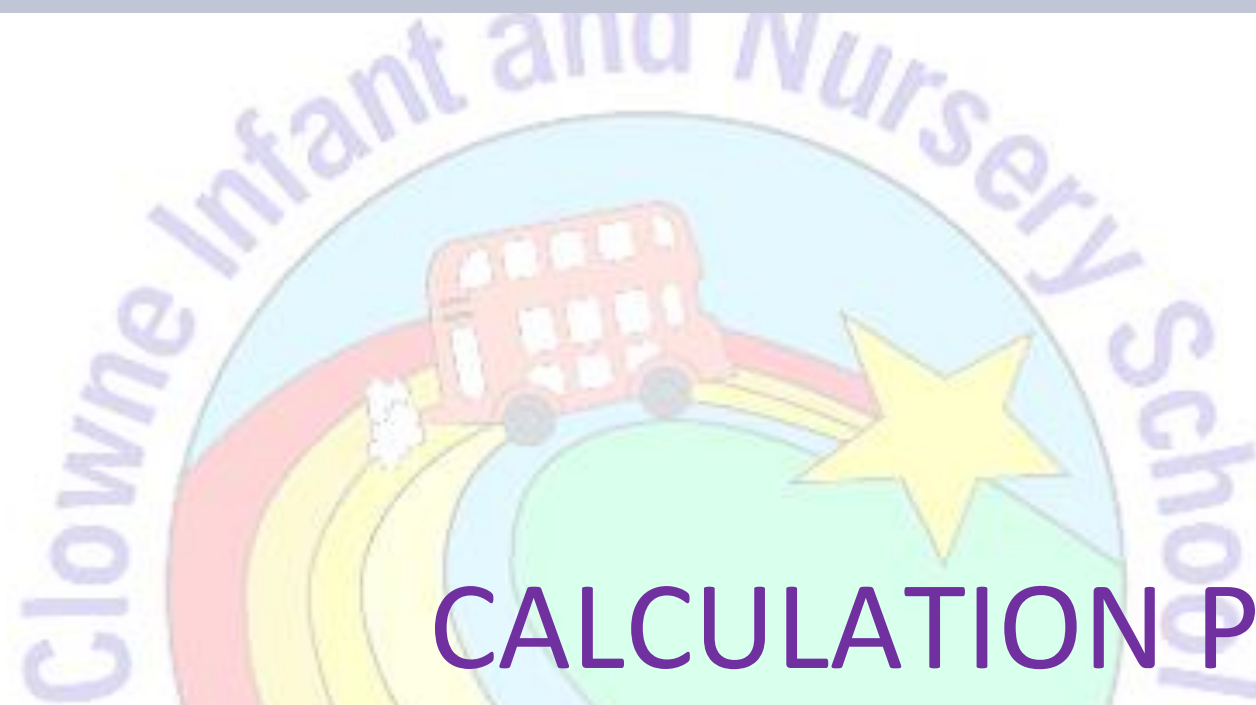




CALCULATION POLICY

Clowne Infant and Nursery School

[Abstract](#)

Calculation policy to be in line with the white rose planning document from September 2020

