

Hightown Junior Infant and Nursery School

At Hightown we work together as a school community with pride, respect, rigour and fairness. We celebrate effort, respond enthusiastically to challenges and create positive opportunities that enable everyone to achieve in every way.

Mastering Mathematics - Calculation Policy and Procedures

Policy date:	September 2025	
Approved by & date	Full Governing Body	
Link school staff:	Lois Stevenson	
Link governor:	Kay Brennan	
Next review date	September 2026	

Mastering Mathematics

Calculation policy and procedures 2024-2025

This document works alongside Hightown JIN Schools' use of : the National Curriculum, the DfE's Mathematics guidance: Key Stages 1 and 2 - Non-statutory guidance for the national curriculum in England, as well as Abacus planning scheme and objectives,

<u>Other resources we use are;</u>

Our KIRF- Key Instant Recall Facts, I See Reasoning, Deepening Understanding, TT Rockstar schedules, Head start word problems and mastery materials, NTS Assessments, Rising Star Arithmetic and problem solving activities.



At Hightown JIN School, we want every child to be successful, fluent mathematicians, who can freely 'talk maths' to explain, reason and justify.
Our children need to be fluent in their application of an arithmetic process and be able to relate and apply it to real life situations.
Children are encouraged to use a wide range of concrete resources and then visually represent their findings, using a variety of ways to support their mathematical thinking and processing.
We aim to create independent mathematicians who are well equipped to apply their learning to the wider world.

Teaching for mastery aims to provide all children with full access to the curriculum enabling them to achieve confidence and competence- 'mastery' in mathematics.
Mastery embeds a deeper understanding of mathematics by utilising a concrete, pictorial and abstract approach so that pupils understand what they are doing rather than just learning to repeat routines without grasping what is happening.

Making Learning Stick:

As a school, we want our children to recall and remember what they have learnt, and this directs how we teach. We teach in chunks, regularly recalling and reviewing NC objectives.
Our planning builds upon the children's knowledge.
Relearning concepts and being encouraged to remember and recall knowledge support the long-term memory. Naturally, children forget information and so it is good practice to regularly re teach and build upon mathematical concepts.

To **master** something means:

Deep and sustainable learning is occurring;

The ability to build on something that has already been sufficiently mastered;

The ability to reason about a concept and make connections;

Conceptual and procedural fluency;

Development of deep mathematical understanding;

Development of both factual/procedural and conceptual fluency;

Longer time on key topics, providing time to go deeper and embed learning.

Mastery involves the development of three forms of knowledge:

Factual – I know that

Procedural – I know how

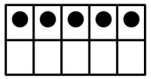
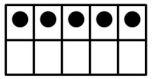
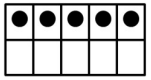
Conceptual – I know why

All mathematics is abstract and needs to be represented in order to provide access and develop understanding and fluency.

At Hightown JIN School, we use a consistent core set of representations: part-part whole grids, tens frames, base 10, Cuisenaire rods, counting sticks, numicon, place value charts, double sided counters, bar modelling and arrays to represent our math's. Bar modelling is used across all year groups – **See Bar modeling guidance.**

Every year group uses these concrete and pictorial representations to embed their learning.

Progression in the use of manipulatives to support concrete learning - USE IT!

Foundation	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Real-life objects	Real-life objects	Real-life objects	Real-life objects	Real-life objects	Real-life objects	Real-life objects
0 – 9 digit cards	0 – 9 digit cards	0 – 9 digit cards	0 – 9 digit cards	0 – 9 digit cards	0 – 9 digit cards	0 – 9 digit cards
Nursery - Number track to 10- R to 20	Number line to 20	Number line to 100	Number line to 100	Number line including negative numbers	Number line including negative numbers	Number line including negative numbers
Numbered counting stick	Counting stick	Counting stick	Counting stick	Counting stick	Counting stick	Counting stick
Tens frame 	Tens frame 	Tens frame 				
	Place value charts – Tens and ones	Place value charts – Hundreds, tens and ones	Place value charts – Thousands, hundreds, tens and ones	Place value charts – Ten thousands, thousands, hundreds, tens, ones and tenths	Place value charts to a million and three decimal places	Place value charts to 10 million and three decimal places
Interlocking cubes - Use one colour to represent one amount	Interlocking cubes - Use one colour to represent one amount	Dienes	Dienes	Dienes	Dienes	Dienes
			Place value counters	Place value counters	Place value counters	Place value counters
	Place value arrow cards – tens and ones	Place value arrow cards – tens and ones	Place value arrow cards – H, T, O	Place value arrow cards – Th, H, T, O	Place value arrow cards	Place value arrow cards
Part-part-whole mat	Part-part-whole mat	Part-part-whole mat	Part-part-whole model	Part-part-whole model	Part-part-whole model	Part-part-whole model
Bar model with real-life objects	Bar model with real life objects/pictorial objects/representative objects eg. counters	Bar model with counters /Dienes progressing to numbers	Bar model with numbers	Bar model with numbers	Bar model with numbers	Bar model with numbers
Bead strings – ten	Bead strings - twenty	Bead strings - hundred	Bead strings - hundred	Bead strings - hundred	Bead strings - hundred	Bead strings - hundred
Numicon shapes	Numicon shapes	Numicon shapes	Numicon shapes	Numicon shapes	Numicon shapes	Numicon shapes
			Cuisenaire rods	Cuisenaire rods	Cuisenaire rods	Cuisenaire rods
Double sided counters	Double sided counters	Double sided counters	Double sided counters	Double sided counters	Double sided counters	Double sided counters
Multilink – use one colour to model an amount	Multilink – use one colour to model an amount	Multilink – use one colour to model an amount	Multilink – use one colour to model an amount	Multilink – use one colour to model an amount	Multilink – use one colour to model an amount	Multilink – use one colour to model an amount

TENS FRAME IDEAS

LIFE SIZE TEN FRAME	Create a life-size ten frame in the classroom and outdoor play area. Use counters, pennies, teddies, gingerbread men, children etc.
FLASH	Flash ***ten frame*** briefly and have children write the number on a whiteboard. Using whiteboards, rather than having children say the number, ensures that all children attempt to respond and allows the teacher to assess class progress. When the response is oral, not all child responses are audible. Encourage children to share the different strategies used to find the total number of dots for cards, "How did you see it?" This can be varied by asking children to write the number and draw the pattern they saw, or by having them build the number flashed on their own blank frame.
FLASH: ONE MORE	Once children are familiar with the basic patterns, and know them automatically, flash a 10 frame or dot card and ask them to name the number that is one more than the number flashed. Variation: ask children to give the number that is two more/one less/double/ten more than the number flashed.
I WISH I HAD TEN	Flash a dot card or ten frame showing 9 or less and say, "I wish I had 10". Children respond with the part that is needed to make ten. The game can focus on a single whole, or the "wish I had" number can change each time. Variation: teacher flashes card and children write the complement of ten on individual whiteboards with dry erase markers.
I WISH I HAD 12	As above but children respond with how many more are needed to make twelve. Children should be confident in facts of 10 before this is attempted. For example to go from 8 to 12, they should realise they need 2 more to get to 10, then 2 more to 12. 2 and 2 is 4. Variation: Children draw an empty number line on their whiteboards to show the two jumps used to get to the target number.
1 MORE **1 LESS** **10 MORE** **10 LESS**	The following four prompts are written on the board: one more one less ten more ten less The teacher flashes a dot or ten frame card as the 'starting number'. The first child selects one prompt. For example, if the teacher flashes a card showing '5' the first child might say, "one more than 5 is 6", the second child might say, "ten more than 6 is 16", and the third child might say, "one less than 16 is 15". Continue until all children have had a turn.
TEEN FRAME FLASH (11-20)	**Teen Frame Flash (11-20)** Once children are subitizing ***ten frame*** patterns 0- 10, cards showing larger numbers (i.e. more than one ten frame) should be introduced. Use mental math sessions with the following key questions: How many? How many more than 10? As children become familiar with the 'teen' patterns introduce further questions to develop number relationships. • What is one more/two more than the number I flashed? • What is one less/two less than the number I flashed? • How far away is the number I flashed from twenty? • Double the number I flash. • What is the near Doubles fact? (i.e., if 15 is flashed, children answer 7+8)
MULTIPLES	Flash a ***tens frame*** and ask children to give you the product if the number you flash was multiplied by 2, 5 etc.

Progression in the teaching of counting in Foundation Stage

Pre-counting

The key focus in pre-counting is an understanding of the concepts more, less and the same and an appreciation of how these are related. Children at this stage develop these concepts by comparison and no counting is involved.

