

Calculation at TAS

Year 4



The Five Big Ideas

At TAS, we want our pupils of all ages to acquire a deep, long-term, secure and adaptable understanding and enjoyment of maths.

Coherence

Lessons are broken down into small connected steps that gradually build up from what a child already knows to the introduction of new concepts.

Representation and Structure

Representations are used in lessons to show children a visual representation of the maths they are doing.

Mathematical Thinking

Children work on ideas by discussing with others and explaining their reasoning, rather than being told how to think.

Fluency

Quick and efficient recall of facts and procedures is vital, so that it can be applied in different contexts.

Variation

The teacher often represents the concept being taught in more than one way, to develop a deeper understanding. Children are also given the opportunity to practise their skills in varied ways, by making connections.

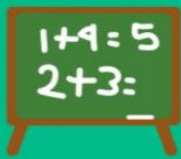
The CPA Approach



CONCRETE -
using physical objects
to solve maths problems.



PICTORIAL -
using drawings
to solve maths problems.



ABSTRACT -
solving maths problems
using only numbers.



Children might begin by
handling real objects...

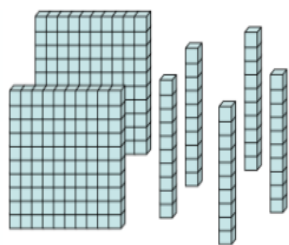
...then using physical
representations of them.

Drawings act as a bridge between the concrete
objects children have been using and the abstract
symbols they must learn to use.

Finally, children learn to use abstract
symbols to solve problems.

$$10 + 7 = 17$$

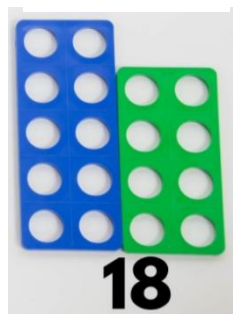
Representations and Resources



Base ten

253

Numicon



18

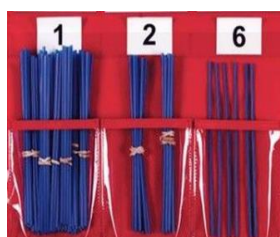
place value counters

Hundreds	Tens	Ones
2	5	6

money

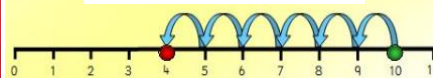


straws

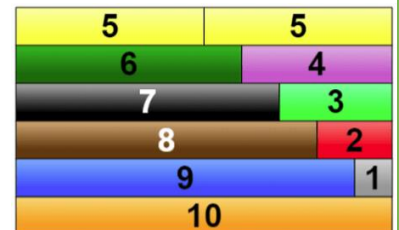


$$10 - 6 = 4$$

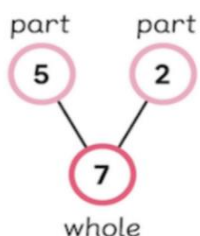
number lines



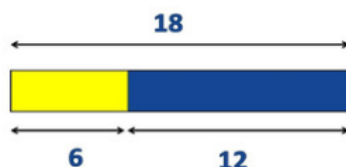
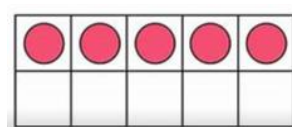
Cuisenaire rods



part whole
models



tens frames



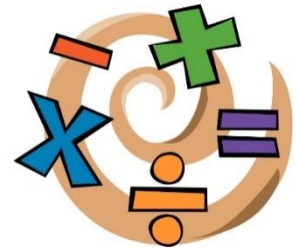
bar models

Rekenreks



Addition

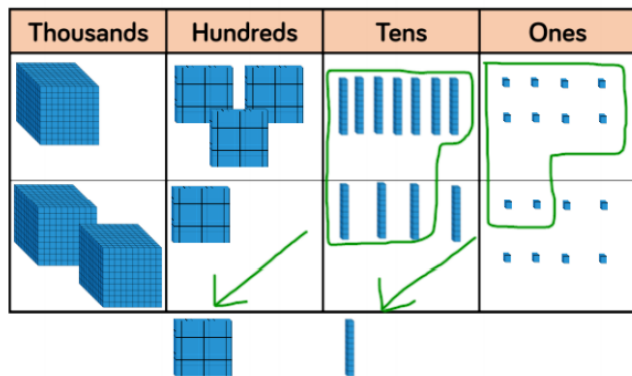
- Column method - regrouping (up to 4 digits)



