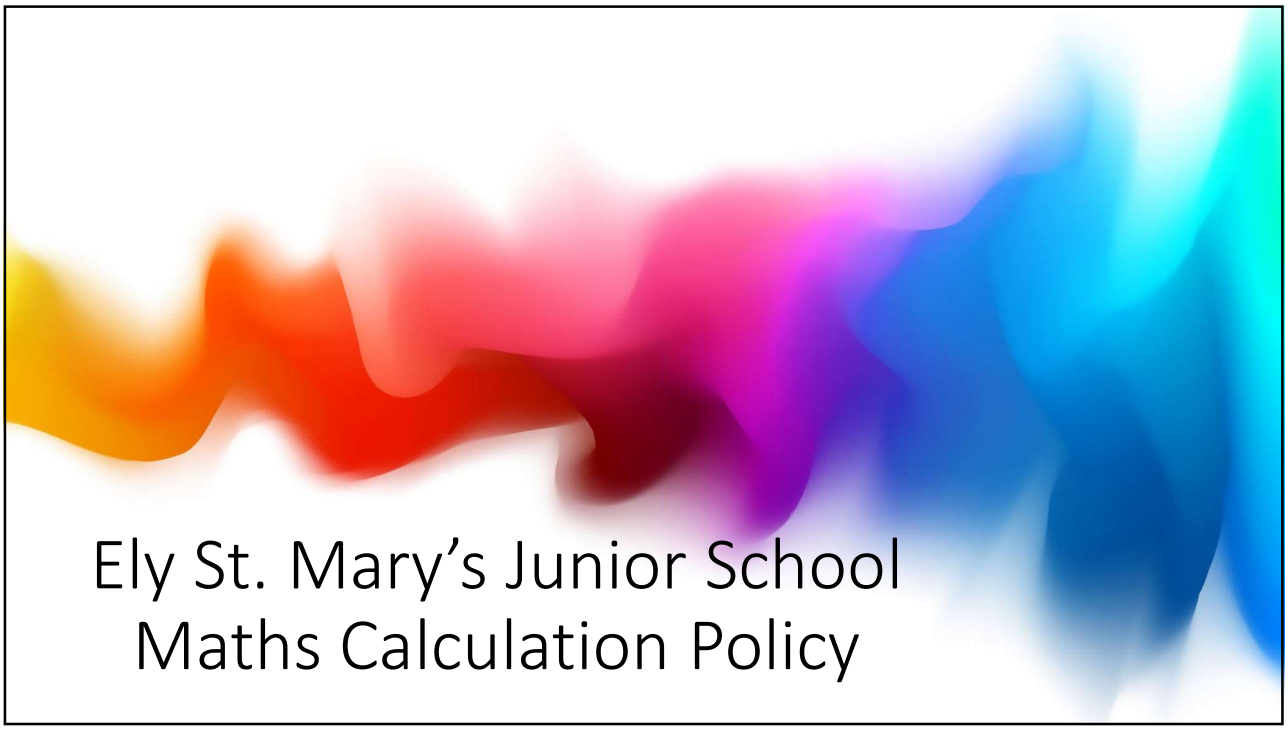


1

Ely St Mary's Junior School Maths Calculation Policy

2

Introduction

The Ely St Mary's Junior School Maths Written Calculation Policy 2023

This policy supports the White Rose Maths scheme used throughout the school. Progression within each area of calculation is in line with the programme of study in the 2014 National Curriculum. This calculation policy should be used to support children to develop a deep understanding of number and calculation. This policy has been designed to teach children through the use of concrete, pictorial and abstract representations.

- Concrete representation– a pupil is first introduced to an idea or skill by acting it out with real objects. This is a 'hands on' component using real objects and is a foundation for conceptual understanding.
- Pictorial representation – a pupil has sufficiently understood the 'hands on' experiences performed and can now relate them to representations, such as a diagram or picture of the problem.
- Abstract representation–a pupil is now capable of representing problems by using mathematical notation, for example 12 x 2 = 24.

It is important that conceptual understanding, supported by the use of representation, is secure for all procedures. Reinforcement is achieved by going back and forth between these representations.

3

Mathematics Mastery

At the centre of the mastery approach to the teaching of mathematics is the belief that all children have the potential to succeed. They should have access to the same curriculum content and, rather than being extended with new learning, they should deepen their conceptual understanding by tackling challenging and varied problems. Similarly, with calculation strategies, children must not simply rote learn procedures but demonstrate their understanding of these procedures through the use of concrete materials and pictorial representations. This policy outlines the different calculation strategies that should be taught and used in Year 1 to Year 6 in line with the requirements of the 2014 Primary National Curriculum.

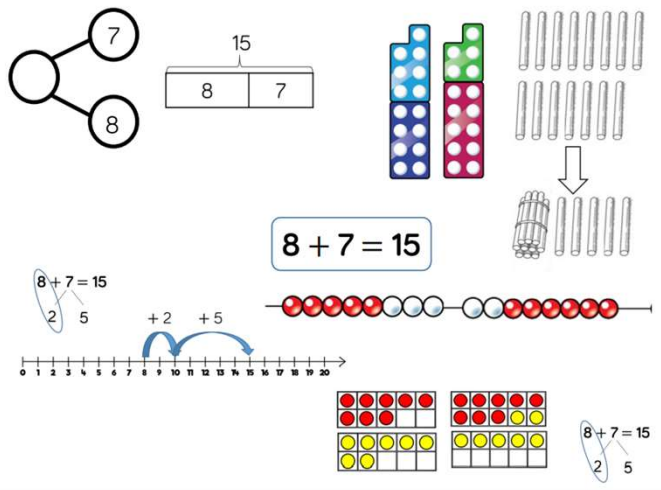
How to use the policy:

This mathematics policy is a guide for all staff at Ely St Mary's Junior School and has been adapted from work by the NCETM. All teachers have been given the scheme of work from the White Rose Maths Hub and are required to base their planning around their year group's modules and not to move onto a higher year group's scheme work. Teachers can use any teaching resources that they wish to use and the policy does not recommend one set of resources over another, rather that, a variety of resources are used. For each of the four rules of number, different strategies are laid out, together with examples of what concrete materials can be used and how, along with suggested pictorial representations. Some of the calculation methods have links to videos demonstrating the method of calculation to aid and support teachers, children and parents.. The principle of the concrete-pictorial-abstract (CPA) approach [Make it, Draw it, Write it] is for children to have a true understanding of a mathematical concept, they need to master all three phases within a year group's scheme of work.

4

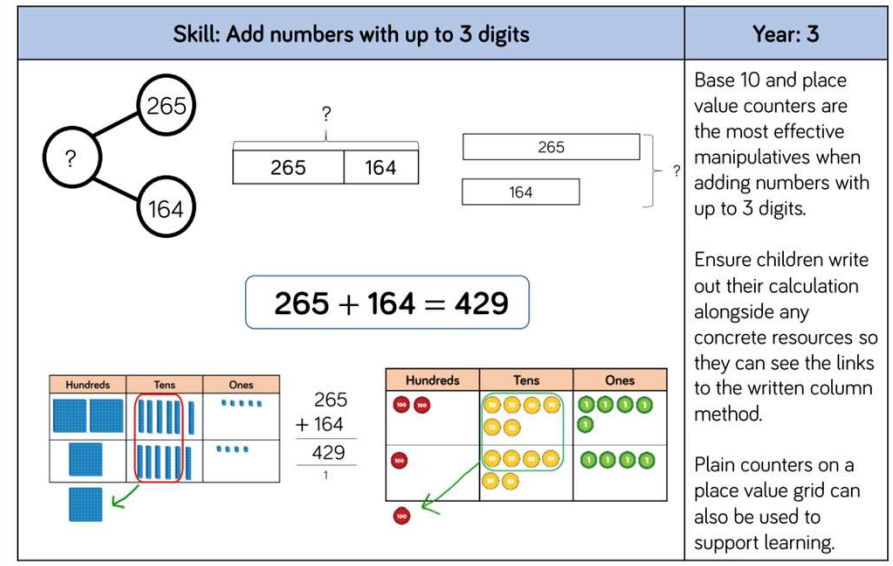
Addition

5

Skill: Add 1 and 2-digit numbers to 20	Year: 1/2
	When adding one-digit numbers that cross 10, it is important to highlight the importance of ten ones equalling one ten. Different manipulatives can be used to represent this exchange. Use concrete resources alongside number lines to support children in understanding how to partition their jumps.

6

Year 3



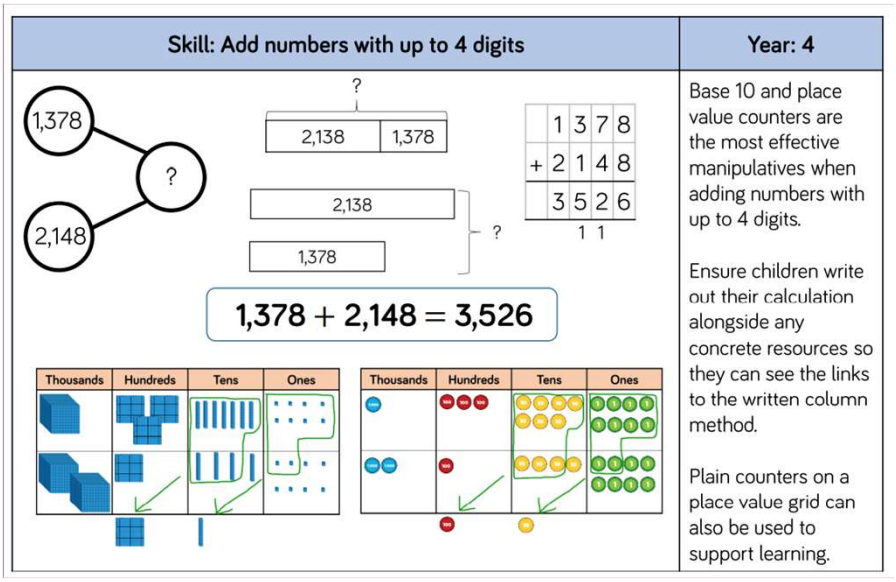
Year 3 will introduce and consolidate this method throughout the year.

https://drive.google.com/file/d/13jv2LIN58afTjKYUMrQZimP6h8HNNsnd/view?usp=sharing

https://drive.google.com/file/d/12BVsjRwuhNK4iVDd0uR5nVZ9o833dkGT/view?usp=sharing

7

Year 4



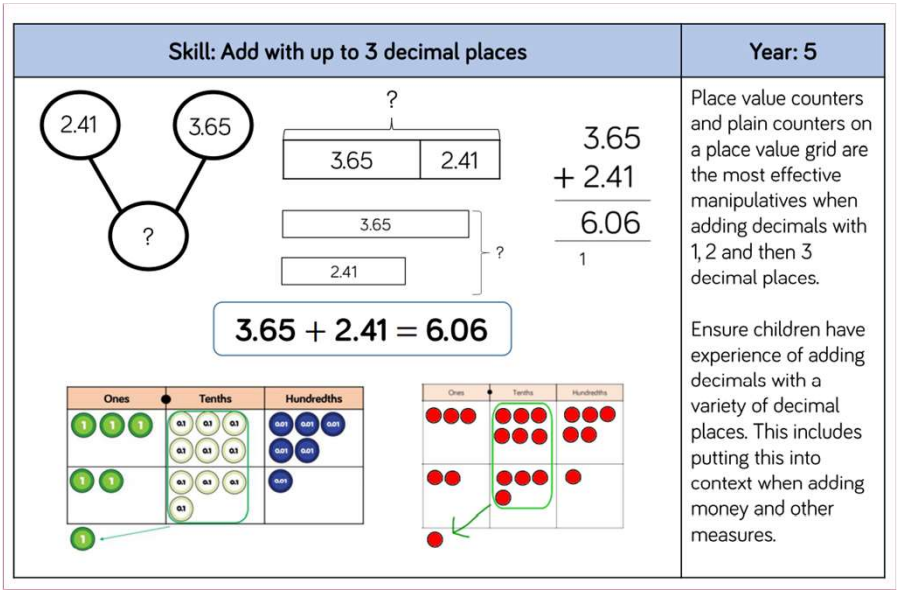
Year 4 will introduce and consolidate this method throughout the year.

Addition Year 4
https://drive.google.com/file/d/1lFEeqqUsrC6TR6V7AOMF9t3Dsh8sC2C9/view?usp=sharing

https://drive.google.com/file/d/1GB9JEz7HWWYNBaZSOHkQxAZs5twdPNOS/view?usp=sharing

8

Year 5

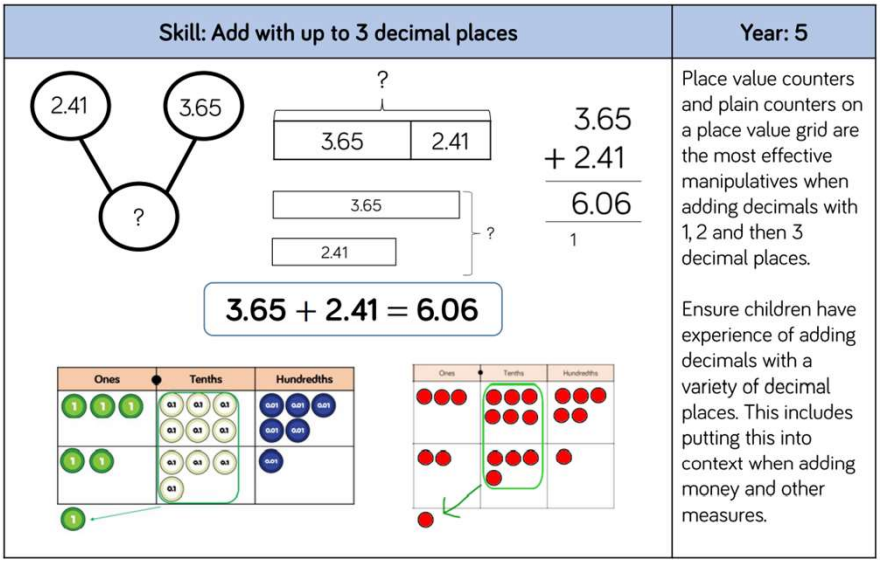


Year 5 will introduce and consolidate this method throughout the year.

Addition Year 5
https://drive.google.com/file/d/1SS7Y-XxRVNa2vape4PsbqV4clVyB9Vwg/view?usp=sharing

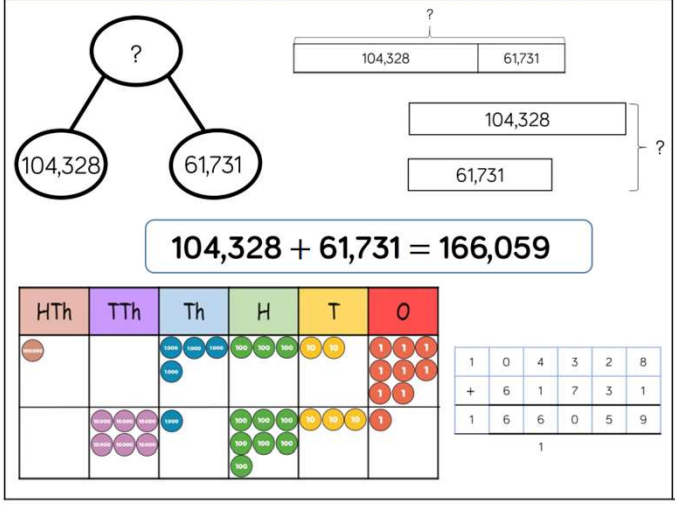
9

Year 5



10

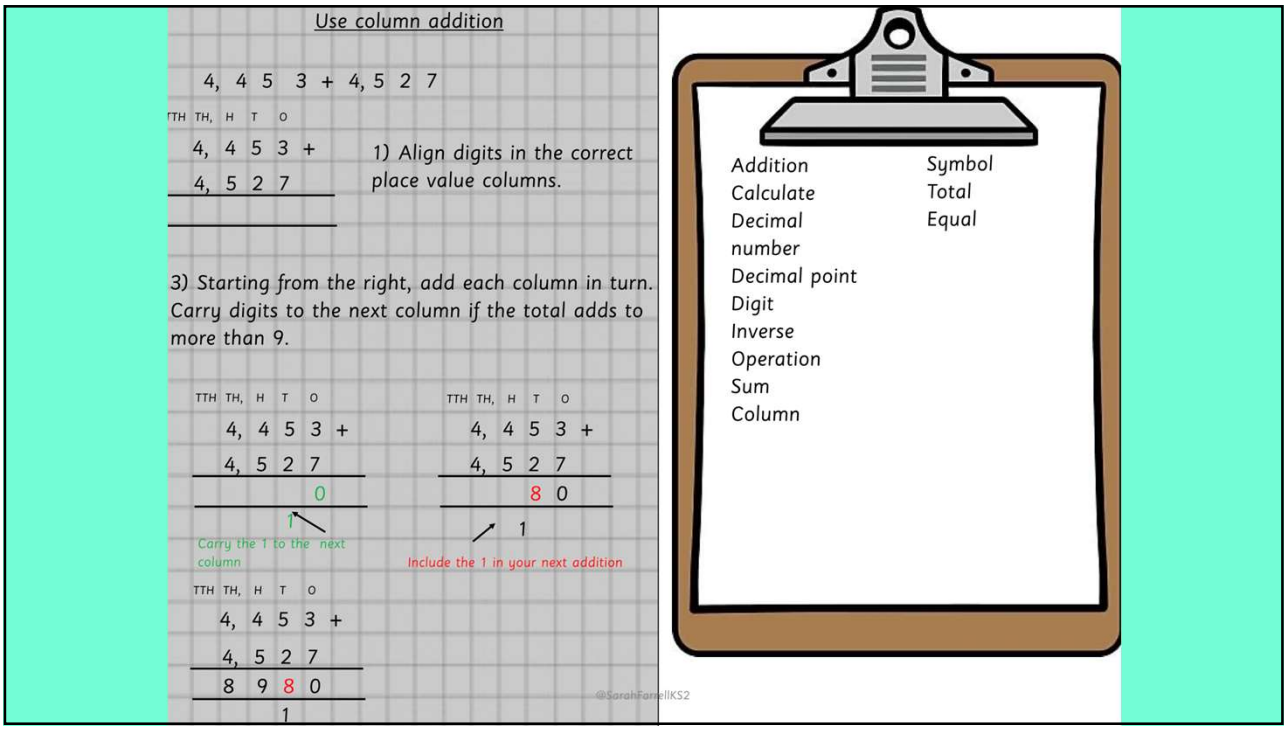
Year 5/6

Skill: Add numbers with more than 4 digits	Year: 5/6
	Place value counters or plain counters on a place value grid are the most effective concrete resources when adding numbers with more than 4 digits. At this stage, children should be encouraged to work in the abstract, using the column method to add larger numbers efficiently.