Ordering

Count by reciting the number names in order forwards and backwards from any starting point.

One to one correspondence

One number word has to be matched to each and every object.
Lack of coordination is a source of potential error – it helps if children move the objects as they count, use large rhythmic movements, or clap as they count.

Cardinality (Knowing the final number counted is the total number of objects)

Count out a number of objects from a larger collection. Know the number they stop counting at will give the total number of objects.

Pre-counting ideas

Provide children with opportunities to sort groups of objects explicitly using the language of ***more*** *and* ***less.***





Which group of apples has the most?
Which group of apples has the least?

Ordering ideas

Provide children with opportunities to count orally on a daily basis. Rote count so that children are able to understand number order and can hear the rhythm and pattern. Use a drum or clap to keep the beat. ***– play games such as hide and seek and*** **what time is it Mr Wolf**



One to one correspondence ideas

Play counting games together moving along a track, play games involving amounts such as knocking down skittles.

Use traditional counting songs throughout the day ensuring children have the visual/kinesthetic resources eg. 5 little ducks, 10 green bottles



Cardinal counting ideas



How many bananas are in my fruit bowl? Allow children to physically handle the fruit.

Provide children with objects to point to and move as they count and say the numbers.

Subitising (recognise small numbers without counting them)

Children need to recognise small amounts without counting them eg. dot patterns on dice, dots on tens frames, dominoes and playing cards as well as small groups of randomly arranged shapes stuck on cards.

Abstraction

You can count anything – visible objects, hidden objects, imaginary objects, sounds etc. Children find it harder to count things they cannot move (because the objects are fixed), touch (they are at a distance), see, that move around. Children also find it difficult to count a mix of different objects, or similar objects of very different sizes.

Conservation of number – MASTERY!

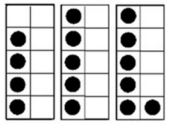
Ultimately children need to realise that when objects are rearranged the number of them stays the same.

End of EYFS counting expectations

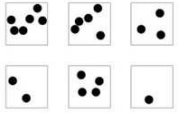
- count reliably to 20
- count reliably up to 10 everyday objects
- estimate a number of objects then check by counting
- use ordinal numbers in context eg first, second, third
- count in twos, fives and tens
- order numbers 1-20
- say 1 more/ 1 less than a given number to 20

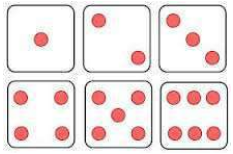
Subitising ideas

Provide children with opportunities to count by recognising amounts.









Abstraction ideas

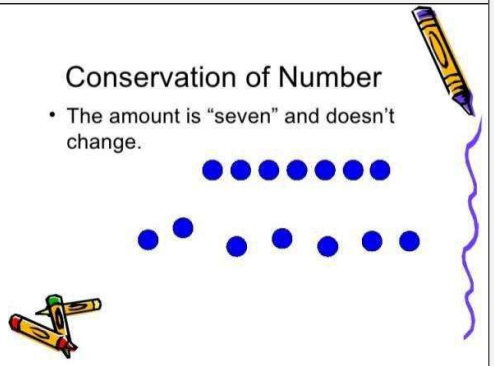


How many pigs are in this picture?

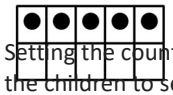
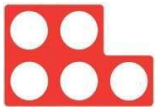
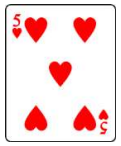
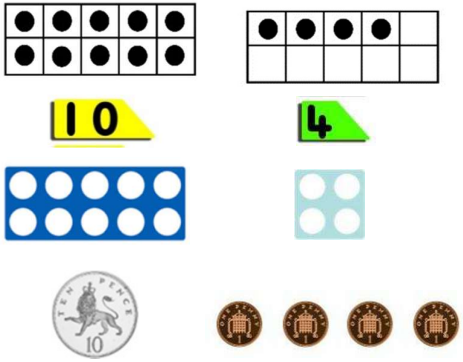
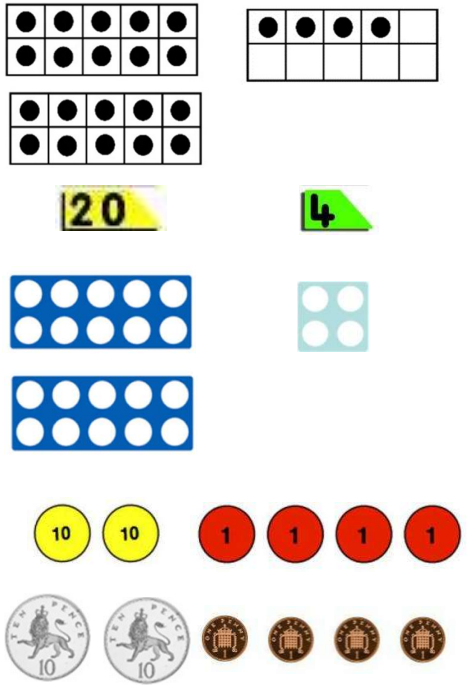
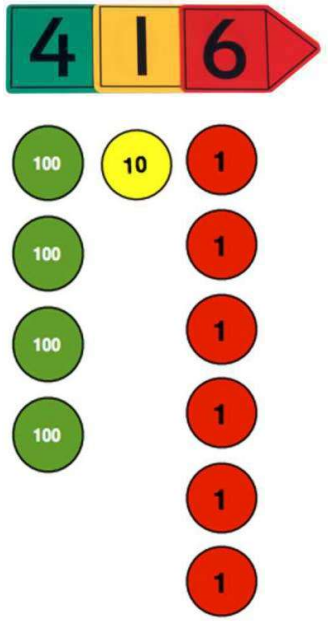
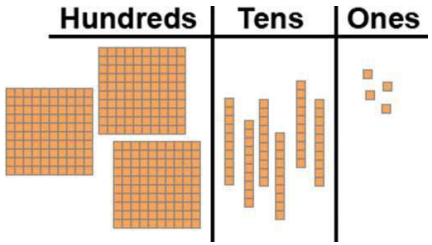
Provide children with a variety of objects to count.



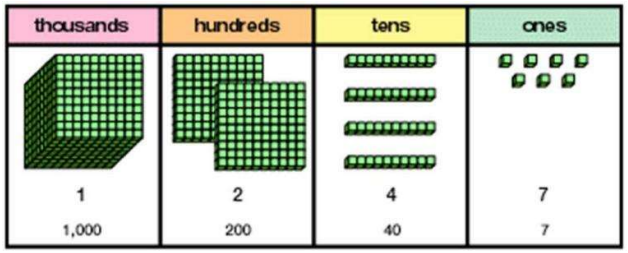
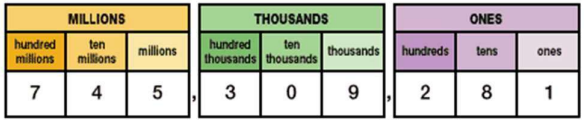
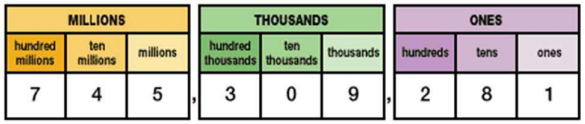




Progression in the teaching of place value

Foundation	Year 1	Year 2	Year 3 onwards
Understanding ten	**Understanding numbers up to 20**	**Understanding numbers up to one hundred**	**Understanding numbers up to one thousand**
A TENS FRAME is a simple maths tool that helps children: • Keep track of counting • See number relationships • Learn addition to 10 • Understand place value Use ***tens frames*** flash cards daily to ensure children recognise amounts. Use empty ***tens frames*** to fill with counters to enable children to understand number relationships. Either fill the ***tens frame*** in pairs or in rows. In rows shows 5 as a benchmark. Children can easily see more than 5 or less.  Setting the counters in pairs, naturally allows the children to see addition concepts. Include other visual images such as dice, cards, dominoes etc.   	'Ten' is the building block of our Base 10 numeration system. Young children can usually 'read' two-digit numbers long before they understand the effect the placement of each digit has on its numerical value. A child might be able to correctly read 62 as sixty-two and 26 as twenty-six, and even know which number is larger, without understanding why the numbers are of differing values. Ten-frames can provide a first step into understanding two-digit numbers simply by the introduction of a second frame. Placing the second frame to the right of the first frame, and later introducing numeral cards, will further assist the development of place-value understanding. 	Continue developing place value through the use of ***tens frames***. 	Continue developing place value through the use of manipulatives.  Use Dienes blocks and place value charts 

Progression in the teaching of place value

Year 4	Year 5	Year 6
Understanding numbers up to ten thousand	**Understanding numbers up to one million including decimals**	**Understanding numbers beyond one million including decimals**
Continue developing place value through the use of manipulatives. • Place value arrow cards • Place value counters • Dienes blocks • Place value charts  	Continue developing place value through the use of manipulatives. • Place value arrow cards • Place value counters (including decimal counters) • Dienes blocks • Place value charts  	Continue developing place value through the use of manipulatives. • Place value arrow cards • Place value counters (including decimals counters) • Dienes blocks • Place value charts 

COUNT IT!

