Addition – Mental Strategies and Jottings

NB. These should be done with increasingly large numbers e.g. 12462 + 2300 and numbers involving decimals

- Partition the smaller number into hundreds, tens, units and decimals and recombine e.g.

  35.8 + 7.3= 35.8 + 7 + 0.3
  = 42.8 + 0.3
  = 43.1



- Add the nearest multiple of 10, 100 or 1000 then adjust e.g.

  458 + 79 = 458 + 80 - 1
  2998 + 47 = 3000 + 47 - 2

- Find near doubles and adjust as needed e.g.

  72 + 68 = (70 + 2) + (70 – 2)

<u>Use of the bar model with multi-step problems</u>

I cut 3 strips of ribbon from a 2m length, the first piece is 65.9 cm, the second is 756 mm, the third is 0.156 m. How much ribbon is left?

2m			
?			?
65.9cm	756mm = 75.6 cm	0.156m = 15.6cm	

Addition – Mental Strategies and Jottings

The Bar model

Aggregation

Augmentation

Addition – Written Strategies

- Short column addition

Extend to numbers with any number of digits and mixed amounts of decimal places

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  3247.7
+ 248.42
 1496.12
  1 1
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Place value counters can continue to be used to support confident calculation with *decimals* and numbers with more than *4 digits* (see Year 4 Calculation Policy).

Revert to expanded methods (see Year 4) if the children experience any difficulty.

Addition – Vocabulary and Resources

Resources:

Place value counters

Base 10

Vocabulary:

commutative, associative and distributive laws, exchanging, algorithm, Brackets, order of operations, BODMAS, aggregation, augmentation

Subtraction – Mental Strategies and Jottings

NB. These should be done with increasingly large numbers e.g. 12462 + 2300 and numbers involving decimals

- Find a difference by counting up e.g. 754 – 286 = 468

  To make this method more efficient, the number of steps should be reduced to a minimum through children knowing:

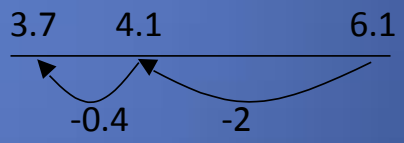
  - *Complements to 1, involving decimals to two decimal places (0.16 + 0.84)*
  - *Complements to 10, 100 and 1000.*

- Subtract the nearest multiple of 10, 100 or 1000 and then adjust

  e.g. 928 – 203 = (928 – 200) -3

  = 728 – 3

  = 725



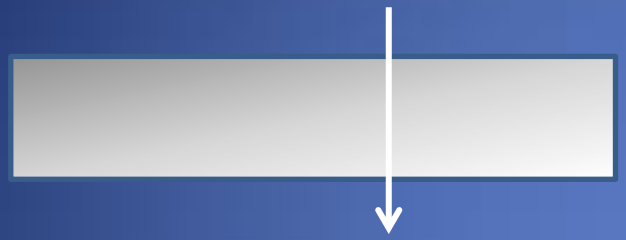
<u>Use of the bar model for multi-step problems</u>

I sold my house for £349 950. I bought a cheaper house costing £225 500 and a posh new speed boat! I managed to keep £35 000 for my savings, how much did I spent on my new boat?

£349,950		
£225,500	Speed boat?	£35,000

Subtraction – Mental Strategies and Jottings

The Bar model



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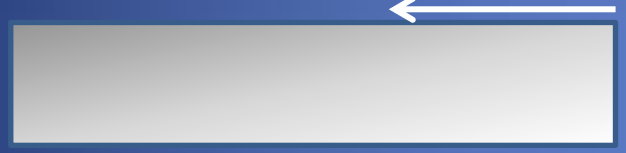
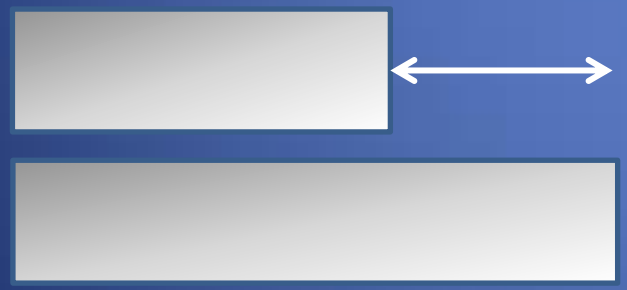
Partitioning into two groups



