

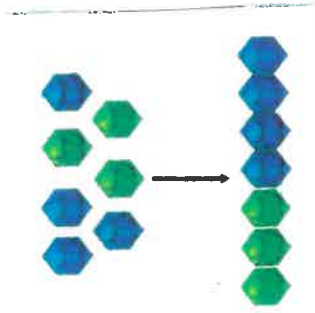
HNTPS Calculation Policy

Addition

Vocabulary: sum, total, parts, wholes, add, and, altogether, more, is the same as, is equal to.

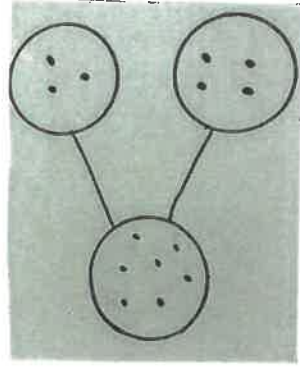
Concrete

Combining two parts to make a whole



Pictorial

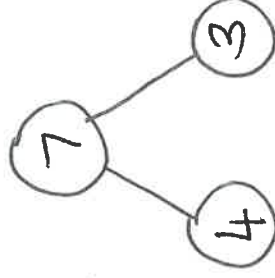
Representing apparatus using dots or crosses on part-whole model



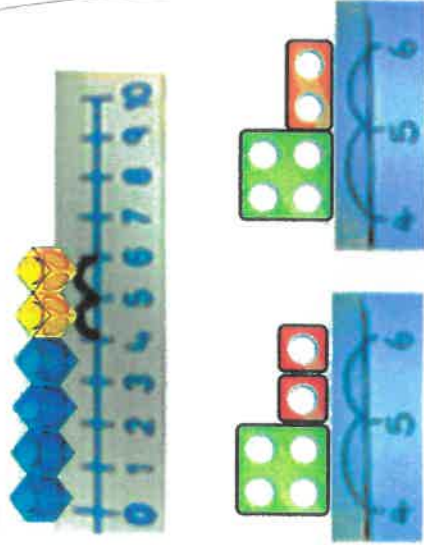
Abstract

Using numbers on a part-whole model

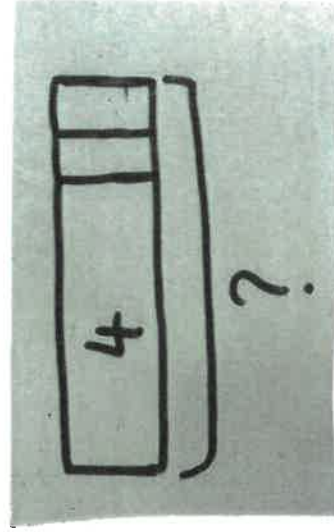
$$4 + 3 = 7$$



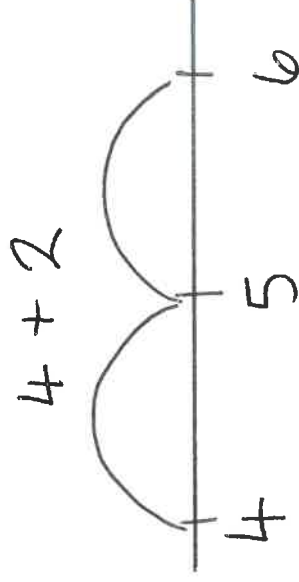
Counting on, on a number line using apparatus to support



Bar modelling showing counting on, rather than counting all

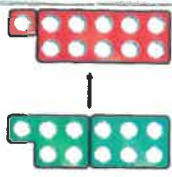
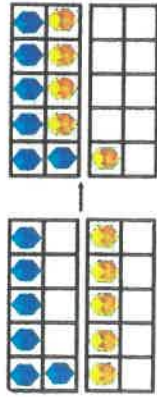


Abstract number line, counting on from a given number



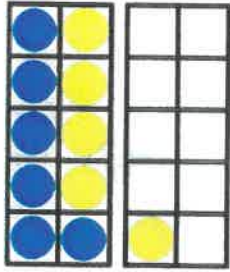
Regrouping to make ten, using ten frames, cubes, Numicon or other apparatus

$$6 + 5$$



Children draw the ten frame and counters/cubes

$$6 + 5$$



Children show an understanding of equality

$$6 + \square = 11$$

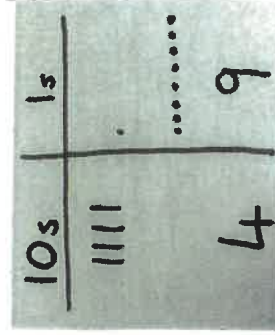
$$6 + 5 = 5 + \square$$

$$6 + 5 = \square + 4$$

Base ten to show developing understanding of partitioning and place value, not crossing boundaries or exchanging