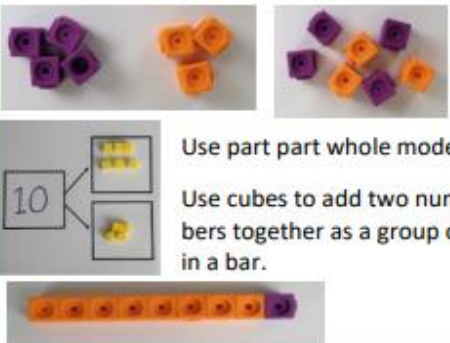
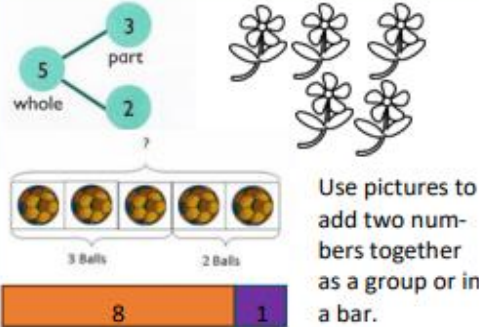
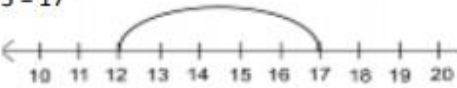
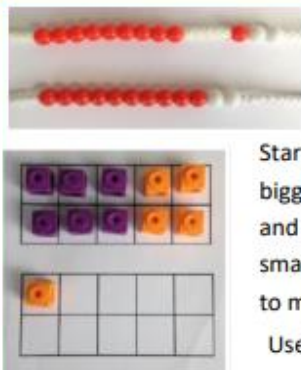
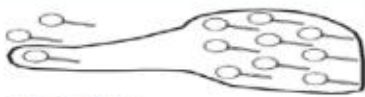
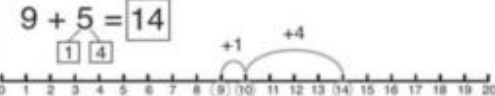
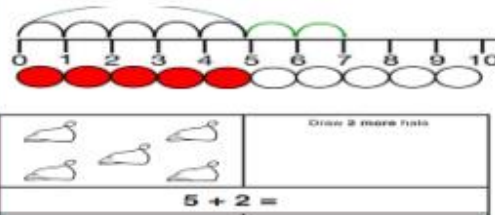
A Journey of Discovery

Updated: by Laura Sellars June 2020

Year

1

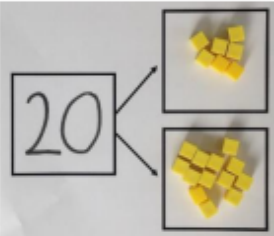
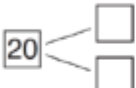
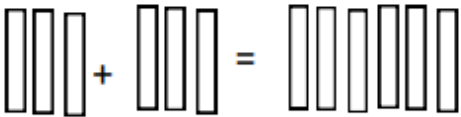
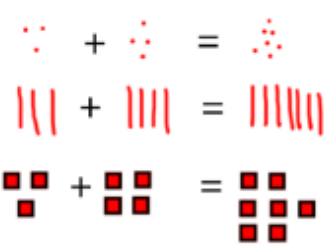
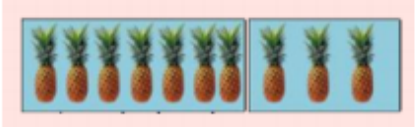
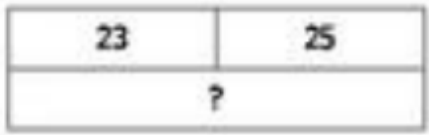
Addition

Objective & Strategy	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part- whole model	 Use part part whole model. Use cubes to add two numbers together as a group or in a bar.	 Use pictures to add two numbers together as a group or in a bar.	$4 + 3 = 7$  $10 = 6 + 4$ Use the part-part whole diagram as shown above to move into the abstract.
Starting at the bigger number and counting on	 Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.	$12 + 5 = 17$  Start at the larger number on the number line and count on in ones or in one jump to find the answer.	$5 + 12 = 17$ Place the larger number in your head and count on the smaller number to find your answer.
Regrouping to make 10. <i>This is an essential skill for column addition later.</i>	 $6 + 5 = 11$ Start with the bigger number and use the smaller number to make 10. Use ten frames.	 $3 + 9 =$ Use pictures or a number line. Regroup or partition the smaller number using the part part whole model to make 10. $9 + 5 = 14$ 	$7 + 4 = 11$ If I am at seven, how many more do I need to make 10. How many more do I add on now?
Represent & use number bonds and related subtraction facts within 20	 2 more than 5.	 $5 + 2 =$	Emphasis should be on the language '1 more than 5 is equal to 6.' '2 more than 5 is 7.' '8 is 3 more than 5.'

