Multiplication and Division at Kingsclere CE Primary School

Mrs Karen Bentall - Maths Lead

16th January 2024

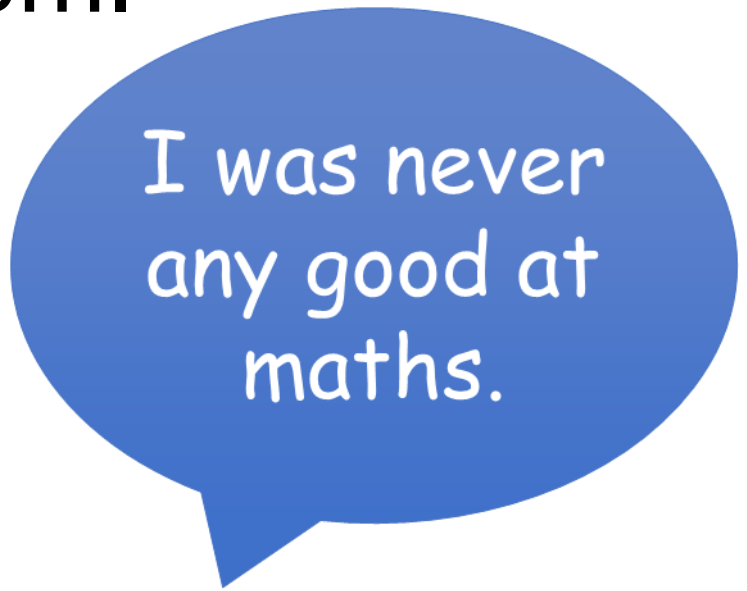
Ofsted GRADED GOOD

Love Courage Respect

Thank you for coming – it is not easy for everyone!

Research suggests that as many as 60% of adults would rather clean the toilet than work out a maths problem.

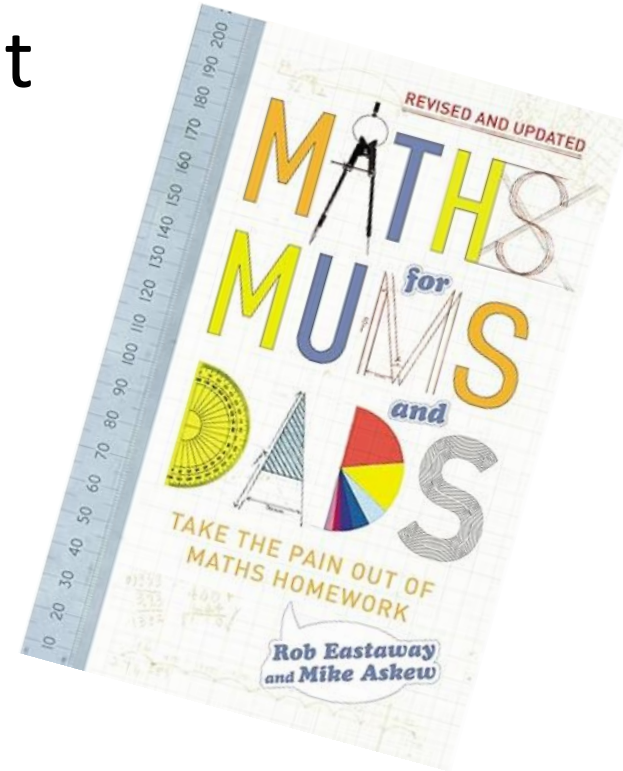
An even larger percentage say:



…and thank you from our child!

"Mathematics plays a unique role in the learning of most children – it is the subject that can make them feel both helpless and stupid. Maths, more than any other subject, has the power to crush children's confidence, and to deter them from learning important methods and tools for many years to come."

Jo Boaler



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“We never did Maths like that in my day!”