Children need to rehearse counting regularly in order that they MASTER the number system.
Remember to count forwards and backwards orally and in written form.
Count from any number.
Ensure pronunciation of numbers is correct.

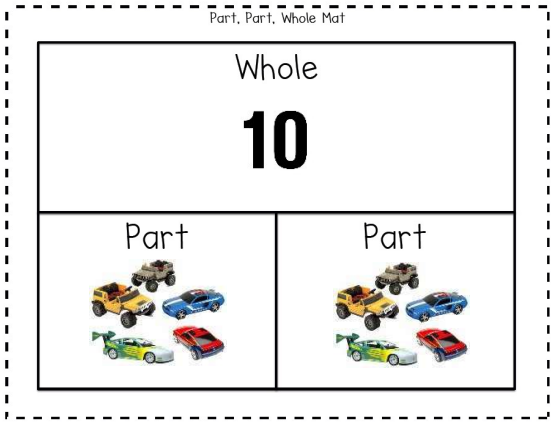
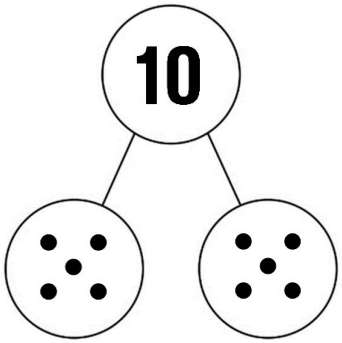
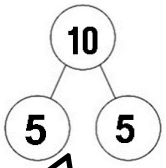
COUNTING IDEAS			
Counting ladder – draw a ladder. Put starter number in the middle. Count forwards up the ladder and backwards down the ladder.	Chanting	Spot my error	Pass the parcel (wrap up numbers, predict next number)
Count in a sequence	Pendulum counting – multilink cube on a string	Speed counting	Mixed sequences eg +10, +1, -2 or missing number sequences
How many beats? Teacher beats wood block. Children count how many times in their head. Record. Each beat could represent an amount.	Action counting	Estimate and count When counting estimated objects, place the objects in rows of 10.	What am I counting in? Teacher counts, children work out rule. Can they then continue the pattern?
Counting stick (attached numbers then remove)	Count to the beat of the drum	Eyes closed counting game -blindfold one child, point to others who stand and say their name. Blindfolded child counts.	Play counting tennis eg count in steps, teacher says 5, children say 10 (mime using racket)
Fizz buzz	Use shapes eg triangles and count number of sides using 3 times table	Count coins in a pot, drop in one by one	Count using constant function on calculator

Lead the counting into calculation so the children see the link, for example, if counting in twos, calculate using repeated addition, multiplication – include inverse operations etc.

DIFFERENT WAYS OF COUNTING				
Single steps	Multiples	Use a rule eg 10 + 1 - 3	Missing numbers	Odds or evens
Fractions	Units of time	Millilitres/litres	Centimetres/metres	Decimals
Grams/kilograms	Negative numbers / Temperature	Percentages	Ordinals	Money

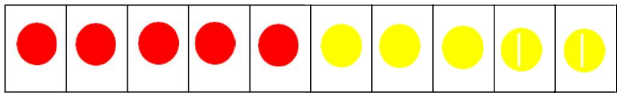
VISUAL AIDS FOR COUNTING				
Number line	100 square	Counting beads	Bead frame	Objects
Number snake	Number tiles	Pocket number line	Real money, large money or magnetic money	Shapes eg count sides
Counting stick	Whiteboards making own visual prompt	Objects (real life)	Base 10 Hundreds, tens, units	Groups of straws
Real life packaging showing arrays eg egg boxes, biscuit packets	Wrapping paper, wall paper etc. to count number of shapes	Number track	Counting bead string	Tape measure or metre stick
Clocks	Measuring jugs	Thermometer	Bead frame/abacus	Calculator
Pictures	Fingers	Interactive whiteboard	Multilink/buttons etc.	Number cards

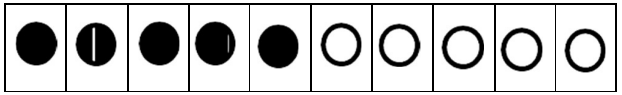
ADD IT!

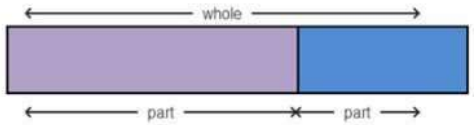
Objective and strategies	Concrete BUILD IT/USE IT!	Pictorial DRAW IT!	Abstract SOLVE IT!
Combine two parts to make a whole model. Part-part-whole model			 Use the part-part whole diagram as shown above to move into the abstract. 5 + 5 = 10 10 = 5 + 5 Use the term ‘number sentence’.

Teach the children that the cubes/counters represent the real-life objects.









Use cubes to add two numbers together as a group or in a bar.



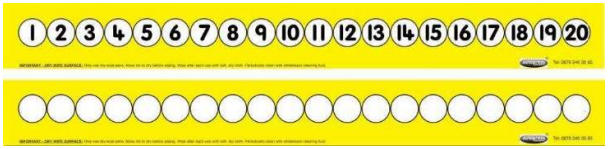
Part + Part = Whole

Whole – Part = Part

Start with the larger number on the bead string then count on 1 by 1 to find the



Use counters on a number track to count on.



7 + 4 = 11

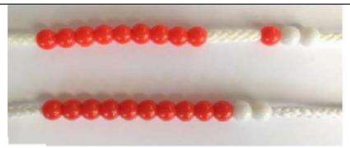


Start at the larger number on the number line and count on in ones or in one jump to find the answer.

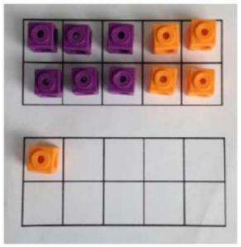
Place the larger number in your head and count on the smaller number to find your answer.

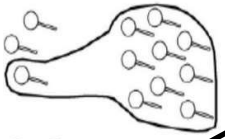
Regrouping to make 10.

Start with the bigger number and use the smaller number to make 10.



6 + 5 = 11



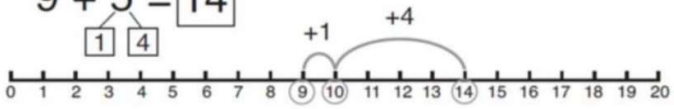


3 + 9 =

Use pictures or a number line. Regroup or partition the smaller number to make 10.

9 + 5 = 14

1 4



If I am at seven, how many more do I need to make 10. How many more do I add on now?

Adding three single digits.

Encourage children to use known facts.

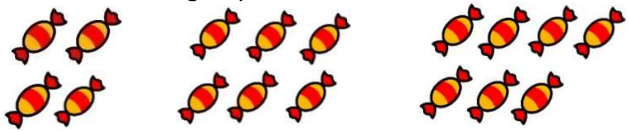
4 + 7 + 6= 17

Put 4 and 6 together to make 10. Add on 7.

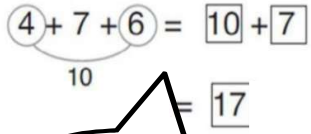


Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.

Add together three groups of objects. Draw a picture to recombine the groups to make 10.

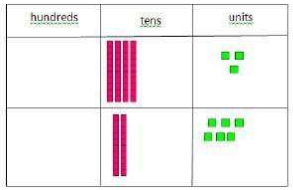


4 + 6 + 7 = 17



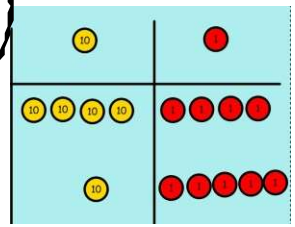
Combine the two numbers that make 10 and then add on the remainder

Column method- no regrouping



$$\begin{array}{r} 43 \\ +\ 26 \\ \hline \end{array}$$

Use Dienes to add tens and ones before moving on to place value counters.



After practically using the base 10 blocks and place value counters, children can draw the Dienes to help them to solve addition calculations.

hundreds	tens	ones
	////	□ □ □
	//	□ □ □ □ □ □
	6	9

After practically using Dienes, children can draw the 'tens' and 'ones'.