Written representation of base ten, not crossing boundaries or exchanging

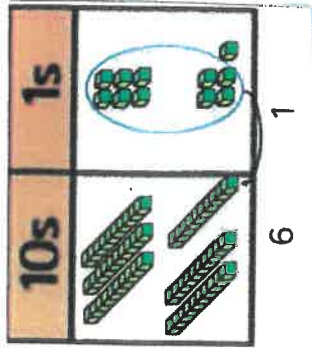


Expanded written method, not crossing boundaries or exchanging

$$\begin{array}{r} 6 \\ + \\ \hline 11 \end{array}$$

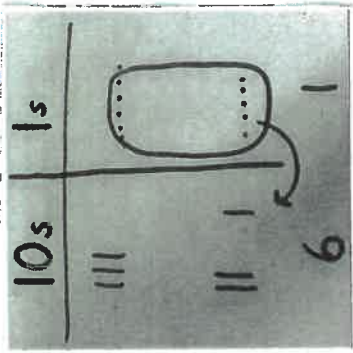
Base ten, crossing boundaries and exchanging

$$36 + 25$$



Written representation of base ten, in a place value chart, crossing boundaries and exchanging.

$$36 + 25$$



?
36
25

Expanded written method, crossing boundaries

$$\begin{array}{r} \text{tu} \\ 36 \\ + 25 \\ \hline 11 \\ 50 \\ \hline 61 \end{array}$$

extend to htu/thutu

Formal written method

$$\begin{array}{r} 243 \\ + 368 \\ \hline 611 \\ 11 \end{array}$$

HNTPS Calculation Policy

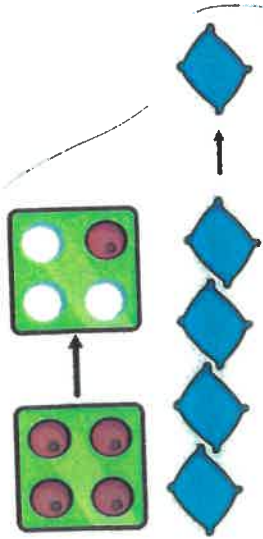
Subtraction

Vocabulary: take away, less than, the difference between, the difference between, subtract, minus, fewer, decrease.

Concrete

Physically taking away and removing objects from a group

$$4 - 3 = 1$$

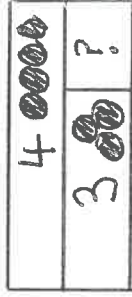


Pictorial

Draw the amount and cross out.



Bar model



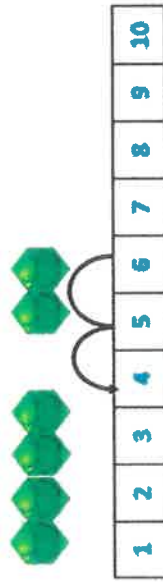
Abstract

Written calculation, bar model, part-whole model



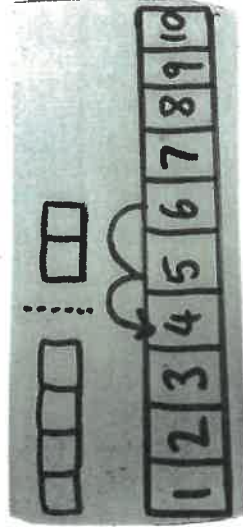
Counting back on a number line and using cubes/counters to physically take away

$$6 - 2 = 4$$



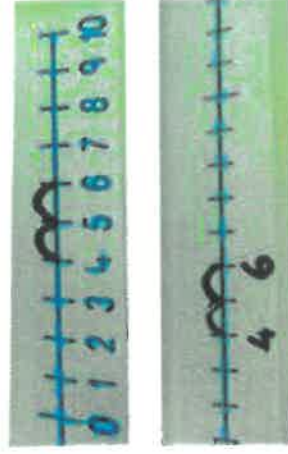
Draw own number line and draw cubes/counters. Cross out when taking away

