Upper KS2 Maths (Years 5 and 6)

Parent Workshop

Session Objectives

- Explain how maths is taught in upper KS2

- Show the methods your child uses in school

- Give you practical ways to help at home

Equipment

- On your table you should have:

- Handout 1- presentation

- Handout 2- progression overview

- Handout 3- Calculation Policy

- Whiteboard, pen and eraser (if needed)

- Other Mathematics equipment

During Year 5 and Year 6

YEAR GROUP	KEY FOCUS
Year 5	• Securing **formal written methods** for all four operations • Developing **place value, fractions and explanation of reasoning**
Year 6	• Applying **efficient calculation methods** accurately and independently • Solving **multi-step problems** involving fractions, decimals and percentages

Handout 1- Progression Grid

White Rose Maths

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Place Value: Counting	• count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number • Count numbers to 100 in numerals; count in multiples of twos, fives and tens **Autumn 1** **Autumn 4** **Spring 2** **Summer 4**	• count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward **Autumn 1**	• count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number **Autumn 1** **Autumn 3**	• count in multiples of 6, 7, 9, 25 and 1000 • count backwards through zero to include negative numbers **Autumn 1** **Autumn 4**	• count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 • count forwards and backwards with positive and negative whole numbers, including through zero **Autumn 1**	
Place Value: Represent	• identify and represent numbers using objects and pictorial representations • read and write numbers to 100 in numerals • read and write numbers from 1 to 20 in numerals and words. **Autumn 1** **Autumn 4** **Spring 2** **Summer 4**	• read and write numbers to at least 100 in numerals and in words • identify, represent and estimate numbers using different representations, including the number line **Autumn 1**	• identify, represent and estimate numbers using different representations • read and write numbers up to 1000 in numerals and in words **Autumn 1**	• identify, represent and estimate numbers using different representations • read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value **Autumn 1**	• read, write, (order and compare) numbers to at least 1 000 000 and determine the value of each digit • read Roman numerals to 1000 (M) and recognise years written in Roman numerals. **Autumn 1**	• read, write, (order and compare) numbers up to 10 000 000 and determine the value of each digit **Autumn 1**

Primary Progression – Place Value

White Rose Maths

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Place Value : Use PV and Compare	• given a number, identify one more and one less Autumn 1 Autumn 4 Spring 2 Summer 4	• recognise the place value of each digit in a two-digit number (tens, ones) • compare and order numbers from 0 up to 100; use <, > and = signs Autumn 1	• recognise the place value of each digit in a three-digit number (hundreds, tens, ones) • compare and order numbers up to 1000 Autumn 1	• find 1000 more or less than a given number • recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) • order and compare numbers beyond 1000 Autumn 1	• (read, write) order and compare numbers to at least 1 000 000 and determine the value of each digit Autumn 1	• (read, write), order and compare numbers up to 10 000 000 and determine the value of each digit Autumn 1
Place Value: Problems& Rounding		• use place value and number facts to solve problems. Autumn 1	• solve number problems and practical problems involving these ideas Autumn 1	• round any number to the nearest 10, 100 or 1000 • solve number and practical problems that involve all of the above and with increasingly large positive numbers Autumn 1	• interpret negative numbers in context • round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 • solve number problems and practical problems that involve all of the above Autumn 1	• round any whole number to a required degree of accuracy • use negative numbers in context, and calculate intervals across zero • solve number and practical problems that involve all of the above Autumn 1

Primary Progression – Addition & Subtraction

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition & Subtraction: Recall, Represent, Use	• read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs • represent and use number bonds and related subtraction facts within 20	• recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 • show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot • recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems	• estimate the answer to a calculation and use inverse operations to check answers	• estimate and use inverse operations to check answers to a calculation	• use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	
	Autumn 2	Autumn 2	Autumn 2	Autumn 2	Autumn 2	

Primary Progression – Addition & Subtraction

White Rose Maths

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition & Subtraction: Calculations	• add and subtract one-digit and two-digit numbers to 20, including zero	• add and subtract numbers using concrete objects, pictorial representations, and mentally, including: ➢ a two-digit number and ones ➢ a two-digit number and tens ➢ two two-digit numbers ➢ adding three one-digit numbers	• add and subtract numbers mentally, including: ➢ a three-digit number and ones ➢ a three-digit number and tens ➢ a three-digit number and hundreds • add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction	• add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate	• add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • add and subtract numbers mentally with increasingly large numbers	• perform mental calculations, including with mixed operations and large numbers • use their knowledge of the order of operations to carry out calculations involving the four operations
	Autumn 2 Spring 1	Autumn 2	Autumn 2	Autumn 2	Autumn 2	Autumn 2

Primary Progression – Addition & Subtraction

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition & Subtraction: Solve Problems	• solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = □ – 9	• solve problems with addition and subtraction: ➤ using concrete objects and pictorial representations, including those involving numbers, quantities and measures ➤ applying their increasing knowledge of mental and written methods	• solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction	• solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	• solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	• solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
	Autumn 2 Spring 1	Autumn 2	Autumn 2	Autumn 2	Autumn 2	Autumn 2