Calculations

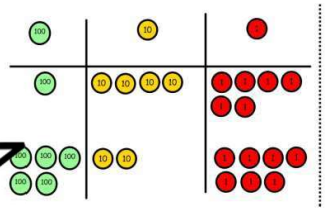
21 + 42 =

$$\begin{array}{r} 21 \\ +\ 42 \\ \hline \end{array}$$

Only select numbers which do not involve regrouping.

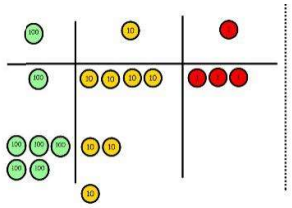
Column method- regrouping

Make both numbers on a place value grid.



$$\begin{array}{r} 146 \\ +\ 527 \\ \hline \end{array}$$

Add up the units and exchange 1o ones for one 10 and so on.



$$\begin{array}{r} 146 \\ +\ 527 \\ \hline \end{array}$$

This can also be done with Dienes to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100.

Continue using place value counters as children begin to work with decimals.

If necessary children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.

hundreds	tens	ones
/	////	□ □ □ □ □ □
/////	//	□ □ □ □ □ □ □ □
6	6	3
	1	

Bar modelling used to support

$$\begin{array}{r} 536 \\ +\ 85 \\ \hline 621 \\ 1\ 1 \end{array}$$

As the children move on, introduce decimals with the same number of decimal places.

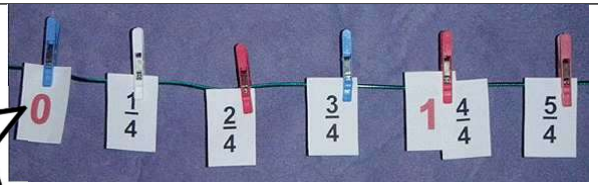
$$\begin{array}{r} 72.8 \\ +\ 54.6 \\ \hline 127.4 \\ 1\ 1 \end{array}$$

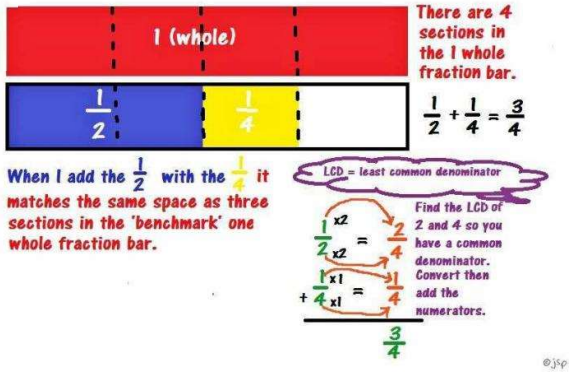
Then move onto decimals with a different number of decimal places.

$$\begin{array}{rrrrrr} & 2 & 7 & . & 3 & 6 & 1 \\ & & 9 & . & 0 & 8 & 0 \\ & 5 & 9 & . & 7 & 7 & 0 \\ + & & 1 & . & 3 & 0 & 0 \\ \hline & 9 & 3 & . & 5 & 1 & 1 \\ & 2 & 1 & & 2 & & \end{array}$$

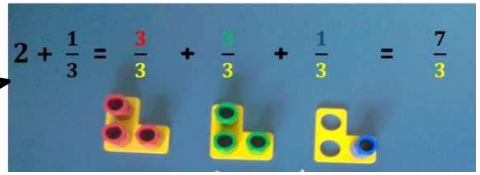
Add fractions

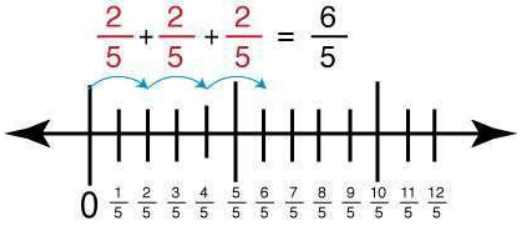
Count in fraction steps using real objects and a number line.



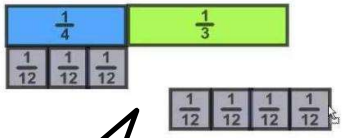


Use Numicon to add fractions.





$$\frac{1}{4} + \frac{1}{3}$$



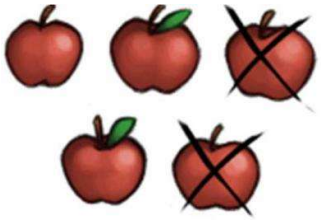
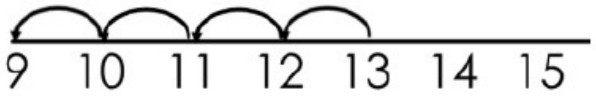
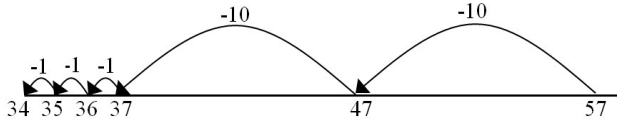
Use the bar model to add fractions.

$$\frac{1}{4} + \frac{1}{3} =$$

$$\frac{1 \times 3}{4 \times 3} + \frac{1 \times 4}{3 \times 4}$$

$$\frac{3}{12} + \frac{4}{12} = \frac{7}{12}$$

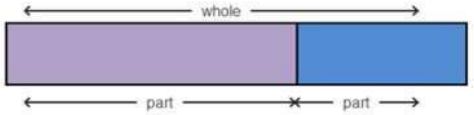
SUBTRACT IT!

Objective and strategies	Concrete BUILD IT/USE IT!	Pictorial DRAW IT!	Abstract SOLVE IT!
Taking away ones	Use real-life physical objects, counters, cubes etc. to show how objects can be taken away.  6 – 2 = 4   	Cross out drawn objects to show what has been taken away.  5 – 2 = 3	4 = 6 – 2 18 - 3= 15 8 – 2 = 6
Counting back Use counters and move them away from the group whilst counting backwards.	Make the larger number in the subtraction calculation. Move the beads along the bead string whilst counting backwards in ones. 13 – 4  	Count back on a number line or number track  Start at the bigger number and count back the smaller number showing the jumps on the number line.  	Put 13 in your head, count back 4. What number are you at? Use your fingers to help. Children will need regular practice counting backwards.

Use cubes to subtract a number from the bar.



Use the bar



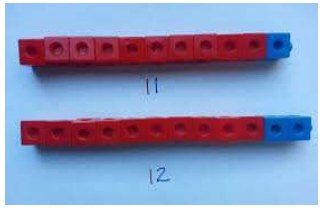
Part + Part = Whole

Whole – Part = Part

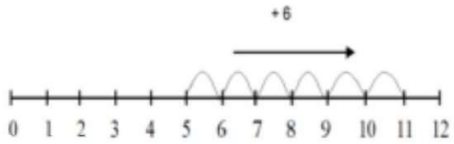
Find the difference

Compare amounts and objects to find the difference.

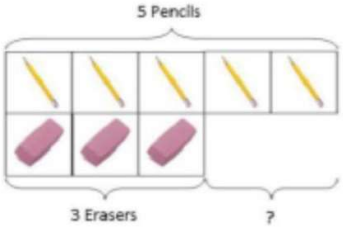
Use cubes to build towers or make bars to find the difference.



Count on to find the difference.

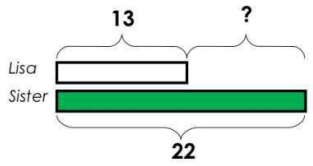


Use basic bar models with items to find the difference.



Comparison Bar Models

Lisa is 13 years old. Her sister is 22 years old. Find the difference in age between them.



Draw bars to find the difference between two numbers.

Hannah has 23 pencils, Helen has 15 pencils. Find the difference between the number of pencils.

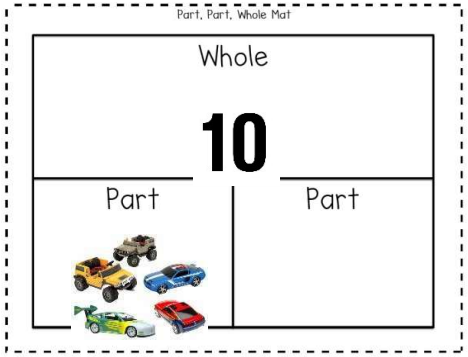
Part-part-whole model

Link to addition- use the part, part whole model

If 10 is the whole and 5 is one of the parts. What is the other part?

