Calculation at TAS

Year 2

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

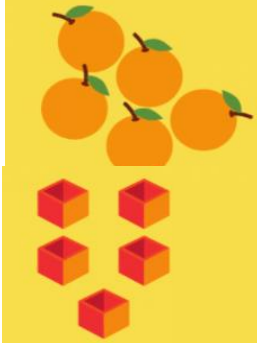
The teacher often represents the concept being taught in more than one way, to develop a deeper understanding. Children are also given the opportunity to practise their skills in varied ways, by making connections.

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...

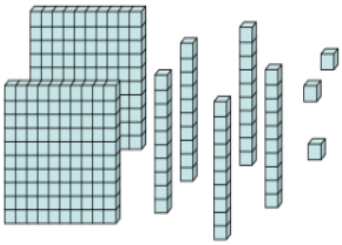
...then using physical representations of them.

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

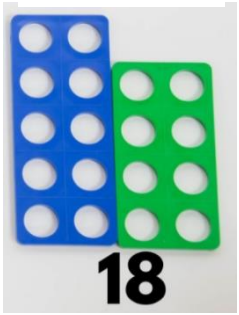
Representations and Resources



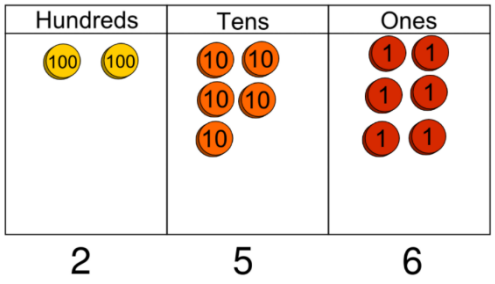
Base ten

253

Numicon

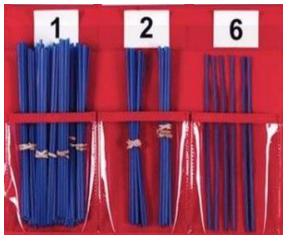


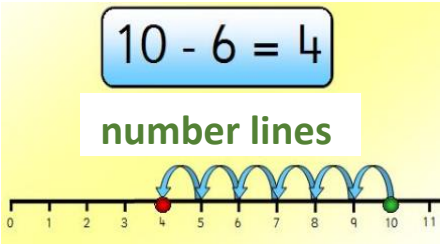
place value counters



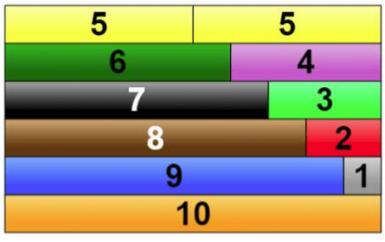
money

straws

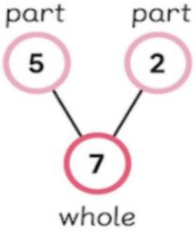




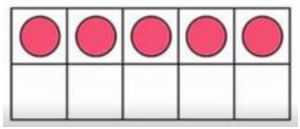
Cuisenaire rods

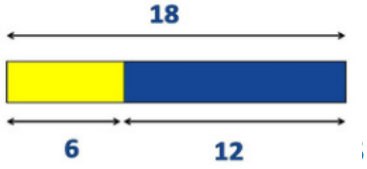


part whole models



tens frames





bar models

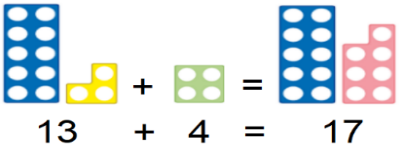
Rekenreks

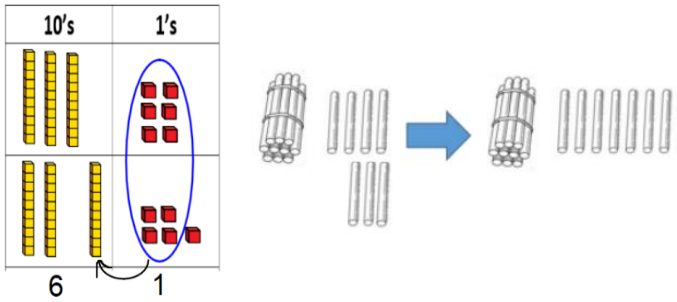
Addition

- Adding 3 single digits – finding bonds, counting on
- Use of base 10 to combine two numbers
- Column method for adding two 2-digit numbers

