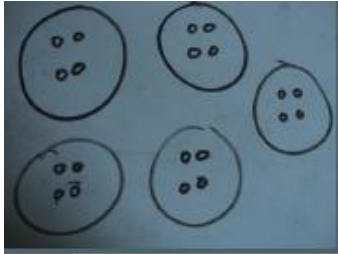


**Models and
images to
support
calculation in
division**

Year 3

Equal Grouping (or sharing)



Using Arrays

Sharing equally between.

e.g. $28 \div 4$

1 xxxxxxxx
2 xxxxxxxx
3 xxxxxxxx
4 xxxxxxxx

or $28 \div 7$

1	2	3	4	5	6	7
x	x	x	x	x	x	x
x	x	x	x	x	x	x
x	x	x	x	x	x	x
x	x	x	x	x	x	x

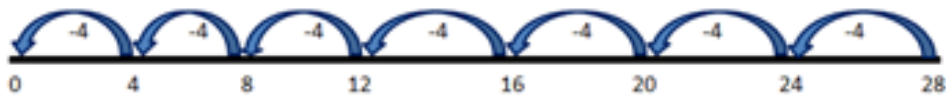
I have 28 sweets. I want to put them into bags of 7.
How many can I fill?

1	xxxxxxx	1 bag (7 sweets)
2	xxxxxxx	2 bags (14 sweets)
3	xxxxxxx	3 bags (21 sweets)
4	xxxxxxx	4 bags (28 sweets)

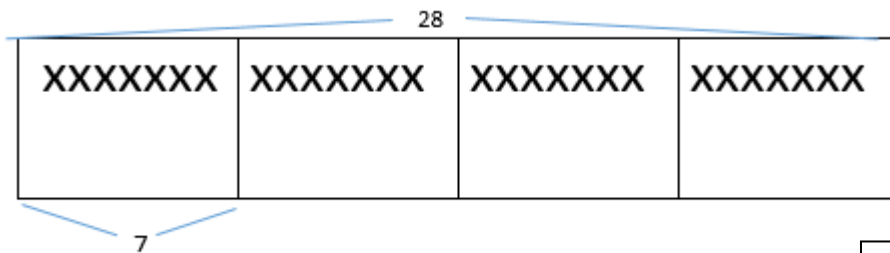
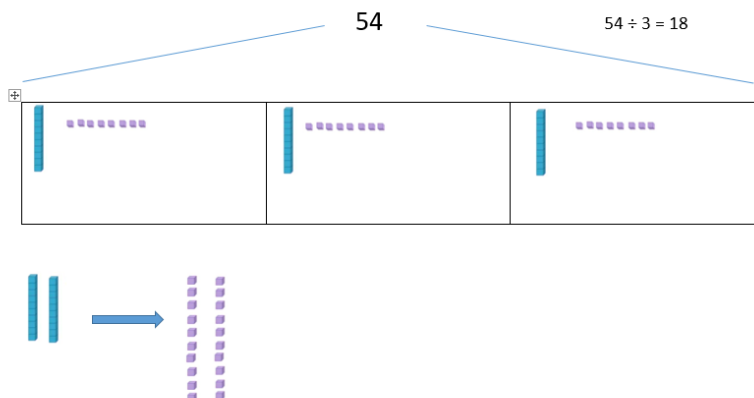
Using a number line

Using a number line for repeated subtraction.

e.g. $28 \div 4 = 7$



Using a bar model



Key Vocabulary

- Share equally
- Lots of
- Groups of
- Jumps of
- Sets of
- Divide
- Product
- Inverse
- Regrouping
- Exchanging

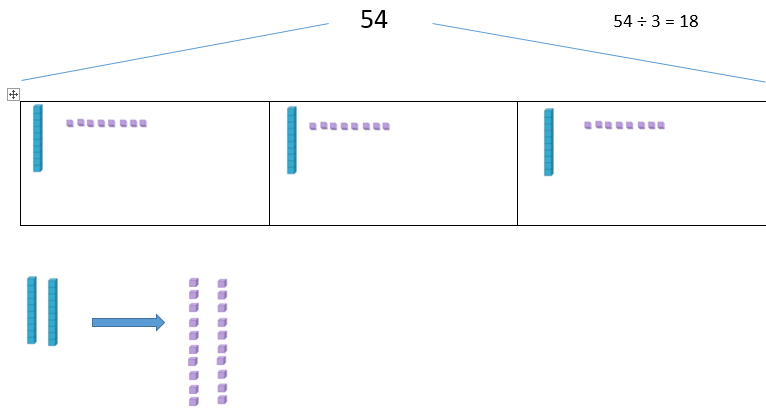
What is ... shared by... ?