Year 5/6 will introduce and consolidate this method throughout the year.

Addition Year 6
https://drive.google.com/file/d/1OdF-dk1W2T_g_WTcllIyq8bfps8YZv3z/view?usp=sharing

11

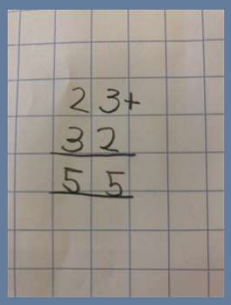


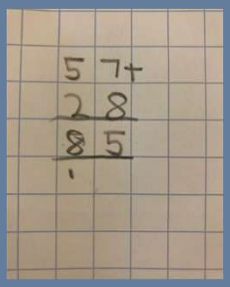
12

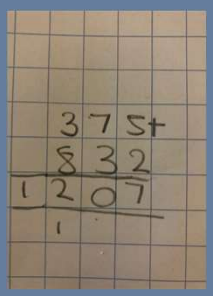
Addition

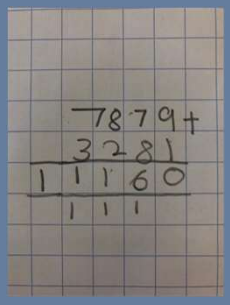
What it will look like in the Maths book

The formal written method





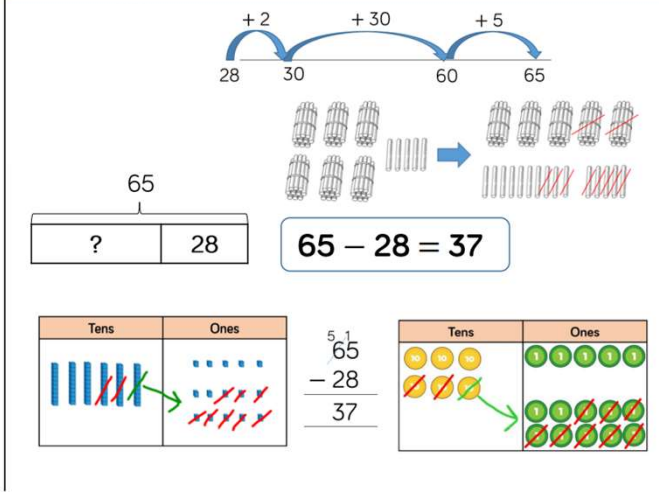




13

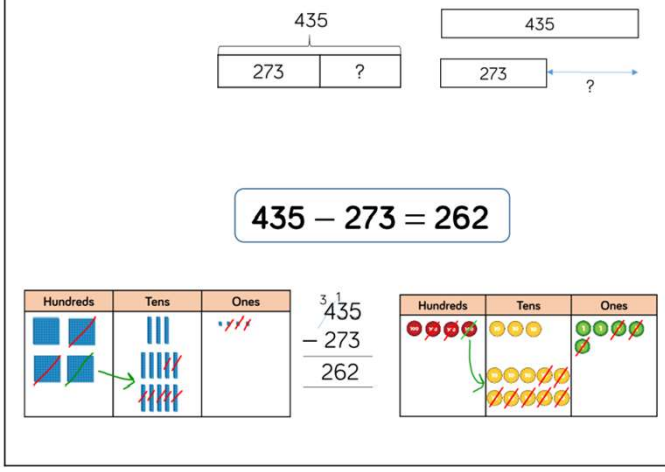
Subtraction

14

Skill: Subtract 1 and 2-digit numbers to 100	Year: 2
	At this stage, encourage children to use the formal column method when calculating alongside straws, base 10 or place value counters. As numbers become larger, straws become less efficient. Children can also use a blank number line to count on to find the difference. Encourage them to jump to multiples of 10 to become more efficient.

15

Year 3

Skill: Subtract numbers with up to 3 digits	Year: 3
	Base 10 and place value counters are the most effective manipulative when subtracting numbers with up to 3 digits. Ensure children write out their calculation alongside any concrete resources so they can see the links to the written column method. Plain counters on a place value grid can also be used to support learning.

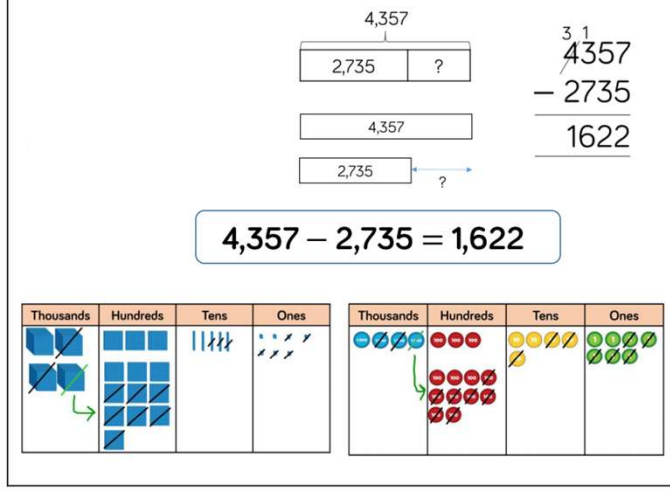
Year 3 will introduce and consolidate this method throughout the year.

Subtraction Year 3
https://drive.google.com/file/d/1dTnyWBFW6MurUtz2s8iGY-qI5aiTBndp/view?usp=sharing

https://drive.google.com/file/d/1m07JqQNrpcdIyN1WBACO-t1_FQrhwCMx/view?usp=sharing

16

Year 4

Skill: Subtract numbers with up to 4 digits	Year: 4
	Base 10 and place value counters are the most effective manipulatives when subtracting numbers with up to 4 digits. Ensure children write out their calculation alongside any concrete resources so they can see the links to the written column method. Plain counters on a place value grid can also be used to support learning.

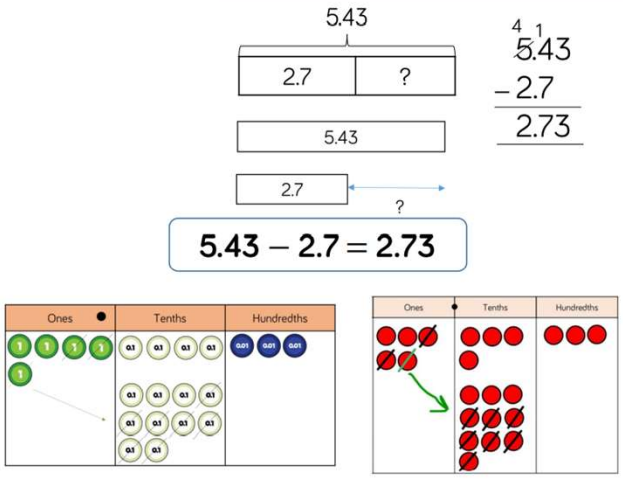
Year 4 will introduce and consolidate this method throughout the year.

Subtraction Year 4
https://drive.google.com/file/d/1kOQxgf7m3QEJaeifuhUoIpAAiF71o77-/view?usp=sharing

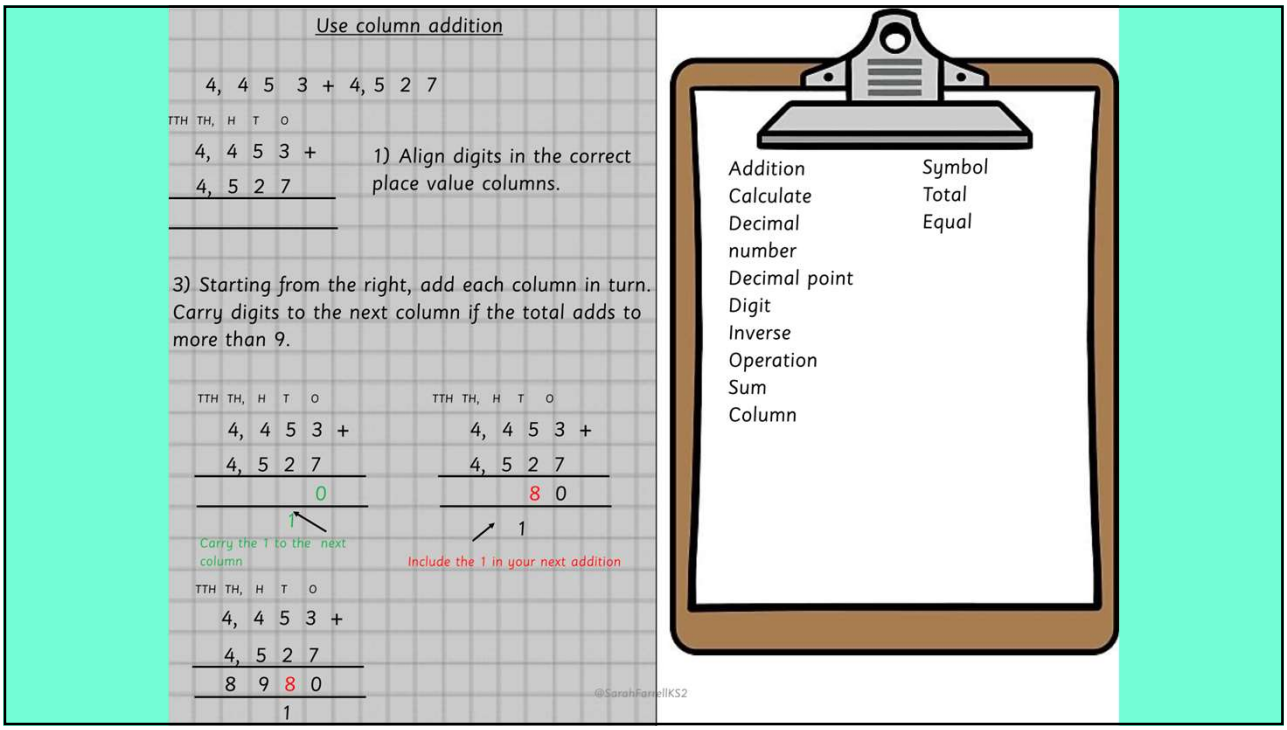
https://drive.google.com/file/d/1TyMwmBtk_CpRYeZ8mRaoWioVOKKAsBIB/view?usp=sharing

17

Year 5

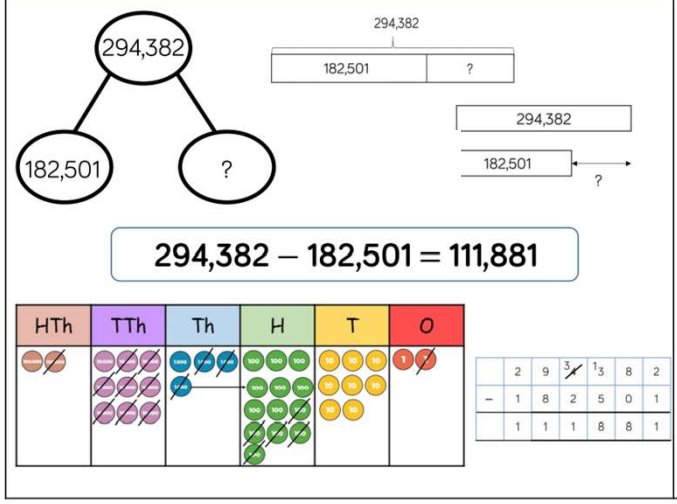
Skill: Subtract with up to 3 decimal places	Year: 5
	Place value counters and plain counters on a place value grid are the most effective manipulative when subtracting decimals with 1, 2 and then 3 decimal places. Ensure children have experience of subtracting decimals with a variety of decimal places. This includes putting this into context when subtracting money and other measures.

18



19

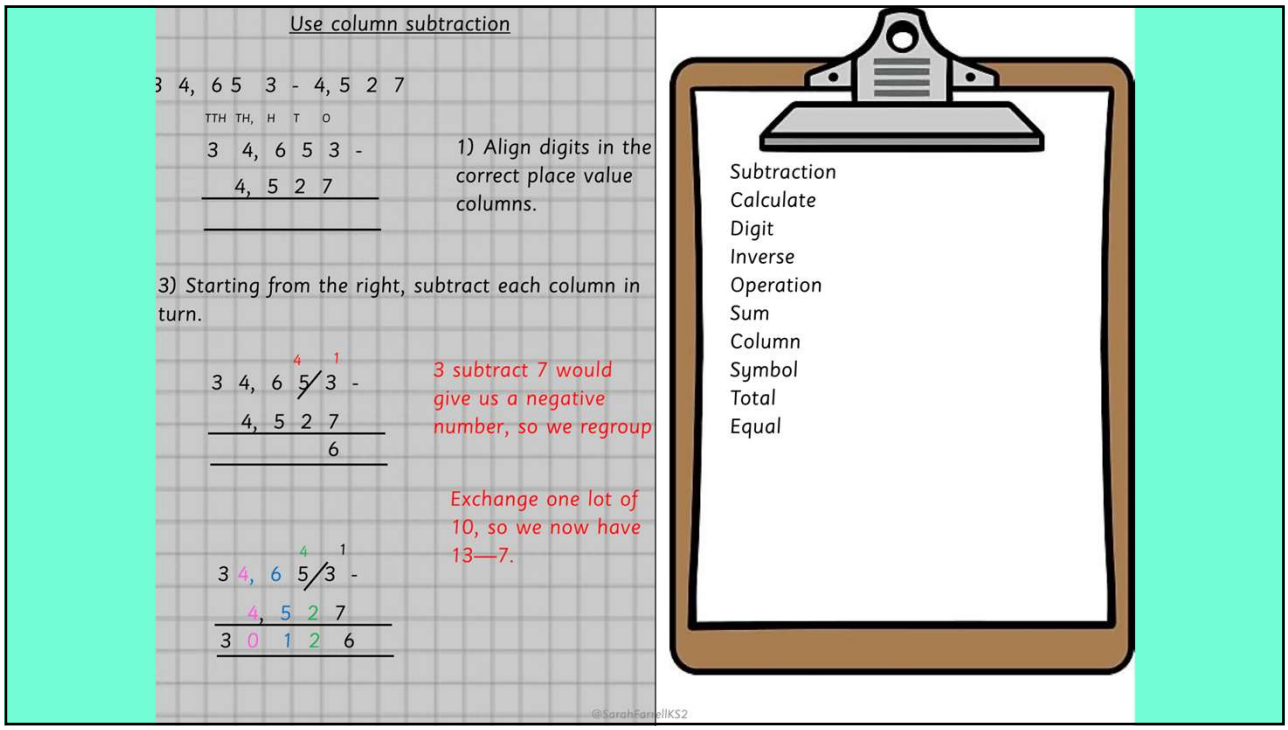
Year 5/6

Skill: Subtract numbers with more than 4 digits	Year: 5/6
	Place value counters or plain counters on a place value grid are the most effective concrete resource when subtracting numbers with more than 4 digits. At this stage, children should be encouraged to work in the abstract, using column method to subtract larger numbers efficiently.

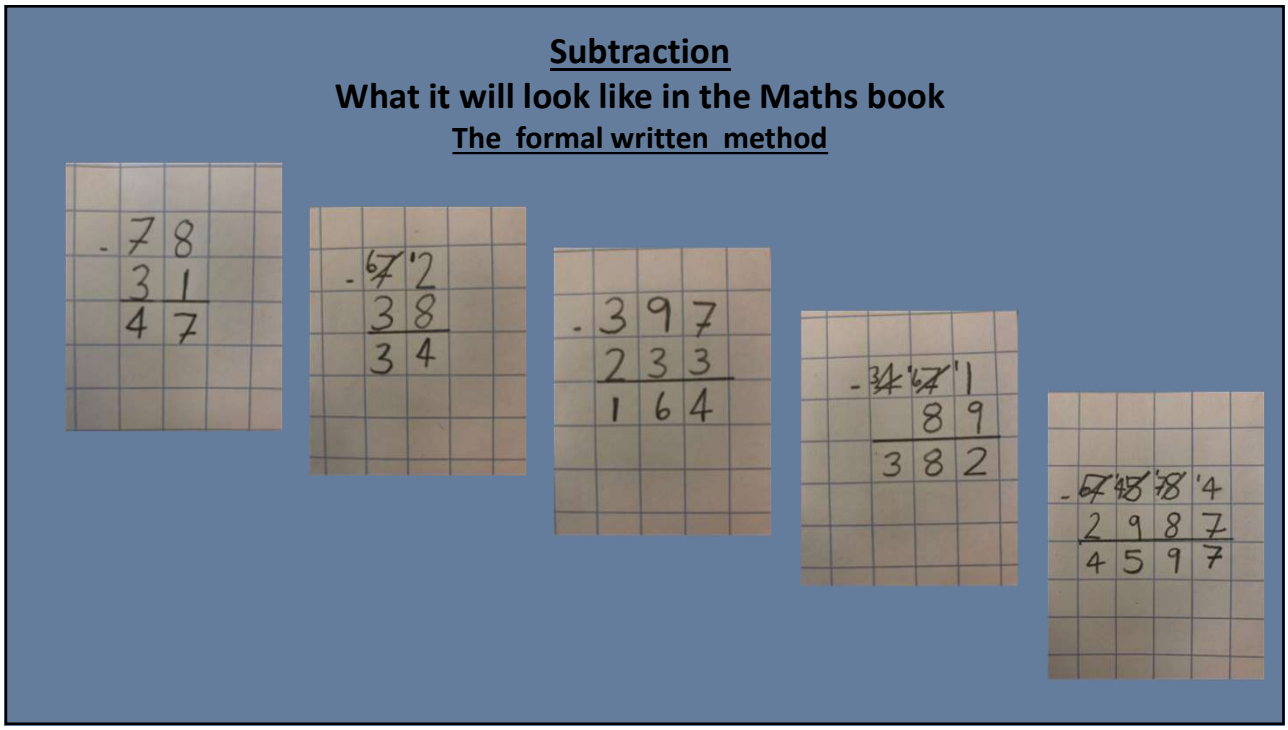
Year 5/6 will introduce and consolidate this method throughout the year.