Concrete

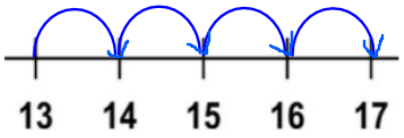
a range of practical objects



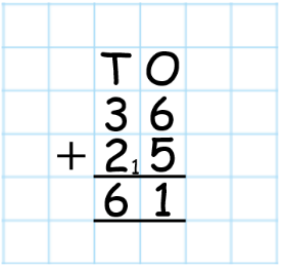


Abstract

number line

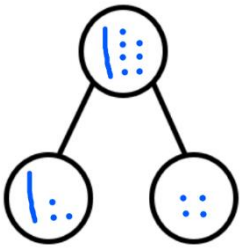


formal column method



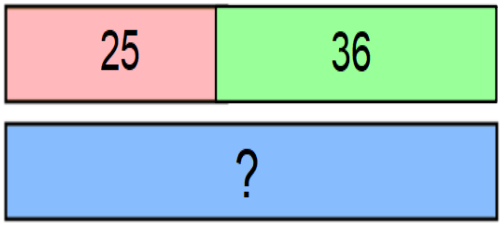
Pictorial

part whole model



Different ways to solve

36 + 25



Key Vocabulary

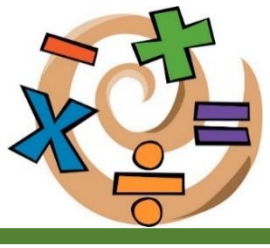
sum total plus add

parts and wholes the same as

altogether more equal to

Subtraction

- Counting back
- Find the difference
- Part whole model
- Make 10
- Use of base 10

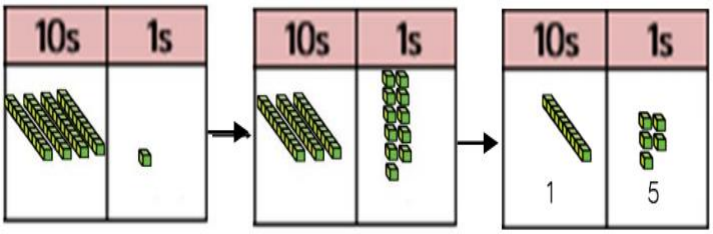


Concrete

Numicon, cubes, objects

14 – 5 = 9

base ten



Abstract

partitioning

14 – 5 = 9

4 1

14 – 4 = 10

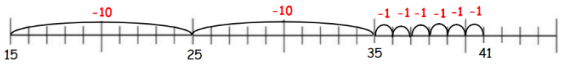
10 – 1 = 9

formal method without exchange

	T	O	
	2	6	
-	1	3	
	1	3	

number line

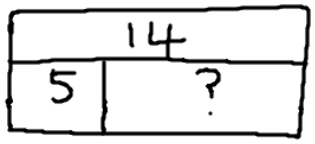
10 + 10 + 1 + 1 + 1 + 1 + 1 + 1 = 26



Pictorial

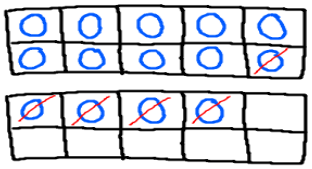
bar model

14 – 5 = 9

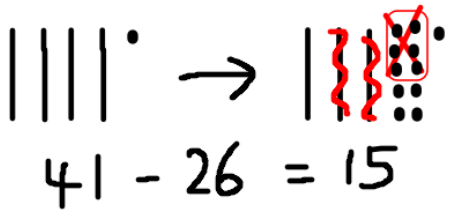


10 frames

14 – 5 = 9



base ten

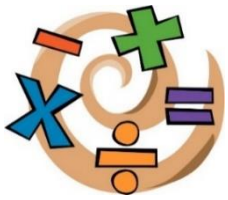


Key Vocabulary

take away	less than	decrease
the difference	subtract	
minus	fewer	

Multiplication

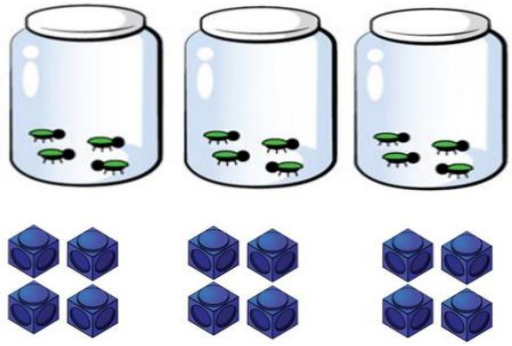
- Arrays showing commutative multiplication



