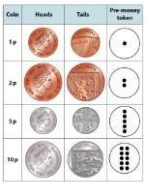
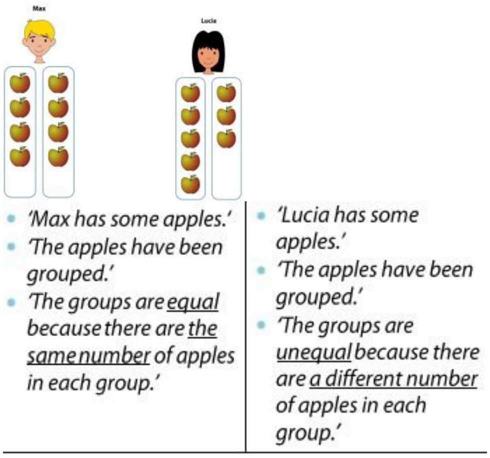
Holy Trinity
C of E Primary School

Stem Sentences
Multiplication & Division

Unitizing		
Examples of stem sentence	Type of stem sentence	
This counter has ______ dots. It is worth _____	Structure	 How much is each counter worth? This counter has 2 dots. It is worth 2. e. g The counter has 2 dots. It is worth 2.
This is a _____ pence coin, It has value of _____p	Structure	 This is a 5p coin. It has a value of 5p.
I say two pence but I think two one pennies **I say five pence but I think five one pennies.** **I say ten pence but I think ten one pennies.**	**Generalisation**	 I say ten pence but I think ten one pennies.
Each ________ has _____ parts Count in groups of ______	Language/ structure	Each bike has 2 wheels.  Count in groups of 2.
Counting in Equal Groups		
The groups are equal because there are the same number in each group. **The groups are unequal because there is a different number in each group.**	**Generalisation**	 - *'Max has some apples.'* - *'The apples have been grouped.'* - *'The groups are equal because there are the same number of apples in each group.'* - *'Lucia has some apples.'* - *'The apples have been grouped.'* - *'The groups are unequal because there are a different number of apples in each group.'* The groups are equal because

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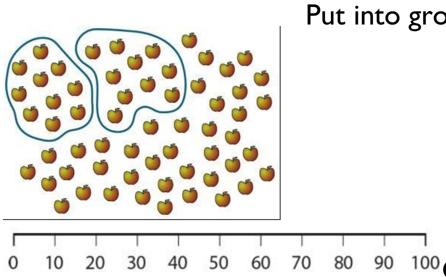
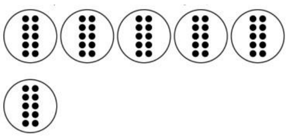
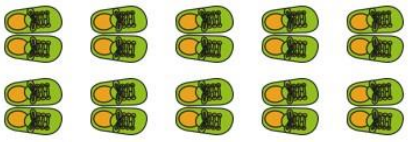
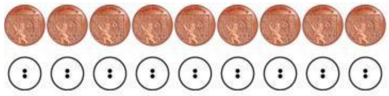
Put into groups of ______	Structure	Put into groups into 10  Count in tens

One group of ______ Two group of _____ Three groups of ______ _____ group(s) of __________	Structure	Counting and unitising  One group of 10, two groups of 10, three groups of 10… One ten, two tens, three tens, … 10,20, 30
There are ____ equal groups of _____ There are _____ in each group. There are ____ groups of _____		How many equal groups are there? How many cakes are there in each group?  There are five equal groups of cakes. There are three cakes in each group. There are five groups of three.
______ group(s) of ______ ____ group(s) of ____ make ____	Language/ structure	One group of two, two groups of two, three groups of two…. Two, four six …. One two, two twos, three threes.  Ten groups of 2 make 10
There are _____ coins Each coin has a value of ______p _____ lots of _____p is ______p altogether	Structure/ language	 There are nine coins Each coin has a value of 2p This is 18p.

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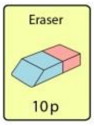
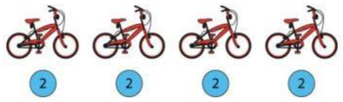
The ________ cost ______p Each coin has a value of ______p So I need ________ coins. Count in ______ s to check	Structure/ language	How many five-pence coins would you need to buy this rubber? rubber  Eraser 10p  The rubber cost 10p Each coin has a value of 5p So I need 2 coins. Check by counting in 5 s .... 5, 10.
____ represents the number of ____ ____ represents the number of __ in each ______	Structure	 6 represents the number of nests 3 represents the number of eggs in each next.

Repeated Addition.

_____ add __ add ___ Structure _____ + ____ + ____		 3 add 3 add 3 add 3 3 + 3 + 3 + 3

Factors and products.

There are _____ groups of ______ _____ x ______ + ______ _____ = ______ x ______	Structure / language	 How many shows are there? Count in groups of two. 6 3 x 2 = 6 or 6 = 3 x 2 There are three groups of two; there are six altogether.
______ is a factor ______ is a factor The product of ____ and ____ is ____ _____ is the product of ____ and ____	Language / structure.	How many wheels altogether?  Two, four, six, eight. There are eight wheels Four is a factor Two is a factor The product of four and two is eight Eight is the product of four and two.

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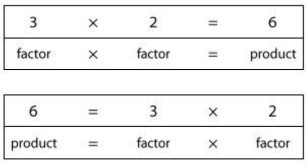
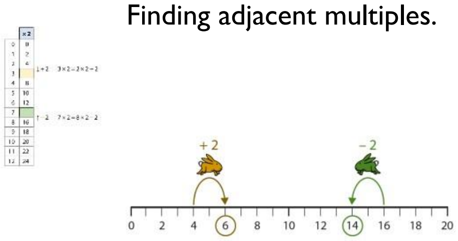
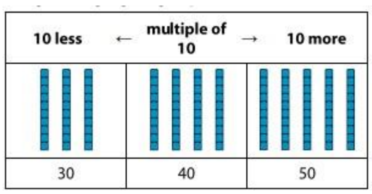
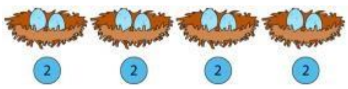
What does the ______ represent? _____ is the product of ____ and ____ The product of ____and ____ is ____.	Structure/ language	 3 × 2 = 6 factor × factor = product 6 = 3 × 2 product = factor × factor What does the 3 represent? What does the 2 represent? What does the 6 represent? Six is the product of two and three The product of two and three is six.
Factor times factor is equal to the product **The product is equal to factor times factor.**	**Generalisation**	
_____ x ______ is __ x ____ and one more _____ ____x ____ = ____ x ____+_____ _____ x ______ is __ x ____ and one less _____ ____x ____ = ____ x ____ - _____	Structure.	Finding adjacent multiples.  3 x 2 = 2 x 2 + 2 3 x 2 is 2 x 2 one one more 2 7 x 2 = 8 x 2 – 2 7 x 2 is 8 x 2 and one less 2

______ has one more group of ____ than _____ _____ has one fewer group of _____ than forty.	Structure/ language	 Using the language of groups. Forty has one more group of ten than thirty Thirty has one fewer group of ten than forty.
Commutativity		
There are _____groups of ____. There are __________ altogether There are _____ ______ , ____ times. There are ______ altogether	Structure	 2 + 2 + 2 + 2 = 8 There are four groups of two eggs. There are eight eggs altogether 4 x 2 = 8 There are two eggs, four times. There are eight eggs altogether 2 x 4 = 8

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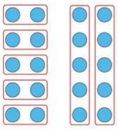
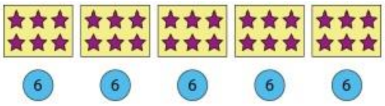
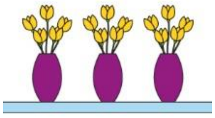
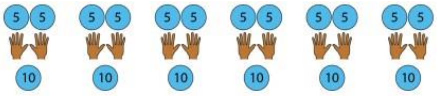
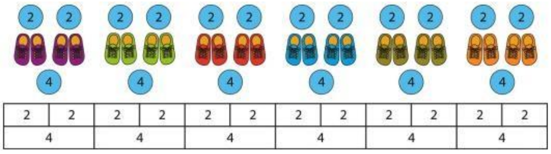
____ represents the number of groups. __ represents the number in each group. ____ groups of _____		 5 represents the number of groups 2 represents the number in each group. 5 groups of 2 2 represnts the number of groups 5 represents the number in each group. 2 groups of 5
If there are _____ equal groups, we can use the ___ times table. __ is a factor so we can use the ____ times table.	Structure	 5 groups of 6 = 6 groups of 5 If there are 5 equal groups, we can use the 5 times table. 5 is a factor so we can use the 5 tijmes table.
The product of __ and ___ is equal to the product of __ and __ ____ times __ is equal to __ times ____	Structure.	 The product of 3 and 5 is equal to the product of 5 and 3 3 times 5 is equal to 5 times 3. 3 x 5 = 5 x 3
The order of the numbers does not matter.	**Generalisation**	4 x 5 = 5 x 4
No of groups x group size = product **Group size x no of groups = product.**	**Generalisation**	

Connecting the times tables		
There are _____ groups of _____ There are ____ groups of _____	Structure	 There are 5 groups of ten There are 10 groups of 5.
For every group of 10, there are two groups of 5. Products in the ten times table are also in the five times table. Even multiples of 5 are also multiples of 10.	**Generalisation / structure.**	
For every one group of four, there are two groups of two.	**Generalisation / structure.**	

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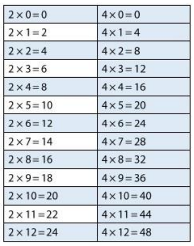
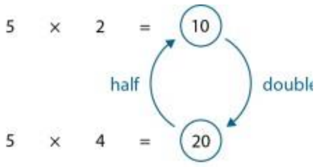
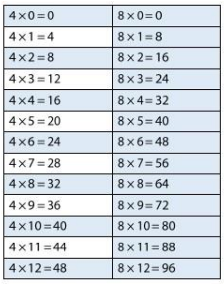
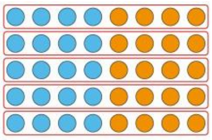
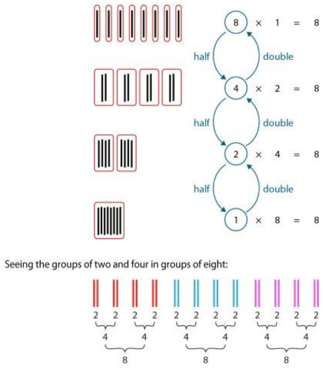
Products in the four times table are also in the two times atble. **The product of an even number and two is a product in the four times tables.**	**Generalisation / structure.**	 2×0=0 4×0=0 2×1=2 4×1=4 2×2=4 4×2=8 2×3=6 4×3=12 2×4=8 4×4=16 2×5=10 4×5=20 2×6=12 4×6=24 2×7=14 4×7=28 2×8=16 4×8=32 2×9=18 4×9=36 2×10=20 4×10=40 2×11=22 4×11=44 2×12=24 4×12=48
Four is double two so: ____ times four is double __ times two. ____fours is double ____ twos. __ times two is half of ____ times four. __ twos is half of __ fours.	Structure	 Four is double two Five times four is double five times two. Five fours is double five twos. Five times two is half of five times four. Five twos is half of five fours.
Products in the eight times table are also in the four times table. **The product of an even number and four is a product in the eight times table.**	**Generalisation / structure.**	 4×0=0 8×0=0 4×1=4 8×1=8 4×2=8 8×2=16 4×3=12 8×3=24 4×4=16 8×4=32 4×5=20 8×5=40 4×6=24 8×6=48 4×7=28 8×7=56 4×8=32 8×8=64 4×9=36 8×9=72 4×10=40 8×10=80 4×11=44 8×11=88 4×12=48 8×12=96
Eight is double four, so ____eights is double __ fours. Four is half of eight, so __ fours is half of __ eights.	Structure	 Eight is double four, so 5 eights is double 5 fours. Four is half of eight, so 5 fours is half of 5 eights. 5 x 4 = 20 . 5 x 8 = 40 (double 20) .