Year 5/6
https://drive.google.com/file/d/1JuLo6JM38CARY0a-LncGJslZcFAWrb5f/view?usp=sharing

20


Use column subtraction
3 4, 6 5 3 - 4, 5 2 7
TTH TH, H T O
3 4, 6 5 3 -
4, 5 2 7
1) Align digits in the correct place value columns.
3) Starting from the right, subtract each column in turn.
3 4, 6 5 3 -
4, 5 2 7
6
3 subtract 7 would give us a negative number, so we regroup
Exchange one lot of 10, so we now have 13—7.
3 4, 6 5 3 -
4, 5 2 7
3 0 1 2 6
@SarahFarrellKS2
Subtraction
Calculate
Digit
Inverse
Operation
Sum
Column
Symbol
Total
Equal

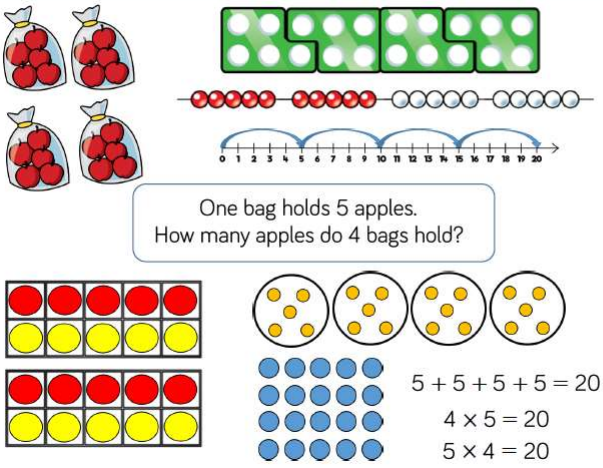
21


Subtraction
What it will look like in the Maths book
The formal written method

22

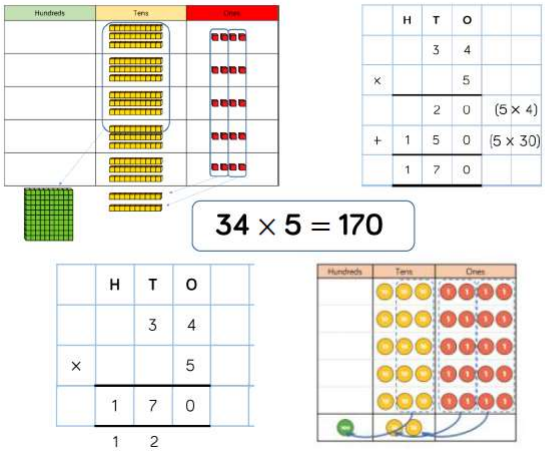
Multiplication

23

Skill: Solve 1-step problems using multiplication	Year: 1/2
	Children represent multiplication as repeated addition in many different ways. In Year 1, children use concrete and pictorial representations to solve problems. They are not expected to record multiplication formally. In Year 2, children are introduced to the multiplication symbol.

24

Year 3

Skill: Multiply 2-digit numbers by 1-digit	Year: 3/4
	Teachers may decide to first look at the expanded column method before moving on to the short multiplication method. The place value counters should be used to support the understanding of the method rather than supporting the multiplication, as children should use times table knowledge.

Year 3 will introduce and consolidate this method throughout the year.

Year 3 Multiply 2-digits by 1-digit
https://drive.google.com/file/d/13JgM4b_Y4fgC348tEUso1ZpXunSKPbYi/view?usp=sharing

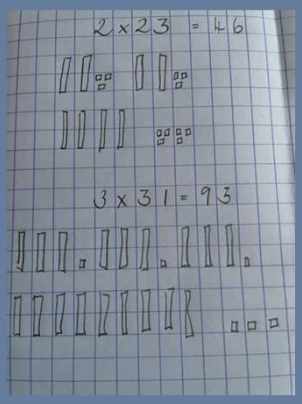
Year 3 Multiply 2-digits by 1-digit (with exchange)
https://drive.google.com/file/d/1B0Rwa5RA4yKPPEvm4oJSWlnA1gYeYaAQ/view?usp=sharing

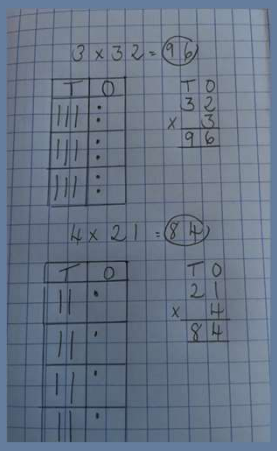
25

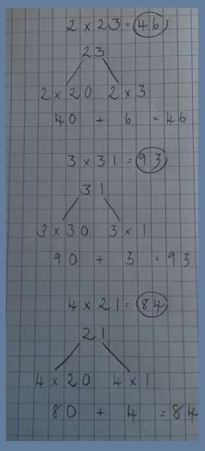
Year 3

What it will look like in the Maths book

Multiplication Build it, Draw it and formal method





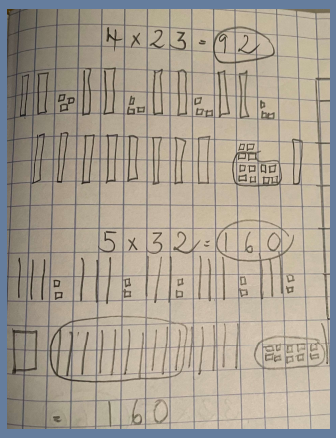


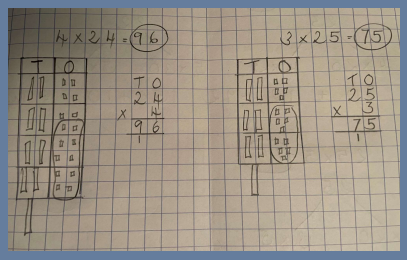
26

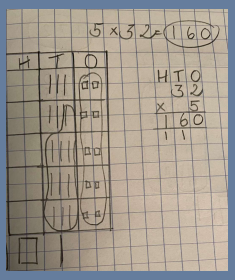
Year 3

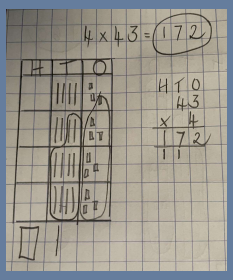
What it will look like in the Maths book

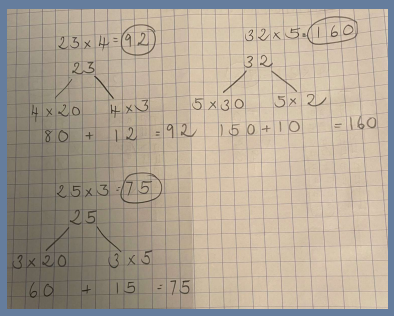
Multiplication (with exchange) Build it, Draw it and formal method











27

Year 4

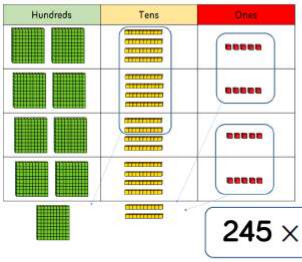
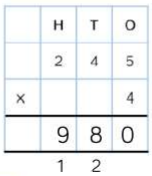
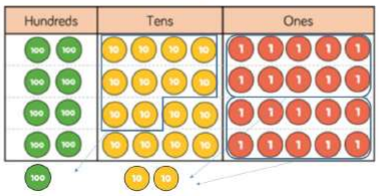
	H	T	O	
		3	4	
×			5	
		2	0	(5 × 4)
+	1	5	0	(5 x 30)
	1	7	0	

Year 4 will consolidate this method throughout the year.

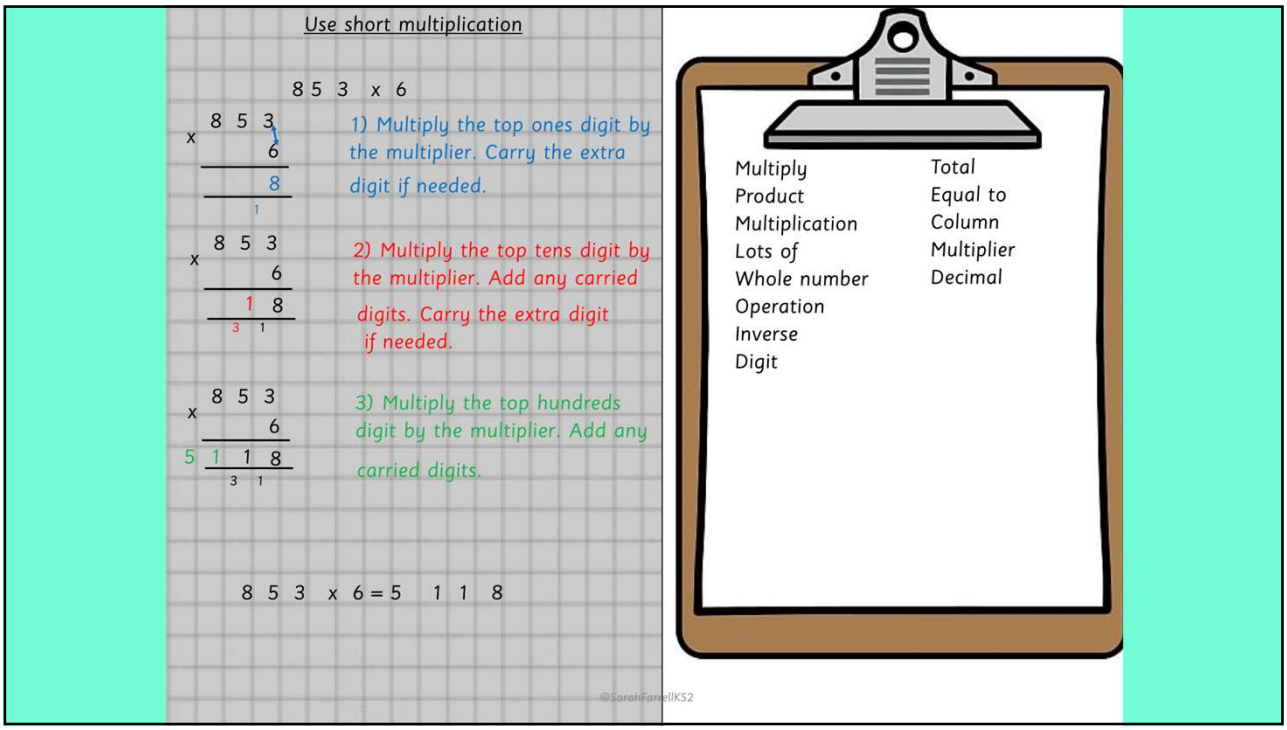
Multiplying 2-digits by 1 digit
https://drive.google.com/file/d/13JgM4b_Y4fgC348tEUso1ZpXunSKPbYi/view?usp=sharing

Multiplying 2-digits by 1 digit (with exchange)
https://drive.google.com/file/d/1_thQd8uR9Zs4O39ZCkqxJpn046KlgqcJ/view?usp=sharing

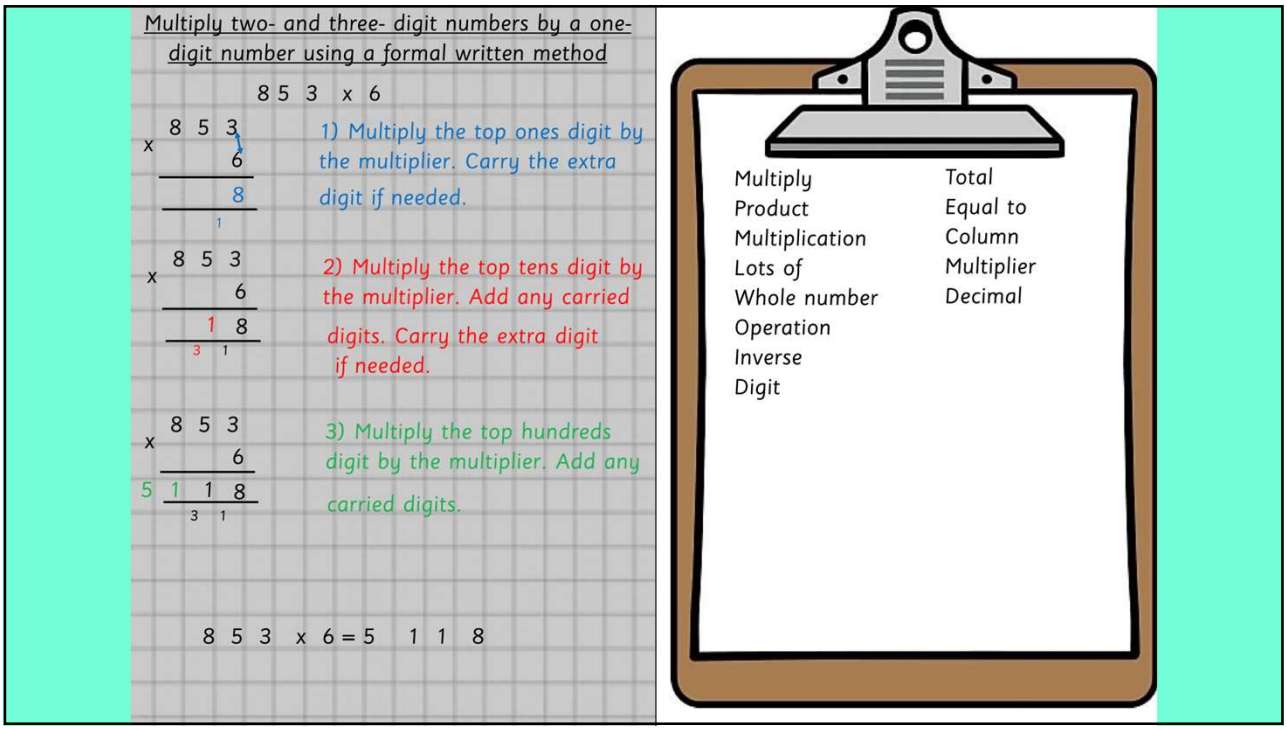
Multiplying 3-digits by 1–digit
https://drive.google.com/file/d/1-CX-vEnCVMZlarKaDTVcDMKpTvy94UCm/view?usp=sharing

Skill: Multiply 3-digit numbers by 1-digit numbers	Year: 3/4
  $245 \times 4 = 980$ 	When moving to 3-digit by 1-digit multiplication, encourage children to move towards the short, formal written method. Base 10 and place value counters continue to support the understanding of the written method. Limit the number of exchanges needed in the questions and move children away from resources when multiplying larger numbers.

28

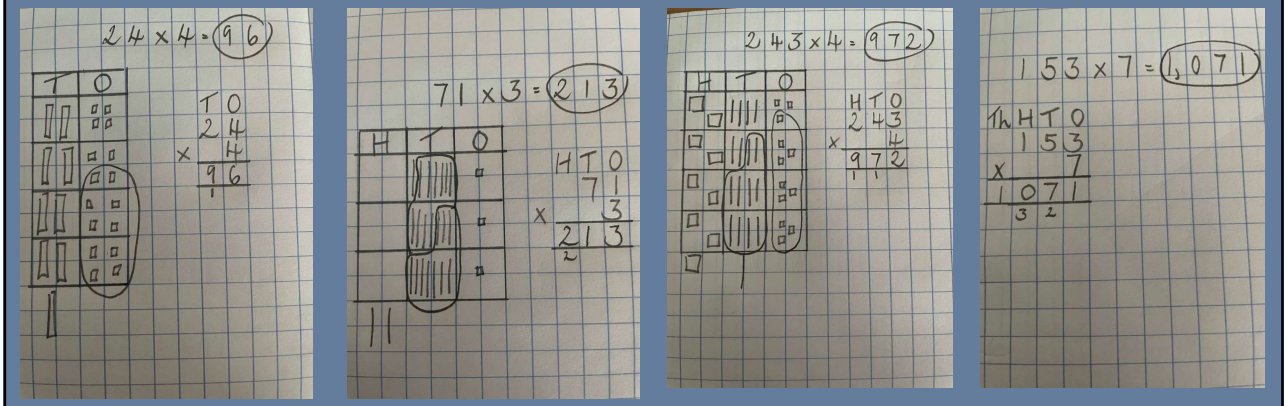

Use short multiplication
8 5 3 x 6
1) Multiply the top ones digit by the multiplier. Carry the extra digit if needed.
2) Multiply the top tens digit by the multiplier. Add any carried digits. Carry the extra digit if needed.
3) Multiply the top hundreds digit by the multiplier. Add any carried digits.
8 5 3 x 6 = 5 1 1 8
©SarahFarrellKS2
Multiply
Product
Multiplication
Lots of
Whole number
Operation
Inverse
Digit
Total
Equal to
Column
Multiplier
Decimal

29


Multiply two- and three- digit numbers by a one-digit number using a formal written method
8 5 3 x 6
1) Multiply the top ones digit by the multiplier. Carry the extra digit if needed.
2) Multiply the top tens digit by the multiplier. Add any carried digits. Carry the extra digit if needed.
3) Multiply the top hundreds digit by the multiplier. Add any carried digits.
8 5 3 x 6 = 5 1 1 8
Multiply
Product
Multiplication
Lots of
Whole number
Operation
Inverse
Digit
Total
Equal to
Column
Multiplier
Decimal

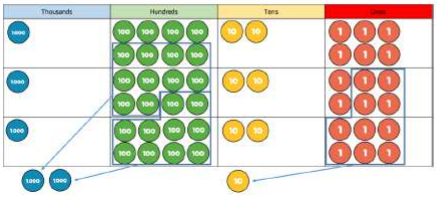
30

Year 4
What it will look like in the Maths book Multiplication (with exchange) Build it, Draw it and formal method



31

Year 5

Skill: Multiply 4-digit numbers by 1-digit numbers	Year: 5
 1,826 × 3 = 5,478 Th H T O 1 8 2 6 × 3 5 4 7 8 2 1	When multiplying 4-digit numbers, place value counters are the best manipulative to use to support children in their understanding of the formal written method. If children are multiplying larger numbers and struggling with their times tables, encourage the use of multiplication grids so children can focus on the use of the written method.