$$6 - 2 = 4$$



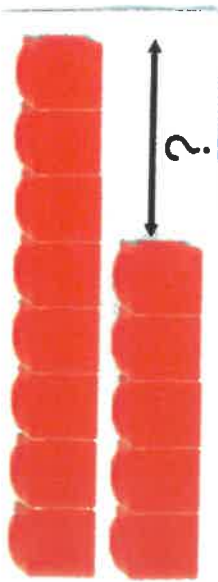
Show jumps on a number line

$$6 - 2 = 4$$

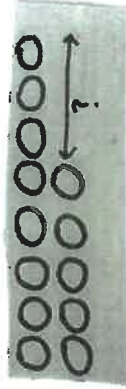


Finding the difference using cubes, Numicon, etc

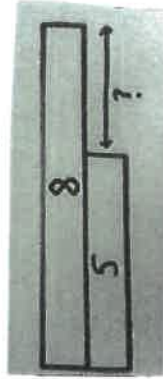
Calculate the difference between 8 and 5.



Draw the cubes, Numicon etc



Bar model



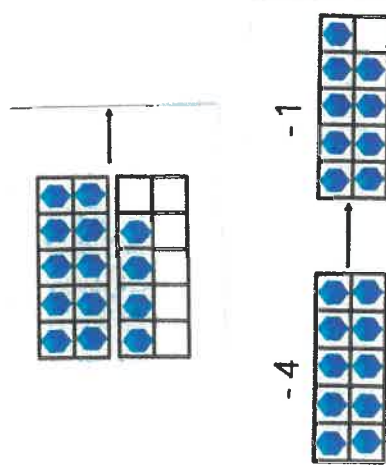
Written calculation for finding the difference

$$8 - 5 = ?$$

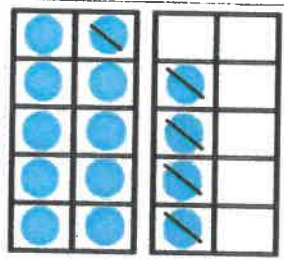
Investigate why pairs of numbers have the same difference

$$9 - 6 = 8 - 5 = 7 - 4$$

Use ten frames to bridge through ten



Draw ten frames to bridge through ten



Partition to show the bridging

$$14 - 5$$

$$14 - 4 = 10$$

$$10 - 1 = 9$$

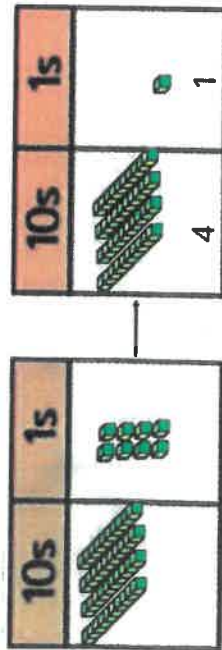
Missing numbers – using the inverse.
Hide the amount that has been taken away.

There are 10 counters


 How many have been taken away?
 $10 - ? = 5$
 $5 + ? = 10$

Column method using base ten, no bridging or exchanging (stealing)

$$48 - 7$$

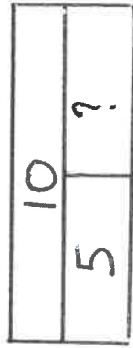


Represent missing number using drawings

$$\text{OOOOO} + ? = \text{OOOOO}$$

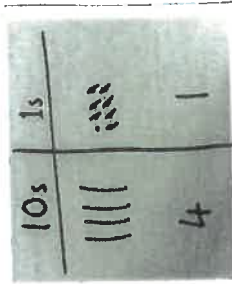
$$\text{OOOOO} - ? = \text{OOOOO}$$

Bar model



Represent base ten pictorially, no bridging or exchanging (stealing)

$$48 - 7$$



Use inverse to find a missing number

$$10 - ? = 5$$

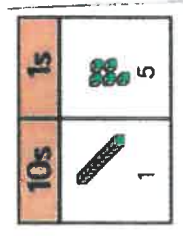
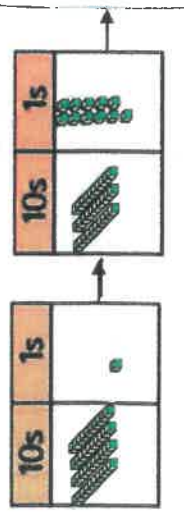
$$5 + ? = 10$$

