

National Curriculum objective:

Add and subtract numbers mentally with increasingly large numbers

Starting with mental addition and subtraction encourages children to use known strategies. Children are encouraged to work through the following process:

- Do I know the answer?
- Can I work it out in my head?
- Do I need a jotting?
- Do I need a formal method?

This supports efficiency within calculations.

Walt: add numbers mentally up to 4 digits

PA
WALT - add numbers mentally up to 4 digits.

Solve these calculations mentally using the strategies:

<u>Partitioning</u>	<u>Rounding and adjusting</u>
1. $834 + 122 = 956$ ✓	4. $199 + 283 = 482$ ✓
2. $2832 + 66 = 2898$ ✓	5. $1938 + 900 = 2838$ ✓
3. $4979 = 3847 + 1132$	6. $4359 + 298 = 4657$ ✓

3) $3000 + 1000 = 4000$
 $800 + 100 = 900$
 $40 + 30 = 70$
 $7 + 2 = 9$
 $4000 + 900 + 70 + 9 = 4979$

1) $800 + 100 = 900$
 $30 + 20 = 50$
 $4 + 2 = 6$
 $900 + 50 + 6 = 956$

2) $30 + 60 = 90$
 $6 + 2 = 8$
 $2800 + 90 + 8 = 2898$

Partitioning means to split the numbers into thousands, hundreds, tens and units etc. to make them easier to add mentally. It links closely with place value. Generally, digits that add together and do not require 'carrying' to the next column can be added using the partitioning strategy.

$$4) \begin{aligned} 199 + 1 &= 200 \\ 283 + 200 &= 483 \\ 483 - 1 &= 482 \end{aligned}$$

$$5) \begin{aligned} 1938 + 62 &= 2000 \\ 2000 + 900 &= 2900 \\ 2900 - 62 &= 2838 \end{aligned}$$

$$6) \begin{aligned} 298 + 2 &= 300 \\ 4359 + 300 &= 4659 \\ 4659 - 2 &= 4657 \end{aligned}$$

Great start

Rounding and adjusting means to round the number to the nearest 10, 100, 1000 etc, and then adjust (either adding or subtracting) the extra numbers that were added.

Calculations which include numbers that are close to a boundary of 10, 100 or 1000 etc can be solved mentally or with a jotting using this strategy.

WALT - subtract numbers mentally with increasingly large numbers

(1)

Use rounding and adjusting to calculate

- 1. $186 - 99 = 87$ ✓
- 2. $352 - 98 = 254$ ✓
- 3. $8693 - 499 = 8194$ ✓
- 4. $11,947 - 197 = 11,750$ ✓
- 5. $32,873 - 4,998 = 27,875$ ✓
- 6. $482,985 - 11,899 = 471,086$ ✓

1) $199 + 1 = 100$
 $186 - 100 = 86$
 $86 + 1 = 87$

2) $98 + 2 = 100$
 $352 - 100 = 252$
 $252 + 2 = 254$

3) $499 + 1 = 500$
 $8693 - 500 = 8193$
 $8193 + 1 = 8194$

4) $197 + 3 = 200$
 $11,947 - 200 = 11,747$
 $11,747 + 3 = 11,750$

5) $4998 + 2 = 5000$
 $32,873 - 5000 = 27,873$
 $27,873 + 2 = 27,875$

6) $11899 + 101 = 12000$
 $482,985 - 12000 = 470,985$
 $470,985 + 101 = 471,086$

Reasoning Task

Without using a formal method...

Take 500 away from each of these numbers:

- 4893
- 9265
- 2256
- 3127

Take 5000 away from each of these numbers:

- 6989
- 8235
- 15,124
- 63,452

$4893 - 500 = 4393 \checkmark$
 $9265 - 500 = 8765 \checkmark$
 $2256 - 500 = 1756 \checkmark$
 $3127 - 500 = 2627 \checkmark$
 $6989 - 5000 = 1989 \checkmark$
 $8235 - 5000 = 3235 \checkmark$
 $15,124 - 5000 = 10,124 \checkmark$
 $63,452 - 5000 = 58,452 \checkmark$

Mastery

Mental agility involving money

Paying amounts with a £50 note:
How quickly can you respond when asked to give change?