How many groups of ... in ...?

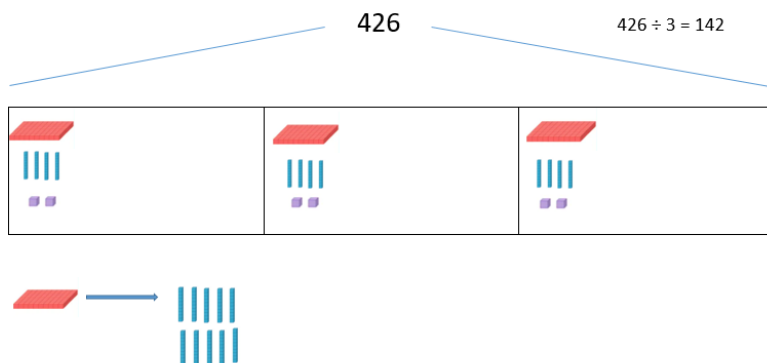
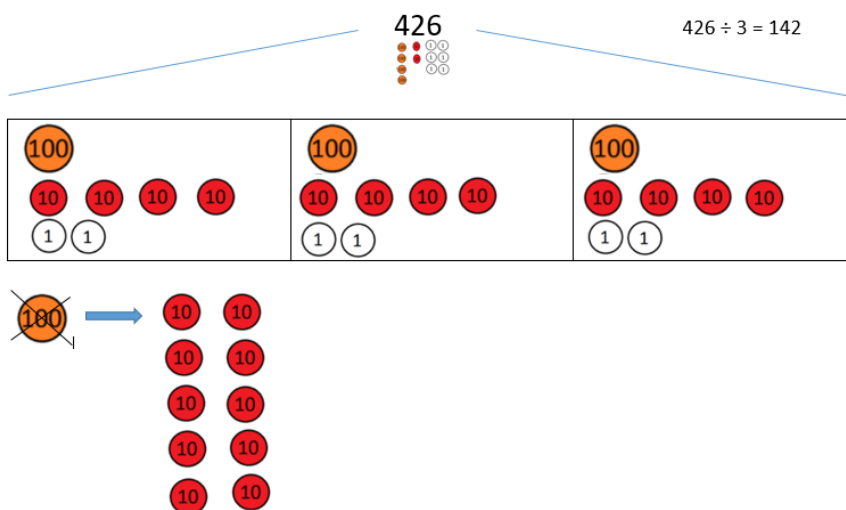
How many jumps of... in ... ?

Year 4

Bar model



Progression to HTU $\div$ U



Possible modelling example

1. Split the bar into 3 equal parts.
2. Make the number being divided using dienes.
3. Starting with your tens, share 54 equally.
4. Make sure each equal part has the same number of tens.
5. If you have any tens that cannot be shared equally exchange each ten for ten ones.
6. Share the ones equally between the 3 equal parts until there are none left or they can no longer be shared equally.
7. Add together how many dienes there are in one equal part. This is your answer
8. If you have any ones left over this will be your remainder.

Key Vocabulary

- Share equally
- Lots of
- Groups of
- Jumps of
- Sets of
- Divide
- Product
- Inverse
- Regrouping
- Exchanging

What is ... shared by... ?

How many groups of ... in ...?

How many jumps of... in ... ?