Products in the eight times table are also in the two and four times table. **Products in the four times table are also in the two times table.**	**Generalisation / structure.**	 Seeing the groups of two and four in groups of eight:
For numbers with more than two digits: If the final two digits are divisiable by four then the number is divisible by four.	**Generalisation**	

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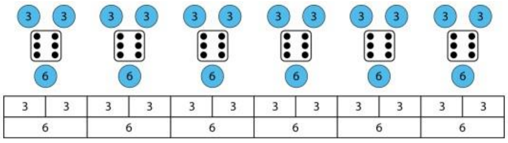
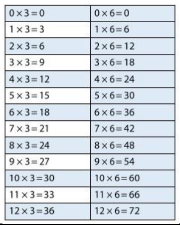
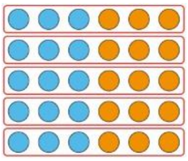
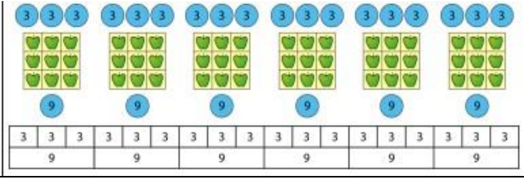
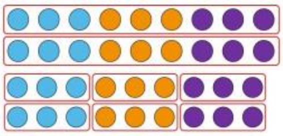
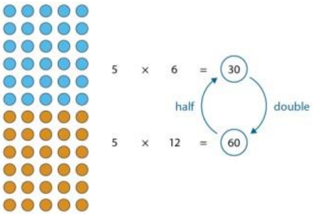
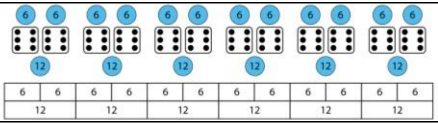
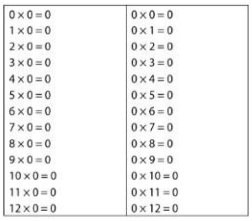
For every one groups of 6 there are two groups of 3	Structure	
Products in the six times table are also in the three times table. **The product of an even number and three is a prodcut in the six times table.**	**Generalisation / structure.**	 0 × 3 = 0 | 0 × 6 = 0 1 × 3 = 3 | 1 × 6 = 6 2 × 3 = 6 | 2 × 6 = 12 3 × 3 = 9 | 3 × 6 = 18 4 × 3 = 12 | 4 × 6 = 24 5 × 3 = 15 | 5 × 6 = 30 6 × 3 = 18 | 6 × 6 = 36 7 × 3 = 21 | 7 × 6 = 42 8 × 3 = 24 | 8 × 6 = 48 9 × 3 = 27 | 9 × 6 = 54 10 × 3 = 30 | 10 × 6 = 60 11 × 3 = 33 | 11 × 6 = 66 12 × 3 = 36 | 12 × 6 = 72
Six is double three, so __ sixes are double ___ threes. Three is half of six, so ___ threes are half of ___ sixes.	Structure.	 Six is double three, so six sixes are double six threes. Three is half of six, so 5 threes is half of 5 eights. 6 x 3 = 18 . 6 x 6 = 36 (double 18) .
For every one group of nine, there are three groups of three.	**Generalisation / structure.**	
Nine is tripple three so ___ nines is tripple ___ threes.	Structure.	 Nine is tripple three so 2 nines is tripple 2 threes.
Six is half of twelve so __ sixes is half of __ twelves. Twelve is double six so __ twelves is double __sixes.	Structure	 Six is half of twelve so five sixes is half of five twelves. Twelve is double six so five twelves is double five sixes.

For every one group of twelve there are two groups of six	**Generalisation / structure**	
The product of ___ and zero is zero. The product of zero and ____ is zero	Structure	 0 × 0 = 0 | 0 × 0 = 0 1 × 0 = 0 | 0 × 1 = 0 2 × 0 = 0 | 0 × 2 = 0 3 × 0 = 0 | 0 × 3 = 0 4 × 0 = 0 | 0 × 4 = 0 5 × 0 = 0 | 0 × 5 = 0 6 × 0 = 0 | 0 × 6 = 0 7 × 0 = 0 | 0 × 7 = 0 8 × 0 = 0 | 0 × 8 = 0 9 × 0 = 0 | 0 × 9 = 0 10 × 0 = 0 | 0 × 10 = 0 11 × 0 = 0 | 0 × 11 = 0 12 × 0 = 0 | 0 × 12 = 0 The product of 3 and 0 is 0 The product of 0 and 3 is 0.

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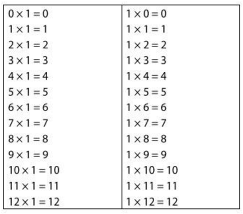
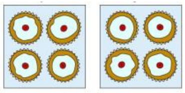
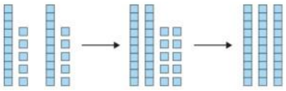
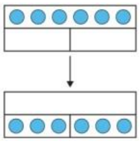
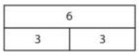
When 0 is a factor, the product is zero.	**Generalisation / language**	$0\times2=0$ $0\times5=0$ $0\times10=0$ $2\times0=0$ $5\times0=0$ $10\times0=0$
The product of ____ and one is ____. The product of one and _____ is _____	Structure	 0 × 1 = 0 1 × 0 = 0 1 × 1 = 1 1 × 1 = 1 2 × 1 = 2 1 × 2 = 2 3 × 1 = 3 1 × 3 = 3 4 × 1 = 4 1 × 4 = 4 5 × 1 = 5 1 × 5 = 5 6 × 1 = 6 1 × 6 = 6 7 × 1 = 7 1 × 7 = 7 8 × 1 = 8 1 × 8 = 8 9 × 1 = 9 1 × 9 = 9 10 × 1 = 10 1 × 10 = 10 11 × 1 = 11 1 × 11 = 11 12 × 1 = 12 1 × 12 = 12 The product of 3 and 1 is 3 The product of 1 and 3 is 3.
When 1 is a factor, the product is equal to the other factor.	**Generalisation / language.**	
Doubling and Halving.		
2 groups of ______ is equal to ____ x 2	Structure	 There are two boxes. Each box contains four cakes. 2 groups of 4 is equal 4 x2
If there are two equal groups we can use the two times table	**Generalisation**	
There are two groups of ______ There are ____, two times This is the same as double _____	Structure	 There are two groups of 5 There are are five, two times This is the same as double 5.
If we need to double/find twice the amount, we can use facts from the two times table.	**Generalisation**	
Doubling a whole number always gives an even number.	**Generalisation**	
Double __ = double__ + double __	Structure	Partition to double  Double 15 = double 10 + double 5 = 20 + 10 = 30
When one of the factors is two, the product is double the other factor.	**Generalisation**	

There are ______ altogether; half of _____ is equal to ______		  There are 6 altogether; half of 6 is equal to 3.

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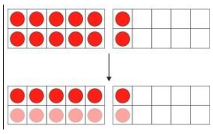
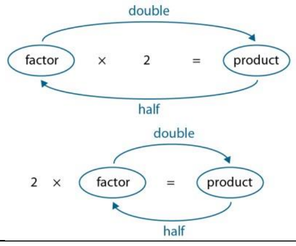
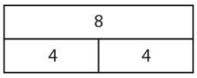
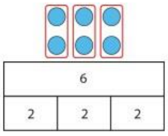
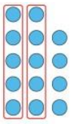
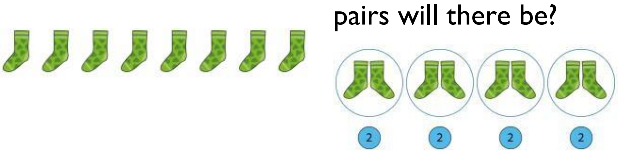
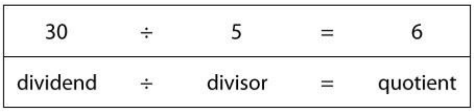
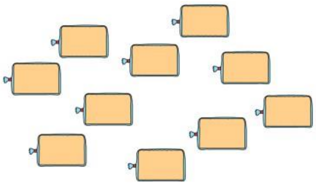
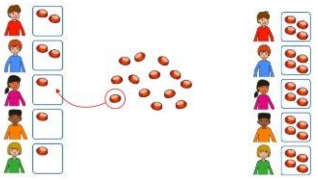
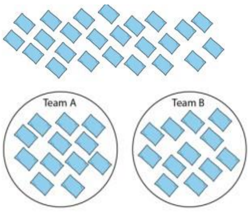
Half of ___ = Half of __ + half of ____	Language/ structure	Partitioning to half  Half of 12 = half of 10 + half of 2 = 5 + 1 = 6
When one of the factors is 2, the other factor is half of the product.	**Generalisation**	
I know that double _____ is ____; so half of ____ is ____	Language / structure.	Link between doubling and halving  I know that double four is equal to eight; so half of eight is equal to four.
Division as grouping.		
_____ divided into groups of _____	Structure/ language	Quotitive division *'There are fifteen biscuits. If I put them into bags of five, how many bags will I need?'* 15 divided into groups of 5.
There are ____ groups of ____; there are __ altogether. __ is divided into groups of __. There are ____ groups. __ is divided into ____ groups of ____	Structure	 There are three groups of two; there are six altogether. Six divided into groups of two. There are three groups Six is divided into three groups of two
____ is divided into groups of __ with a remainder of ____	Structure	Division with a reminader  14 = 5 + 5 + 4 14 = 2 x 5 + 4 Fourteen is divided into two groups of five with a remainder of four.
____ is divided into groups of ____. There are ____ groups.	Structure	There are eight socks. If I put them into pairs, how many pairs will there be?  Eight is divided into groups of 2. There are four groups There are four groups of two in eight.