Concrete

base ten

$$1378 + 2148$$



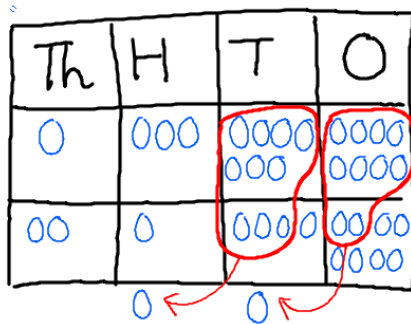
Abstract

formal written method

	1	3	7	8
+	2	1	4	8
	3	5	2	6
	1	1		

Pictorial

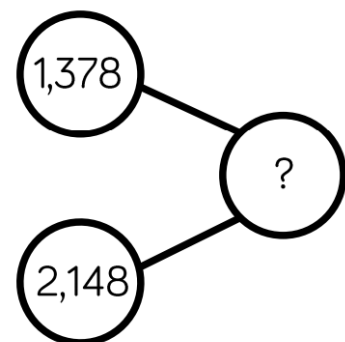
place value counters



Different ways to solve

part whole model

$$1378 + 2148$$



Key Vocabulary

sum

total

plus

add

parts and wholes

the same as

altogether

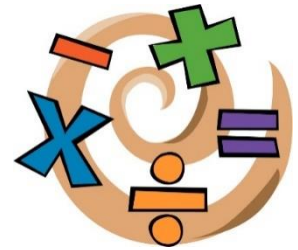
more

equal to



Subtraction

- Column method with regrouping (up to 4 digits)



Concrete

place value counters

$$4357 - 2735 = 1622$$

Thousands	Hundreds	Tens	Ones

Abstract

formal written method

$$\begin{array}{r} 3 \quad 1 \\ 4357 \\ - 2735 \\ \hline 1622 \end{array}$$

Different ways to solve

missing box problems

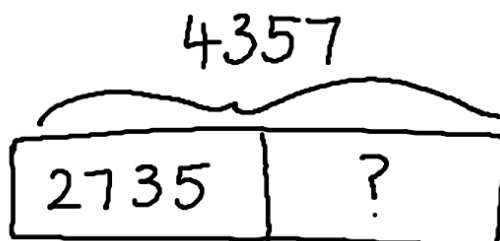
$$4357 - \text{frog} = 2735$$

word problems

Calculate the difference between 4357 and 2735.

Pictorial

bar model



Key Vocabulary

take away	less than	decrease
the difference	subtract	
minus	fewer	



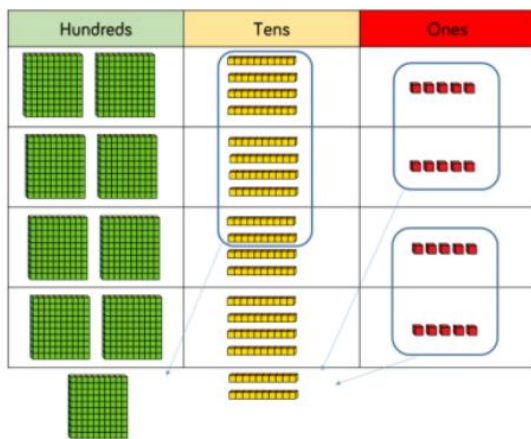
Multiplication

- Column multiplication
(introduced with place value counters)



Concrete

base ten



Abstract

formal written method for short multiplication

	H	T	O
	2	4	5
x			4
	9	8	0
	1	2	

Pictorial

place value counters

Different ways to solve

word & missing box problems

Mr and Mrs Wood and their 2 children are going on a weekend break to London. It will cost £245 per person. What will the total cost of the trip be?

Key Vocabulary

double
multiplied by
groups of

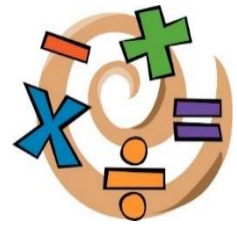
times
the product of
equal groups

lots of



Division

- Division with a remainder
- Short division (up to 3 digits by 1 digit - concrete and pictorial)