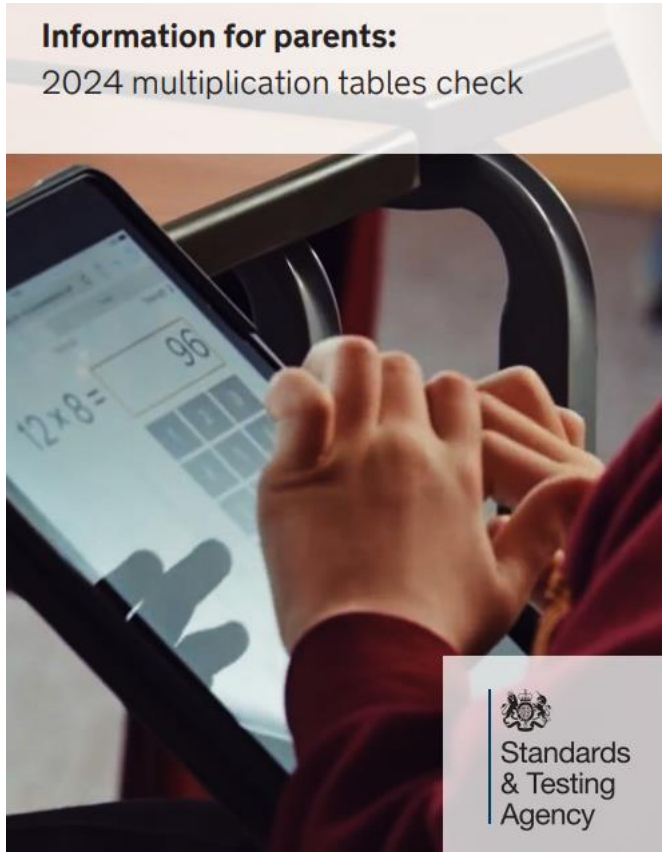
- **<u>Aims of today’s event:</u>**
- Understand the reasoning behind the way we teach Maths the way we do
- Explore how learning multiplication and division progresses through Kingsclere CE Primary School
- Give you a chance to see your child modelling some activities in their classroom, have a go yourself and look at what comes next
- Provide ideas for how you can support your child at home

Why does maths matter if I've got a calculator on my phone?

- Adults with poor maths skills are twice as likely to be unemployed than those who enjoy some competency in numeracy.
- Those adults with at least basic maths skills can expect to earn a quarter more than those who lack a basic mathematical understanding.
- Between a third and a half of people with poor numeracy skills have a desire to improve them but less than 4% have actually attended any maths classes – so again, thank you all for joining us today!

Year 4 multiplication check

Leaflet for year 4 parents



Between Monday 3 June and Friday 14 June 2024

- On-screen check of 25 times table questions up to 12 x 12
- 6 seconds to answer each question on an IPad

Maths Ambassadors

- Representatives from each class who are championing maths across our school
- First event today – answer questions
- Moving forwards – intend to produce a series of short explanatory films for the website showing how maths progresses across our school

1-10-5 derive – that’s the way we do it!

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Fluency, reasoning and problem-solving

- Fluency - **recall** of **mental maths facts** e.g. times tables, number bonds etc.
- Reasoning - children need to be able to **explain** the mathematical concepts with number sense; they must explain **how** they got the answer and **why** they are correct.
- Problem Solving - applying their skills to real-life contexts