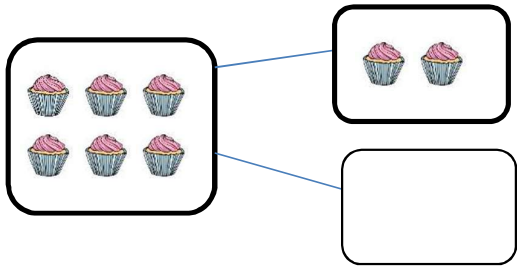
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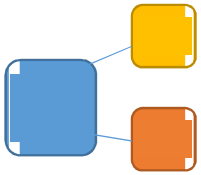
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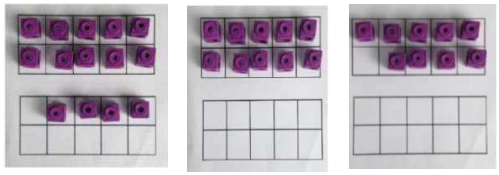
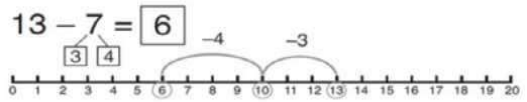
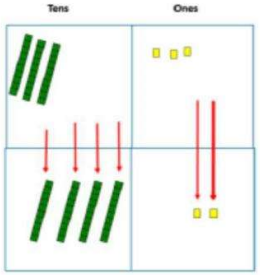
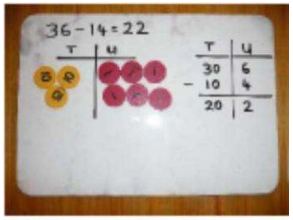
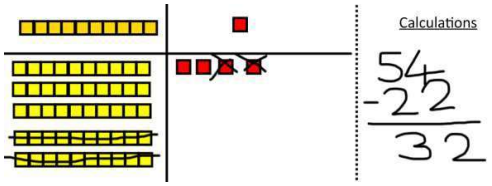
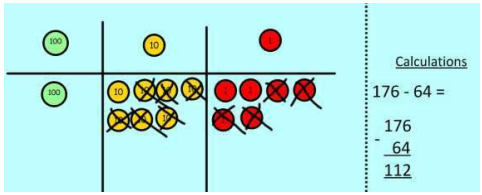
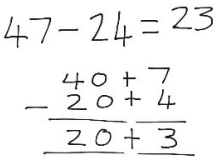
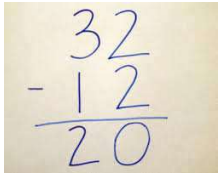


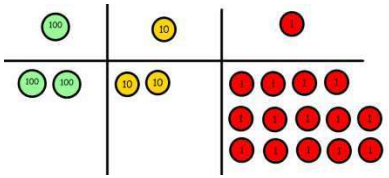
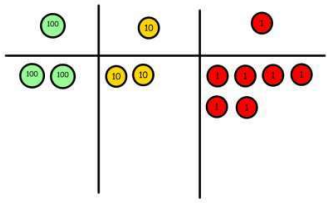
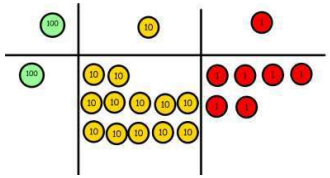
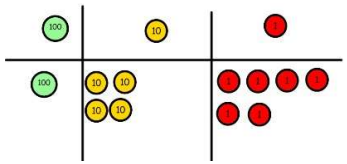
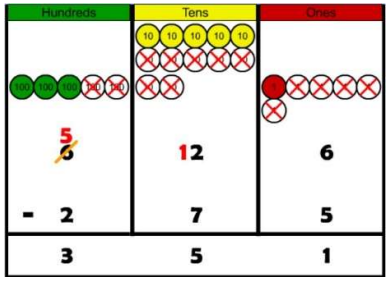
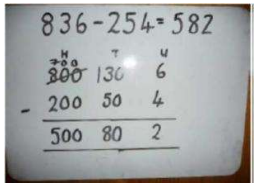
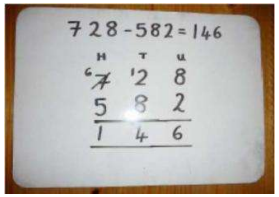
or 10 - ? = 5

Use a pictorial representation of objects to show the part-part-whole model





Make 10	14 – 5 =  Make 14 on the ten frame. Take away the four first to make 10 and then takeaway one more so you have taken away 5. You are left with the answer of 9.	 Start at 13. Take away 3 to reach 10. Then take away the remaining 4 so you have taken away 7 altogether. You have reached your answer.	16 – 8 = How many do we take off to reach the next 10? How many do we have left to take off?
Column method without regrouping	75- 42 = Use Dienes to make the bigger number then take the smaller number away.  Show how you partition numbers to subtract. Again make the larger number first.  	Draw the Dienes or place value counters alongside the written calculation to help to show working.   	This will lead to a clear written column subtraction.  

Column method with regrouping	Make the larger number with the Dienes or place value counters. Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones.  Calculations 234 - 88 Now I can subtract my ones. Now look at the tens, can I take away 8 tens easily? I need to exchange one hundred for ten tens.  Calculations 234 - 88  Calculations 234 - 88 Now I can take away eight tens and complete my subtraction  Calculations 234 - 88 146 Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.	Draw the counters onto a place value grid and show what has been taken away by crossing the counters out as well as clearly showing the exchanges made.  When confident, children can find their own way to record the exchange/regrouping.	 Children can start their formal written method by partitioning the number into clear place value columns.  Moving forward the children use a more compact method. This will lead to an understanding of subtracting any number including decimals. 5 12 1 2 6 3 . 0 - 2 6 . 5 2 3 6 . 5

Subtract fractions

If there are five fifths and I eat one fifth, what fraction of the cake is left?

The cake has been divided into five slices. Each part is one fifth of the whole cake.

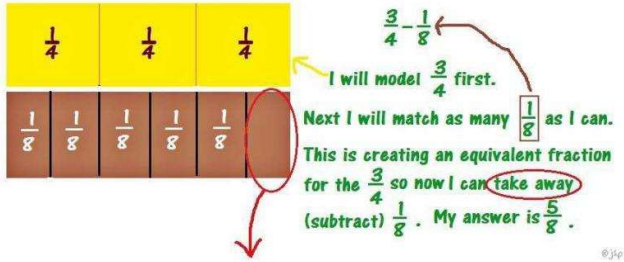


Draw a bar model to represent the cake.



$\frac{5}{5} - \frac{1}{5} = \frac{4}{5}$

Progress onto subtracting fractions with different denomiators.

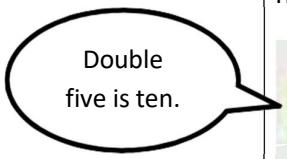
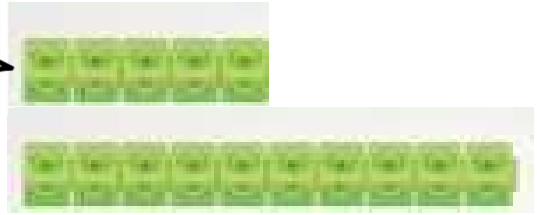
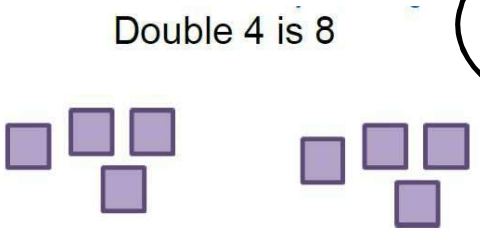
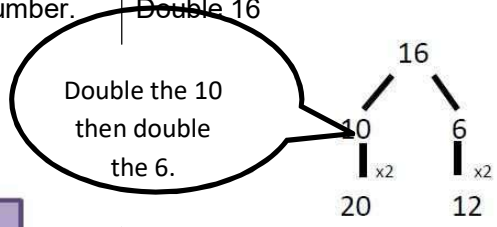
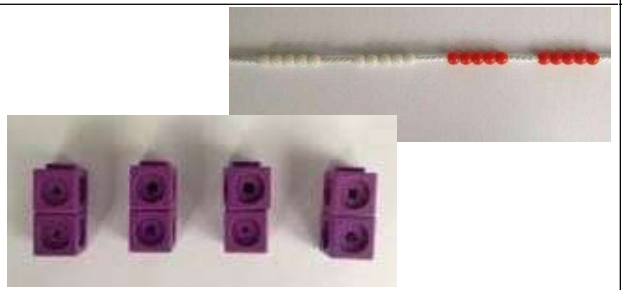
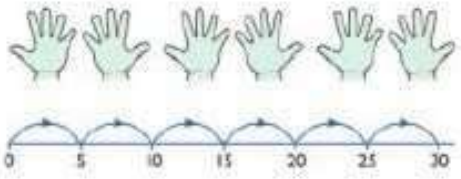


