SUBTRACTION

PRE-STAGE 1

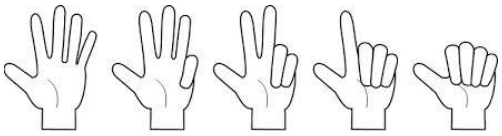
SUMMARY – COUNTING BACK

Children should begin to be able to count down from ten to zero be able to read and sequence numbers to ten. Children need to understand the concept of having a set quantity in a group and making that group smaller by taking objects away. Additionally, children will need to be able to sort and compare groups by size.

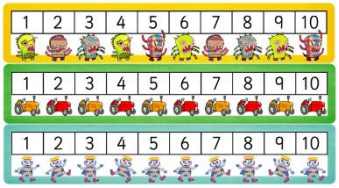
VOCABULARY

Take away, take, less, leaves, how many less, fewer, count back, count down, more than/less than

IMAGES



Counting using fingers – starting with the little fingers to end with the thumb

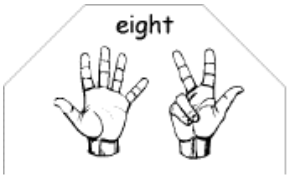


Example of a number track – like a train track and easy to jump/move along backwards

Use Numicon to support number recognition and taking away numbers to leave a new quantity

Example of counting beads to take away a value

Use fingers to count back and show how many are left when taking away



KEY SKILLS

- Verbally count back from ten to zero
- Read numerals 10 to zero
- Count from a given number down to zero eg: start at 7…6,5,4,3,2,1
- Use fingers to show numbers to ten and count down dropping a finger each time.
- Begin to use a number track
- Estimate the quantity of objects up to 10
- Understand that you will always have a smaller number/value left when you take away.
- Compare the size of two groups when items have been taken away

RESOURCES

Children should still have access to wide range of resources such as counting equipment, everyday objects, number tracks, Numicon, counting beads etc.

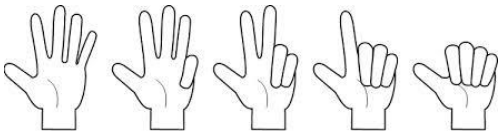
SUBTRACTION

STAGE 1

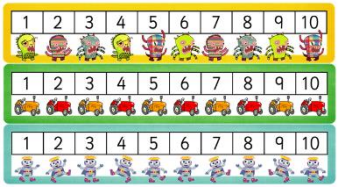
SUMMARY – COUNTING BACK

Children should begin to be able to count down from twenty to zero be able to read and write numerals to twenty. Children need to understand the concept of having a set quantity in a group and making that group smaller by taking objects away. Additionally, children will need to be able to sort and compare groups by size.

IMAGES

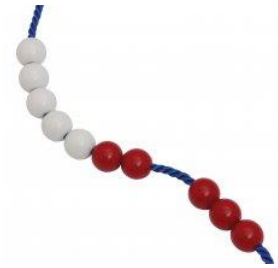


Counting using fingers – starting with the little fingers to end with the thumb (reverse of addition)



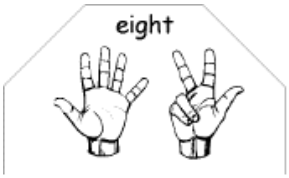
Example of a number track – like a train track and easy to jump/move along backwards

Use Numicon to support number recognition and taking away numbers to leave a new quantity



Example of counting beads to take away a value

Use fingers to count back and show how many are left when taking away



RESOURCES

Children should still have access to wide range of resources such as counting equipment, everyday objects, number tracks, number lines, Numicon, counting beads etc.

VOCABULARY

Equal to, take away, take, less, leaves, how many less, fewer, least, count back, count down, more than/less than

KEY SKILLS

- Verbally count back from twenty (and beyond) to zero
- Say what one less than a given number is 0-10 eg: what is one less than 6?
- Begin to say what one less than a given number is 0-20 eg: what is one less than 16?
- Read and write the numerals 20 to zero
- Count from a given number down to zero eg: start at 7…6,5,4,3,2,1
- Read numerals to 20
- Write numerals to 20
- Form numerals correctly
- Use fingers to show numbers to ten and count down dropping a finger each time.
- Begin to use a number track and line correctly
- Estimate the quantity of objects up to 20 or more.
- Understand that you will always have a smaller number/value left when you take away.
- Compare the size of two groups when items have been taken away