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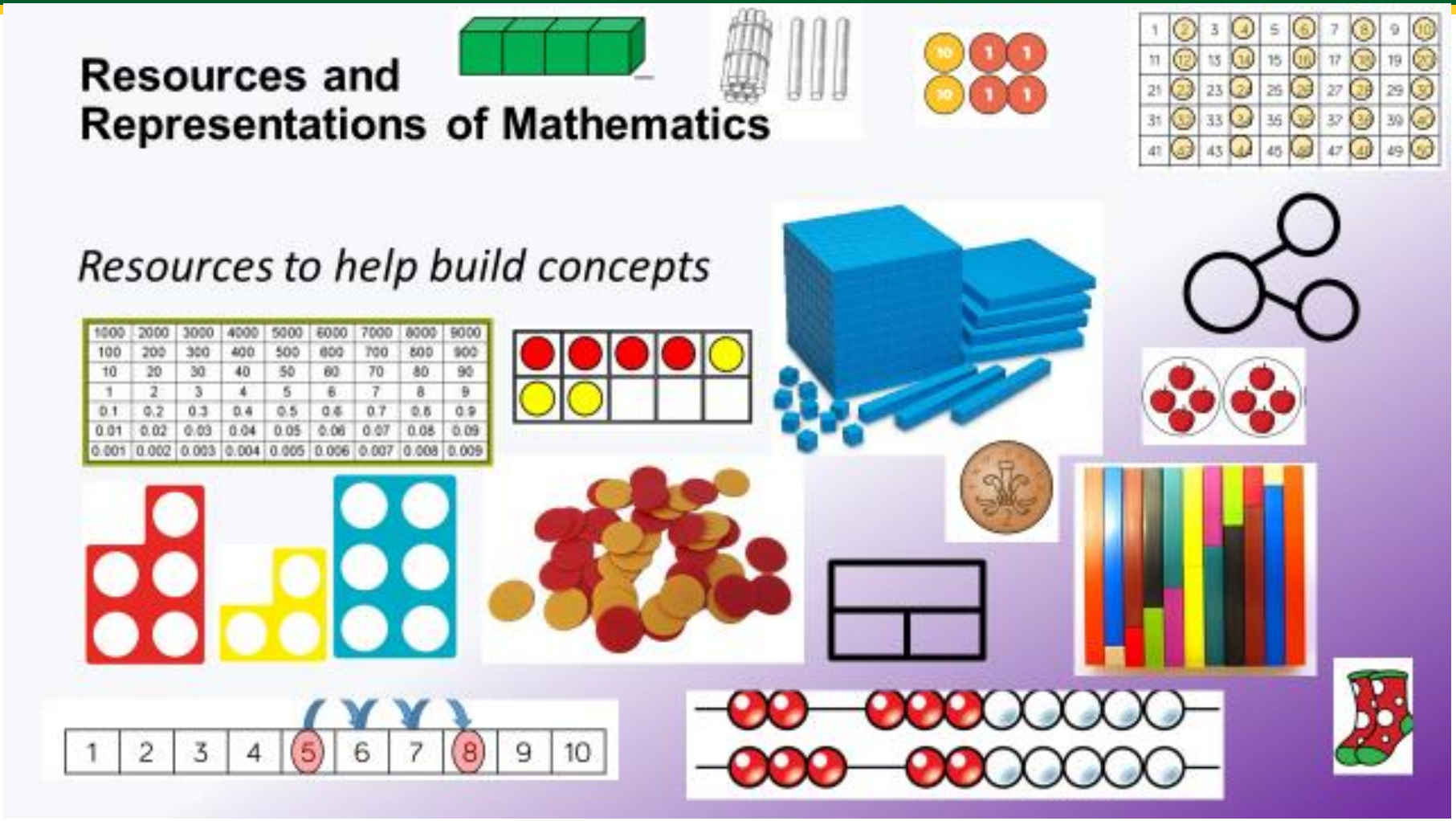
Resources and Representations



Concrete – Pictorial - Abstract

- **Concrete** – model with objects or materials
- **Pictorial** – model by drawing a representation
- **Abstract** – using symbols such as the obelus

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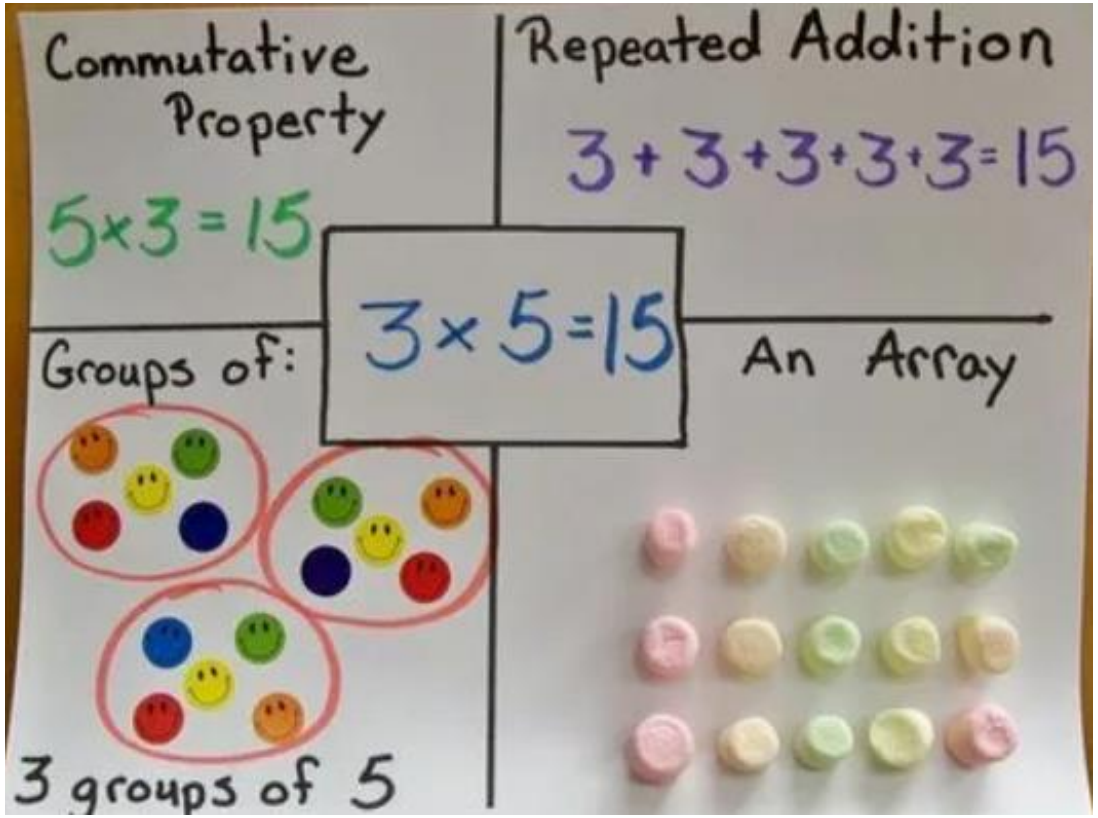
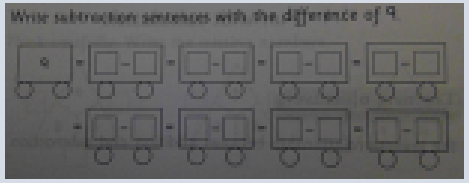