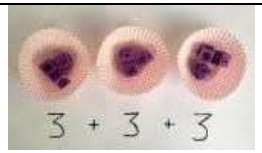
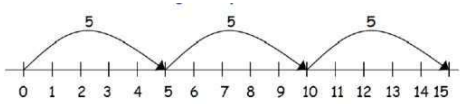
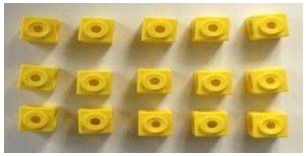
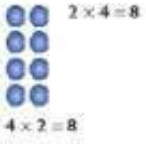
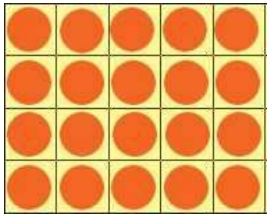
$\frac{3}{4} - \frac{1}{8} =$

$\frac{3x2}{4x2} - \frac{1}{8}$

$\frac{6}{8} - \frac{1}{8} = \frac{5}{8}$

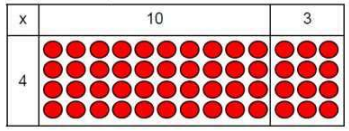
MULTIPLY IT!

Objective and Strategies	Concrete BUILD IT/USE IT!	Pictorial DRAW IT!	Abstract SOLVE IT!
Doubling 	Use practical activities to show how to double a number.  5 x 2 = 10	Draw pictures to show how to double a number. 	Double 16  Partition a number and then double each part before recombining it back together. Count in multiples of a number aloud.
Counting in multiples	 Count in multiples supported by concrete objects in equal groups.	 Use a number line or pictures to continue support in counting in multiples.	Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25, 30

Repeated addition	   Use different objects to add equal groups.	There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?  2 add 2 add 2 equals 6  5 + 5 + 5 = 15	Write addition sentences to describe objects and pictures.  2 + 2 + 2 + 2 + 2 = 10
Arrays- showing commutative multiplication	Create arrays using counters/ cubes to show multiplication sentences.  	Draw arrays in different rotations to find **commutative** multiplication sentences.    Link arrays to area of rectangles.	Use an array to write multiplication sentences and reinforce repeated addition.  5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 5 x 3 = 15 3 x 5 = 15

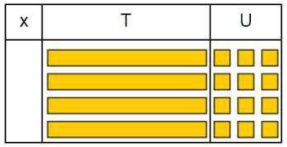
Grid Method

Show the link with arrays to first introduce the grid method.



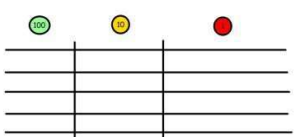
4 rows of 10 4 rows of 3

Use Dienes to move towards a more compact method.



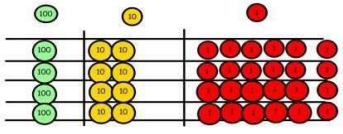
4 rows of 13

Use place value counters to show finding groups of a number eg. multiplying by 4 so we need 4 rows.



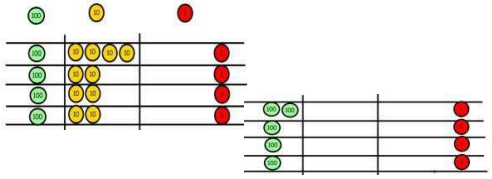
Calculations
4 x 126

Fill each row with 126.



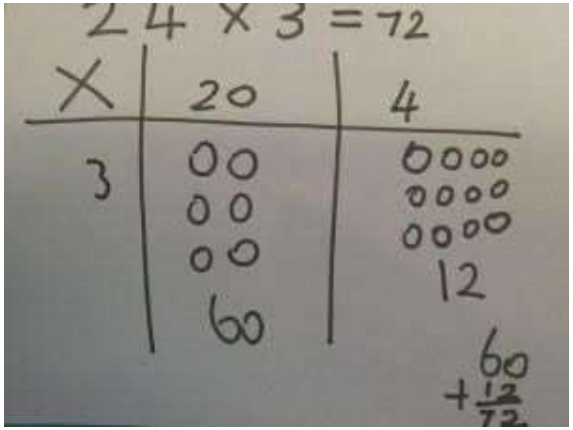
Calculations
4 x 126

Add up each column, starting with the ones making any exchanges needed.



Children can represent the work they have done with place value counters in a way that they understand.

They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below.



Start with multiplying by one digit numbers and showing the clear addition alongside the grid.

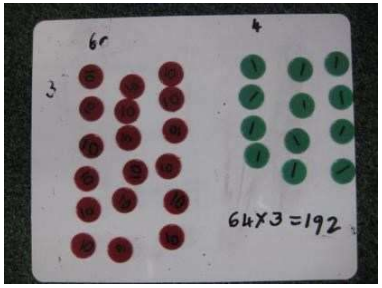
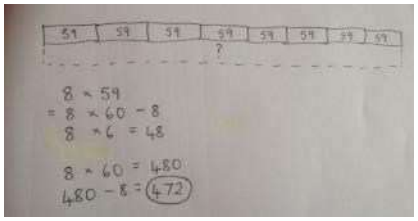
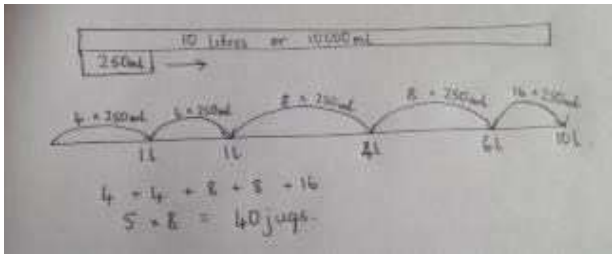
×	30	5
7	210	35

210 + 35 = 245

Moving forward, multiply by a 2 digit number showing the different rows within the grid method.

	10	8
10	100	80
3	30	24

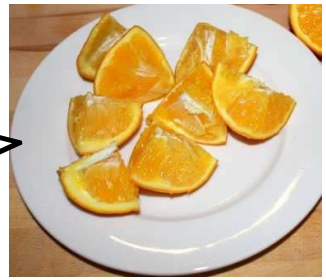
X	1000	300	40	2
10	10000	3000	400	20
8	8000	2400	320	16

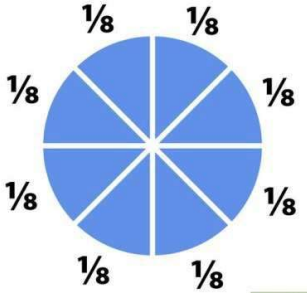
Column multiplication	Children can continue to be supported by place value counters at the stage of multiplication.  It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.	Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.   	**Start with long expanded multiplication,** reminding the children about lining up their numbers clearly in columns. If it helps, children can write out what they are solving next to their answer. 32 x 24 8 (4 x 2) 120 (4 x 30) 40 (20 x 2) 600 (20 x 30) 768 74 x 63 12 210 240 + 4200 4662 This moves to the more compact method. 327 x 53 981 ← 327 x 3 1635 0 ← 327 x 50 17331

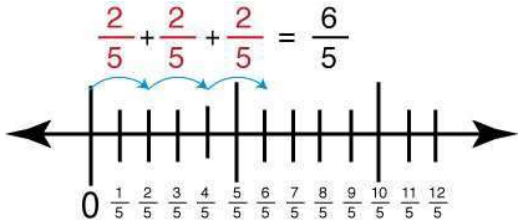
Multiplication of fractions

What would three lots of one eights be?

Count in fraction steps (repeated addition)







Three times one eighth.