Year

2

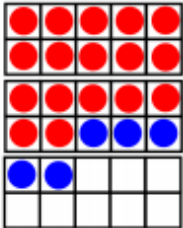
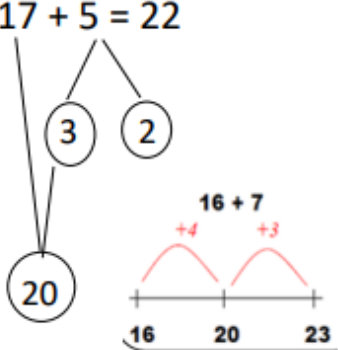
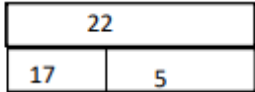
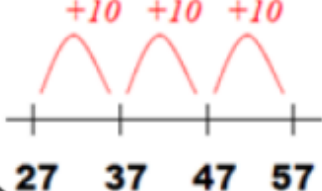
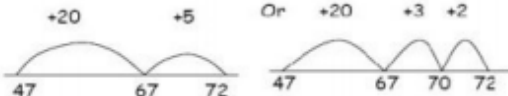
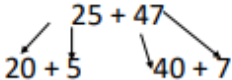
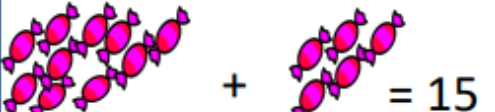
Addition

Objective & Strategy	Concrete	Pictorial	Abstract
Adding multiples of ten	$50 = 30 + 20$  Model using dienes and bead strings	 $3 \text{ tens} + 5 \text{ tens} = \underline{\hspace{2cm}} \text{ tens}$ $30 + 50 = \underline{\hspace{2cm}}$ Use representations for base ten.	$20 + 30 = 50$ $70 = 50 + 20$ $40 + \square = 60$
Use known number facts <i>Part part whole</i>	 Children explore ways of making numbers within 20	 $\square + \square = 20$ $20 - \square = \square$ $\square + \square = 20$ $20 - \square = \square$	$\square + 1 = 16$ $16 - 1 = \square$ $1 + \square = 16$ $16 - \square = 1$
Using known facts	$\square\square + \square\square = \square\square\square\square$ 	 Children draw representations of H,T and O	$3 + 4 = 7$ <i>leads to</i> $30 + 40 = 70$ <i>leads to</i> $300 + 400 = 700$
Bar model	 $3 + 4 = 7$	 $7 + 3 = 10$	 $23 + 25 = 48$

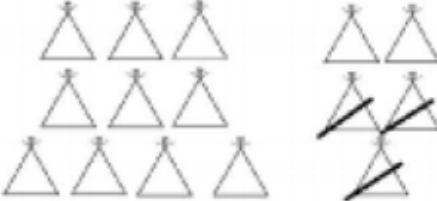
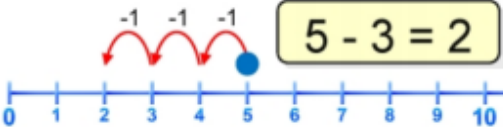
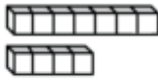
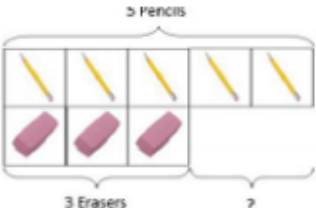
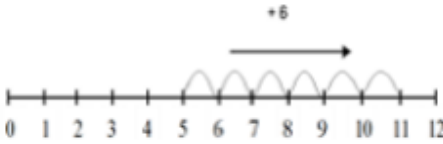
Year

2

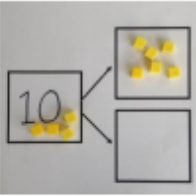
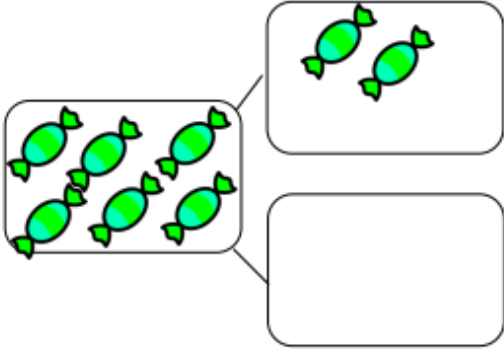
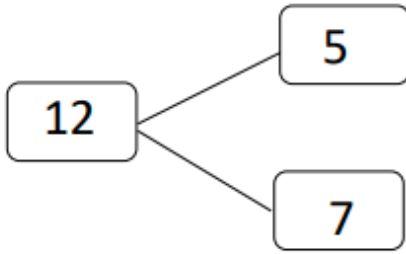
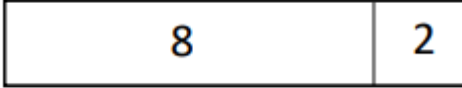
Addition