How do we ensure the right challenge?

Differentiating through depth for highest attainers – some ideas!*

Many different ways



6 + 8 = 14

Find 3 different ways to solve this.

[Where relevant, would expect systematic working from highest attainers]

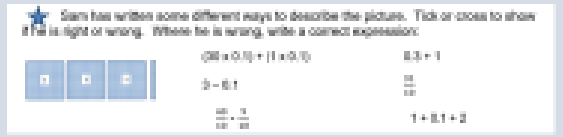
Generalising

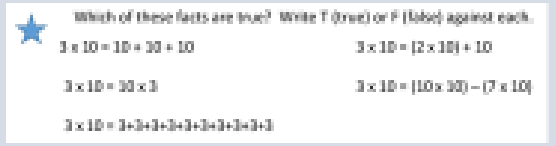
Captain Conjecture says, 'I can double any number, but I can only halve some numbers.'

Do you agree?

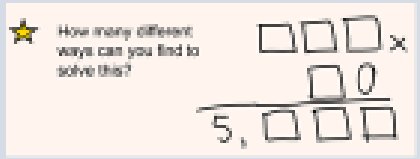
Explain your reasoning.

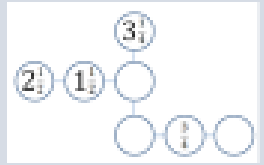
Equivalent or not?

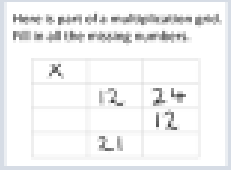




Empty box problems

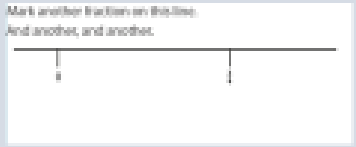






These are not the only ways!
Just some of my 'go to' ones

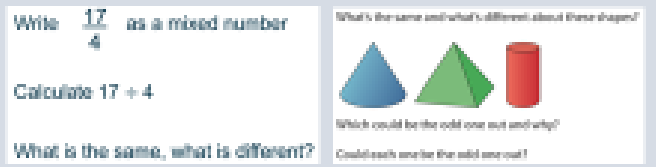
No clear signpost



[A bit harder to write – start by using e.gs in NCETM assessing for mastery materials]

Explaining ideas/ misconceptions

What is the same, what is different?