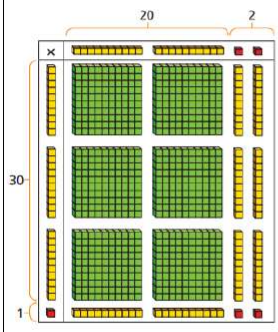
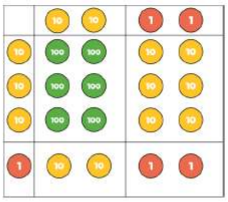
Year 5 will introduce and consolidate this method throughout the year.

Multiply 2-digit by 1-digit
https://drive.google.com/file/d/1kISeuOMQd0QlNRsxKYWaNyeTRIwiW5Fi/view?usp=sharing

Multiply 3-digits by 1-digit
https://drive.google.com/file/d/1U1XRg6Bw61rnPt9Wve961f_vQc4TIBo1/view?usp=sharing

Multiply 4-digits by 1-digit
https://drive.google.com/file/d/1xPZWAJ3eOi4PjpMzoEvz3CJjs7vT_7RF/view?usp=sharing

32

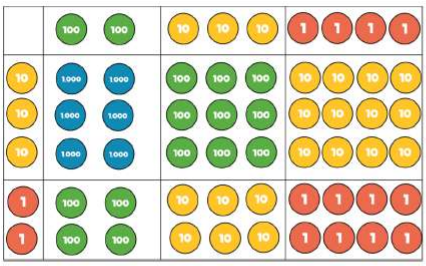
Skill: Multiply 2-digit numbers by 2-digit numbers	Year: 5
  $22 \times 31 = 682$	When multiplying a multi-digit number by 2-digits, use the area model to help children understand the size of the numbers they are using. This links to finding the area of a rectangle by finding the space covered by the Base 10.

	H	T	O
		2	2
×		3	1
		2	2
	6	6	0
	6	8	2

Year 5 will introduce and consolidate this long multiplication method throughout the year.

Multiply 2-digits by 2-digits
https://drive.google.com/file/d/1ugGUEu56VLRHJk3txpI9XiPLpaC9BTJT/view?usp=sharing

33

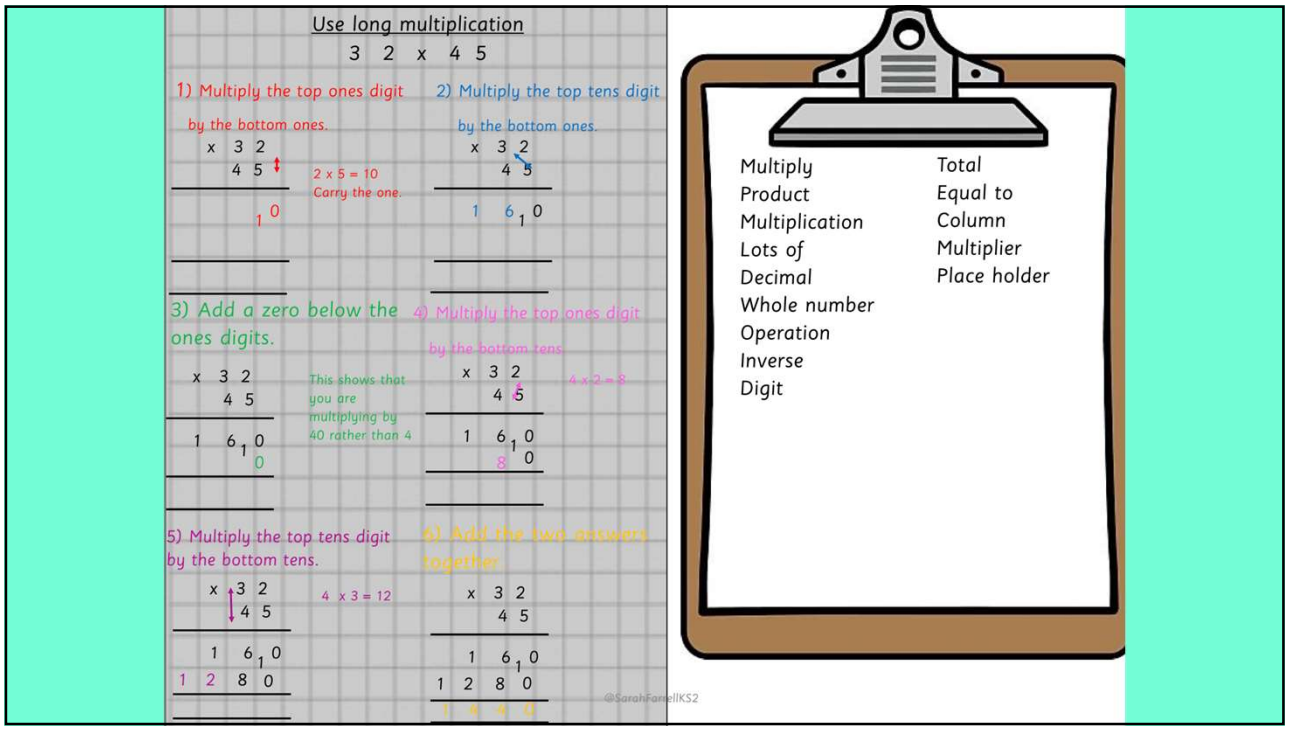
Skill: Multiply 3-digit numbers by 2-digit numbers	Year: 5
 $234 \times 32 = 7{,}488$	Children can continue to use the area model when multiplying 3-digits by 2-digits. Place value counters become more efficient to use but Base 10 can be used to highlight the size of numbers.

	Th	H	T	O
		2	3	4
×			3	2
		4	6	8
	$^{1}7$	$^{1}0$	2	0
	7	4	8	8

Year 5 will introduce and consolidate this long multiplication method throughout the year.

Multiply 3-digits by 2-digits
https://drive.google.com/file/d/1q4bngfvlBTxRm2Lg4EuN27_6MtBEMwM2/view?usp=sharing

34

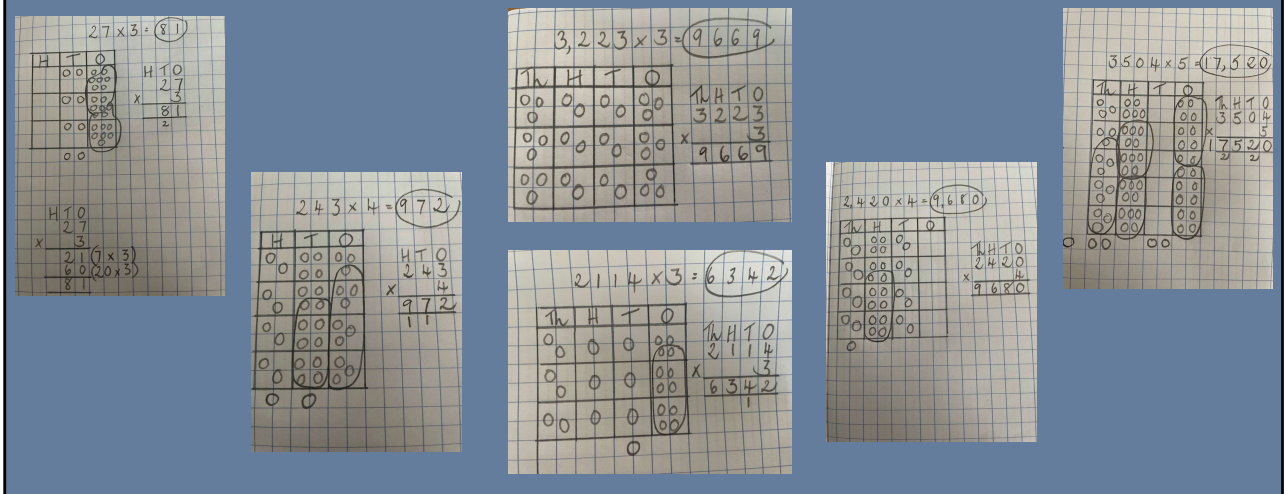


35

Year 5

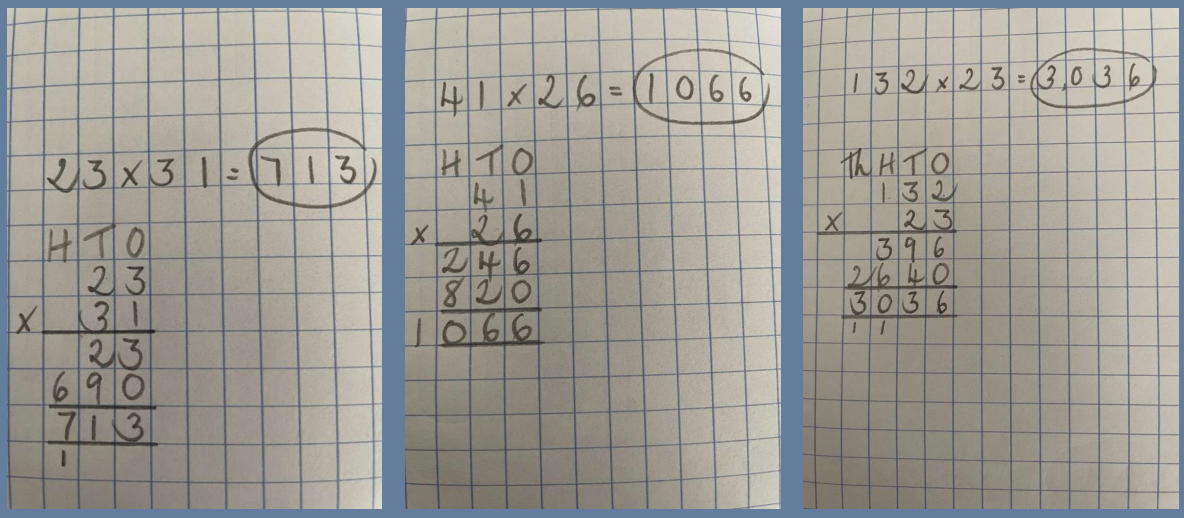
What it will look like in the Maths book

Multiplication (with exchange) Build it, Draw it and formal method



36

Year 5
What it will look like in the Maths book
Long Multiplication formal method



37

Year 6

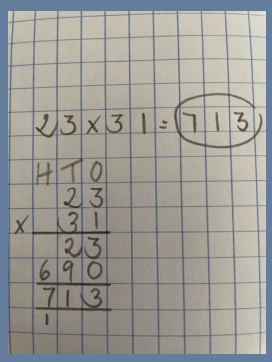
Year 6 will continue to consolidate throughout the year.

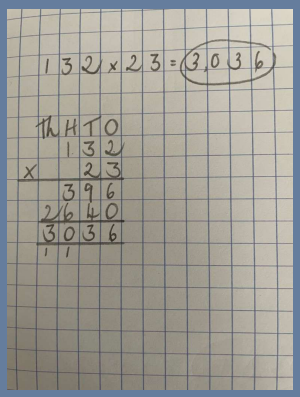
Multiply 4-digits by 2-digits
https://drive.google.com/file/d/1AS5lA_R8firftxFfHLleXgR0XFu0OWS6/view?usp=sharing

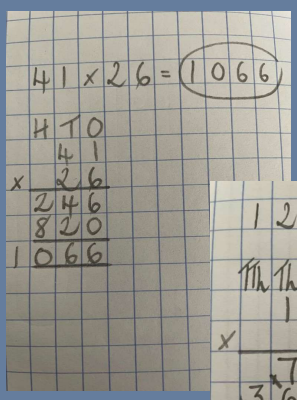
Skill: Multiply 4-digit numbers by 2-digit numbers	Year: 5/6
TTh Th H T O 2 7 3 9 × 2 8 2 1 9 1 2 (2) (5) (3) (7) 5 4 7 8 0 (1) (1) 7 6 6 9 2 1 2,739 × 28 = 76,692	When multiplying 4-digits by 2-digits, children should be confident in the written method. If they are still struggling with times tables, provide multiplication grids to support when they are focusing on the use of the method. Consider where exchanged digits are placed and make sure this is consistent.

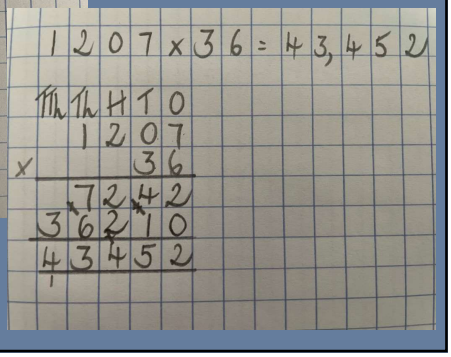
38

Year 6
What it will look like in the Maths book
Long Multiplication formal method





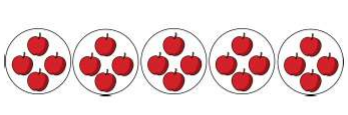
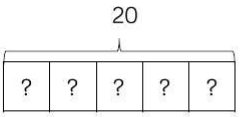
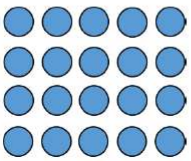
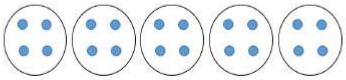




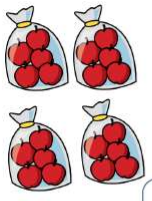
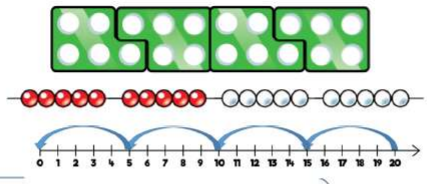
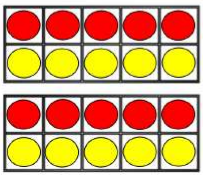
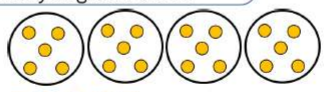
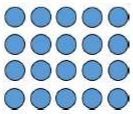
39

Division

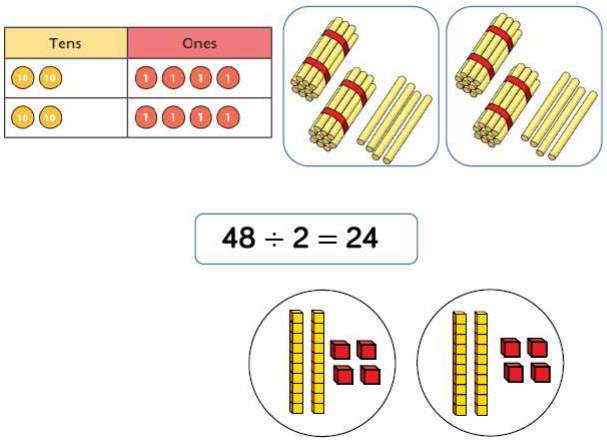
40

Skill: Solve 1-step problems using multiplication (sharing)	Year: 1/2
  There are 20 apples altogether. They are shared equally between 5 bags. How many apples are in each bag?   20 ÷ 5 = 4	Children solve problems by sharing amounts into equal groups. In Year 1, children use concrete and pictorial representations to solve problems. They are not expected to record division formally. In Year 2, children are introduced to the division symbol.

41

Skill: Solve 1-step problems using division (grouping)	Year: 1/2
  There are 20 apples altogether. They are put in bags of 5. How many bags are there?    20 ÷ 5 = 4	Children solve problems by grouping and counting the number of groups. Grouping encourages children to count in multiples and links to repeated subtraction on a number line. They can use concrete representations in fixed groups such as number shapes which helps to show the link between multiplication and division.

42

Skill: Divide 2-digits by 1-digit (sharing with no exchange)	Year: 1/2
	When dividing larger numbers, children can use manipulatives that allow them to partition into tens and ones. Straws, Base 10 and place value counters can all be used to share numbers into equal groups. Part-whole models can provide children with a clear written method that matches the concrete representation.

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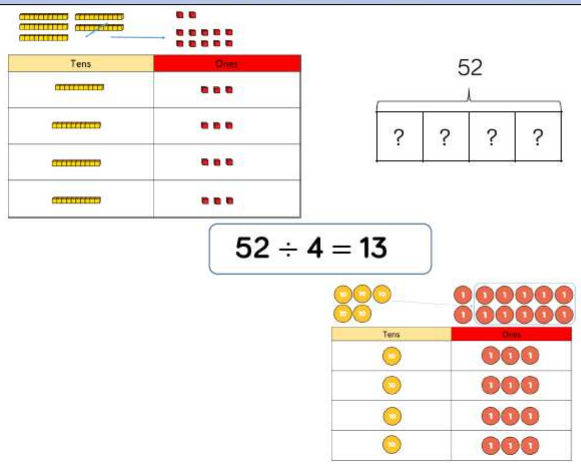
Year 3

Skill: Divide 2-digits by 1-digit (sharing with exchange)	Year: 3/4
	When dividing numbers involving an exchange, children can use Base 10 and place value counters to exchange one ten for ten ones. Children should start with the equipment outside the place value grid before sharing the tens and ones equally between the rows. Flexible partitioning in a part-whole model supports this method.

Year 3 will introduce and consolidate this method throughout the year.