White Rose Maths

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Multiplication & Division: Recall, Represent, Use		• recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers • show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot	• recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables	• recall multiplication and division facts for multiplication tables up to 12 × 12 • use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers • recognise and use factor pairs and commutativity in mental calculations	• identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers • know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers • establish whether a number up to 100 is prime and recall prime numbers up to 19 • recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})	• identify common factors, common multiples and prime numbers • use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.
		Autumn 4 Spring 1	Autumn 3	Autumn 4 Spring 1	Autumn 4	Autumn 2

Primary Progression – Multiplication & Division

White Rose Maths

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Multiplication & Division: Calculations		• calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs	• write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods	• multiply two-digit and three-digit numbers by a one-digit number using formal written layout	• multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers • multiply and divide numbers mentally drawing upon known facts • divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context • multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	• multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication • divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context • divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context • perform mental calculations, including with mixed operations and large numbers
		Autumn 4 Spring 1	Autumn 3 Spring 1	Spring 1	Autumn 4 Spring 1 Summer 1	Autumn 2

Handout 2- Calculation Policy

Calculation Policy

Concrete- Pictorial- Abstract Approach

The CPA approach is a highly effective way of teaching mathematics that helps children build a deep understanding of concepts. It moves through three stages: starting with hands-on experiences, then using visual representations, and finally progressing to formal mathematical symbols. This structured progression ensures that pupils develop confidence and fluency in their learning.

5

3   2

3 + 2 = 5
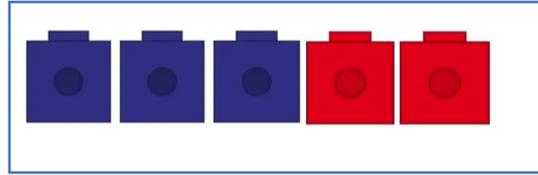
Concrete
- Children use physical objects (e.g., counters, cubes, beads) to understand mathematical concepts.
- This stage helps them see and touch what numbers represent.
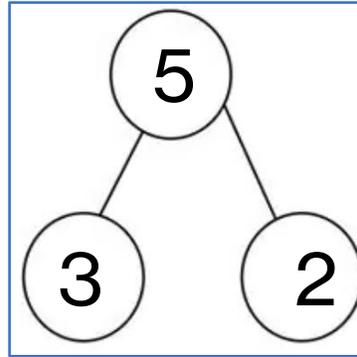
Pictorial
- Children move to drawing pictures or using visual representations (e.g., diagrams, bar models) of the objects.
- This bridges the gap between hands-on experience and symbolic understanding.

Abstract
- Children use numbers and symbols (e.g., 4 + 3 = 7) without physical or visual aids.
- This is the formal stage where they apply concepts using mathematical notation.

Further information:
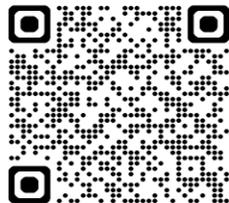
Link: What is the CPA approach? | White Rose Education

The Key Operations

Vocabulary

Array (square numbers)

2x2=4
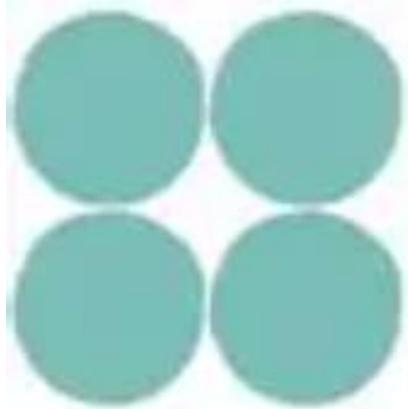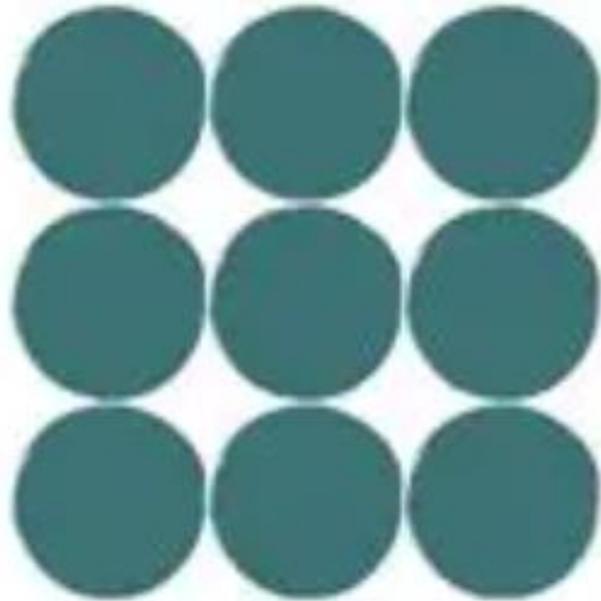
3x3=9

