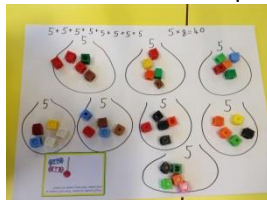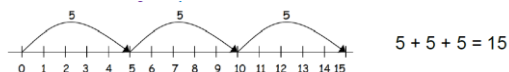| Multiplication	Vocabulary	Multiply, times, count in multiple steps, double, how many times? Once, twice (scaling) repeated addition, array, lots of, groups of equal amounts, product, square numbers, cubed numbers, common multiples, common factors, prime numbers, BODMAS	
Objective and Strategies	**Concrete**	**Pictorial**	**Abstract**
Introduction of the = sign **develop an understanding of 'equals'.**	Introduce the = sign and start with examples like 5 = 5 using different objects. Use a balance to illustrate.	Use the = sign in different places in pictorial problems ~sometimes have the total box at the beginning. Draw how many more you need to make the sets equal…	Use the = sign in different places 3 = 2 + 1 1 + 2 = 3 Missing number questions
Doubles to 10.	~use concrete objects~ Lego/bricks in construction etc. double 4 is 8 $4 \times 2 = 8$ Place objects on a double mat~	Drawing the double~ Double 4 is 8 use dominoes to illustrate the double	Recall of double numbers. Double matching games.
Counting in multiples.	2 4 6 8	Using pictures to support counting up in multiples. 5 10 15 Counting tally marks to support counting in 5s.	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25 , 30 Looking for the patterns.
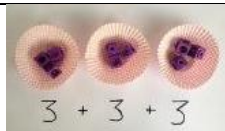
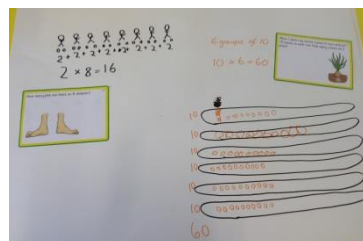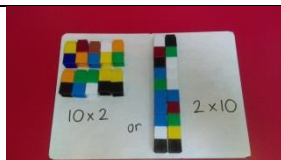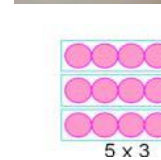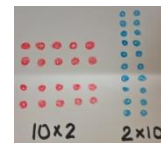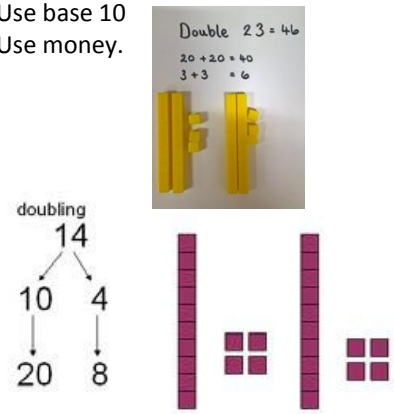| Repeated addition.	Use different objects to add equal groups. Solve whole number problems. If I had 8 bags of sweets with 5 sweets in each bag, how many sweets would I have altogether?	5 + 5 + 5 = 15 There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there? 2 add 2 add 2 equals 6 " I want three, four times" 3 + 3 + 3 + 3 = 12 3 x 4 = 12 Encourage children to draw the pictures to solve the problems. 2 × 8 = 16	Child to write repeated addition to solve the problems.
Arrays- showing commutative multiplication.	10×2 or 2×10 - Making the arrays to solve word problems. 4 x 3 = 12 "4 cakes, 3 times" 4 multiplied by 3	Drawing the arrays to solve problems. 3 + 3 + 3 + 3 = 12 3 multiplied by 4 is 12 3 x 4 = 12 10×2 2×10 3 x 5 = 5 x 3	Learn multiplication tables. 10 x 2 = 20 2 x 10 = 20 Solve calculations by applying knowledge of commutative multiplication.
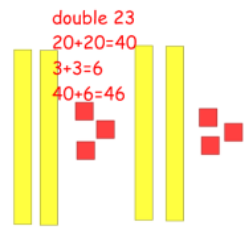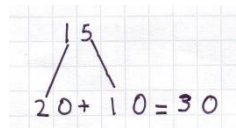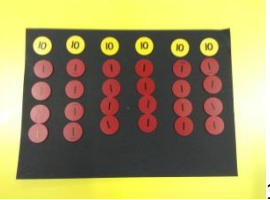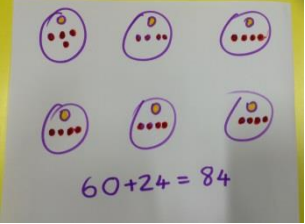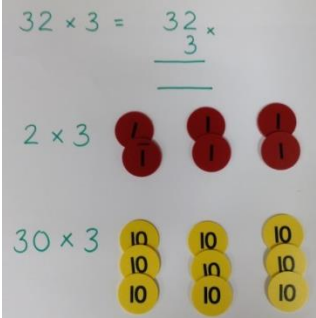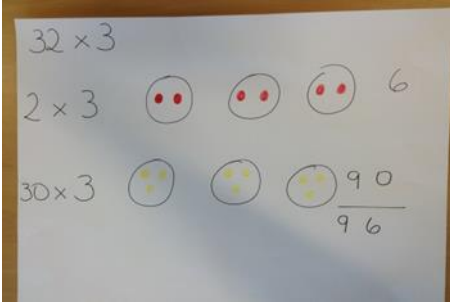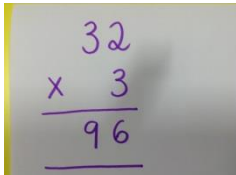
Doubling by partitioning.	Use base 10 Use money. Double 23 = 46 20 + 20 = 40 3 + 3 = 6 doubling 14 10 4 20 8	Draw base 10. double 23 20+20=40 3+3=6 40+6=46 Draw money.	15 20 + 1 0 = 3 0
Two digits multiplied by one digit will be introduced using partitioning. **TO x O** **HTO x O**	14 x 6 = Or use base 10/money. 13p x 3 = 10p x 3 + 3p x 3 = 30p + 9p = 39p 30p 9p	60 + 24 = 84 Drawing the place value coins, base 10 or money. The calculation is 14 x 6. The children have put 14 into 6 groups and then calculated the answers using multiplication and/or repeated addition.	14 x 6 10 x 6 = 60 4 x 6 = 24 60 + 24 = 84