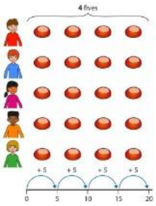
Stem Sentences
Multiplication & Division

The ____ represents the total number of seeds The ____ represents the number of seeds in each group/pot	Structure	There are fourteen seeds. Two seeds are planted in each pot How may pots are needed?  Fourteen divided into groups of two The 14 represents the total number of seeds The 2 represents the number of seeds in each group/pot.
Dividend ÷ divisor = quotient.	**Generalisation / language**	 30 ÷ 5 = 6 dividend ÷ divisor = quotient
____ is the dividend ____ is the divisor ____ is the quotient.	Language	I buy ten loaves of bread. I can fit five loaves into each bag. How many bags do I need?  10 ÷ 5 = 2 The dividend is ten. It represnts how many loaves I have altogether. The divisor is five. It represents the number in each bag. The quotient is 2. It representns how many bags I will need.
Division as sharing		
_____ divided between _______	Language / structure	Partitive division *'I have twenty conkers and I share them equally between five children. How many conkers does each child get?'* 20 divided between 5
_____ are shared equally between _____. Each child gets ______	Language / structure	I have twenty conkers and I share them equally between five children. How many conkers does each child have?  Twenty conkers are shared equally between five children. Each child gets four conkers.

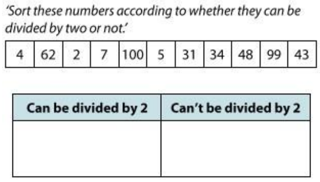
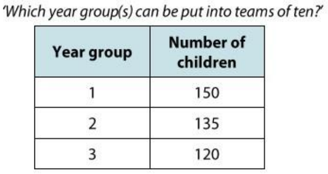
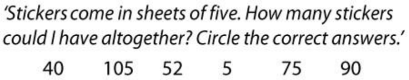
Stem Sentences
Multiplication & Division

____ divided between ____ is equal to ____ each.	Structure	There are twenty-four bean bags. If they are shared qually between two teams, how many bean bags does each team get?  Sharing one at a time … 24 ÷ 2 = 12 Twenty four divided between two is equal to twelve each.

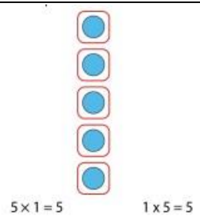
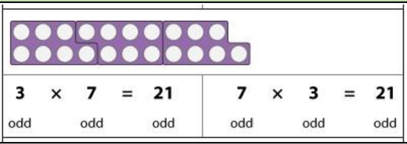
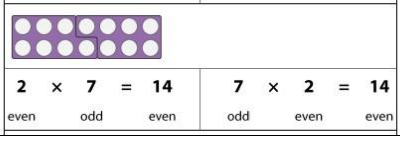
<table>
<tr><td>One ____is one each. That's ____
Two ____ is two each. That's ____

_______divided between ____ is equal to _____ each.</td><td>Structure</td><td>
One five is one each. That's five
Two fives is two each. That's ten
Three fives is three each. That's fifteen.
Four fives is four each. That's twenty.
20 ÷ 5 = 4
Twenty divided between five is equal to four each.</td></tr>
<tr><td>If the divisor is two, we can use the two times table to find the quotient.

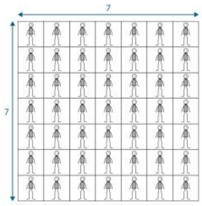
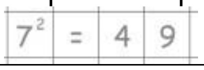
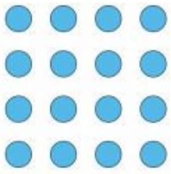
If the divisor is five, we can use the five times table to find the quotient.

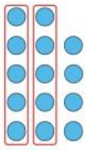
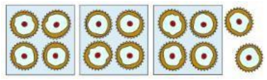
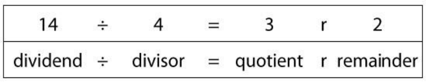
If the divisor is two, the quotient is half of the dividend.</td><td>Generalisation</td><td></td></tr>
<tr><td colspan="3">Rules of divisibility</td></tr>
<tr><td>A number is divisible by two if the ones digits is even.</td><td>Generalisation</td><td>
<i>'Sort these numbers according to whether they can be divided by two or not.'</i><table><tr><td>4</td><td>62</td><td>2</td><td>7</td><td>100</td><td>5</td><td>31</td><td>34</td><td>48</td><td>99</td><td>43</td></tr></table><table><tr><th>Can be divided by 2</th><th>Can't be divided by 2</th></tr><tr><td></td><td></td></tr></table></td></tr>
<tr><td>A number is divisible by ten if the ones digits is zero.</td><td>Generalisation</td><td>
<i>'Which year group(s) can be put into teams of ten?'</i><table><tr><th>Year group</th><th>Number of children</th></tr><tr><td>1</td><td>150</td></tr><tr><td>2</td><td>135</td></tr><tr><td>3</td><td>120</td></tr></table></td></tr>
<tr><td>A number is divisible by five if the ones digits is five or zero.</td><td>Generalisation</td><td>
<i>'Stickers come in sheets of five. How many stickers could I have altogether? Circle the correct answers.'</i>
40 105 52 5 75 90</td></tr>
</table>

Stem Sentences
Multiplication & Division

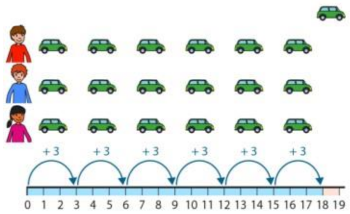
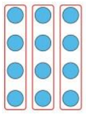
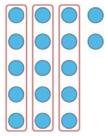
When the divisor is equal to one, the quotient is equal to the dividend.	**Generalisation**	
When zero is a factor, the product is zero. **When the dividend is zero, the quotient is zero.**	**Generalisation**	0 x 5 = 0 One of the facotrs is zero so the product is zero. Zero groups of five is zero.
When one is a factor, the product is equal to the other factor.	**Generalisation**	1 x 10 = 10 One of the facotrs is one so the product is ten.
When the dividend is zero, the quotient is zero.	**Generalisation**	0 ÷ 2 = 0 0 ÷ 5 = 0 0 ÷ 10 = 0
When the dividend is equal to the divisor, the quotient is one.	**Generalisation**	2 ÷ 2 = 1 5 ÷ 5 = 1 10 ÷ 10 = 1
When the divisor is equal to one, the quotient id equal to the dividend.	**Generalisation**	2 ÷ 1 = 2 5 ÷ 1 = 5 10 ÷ 1 = 10
For a number to be divisible by three, the sum of the digits of the number must be divisible by three.	**Generalisation**	e.g. 453 4 + 5 + 3 = 12 m (12 is divisuble by 3 1 + 2 = 3 (Keep adding and if you get 3, 6 or 9 then it is divisible by 3)
For a number to be divisible by three, it must be divisible by 3 and divisible by 2 (even)	**Generalisation**	
For a number to be divisible by nine, the sum of the digits of the number must be divisible by nine.	**Generalisation**	e.g. 63 6 + 3 = 9 567 5 + 6 + 7 = 18 1 + 8 = 9
Odd and Even factors		
Odd factor x odd factor = odd product	**Generalisation** **.**	
Even factor x odd factor = even product	**Generalisation**	
Odd factor x even factor = even product.	**Generalisation**	
Even factor x even factor = even product.	**Generalisation**	
Square Numbers		

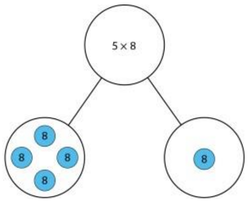
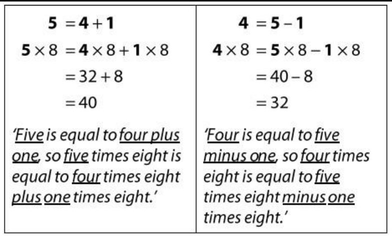
Stem Sentences
Multiplication & Division

We can write this as ___ times __ is equal to ___. Both factors are the same, so we can also write this as __ squared is equal to ___	Structure	 There are seven netball teams, each with seven players. We can write this as 7 times 7 is equal to 49. 7 x 7 = 49 Both facotrs are the same, so we can also write this as 7 squared is equal to 49 $7^2 = 49$ 
When both factors have the same value, the product is called a square number. **Square numbers can be represented by square shaped arrays.**	**Generalisation**	

Division with remainders.		
___ is divided into groups of __ . There are __ groups with a remainder of ___	Structure	 14 is divided into groups of 5. There are 2 groups of 5 with a remainder of 4. 14 = 5 + 5 + 4 14 = 2 x 5 + 4 The '14' represents the total number of counters The '2 x 5' represents 2 groups of 5 The '4' represents the remaining counters.
____ divided into equal gropus of __ is equal to ___, with a remainder of ___.	Structure	A baker has fourteen cakes. He sells cakes in boxes of four. How can he box the cakes?  Fourteen divided into equal groups of four is equal to three, with a remainder of two. So, the baker can make three boxes of cakes with two let over.
Dividend ÷ divisor = quotient r remainder	**Generalisation**	 14 ÷ 4 = 3 r 2 dividend ÷ divisor = quotient r remainder

Stem Sentences
Multiplication & Division

_______ divided between _____ is equal to ____ each with a remainder of ______.	Language / structure.	Partitive division  Nineteen divided between three is equal to six each with a remainder of one.
The largest multiple of _____ that is less than or equal to ____ is _____.	Language / structure.	$0 \times 5 = 0$ $1 \times 5 = 5$ $2 \times 5 = 10$ $\mathbf{3 \times 5 = 15}$ $4 \times 5 = 20$ The largest multiple of five that is less then or equal to nineteen if fifteen.
The remainder is always less than the divisor.	**Generalisation**	
____ is a multiple of ___, so when it is divided into gropus of ___ there are none left over: there is no remainder.	Structure	 12 is a multiple of 4, so when it is divided into gropus of 4 there are none left over: there is no remainder.
____ **is not** multiple of ___, so when it is divided into gropus of ___ there are some left over: there is a remainder.	Structure	 17 **is not** multiple of 5, so when it is divided into gropus of 5 there are some left over: there is a remainder.