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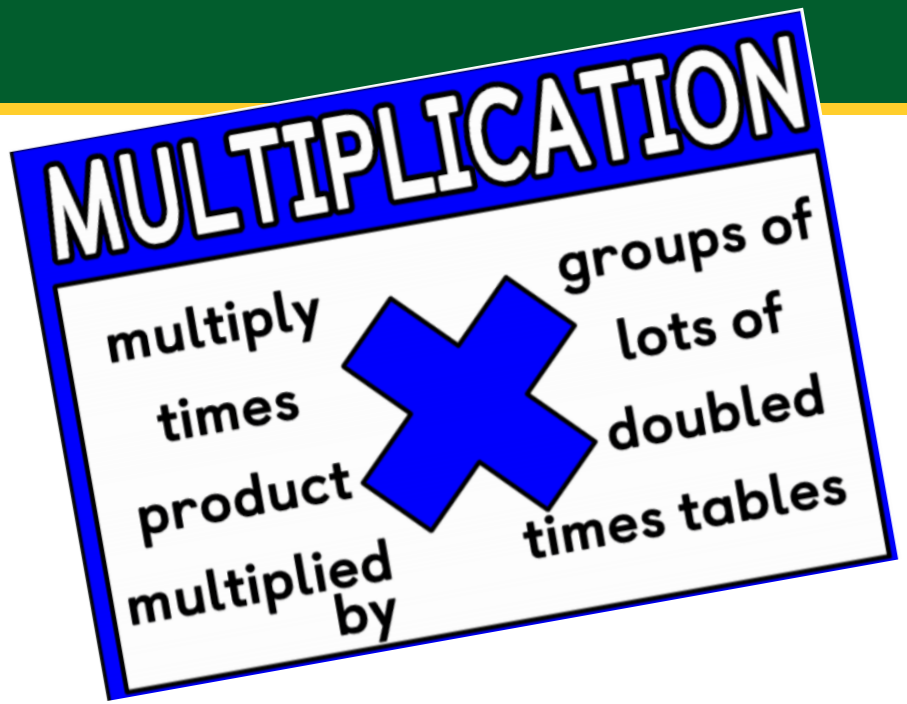
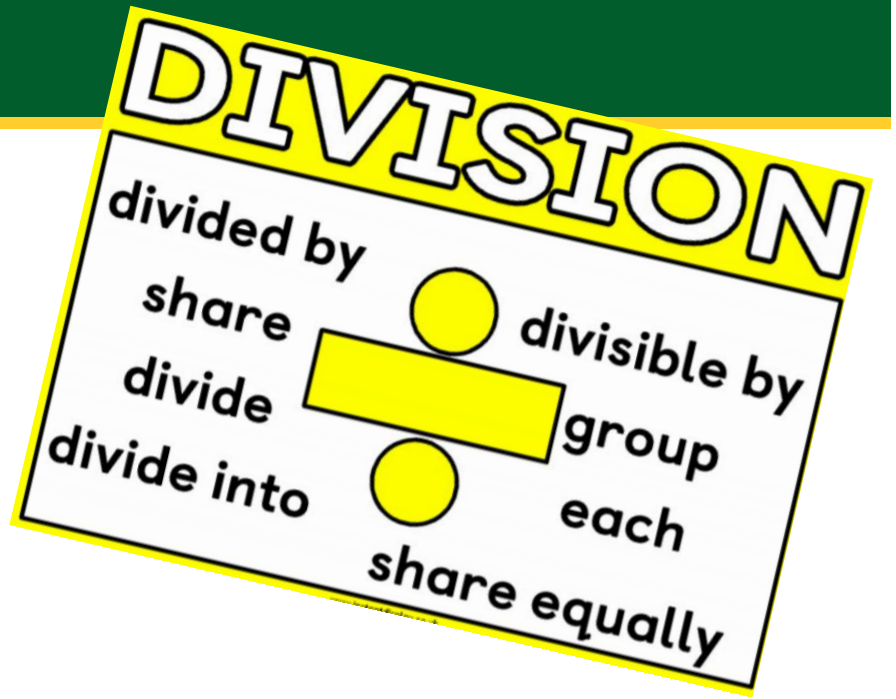
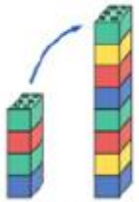
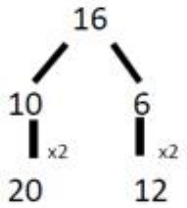
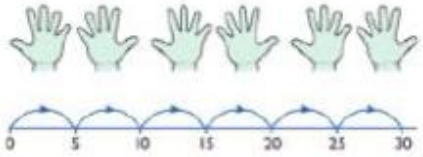