Objective & Strategy	Concrete	Pictorial	Abstract
Add a two digit number and ones Children explore the pattern. $17 + 5 = 22$ $27 + 5 = 32$	 Use ten frame to make 'magic ten'	Use part part whole and number line to model. $17 + 5 = 22$ 	$17 + 5 = 22$ Explore related facts $17 + 5 = 22$ $5 + 17 = 22$ $22 - 17 = 5$ $22 - 5 = 17$ 
Add a 2 digit number and tens Explore that the ones digit does not change	 $25 + 10 = 35$	$27 + 30$ 	$27 + 10 = 37$ $27 + 20 = 47$ $27 + \square = 57$
Add two 2-digit numbers Model using dienes, place value counters and numicon		 Use number line and bridge ten using part whole if necessary.	$25 + 47$  $20 + 40 = 60$ $5 + 7 = 12$ $60 + 12 = 72$
Add three 1-digit numbers Combine to make 10 first if possible, or bridge 10 then add third digit		 Regroup and draw representation.  $= 15$	$4 + 7 + 6 = 10 + 7$ $= 17$ Combine the two numbers that make/ bridge ten then add on the third.

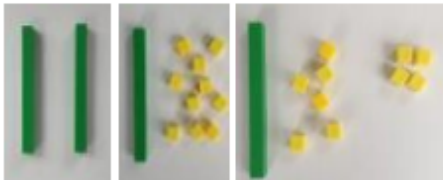
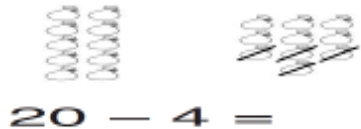
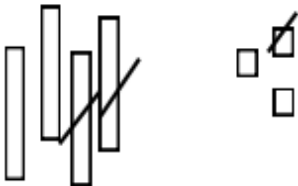
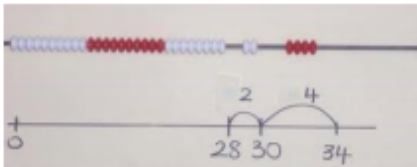
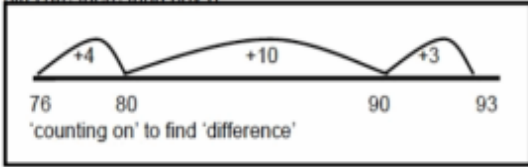
Subtraction

Objective & Strategy	Concrete	Pictorial	Abstract
Taking away ones.	Use physical objects, counters, cubes etc to show how objects can be taken away.  $6 - 4 = 2$  $4 - 2 = 2$	 $15 - 3 = 12$ Cross out drawn objects to show what has been taken away.	$7 - 4 = 3$ $16 - 9 = 7$
Counting back	  Move objects away from the group, counting backwards.  Move the beads along the bead string as you count backwards.	 $5 - 3 = 2$ Count back in ones using a number line.	Put 13 in your head, count back 4. What number are you at?
Find the Difference	Compare objects and amounts  'Seven is 3 more than four' 'I am 2 years older than my sister'  3 Pencils 3 Erasers ? Lay objects to represent bar model.	Count on using a number line to find the difference.  +6	Hannah has 12 sweets and her sister has 5. How many more does Hannah have than her sister.?

