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Primary School

Calculation Methods

Upper KS2

Year 5&6



A guide for parents
and pupils

Progression in Teaching Addition

Key Vocabulary

add
addition
plus
and
count on
more
sum
total
altogether
increase

add and count on
addition plus
more sum total
altogether increase

Year 5:

Column method

LO - Add whole numbers with more than 4 digits, including using formal written methods (columnar addition).

LO - Add numbers mentally with increasingly large numbers.

LO - Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.

LO - Solve addition multi-step problems in contexts, deciding which operations and methods to use and why.

Estimate:

$$800 + 640 = 1440$$

789 + 642 becomes

$$\begin{array}{r} 789 \\ + 642 \\ \hline 1431 \\ \hline \end{array}$$

Answer: 1431

25.356 + 346.28 becomes:

Estimate:

$$25 + 350 = 375$$

$$\begin{array}{r} 25.356 \\ + 346.28 \\ \hline 371.636 \\ \hline \end{array}$$

Year 6:

Column method

LO - Perform mental calculations, including with mixed operations and large numbers.

LO - Use their knowledge of the order of operations to carry out calculations involving the four operations.

LO - Solve addition and multi-step problems in contexts, deciding which operations and methods to use and why.

Estimate:

$$21\ 000 = 12\ 500 + 8\ 500$$

$$\begin{array}{r} 12\ 462 \\ + 8\ 456 \\ \hline 20\ 918 \\ 1\ 1 \end{array}$$

$$1 \times (5 - 5) \div 1^2$$

$$10 - 3 + (6 \div 3)^2$$

Progression in Teaching Subtraction

Key Vocabulary

subtract
take away
minus
count back
less
fewer
difference between

count back take away
fewer subtract
minus less
difference between

Year 5:

Column method

LO - Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction).

LO - Subtract numbers mentally with increasingly large numbers.

LO - Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.

LO - Solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Estimate:

$$900 - 500 = 400$$

874 - 523 becomes

$$\begin{array}{r} 874 \\ - 523 \\ \hline 351 \end{array}$$

Answer: 351

$$900 - 500 = 400$$

932 - 457 becomes

$$\begin{array}{r} 8 \quad 12 \quad 1 \\ 932 \\ - 457 \\ \hline 475 \end{array}$$

Answer: 475

932 - 457 becomes

$$\begin{array}{r} 1 \quad 1 \\ 932 \\ - 457 \\ \hline 475 \end{array}$$

Answer: 475

9.076 - 3.142 becomes:

Estimate:

$$9 - 3 = 6$$

$$\begin{array}{r} 9.076 \\ - 3.142 \\ \hline 5.934 \end{array}$$

Year 6:

Column method

LO - Perform mental calculations, including with mixed operations and large numbers.

LO - Use their knowledge of the order of operations to carry out calculations involving the four operations.

LO - Solve subtraction and multi-step problems in contexts, deciding which operations and methods to use and why.

$$3906 = 12\,462 - 8556$$

Estimate:

$$4000 = 12\,500 - 8\,500$$

$$\begin{array}{r} \overset{11}{1} \overset{1}{2} \overset{4}{4} \overset{5}{5} \overset{1}{6} \overset{1}{2} \\ - \quad 8\,556 \\ \hline \quad 3\,906 \end{array}$$

$$12.4 - 3.56 =$$

Estimate: $12 - 4 = 8$ (my answer should be between 8 and 9)

$$\begin{array}{r} \overset{1}{1} \overset{2}{2} \overset{13}{.} \overset{1}{4} \overset{1}{0} \\ - \quad 3.56 \\ \hline \quad 8.84 \end{array}$$

Progression in Teaching Multiplication

Key Vocabulary

lots of
groups of
times
multiply
multiplication
multiple
product
once, twice, three times
array, row, column
double
repeated addition

multiplication **product**
once, twice, three times
double **groups of**
repeated addition **lots of**
array, row, column **multiply**
times **multiple**

Year 5 and 6:

Short & Long Multiplication Method

- LO - count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000.
- LO - multiply numbers mentally drawing upon known facts.
- LO - multiply whole numbers and those involving decimals by 10, 100 and 1000.
- LO - identify multiples & factors, including finding all factor pairs of a number, & common factors of two numbers.
- LO - know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.
- LO - establish whether a number up to 100 is prime and recall prime numbers up to 19.
- Y6 LO - Use their knowledge of the order of operations to carry out calculations involving the four operations
- LO - recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3).
- LO - multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.

2307 x 8 =

Estimate: 2000 x 8 = 16000

Calculate: (Short multiplication)

$$\begin{array}{r}
 2307 \\
 \times \quad 8 \\
 \hline
 18456
 \end{array}$$

2 5



1431 x 23 =

Estimate: 1431 x 20 = 28620

Calculate: (Long multiplication)

$$\begin{array}{r}
 1431 \\
 \times \quad 23 \\
 \hline
 4293 \quad (1431 \times 3) \\
 28620 \quad (1431 \times 20) \\
 \hline
 32913
 \end{array}$$

1 1

Progression in Teaching Division

Key Vocabulary

lots of
groups of
share
group
halve
half
divide
division
divided by
remainder
factor
quotient
divisible

group groups of
lots of divide
divided by quotient
division factor
remainder divisible
half halve share

Year 5 & 6:

Compact (bus-shelter) Method

The final step is for confident mathematicians who understand the value of all the digits and who know all their multiplication facts. This method allows the children, especially in Year 6, to represent any remainders as integers, fractions or decimals.

$$\begin{array}{r} 97 \\ 3 \overline{) 292} \\ \underline{30} \\ 29 \\ \underline{27} \\ 20 \\ \underline{21} \\ 1 \end{array}$$

$$362 \div 7 =$$

$$\begin{array}{r} 51 \text{ r}5 \\ 7 \overline{) 362} \\ \underline{35} \\ 12 \\ \underline{14} \\ 2 \end{array}$$

$$362 \div 7 = 51 \text{ r}5$$

98 ÷ 7 becomes

$$\begin{array}{r} 14 \\ 7 \overline{) 98} \\ \underline{7} \\ 28 \\ \underline{28} \\ 0 \end{array}$$

Answer: 14

432 ÷ 5 becomes

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

Answer: 86.4

496 ÷ 11 becomes

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

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

Year 6: Long Division Method

LO - divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as a whole number, remainders, fractions or by rounding, as appropriate for the context.

$$\begin{array}{r} 36 \\ 7 \overline{)2542} \end{array}$$

$$\begin{array}{r} 36 \\ 7 \overline{)252} \\ -21 \downarrow \\ \hline 42 \\ -42 \\ \hline 0 \end{array}$$



$$\begin{array}{r} 422 \\ 6 \overline{)2532} \\ \underline{24} \downarrow \\ 13 \\ \underline{12} \downarrow \\ 12 \\ \underline{12} \\ 0 \end{array}$$



$$\begin{array}{r} 1813 \\ 13 \overline{)23576} \\ \underline{13} \downarrow \\ 105 \\ \underline{104} \downarrow \\ 17 \\ \underline{13} \downarrow \\ 46 \\ \underline{39} \\ 7 \end{array}$$



Thank you for listening.