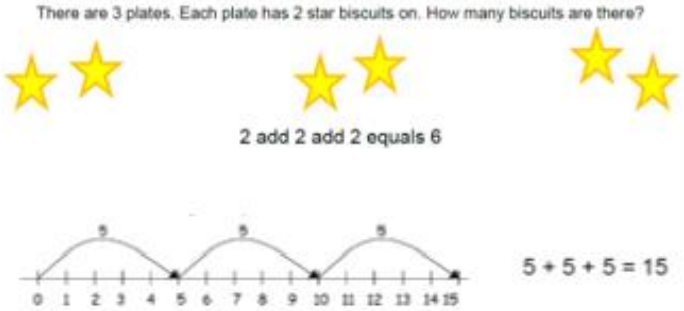
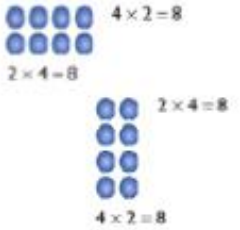
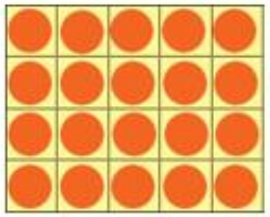


Methods and vocabulary progress through the school – see the website for our progression document

Multiplication – doubling and counting in multiples

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

Repeated addition and arrays

Repeated addition	   Use different objects to add equal groups.		Write addition sentences to describe objects and pictures. 
Arrays- showing commutative multiplication	Create arrays using counters/ cubes to show multiplication sentences.   	Draw arrays in different rotations to find **commutative** multiplication sentences.   Link arrays to area of rectangles.	Use an array to write multiplication sentences and reinforce repeated addition.  5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 5 x 3 = 15 3 x 5 = 15

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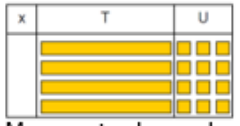
Grid or Area method

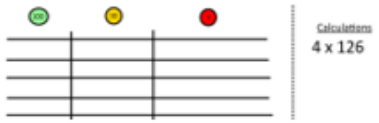
Grid (Area) Method

Show the link with arrays to first introduce the grid method showing the area each part is represented by clearly.
4 rows of 10, 4 rows of 3

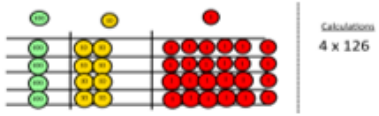
Move on to using Base 10 to progress towards a more compact method.
4 rows of 13



Move on to place value counters to show how we are finding groups of a number.We are multiplying by 4 so we need 4 rows.



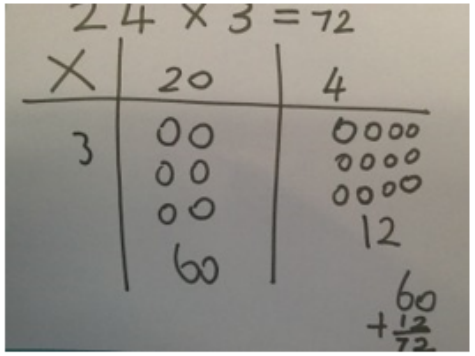
Fill each row with 126.



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

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

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

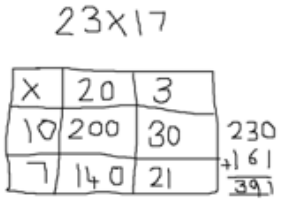


Start with multiplying by one digit numbers and showing the clear addition alongside the grid.

×	30	5
7	210	35

210 + 35 = 245

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



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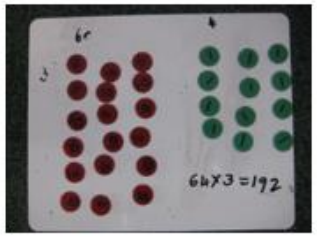
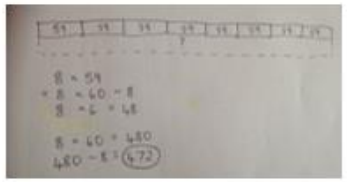
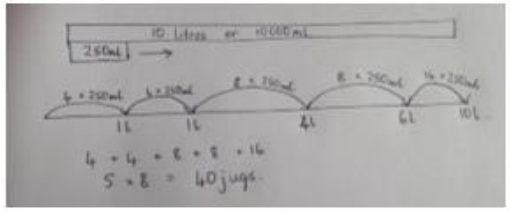
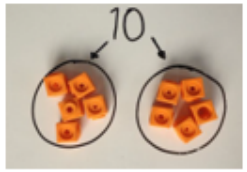
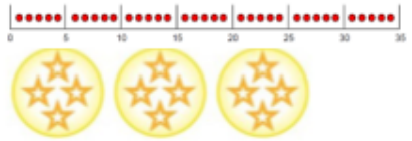
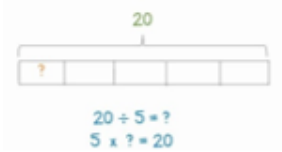
Column multiplication