Year 5

1. Write out the number sentence, it should look like this:

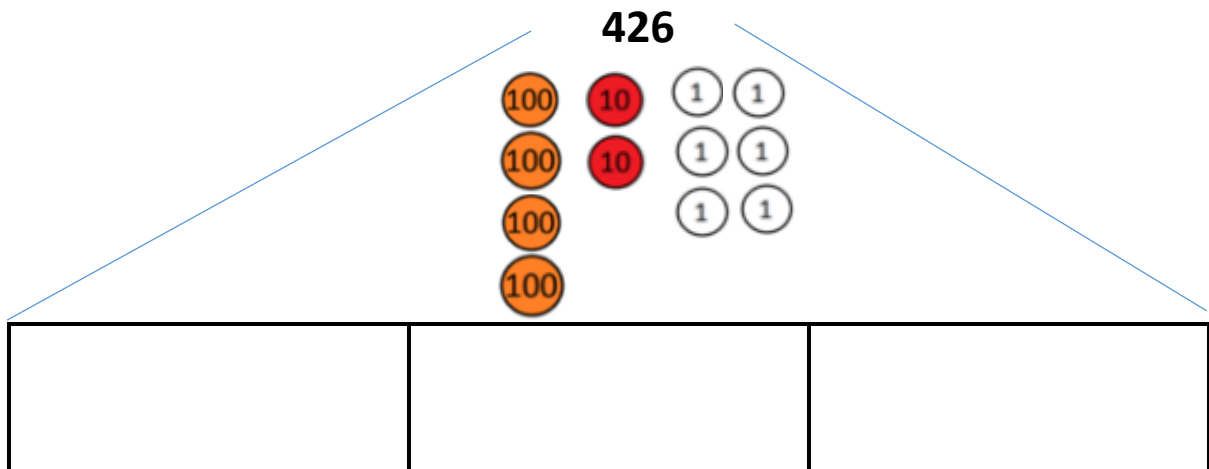
Dividend (big number) $\div$ (operation symbol) divisor (small number) = (equals symbol).

$$426 \div 3 =$$

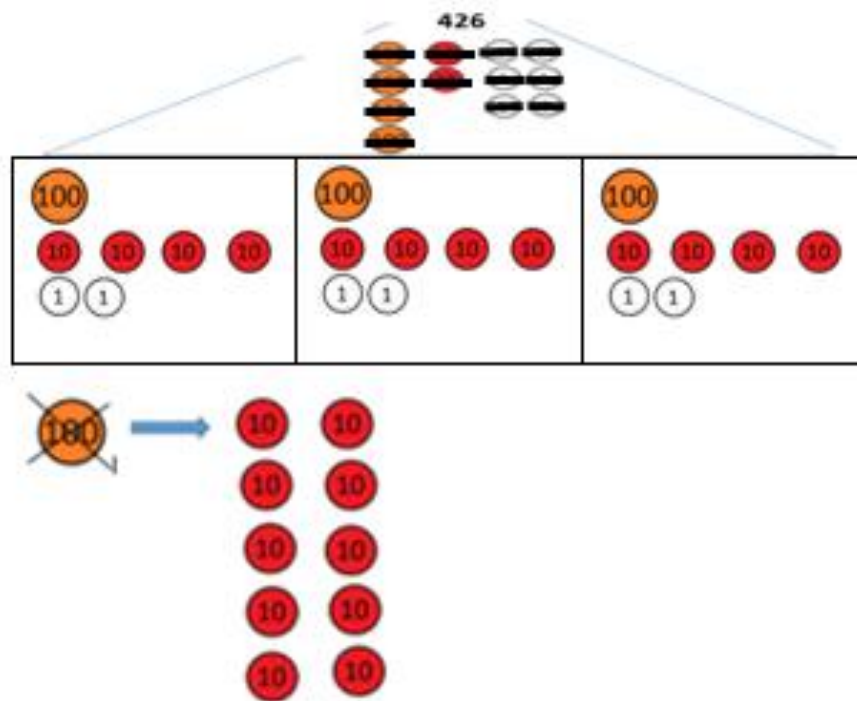
2. The divisor tells you how many equal parts needs to be drawn in your bar model - use a ruler to draw yours.

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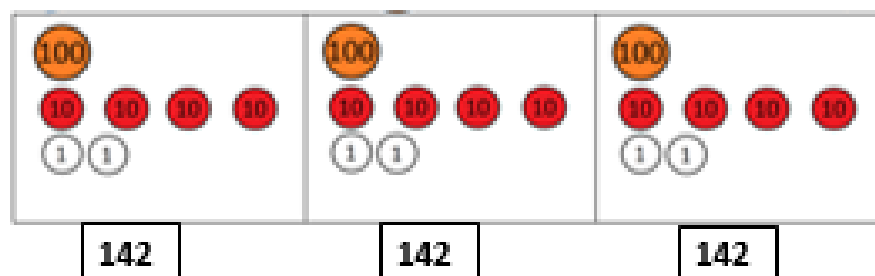
3. Write your dividend above the bar model and partition the number into ones, tens, hundreds and so on, then represent this in discs.