Expanded column method, no bridging or exchanging (stealing)

$$\begin{array}{r} 48 \\ - 7 \\ \hline 41 \end{array} \rightarrow \begin{array}{r} 40 + 8 \\ - 00 + 7 \\ \hline 40 + 1 \end{array}$$

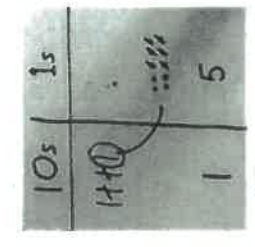
Column method using base ten, exchanging (stealing)

$$41 - 26$$



Represent base ten pictorially, bridging or exchanging (stealing)

$$41 - 26$$



Expanded column method, bridging or exchanging (stealing)

$$\begin{array}{r} 41 \\ -26 \\ \hline 15 \end{array} \rightarrow \begin{array}{r} 30 \\ 40 + 1 \\ -20 + 6 \\ \hline 10 + 5 \end{array}$$

Extend to $41 - 26$

Formal column method

$$\begin{array}{r} 41 \\ -26 \\ \hline 15 \end{array}$$

HNTPS Calculation Policy

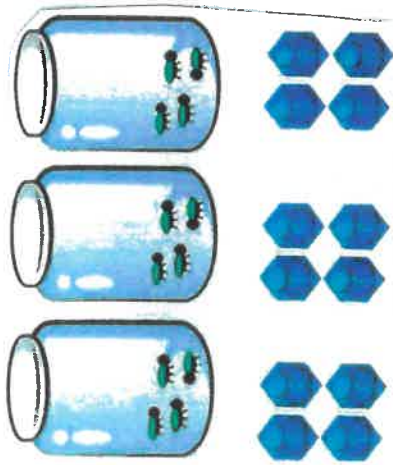
Multiplication

Vocabulary: double, times, multiplied by, the product of, groups of, groups of, equal groups

Concrete

Repeated grouping/repeated addition

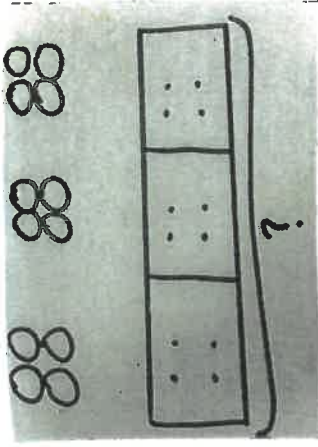
$$4 \times 3 \text{ or } 4 + 4 + 4$$



Pictorial

Represent repeated grouping/addition pictorially

$$4 \times 3$$



Abstract

Written calculation

$$4 \times 3 = 12$$

$$4 + 4 + 4 = 12$$

Number line with apparatus alongside, to show repeated addition

$$4 \times 3 = 12$$



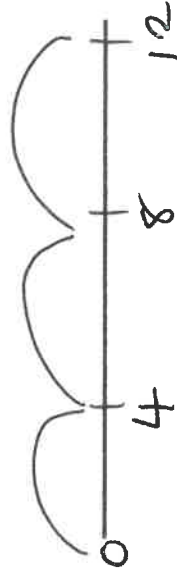
Represented pictorially, alongside a number line

$$4 \times 3 = 12$$



Abstract number line, showing jumps

$$4 \times 3 = 12$$



Make arrays to show commutativity

$$5 \times 2 = 2 \times 5$$

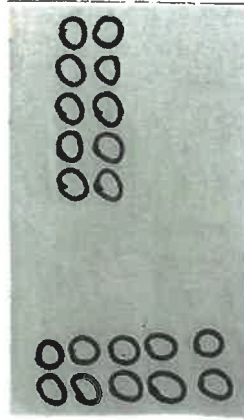


2 lots of 5



5 lots of 2

Represent the array pictorially



Use an array to write a range of calculations

$$10 = 2 \times 5$$

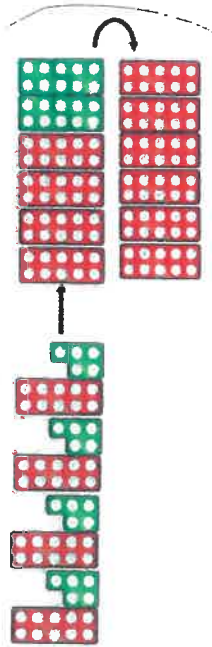
$$10 = 5 \times 2$$

$$2 + 2 + 2 + 2 + 2 = 10$$

$$10 = 5 + 5$$

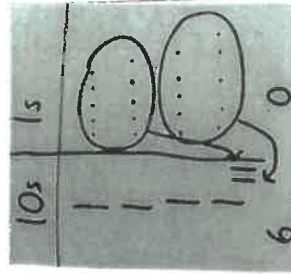
Partition to multiply, using Numicon, base ten etc

