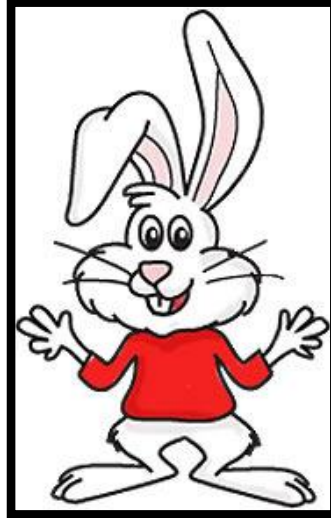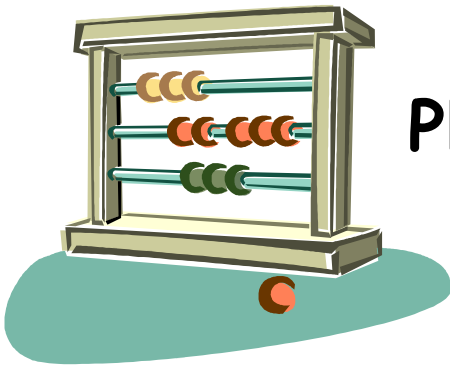# A Parent's Guide To

Year 2 Models and Calculation Strategies:
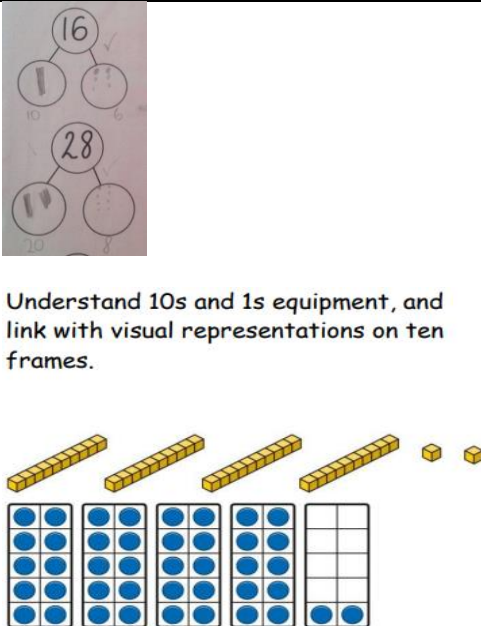# Place Value, Addition, Subtraction, Multiplication and Division

Key Stage 1 Maths

The principal focus of mathematics in Key Stage 1 is to help pupils to develop confidence and mental fluency with whole numbers, counting and place value. This involves working with numerals, words and the four operations, including with practical resources (e.g. concrete objects and measuring tools).
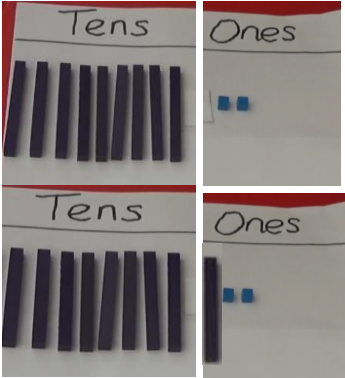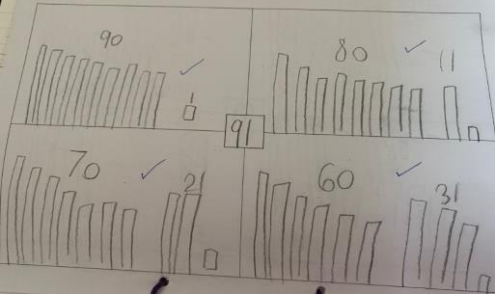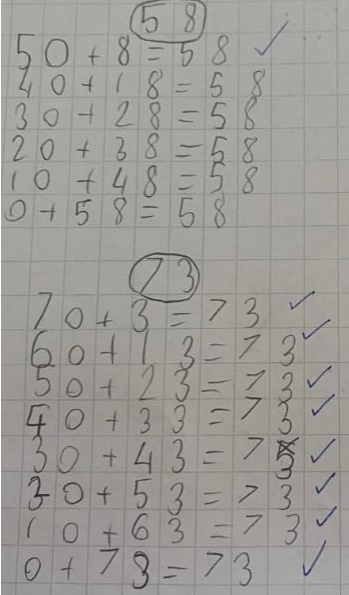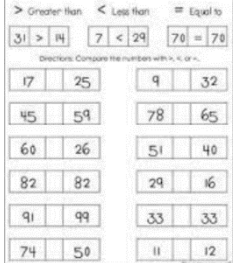
Pupils will develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. They will use a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money.