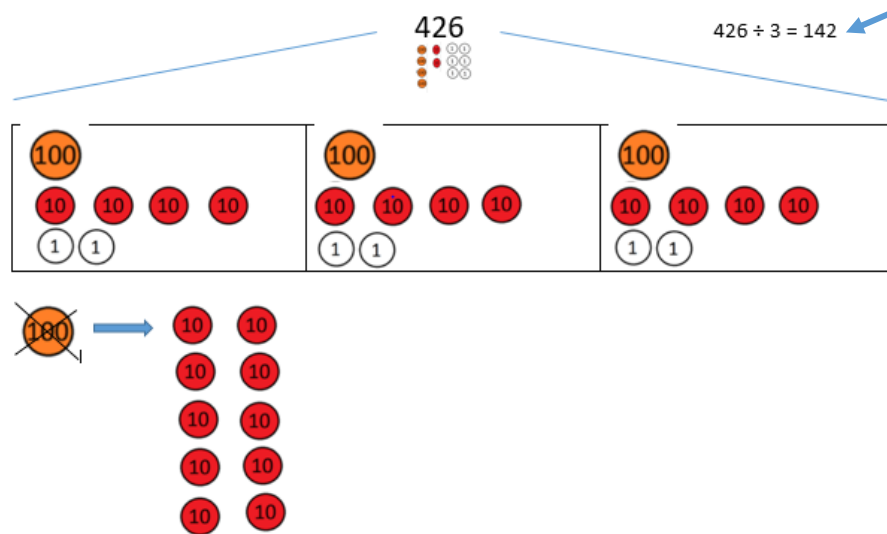
4. Share the discs equally between the parts of the bar model, starting with the largest place value discs, remember to cross them off as you do so.
5. If you are unable to share equally, exchange for the lower place value discs (e.g. one 100 disc changes to ten 10 discs etc.)



6. Once you have shared everything equally add up the total in each part of the bar model - check they are equal.



7. Your answer is called the quotient, you can write this into the original number sentence



Key Vocabulary

- Share equally
- Lots of
- Groups of
- Jumps of
- Sets of
- Divide
- Product
- Inverse
- Regrouping
- Exchanging
- Divisor
- Dividend
- Quotient
- Column
- Multiples

What is ... shared by... ?

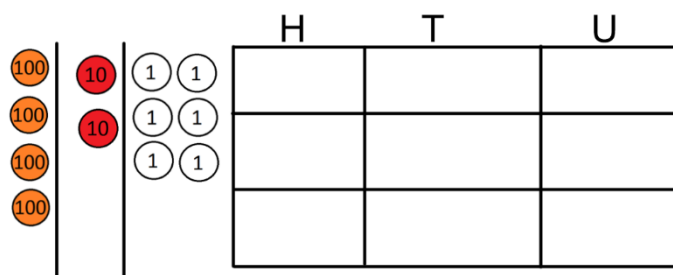
How many groups of ... in ...?

How many jumps of... in ... ?

Steps to Success – Division using Discs

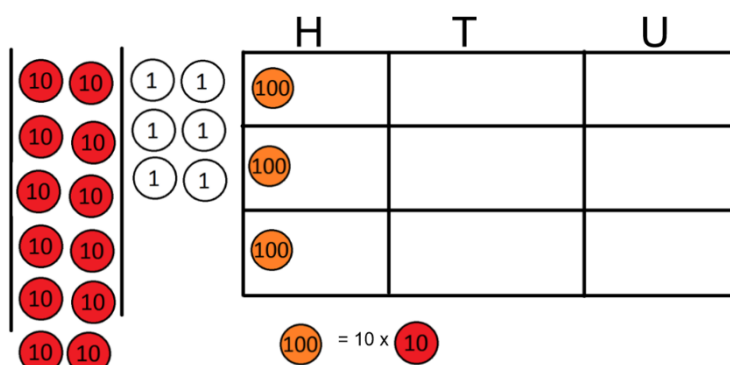
Step 1 $426 \div 3 =$

Get your place value discs in the value of the largest number you are dividing. Draw a grid to divide your numbers (columns = number of digits in the number, rows = number you are dividing by)



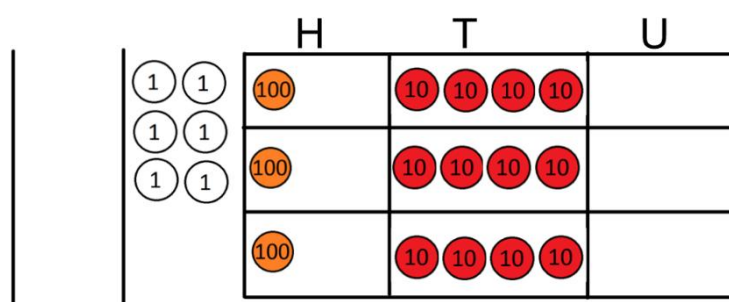
Step 2

Start with the largest unit. For this number you will start with hundreds. Divide the hundreds equally over the 3 groups. If you can't split hundreds for equally, left over tens.