How much change will you have from a £50 if you were asked to pay:

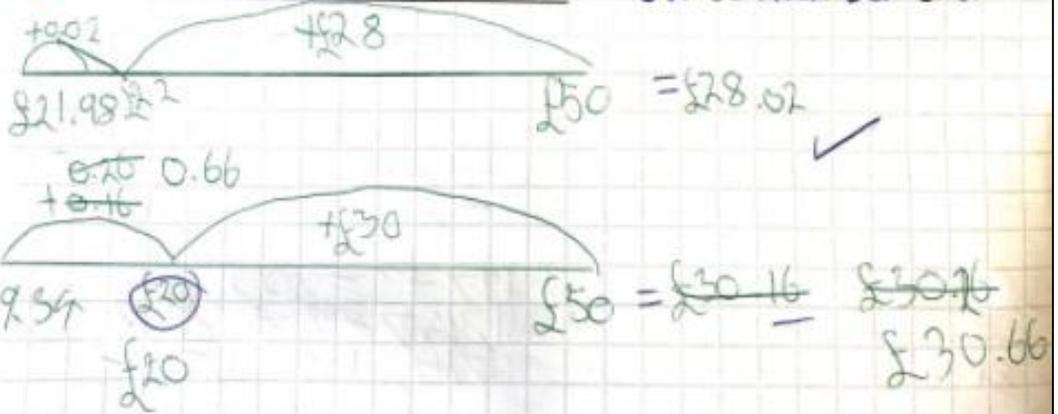
- £21.98; £14.92; £17.93; £16.32; £16.88
- £19.34; £34.56; £14.87; £17.45; £17.77

✓ Good (TP)

$£21.98 + 0.02 = 22$
 $£50 - £22 = £28$
 $£28 - 0.02 = £27.98$

Is this efficient?

Use a number line.



To become secure in the understanding of the mental strategies, children work through fluency tasks which gives them the opportunity to practise the skill.

Once children are confident and understand the mental strategies, they apply their knowledge and understanding to more complex reasoning and problem solving tasks. These tasks include other mathematical content from the Programmes of Study. In this example, the children are applying the mental calculation strategies to money and finding change using decimal numbers.

Marking and feedback encourages efficiency with calculations and using the skills that have been taught either in the unit of work, or from an earlier Programme of Study in the National Curriculum.

Fluent in Five is a daily maths practice exercise, where children are given five minutes to answer four calculation questions. This gives children further opportunity to practise taught strategies and consider whether they have used the most efficient strategy.

National Curriculum objective:

Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)

Fluency to practise the skill of column addition.

chant of 5

1) $186 + 70 = 256$ ✓

2)
$$\begin{array}{r} 5667 \\ + 3334 \\ \hline 9001 \\ \hline \end{array}$$
 ✓ I should have used mental method

3) $3 \times 7 = 21$ ✓

4) $3940 + 2010 = 5950$ ✓

WALT – add whole numbers with more than 4 digits using the formal written method

Fluency

Now using columnar addition complete the following:

65122	461143	912301	901245
22316+ ✓	426815+ ✓	245178+ ✓	637924+ ✓
56124	92567	245012	672014
24685+ ✓	13532+ ✓	434999+ ✓	562771+ ✓

Fluency Task 2

Using the column method, answer:

54,311 + 425 + 3,501

35,622 + 24,316 + 7,43

3,942 + 14,356 + 88

$\begin{array}{r} 54,311 \\ 3,501 \\ 425 \\ \hline 58,237 \end{array}$ ✓	$\begin{array}{r} 35,622 \\ 24,316 \\ 743 \\ \hline 60,681 \end{array}$ ✓	$\begin{array}{r} 14,356 \\ 3,942 \\ 88 \\ \hline 18,386 \end{array}$ ✓
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Mastery Task 1

Work out the missing numbers

$$\begin{array}{r} \overset{5}{\square}4\overset{9}{\square}3\overset{7}{\square} \\ + 2\overset{3}{\square}5\overset{9}{\square}2 \\ \hline 78529 \end{array}$$

Super progress
(✓)

Mastery Task 2

Melchester Rovers is a very popular football team. At their first match 67,982 watched them play and at the second match 1236 more people watched them play.

How many people watched them play their first two matches?

$$\begin{array}{r} 67,982 \\ + 1,236 \\ \hline 69,218 \\ \times \times \end{array}$$

$$\begin{array}{r} 67,982 \\ + 1,236 \\ \hline 69,218 \\ \times \times \end{array}$$

$$\begin{array}{r} + 67,982 \\ + 1,236 \\ \hline 69,218 \end{array} \checkmark$$

$$\begin{array}{r} + 69,218 \\ + 67,982 \\ \hline 137,200 \end{array} \checkmark$$

137,200 played watched
their first two matches
in total

Reasoning and problem solving tasks
applying the skill of column addition.