Column multiplication	Children can continue to be supported by place value counters at the stage of multiplication.  It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.	Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.   	Start with long multiplication, reminding the children about lining up their numbers clearly in columns. 27 x 6 = 162 23 x 14 = 92 (4x3) (4x20) If it helps, children can write out what they are solving next to their answer, especially where 2 digit numbers are the multiplier. 32 x 24 8 (4 x 2) 120 (4 x 30) 40 (20 x 2) 600 (20 x 30) 768 This moves on to the more compact written method 1342 x 18 13420 10736 24156

Division – halving, sharing and grouping

Objective and Strategies	Concrete	Pictorial	Abstract
Sharing objects into groups	 I have 10 cubes, can you share them equally in 2 groups? 	Children use pictures or shapes to share quantities.  8 ÷ 2 = 4	Share 9 buns between three people. 9 ÷ 3 = 3
Division as grouping	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.   96 ÷ 3 = 32 	Use a number line to show jumps in groups. The number of jumps equals the number of groups.  Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group. 	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?

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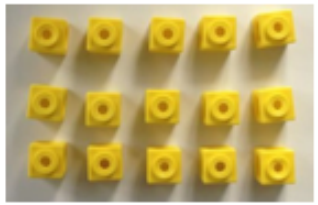
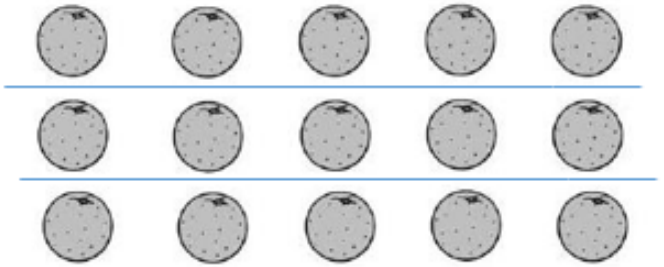
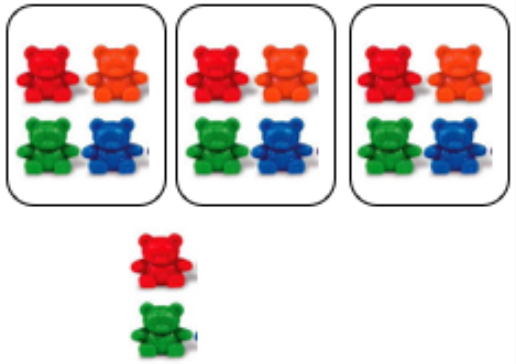
Arrays, numberlines and remainders

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

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Long division

Children are encouraged to jot WIKA (What I Know Already) alongside the abstract long division method. Not all multiplicands will need ot be calculated for efficiency.

WIKA

1 x = 26

2x

5x = 130

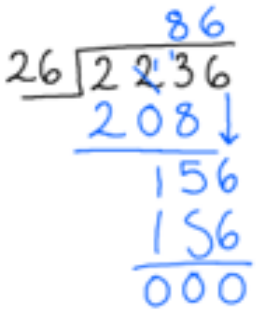
6x = 156

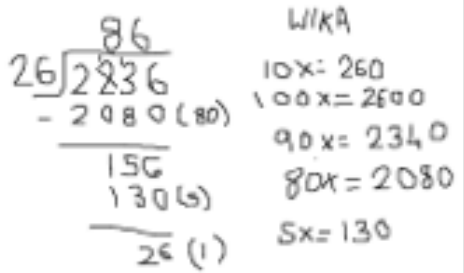
8x = 208

9x = 234

10 x = 260

For some children, division by chunking is a more workable method. Here children work out 'chunks' which are factors of the divisor. They continue to subtract chunks until there is nothing left or they are left with a remainder.





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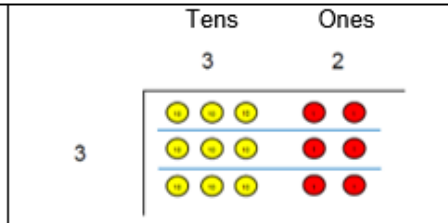
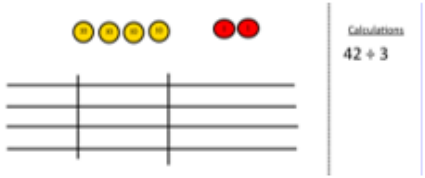
Short division

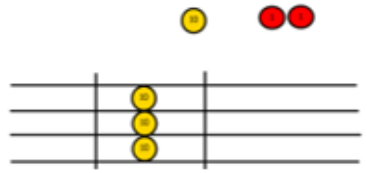
Short division



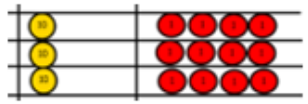
Use place value counters to divide using the bus stop method alongside



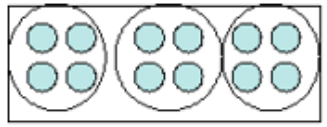
42 ÷ 3=
Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.