Year 3 Divide 2-digits by 1-digit
https://drive.google.com/file/d/1TDW5w4EvBbirOM7zv_rpsjlYtaR4DvG5/view?usp=sharing

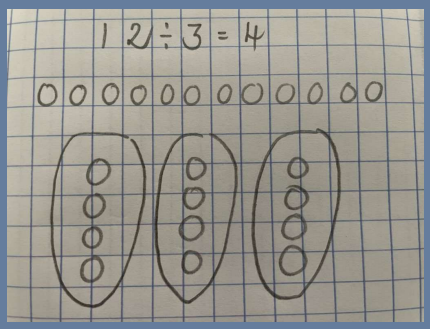
Year 3 Divide 2-digits by 1-digit (with exchange)
https://drive.google.com/file/d/11W-eM4WFfIn8S7VLSeZeZv2bVdmjlyw8/view?usp=sharing

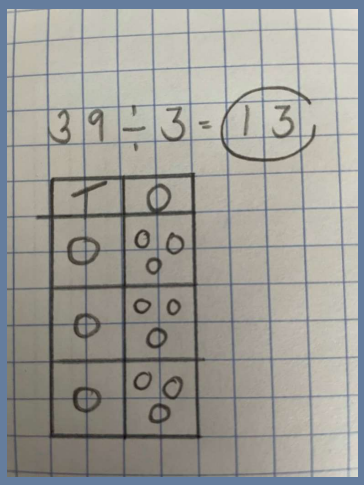
Divide with remainders activity
https://drive.google.com/file/d/1szk2kyHhyDcm1W5jPRBjI4UMIvJ5R7zx/view?usp=sharing

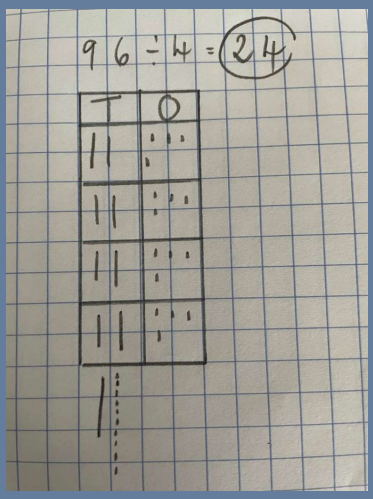
Year 3 Divide 2-digits by 1-digit
https://drive.google.com/file/d/1Vh7RRBqqL2lijSo-5hNZrOWByWYcEQ52/view?usp=sharing

44

Year 3
What it will look like in the Maths book
Division Build it, Draw it and formal method







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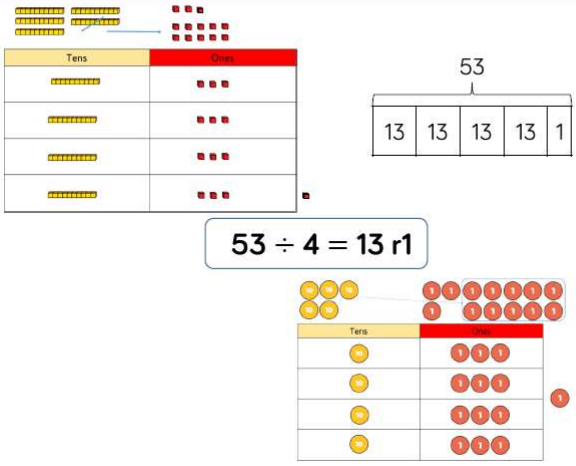
Year 4

Use of manipulatives

Year 4 Divide 2-digits by 1-digit
https://drive.google.com/file/d/1IB2gPA5HTd1jbXhcad9tXlktrutjRlR1/view?usp=sharing

Year 4 Divide 2-digits by 1-digit +
https://drive.google.com/file/d/1IUy55vgVSgrz97jGgeBgtpX0d8ymKFAJ/view?usp=sharing

Year 4 Divide 2-digits by 1-digit (2)
https://drive.google.com/file/d/1lSi7dRs_zzLnG-CzTo3MoWjzaO4onuBo/view?usp=sharing

Skill: Divide 2-digits by 1-digit (sharing with remainders)	Year: 3/4
	When dividing numbers with remainders, children can use Base 10 and place value counters to exchange one ten for ten ones. Starting with the equipment outside the place value grid will highlight remainders, as they will be left outside the grid once the equal groups have been made.

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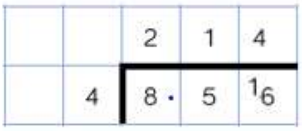
Year 4

Use of manipulatives

Year 4 Divide 2-digits by 1-digit (2)
https://drive.google.com/file/d/1lSi7dRs_zzLnG-CzTo3MoWjzaO4onuBo/view?usp=sharing

Year 4 Divide 2-digits by 1-digit (3)
Number lines
https://drive.google.com/file/d/1rFF_PCQ3PoP_oqbF0_by_cbUYlIQA-qb/view?usp=sharing

Start to use formal methods alongside use of manipulatives



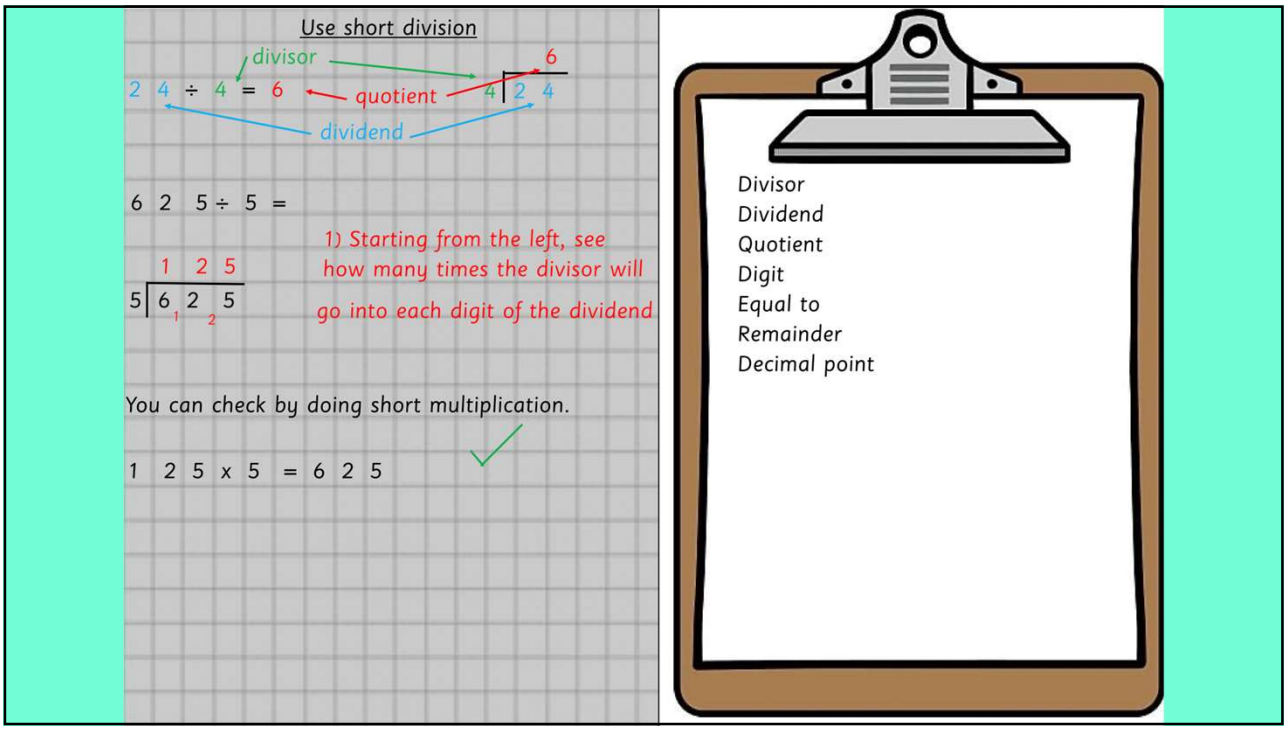
47

Skill: Divide 3-digits by 1-digit (sharing)	Year: 4
844 ÷ 4 = 122 844 ? ? ? ? H T O 844 ÷ 4 = 122 Hundreds Tens Ones	Children can continue to use place value counters to share 3-digit numbers into equal groups. Children should start with the equipment outside the place value grid before sharing the hundreds, tens and ones equally between the rows. This method can also help to highlight remainders.

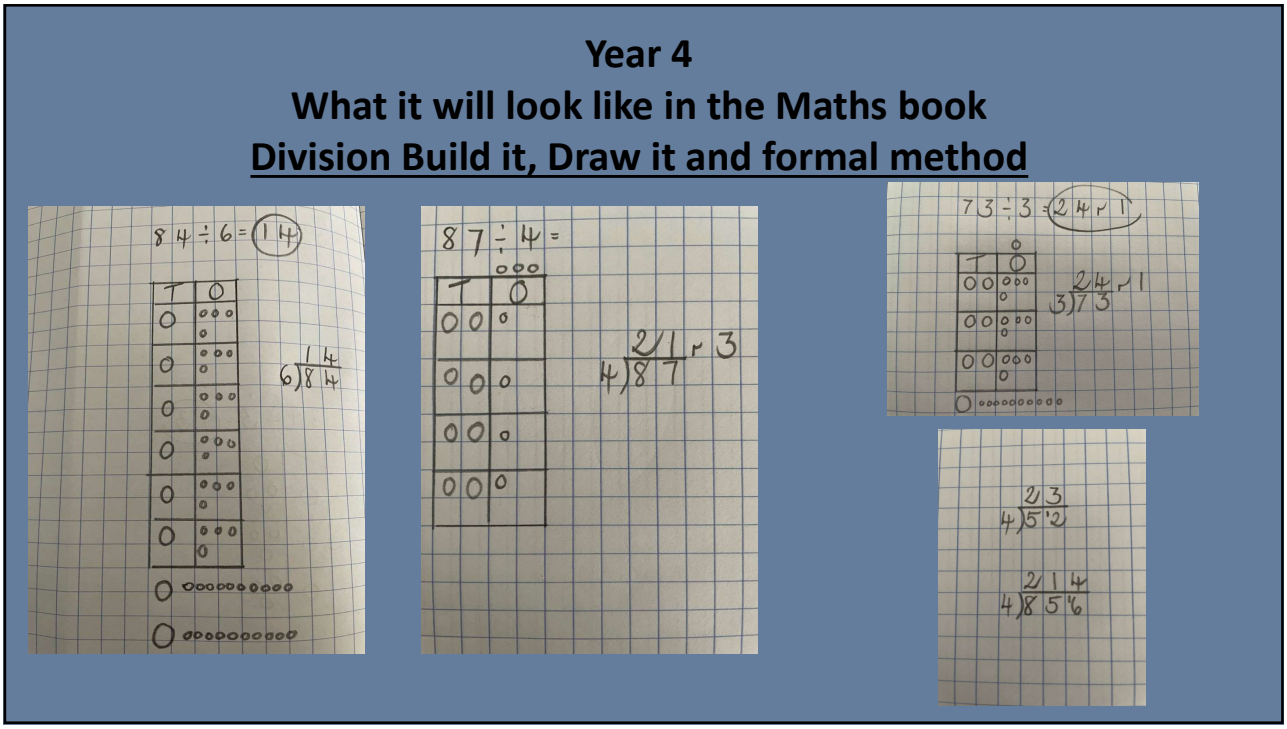
Year 4 Divide 3-digits by 1 digit

https://drive.google.com/file/d/1mZeGvquLlA-VCsb6BxrfuzTDZXFMWtog/view?usp=sharing

48

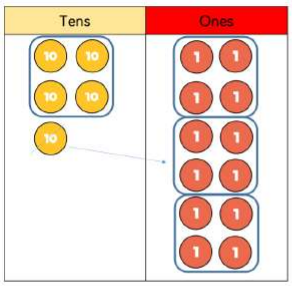
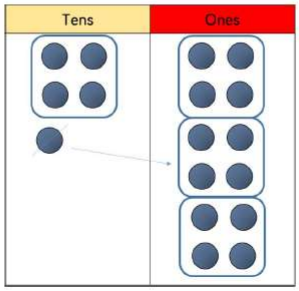

Use short division
divisor
quotient
dividend
2 4 ÷ 4 = 6
6
4 2 4
6 2 5 ÷ 5 =
1) Starting from the left, see how many times the divisor will go into each digit of the dividend
1 2 5
5 6 2 5
You can check by doing short multiplication.
1 2 5 x 5 = 6 2 5
Divisor
Dividend
Quotient
Digit
Equal to
Remainder
Decimal point

49


Year 4
What it will look like in the Maths book
Division Build it, Draw it and formal method
84 ÷ 6 = 14
87 ÷ 4 =
21 r 3
73 ÷ 3 = 24 r 1
24 r 1
23
214

50

Year 5

Skill: Divide 2-digits by 1-digit (grouping)	Year: 4/5
   52 ÷ 4 = 13	When using the short division method, children use grouping. Starting with the largest place value, they group by the divisor. Language is important here. Children should consider 'How many groups of 4 tens can we make?' and 'How many groups of 4 ones can we make?' Remainders can also be seen as they are left ungrouped.

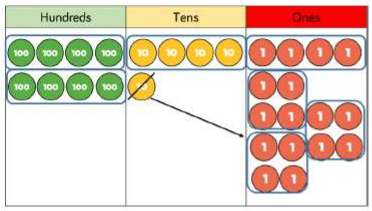
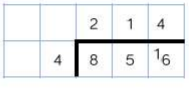
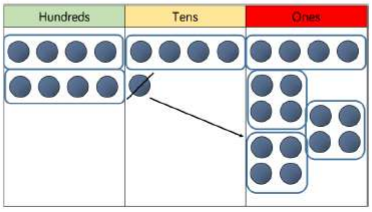
Year 5 Divide 2-digits by 1 digit

https://drive.google.com/file/d/1KOdyBIE3JL6RGx2oOP6fKa6nA85ms2Ku/view?usp=sharing

Year 5 Divide 2-digits by 1-digit (2)

https://drive.google.com/file/d/14J0AOtIlznCFfioarfyeaQMtreSVwYzb/view?usp=sharing

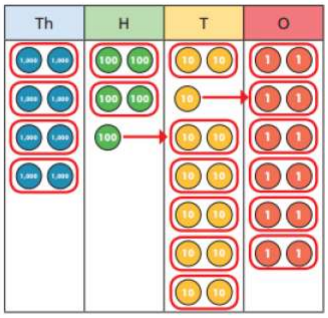
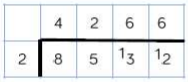
51

Skill: Divide 3-digits by 1-digit (grouping)	Year: 5
   856 ÷ 4 = 214	Children can continue to use grouping to support their understanding of short division when dividing a 3-digit number by a 1-digit number. Place value counters or plain counters can be used on a place value grid to support this understanding. Children can also draw their own counters and group them through a more pictorial method.

Year 5 Divide 3-digits by 1-digit

https://drive.google.com/file/d/1N3OeapyCMGao0c39QHY16lf6qlgDLE4O/view?usp=sharing

52

Skill: Divide 4-digits by 1-digit (grouping)	Year: 5
  8,532 ÷ 2 = 4,266	Place value counters or plain counters can be used on a place value grid to support children to divide 4-digits by 1-digit. Children can also draw their own counters and group them through a more pictorial method. Children should be encouraged to move away from the concrete and pictorial when dividing numbers with multiple exchanges.

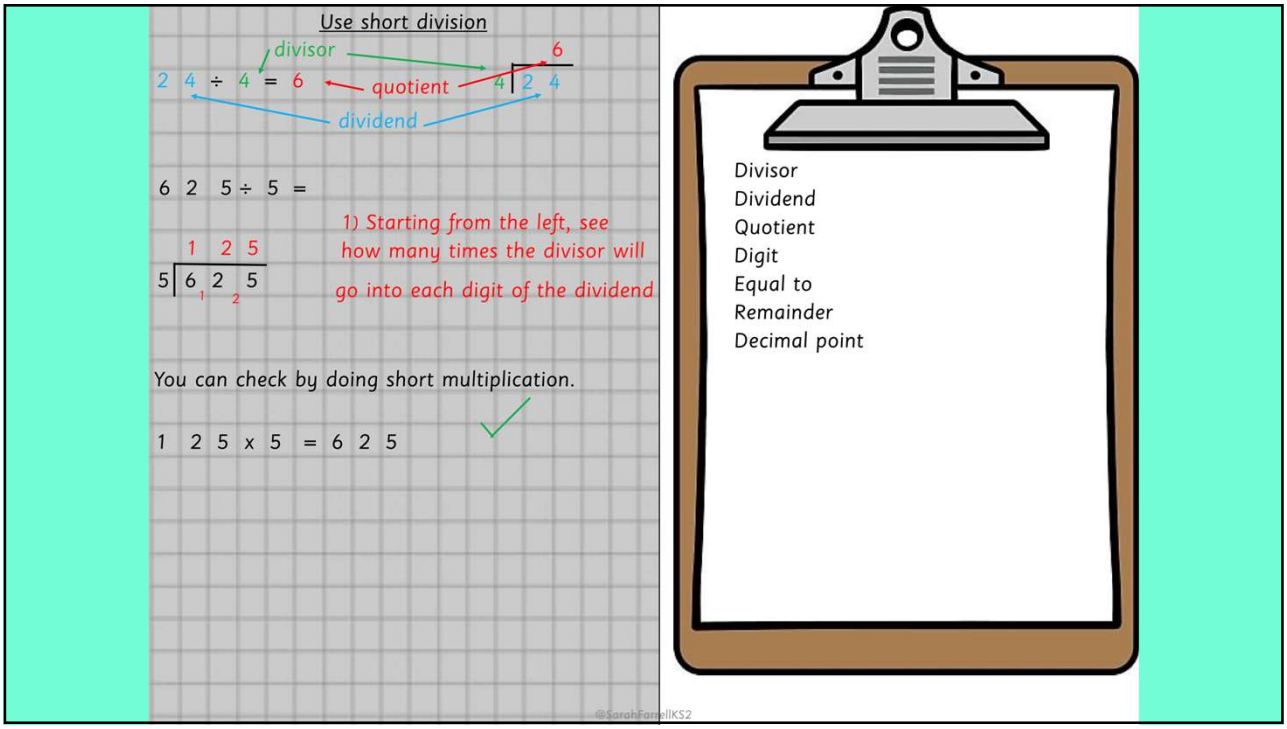
Year 5 Divide 4-digits by 1-digit

https://drive.google.com/file/d/1GLBwFpo6zninuWoV8JIqicO8kDvSAbzQ/view?usp=sharing