If the dividend is a multiple of the divisor there is no remainder. If the dividend is not a multiple of the divisor. Thre is a reaminader.	**Language / Generalisation**	
Connecting multiplication and division.		
The product in the multiplication equation has the same value as the dividend in the mathcing division equation.	Structure / language/ generalisation.	$a \times b = c$ $c \div a = b$
The factors in the multipication equation have the same values as the divisor and the quotient in the matching division equation.	Structure / language/ generalisation.	$a \times b = c$ $c \div a = b$
Distributive law		
____ is equal to ____ plus ____ so ____ times ____ is equal to ____ times ____ plus ____ times ____	Structure	  $5 = 4 + 1$ $5 \times 8 = 4 \times 8 + 1 \times 8$ $= 32 + 8$ $= 40$ *'Five is equal to four plus one, so five times eight is equal to four times eight plus one times eight.'* $4 = 5 - 1$ $4 \times 8 = 5 \times 8 - 1 \times 8$ $= 40 - 8$ $= 32$ *'Four is equal to five minus one, so four times eight is equal to five times eight minus one times eight.'*

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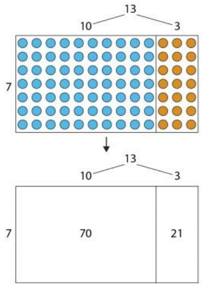
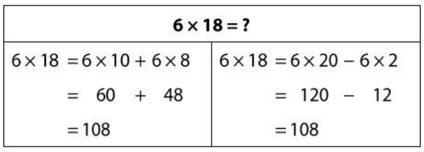
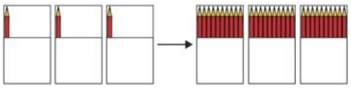
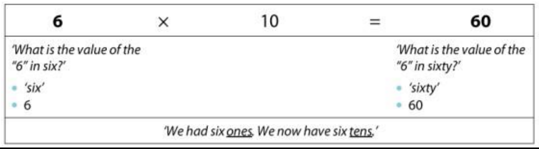
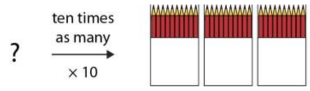
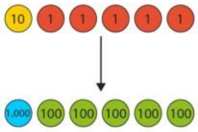
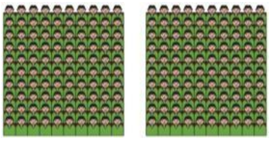
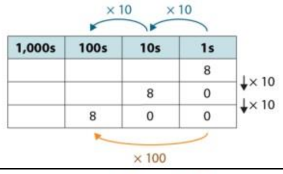
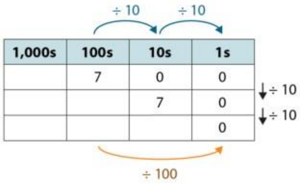
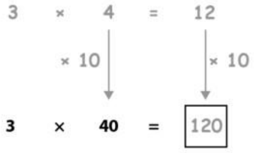
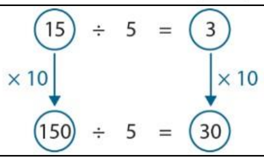
<table>
<tr><td>Partition __ x __ into __ x___ and __x___</td><td></td><td>Derrive multiplication facts beyond known times tables.

Partition 7 x 13 into 7 x 10 and 7 x 3
7 x 13 = 7 x 10 + 7 x 3
= 70 + 21
= 91</td></tr>
<tr><td>__ x __ = __ x__ add __ x __
OR
__ x __ = __ x __ subtract __ x __</td><td>Structure</td><td>Working flexibly

6 × 18 = ?
6 × 18 = 6 × 10 + 6 × 8
= 60 + 48
= 108
6 × 18 = 6 × 20 − 6 × 2
= 120 − 12
= 108
6 x 18 can be partitioned into 6 x 10 add 6 x 8
Or
6 x 20 subtract 6 x 2.</td></tr>
<tr><td colspan="3">Multiplying and dividing by 10, 100 or 1,000</td></tr>
<tr><td>For every one pencil of Emily's Jamie has ten.
____ multiplied by ten is equal to ____
___ is ten times the size of ____</td><td></td><td>Emily has three pencils; Jamie has ten times as many. How many pencils does Jamie have?

For every one pencil of Emily's Jamie has ten.
Think of 3 and make it ten times the size.
Think of 3 and multiply by ten.
3 multiplied by ten is equal to 30
30 is ten times the size of 3
30 pencils is ten times as many as 3 pencils. Jamie has 30 pencils.</td></tr>
</table>

<table>
<tr><td>To find ten times as many , multiply by ten.
All multiples of ten have a ones digit of zero.</td><td>Generalisation</td><td></td></tr>
<tr><td>We had ____ ones. We now have ____ tens.</td><td>Structure / language</td><td>
6 × 10 = 60
<i>'What is the value of the "6" in six?'</i>
'six'
6
<i>'What is the value of the "6" in sixty?'</i>
'sixty'
60
<i>'We had six ones. We now have six tens.'</i></td></tr>
<tr><td>To multiply a whole number by ten, place a zero after the final digit of that number.</td><td>Generalisation</td><td>It is important to use the phrase 'place a zero' rather than 'add a zero.' The placed zero is a place value holder.</td></tr>
</table>

Stem Sentences
Multiplication & Division

____ is ten times as many as ____ Emily has ____ pencils	Structure.	Jamie has 30 pencils; he has ten times as many as Emily. How many pencils does Emily have?  30 is tens times as many as 3 Emily has 3 pencils
To find the inverse of ten times as many, divide by ten. **To divide a multiple of ten by ten, remove the zero from the ones place.**	**Generalisation**	
____ multipled by one hundred is equal to ____ ____ is one hundred times the size of ______		I have 15, This is one ten and five ones. How much is one hundred times this amount?  15 multiplied by one hundred is equal to 1500 1500 is one hundred times the size of 15
All multiples of 100 have both a tens and ones digit of zero.	**Generalisation**	
To multiply a whole number by a hundred, place two zeros after the final digit of that number.	**Generalisation**	It is important to use the phrase 'place a zero' rather than 'add a zero.' The placed zero is a place value holder.
_____ divided by one hunderd is equal to _____	Structure	 200 divided by one hunderd is eqaul to 2 200 ÷ 100 = 2
Multiplying by one hundred is equivalent to multiplying by ten, and then multiply by ten again.	**Generalisation**	
Dividing by one hundred is equivalent to dividing by ten, and then divide by ten again.	**Generalisation**	

If one factor is made ten times the size, the product will be ten times the size.	**Generalisation**	
If the dividend is made ten times the size, the quotient will be ten times the size.	**Generalisation**	

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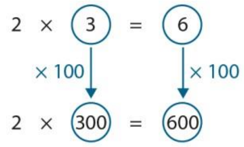
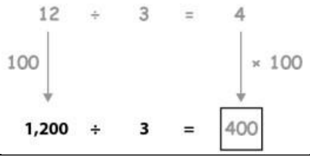
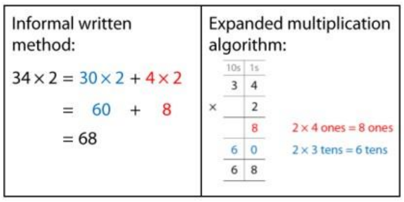
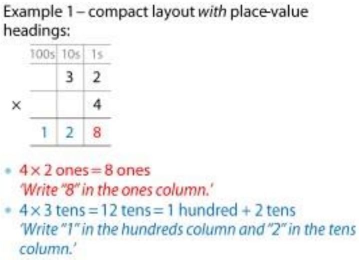
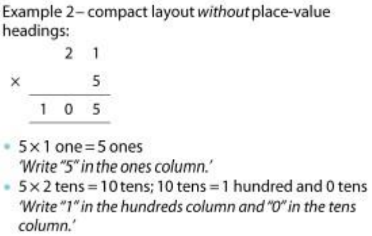
If one factor is made one hundred times the size, the product will be one hundred times the size.	**Generalisation**	
If the dividend is made one hundred times the size, the quotient will be one hundred times the size.	**Generalisation**	
To multiply multiples of ten, one hundred or one thousand, remove the zeros, find the product of the single digits numbers then replace the zeros.	**Generalisation**	
Short multiplication		
Partition ____ into ____ and ____ Multiply the ones ____ x ____ Multiple the tens ____ x ____	Structure	Informal written method: 34 × 2 = 30 × 2 + 4 × 2 = 60 + 8 = 68 Expanded multiplication algorithm: 10s 1s 3 4 × 2 8 2 × 4 ones = 8 ones 6 0 2 × 3 tens = 6 tens 6 8 Partition 34 into 30 and 4 Multiply the ones ____ x ____ Multiple the tens ____ x ____
____ hundreds x ____ = ____ hundreds ____ tens x ____ = ____ tens ____ ones x ____ = _____ ones	Language / structure.	 5 hundreds × 3 = 15 hundreds 2 tens × 3 = 6 tens 1 one × 3 = 3 ones 521 × 3 = 500 × 3 + 20 × 3 + 1 × 3 = 1500 + 60 + 1
Partition ____ into ____ and ____ ____ x ____ ones = _____ ones Write the ____ in the ones column (and __ in the tens column) ____ x ____ tens = _____ tens Write the ____ in the tens column (and __ in the hundreds column)	Structure	Example 1 – compact layout *with* place-value headings: 100s 10s 1s 3 2 × 4 1 2 8 • 4 × 2 ones = 8 ones *'Write "8" in the ones column.'* • 4 × 3 tens = 12 tens = 1 hundred + 2 tens *'Write "1" in the hundreds column and "2" in the tens column.'* Example 2 – compact layout *without* place-value headings: 2 1 × 5 1 0 5 • 5 × 1 one = 5 ones *'Write "5" in the ones column.'* • 5 × 2 tens = 10 tens; 10 tens = 1 hundred and 0 tens *'Write "1" in the hundreds column and "0" in the tens column.'*

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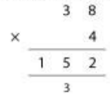
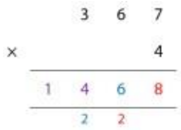
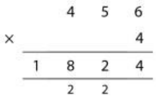
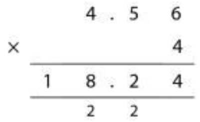
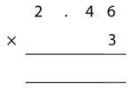
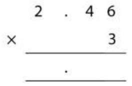
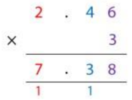
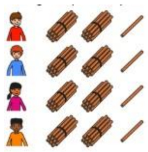
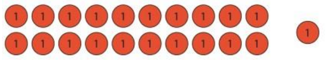
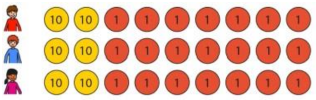
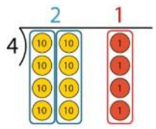
Holy Trinity
C of E Primary School