We exchange this ten for ten ones and then share the ones equally among the groups. We look how much in 1 group so the answer is 14.



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



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

Begin with divisions that divide equally with no remainder.

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

Move onto divisions with a remainder.

$$\begin{array}{r} 86\ r\ 2 \\ 3\overline{)542} \end{array}$$

Finally move into decimal places to divide the total accurately.

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

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How can you help at home?

- Talk about maths – make it real
- Play games – some ideas to takeaway in classrooms
- Make it fun!
- Ask the teacher
- Check the school website for progression document and videos

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Finally …

- **Don’t tell your child you are hopeless at maths!**
- You may remember maths being hard, but you were probably not hopeless, and even if you were, that implies to your child, ‘I was hopeless at maths and I’m a successful adult, therefore maths is not important’
- **Do play (maths) with your child**
- There are opportunities for impromptu learning in games with real people that you don’t get with an X-Box
- **Do get excited about maths and your child will get excited too!**

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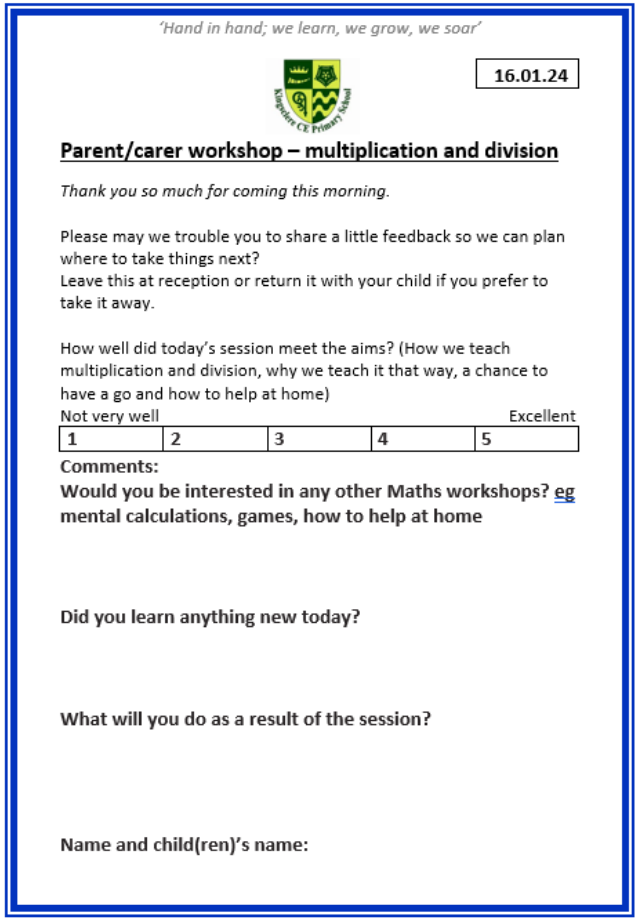
What next?

- Take a walk around – have a go at some of the activities
- Feel free to take a look in other classrooms – Maths Ambassadors are here to help
- Evaluation slips – tell us what you think!
- If you are able to volunteer any time to our school we are always on the lookout for helpers with trips/reading/maths games so mention it to a teacher

Evaluation slips



'Hand in hand; we learn, we grow, we soar'

16.01.24

Parent/carer workshop – multiplication and division

Thank you so much for coming this morning.

Please may we trouble you to share a little feedback so we can plan where to take things next?
Leave this at reception or return it with your child if you prefer to take it away.

How well did today's session meet the aims? (How we teach multiplication and division, why we teach it that way, a chance to have a go and how to help at home)

Not very well — Excellent

1	2	3	4	5

Comments:

Would you be interested in any other Maths workshops? eg mental calculations, games, how to help at home

Did you learn anything new today?

What will you do as a result of the session?

Name and child(ren)'s name:

Kingsclere CE Primary School

Any questions? – I’m around until 10