Subtraction

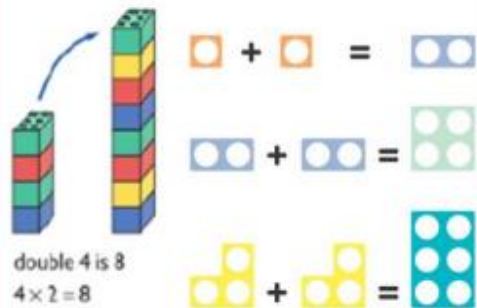
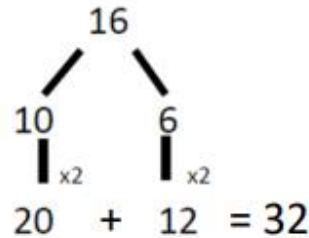
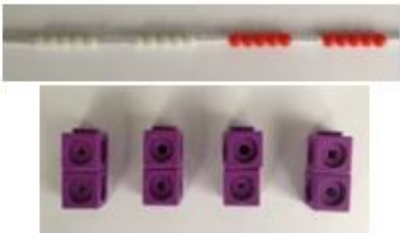
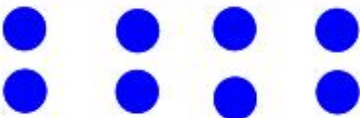
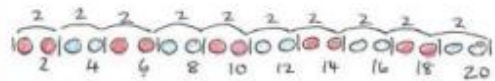
Objective & Strategy	Concrete	Pictorial	Abstract
Represent and use number bonds and related subtraction facts within 20 Part Part Whole model	 Link to addition. Use PPW model to model the inverse. If 10 is the whole and 6 is one of the parts, what's the other part? $10 - 6 = 4$	 Use pictorial representations to show the part.	Move to using numbers within the part whole model. 
Make 10	14—9  Make 14 on the ten frame. Take 4 away to make ten, then take one more away so that you have taken 5.	13—7  Jump back 3 first, then another 4. Use ten as the stopping point.	16—8 How many do we take off first to get to 10? How many left to take off?
Bar model	 $5 - 2 = 3$		 $10 = 8 + 2$ $10 = 2 + 8$ $10 - 2 = 8$ $10 - 8 = 2$

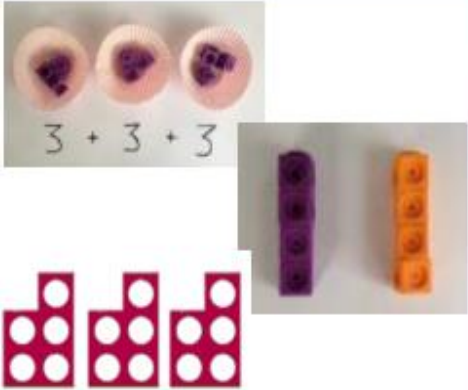
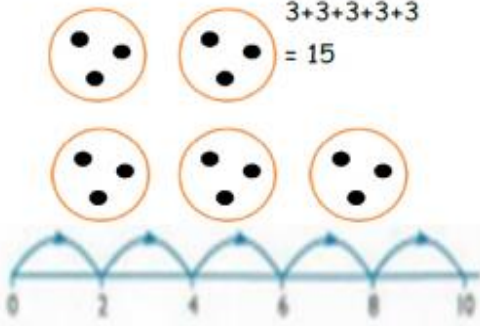
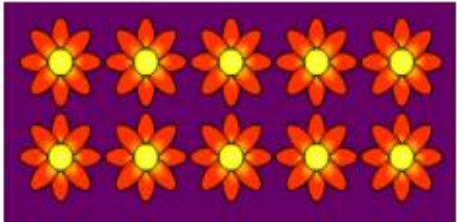
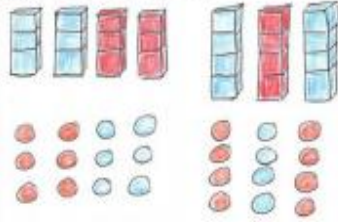
Subtraction

Objective & Strategy	Concrete	Pictorial	Abstract
Regroup a ten into ten ones	 Use a PV chart to show how to change a ten into ten ones, use the term 'take and make'	 $20 - 4 =$	$20 - 4 = 16$
Partitioning to subtract without regrouping. <i>'Friendly numbers'</i>	$34 - 13 = 21$ Use Dienes to show how to partition the number when subtracting without regrouping. 	Children draw representations of Dienes and cross off.  $43 - 21 = 22$	$43 - 21 = 22$
Make ten strategy <i>Progression should be crossing one ten, crossing more than one ten, crossing the hundreds.</i>	 $34 - 28$ Use a bead bar or bead strings to model counting to next ten and the rest.	 Use a number line to count on to next ten and then the rest.	$93 - 76 = 17$