Commutative

$$A \times B = B \times A$$

Factor and Multiple/product

$$2 \times 10 = 20$$

factors

product
/Multiple

Lesson Structure
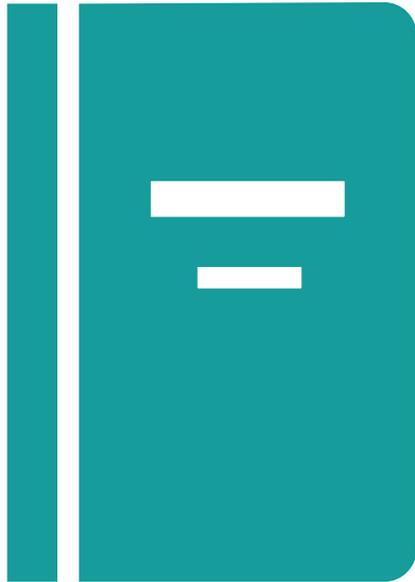
1. Flashback 4 (Flashback 2 in Y1)

2. Recap can be on whiteboards

3. Modelling/ discussion/ whiteboard work

4. Worked Examples, check for misconceptions

5. Practice **(Fluency, Reasoning, Problem Solving)**

6. Regroup (if needed)

7. Further activity

8. Plenary- what have you learned? Take-away,

Counting and Number Bonds

Counting and number bonds are the basics of maths – everything else builds on these skills.

Helps children add and subtract quickly without always using fingers.

Makes problem-solving easier because they understand how numbers work together.

Prepares them for learning in the future (multiplication, division, fractions).

Used in everyday life – money, time, measuring.

How does this apply to KS2

Children build on **KS1 number bonds to 10 and 20** by using them flexibly with **larger numbers**, decimals and multiples of 10, 100 and 1,000.

Number bonds support **efficient mental calculation**, helping pupils add and subtract quickly before using formal written methods.

In multiplication and division, known number bonds help children **derive facts** (e.g. using 3 + 7 = 10 to support 30 + 70 or 300 + 700).

Bonds are used to **bridge through key values** (e.g. to the next whole number or multiple of 10) when working with decimals and fractions.

Secure number bonds allow Year 5 and 6 pupils to **check written calculations**, estimate answers and spot mistakes independently.

Place value

Partitioning for calculation
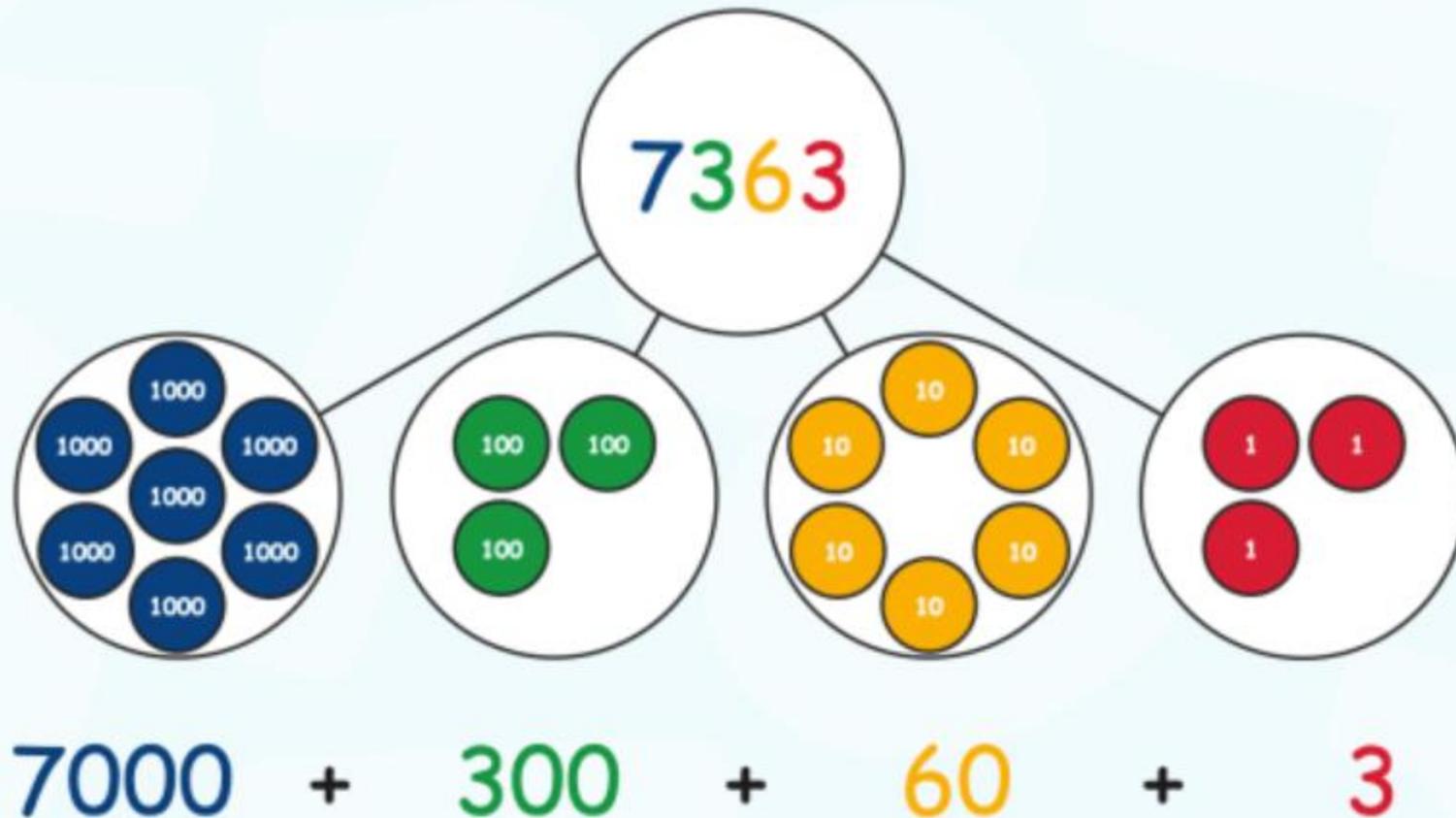
What is partitioning?