Step 3

Divide the tens equally into the groups. If they can't be, you will need to exchange like step 2 for the tens and ones.

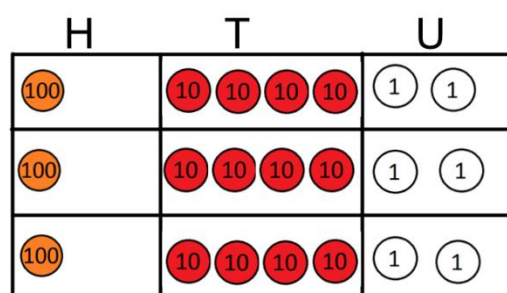


Step 4

Now divide the ones equally. If you can't divide the ones equally, anything that you have left over the will remainders

Count up the discs in one row, this will be the answer.

$$426 \div 3 = 142$$

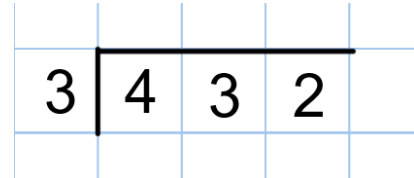


Steps to Success – Dividing using short method with discs

$$432 \div 3 = 144$$

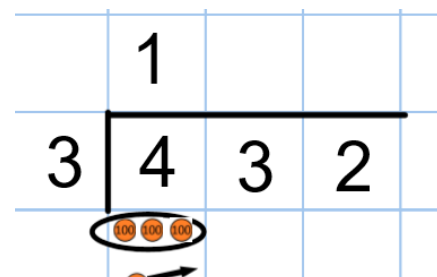
Step 1

Write out the question. Place the divisor (the number you are dividing by) outside the short division bar. Place the number you are sharing inside the division bar.



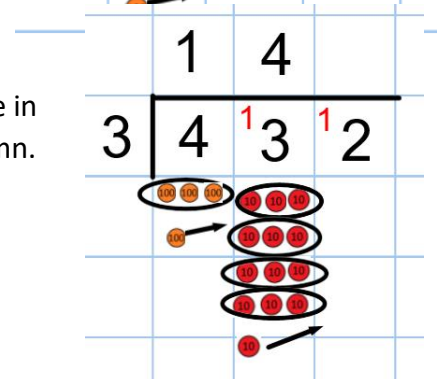
Step 2

How many groups of 3 hundreds can we make with 4 hundreds? We can make 1 group. So you put a 1 above the four. There is 1 group of hundred left over. This gets exchanged for 10 tens in the next column.



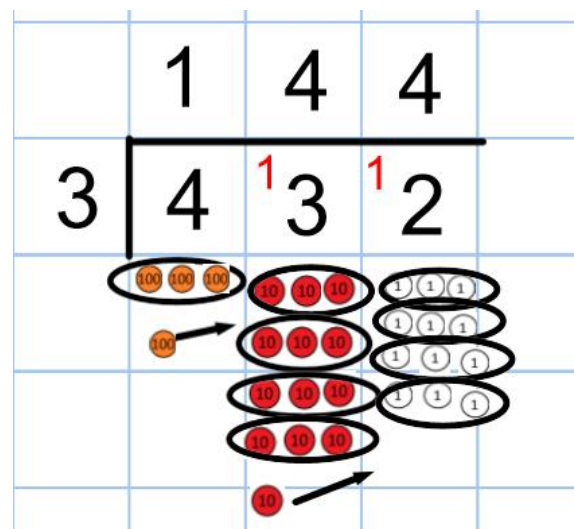
Step 3

How many groups of 3 tens can we make with 13 tens? We can make 4 groups of 3 tens (120) and there is 1 ten left over. So we put a 4 above in the tens column. This then gets exchanged for 10 ones in the next column. Now there are 12 ones.