Expanded column method-
(without carrying)
 	
The next step is to show the children the method of recording in a column format. The children will start by multiplying the ones, then the tens and then recombining.
	32 x 3
	
	32 × 3 = 32 ×
	            3
	2 × 3
	30 × 3
		32 x 3
		
		32 × 3
		2 × 3 6
		30 × 3 9 0
		            9 6
			32 x 3
			
			32
			× 3
			96
			
			Short Multiplication
			
			Children who feel secure on this can be introduced to the compact method, **without carrying.**

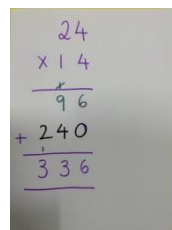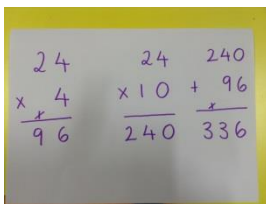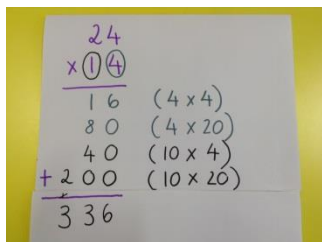|			
Expanded column method- **(with carrying)** **The next step is to show the children the method of recording in a column format. The children will start by multiplying the ones, then the tens and then recombining.**			Short Multiplication Children who feel secure on this can be introduced to the compact method, **with carrying.**
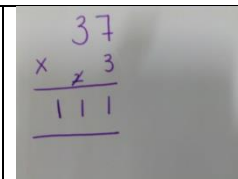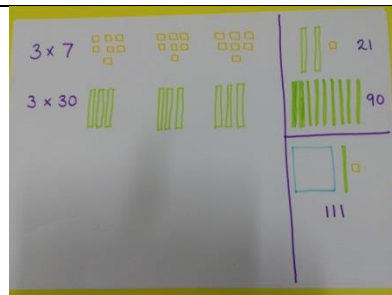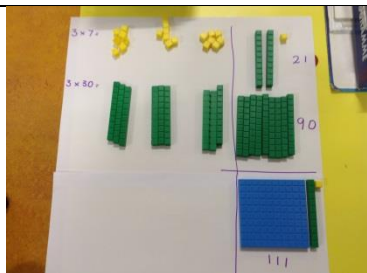
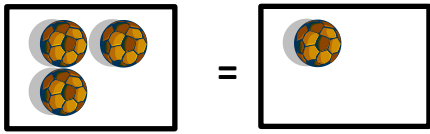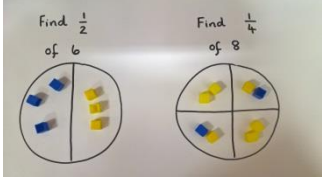|	
Multiplying two digits by two digits will follow the same progress. **~ Children will be asked to estimate the answer first using rounding.** **~ Children will start by multiplying the ones and then the tens.** **~ Once they are secure, the children may not need to make the jottings at the side and they can use the compact method.