SUBTRACTION

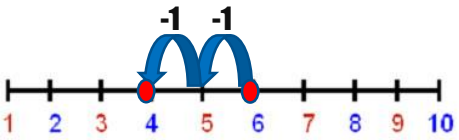
STAGE 2

SUMMARY – TAKE AWAY SINGLE DIGIT NUMBERS

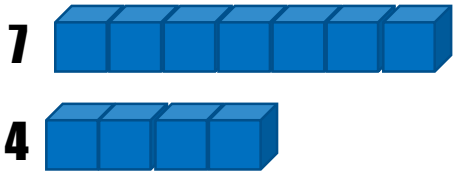
Children consolidate understanding of subtraction practically showing subtraction on bead strings, using cubes etc. and in familiar contexts. Children are also introduced to more formal recording, using number lines as below.

IMAGES

6 – 2 = 4



Subtracting using a number line. Counting back in ones to take away.



Find the 'difference' between numbers. This is introduced practically in finding the difference and working out how many more or less there are.

Write subtraction number sentences using correct operational signs using (-) and (=)

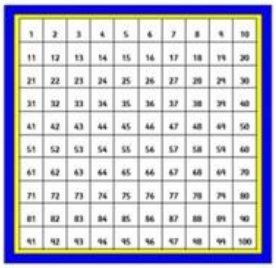
Interpret subtraction number sentences and solve missing box problems using concrete objects and number lines

8-3 = ☐ 11 - 4 = ☐

5-3-1 = ☐ ☐ - 4 = 2

☐ - ☐ = 6

Use 100 square to count back in ones and tens from any number. Understand the navigation on a 100 square.



RESOURCES

Children should still have access to wide range of resources such as counting equipment, everyday objects, number tracks, number lines, numicon.

VOCABULARY

Equal to, take away, take, less, minus, subtract, leaves, how many less, fewer, least, count back, count down, more than/less than, how many left/less, subtract, subtraction, the difference

KEY SKILLS

- Given a number and say one more or less that its value
- Count numbers up to 100 and **down/back** (and cross the 100 boundary)
- Count back in ones from any number eg: 22,21,20,19,18 making sure to cross the tens boundary successfully
- Represent and use subtraction facts to 20 and within 20
- Subtract one digit and two digit numbers to 20, including zero
- Solve one step problems that involve addition and subtraction, using concrete objects (i.e. bead strings, cubes) and pictures
- Solve missing number problems
- Compare two values and find the difference between them

SUBTRACTION

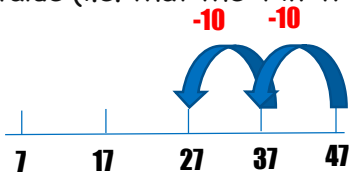
SUMMARY – TAKE AWAY TWO DIGIT NUMBERS

Children are able to subtract using a number line by counting back, aiming to develop their mental subtraction skills. They will learn to subtract ones, tens and also count on (add) to solve a subtraction where relevant. Subtract 10, 20, 30 from any 2 digit number. Add 11, 21, 22 from any 2 digit number.

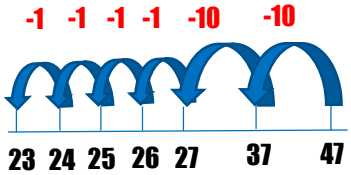
IMAGES

Children are encouraged to work at their own speed deciding how quickly they want to jump back in tens or in larger steps of ten, making their calculations more efficient. The final version requires children to be very confident with partitioning (splitting of tens and units) and place value (i.e. that the 4 in 47 means 40).