- Partitioning in maths is the process of breaking numbers into smaller, more manageable parts to simplify calculation and enhance understanding of place value. It is particularly useful for addition and subtraction. It also allows children to recognise the value of each number based on its position in a number.

10 ← 15 → 5

Partitioning example

$$785 + 211$$

Partitioning example

14 x 8

Partitioning example

$$584 - 232$$

Concrete, Pictoral and Abstract Approach

Children move through these stages to help them *really understand* maths, not just memorise answers.

Think of it as:
👉 **touch it → see it → write it**

Why is CPA so important?

✔️ Builds strong understanding
✔️ Helps children explain their thinking
✔️ Supports different learning styles
✔️ Reduces "guessing" in maths
✔️ Builds confidence

Children may move **back and forth** between stages – that's normal and healthy learning.

CPA

▶ Concrete

▶ Pictorial
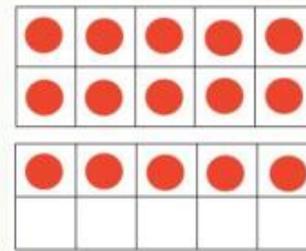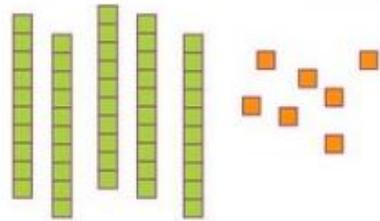
▶ Abstract   five   5   3 + 2 = 5

1 - Concrete (Hands-on learning)

🧸 **This is learning using real objects.**

Children use items they can touch and move, such as:

- Counters
- Cubes
- Coins
- Toys
- Fingers!

Example: 2 + 1
A child might put out **2 counters**, then **add 1 more** and count them all.

✅ This helps children understand *what numbers actually mean*, not just what they look like.

2 - Pictorial (Seeing it)

🖍**Now children draw pictures or look at images instead of using real objects.**

They might:

- Draw circles
- Use dots
- See simple diagrams in books

Example: 2 + 1

The child draws **two circles**, then **one more**, and counts them.

✅ This step acts as a bridge between real objects and numbers.

3 - Abstract (Numbers and symbols)

🔢 **This is where children use numbers and maths symbols.**

Example:

2 + 1 = 3

✅ Because they've already used objects and pictures, the numbers now *make sense*.

Example 1: Number bonds to 5

✋ **Concrete (Hands-on)**

Activity:

- Get **5 objects** off the table
- Move some into **two groups -** for example:
- 2 in one hand and 3 in the other

  Say together: "2 and 3 make 5"

Try all combinations:
- 0 and 5
- 1 and 4
- 2 and 3

✅ Children can *see and feel* the total staying the same.

🖼️ **Pictorial (Pictures)**

Draw or look at pictures showing the groups.
Example drawing:
- Draw **5 circles**
- Colour **2 red** and **3 blue**

Ask:
- "How many altogether?"
- "How many in each group?"

✅ This links the real objects to visual thinking.

🔢 Abstract (Numbers)

Now write the number sentence:

```
2 + 3 = 5
```

Or:

```
5 = 2 + 3
```

✅ The child understands *why* it works.

Parent tip 💡 At home, try saying:

- "Show me with objects"
- "Can you draw it?"
- "Now write the number sentence"

This follows CPA naturally without pressure.