**	At this point children will have a good grasp of multiplication /multiplication tables etc., and will be able to move straight to the abstract. ~ If children are still struggling with this, they can partition the two digits into two single digit calculations. ~ We will extend this to using larger numbers and decimals. Children will need to be reminded to line up their digits in the correct column. Plus, if children are finding this difficult, it is helpful to write the ones calculation in pencil, and the tens calculation in pen.
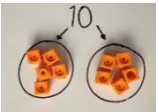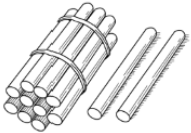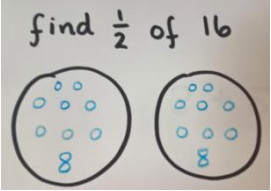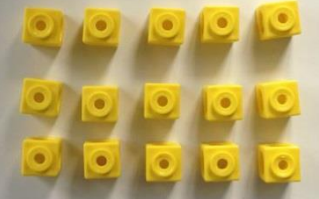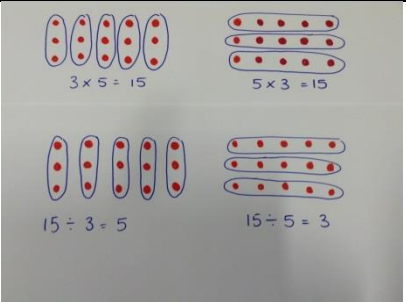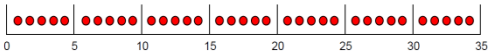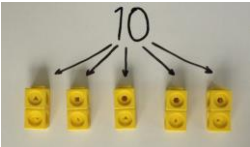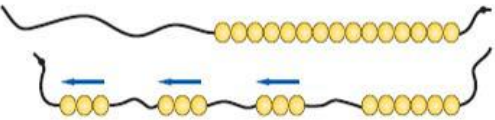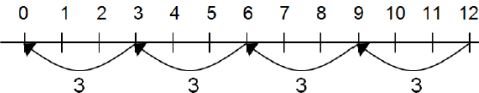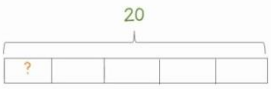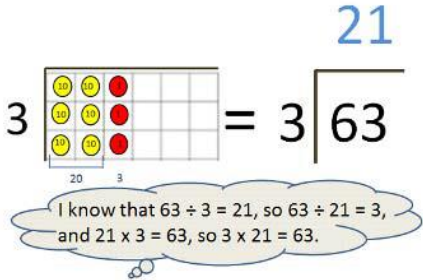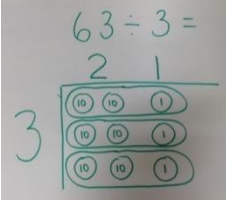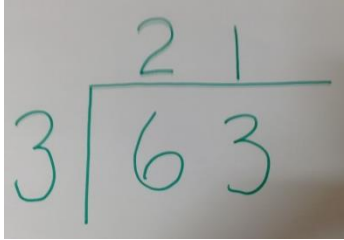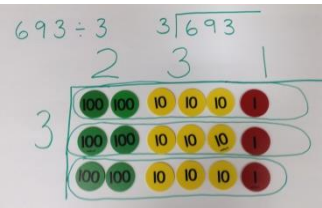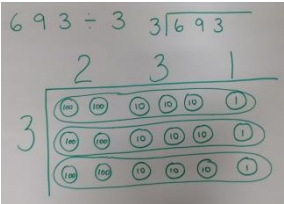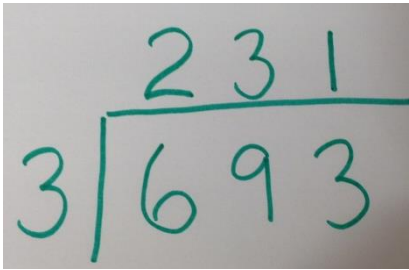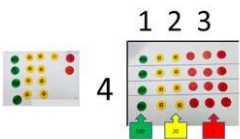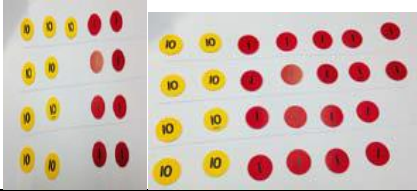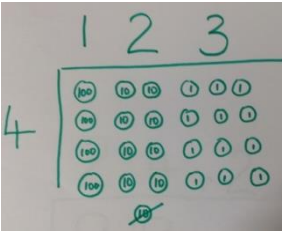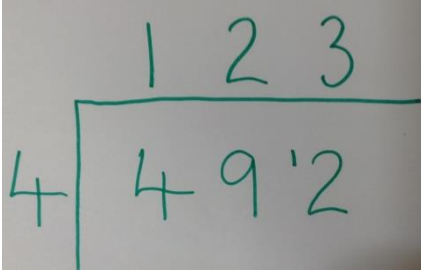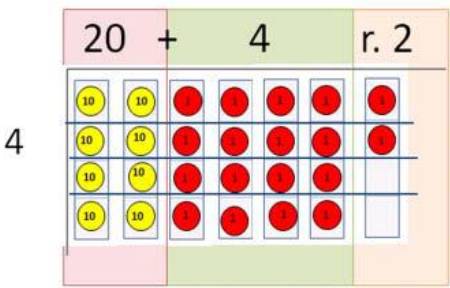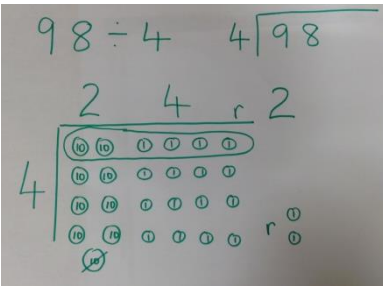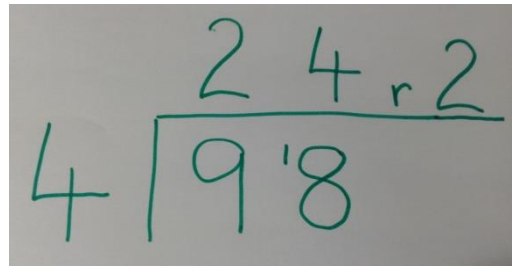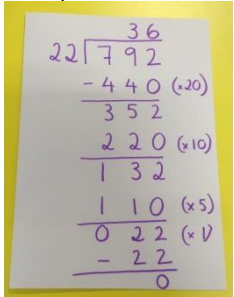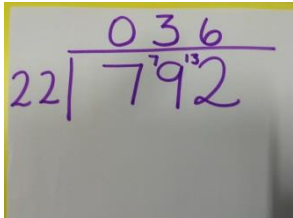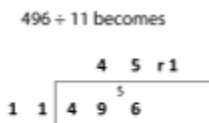
