

Addition

Pupils should be taught to:

- Add whole numbers with more than 4-digits, including using formal written methods (column addition)
- Add numbers mentally with increasingly large numbers
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Solve addition multi step problems in contexts, deciding which operations and methods to use and why

The decimal point needs to be lined up just like all of the other place value columns and must be remembered in the answer column. It is important children understand why this is and get into this habit very quickly.

$$\begin{array}{r} \text{£} 23.59 \\ + \text{£} 7.55 \\ \hline \text{£} 31.14 \end{array}$$

Children should be working with numbers greater than 4 digits including numbers in the ten thousands and hundred thousands.

$$\begin{array}{r} 23481 \\ + 1362 \\ \hline 24843 \end{array}$$

Children need to start using the column method to add more than two values, still considering place value very carefully.

It is important that children say 6 tenths add 7 tenths so they understand that they are adding part of a number not a whole number.

Empty places should be filled with a zero to show the value of that place.

$$\begin{array}{r} 19.01 \\ 3.65 \\ + 0.70 \\ \hline 23.36 \end{array}$$

Bar modelling

Club A has 235 male members, and 172 female members. 45 new members join the club.

- How many members were in the club at first?
- How many members are in the club now?

Mastery in addition – see

NCETM website for more examples

Captain Conjecture says, 'When working with whole numbers, if you add two 2-digit numbers together the answer cannot be a 4-digit number.'

Do you agree?
Explain your reasoning.



Key vocabulary: add, more, plus, and, make, altogether, total equal to, equals, double, most, count on, number line, sum, tens, units, partition, addition, column, tens boundary, hundreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse, decimal places, decimal point, tenths, hundredths, thousandths

Subtraction

Pupils should be taught to:

- Subtract whole numbers with more than 4-digits, including using formal written methods (column subtraction)
- Subtract numbers mentally with increasingly large numbers
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Solve subtraction multi step problems in contexts, deciding which operations and methods to use and why.

Compact column subtraction (with 'exchanging').

Subtracting with larger integers:

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

$$\begin{array}{r} 28'10'8'6 \\ - \quad 2128 \\ \hline 28,928 \end{array}$$

Subtracting with decimal values, including mixtures of integers and decimals, aligning the decimal point

Create lots of opportunities for subtracting and finding differences with money and measures.

Add a 'zero' as a place holder, in any empty decimal places to aid understanding of what to subtract in that column.

$$\begin{array}{r} 7'10'6'8' \cdot 0 \\ - \quad 372 \cdot 5 \\ \hline 6796 \cdot 5 \end{array}$$

Bar modelling

Ali had 365 stickers.

Jenny had 42 stickers less than Ali.

- How many stickers did Jenny have?
- How many stickers did they have altogether?

Mastery in subtraction – see

NCETM website for more examples

Captain Conjecture says, 'If you keep subtracting 3 from 397 you will eventually reach 0.'

Do you agree?
Explain your reasoning.



Key Vocabulary: equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is?, difference, count on, strategy, partition, tens, units exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal point, decimal

Multiplication

Pupils should be taught to:

- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- Establish whether a number up to 100 is prime and recall prime numbers up to 19
- Multiply numbers up to 4-digits and by a 1 or 2-digit number using formal written method, including long multiplication for 2-digit numbers
- Multiply and divide numbers mentally drawing upon known facts
- Divide numbers up to 4 digit by one-digit number using the formal written method or short division and interpret remainders appropriately for the context
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000

Short multiplication for multiplying by a single digit:

x	300	20	7	
4	1200	80	28	

	3	2	7	
x			4	
	1	3	0	8
		1	2	

Pupils could be asked to work out a given calculation using the grid, and then compare it to „your“ column method. What are the similarities and differences? Unpick the steps and show how it reduces the steps.

Show long multiplication for multiplying by 2 digits:

		10	8	
10	100	80		
3	30	24		

		1	8	
x		1	3	
	5	4		2
	1	8	0	
	2	3	4	

Moving on towards more complex numbers

	1	2	3	4
x			1	6
	7	4	0	4
	1	2	3	4
	1	9	7	4

Mastery in multiplication - see

NCETM website for more examples

Fill in the missing numbers in this multiplication pyramid.

		108	
			6
		3	
2			

Key vocabulary: Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, as big as, once, twice, three times, partition, grid method, multiple, product, tens, units, value, sets of, inverse, square, factor, integer, decimal, short/long multiplication, carry

Division

Year 5

Pupils should be taught to:

- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- Establish whether a number up to 100 is prime and recall prime numbers up to 19
- Multiply numbers up to 4-digits and by a 1 or 2-digit number using formal written method, including long multiplication for 2-digit numbers
- Multiply and divide numbers mentally drawing upon known facts
- Divide numbers up to 4 digit by one-digit number using the formal written method or short division and interpret remainders appropriately for the context
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000

Short division with remainders:

Now that pupils are introduced to examples that give rise to remainder answers, division needs to have a real life problem solving context, where **pupils consider the meaning of the remainder and how to express it**, i.e. as a fraction, a decimal, or as a rounded number or value, depending upon the context of the problem

$$\begin{array}{r} 0663 \text{ r } 5 \\ 8 \overline{) 5350^2 9} \end{array}$$

The answer to $5309 \div 8$ could be expressed as 663 and five

See Y6 for how to continue the short division to give a decimal answer for children who are confident.

If children are confident and accurate introduce **long division** for pupils who are ready to divide any number by a 2-digit number (e.g. $2678 \div 19$).

Th H T O

$$\begin{array}{r} 869 \text{ r } \\ 4 \overline{) 3477} \\ \underline{23} \\ 477 \end{array}$$

Demonstrate how record the remainder as a fraction

Th H T O

$$\begin{array}{r} 869 \text{ r } 1 - 869 \frac{1}{2} \\ 4 \overline{) 3477} \\ \underline{23} \\ 477 \end{array}$$

It is useful to be able to convert remainders to a fraction in situations where something needs to be shared between a certain number of people or groups, e.g. a chocolate bar that has two pieces remaining and four people to share between. Each person would receive half of a piece of the remaining pieces.

Mastery in division - see

NCETM website for more examples

Fill in the missing numbers:

$$8 \div 2 = \square \div 4 = 32 \div \square = 64 \div \square$$

Key vocabulary: share, share equally, one each, two each... group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor, inverse, quotient, prime number, prime factors, composite number (non-prime)