Year 4-6 Addition

Objective & Strategy	Concrete	Pictorial	Abstract
Y4—add numbers with up to 4 digits	Children continue to use dienes or pv counters to add, exchanging ten ones for a ten and ten tens for a hundred and ten hundreds for a thousand.	Draw representations using pv grid.	Continue from previous work to carry hundreds as well as tens. Continue from previous work, exchanging hundreds as well as tens.
Y5—add numbers with more than 4 digits. Add decimals with 2 decimal places, including money.	As year 4 Introduce decimal place value counters and model exchange for addition.	2.37 + 81.79	72.8 + 54.6 = 127.4 11 £23.59 + £7.55 = £31.14
Y6—add several numbers of increasing complexity. Including adding money, measure and decimals with different numbers of decimal points.	As Y5	As Y5	81,059 3,668 15,301 + 20,551 = 120,579 Insert zeros for place holders. 23.361 9.080 59.770 + 1.300 = 93.511
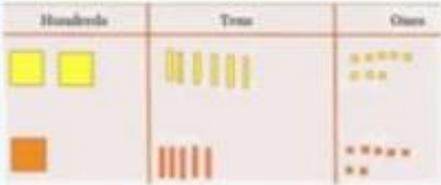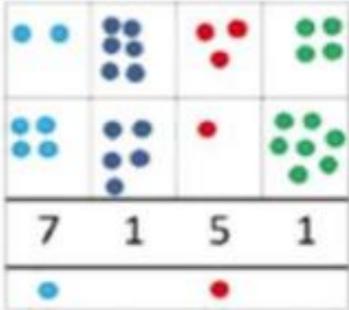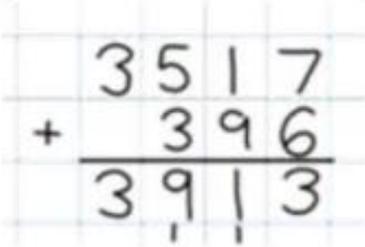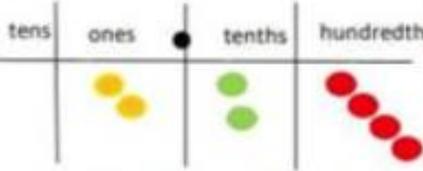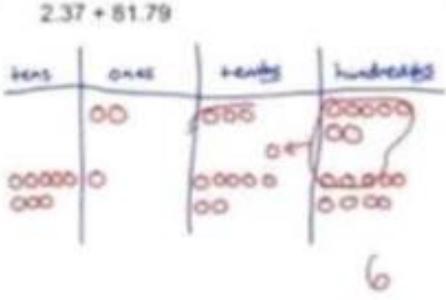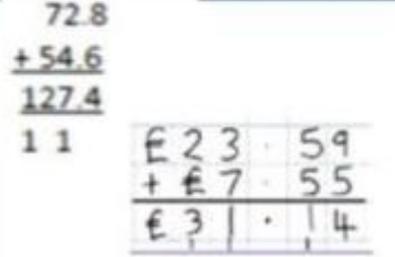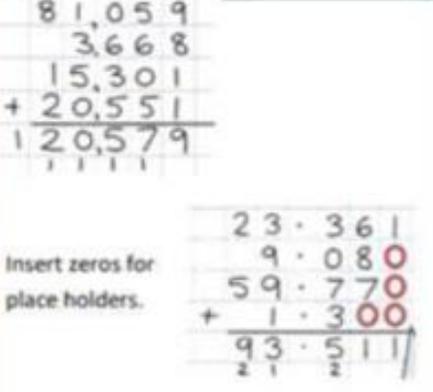
Further information:

BBC Bitesize Explanation Links

Year 4   Year 5 and 6

Link- STEM- Adding and Subtracting at Year 3 and Year 4 Resource Collection

Link- STEM- Adding and Subtracting at Year 5 and Year 6 Resource Collection

How Column Addition Works

We line up digits by **place value**:

Thousands | Hundreds | Tens | Ones

We start adding from the **right** (Ones) and move left.

If a column adds to 10 or more, we **exchange**.
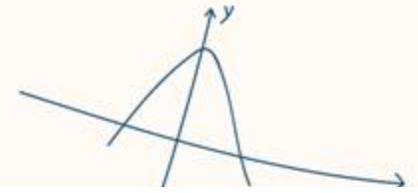
Step-by-Step Addition with Exchange
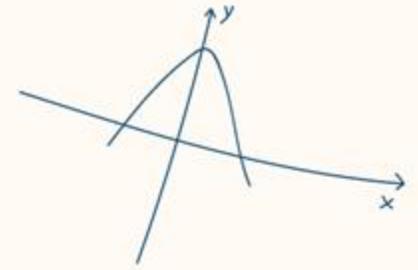
Step-by-Step:

Ones: 8 + 4 = 12
    Write 2, carry 1 ten

Tens: 5 + 6 + 1 = 12
    Write 2, carry 1 hundre

Hundreds: 4 + 7 + 1 = 1

Why Did We Exchange?

1

```
  T      O
  1
         8
+        4
_____
         2
```

2

```
  H      T
         5
         6
       +1
       _____
         2
  1 ←
```

3

```
  Th     H
  1      1
         4
         7
+        
_____
         2
```

Ones Column

I exchange because 8 + 4 = 12. I write 2 and carry 1 ten to the tens column.

Tens Column

I regroup 12 tens into 1 hundred and 2 tens because 10 tens = 1 hundred.