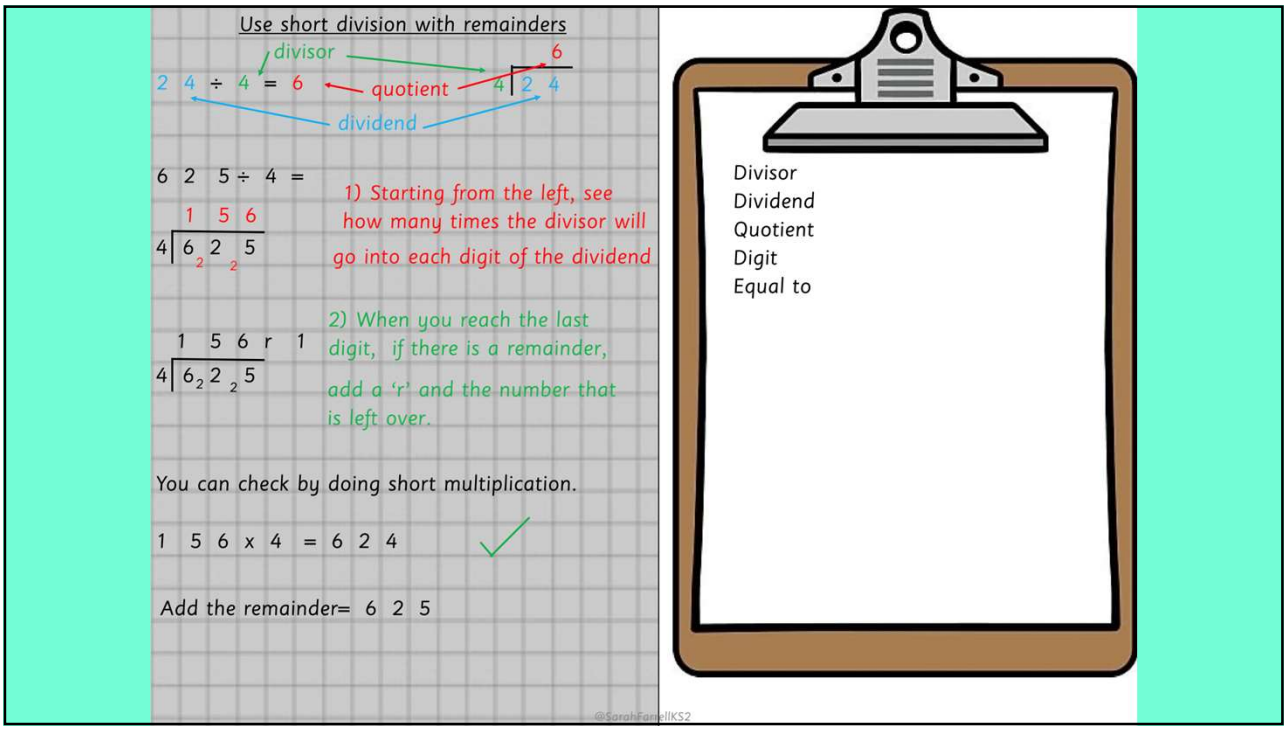
Year 5 Divide with remainders

https://drive.google.com/file/d/1RPouGUDreFseu0mvGcN2V-M_1sdQKw7u/view?usp=sharing

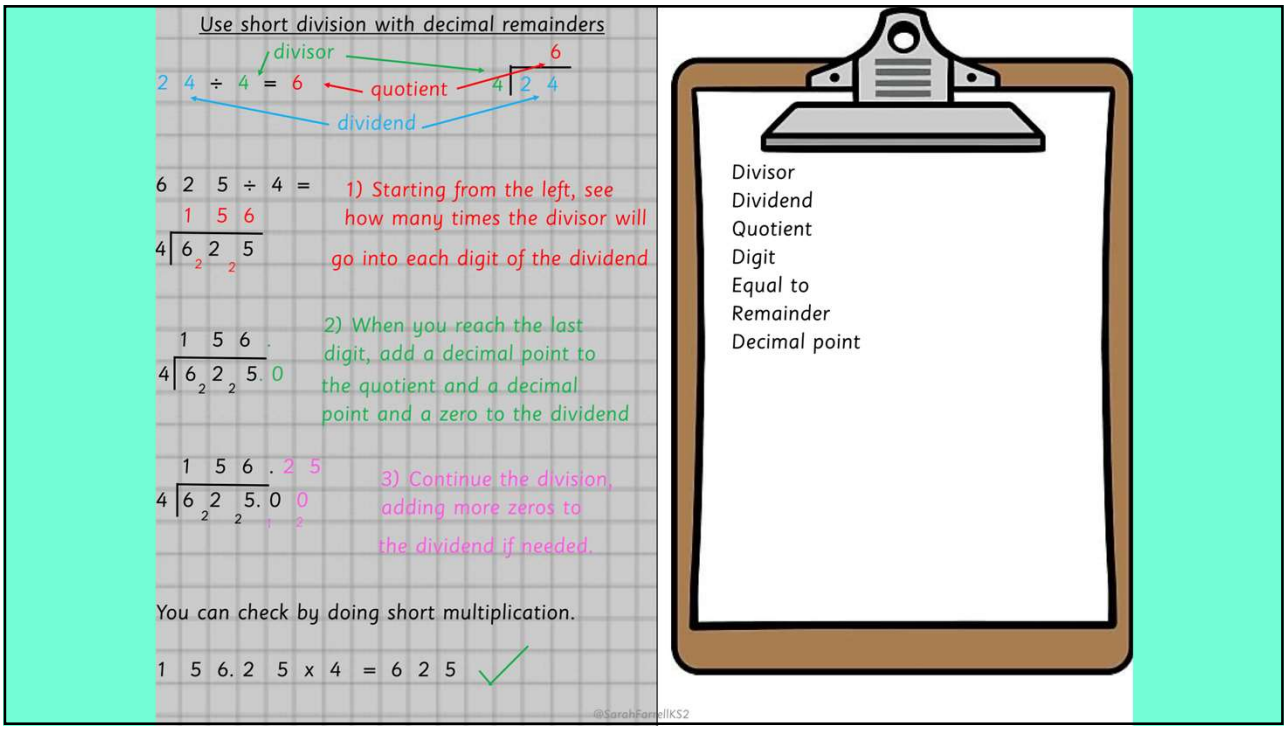
53



54

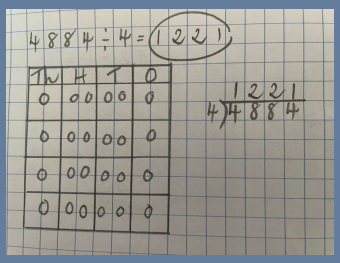

Use short division with remainders
divisor
quotient
dividend
2 4 ÷ 4 = 6
6
4 2 4
6 2 5 ÷ 4 =
1 5 6
4 6 2 2 5
1) Starting from the left, see how many times the divisor will go into each digit of the dividend
1 5 6 r 1
4 6 2 2 5
2) When you reach the last digit, if there is a remainder, add a 'r' and the number that is left over.
You can check by doing short multiplication.
1 5 6 x 4 = 6 2 4
Add the remainder= 6 2 5
@SarahFarrellKS2
Divisor
Dividend
Quotient
Digit
Equal to

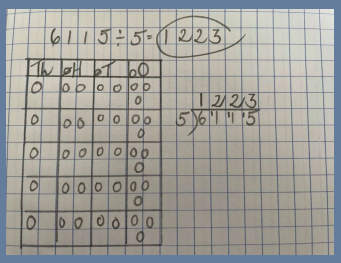
55

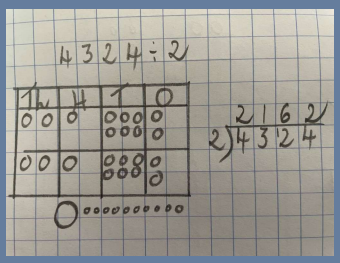

Use short division with decimal remainders
divisor
quotient
dividend
2 4 ÷ 4 = 6
6
4 2 4
6 2 5 ÷ 4 =
1 5 6
4 6 2 2 5
1) Starting from the left, see how many times the divisor will go into each digit of the dividend
1 5 6 .
4 6 2 2 5. 0
2) When you reach the last digit, add a decimal point to the quotient and a decimal point and a zero to the dividend
1 5 6 . 2 5
4 6 2 2 5. 0 0
3) Continue the division, adding more zeros to the dividend if needed.
You can check by doing short multiplication.
1 5 6. 2 5 x 4 = 6 2 5
@SarahFarrellKS2
Divisor
Dividend
Quotient
Digit
Equal to
Remainder
Decimal point

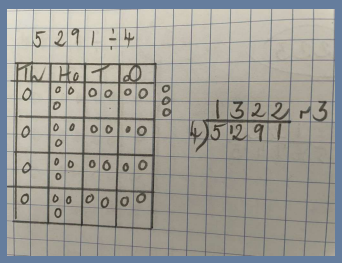
56

Year 5
What it will look like in the Maths book
Division Build it, Draw it and formal method









57

Year 6

Year 6 Short division

https://drive.google.com/file/d/169hmU8BRQtoJh0NL3eX4RZ9Ja3sWoXnd/view?usp=sharing

How To Teach The Formal Long Division Method At KS2 Step By Step So Children Love It!

https://thirdspacelearning.com/blog/teach-long-division-method-ks2-steps/

Skill: Divide multi digits by 2-digits (short division)	Year: 6
0 3 6 / 12 | 4 | 4 3 | 7 2 432 ÷ 12 = 36 0 4 8 9 / 15 | 7 | 7 3 | 13 3 | 13 5 7,335 ÷ 15 = 489 15 30 45 60 75 90 105 120 135 150	When children begin to divide up to 4-digits by 2-digits, written methods become the most accurate as concrete and pictorial representations become less effective. Children can write out multiples to support their calculations with larger remainders. Children will also solve problems with remainders where the quotient can be rounded as appropriate.

58

How to create multiples of numbers greater than 12 to support division

Partition the number

16

10	**+**	**6**	**=**	**16**
20	**+**	**12**	**=**	**32**
30	**+**	**18**	**=**	**48**
40	**+**	**24**	**=**	**64**
50	**+**	**30**	**=**	**80**
60	**+**	**36**	**=**	**96**

59

How to create multiples of numbers greater than 12 to support division

Partition the number

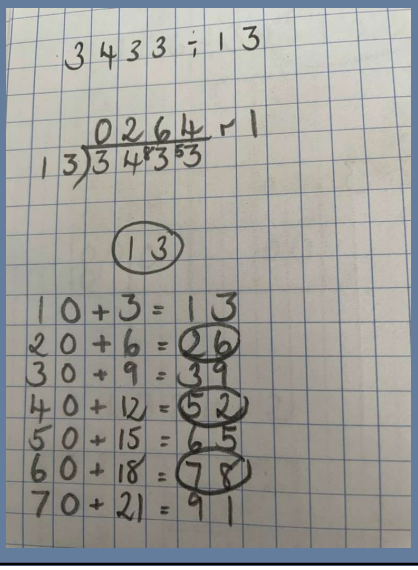
24

Create at least 6-8 multiples

20	**+**	**4**	**=**	**24**
40	**+**	**8**	**=**	**48**
60	**+**	**12**	**=**	**72**
80	**+**	**16**	**=**	**96**
100	**+**	**20**	**=**	**120**
120	**+**	**24**	**=**	**144**

60

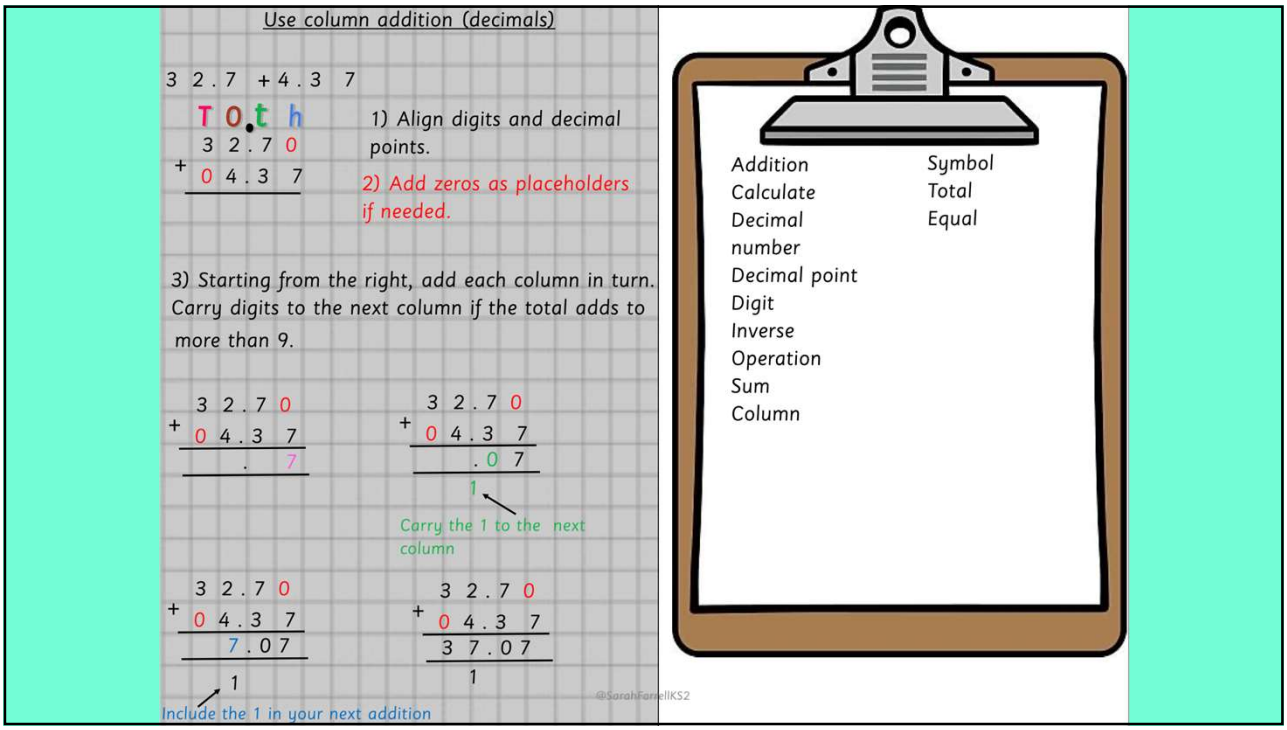
Year 6
What it will look like in the Maths book