Concrete

place value counters

$$844 \div 4 = 211$$

H	T	O

Abstract

written methods

$$844 \div 4$$

$$844 = 800 + 40 + 4$$

$$800 \div 4 = 200$$

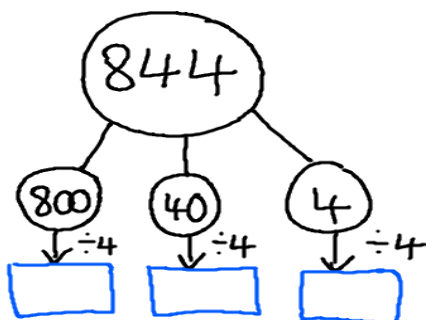
$$40 \div 4 = 10$$

$$4 \div 4 = 1$$

$$200 + 10 + 1 = 211$$

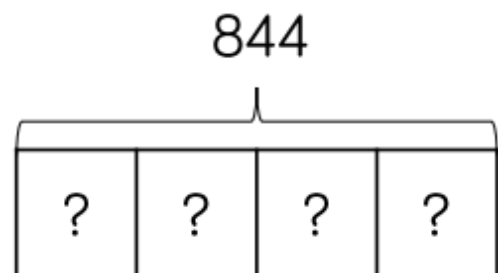
Pictorial

partitioning



Different ways to solve

bar model



Key Vocabulary

share
divide
half

group
divided by



Methods of calculation for each year group

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition	Add two 1-digit numbers to 10 Add 1- and 2-digit numbers to 20	Add three 1-digit numbers Add 1 and 2-digit numbers to 100 Add two 2-digit numbers	Add with up to 3 digits	Add with up to 4 digits	Add with more than 4 digits Add with up to 3 decimal places	
Representations and models	Part whole model, bar model, Ten frames, bead strings, number line, straws	Part whole model, bar model, Ten frames, bead strings, number line, straws, hundred square, Base 10	Column Addition Part whole model, bar model, Base 10, place value counters	Column Addition Part whole model, bar model, Base 10, place value counters	Column Addition Part whole model, bar model, place value counters	
Subtraction	Subtract two 1-digit numbers to 10 Subtract 1- and 2-digit numbers to 20	Subtract 1 and 2-digit numbers to 100 Subtract two 2-digit numbers	Subtract with up to 3 digits	Subtract with up to 4 digits	Subtract with more than 4 digits Subtract with up to 3 decimal places	
Representations and models	Part whole model, bar models, number lines, ten frames, bead strings, number tracks, straws	Part whole model, bar Model, number lines, Straws, hundred square, Base 10, place value counters	Column subtraction part whole model, bar model, Base 10, place value counters	Column subtraction part whole model, bar model, place value counters	Column subtraction part whole model, bar model, place value counters	
Times Tables		Recall and use multiplication and division facts for the 2, 10 and 5 times tables	Recall and use multiplication and division facts for the 3, 4 and 8 times tables	Recall and use multiplication and division facts for the 6, 7, 9, 11 and 12 times tables		
Representations and models		Hundred square, Base 10, number lines, bead strings, place value counters, number tracks, everyday objects	Hundred square, Base 10, number lines, bead strings, place value counters, number tracks, everyday objects	Hundred square, Base 10, number lines, bead strings, place value counters, number tracks, everyday objects		
Multiplication	Solve one-step problems with multiplication	Solve one-step problems with multiplication	Multiply 2-digit by 1-digit numbers	Multiply 2 and 3-digit by 1-digit numbers	Multiply 4-digit by 1-digit numbers Multiply 2-digit by 2 and 3-digit numbers	Multiply 2-digit by 4-digit numbers
Representations and models	Bar models, counters, Base 10, Ten frames, bead strings, number lines	Bar models, counters, Base 10, Ten frames, bead strings, number lines	Expanded written method Short written method Place value counters, Base 10	Expanded written method Short written method Place value counters, Base 10	Formal written method Place value counters, Base 10	Formal written method
Division	Solve one-step problems with division (grouping and sharing)	Solve one-step problems with division (grouping and sharing)	Divide 2 digits by 1 digit (sharing with and without exchange, with and without remainders)	Divide 2 digits by 1 digit (grouping and sharing with remainders)	Divide 3 and 4 digits by 1 digit (sharing with exchange and grouping)	Divide multi digits by 2 digits (short and long division)
Representations and models	Real life objects, bead strings, ten frames, number lines, arrays, counters, bar models	Real life objects, bead strings, ten frames, number lines, arrays, counters, bar models	Straws, Base 10, bar models, place value counters, part whole models	Written short division Place value counters,	Written short division Base 10, bar models, place value counters. part whole models	Written sort and long division. list of multiples

Please note: some children may need to work in the stage before or after their year group, as appropriate for their needs.