Concrete

arrays of cubes and different objects

4 + 4 + 4 3 x 4



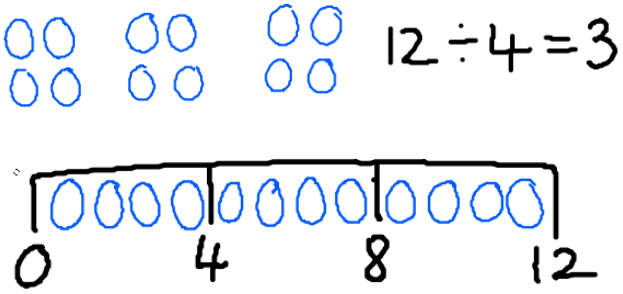
Abstract

calculations using arrays

12 = 3 x 4
4 x 3 = 12
4 + 4 + 4 = 12
12 = 3 + 3 + 3

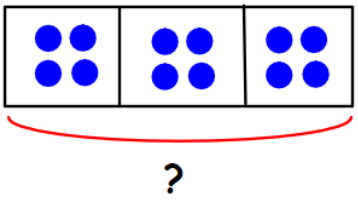
Pictorial

arrays

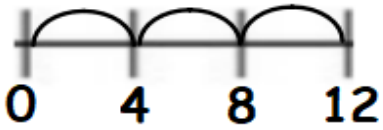


Different ways to solve

bar model



number line

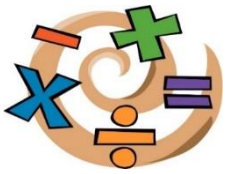


Key Vocabulary

double
multiplied by
groups of
times
the product of
equal groups
lots of

Division

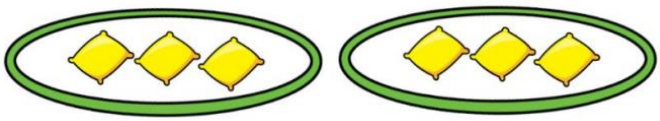
- Division as grouping
- Division within arrays – linking to multiplication
- Repeated subtraction



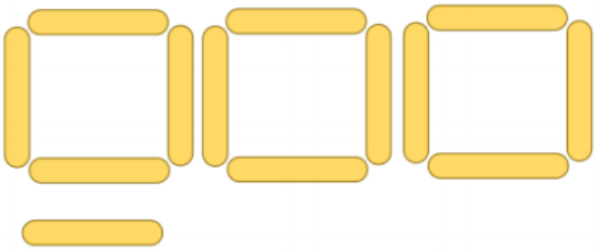
Concrete

sharing a range of objects

6 ÷2



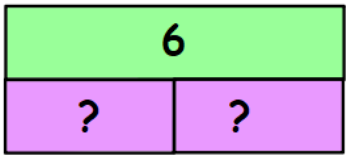
13 ÷ 4



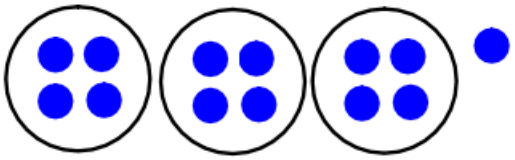
Abstract

times table facts

6 ÷ 2 = 3

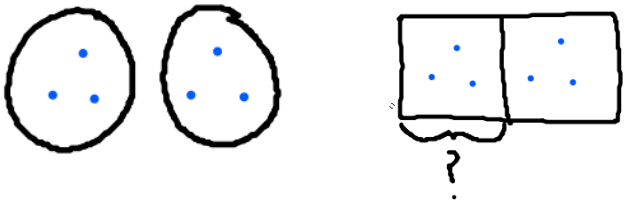


13 ÷ 4 = 3 r 1



Pictorial

6 ÷ 2 = 3

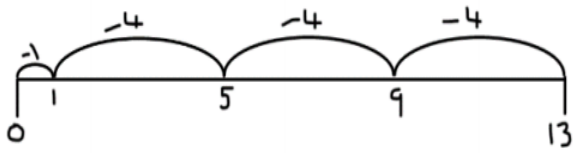


Different ways to solve

number line

13 ÷ 4

'3 groups of 4, with 1 left over'



Key Vocabulary

share	group
divide	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.