By the end of Year 2, pupils need to know the number bonds to 20 and be precise in using and understanding place value.

This booklet shows the progression of models and images that we will be using in school to teach each operation across Year 2. Encourage your child to use concrete objects first, then record pictorially before moving onto more abstract forms of recording.
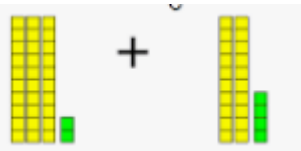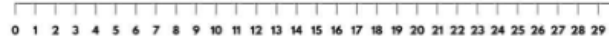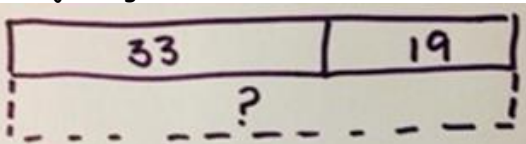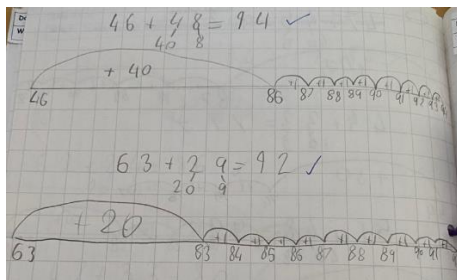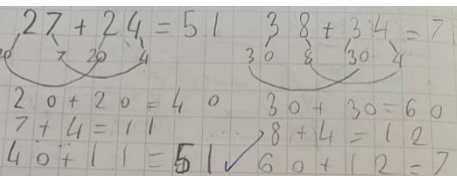
Number and Place Value

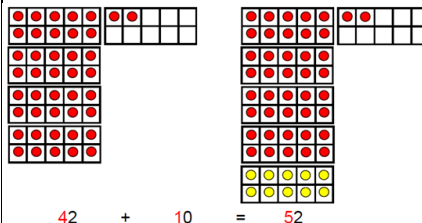| Strategy/ Curriculum Statement	Concrete	Pictorial	Abstract	Vocabulary
Recognise the place value of each digit in a two-digit number (tens, ones). Partition a two-digit number into tens and ones to demonstrate an understanding of place value.	Representing how many tens and ones are in a number using concrete resources such as dienes, 10s and 1s counters, 10p and 1ps, bead strings and Numicon.	Understand 10s and 1s equipment, and link with visual representations on ten frames.	1 6 3 5 | | | | 10 6 30 5 To know how many tens and ones are in a number without the use of objects and visual representations.	tens, ones, partition, partitioning, dienes, place value