Hundreds

I exchange because 4 + 7 + 1 (carried) = 12 hundreds. I carry 1 thousand.
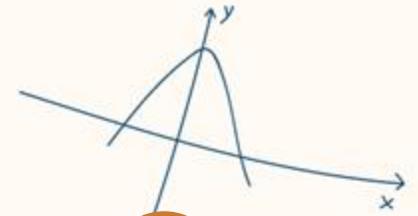
Sentence Stems for Success
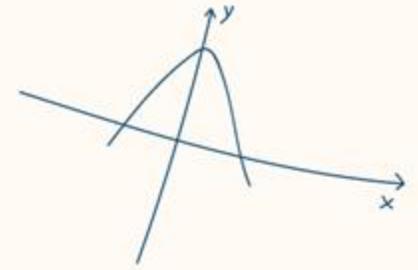
I exchange because…

there are 10 or more in one column.

I regroup ___ into ___ because…

10 tens into 1 hundred, or 10 hundreds into 1 thousand.

The total is…

the answer when we add.

I carry the 1 to the next column because…

it represents 1 ten, 1 hundred, or 1 thousand.

Try These: Fluency Practice/ whiteboards
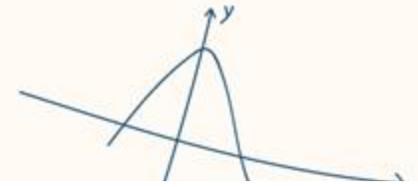
Find the total using column addition:

1. 1,347 + 2,586
2. 4,209 + 1,793

Th	H	T	O
1	3	4	7
+ 2	5	8	6

Exchange Row

Year 4-6 Subtraction

Objective & Strategy	Concrete	Pictorial	Abstract
Subtracting tens and ones Year 4 subtract with up to 4 digits. *Introduce decimal subtraction through context of money*	234 - 179 Model process of exchange using Numicon, base ten and then move to PV counters.	Children to draw pv counters and show their exchange—see Y3	 Use the phrase 'take and make' for exchange
Year 5- Subtract with at least 4 digits, including money and measures. *Subtract with decimal values, including mixtures of integers and decimals and aligning the decimal*	As Year 4	Children to draw pv counters and show their exchange—see Y3	 Use zeros for place-holders.
Year 6—Subtract with increasingly large and more complex numbers and decimal values.			

Annotated Example

5,302 – 2,648

- Ones: 2 < 8, so exchange 1 ten. 12 - 8 = 4.
- Tens: 0 (now 9 after exchange). 9 - 4 = 5.
- Hundreds: 2 (after exchange) < 6, so exchange 1 thousand. 12 - 6 = 6.
- Thousands: 4 (after exchange) - 2 = 2.

Answer: 2,654.

"I regroup 1 hundred into 10 tens because I need more in the tens column."
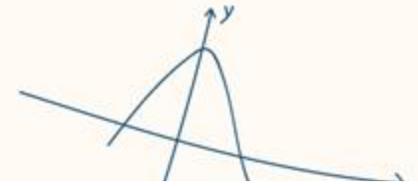
Steps to Success