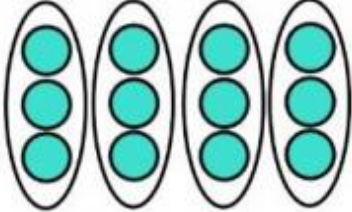
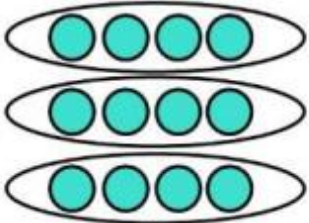
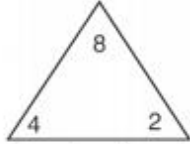
Year 1

Multiplication

Objective & Strategy	Concrete	Pictorial	Abstract
Doubling	Use practical activities using manipulatives including cubes and Numicon to demonstrate doubling  double 4 is 8 $4 \times 2 = 8$	Draw pictures to show how to double numbers Double 4 is 8 	Partition a number and then double each part before recombining it back together.  $20 + 12 = 32$
Counting in multiples	Count the groups as children are skip counting, children may use their fingers as they are skip counting. 	 Children make representations to show counting in multiples. 	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25, 30
Making equal groups and counting the total	  $\square \times \square = 8$ Use manipulatives to create equal groups.	Draw  to show $2 \times 3 = 6$ Draw and make representations	$2 \times 4 = 8$

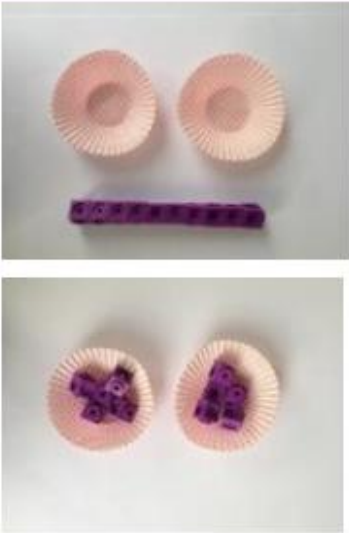
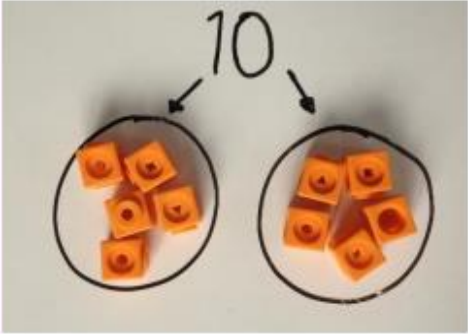
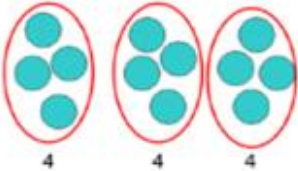
Objective & Strategy	Concrete	Pictorial	Abstract
Repeated addition	 Use different objects to add equal groups	Use pictorial including number lines to solve prob There are 3 sweets in one bag. How many sweets are in 5 bags altogether?  $3+3+3+3+3 = 15$	Write addition sentences to describe objects and pictures.  $2+2+2+2+2 = 10$
Understanding arrays	Use objects laid out in arrays to find the answers to 2 lots 5, 3 lots of 2 etc. 	Draw representations of arrays to show understanding 	$3 \times 2 = 6$ $2 \times 5 = 10$

Objective & Strategy	Concrete	Pictorial	Abstract
Doubling	Model doubling using dienes and PV counters. $40 + 12 = 52$	Draw pictures and representations to show how to double numbers	Partition a number and then double each part before recombining it back together. $16 \begin{matrix} \swarrow & \searrow \\ 10 & 6 \end{matrix} \begin{matrix} \downarrow \times 2 & \downarrow \times 2 \\ 20 & 12 \end{matrix} \rightarrow 20 + 12 = 32$
Counting in multiples of 2, 3, 4, 5, 10 from 0 (repeated addition)	Count the groups as children are skip counting, children may use their fingers as they are skip counting. Use bar models. $5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40$	Number lines, counting sticks and bar models should be used to show representation of counting in multiples.	Count in multiples of a number aloud. Write sequences with multiples of numbers. 0, 2, 4, 6, 8, 10 0, 3, 6, 9, 12, 15 0, 5, 10, 15, 20, 25, 30 $4 \times 3 = \square$