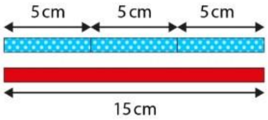
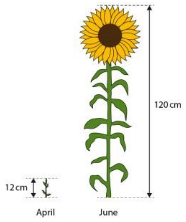
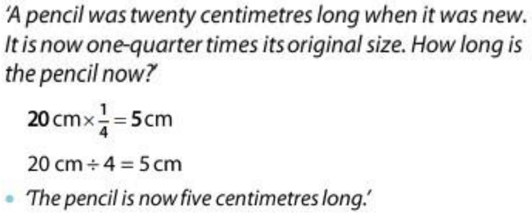
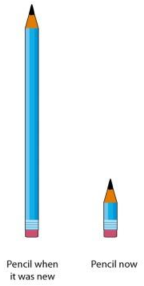
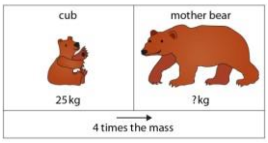
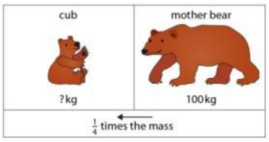
_____ x _____ ones = ____ ones + ____ tens ____ x ____ tens = _____ tens + ____ hundreds.	Structure	Multiplication algorithm – expanded layout:  4 × 8 ones = 32 ones = 3 tens + 2 ones 4 × 3 tens = 12 tens = 1 hundred + 2 tens 1 hundred + 2 tens + 3 tens + 2 ones = 1 hundred + 5 tens + 2 ones Multiplication algorithm – compact layout: 
If there are ten or more ones, we must regroup the ones into tens and ones. **If there are ten or more tens, we must regroup the tens into hundreds and tens.**	**Generalisation**	
_____ _____s are _____ *(writing down ____ below the tens column and ____ in the ones colum.)* ____ _____s are _______, plus _____ is ______ *(write down ____ below the hundred column and +____ in the tens colum)* _____ _____s are ______; plus _____ is ______ *(writing down _____ in the thousands column and _____ in the hundreds column)*	Language and structure.	 Four sevens are twenty-eight (writing down 2 below the tens column and 8 in the ones colum. Four sixes are twenty four, plus two is twenty six (write down 2 below the hundred column and 6 in the tens colum) Four threes are twelve; plus two is fourteen (writing down 1 in the thousands column and 4 in the hundreds column)
_____ ones x ____ = ______ ones S0 ____ hundredths x ____ = _____		 456 ones × 4 = 1,824 ones so 456 hundredths × 4 = 1,824 hundredths 4.56 × 4 = 18.24 
In short multiplication, if there is a decimal point in the number being multiplied put a decimal point in the product line, line it up with the decimal point in the number being multiplied.	**Generalisation**	Step 1 – lay out the calculation:  Step 2 – write the decimal point for the product:  Step 3 – perform the calculation, with unitising: 

Short Division

Stem Sentences
Multiplication & Division

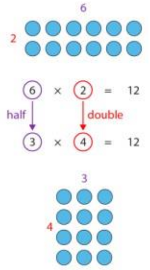
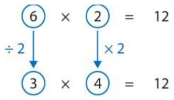
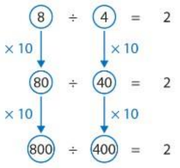
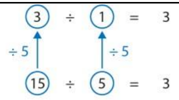
_____ tens divided by ____ is equal to ____tens each. _____ ones divided by ____ is equal to ____ one each. ____ tens and _____ ones make ______ each	Structure	84 ÷4 = 21  8 tens ÷ 4 = 2 tens 4 ones ÷ 4 = 1 one 84 ÷ 4 = 21 Eight tens divided by four is equal to two tens each. Four ones divided by four is equal to one one each. ____ tens and _____ ones make ______ each
If dividing the tens gives a remaider of one or more tens, we must exchange the remaing tens for ones.	**Generalisation**	
_____ tens are one ten each. That's _____. _____ tens are two tens each. That's ______. There are _____tens left over. Exchange the remaining tens for ones. _____ tens and ____ one is equal to ________ ones. _______ ones divided between _____ is equal to _____ ones each. _____ tens and _____ ones makes _____ Each child gets ______ marbles.	Language / structure	81 ÷ 3 =  Three tens are one ten each. That's thirty. Six tens are two tens each. That's sixty. There are two tens left over.  Exchange the remaining tens for ones: Two tens and one one is equal to twenty one ones. Twenty one ones divided between three is equal to seven ones each. Add the partial quotients  6 tens ÷ 3 = 2 tens 21 ones ÷ 3 = 7 ones 81 ÷ 3 = 27 2 tens and 7 ones makes 27. Each child gets twenty-seven marbles.
_____ tens and _____ ones divided between ____ is equal to _____ tens and _____ one. Each child gets _______		21 ÷ 4  Eight tens and four ones divided between four is equal to two tens and one one. Each child gets twenty-ones sticks.
473 = ___ hundreds + ___ tens + ___ ones. _____ hundreds ÷ ____ = ___ **hundred(s)** r ____ hundred (s). ____ hundred(s) + ____ tens = _____ tens ____ tens ÷ ____ = ___ **tens** r ____ tens __ tens + ____ ones = ____ ones ____ ones ÷ ____ = ___ **ones r** ____ **ones** So ______ ÷ _____ = _____ r__	Language and structure.	473 = 4 hundreds + 7 tens + 3 ones. 4 hundreds ÷ 3 = **1 hundred** r 1 hundred. 1 hundred + 7 tens = 17 tens 17 tens ÷ 3 = **5 tens** r 2 tens 2 tens + 3 ones = 23 ones 23 ones ÷ 3 = **7 ones r 2 ones** So 473 ÷ 3 = 157r2

Stem Sentences
Multiplication & Division

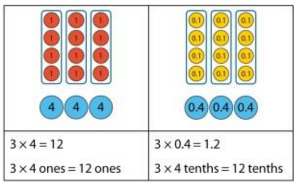
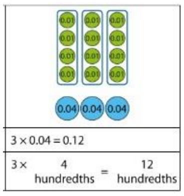
If dividing the hundreds gives a remainder of one or more hundred, we must exchaneg the remaining hundreds for tens.	**Generalisation**	
Scaling		
The _____ is ____ times the length of the ______.	Structure / language	 The plain ribbon is three times the length of the spotty ribbon. 5cm x 3 = 15cm The 5cm represents the length of one spotty ribbon The 3 represents the number of spotty ribbons that are equal to the length of the plain ribbon. The 15cm represents the length of three spotty ribbins. It also represents the length of the plain ribbon.
If two objects are the same length, one object is one times the length of the other.	**Generalisation**	
____ multiplied by ____ is equal to _____ _____ is ____ times the size of _____		 12 multiplied by 10 is equal to 120 120 is 10 times the size of 12
____ divided by ____ is equal to _____ _____ is ____ times the size of _____		'A pencil was twenty centimetres long when it was new. It is now one-quarter times its original size. How long is the pencil now?' $20\,\text{cm} \times \frac{1}{4} = 5\,\text{cm}$ $20\,\text{cm} \div 4 = 5\,\text{cm}$ - 'The pencil is now five centimetres long.'  5cm is ¼ times the size of 20cm
The ____ is ____ times the mass of ______		 The mass of the mother bear is four times the mass of her cub. 25kg x 4 = 100 kg The mass of the mother bear is one hundred kilograms.  The mass of the cub is one quarter times the mass of his mother. 100kg x ¼ = 25kg 100 ÷ 4 = 25kg

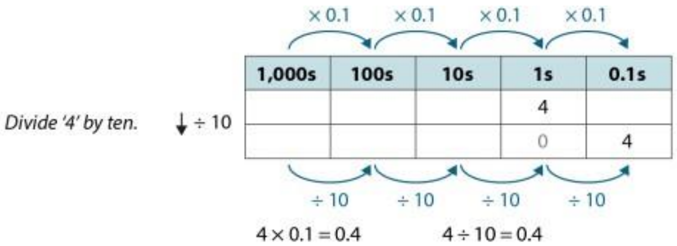
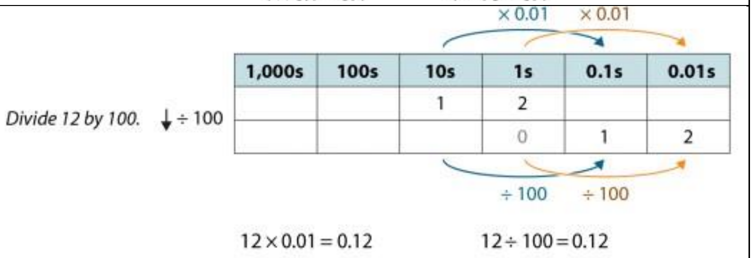
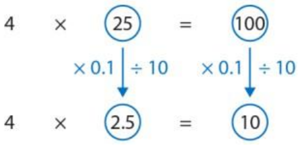
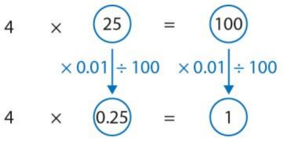
Stem Sentences
Multiplication & Division

		The mass of the bear cub is twenty-five kilograms.

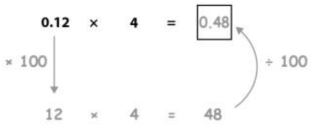
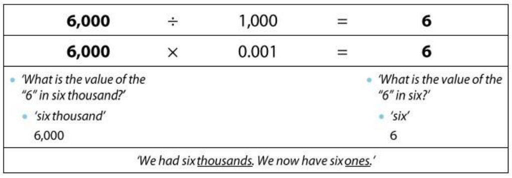
Equivalence		
If I double one factor, I must halve the other factor for the product to stay the same.	**Generalisation**	
If I multiply ___by two, I must divide ____ by two for the product to stay the same.	Structure	 If I multiply 2 by two, I must divide 6 by two for the product to stay the same.
If I multiply one factor by two , I must divide the other factor by two for the product to stay the same.	**Generalisation**	
If I multiply one factor by ____ , I must divide the other factor by ____ for the product to stay the same.	**Generalisation**	
If I multiply the dividend by _____, I must multiply the divisor by _____ for the quotient to stay the same.	Language / structure.	Dividend ÷ divisor = quotient. 
If I divide the dividend by _____, I must divide the divisor by ___ for the quotient to stay the same.	Language / structure.	 *'If I divide the dividend by five, I must divide the divisor by five for the quotient to stay the same.'*
Calculation x and ÷ decimal fractions by whole numbers.		