$^{10}/_{8} = 1\ ^{2}/_{8}$
$^{9}/_{8} = 1\ ^{1}/_{8}$
$^{8}/_{8} = 1$
$^{7}/_{8}$
$^{6}/_{8}$
$^{5}/_{8}$
$^{4}/_{8} = {}^{1}/_{2}$
$^{3}/_{8}$
$^{2}/_{8} = {}^{1}/_{4}$
$^{1}/_{8}$

$3 \times {}^{1}/_{8} =$

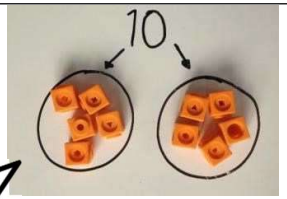
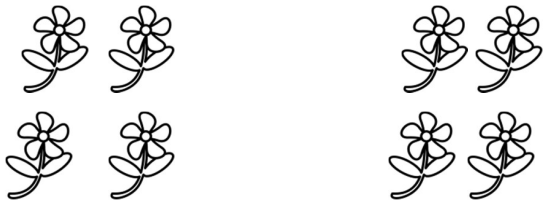
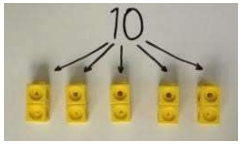
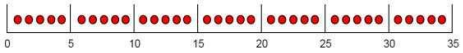
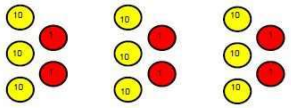
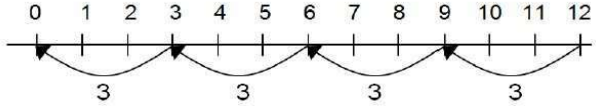
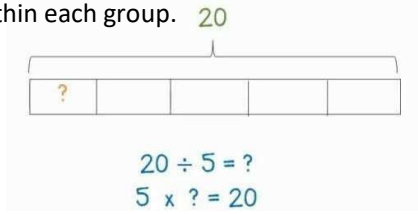
$\frac{3}{1} \times \frac{1}{8} = \frac{3}{8}$

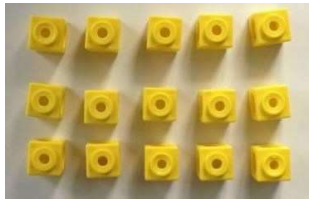
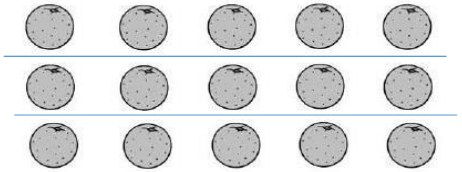
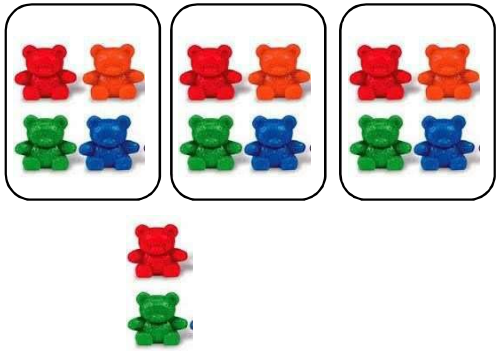
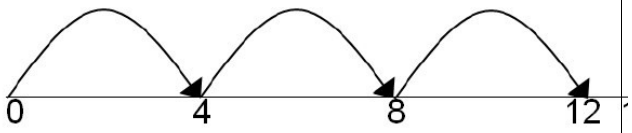
Multiply numerators together then multiply the denominators

.

DIVIDE IT!

It is important to make links with fractions

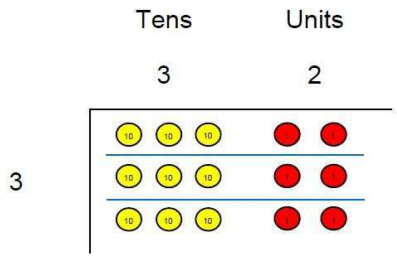
Objective and strategies	Concrete BUILD IT/USE IT!	Pictorial DRAW IT!	Abstract SOLVE IT!
Sharing objects into groups If we are dividing by two we are finding one half.	 I have 10 cubes; can you share them equally into 2 groups?	Children use pictures or shapes to share quantities.  8 ÷ 2 = 4	One half of 14 is 7 ½ of 14 = 7 14 ÷ 2 = 7 Share 9 cakes between three people. 9 ÷ 3 = 3
Division as grouping If we are dividing by three we are finding one third.	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.   96 ÷ 3 = 32 	Use a number line to show jumps in groups. The number of jumps equals the number of groups.  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. 	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?

Division within arrays	 Link division to multiplication by creating an array and thinking about the number sentences that can be created. Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15	 Draw an array and use lines to split the array into groups to make multiplication and division sentences.	Find the inverse of multiplication and division sentences by creating four linking number sentences. 7 x 4 = 28 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7
Division with a remainder	14 ÷ 3 = Divide objects between groups and see how much is left over 	Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.  Draw dots and group them to divide an amount and clearly show a remainder. 	Complete written divisions and show the remainder using r. 

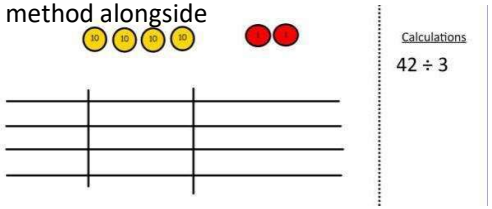
Short division

Find one third of 96.

96 ÷ 3 =

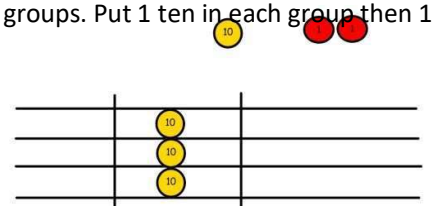


Use place value counters to divide using the bus stop method alongside

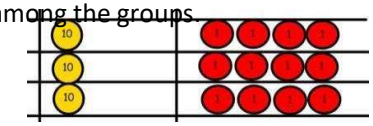


42 ÷ 3=

Start with the biggest place value; share 40 into three groups. Put 1 ten in each group then 1 ten left over.

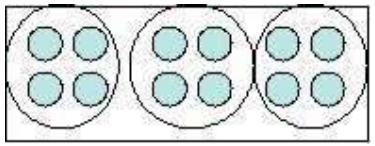


Exchange this ten for ten ones and then share the ones equally among the groups.



Look how much is in 1 group so the answer is 14.

Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.



Encourage them to move towards counting in multiples to divide more efficiently.

Begin with divisions that divide equally with no remainder.

$$\begin{array}{r} 218 \\ 4\overline{)872} \\ 3 \end{array}$$

Move onto divisions with a remainder.

$$\begin{array}{r} 86\ r\ 2 \\ 5\overline{)432} \\ 3 \end{array}$$

Finally move into decimal places to divide the total accurately.

$$\begin{array}{r} 14.6 \\ 35\overline{)511.0} \\ 16\quad 21 \end{array}$$

Long division

(chunking method)

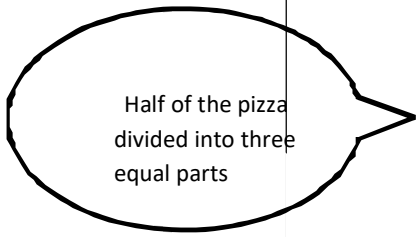
Divide by single digit then progress to dividing by two digit number

```
      86 r2
   ------
5 | 432
    200      (40 x 5)
   ------
    232
    200      (40 x 5)
   ------
     32
     30      ((6 x 5 )
   ------
      2
```

```
13 | 1 9 3 7
   - 1 3 0 0     13 x 100
   -------
     6 3 7
   -   5 2 0     13 x 40
   -------
     1 1 7
   -   1 1 7     13 x 9
   -------
         0
```