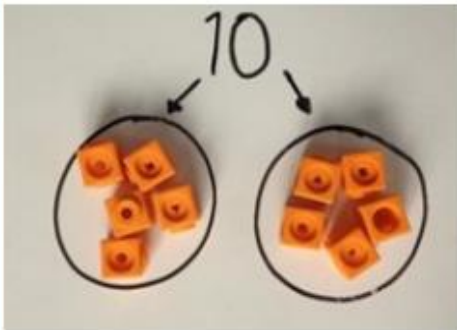
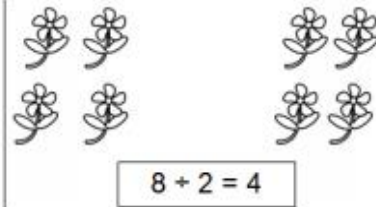
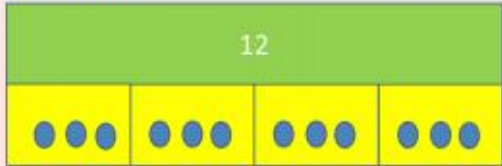
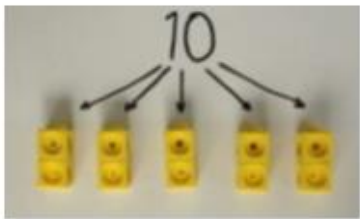
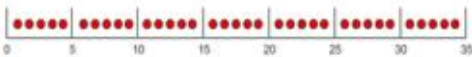
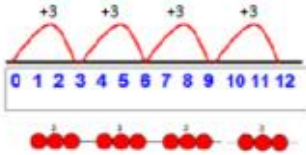
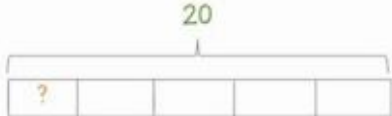
Objective & Strategy	Concrete	Pictorial	Abstract
Multiplication is commutative	Create arrays using counters and cubes and Numicon.    Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer.  	Use representations of arrays to show different calculations and explore commutativity.  	$12 = 3 \times 4$ $12 = 4 \times 3$ Use an array to write multiplication sentences and reinforce repeated addition.  $5 + 5 + 5 = 15$ $3 + 3 + 3 + 3 + 3 = 15$ $5 \times 3 = 15$ $3 \times 5 = 15$
Using the Inverse <i>This should be taught alongside division, so pupils learn how they work alongside each other.</i>		 $\square \times \square = \square$ $\square \times \square = \square$ $\square \div \square = \square$ $\square \div \square = \square$	$2 \times 4 = 8$ $4 \times 2 = 8$ $8 \div 2 = 4$ $8 \div 4 = 2$ $8 = 2 \times 4$ $8 = 4 \times 2$ $2 = 8 \div 4$ $4 = 8 \div 2$ Show all 8 related fact family sentences.

Year
1

Division

Objective & Strategy	Concrete	Pictorial	Abstract
Division as sharing Use Gordon ITPs for modelling	  I have 10 cubes, can you share them equally in 2 groups?	Children use pictures or shapes to share quantities.  8 Shared between 2 is 4 Sharing:  12 shared between 3 is 4	12 shared between 3 is 4