Step 1

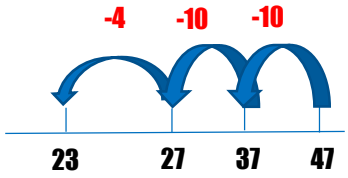


Subtract 2 digit numbers by tens only eg: 47-20

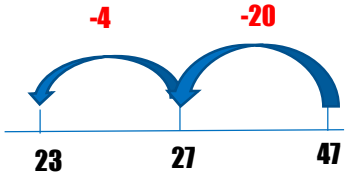


Subtract 2 digit numbers by tens then ones 47-24

Step 2

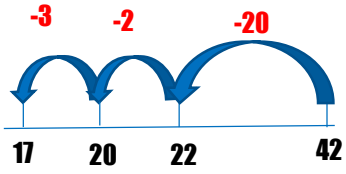


Subtract 2 digit numbers by tens then ones 47-24 (but in larger steps (47-10-10-4)



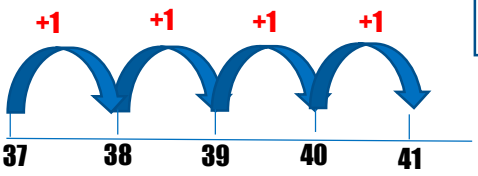
Subtract 2 digit numbers by tens then ones 47-24 (47-20-4)

Step 3



Children are taught to bridge through ten for example 42-25

Step 4



41 – 37 = 4

Subtract numbers that are close together by **counting on**. Chn are only ready to use this when they understand the link between addition and subtraction

RESOURCES

Children should still have access to wide range of resources such as counting equipment, everyday objects, number tracks, number lines, numicon.

STAGE 3A

VOCABULARY

Equal to, take away, take, less, minus, subtract, how many less, fewer, least, count back, count down, more than/less than, subtract, subtraction, the difference, count on, strategy, partition, tens, ones

KEY SKILLS

- Recognise the place value of each digit in a two digit numbers
- Recall and use subtraction facts to 20 fluently and derive and use related facts up to 100
- Subtract using concrete objects, pictorial representations, 100 squares and mentally, including a two digit number and ones (eg: 27-6), a two digit number and tens (eg: 35-10), and two 2 digit numbers (eg: 46-21)
- Show that subtraction of one number from another number cannot be done in any order
- Recognise and use inverse relationship between addition and subtraction, using this to check calculations and missing number problems.
- Solve simple addition and subtraction problems including measures, using concrete objects, pictorial representation and applying their increased knowledge of mental and written methods.
- Read and write numbers to at least 100 in numerals and words.

SUBTRACTION

SUMMARY – TAKE AWAY TWO DIGIT NUMBERS

Children are able to subtract using a number line by counting back, aiming to develop their mental subtraction skills. They will learn to subtract ones, tens and also count on (add) to solve a subtraction where relevant. Subtract 10, 20, 30 from any 2 digit number. Add 11, 21, 22 from any 2 digit number.

IMAGES

Children are encouraged to work at their own speed deciding how quickly they want to jump back in tens or in larger steps of ten, making their calculations more efficient. The final version requires children to be very confident with partitioning (splitting of tens and ones) and place value (i.e. that the 4 in 47 means 40).

RESOURCES

Children should still have access to wide range of resources such as counting equipment, everyday objects, number tracks, number lines, numicon.

The pupils can partition two digit numbers into different combinations of tens and ones. This may include using apparatus. E.g. 23 is the same as 2 tens and 3 ones which is the same as 2 ten and 13 ones.

48 - 23=

40 - 20= 20
8 - 3 = 5

20+5 = 25

Then, children should check their answer by completing the inverse.

25+ 23 =

20+20= 40

5 + 3 = 8

40 + 8 = 48

STAGE 3B

VOCABULARY

Equal to, take away, take, less, minus, subtract, how many less, fewer, least, count back, count down, more than/less than, subtract, subtraction, the difference, count on, strategy, partition, tens, ones

KEY SKILLS

- Recognise the place value of each digit in a two digit numbers
- Recall and use subtraction facts to 20 fluently and derive and use related facts up to 100
- Subtract using concrete objects, pictorial representations, 100 squares and mentally, including a two digit number and ones (eg: 27-6), a two digit number and tens (eg: 35-10), and two 2 digit numbers (eg: 46-21)
- Show that subtraction of one number from another number cannot be done in any order
- Recognise and use inverse relationship between addition and subtraction, using this to check calculations and missing number problems.
- Solve simple addition and subtraction problems including measures, using concrete objects, pictorial representation and applying their increased knowledge of mental and written methods.
- Read and write numbers to at least 100 in numerals and words.

SUBTRACTION

SUMMARY – SUBTRACT TWO AND THREE DIGIT NUMBERS

Children continue to subtract using the expanded column method (partitioning out the tens and ones and then recombining at the end). Exchanging (previously called borrowing) is introduced. This will eventually lead to compact column subtraction.