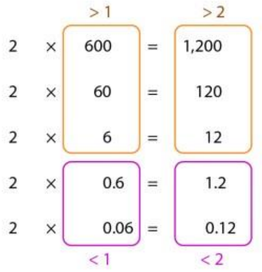
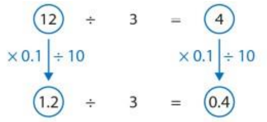
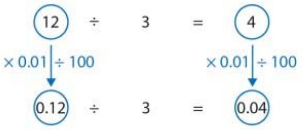
Stem Sentences
Multiplication & Division

____times __ones is equal to ____ones, so ____ times____ tenths is equal to ____tenths.	Structure	 3 times 4 ones is equal to 12 ones, so 3 times 4 tenths is equal to 12 tenths.
____times __ones is equal to ____ones, so ____ times____ hundredths is equal to ____ hundredths.	Structure	 3 times 4 ones is equal to 12 ones, so 3 times 4 hundredths is equal to 12 hundredths.
One tenths of _____ metre(s) is _____ metre(s)	Structure	*'William has a twelve-metre length of string. Mary's string is one-tenth times the length of William's string. How long is Mary's string?'*  • *'One-tenth of twelve metres is one-point-two metres.'* • *'One-tenth of twelve metres is twelve-tenths of a metre.'* One tenths of 12 metre(s) is 1.2metre(s)

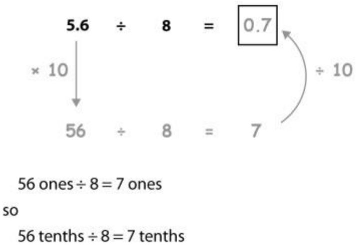
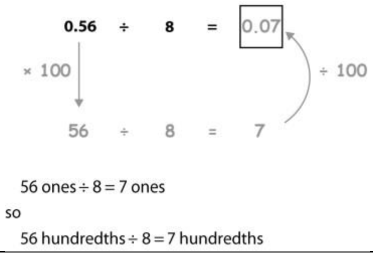
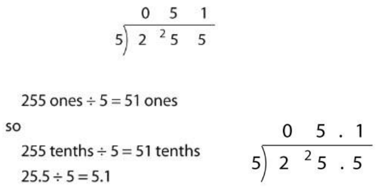
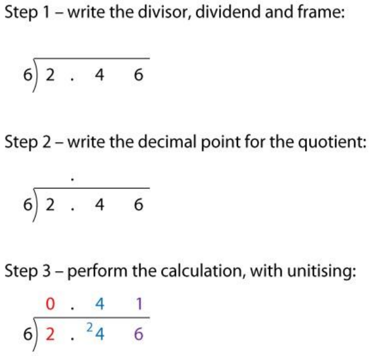
When a number is divided by ten, the digits move one place to the right. **When a number is multipled by 0.1 or 1/10, the digits more one place to the right. (Because x 0.1 is equal to ÷ 10)**	**Generalisation**	
When a number is divided by 100, the digits move two places to the right. **When a number is multipled by 0.01 or 1/100, the digits more one place to the right. (Because x 0.01 is equal to ÷ 100)**	**Generalisation**	
____ is one-tenth of the size of ____, so ____ times ____ is one-tenth the size of ____ times ____.	Structure	 2.5 is one-tenth of the size of 25, so 4 times 2.5 is one-tenth the size of 4 times 25.
_____ is one-hundredth the size of ____, so ____ times ____ is onehundredth the size of ____ times ____.	Structure	 0.25 is one-hundredth the size of 25, so 4 times 0.25 is onehundredth the size of 4 times 25.

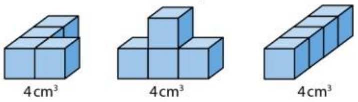
Stem Sentences
Multiplication & Division

If one factor is made one-tenth times the size, the product will be one-tenth times the size. **If one factor is made one-hundredth times the size, the product will be one-hundredth times the size.**	**Generalisation**	
I move the digits of the number being multipled _____ places to the left until I get a whole number; then I multiply; then I move the digits of the product ____ places to the right.	Structure	 I move the digits of the number being multipled 2 places to the left until I get a whole number; then I multiply; then I move the digits of the product 2 places to the right.
When a number is multiples by one thousand, the digits move three places to the left. **When a number is divided by one thousand, the digits more three places to the right.**	**Generalisation**	
Dividing by one thousand is equivalent to multiplying by one thousandth.	**Generalisation**	 **6,000** ÷ 1,000 = **6** **6,000** × 0.001 = **6** • *'What is the value of the "6" in six thousand?'* • *'six thousand'* 6,000 • *'What is the value of the "6" in six?'* • *'six'* 6 *'We had six <u>thousands</u>. We now have six <u>ones</u>.'*

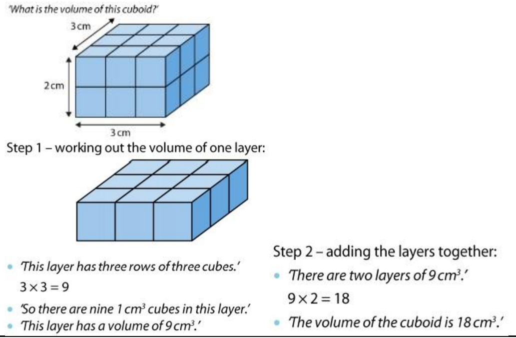
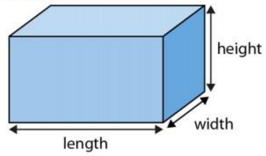
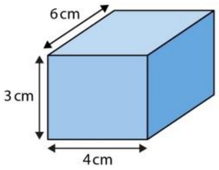
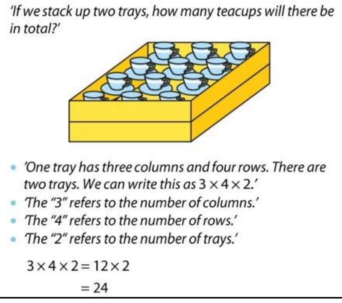
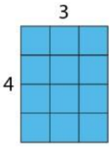
When a number is multiplied by a value greater then one, the product is greater then the original number. **When a number is multiplied by a value less than one, the product is less than the original number.**	**Generalisation**	
_____ is one-tenth the size of ____ so ____ divided by ____ is one tenth the size of ____ divided by ____ _____ is one-hundredth the size of ____ so ____ divided by ____ is one hundredth the size of ____ divided by ____	Structure	 • *'One-point-two is one-tenth the size of twelve, so one-point-two divided by three is one-tenth the size of twelve divided by three.'*  • *'Zero-point-one-two is one-hundredth the size of twelve, so zero-point-one-two divided by three is one-hundredth the size of twelve divided by three.'*

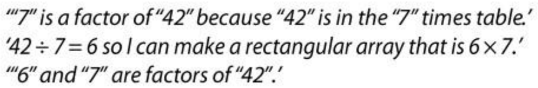
Stem Sentences
Multiplication & Division

If the dividend is made one-tenth times the size, the quotient will be one-tenth times the size.	**Generalisation**	 56 ones ÷ 8 = 7 ones so 56 tenths ÷ 8 = 7 tenths
If the dividend is made onehundredth times the size, the quotient will be one-hundredth times the size.	**Generalisation**	 56 ones ÷ 8 = 7 ones so 56 hundredths ÷ 8 = 7 hundredths
I move the digits of the dividend ___ places to the left until I get a whole number; then I divide; then I move the digits of the quotient ___ places to the right.	**Generalisation**	
_____ ones ÷ __ = ____ ones So ____ tenths ÷ ____ = ____ tenths.	Structure	 255 ones ÷ 5 = 51 ones so 255 tenths ÷ 5 = 51 tenths 25.5 ÷ 5 = 5.1
If there is a decimal point in the dividend, put a decimal point in the quotient; line it up with the decimal point in the dividend.	**Generalisation**	Step 1 – write the divisor, dividend and frame: Step 2 – write the decimal point for the quotient: Step 3 – perform the calculation, with unitising:

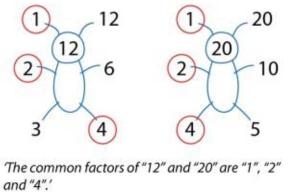
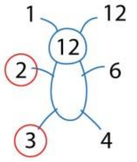
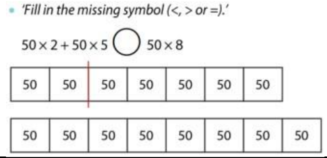
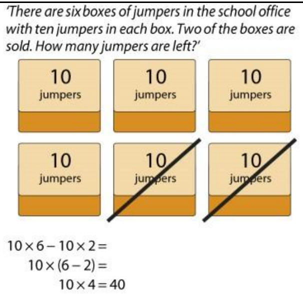
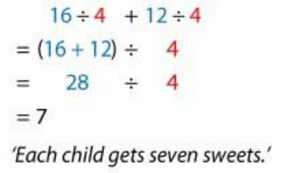
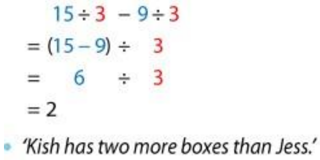
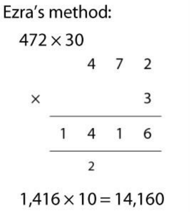
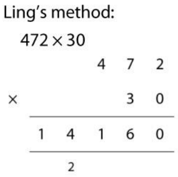
Volume		
You can measure volume in cubic centimetres. You write this as cm³	**Generalisation**	
This shape has a volume of ___ cm³	Language	*'What is the volume of each shape?'*  • *'This shape has a volume of 4 cm³.'*

Stem Sentences
Multiplication & Division

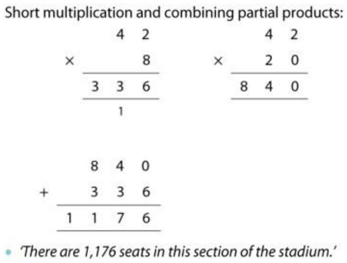
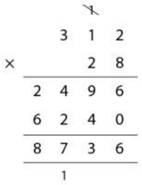
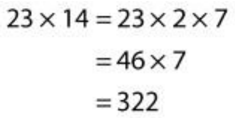
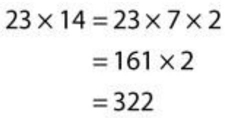
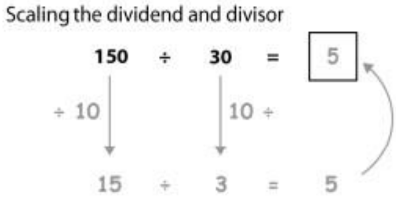
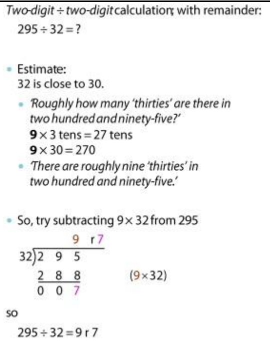
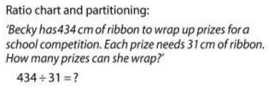
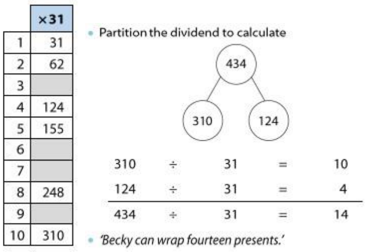
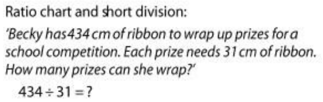
This layer has ___ rows of cubes There are ___ 1cm^3 cubes in this layer. This layer has a volume of ____ cm^3. The volume of the cuboid is ___ cm^3.	Structure	 *'What is the volume of this cuboid?'* Step 1 – working out the volume of one layer: - *'This layer has three rows of three cubes.'* $3 \times 3 = 9$ - *'So there are nine 1 cm^3 cubes in this layer.'* - *'This layer has a volume of 9 cm^3.'* Step 2 – adding the layers together: - *'There are two layers of 9 cm^3.'* $9 \times 2 = 18$ - *'The volume of the cuboid is 18 cm^3.'*
The volume of a cuboid can be found by multiplying the length by the width by the height.	**Generalisation**	Finding the volume of a cuboid: 
Length X width X height ____cm X ____cm X ____cm = ___cm^3	Structure	 Length X width X height. 4cm x 3cm x 6cm = 42cm^3
The ___ refers to the ____	Structure	 *'If we stack up two trays, how many teacups will there be in total?'* - *'One tray has three columns and four rows. There are two trays. We can write this as $3 \times 4 \times 2$.'* - *'The "3" refers to the number of columns.'* - *'The "4" refers to the number of rows.'* - *'The "2" refers to the number of trays.'* $3 \times 4 \times 2 = 12 \times 2$ $= 24$
If you change the order of the factors, the product remains the same.	**Generalisation**	
Factors, multiples, prime numbers and composite numbers.		
There are ___ tiles. There are ___ rows and ___ columns, So ___ and ___ are factors of ____.	Language / structure.	 There are 12 tiles. There are 4 rows and 3 columns, So 4 and 3 are factors of 12
1 is a factor of all positive integers. Every positive integer is a factor of itself. **The smallest factor of a positive integer is always 1.** **The largest factor of a positive integer is always itself.**	**Generalisation**	