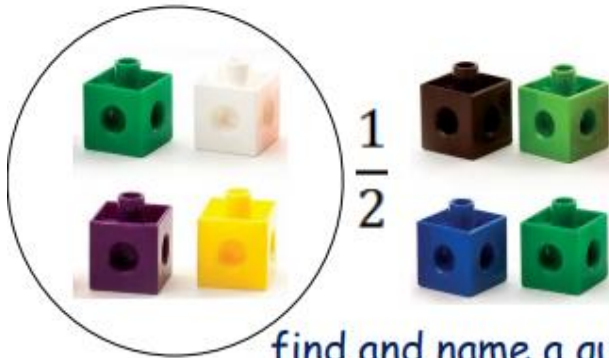
Division

Objective & Strategy	Concrete	Pictorial	Abstract
Division as sharing	 I have 10 cubes, can you share them equally in 2 groups?	Children use pictures or shapes to share quantities.  $8 \div 2 = 4$ Children use bar modelling to show and support understanding.  $12 \div 4 = 3$	$12 \div 3 = 4$
Division as grouping	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.  	Use number lines for grouping  $12 \div 3 = 4$ Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.  $20 \div 5 = ?$ $5 \times ? = 20$	$28 \div 7 = 4$ Divide 28 into 7 groups. How many are in each group?

Fractions

Recognise, find and name a half as one of two equal parts of an object, shape or quantity.

Concrete



Recognise, find and name a quarter as four equal parts of an object, shape or quantity.

Pictorial

A whole apple



1

Half an apple



$\frac{1}{2}$

Recognise, find and name a quarter as four equal parts of an object, shape or quantity.

Abstract

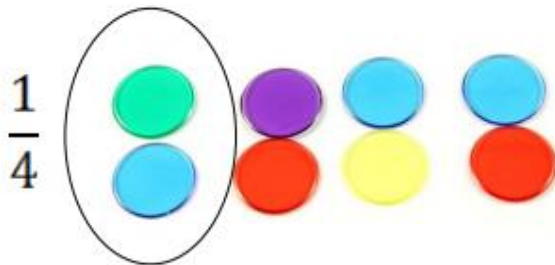
Half of 10 =

Half of 8 =

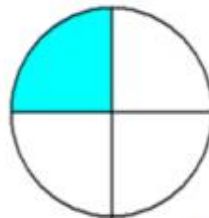
Half of 14 =

$\frac{1}{2}$

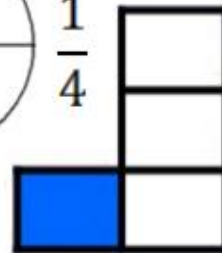
Concrete



Pictorial



$\frac{1}{4}$



Abstract

A quarter of 20 =

A quarter of 12 =

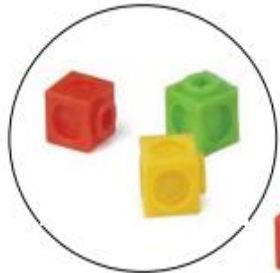
A quarter of 8 =

$\frac{1}{4}$

Fractions

Recognise, find and name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity.

Concrete

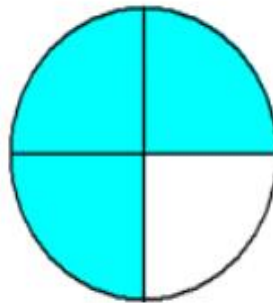


and recognise the $\frac{1}{2}$.



Write simple equivalence

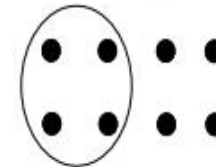
Pictorial



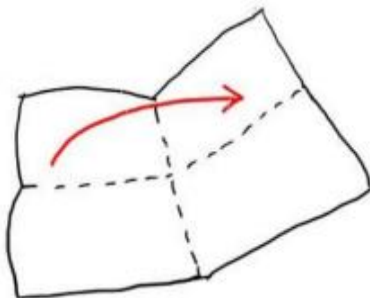
fractions of $\frac{2}{4}$ and

Abstract

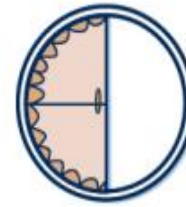
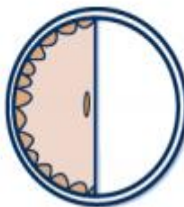
$$\frac{2}{4} \text{ of } 8 = \square$$



Concrete



Pictorial



I have $\frac{1}{2}$ a pie You have $\frac{2}{4}$ of a pie

Abstract

$$\frac{1}{2} \text{ of } 6 = \square$$