Division	**Vocabulary**	Divide, share, group, half, fractions, divided by, left over/remainder, division facts, chunking, bus stop method, inverse, common factors, common multiples, BODMAS	
Objective and Strategies	**Concrete**	**Pictorial**	**Abstract**
Introduction of the = sign **develop an understanding of 'equals'.**	Introduce the = sign and start with examples like 5 = 5 using different objects. Use a balance to illustrate.	Use the = sign in different places in pictorial problems –sometimes have the total box at the beginning. Draw how many more you need to make the sets equal… =	Use the = sign in different places 3 = 2 + 1 1 + 2 = 3 -missing number questions
Sharing objects into groups.	I have 10 cubes, can you share them equally in 2 groups?	Children use pictures or shapes to share quantities. $8 \div 2 = 4$	Share 9 buns between three people. $9 \div 3 = 3$ Recall of division facts.
Finding a fraction of a number. **Finding a half/quarter.** **Reinforce the connection between fractions and division.**	Find $\frac{1}{2}$ of 6 Find $\frac{1}{4}$ of 8 Children use concrete objects to share or group to find half/quarter/third etc. $12 \div 2 =$	find $\frac{1}{2}$ of 16 8 8 Children encouraged to draw pictures to aid understanding.	Recall of halve numbers Understand the correspondence between doubles and halves.