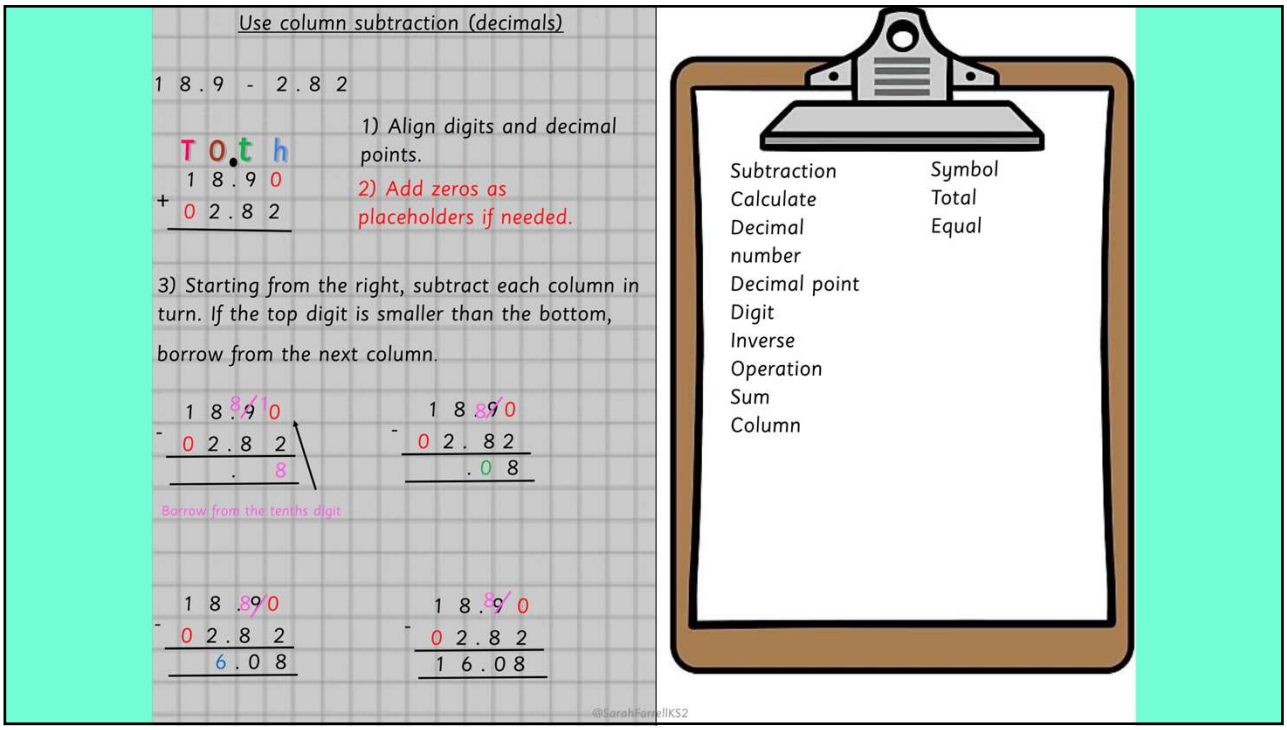
61

Decimals

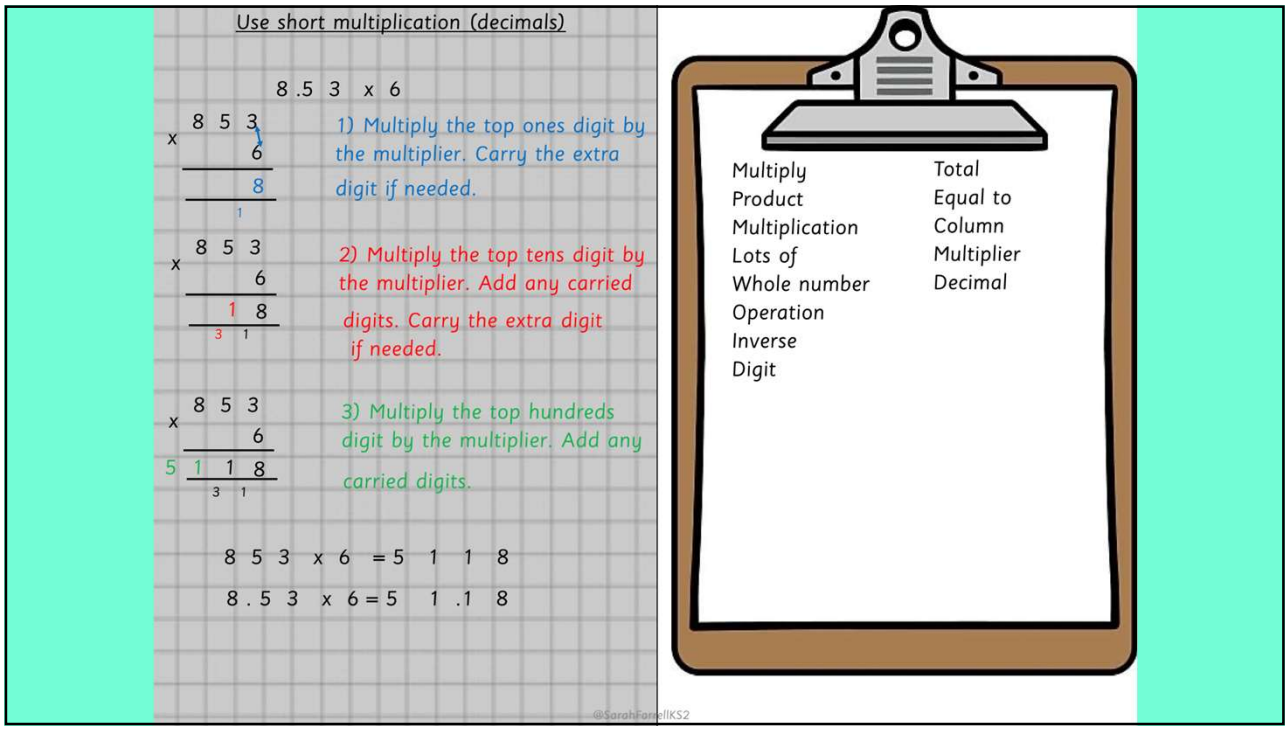
62


Use column addition (decimals)
3 2.7 + 4.3 7
T O.t h
3 2.7 0
+ 0 4.3 7
1) Align digits and decimal points.
2) Add zeros as placeholders if needed.
3) Starting from the right, add each column in turn. Carry digits to the next column if the total adds to more than 9.
3 2.7 0
+ 0 4.3 7
. 7
3 2.7 0
+ 0 4.3 7
. 0 7
1
Carry the 1 to the next column
3 2.7 0
+ 0 4.3 7
7.07
1
Include the 1 in your next addition
3 2.7 0
+ 0 4.3 7
3 7.07
1
@SarahFarnellKS2
Addition
Calculate
Decimal number
Decimal point
Digit
Inverse
Operation
Sum
Column
Symbol
Total
Equal

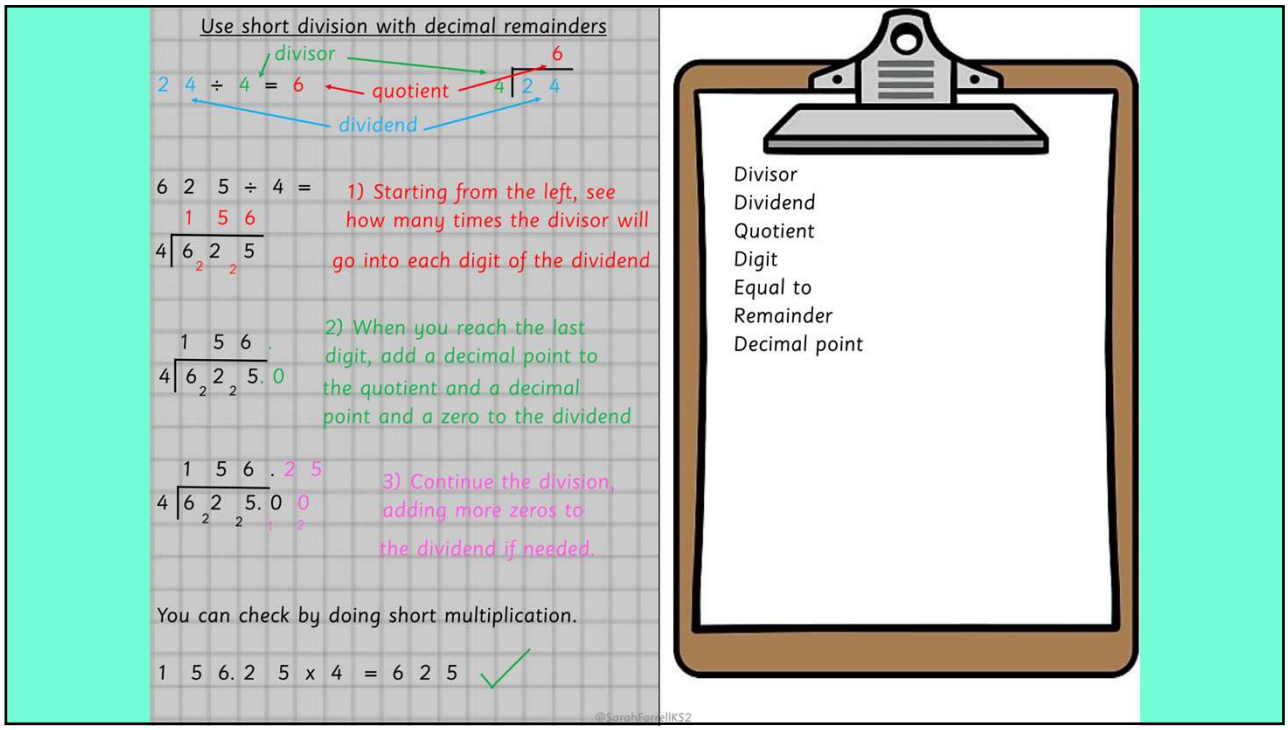
63


Use column subtraction (decimals)
1 8.9 - 2.8 2
T O.t h
1 8.9 0
+ 0 2.8 2
1) Align digits and decimal points.
2) Add zeros as placeholders if needed.
3) Starting from the right, subtract each column in turn. If the top digit is smaller than the bottom, borrow from the next column.
1 8.9 0
- 0 2.8 2
. 8
Borrow from the tenths digit
1 8 8 9 0
- 0 2.8 2
. 0 8
1 8 .8 9 0
- 0 2.8 2
6.0 8
1 8.9 0
- 0 2.8 2
1 6.0 8
@SarahFarnellKS2
Subtraction
Calculate
Decimal number
Decimal point
Digit
Inverse
Operation
Sum
Column
Symbol
Total
Equal

64


Use short multiplication (decimals)
8.5 3 x 6
x 8 5 3
6
8
1
1) Multiply the top ones digit by the multiplier. Carry the extra digit if needed.
x 8 5 3
6
1 8
3 1
2) Multiply the top tens digit by the multiplier. Add any carried digits. Carry the extra digit if needed.
x 8 5 3
6
5 1 1 8
3 1
3) Multiply the top hundreds digit by the multiplier. Add any carried digits.
8 5 3 x 6 = 5 1 1 8
8.5 3 x 6 = 5 1.1 8
@SarahFarrellKS2
Multiply
Product
Multiplication
Lots of
Whole number
Operation
Inverse
Digit
Total
Equal to
Column
Multiplier
Decimal

65

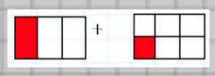

Use short division with decimal remainders
divisor
quotient
dividend
2 4 ÷ 4 = 6
6
4 2 4
6 2 5 ÷ 4 =
1 5 6
4 6 2 2 5
1) Starting from the left, see how many times the divisor will go into each digit of the dividend
1 5 6 .
4 6 2 2 5. 0
2) When you reach the last digit, add a decimal point to the quotient and a decimal point and a zero to the dividend
1 5 6 . 2 5
4 6 2 2 5. 0 0
3) Continue the division, adding more zeros to the dividend if needed.
You can check by doing short multiplication.
1 5 6. 2 5 x 4 = 6 2 5
@SarahFarrellKS2
Divisor
Dividend
Quotient
Digit
Equal to
Remainder
Decimal point

66

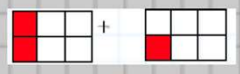
Fractions

67

Add fractions

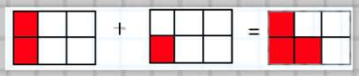
$\frac{1}{3} + \frac{1}{6}$ 

1) Convert both fractions to have the same denominator. $\frac{1}{3}\ ^{\times 2} + \frac{1}{6}\ _{\times 2}$

$\frac{2}{6} + \frac{1}{6}$ 

2) Add the numerators, but not the denominators.

$\frac{2}{6} + \frac{1}{6} = \frac{3}{6}$



3) Simplify the answer if you can.

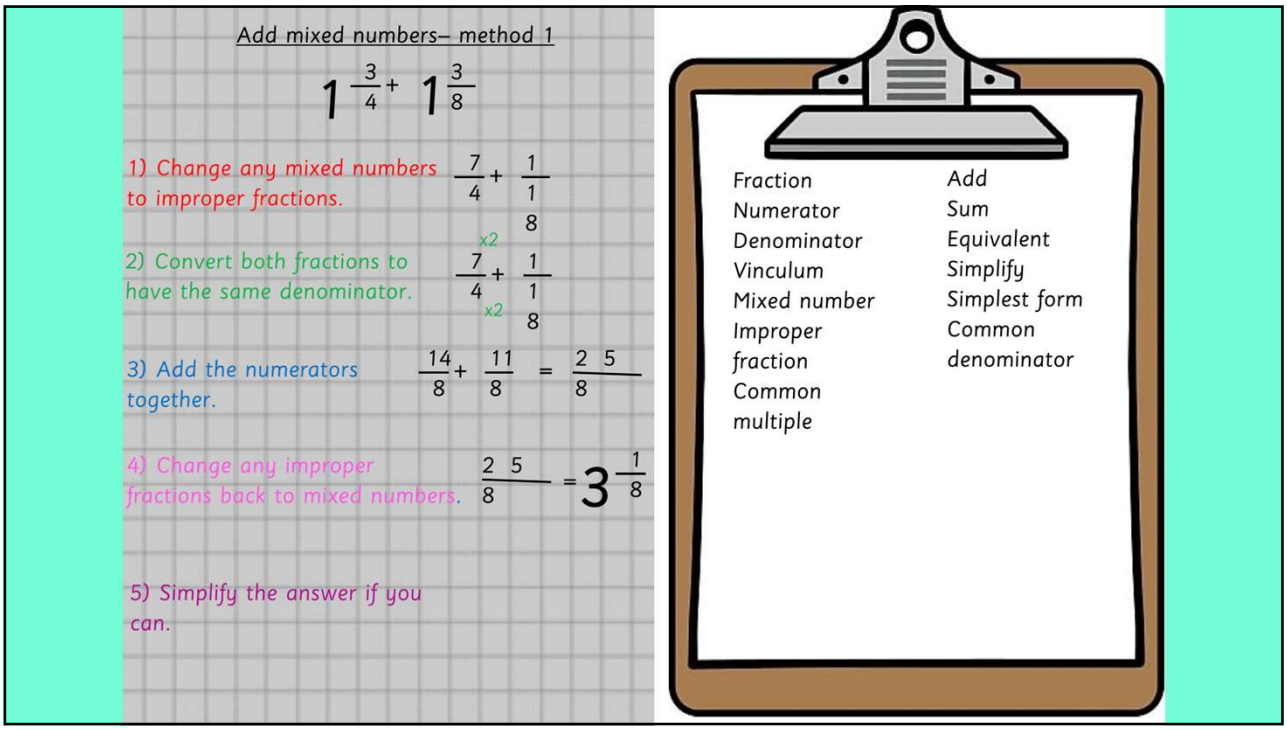
$\frac{3}{6} \overset{\div 3}{=} \frac{1}{2}$

$\div 3$

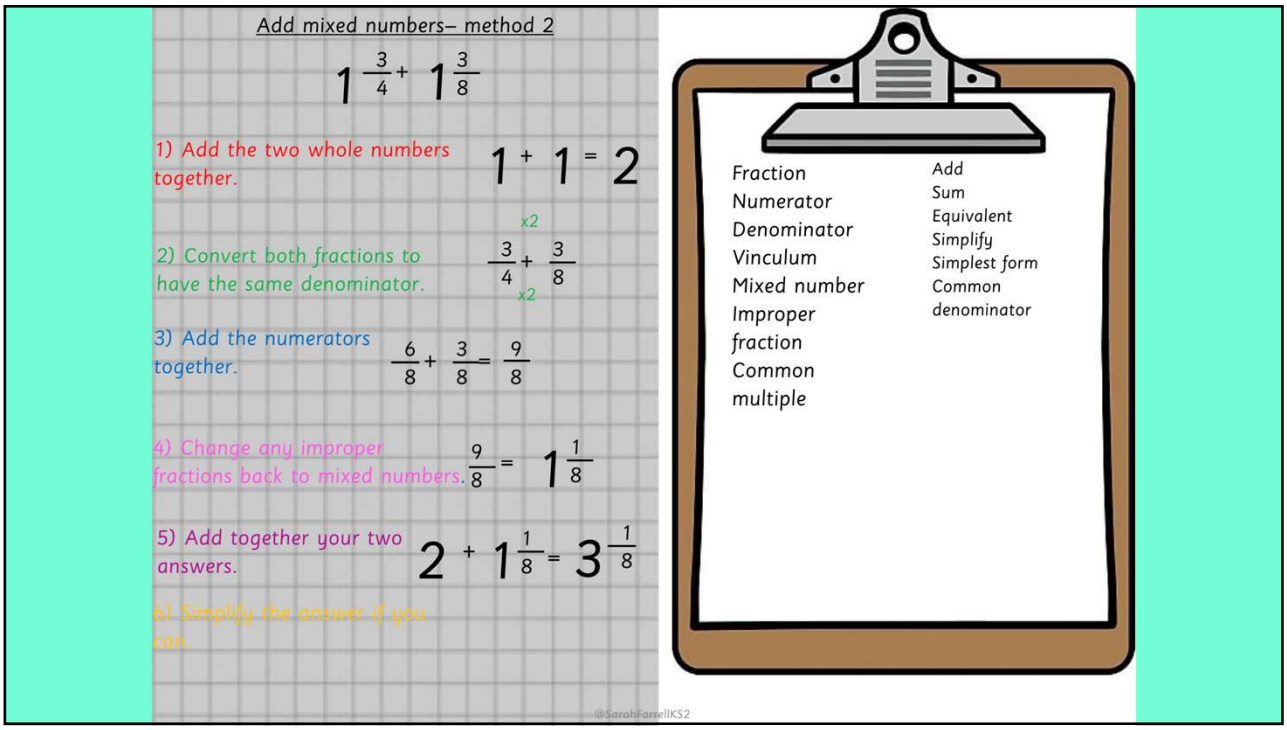
Fraction
Numerator
Denominator
Vinculum
Mixed number
Improper fraction
Common multiple

Add
Sum
Equivalent
Simplify
Simplest form
Common denominator

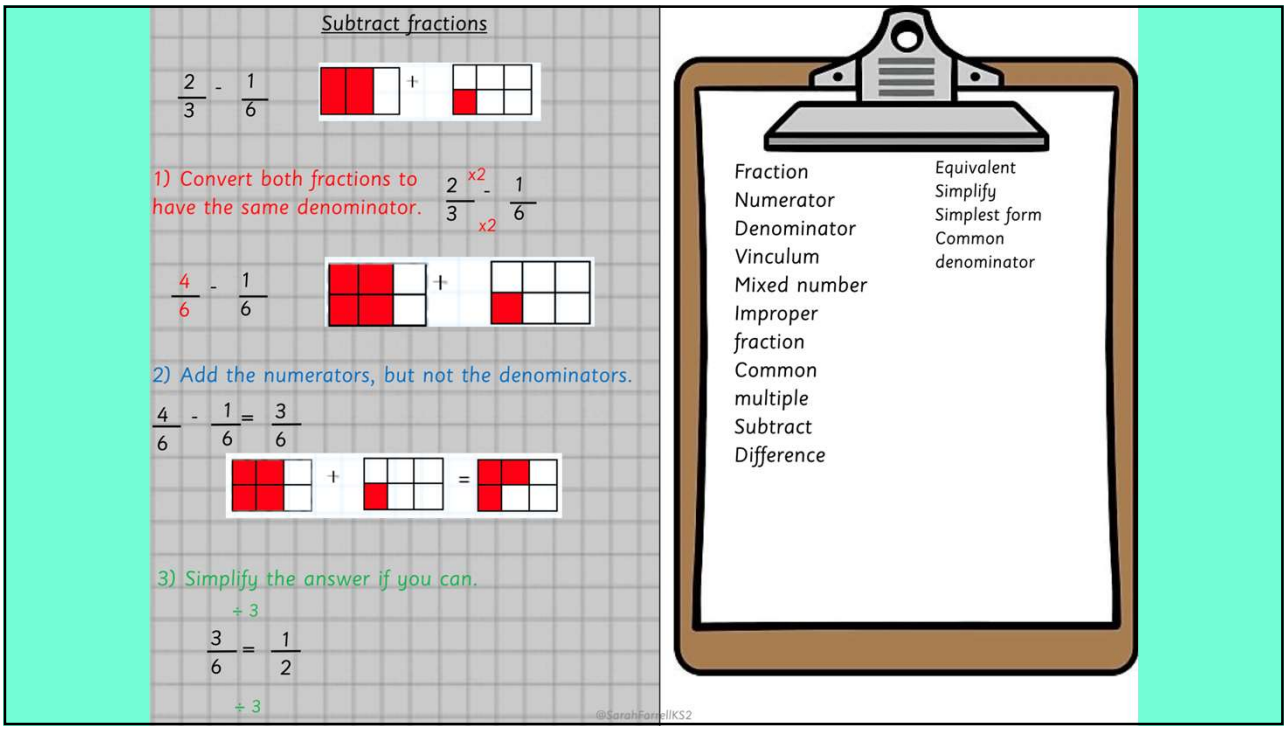
68


Add mixed numbers– method 1
$1\frac{3}{4} + 1\frac{3}{8}$
1) Change any mixed numbers to improper fractions.
$\frac{7}{4} + \frac{1}{8}$
2) Convert both fractions to have the same denominator.
x2
$\frac{7}{4} + \frac{1}{8}$
x2
3) Add the numerators together.
$\frac{14}{8} + \frac{11}{8} = \frac{25}{8}$
4) Change any improper fractions back to mixed numbers.
$\frac{25}{8} = 3\frac{1}{8}$
5) Simplify the answer if you can.
Fraction
Numerator
Denominator
Vinculum
Mixed number
Improper fraction
Common multiple
Add
Sum
Equivalent
Simplify
Simplest form
Common denominator