____ is a factor of ___ because ___ is in the ___ times table.	Structure / language	 *'"7" is a factor of "42" because "42" is in the "7" times table.'* *'$42 \div 7 = 6$ so I can make a rectangular array that is 6×7.'* *'"6" and "7" are factors of "42".'*

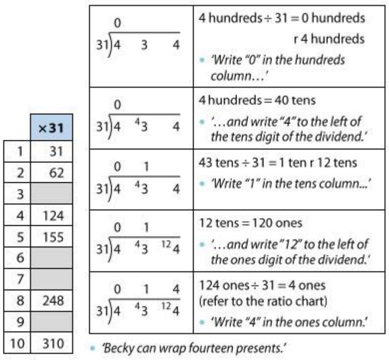
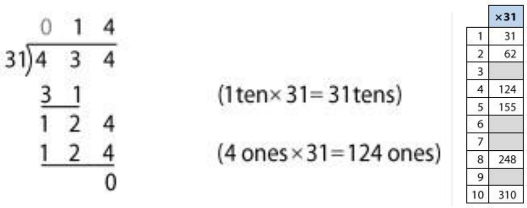
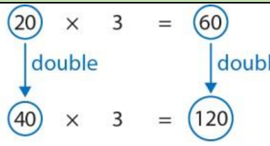
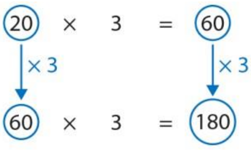
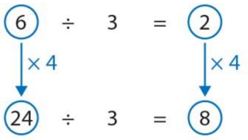
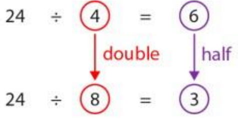
Stem Sentences
Multiplication & Division

Numbers that have more than two factors are composite numbers.	**Generalisation**	
Numbers that have exactly two factors are prime numbers.	**Generalisation**	
The common factors of ____ and ____ are _______	Language / structure	Common factors  'The common factors of "12" and "20" are "1", "2" and "4".'
____ and ____ are prime factors of _____		Prime Factors  2 and 3 are prime fctors of 12.
Combining calculations		
When there are no brackets, multiplication is completed before addition and subtraction.	**Generalisation**	 'Fill in the missing symbol (<, > or =).' $50 \times 2 + 50 \times 5$ ○ 50×8
When there are no brackets, division is completed before addition and subtraction.	**Generalisation**	
a x c – c x c = (a – b) x c	**Structure / generalisation**	 'There are six boxes of jumpers in the school office with ten jumpers in each box. Two of the boxes are sold. How many jumpers are left?' $10 \times 6 - 10 \times 2 =$ $10 \times (6 - 2) =$ $10 \times 4 = 40$
When two dividends are divided by the same divisor, we can <u>add</u> the dividends first then divide.	**Generalisation**	 $16 \div 4 + 12 \div 4$ $= (16 + 12) \div 4$ $= 28 \div 4$ $= 7$ 'Each child gets seven sweets.'
When two dividends are divided by the same divisor, we can <u>subtract</u> the dividends first then divide.	**Generalisation**	 $15 \div 3 - 9 \div 3$ $= (15 - 9) \div 3$ $= 6 \div 3$ $= 2$ 'Kish has two more boxes than Jess.'
Long multiplication		
To multiply by a multiple of 10, use short multiplication by a single digit number then multiply by 10.	**Generalisation**	 Ezra's method: 472×30 $\begin{array}{r} 4\ 7\ 2 \\ \times\ \ \ \ \ 3 \\ \hline 1\ 4\ 1\ 6 \\ \hline 2\ \ \ \ \end{array}$ $1{,}416 \times 10 = 14{,}160$  Ling's method: 472×30 $\begin{array}{r} 4\ 7\ 2 \\ \times\ \ \ 3\ 0 \\ \hline 1\ 4\ 1\ 6\ 0 \\ \hline 2\ \ \ \ \ \ \end{array}$

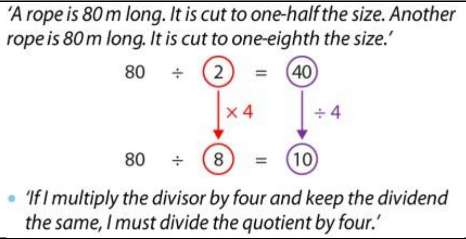
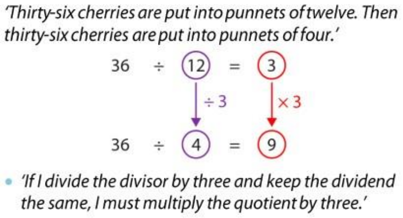
Stem Sentences
Multiplication & Division

To multiply two two digt numbers, first multiply by the ones, then miultiply by the tens, and then add them together.	**Generalisation**	42 x 28  Short multiplication and combining partial products: $\begin{array}{r} 4\ 2 \\ \times\quad 8 \\ \hline 3\ 3\ 6 \\ \hline 1\ \ \end{array}$ $\begin{array}{r} 4\ 2 \\ \times\ 2\ 0 \\ \hline 8\ 4\ 0 \\ \hline \end{array}$ $\begin{array}{r} 8\ 4\ 0 \\ +\ 3\ 3\ 6 \\ \hline 1\ 1\ 7\ 6 \end{array}$ - *'There are 1,176 seats in this section of the stadium.'*
Multiply by the units. Add the place value holder to show it is ten times the size. Multiply by the tens. Add the partial products.	**Generalisation**	 $\begin{array}{r} 3\ 1\ 2 \\ \times\quad 2\ 8 \\ \hline 2\ 4\ 9\ 6 \\ 6\ 2\ 4\ 0 \\ \hline 8\ 7\ 3\ 6 \\ \hline 1\ \ \ \ \ \end{array}$
When multiplying, you can write a compositve number as factor x factor and use the associative law to make the calculation more efficient.	**Generalisation**	 $23 \times 14 = 23 \times 2 \times 7$ $= 46 \times 7$ $= 322$ To  $23 \times 14 = 23 \times 7 \times 2$ $= 161 \times 2$ $= 322$
Division – 2-digit divisors		
If I divide the dividend by ten, I must divide the divisor by ten for the quotient to stay the same.	**Generalisation**	 Scaling the dividend and divisor $$\begin{tikzcd} 150 \arrow[d, "\div 10"'] & \div & 30 \arrow[d, "10 \div"] & = & \boxed{5} \\ 15 & \div & 3 & = & 5 \arrow[u, bend right] \end{tikzcd}$$
There are roughly _____ '______' in _______.	Structure	 *Two-digit ÷ two-digit* calculation; with remainder: $295 \div 32 = ?$ - Estimate: 32 is close to 30. - *'Roughly how many 'thirties' are there in two hundred and ninety-five?'* **9** × 3 tens = 27 tens **9** × 30 = 270 - *'There are roughly nine 'thirties' in two hundred and ninety-five.'* - So, try subtracting 9 × 32 from 295 $\begin{array}{r} 9\ \ \text{r}\,7 \\ 32\overline{)2\ 9\ 5} \\ \underline{2\ 8\ 8} \\ 0\ 0\ 7 \end{array}$ (9 × 32) so $295 \div 32 = 9\text{ r }7$
Partition ____ into __ and _____	Structure	Partitioing  Ratio chart and partitioning: *'Becky has 434 cm of ribbon to wrap up prizes for a school competition. Each prize needs 31 cm of ribbon. How many prizes can she wrap?'* $434 \div 31 = ?$  ×31 1 31 2 62 3 4 124 5 155 6 7 8 248 9 10 310 - Partition the dividend to calculate 434 → 310, 124 310 ÷ 31 = 10 124 ÷ 31 = 4 434 ÷ 31 = 14 - *'Becky can wrap fourteen presents.'*
____ hundreds divided by ____ is equal to ____ hundreds with a remainder of ____ Exhange the reminader: _____ hundreds is equal to ____ tens.	Structure	Short division method  Ratio chart and short division: *'Becky has 434 cm of ribbon to wrap up prizes for a school competition. Each prize needs 31 cm of ribbon. How many prizes can she wrap?'* $434 \div 31 = ?$

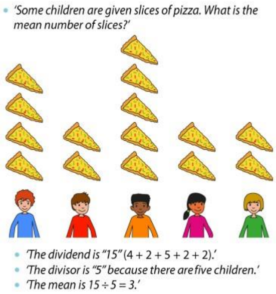
Stem Sentences
Multiplication & Division

____ tens divided by ____ is equal to ____ tens with a remainder of ____ Exhange the reminader: _____ tens is equal to ____ ones.		
	Structure	Long division 
Compensation to calculate.		
If I double one factor, I must double the product.	**Generalisation**	
If I multiply one factor by ____ , I must multiply the product by ____.	Structure/ language	 If I multiply one factor by 3 , I must multiply the product by 3.
If I divide one factor by ____ , I must divide the product by ____.	Structure/ language	 If I divide one factor by 5 , I must divide the product by 5.
If I multiply the dividend by ____ and keep the divisor the same, I must multiply the quotient by _____.	Structure/ language	 If I multiply the dividend by 4 and keep the divisor the same, I must multiply the quotient by 4.
If I double the divisor and keep the dividend the same, I must halve the quotient.	**Generalisation**	

Stem Sentences
Multiplication & Division

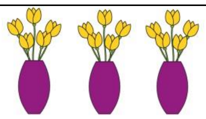
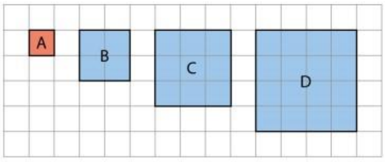
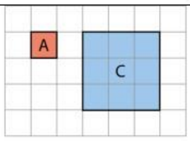
If I multiply the divisor by ____ and keep the dividend the same, I must divide the quotient by _____.	Structure.	 'A rope is 80 m long. It is cut to one-half the size. Another rope is 80 m long. It is cut to one-eighth the size.' 80 ÷ 2 = 40 × 4 ÷ 4 80 ÷ 8 = 10 • 'If I multiply the divisor by four and keep the dividend the same, I must divide the quotient by four.'
If I divide the divisor by ____ and keep the dividend the same, I must multiply the quotient by _____.	Structure.	 'Thirty-six cherries are put into punnets of twelve. Then thirty-six cherries are put into punnets of four.' 36 ÷ 12 = 3 ÷ 3 × 3 36 ÷ 4 = 9 • 'If I divide the divisor by three and keep the dividend the same, I must multiply the quotient by three.'