Start Right	Compare Digits	Regroup First	Subtract
Begin subtracting in the ones column.	If top digit is smaller, exchange from the left.	Adjust the digits before subtracting.	Work out the difference in that column.
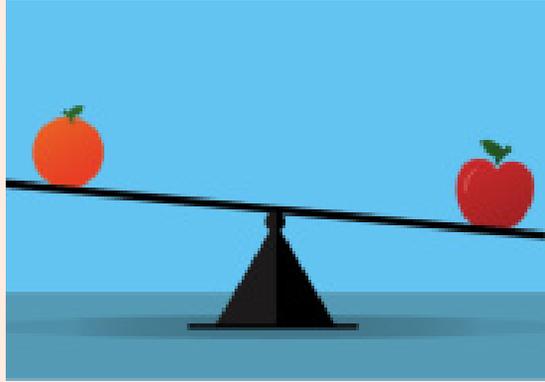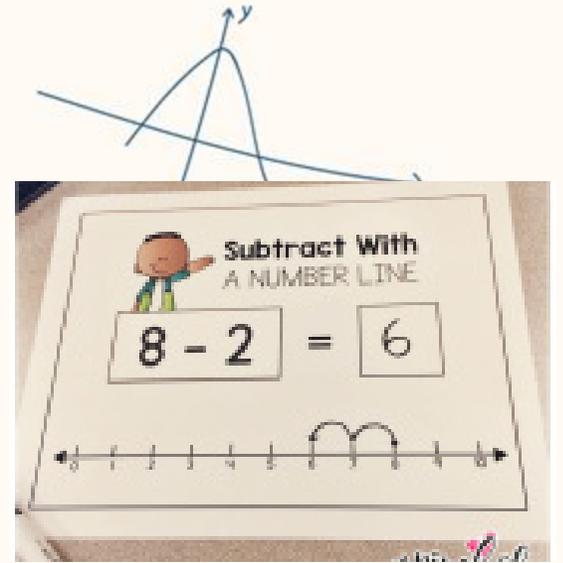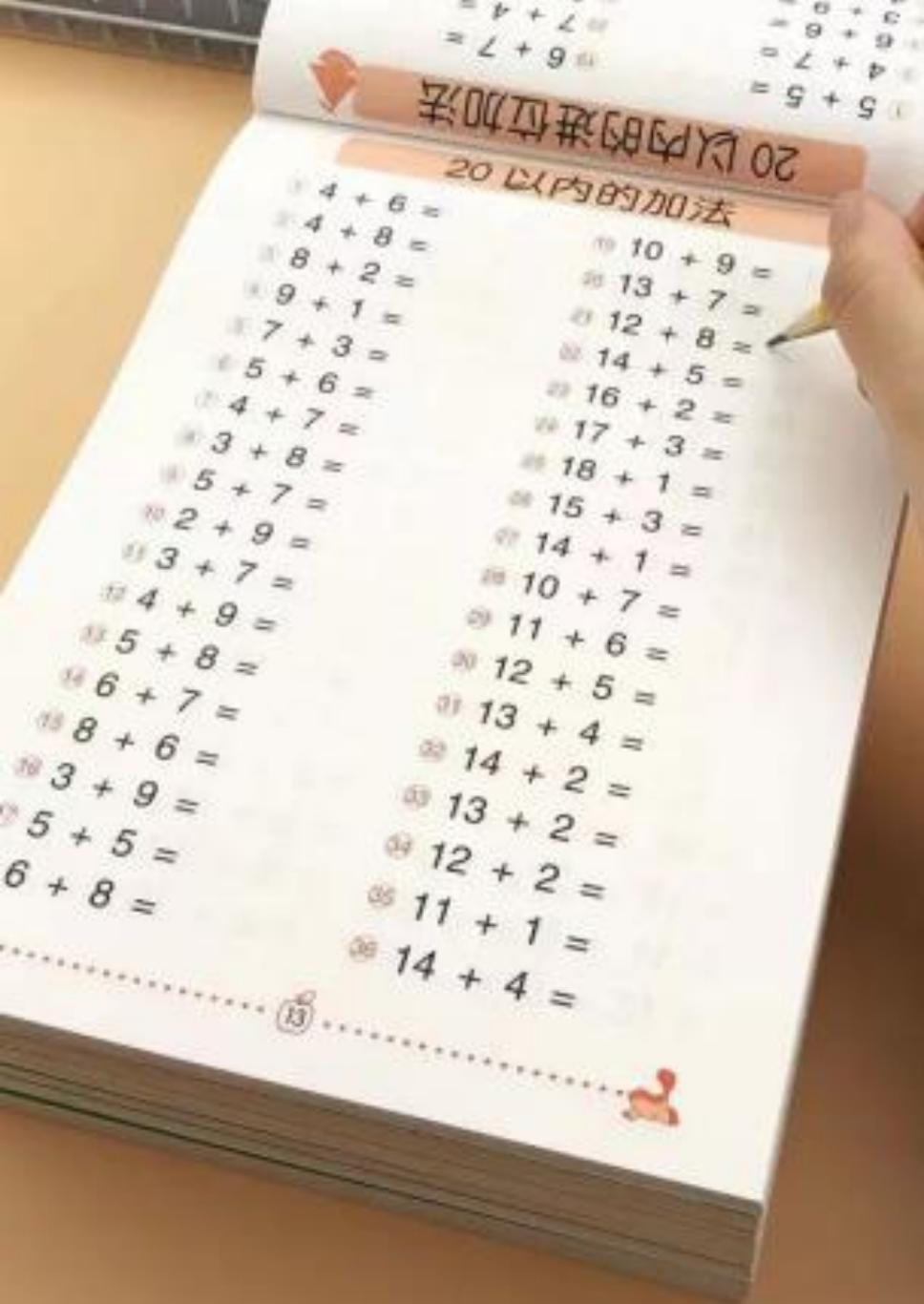
Your Turn: Fluency Practice

Work out these questions using column subtraction. Remember to exchange when needed.

1. 3,421 – 1,265
2. 5,034 – 2,178

Year 5 and 6 Multiplication

Objective & Strategy	Concrete	Pictorial	Abstract
Column Multiplication for 3 and 4 digits x 1 digit.	It is important at this stage that they always multiply the ones first. Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. 321 x 2 = 642	 	 This will lead to a compact method.
Column multiplication	Manipulatives may still be used with the corresponding long multiplication modelled alongside.	 Continue to use bar modelling to support problem solving	 18 x 3 on the first row (8x3 – 24, exchanging the 2 for 20, then 1 x 3 18 x 10 on the 2nd row. Show multiplying by 10 by putting zero in units first
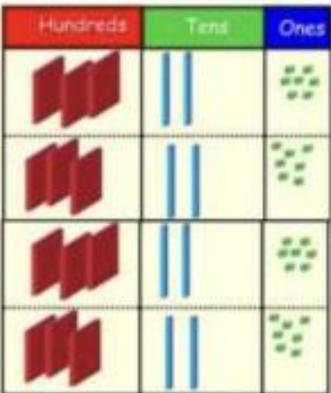
Pictorial table (first row):

x	300	20	7
4	1200	80	28

Abstract (first row):

327
x   4
28
80
1200
1308

Pictorial table (second row):

	10	8
10	100	80
3	30	24

Abstract (second row):