Fluent in 5

$$1) 377 + 40 = 417 \checkmark$$

$$2) 7643 + 1339 = 8982 \checkmark$$

$$3) 3327 + 4375 = 7702 \checkmark$$

$$4) 12 \times 8 = 96 \checkmark$$

$$\begin{array}{r} 3000 + 4000 = 7000 \\ 300 + 300 = 600 \\ 70 + 20 = 90 \\ 7 + 5 = 12 \\ 7000 + 600 + 90 + 12 = \\ 7702 \end{array}$$

WALT – subtract numbers with up to four digits using the formal written method

Fluency

$$\begin{array}{r} 68 \\ 7894 \\ - 3918 \\ \hline 3976 \checkmark \end{array}$$

$$\begin{array}{r} 63 \\ 7425 \\ - 6773 \\ \hline 652 \checkmark \end{array}$$

$$\begin{array}{r} 7 \\ 9882 \\ - 6443 \\ \hline 3439 \checkmark \end{array}$$

$$\begin{array}{r} 5 \\ 6746 \\ - 5816 \\ \hline 930 \checkmark \end{array}$$

$$\begin{array}{r} 76 \\ 6873 \\ - 5175 \\ \hline 1698 \checkmark \end{array}$$

$$\begin{array}{r} 63 \\ 7043 \\ - 5878 \\ \hline 1165 \checkmark \end{array}$$

$$\begin{array}{r} 7 \\ 7861 \\ - 7200 \\ \hline 661 \checkmark \end{array}$$

$$\begin{array}{r} 879 \\ 9803 \\ - 1985 \\ \hline 7818 \checkmark \end{array}$$

Mastery

Use formal methods to solve the problem:

David went to a football match and estimated that there were 4367 supporters in the ground.

When the official announcement was made there were 5912 supporters.

What was the difference between David's estimate and the actual total?

When full, the ground holds 6712. How many empty seats were there?

$$\begin{array}{r} 810 \\ 5912 \\ - 4367 \\ \hline 1545 \checkmark \end{array}$$

there is a 1545 difference

$$\begin{array}{r} 6712 \\ - 5912 \\ \hline 800 \checkmark \end{array}$$

there were 800 empty seats

Fluent in Five tasks to consolidate and embed methods for the four operations using both mental and written strategies.

Revision – four digit numbers using the column method of subtraction. This is a Y4 objective (up to 4 digits) before moving onto larger numbers.

Application of column subtraction with a problem solving task. This task uses the language of 'difference'.

Mastery task.

The use of mathematical vocabulary is encouraged in examples as well as number explanations as well. Children are encouraged to use numbers and symbols in mathematical explanations.



Mastery Task 2

Spot the Mistake

Find the mistake and explain where they have gone wrong with the calculation. Remember to use mathematical vocabulary.

$$\begin{array}{r} 9317 \\ -3692 \\ \hline 6385 \end{array}$$

$$\begin{array}{r} 6129 \\ -2804 \\ \hline 4325 \end{array}$$

The mistake is

$$\begin{array}{r} 9317 \\ -3692 \\ \hline 6385 \end{array}$$

they have worked it out as if it was like this

$$\begin{array}{r} 9697 \\ -3312 \\ \hline 6385 \end{array}$$

When it should have been

$$\begin{array}{r} 812 \\ 9317 \\ -3692 \\ \hline 5625 \end{array}$$

The mistake is this

$$\begin{array}{r} 6129 \\ -2804 \\ \hline 4325 \end{array}$$

they have not carried over the thousands and it got their 300 when it should have been, done like this

$$\begin{array}{r} 5 \\ 6129 \\ -2804 \\ \hline 3325 \end{array}$$

Well done - try to use more mathematical vocabulary if you are writing an answer.

WALT – subtract whole numbers with more than 4 digits using the formal written method

(A)

Fluency

Now using columnar subtraction complete the following:

65122	461143	912301	901245
22316	426815	245178	637924
42806 ✓	03428 ✓	667123 ✓	263321 ✓
56124	92567	445012	672014
24685	13532	234999	562771
31439 ✓	79035 ✓	210013 ✓	109243 ✓

✓

Fluency and reasoning tasks using numbers with more than four digits (Year 5 objective).

Mastery

Holly is completes this subtraction incorrectly

$$\begin{array}{r} 28701 \\ - 7621 \\ \hline 21180 \end{array}$$

She has not exchanged from the hundreds so therefore the sum is wrong. the real answer should be this...

* calculation

$$\begin{array}{r} 287101 \\ - 7621 \\ \hline 21089 \end{array}$$

Explain the mistake to Holly and correct it for her.

Mastery Task 2

- Find the missing numbers in these calculations.

$$\begin{array}{r} 2 \quad 6 \\ 3 \quad 14 \quad \square \quad 1 \quad \square \\ - \quad \square \quad 4 \quad 8 \quad 2 \\ \hline 2 \quad 9 \quad 2 \quad \square \quad 4 \end{array}$$

$$\begin{array}{r} 6 \quad \square \quad 0 \quad 2 \quad \square \\ + \quad 5 \quad \square \quad 5 \quad 1 \\ \hline \square \quad 9 \quad 1 \quad 8 \quad 0 \end{array}$$

Great. (TP)

Correct use of language is a focus within teaching and learning, e.g. calculation/subtraction