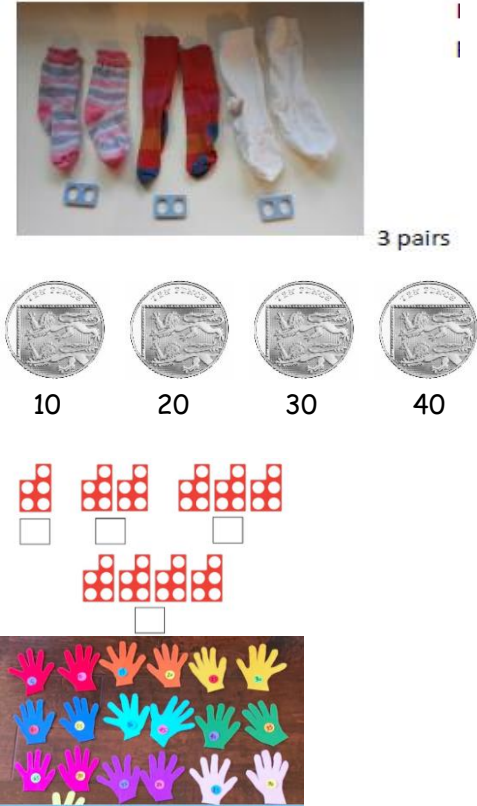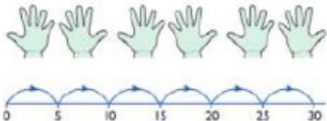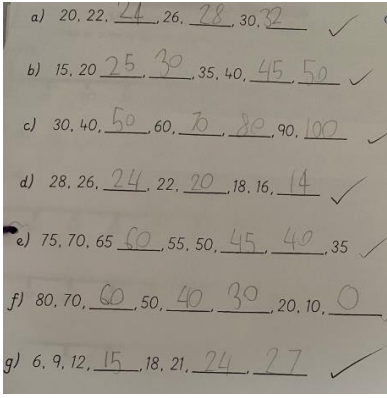|				
Partition any two-digit number into different combinations of tens and ones	Making 92 using different combinations of tens and ones.	\n\nPictorial representations of tens and ones and understanding of exchanging tens.	\n\nPartitioning numbers mentally and recording as number sentences.	tens, ones, partitioning, dienes, place value
Compare and order numbers from 0 up to 100; use > < and = signs	Ordering and comparing numbers using practical resources.	Which numbers are covered?\nGive me a number between ……. and …….\nHow do you know?\n\n\n\nOrder consecutive numbers to 100: Use number line for support.\n\n Use greater than/less than symbols to compare numbers.	Order random numbers to 100\nHow do we know which is smallest/biggest?\n\n46 63 72 85 100\n\nUse greater than/less than symbols to compare numbers and explain why they are different.	bigger than, greater than, smaller than, less than, equal to

Addition and Subtraction

Strategy/ Curriculum Statement	Concrete	Pictorial	Abstract	Vocabulary
Recall number bonds to and within 10 and use these to reason with and calculate bonds to and within 20, recognising other associated additive relationships	0+10=10 4+6=10 1+9=10 5+5=10 2+8=10 6+4=10 3+7=10 7+3=10 5+5 6+4 7+3 8+2 9+1 Using concrete resources such as tens frames, Numicon, multilink etc. to work out and show number bonds to 10.	How many more to make 10? ____ Using pictorial representations to help calculate number bonds to 10. Linking number bonds to 10 and 20. 4 + 6 = 10 4 + 16 = 20	In year 2 children are expected to be able to **mentally** recall number bonds to and within 10, as well as understand associated facts. ☐ + 3 = 10 10 | 10 / 2 | 7 1 + ☐ = 10 6 + 4 = 10 10 – 4 = 6 4 + 6 = 10 10 – 6 = 4 I "If I know that 8 + 2 = 10, then I also know that 8 + ? = 20". "If I know that 10 – 6 = 4, then I also know that 20 – 6 = ?"	number bonds, pairs, add, addition, take away, subtraction, commutative, inverse
Recall and use addition and subtraction facts to 20 fluently,	Using concrete resources to represent and calculate number bonds to 20. 20 = 1+19 2+18	Using or drawing pictorial representations to support calculations. 20 / 3	In year 2 children are expected to be able to **mentally** recall number bonds to 20, as well as understand associated facts. 2 + 18 = 20 18 + 2 = 20 20 – 2 = 18 20 – 18 = 2	add, addition, subtract, subtraction, equals, number bonds,

and derive and use related facts up to 100.			"If I know that 6 + 4 = 10, then I know that 6 + 14 = 20 and 60 + 40 = 100." If 8 + 6 = 14 Then 80 + 60 must be 140!	pairs, recall, commutative, inverse
Add 2 two-digit numbers.	Tens frames, dienes and Numicon are useful resources to build on conceptual understanding of place value and adding on tens. 42 + 10 = 52 Then move on to using dienes to add on tens and ones. Using dienes practically. E.g. 32 + 24 = 	 A hundred square is a useful tool to enable children to add or subtract tens from any number. It also reinforces the idea that the tens number increases or decreases, but the ones digit stays the same. e.g. 36 + 10 = 46 64 – 20 = 44 Children can also use a structured number line Or jottings such as a bar model. 	Solving addition calculations mentally or using written methods such as: unstructured number lines or the 'smile' partitioning method where you add the tens first, then the ones, then recombine back together. 	Add, addition, sum, total, equals, two-digit, more, partition