See that division is the inverse of multiplication. **Division within arrays.**	 can be created. Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15	Link division to multiplication by creating an array and thinking about the number sentences that	Recall of facts Fact families Missing numbers e.g., 15 ÷ ? = 5 KS2 Division will be introduced using visual arrays.
Division as grouping. **Repeated subtraction.**	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding. 15 ÷ 3 =	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. 20 ÷ 5 = ? 5 x ? = 20	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?
TO ÷ O using the bus stop method. With this method you always start with the highest value digit. **This will be extended to larger numbers (HTO ÷ O) and decimals with no remainder.**	 I know that 63 ÷ 3 = 21, so 63 ÷ 21 = 3, and 21 x 3 = 63, so 3 x 21 = 63. 63÷3=	Bus stop method: Children to follow the same method but encouraged to draw the place value coins if support still needed. 	Bus stop method:

	We would get the children to count out 63 using the place value coins. We would say what is 60 ÷ 3 (placing the tens into 3 groups) Then 3 ÷ 3 (placing the ones into 3 groups)		
TO ÷ O **HTO ÷ O** **using the bus stop method with carrying and remainders**	492 ÷ 4 = Carrying- 98 ÷ 4 Count out 98 using place value coins. Place a ten into 4 groups. 1 ten in each group carry 1 ten over. Exchange the ten for 10 ones. Place the ones into 4 groups, the answer is 24 r 2 	492 ÷ 4 Children to be encouraged to cross out a ten and draw 10 ones. 	

20 + 4 r. 2

$98 \div 4$ $4\overline{)98}$

$2\ 4\ r\ 2$
$4\overline{)9\ '8}$

Long Division HTO ÷ TO **~no remainders** **~with remainders** **This is known as the chunking method and we take away chunks of the divisor.**	At this point children will have a good grasp of multiplication /multiplication tables etc. and will be able to move straight to the abstract.

$$\begin{array}{r} 36 \\ 22\overline{)792} \\ -440\ (\times 20) \\ \hline 352 \\ 220\ (\times 10) \\ \hline 132 \\ 110\ (\times 5) \\ \hline 022\ (\times 1) \\ -22 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 036 \\ 22\overline{)79^72^{13}2} \end{array}$$

By Year 5 and 6 the children are taught the chunking method and can choose their preferred method. The remainder will be shown as a fraction or a decimal.

98 ÷ 7 becomes

$$\begin{array}{r} 1\ 4 \\ 7\overline{)9\ ^28} \end{array}$$

Answer: 14

432 ÷ 5 becomes

$$\begin{array}{r} 8\ \ 6\ r2 \\ 5\overline{)4\ 3\ ^32} \end{array}$$

Answer: 86 remainder 2

496 ÷ 11 becomes

$$\begin{array}{r} 4\ \ 5\ r1 \\ 1\ 1\overline{)4\ 9\ ^56} \end{array}$$

Answer: $45\frac{1}{11}$