Addition and Subtraction knowledge organiser

Maths

Key vocabulary: add, subtract, ones, tens, hundreds, thousands, increase, decrease, partition, inverse, exchange, place value, column, column addition/subtraction, less than, greater than, difference, efficient subtraction, estimate, actual answer, commutative

Add and subtract 1s, 10s, 100s and 1,000s

When adding or subtracting a multiple of 1, 10, 100 or 1,000, some columns always change, some never change and some sometimes change depending on the number being added and subtracted.

Adding

	Th	H	T	O
	3	2	5	3
+			5	0
	3	3	0	3
		1		

For this calculation, the ones and thousands columns did not change, but the tens and hundreds column did change because we had to make an exchange.

Subtracting

	Th	H	T	O
	$2\not{3}$	$^{1}4$	2	6
-		8	0	0
	2	6	2	6

For this calculation, the thousands and hundreds columns changed because we needed to exchange 1 thousand to 10 hundreds.

Add up to two 4-digit numbers

When adding, always begin with the ones column and work your way through the tens, hundreds and then the thousands column. Some calculations will not need any exchanges because the numbers in each place value column never total greater than 9.

For example:

	Th	H	T	O
	4	5	7	1
+	3	0	2	5
	7	5	9	6

Some calculations will need one or more exchange because the numbers in the place value column total greater than 9.

For example:

	Th	H	T	O
	2	6	4	8
+	1	4	6	1
	4	1	0	9
	1	1		

The total for the tens and hundreds column are greater than 9 so an exchange is needed.

Subtracting two 4-digit numbers

Like adding, when subtracting two 4-digit numbers, always start with the ones column then work your way through the tens, hundreds and thousands columns. Some calculations will not need an exchange because there is always enough numbers to subtract.

For example:

	Th	H	T	O
	6	7	4	9
-	2	4	1	6
	4	3	3	3

Sometimes, there is not enough numbers to subtract and one or more exchange is needed.

For example:

	Th	H	T	O
	$2\not{3}$	$^{1}6$	$3\not{4}$	$^{1}1$
-	1	7	2	5
	1	9	1	6

Here, there were not enough ones to subtract from the first number so we needed to exchange 1 ten for 10 ones. There were also not enough hundreds to subtract from the first number, so we needed to exchange 1 thousand for 10 hundreds.

Efficient subtraction

Some methods are more efficient than others when completing a subtraction calculation.
Some calculations can be worked out quickly and mentally in our heads.
For example, 3,199 – 199 = 3,000

Counting on

Sometimes, we can count on using our number bond knowledge and work out what we have added altogether.
For example: 104 – 97 = 7

3 + 4 = 7

Partitioning

When we do not need to make an exchange, we can partition the second number to make it easier to work with.

For example:

4,586 – 1,242 = 3,344

4,586 – 1,000 = 3,586

3,586 – 200 = 3,386

3,386 – 40 = 3,346

3,346 – 2 = 3,344

Increasing or decreasing each number by the same amount

For calculations where the numbers are close together, you can increase or decrease each number by the same amount to make them easier to work with.

For example:

	Th	H	T	O
	~~1~~ ~~2~~	~~9~~ ~~10~~	~~9~~ ~~10~~	$^{1}1$
-		9	4	6
	1	0	5	5

→

	Th	H	T	O
	1	9	9	9
-		9	4	4
	1	0	5	5

By subtracting 2 from each number, the calculation is easier and much quicker to complete as there are no exchanges needed in the second calculation.

Estimating answers

Sometimes estimating an answer is helpful as it gives us an idea of whether an answer is appropriate.
An estimated answer can be greater than or less an actual answer depending on what the numbers were rounded to.
4- digit numbers can be rounded to the nearest 10, 100 or 1,000.
For example: 4,123 + 2,968 = 7,091

To the nearest 10: 4,120 + 2,970 = 7,090
The estimate is less than the actual answer. The first number was rounded down and the second number was rounded up.

To the nearest 100: 4,100 + 3,000 = 7,100
The estimate is greater than the actual answer. The first number was rounded down and the second number was rounded up.

To the nearest 1,000: 4,000 + 3,000 = 7,000
The estimate is less than the actual answer. The first number was rounded down and the second number was rounded up.
Rounding to the nearest 10 will always give the most accurate estimate.

Checking strategies

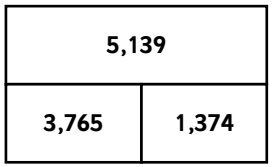
Using the inverse is a useful way to check an answer is correct.
The inverse is the opposite operation, so addition is the inverse of subtraction and subtraction is the inverse of addition.
Bar models and part-whole models are also useful visual tools to make sure a calculation is correct.

For example: 3,765 + 1,374 = 5,139

Inverse

	Th	H	T	O
	~~4~~ ~~5~~	~~10~~ ~~1~~	$^{1}3$	9
-	1	3	7	4
	3	7	6	5

Bar model



Part-whole model