	36 + 48 Children will need to bridge 10 by exchanging ten ones for a ten rod.			
Subtract a two-digit number from a two-digit number.	Using dienes practically. Start with subtracting just tens first. E.g. 65 – 30 = 65 - 30 = 35 Then move on to subtracting tens and ones. E.g. 56 – 24 =	Using a structured number line. E.g. 84 – 26 = Subtract the tens, then the ones.	Solving subtraction calculations mentally or using a written method such as an unstructured number line. E.g. 84 – 26 =	Subtract, take away, equals, total, less, partition

Multiplication and Division

Strategy/ Curriculum Statement	Concrete	Pictorial	Abstract	Vocabulary
Counting in multiples Children to count forwards and backwards in multiples of 2s, 5s and 10s.	 3 pairs 10 20 30 40 	Using a number line or picture representations of objects. 	Mentally count in multiples of a number. Write sequences with multiples of numbers and work out missing numbers in sequences both forwards and backwards. a) 20, 22, _24_, 26, _28_, 30, _32_ b) 15, 20 _25_, _30_, 35, 40, _45_, _50_ c) 30, 40, _50_, 60, _70_, _80_, 90, _100_ d) 28, 26, _24_, 22, _20_, 18, 16, _14_ e) 75, 70, 65 _60_, 55, 50, _45_, _40_, 35 f) 80, 70, _60_, 50, _40_, _30_, 20, 10, _0_ g) 6, 9, 12, _15_, 18, 21, _24_, _27_ If I count in 2's will I get to the number 66? What about 71? If I count in 10s will I get to the number 39? Why not?	Groups of, lots of, times, sequences

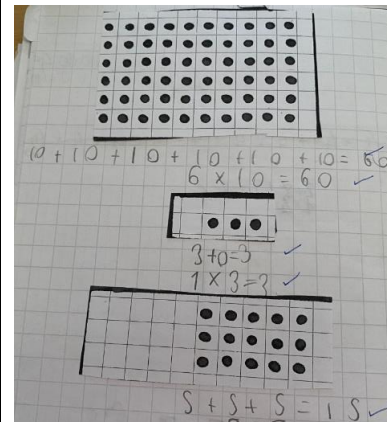| Repeated Addition		Recognising the relationship between repeated addition and multiplication. Drawing representations. 	Writing repeated addition number sentences to describe objects and pictures. 2 + 2 + 2 + 2 + 2 + 2 = 12 Writing multiplication number sentences. 6 x 2 = 12	repeated addition, times, lots of, groups of

Content within image 1:

2 + 2 + 2 + 2 = 8

5 + 5 + 5 = 15

10 + 10 + 10 + 10 = 40

5+5+5=15

3+3+3=9

3 + 3 + 3

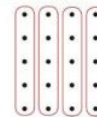| Arrays using commutative multiplication | Real life objects and examples of arrays.

1 x 5
2 x 5
3 x 5
4 x 5 | Using counters to visualise commutativity.
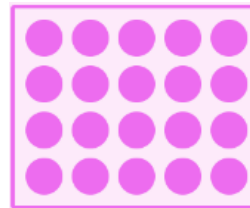
This is 2 groups of 6 and also 6 groups of 2.

Drawing arrays to solve multiplications and demonstrate commutativity.
Use arrays to visualise commutativity.

5 x 4 = 20   so   4 x 5 = 20 | Using knowledge of arrays and commutativity to solve multiplications mentally.