IMAGES

89 – 35 = 54

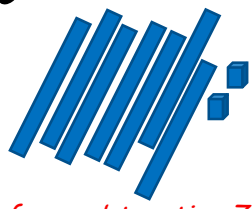
Step 1

	T			O		
	8	0	+	9		
-	3	0	+	5		
	5	0	+	4		
				=	5	4

Introduce this method with examples where no decomposition (exchanging) is required

Step 2

72 – 47 = 25



	T			O		
	~~7~~ 60	0	+	12		
-	4	0	+	7		
	2	0	+	5		
				=	2	5

Introduce 'exchanging' through practical subtraction. Make the larger number with 'ten rods / sticks' and units with cubes – then subtract the 47 from it.

Before subtracting 7 from the 72 blocks, children will need to exchange a row of 10 for ten units. Then they will subtract 7 and ones and 4 tens (in this order). When learning the exchange, children explore partitioning in different ways so they understand that when you exchange, the VALUE stays the same eg: 72=70+2 or 60+12 or 50 +22

Step 3

	2	3	8	-	1	4	6	=	9	2
	~~2~~ 100	~~3~~	0	+	~~1~~ 130	~~4~~	0	+	8	
-	1	0	0	+	4	0	+	6		
			0	+	9	0	+	2		
								=	9	2

Once pupils are secure with the understanding of 'exchanging' they can use the partitioned column method to subtract 2 and 3 digit numbers. This is a useful method when subtracting money eg: £1+ 30p + 8p

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STAGE 4

VOCABULARY

Equal to, take away, take, less, minus, subtract, leaves, how many less, fewer, least, count back, count down, more than/less than, subtract, subtraction, the difference, count on, strategy, partition, tens, ones, exchange, decrease, hundreds, value, digit, decomposition

KEY SKILLS

- Subtract mentally ones, tens or hundreds from a 3 digit number.
- Estimate answers and use inverse operations to check. Explain why you chose a method.
- Solve problems, including missing number problems.
- Find 10 or 100 more or less than a given number.
- Recognise the place value of each digit in a 3 digit number
- Counting up to find the difference, either using a number line or as as a mental strategy, when numbers are close together or near multiples of ten.
- Practise mental subtraction strategies, such as subtracting near multiples of 10 or adjusting (eg: subtracting 19 or 21).
- Select the most appropriate methods and explain why.
- Find change from a given amount of money.
- Subtract 2 or 3 digit numbers using the expanded column method.

SUBTRACTION

SUMMARY – SUBTRACT UP TO 4 DIGIT NUMBERS

Children continue to subtract using the expanded column method (partitioning out the thousands, hundreds, tens and units and then recombining at the end). Exchanging (carrying / borrowing) is continued. This will lead to compact column addition.

IMAGES

Step 1

	2	7	5	4	-	1	5	6	2	=	1	1	9	2
							600							
	2	0	0	0	+	~~7~~	~~0~~	~~0~~	+1	~~5~~	0	+	4	
–	1	0	0	0	+	5	0	0	+	6	0	+	2	
	1	0	0	0	+	1	0	0	+	9	0	+	2	
										=	1	1	9	2

Step 2

	H	T	O
	2	7	4
-	1	5	2
			2
		2	0
	1	0	0
	1	2	2

Children can move to the column method of subtraction in stages. Some prefer to see each value subtracted out and then added back together at the end i.e. the ones, then the tens, then the hundreds are all completed in stages and the answers added together. From here children move to step 3 – the compact method.

Step 3

	Th	H	T	O
	2	~~6~~ 7	15	4
	1	5	6	2
	1	1	9	2

To introduce the compact method, children are asked to perform subtraction calculations with the familiar partitioned column method and then have the compact method displayed alongside. Children are asked to make links between the two and to consider how one method links to the other, what is similar and what is different.