Reduction – by a quantity or amount



Comparison – of the difference

Inverse – how much more

Subtraction – Written Strategies

- Short column subtraction

  (use of place value counters for support)

$$\begin{array}{r} {\scriptstyle 8\ 12\ 1} \\ 9\not{3}\not{2} \\ -\ 4\ 5\ 7 \\ \hline 4\ 7\ 5 \end{array} \qquad \begin{array}{r} {\scriptstyle 2\ 17} \\ 3\not{8}.2 \\ -\ 28.7 \\ \hline 29.5 \end{array}$$

Subtraction – Vocabulary and Resources

Resources:

Place value counters

Vocabulary:

Deduct, reduce by, remove, remains, left over, loss, discount, efficient, exchanging, commutative, associative and distributive laws, expanded method, algorithm, Brackets, order of operations, BODMAS, aggregation, augmentation

Multiplication – Mental Strategies and Jottings

- Children must know what prime, square, cube and composite (non-prime) numbers are. They need to know how to find common multiples and factors.

- Partitioning

  e.g. 87 x 6 = (80 x 6) + (7 x 6) = 480 + 42 = 522

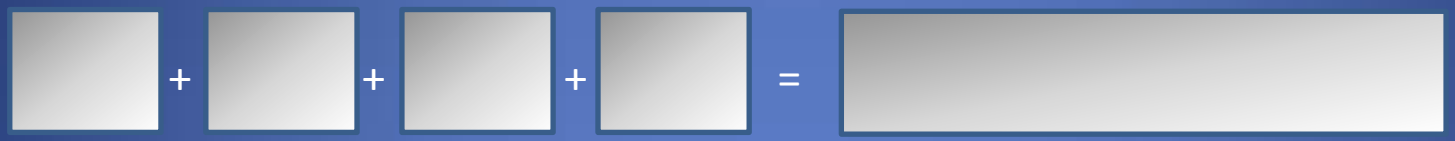
<u>Use of the bar model with problem solving</u>

I save £1595 per month so that I can buy myself a car that will cost £15995, how many months will it take me to save up?

Multiplication – Mental Strategies and Jottings

The Bar model

Repeated Aggregation



Scaling

Multiplication– Written Strategies

- Short column multiplication when multiplying by one digit

(expanded method may be used where needed – see Year 4 Calculation Policy)

$$\begin{array}{r} 24 \\ \times\ 6 \\ \hline 144 \\ {\scriptstyle 2\ \ \ } \end{array}$$

$$\begin{array}{r} 342 \\ \times\ 5 \\ \hline 1710 \\ {\scriptstyle 2\ 1} \end{array}$$

- Long column multiplication when multiplying by two digits

$$\begin{array}{r} 1\ 2\ 4 \\ \times\ 2\ 6 \\ \hline 7_{1}4_{2}4 \\ 2\ 4\ 8\ 0 \\ \hline 3\ 2\ 2\ 4 \\ {\scriptstyle 1\ \ 1} \end{array}$$

Units x top number

Tens x top number

Multiplication– Vocabulary and Resources

Resources:

Place value counters

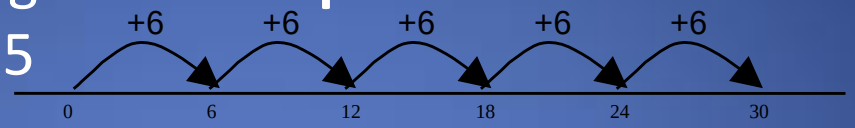
Vocabulary:

- Product, multiplier, multiplicand, scaling, factors, ratio, non unit fractions, efficient, exchanging, commutative, associative and distributive laws, algorithm, brackets, order of operations, BODMAS, aggregation, LCM, prime/ square and cube numbers, powers

Division – Mental Strategies and Jottings

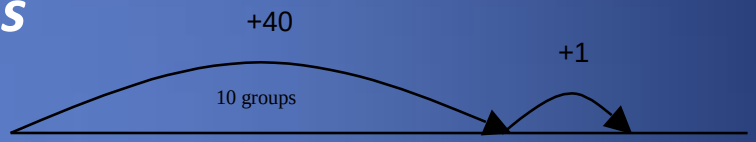
- Sharing and grouping to count **up**

30 ÷ 6 = 5



- Larger groupings of known number facts including remainders ***expressed as fractions***

41 ÷ 4 = (10 x 4) + 1 = 10 1/4 = 10.25



Continue to develop confidence and understanding with mental division, with increasingly larger numbers, including up to 4 digits (and more than if applicable) and decimal numbers.

Children could use the bar model, number line, informal jottings to support their mental computation

1 ÷ □ = 0.2

1 ÷ □ = 0.125

1 ÷ 4 = 0.25

1 ÷ □ = 4

For every 2l water there is 60 ml of squash, if I use 270ml of squash how much water have I used?

Water : Squash

2 l : 60 ml

? : 270 ml

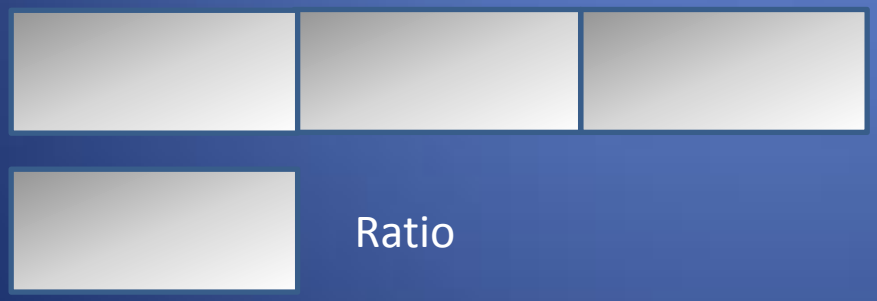
Division – Mental Strategies and Jottings

The Bar model

Sharing equally

Repeated subtraction

Repeated addition



Ratio

Division – Written Strategies

- Bus stop method – short method

e.g. 432 ÷ 5 =

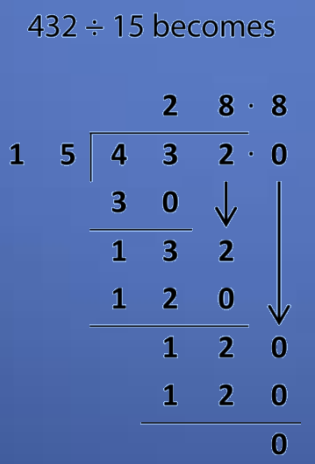
$$5 \overline{)\, 4^{4}3^{3}2.^{2}0} \quad 0\,8\,6.\,4$$

496 ÷ 11 = $11 \overline{)\, 4\,9^{5}6}$ 4 5 r.1

NB. Pupils to interpret non-integer answers in different ways depending on the context – as remainders, fractions, decimals or through rounding where appropriate.

- Bus stop method – long method

e.g.



972 ÷ 36 =

27

36 | 972

- 720 (**20** x 36)

252 (**7** x 36)

- 252 (**=27**)

0

Division – Vocabulary and Resources

Resources:

Place value counters

Vocabulary:

- Dividend, divisor, quotient, remainder, left over, rules of divisibility, divisible by, factors, multiple, ratio, non unit fractions, efficient, exchanging, commutative, associative and distributive laws, algorithm, Brackets, order of operations, BODMAS, LCM, prime/ square and cube numbers, augmentation
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