If I know that 2 x 10 = 20, then I know that 10 x 2 = 20. | Groups of, lots of, times, commutative, array, column, row, multiplication |

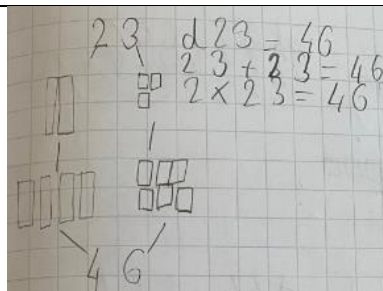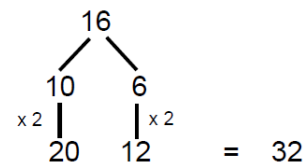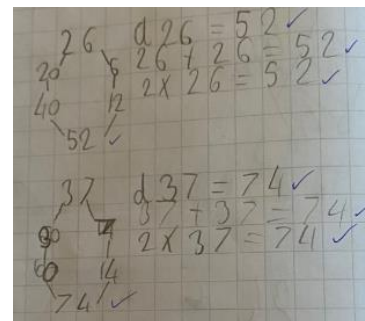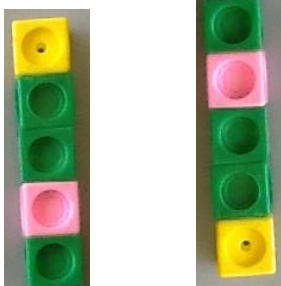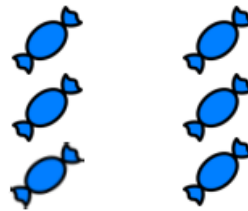| Doubles				doubling, times, lots of, add
Children should develop their mental recall for doubles and relate this to the 2x table.	Double 16 = Double 10 + Double 6 Using practical resources to double numbers. To double tens first and then ones.	Drawing representations of these resources i.e. dienes to double numbers.	10 + 10 = 20 6 + 6 = 12 20 + 12 = 22	

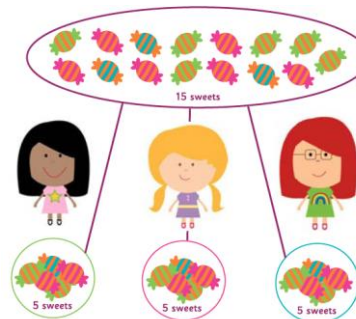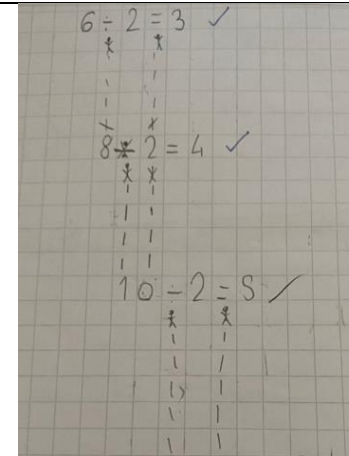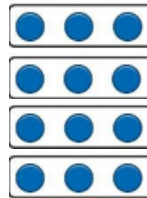| **Sharing** | Take the amount of objects and share them equally between how many people there are. One to each person at a time. Keep going until all of the objects have been shared. | $6\div2=3$ $15 \div 3 = 5$ Represent the objects shared into equal parts using a bar model. 20 shared into 5 groups = 4 | | Share, sharing, equal, groups, parts, people, each, division |

10 multilink shared between 2 people is 5 each.

If you share 14 smarties between 2 people, each person would get 7 smarties each.
$14 \div 2 = 7$