$$15 \times 4$$



Represent partitioning pictorially

$$15 \times 4$$



Write calculations to show partitioning

$$15 \times 4 \rightarrow 10 \times 4 = 40$$

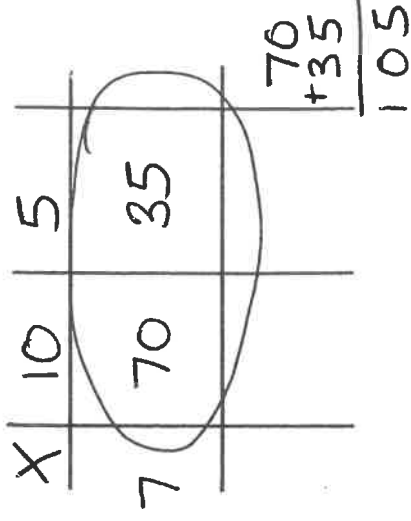
$$5 \times 4 = 20$$



$$\begin{array}{r} 40 \\ + 20 \\ \hline 60 \end{array}$$

Grid method multiplication

$$15 \times 7$$



* Children must have learned how to multiply and divide by 10/100/1000 before this step, as they will use this understanding

Formal method multiplication

$$\begin{array}{r} 12 \\ \times 13 \\ \hline 36 \\ 120 \\ \hline 156 \end{array}$$

HNTPS Calculation Policy

Division		
Concrete	Pictorial	Abstract
<p>Vocabulary: double, times, multiplied by, the product of, groups of, equal groups</p> <p>Sharing and grouping using a range of objects</p> <p>$6 \div 2 =$</p> <p>6 shared into 2 groups</p> <p>6 shared into groups of 2</p>	<p>Represent sharing/grouping pictorially</p>	<p>Written calculation and full bar model showing sharing and grouping</p> <p>$6 \div 2 = 3$</p> <p>$6 = 3 \times 2$ $6 = 2 \times 3$</p>
<p>Repeated addition/subtraction using cubes/counters etc above a number line</p> <p>$6 \div 2$</p>	<p>Represented pictorially, alongside a number line</p> <p>$6 \div 2$</p>	<p>Abstract number line, showing jumps</p> <p>$6 \div 2$</p> <p>Bar model</p>

Sharing with remainders

$$13 \div 4$$

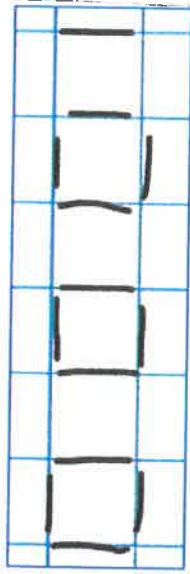
Use of lollipop sticks to form wholes - squares are made because we are dividing by 4.



There are 3 whole squares, with 1 left over.

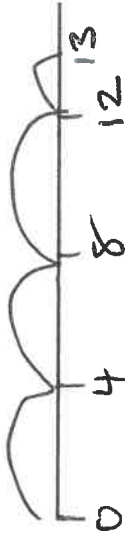
Represented pictorially

$$13 \div 4$$

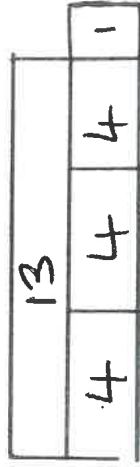


Represented on a number line

$$13 \div 4$$



Bar model



Long division

$$42 \div 3$$

$$\begin{array}{r} 14 \\ 3 \overline{) 42} \\ \underline{-3} \\ 12 \\ \underline{-12} \\ 00 \end{array}$$

$$3 \quad 6 \quad 9 \quad 12 \quad 15 \quad 18 \quad 21$$

Short division

$$42 \div 3$$

$$\begin{array}{r} 14 \\ 3 \overline{) 42} \\ \underline{30} \\ 12 \\ \underline{12} \\ 0 \end{array}$$