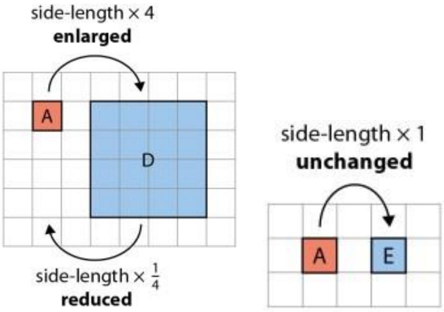
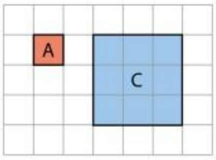
<table>
<tr><th colspan="3">Mean Average</th></tr>
<tr><td>**The mean is the size of each part when a quantity is shared equally.**

The mean is the total of the numbers divided by how many numbers there are.</td><td>**Generalisation**</td><td></td></tr>
<tr><td>The dividend is ________
The divisor is ____ because _______
The mean is _____ ÷ _____ = _______</td><td>Language / structure.</td><td>
• 'Some children are given slices of pizza. What is the mean number of slices?'
• 'The dividend is "15" (4 + 2 + 5 + 2 + 2).'
• 'The divisor is "5" because there are five children.'
• 'The mean is 15 ÷ 5 = 3.'</td></tr>
<tr><td>**If the number of values in the set stays the same and the total increases, the mean also increases.**

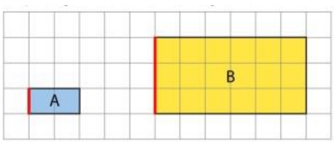
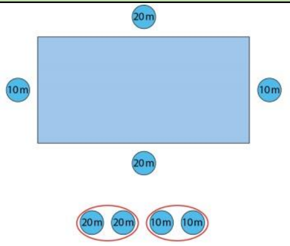
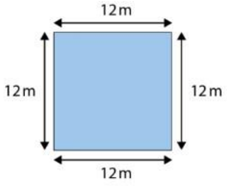
If the number of values in the set stays the same and the total decreases, the mean also decreases.</td><td>**Generalisation**</td><td></td></tr>
<tr><th colspan="3">Ratio and Proportion</th></tr>
</table>

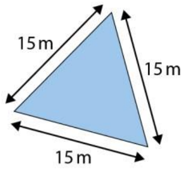
Stem Sentences
Multiplication & Division

<table>
<tr>
<td>For every ___ there are ______</td>
<td>Language / structure.</td>
<td>
<table>
<tr><th>Number of grapes that Lily eats</th><th>Number of grapes that Ralph eats</th></tr>
<tr><td>1</td><td>10</td></tr>
<tr><td>?</td><td>20</td></tr>
<tr><td>3</td><td>?</td></tr>
</table>
'If Ralph eats twenty grapes, how many does Lily eat?'
'If Lily eats three grapes, how many does Ralph eat?'
For every one vase there are 5 flowers.</td>
</tr>
<tr>
<td>The length of one of the sides of the square is ___ times the length of one of the sides of square _____.
The side length of square ___ is ___ times the side-length of square ___.</td>
<td>Structure.</td>
<td>
Example comparison:
- *'The length of one of the sides of square B is two times the length of one of the sides of square A.'*
side-length of B = side-length of A × **2**
- *'The length of one of the sides of square A is one-half times the length of one of the sides of square B.'*
side-length of A = side-length of B × $\frac{1}{2}$</td>
</tr>
<tr>
<td>To change shape ___ into shape ___, scale the side-lengths by a scale factor of ___.</td>
<td></td>
<td>
- *'To change shape A into shape C, scale the side-lengths by a scale factor of three.'*
side-length of C = side-length of A × **3**
- *'To change shape C into shape A, scale the side-lengths by a scale factor of one-third.'*
side-length of A = side-length of C × $\frac{1}{3}$</td>
</tr>
</table>

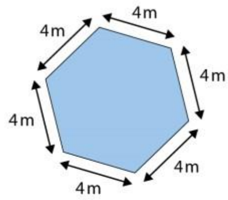
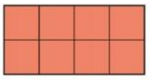
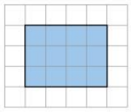
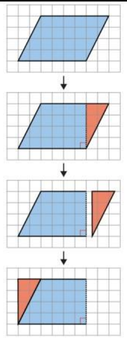
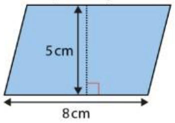
<table>
<tr>
<td>If the scale factor is greater than one, the shape is made larger. We can say the shape is enlarged.
If the scale factor is equal to one, the shape is the same size.
If the scale factor is less than one, the shape is made smaller. We can say the shape has been reduced.</td>
<td>Generalisation</td>
<td> </td>
</tr>
<tr>
<td>The ratio of the dimensions of shape ___ to the dimensions of shape ___ is equal to __ to ___.</td>
<td>Structure/ language</td>
<td>
- *'To change shape A into shape C, scale the side-lengths by a scale factor of three.'*
- *'The ratio of the dimensions of shape A to the dimensions of shape C is equal to one-to-three.'*
- *'We can write this as:'*
dimensions of A : dimensions of C = 1 : 3</td>
</tr>
</table>

Stem Sentences
Multiplication & Division

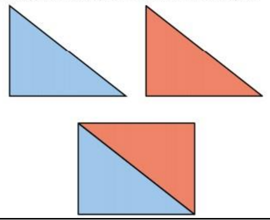
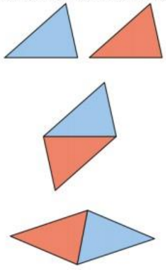
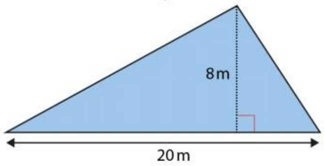
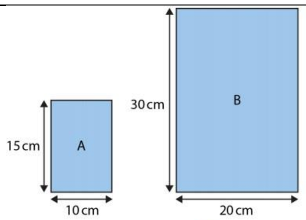
To change shape ____ into shape ____, scale the dimensions by a scale factor of ____ The ratio of dimensions of shape ____ to the dimensions of shape ____ is equal to ____ to ____	Structure / language.	 To change shape A into shape B, scale the dimensions by a scale factor of 3 The ratio of dimensions of shape A to the dimensions of shape B is equal to 1 to 3
Area and Perimeter		
Perimeter is equal to two times _____ plus two times _____.	Language / structure.	 $P = 2 \times 20\,m + 2 \times 10\,m$ $= 40\,m + 20\,m$ $= 60\,m$
The perimeter of a rectangle is equal to two times the length of the long side plus two times the length of the short side.	**Generalisation**	
Perimeter of the square is _____ + ______ + ______ + ______ Or Perimeter of the square is 4 x ________	Structure	 $P = 12\,m + 12\,m + 12\,m + 12\,m$ $= 12\,m \times 4$ $= 48\,m$
The perimeter of a square is four times the length of one of the sides.	**Generalisation**	

Perimeter of the equilateral triangle is _____ + ______ + ______ Or Perimeter of the equilateral triangle is 3 x ______	Structure	 $P = 15\,m + 15\,m + 15\,m$ $= 3 \times 15\,m$ $= 45\,m$
The perimeter of an equilateral trinagle is three times the length of one of the sides.	**Generalisation**	

Stem Sentences
Multiplication & Division

Perimeter of the regular hexagon is ______ + ______ + ______ + ______ + ______ + _______ Or Perimeter of the regular hexagon is 6 x ______		 $P = 4\,m + 4\,m + 4\,m + 4\,m + 4\,m + 4\,m$ $= 6 \times 4\,m$ $= 24\,m$
To find the perimeter of a regular polygon, you miltiply the length one of the sides by the number of sides.	**Generalisation**	
If you know the perimeter of a regular polygon you divide it by the number of sides to find the length of one of its sides.	**Generalisation**	
This shape has an area of _____ square units.		 This shape has an area of 8 square units.
We can measure area in square centimetres. We write this as cm²	**Generalisation**	
The ____ represents the _____	Structure	 $5\text{ cm} \times 4\text{ cm} = 20\text{ cm}^2$ $4\text{ cm} \times 5\text{ cm} = 20\text{ cm}^2$ $A = 20\text{ cm}^2$ *'The "5 cm" represents the width.'* *'The "4 cm" represents the length.'* *'The "20 cm²" represents the area.'*
To find the area of a rectangle multiply the length by the width.	**Generalisation**	 4 x 3 = 12cm²
A parallelogram can be made into a rectangle that has the same area.	**Generalisation**	
The base is _____ The perpendicular height is _____ The area is _____	Structure/ language	*'Find the area of this parallelogram.'*  - *'The base is 8 cm.'* - *'The perpendicular height is 5 cm.'* - *'The area is 8 × 5 = 40 cm².'*
To find the area of a parallelogram multiply the base by the perpendicular height.	**Generalisation**	

Stem Sentences
Multiplication & Division

Two right-angled triangles that are the same can be joied to make a rectangle. **A rectangle can be divided into two right-angled triangles.**	**Generalisation**	Combining two triangles to make a rectangle: 
Two triangles that are the same can be joined to make a parallelogram. **A parallelogram can be divided into two triangles.**	**Generalisation**	Combining two triangles to make a parallelogram: 
To find the area of a triangle multiply the base by the perpendicular height and then divide by two.	**Generalisation**	*'Find the area of this triangle.'*  - *'The base is 20m.'* - *'The perpendicular height is 8m.'* - *'The area is* $20 \times 8 \div 2 = 160 \div 2 = 80 m^2$.*'*
Shapes can have the same perimeter but different areas. **Shapes can have the same area but different perimeters.**	**Generalisation**	
When a shape has been transformed by a scale factor, the perimeter is also transformed by the same scale factor.	**Generalisation**	 perimeter = 10 + 10 + 15 + 15 = 50 cm perimeter = 20 + 20 + 30 + 30 = 100 cm 50 × 2 = 100 *'The perimeter has changed by a scale factor of two.'*

Credit: Enigma