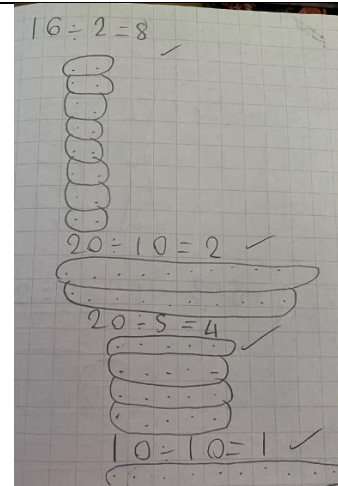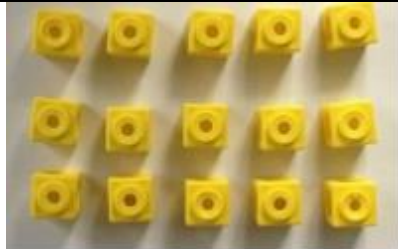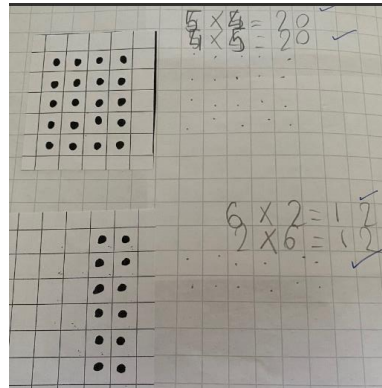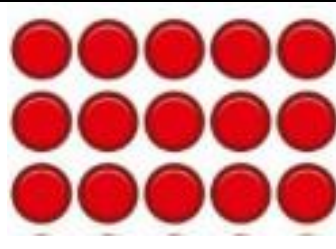| Grouping | Understand how to make equal groups from a whole. 8 divided into 4 equal groups. There are 2 in each group. | 12 ÷ 3 = 4 We encourage the children to move to the next row to make it easier for them to group and count. Just like an array! 1, 2, 3 group it 4, 5, 6 group it 7, 8, 9 group it 10, 11, 12 group it 12 divided into groups of 3 = 4 groups. | | Share, equal, groups, array, , divided by, division |

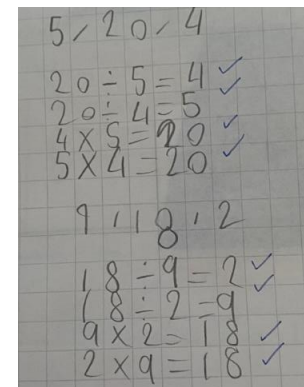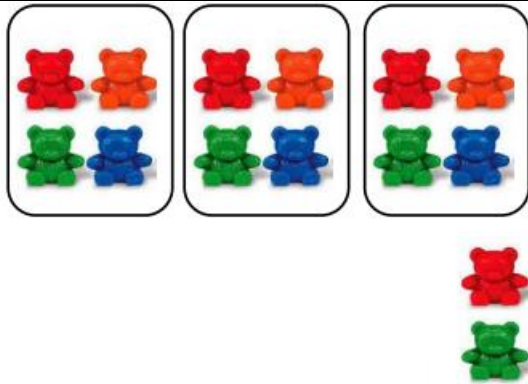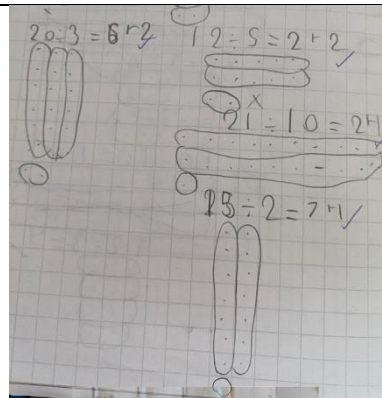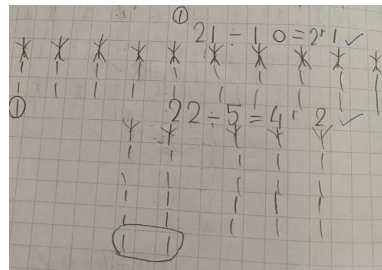| Arrays | $15 \div 5 =$
 15 multilink have been arranged into rows of 5. There are 3 rows so the answer is 3. | | Inverse. Children to understand that division is the inverse of multiplication. They can write the four number sentences to complete a number family.

 $4 \times 5 = 20$
 $5 \times 4 = 20$
 $20 \div 5 = 4$
 $20 \div 4 = 5$
  | groups, columns, rows, array, divided by, division, inverse, number family |

Remainders	 14 ÷ 3 = 14 ÷ 3 = 4 r2 Use objects to represent a number and share them between groups to see how many are left over.	 Sharing out to find a remainder. 	To represent the remainder using r. Children to be able to use their knowledge of counting in 2s, 5s and 10s to divide mentally, understanding that the remainder is whatever is left that you cannot count in. 11 ÷ 2= 5 r1 2, 4, 6, 8, 10 I have counted in 2s five times and there is 1 left over.	Share, equally, each, remainder, remaining, left, divided by