STAGE 5

VOCABULARY

Equal to, take away, take, less, minus, subtract, leaves, how many less, fewer, least, count back, count down, more than/less than, subtract, subtraction, the difference, count on, strategy, partition, tens, units, ones, exchange, borrow, decrease, hundreds, value, digit, decomposition, inverse, adjust

KEY SKILLS

- Subtract by counting on where numbers are close together or they are near to multiples of 10, 100 etc.
- Children select the most appropriate methods for given subtraction calculations
- Estimate and use inverse operations to check answers
- Solve addition and subtraction 2 step problems choosing which operations and methods and why
- Solve measure and money problems involving fractions and decimals to two decimal places
- Find 1000 more or less than a given number
- Count backwards through zero, including negative numbers
- Recognise place value of each digit in a 4 digit number. Round any number to the nearest 10, 100, 1000
- Solve number and practical problems that involve the above, with increasingly large positive numbers

SUBTRACTION

SUMMARY – SUBTRACT WITH AT LEAST 4 DIGIT NUMBERS, INCLUDING DECIMALS

Children are confident to use the compact column subtraction method and can utilise this to solve problems using money, measures and most significantly, **decimals**. Exchanging / borrowing is still practised.

IMAGES

Step 1

	TTh	Th	H	T	O
-	~~2~~ ~~3~~	~~10~~ ~~1~~	10	~~4~~ ~~5~~	16
		2	1	2	8
	2	8	9	2	8

Children who are still not secure with number facts and place value will need to remain on the partitioned column method until they are ready for the compact method.

Children are asked to mark with a comma if they need this to help say the answer for much larger numbers

Step 2

	Th	H	T	O	.	$\frac{1}{10}$
	~~6~~ ~~7~~	~~10~~ ~~1~~	16	~~8~~ ~~9~~	.	10
-		3	7	2	.	5
	6	7	9	6	.	5

Children subtract with decimal values, including mixture of integers and decimals, aligning the decimal point. Pupils are reminded to add s 'zero' in any empty decimal place to aid understanding of what to subtract in that column.

STAGE 6 VOCABULARY

Equal to, take away, take, less, minus, subtract, leaves, how many less, fewer, least, count back, count down, more than/less than, subtract, subtraction, the difference, count on, strategy, partition, tens, units, ones, exchange, borrow, decrease, hundreds, value, digit, decomposition, inverse, adjust, tenths, hundredths, decimal point, decimal

KEY SKILLS

- Subtract numbers mentally with increasingly large numbers
- Use rounding and estimation to check answers to calculations and determine, in a range of contexts, levels of accuracy.
- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why
- Read, write, order and compare numbers to at least 1 million and determine the value of each digit
- Count forwards and backwards in steps of the powers of ten for any given number to 1 million
- Interpret negative numbers in context, counting forwards and backwards with positive and negative integers through 0
- Round any number up to 1 million to the nearest 10,100, 1000, 10,000, 100,000

SUBTRACTION

SUMMARY – SUBTRACT INCREASINGLY COMPLEX NUMBERS AND DECIMAL VALUES

Children are confident to use the compact column subtraction method to solve more complex integers. Pupils should be able to apply their knowledge to a range of mental strategies, mental recall skills and informal and formal written methods when selecting the most appropriate method to work out subtraction problems.

IMAGES

Step 1

	0 ~~1~~ 14 ~~5~~ 9 ~~0~~ , 16				9	9	
-		8	9	, 9	4	9	
		6	0	, 7	5	0	

Children are still encouraged to mark with a comma to clarify larger 5 or more digit numbers.

Step 2

		9							
	0 1	~~10~~ ~~0~~	15	.	3 ~~4~~	11	9	kg	
-		3	6	.	0	8	0	kg	
		6	9	.	3	3	9	kg	

Empty decimal places can be filled with zero to show the place value in each column

Using the column compact method to subtract money and measures, including decimals with different numbers of decimal places

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STAGE 7 VOCABULARY

Equal to, take away, take, less, minus, subtract, leaves, how many less, fewer, least, count back, count down, more than/less than, subtract, subtraction, the difference, count on, strategy, partition, tens, units, ones, exchange, borrow, decrease, hundreds, value, digit, decomposition, inverse, adjust, tenths, hundredths, decimal point, decimal

KEY SKILLS

- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why
- Read, write, order and compare numbers to at least 1 million and determine the value of each digit
- Round any whole number to a required degree of accuracy
- Use negative numbers in context and calculate intervals across zero
- Children need to utilize and consider a range of mental subtraction strategies, jottings and written methods before choosing how to calculate.