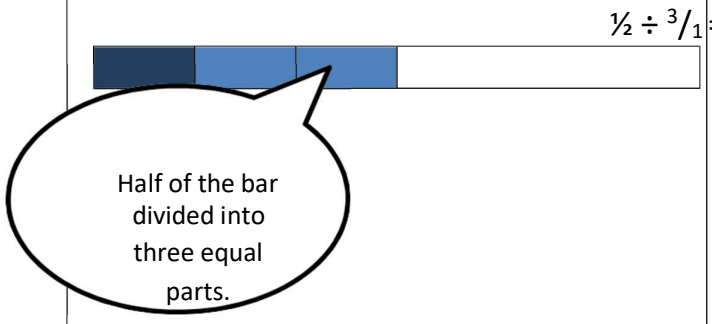
Division of fractions

½ ÷ 3 =



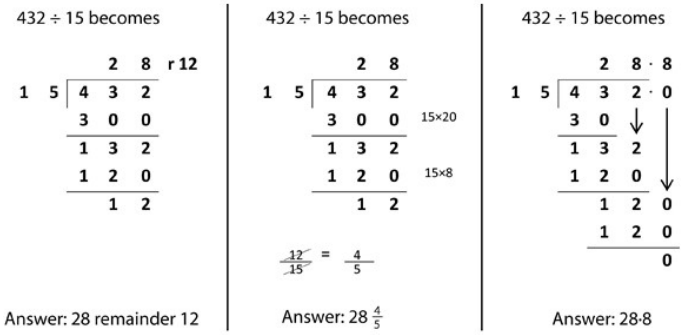


½ ÷ 3 =



½ ÷ 3 =

½ x 1/3 = 1/6

Y5&6 age related strategies Divide numbers up to 4 digits by a two digit whole number using long division(interpreting remainders appropriately: Integer ÷ U (eg 123 ÷7) Decimal÷ U (eg 27.6 ÷ 8) HTU ÷TU	**Long division bus shelter methods ***  432 ÷ 15 becomes 2 8 r 12 1 5 | 4 3 2 3 0 0 1 3 2 1 2 0 1 2 Answer: 28 remainder 12 432 ÷ 15 becomes 2 8 1 5 | 4 3 2 3 0 0 15×20 1 3 2 1 2 0 15×8 1 2 $\frac{12}{15} = \frac{4}{5}$ Answer: $28\frac{4}{5}$ 432 ÷ 15 becomes 2 8 · 8 1 5 | 4 3 2 · 0 3 0 1 3 2 1 2 0 1 2 0 1 2 0 0 Answer: 28·8 **Long division is for calculations where the divisor is 13 or greater. Here we need to record the intermediate steps.**
Y5&6 age related strategies Divide numbers up to 4 digits by a two digit number using short division (interpreting remainders appropriately): Integer ÷ U (eg 123 ÷7) Decimal÷ U (eg 27.6 ÷ 8) HTU ÷TU	**Short division methods** This method should be introduced when pupils have a firm understanding of all previous division learning Pupils can then be taught to show remainders as a decimal 31.50 4) 126.^{2}00

Long division * TALK MATHS

To calculate 748 divided by 51,

1. First, set the sum out as shown:

$$51\overline{)748}$$

2. We work out 74 divided by 51, and write the answer (1) above the 4.
$1 \times 51 = 51$, so we write this underneath 74.

Subtract 51 from 74 to get the remainder (23).

$$\begin{array}{r} 1 \\ 51\overline{)748} \\ -51 \\ \hline 23 \end{array}$$

3. We now bring down the next digit (8) and write it on the end of the 23. This is the same as writing the remainder at the top:

$$\begin{array}{r} 1 \\ 51\overline{)748} \\ -51 \\ \hline 238 \end{array}$$

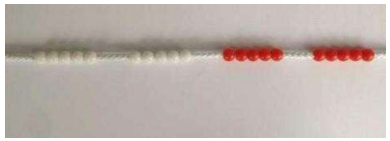
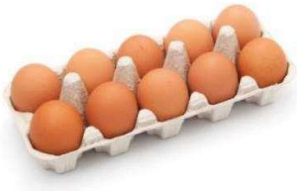
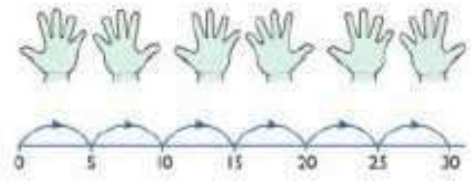
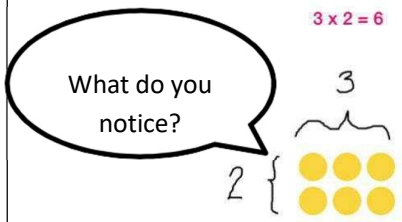
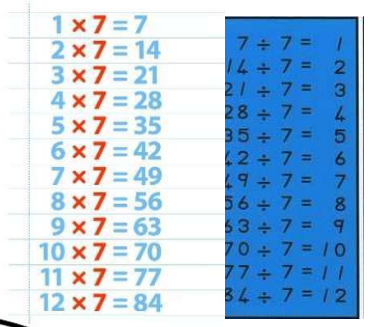
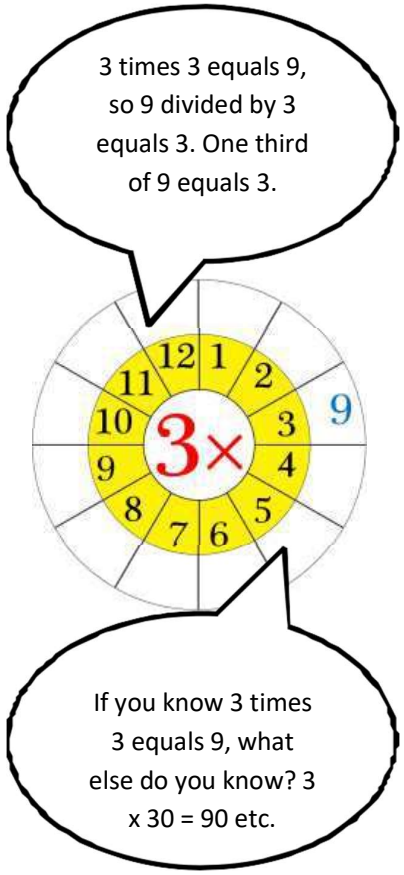
We now work out 238 divided by 51, and write the answer (4) above the 8. You use estimation skills here: 51 is roughly 50 and $4 \times 50 = 200$. You can work out $51 \times 4 = 204$ separately.

4. We write 204 underneath the 238 and subtract to find the remainder. There are no more digits to bring down, so we have our answer:

$$\begin{array}{r} 14 \\ 51\overline{)748} \\ -51 \\ \hline 238 \\ -204 \\ \hline 34 \end{array}$$

5 So the answer is **14 remainder 34.**

Quality first times tables teaching

Children will be taught the concept of multiplication using practical resources.	Children will progress on to using number lines or pictures.	Children will count in multiple steps.	Children will recite times tables by rote. Links will be made with 'grouping' and division whilst times tables are being taught.
Concrete **BUILD IT! / USE IT!**	**Pictorial** **DRAW IT!**	**Abstract stage 1** **SOLVE IT!**	**Abstract stage 2** **PRACTISE IT!**
Count in multiples supported by concrete objects in equal groups.   Use real-life arrays or build arrays.  	 Use a number line or pictures to continue support in counting in multiples.  What do you notice? 3 x 2 = 6 3 2	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25, 30 Record multiplication number sentences.  Link multiplication and division facts.	Recite times tables by rote orally.  3 times 3 equals 9, so 9 divided by 3 equals 3. One third of 9 equals 3. If you know 3 times 3 equals 9, what else do you know? 3 x 30 = 90 etc.

Key Instant Recall Facts

To help develop children's fluency in mathematics, each year group, per half term, has a specific mathematical fact to focus on.
These will be our - Key Instant Recall Facts.
All these facts link to each year groups NC expectations.

These facts can be used in: early morning work, maths lesson starters, your classes maths half term homework focus so their learning log project or skills to cover through a maths game, a homework hub focus, recall when children are lining up, in PE.

They are intended to be challenging and they aren't stand-alone maths tasks, children will need to be taught the necessary maths skills and strategies in lessons.

KIRF's

	Y1	Y2	Y3	Y4	Y5	Y6
Aut 1		Number bonds to 20	Number bonds for each number to 20	Number bonds to 100	Decimal number bonds to 1 & 10	Inverse facts for all x tables to 12x12
Aut 2	Number bonds to 6	2 x table	3 x table	6 x table	All x tables to 12x12	Common factors
Spr 1	Doubles/halves to 10	Doubles/halves to 20	Durations of time	9 & 11 x table	Metric conversions	Convert between FDP
Spr 2	Number bonds to 10	10 x table	4 x table	Decimal equivalents of fractions	Prime numbers up to 20	Prime numbers up to 50
Sum 1	o'clock & half past	Time to 5 minutes	Time to 1 minute	7 x table	Square numbers and roots	
Sum 2	Number bonds for each number to 10	5 x table	8 x table	X & ÷ by 10 & 100	Factor pairs	

REASON IT!

There is a huge emphasis on reasoning in math's lessons. Children need opportunities to justify and explain their knowledge.

We use: Rising stars problem solving, Headstart mastery activities and Headstart word problems alongside resources from - White Rose Hub, Abacus, TES

Odd one out	Would you rather have … ?	Find the mistake.	What is the same and what is different?
True or false?	Here is the answer, explain how it was worked out.	Always, sometimes, never	Give me a silly answer to this problem. What makes it silly?
Tell me about this…	Prove/disprove this statement.	Convince me that …	What if….?
Give me a hard and easy example of a calculation you could do with these numbers. Give me a hard and easy example of a five-digit calculation. Give me a hard and easy example of a question you could ask about this graph/pie chart etc.	What do you notice?	How are these linked?	If you know this fact, what else do you know? Eg. If you know: 4 + 6 = 10 You know: 40 + 60 = 100 100 – 40 = 60 The sum of 6 and 4 is 10. 4000 + 6000 = 10,000 100,000 – 60,000 = 40,000 If it is 6 o'clock now, in 4 hours it will be 10 o'clock.