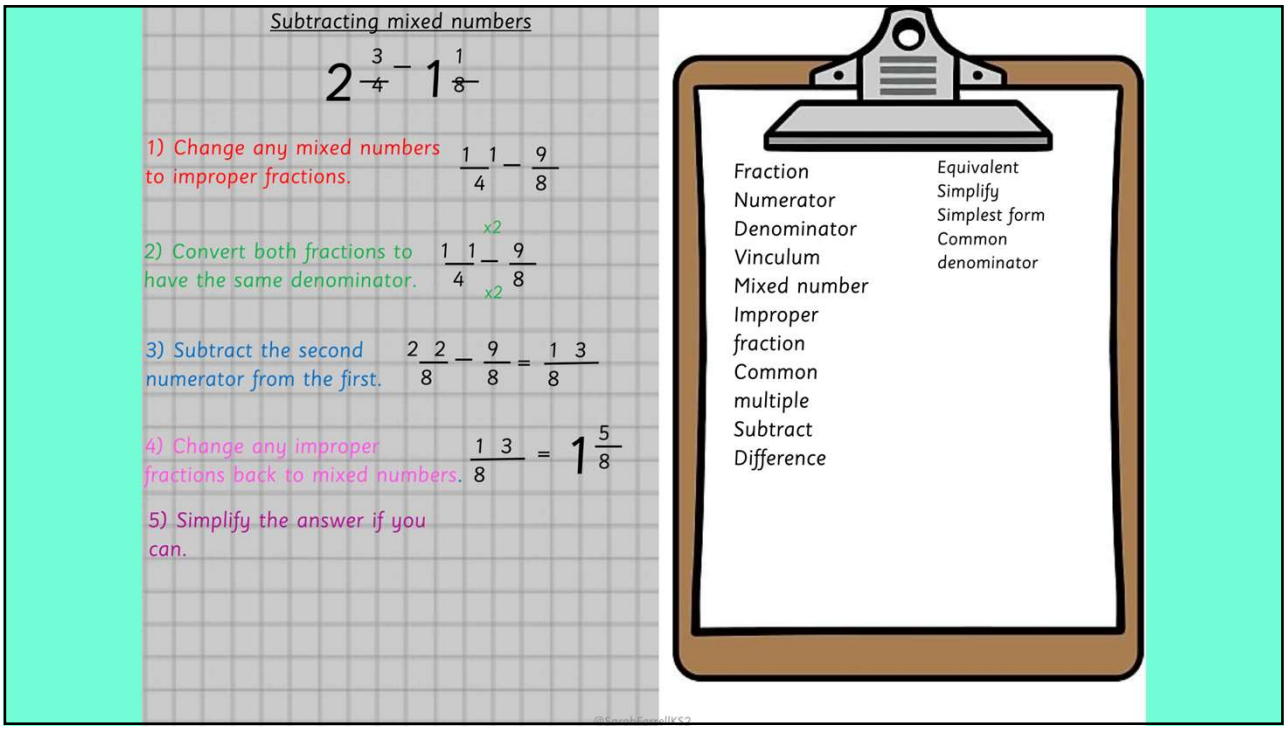
69


Add mixed numbers– method 2
$1\frac{3}{4} + 1\frac{3}{8}$
1) Add the two whole numbers together.
$1 + 1 = 2$
2) Convert both fractions to have the same denominator.
x2
$\frac{3}{4} + \frac{3}{8}$
x2
3) Add the numerators together.
$\frac{6}{8} + \frac{3}{8} = \frac{9}{8}$
4) Change any improper fractions back to mixed numbers.
$\frac{9}{8} = 1\frac{1}{8}$
5) Add together your two answers.
$2 + 1\frac{1}{8} = 3\frac{1}{8}$
6) Simplify the answer if you can.
Fraction
Numerator
Denominator
Vinculum
Mixed number
Improper fraction
Common multiple
Add
Sum
Equivalent
Simplify
Simplest form
Common denominator
@SarahFarrellKS2

70


Subtract fractions
2/3 - 1/6
1) Convert both fractions to have the same denominator.
x2
2/3 - 1/6
x2
4/6 - 1/6
2) Add the numerators, but not the denominators.
4/6 - 1/6 = 3/6
3) Simplify the answer if you can.
÷ 3
3/6 = 1/2
÷ 3
@SarahFarrellKS2
Fraction
Numerator
Denominator
Vinculum
Mixed number
Improper fraction
Common multiple
Subtract
Difference
Equivalent
Simplify
Simplest form
Common denominator

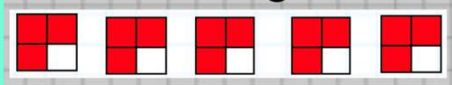
71


Subtracting mixed numbers
2 3/4 − 1 1/8
1) Change any mixed numbers to improper fractions.
1 1/4 − 9/8
2) Convert both fractions to have the same denominator.
x2
1 1/4 − 9/8
x2
3) Subtract the second numerator from the first.
2 2/8 − 9/8 = 1 3/8
4) Change any improper fractions back to mixed numbers.
1 3/8 = 1 5/8
5) Simplify the answer if you can.
@SarahFarrellKS2
Fraction
Numerator
Denominator
Vinculum
Mixed number
Improper fraction
Common multiple
Subtract
Difference
Equivalent
Simplify
Simplest form
Common denominator

72

Multiplying fractions by whole numbers

$\frac{3}{4} \times 5$



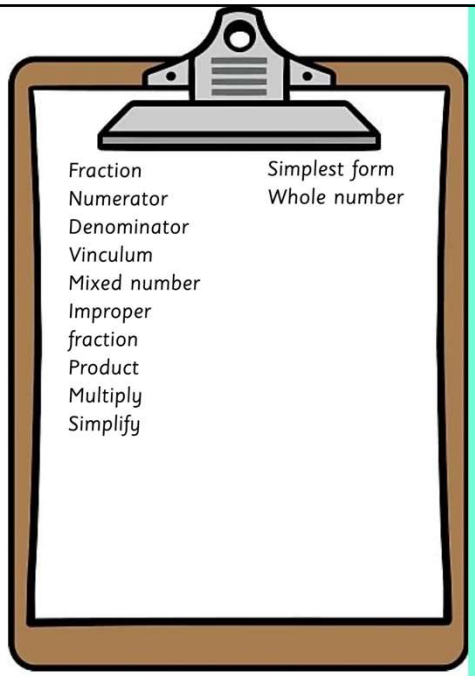
1) Write the whole number as a fraction over 1. $\frac{3}{4} \times \frac{5}{1}$

2) Multiply the numerators $\frac{3}{4} \times \frac{5}{1} = \frac{1\ 5}{4}$

3) Multiply the denominators

4) Change any improper fractions back to mixed numbers. $\frac{1\ 5}{4} = 3\frac{3}{4}$

5) Simplify the answer if you can.



Fraction
Numerator
Denominator
Vinculum
Mixed number
Improper fraction
Product
Multiply
Simplify
Simplest form
Whole number

73

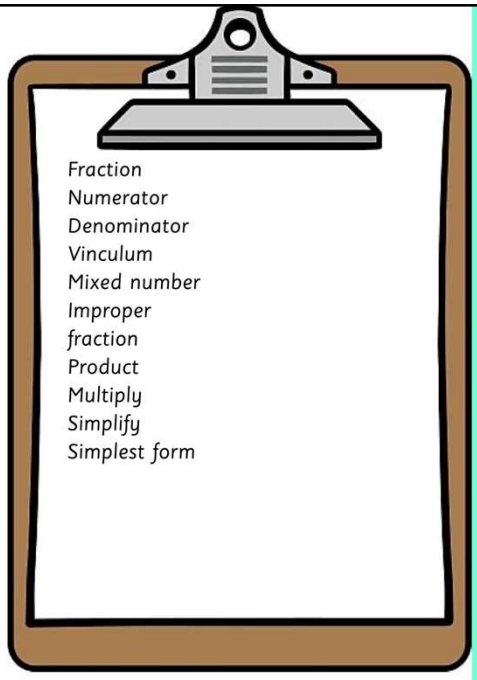
Multiplying pairs of fractions

$\frac{3}{4} \times \frac{2}{3}$

1) Multiply the numerators $\frac{3}{4} \times \frac{2}{3} = \frac{6}{1\ 2}$

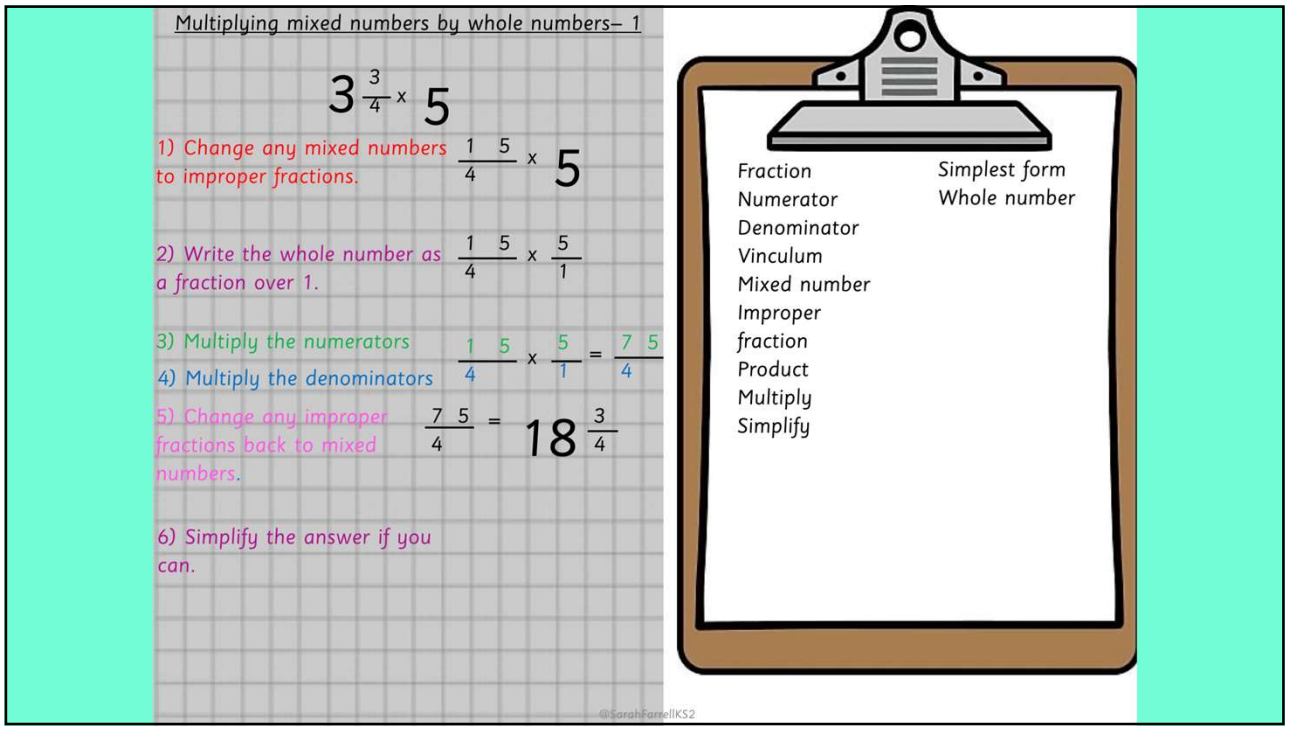
2) Multiply the denominators

3) Simplify the answer if you can. $\frac{6}{1\ 2} = \frac{1}{2}$

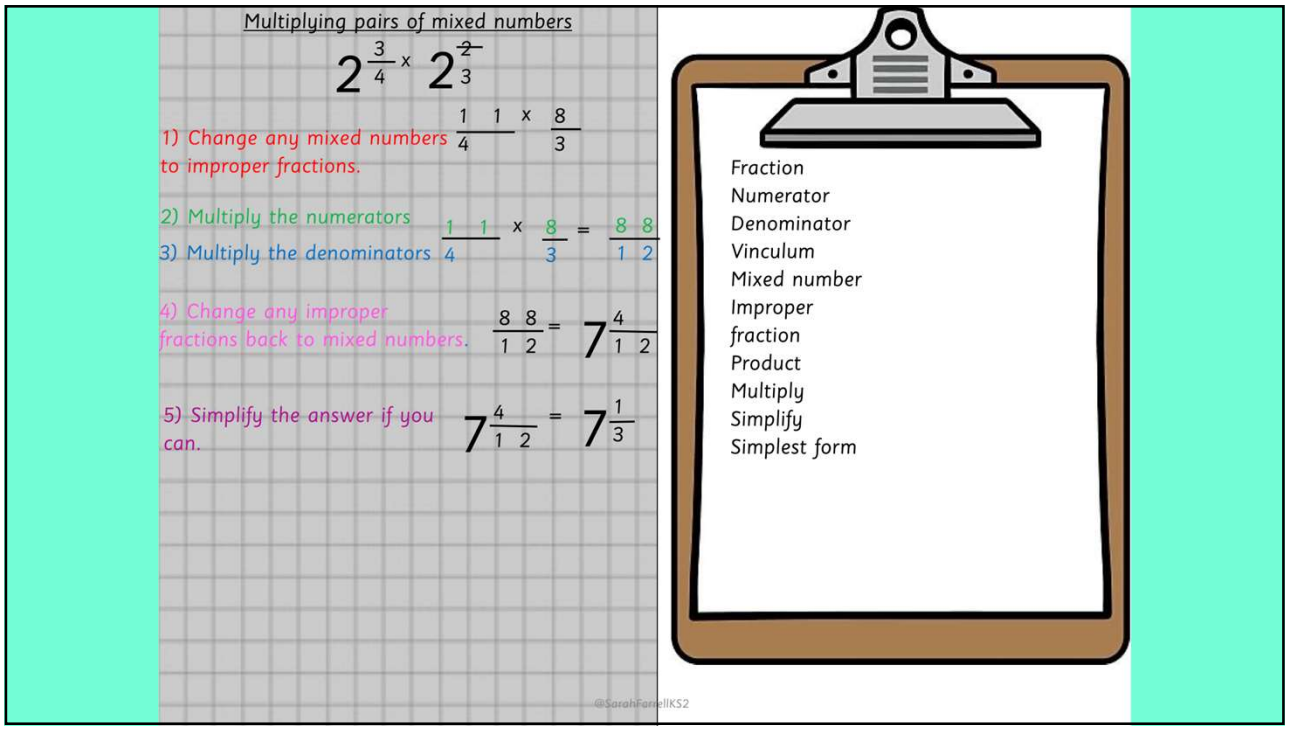


Fraction
Numerator
Denominator
Vinculum
Mixed number
Improper fraction
Product
Multiply
Simplify
Simplest form

74


Multiplying mixed numbers by whole numbers– 1
$3\frac{3}{4} \times 5$
1) Change any mixed numbers to improper fractions.
$\frac{15}{4} \times 5$
2) Write the whole number as a fraction over 1.
$\frac{15}{4} \times \frac{5}{1}$
3) Multiply the numerators
4) Multiply the denominators
$\frac{15}{4} \times \frac{5}{1} = \frac{75}{4}$
5) Change any improper fractions back to mixed numbers.
$\frac{75}{4} = 18\frac{3}{4}$
6) Simplify the answer if you can.
@SarahFarrellKS2
Fraction
Numerator
Denominator
Vinculum
Mixed number
Improper fraction
Product
Multiply
Simplify
Simplest form
Whole number

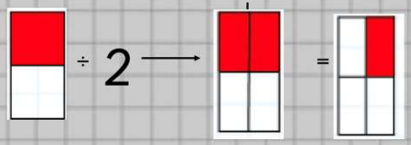
75


Multiplying pairs of mixed numbers
$2\frac{3}{4} \times 2\frac{2}{3}$
1) Change any mixed numbers to improper fractions.
$\frac{11}{4} \times \frac{8}{3}$
2) Multiply the numerators
3) Multiply the denominators
$\frac{11}{4} \times \frac{8}{3} = \frac{88}{12}$
4) Change any improper fractions back to mixed numbers.
$\frac{88}{12} = 7\frac{4}{12}$
5) Simplify the answer if you can.
$7\frac{4}{12} = 7\frac{1}{3}$
@SarahFarrellKS2
Fraction
Numerator
Denominator
Vinculum
Mixed number
Improper fraction
Product
Multiply
Simplify
Simplest form

76

Divide fractions by whole numbers

$\frac{1}{2} \div 2$



1) Multiply the denominator by the whole number and write the answer as the new denominator.

$\frac{1}{2} \div 2$

$= \frac{1}{4}$

2) Simplify the answer if you can.

Fraction
Numerator
Denominator
Vinculum
Mixed number
Improper fraction
Divisor
Dividend

Quotient
Simplify
Simplest form
Whole number

77

Divide fractions by whole numbers

$5\frac{3}{4} \div 3$

1) Change any mixed numbers to improper fractions.

$\frac{2\ 3}{4} \div 3$

2) Multiply the denominator by the whole number and write the answer as the new denominator.

$\frac{2\ 3}{4} \div 3$

3) Change any improper fractions back to mixed numbers.

$\frac{2\ 3}{1\ 2} = 1\frac{1\ 1}{1\ 2}$

4) Simplify the answer if you can.

Fraction
Numerator
Denominator
Vinculum
Mixed number
Improper fraction
Divisor
Dividend

Quotient
Simplify
Simplest form
Whole number

78