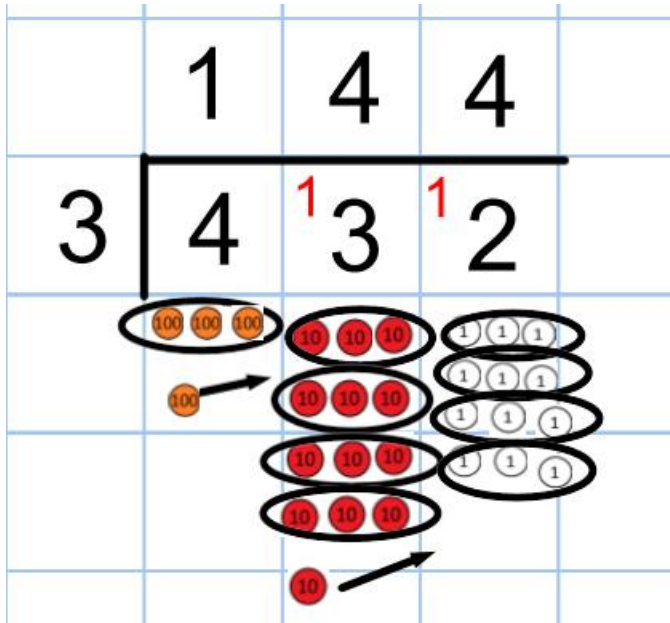
Step 4

How many groups of 3 ones are there in 12 ones? There are 4 groups and there are no left over. So we put the digit 4 above in the ones column. The answer is 144.

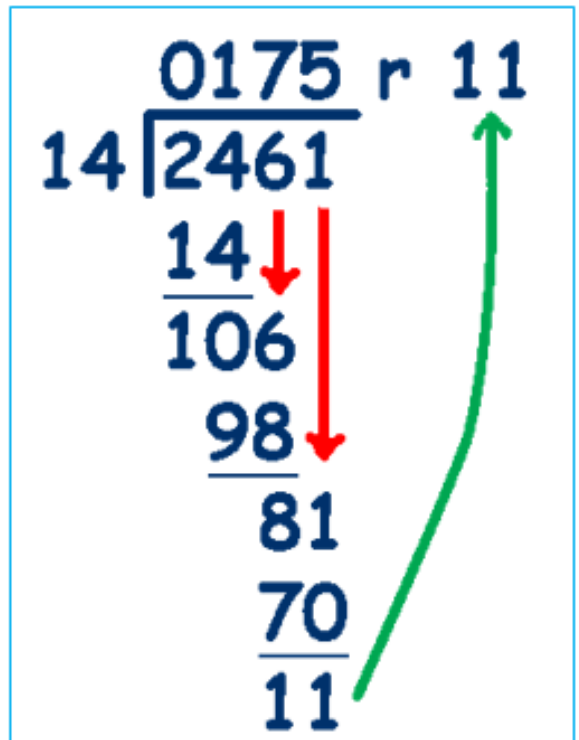


Year 6

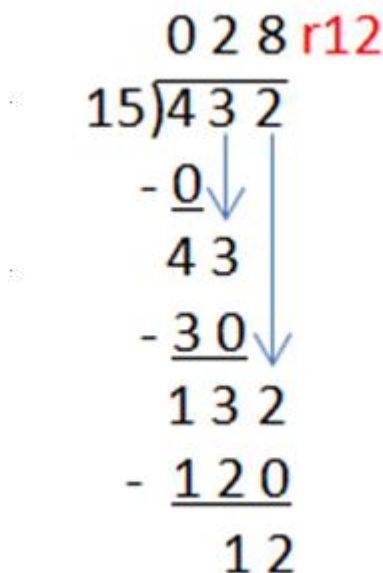
Short division



Long division



Suggested modelling of long division



- ✚ Create a times table bank for the number we are dividing by in this case 15. Use 1, 10 5 derive to find all the facts.
- ✚ How many groups of 15 hundred can we make with the 4 hundreds? We can't make any groups of 15 hundreds. Record a 0 above the hundreds. We will have to regroup the hundreds into the tens column. We now have 43 tens.
- ✚ How many groups of 15 tens can we make with 43 tens? We can make 2 groups. Record a 2 above the tens. Do we have any tens left? Yes we have 13 tens left. We will have to regroup the tens into the unit's column. We have 132 units.
- ✚ How many groups of 15 units can we make with 132 units? We can make 8 groups of 15. Record an 8 above the units. Are there any units left? Yes, there are 12. These will be our remainder.

Key Vocabulary

- Share equally
- Lots of
- Groups of
- Jumps of
- Sets of
- Divide
- Product
- Inverse
- Regrouping
- Exchanging
- Divisor
- Dividend
- Quotient
- Column
- Multiples

What is ... shared by... ?

How many groups of ... in ...?

How many jumps of... in ... ?