1 2 3 4
x   1 6
7 4 0 4 (1234 x 6)
1 2 3 4 0 (1234 x 10)
1 9,7 4 4

Short Multiplication

Long Multiplication
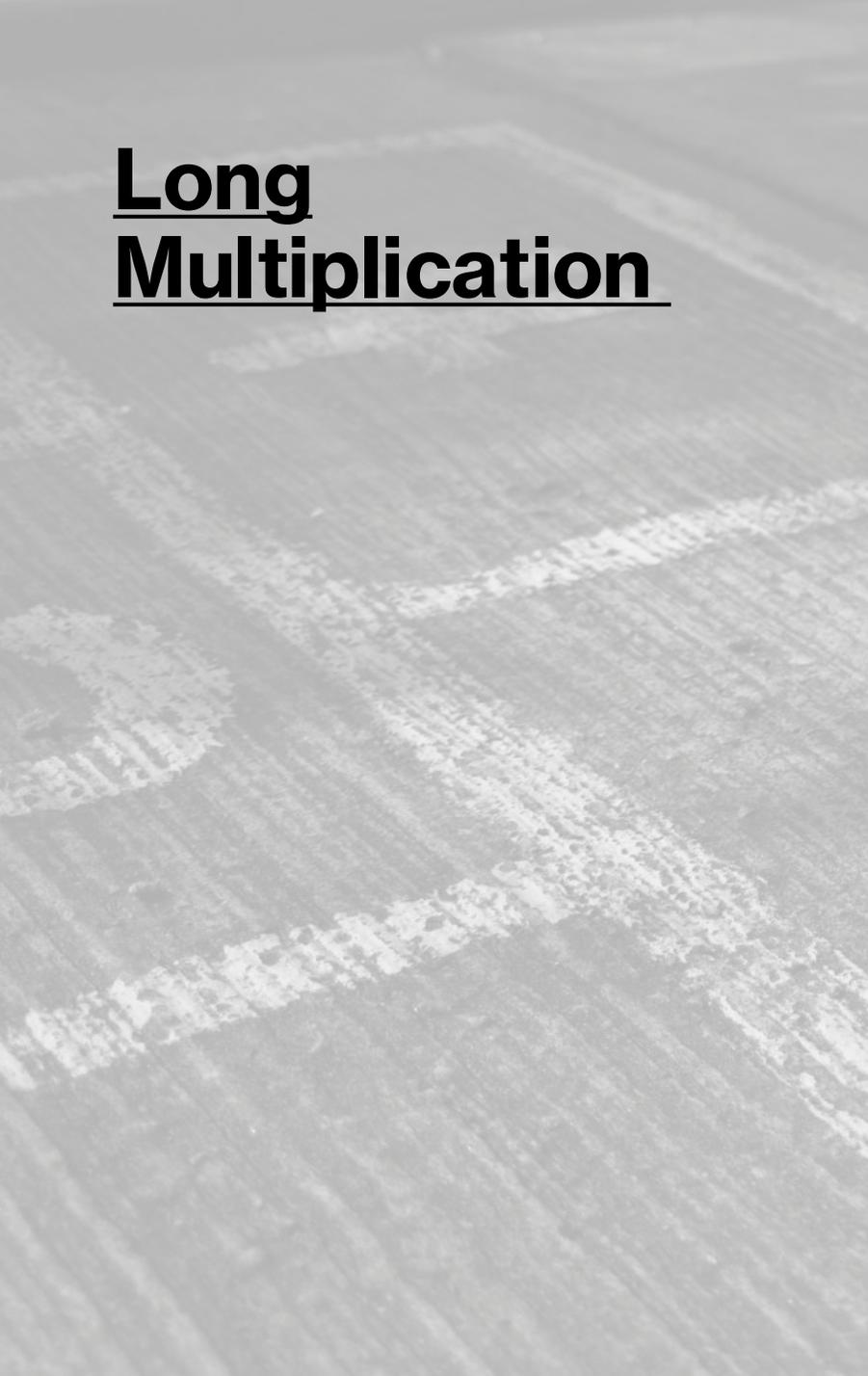
4. Multiplication and Division/ Sharing

Year 5

Step 1 Multiples

Step 2 Common multiples

Step 3 Factors

Step 4 Common factors

Step 5 Prime numbers

Step 6 Square numbers

Step 7 Cube numbers

Step 8 Multiply by 10, 100 and 1,000

Step 9 Divide by 10, 100 and 1,000

Step 10 Multiples of 10, 100 and 1,000

Step 1 Multiply up to a 4-digit number by a 1-digit number

Step 2 Multiply a 2-digit number by a 2-digit number (area model)

Step 3 Multiply a 2-digit number by a 2-digit number

Step 4 Multiply a 3-digit number by a 2-digit number

Step 5 Multiply a 4-digit number by a 2-digit number

Step 6 Solve problems with multiplication

Step 7 Short division

Step 8 Divide a 4-digit number by a 1-digit number

Step 9 Divide with remainders

Step 10 Efficient division

Step 11 Solve problems with multiplication and division

Year 6

Step 10 Division using factors

Step 11 Introduction to long division

Step 12 Long division with remainders
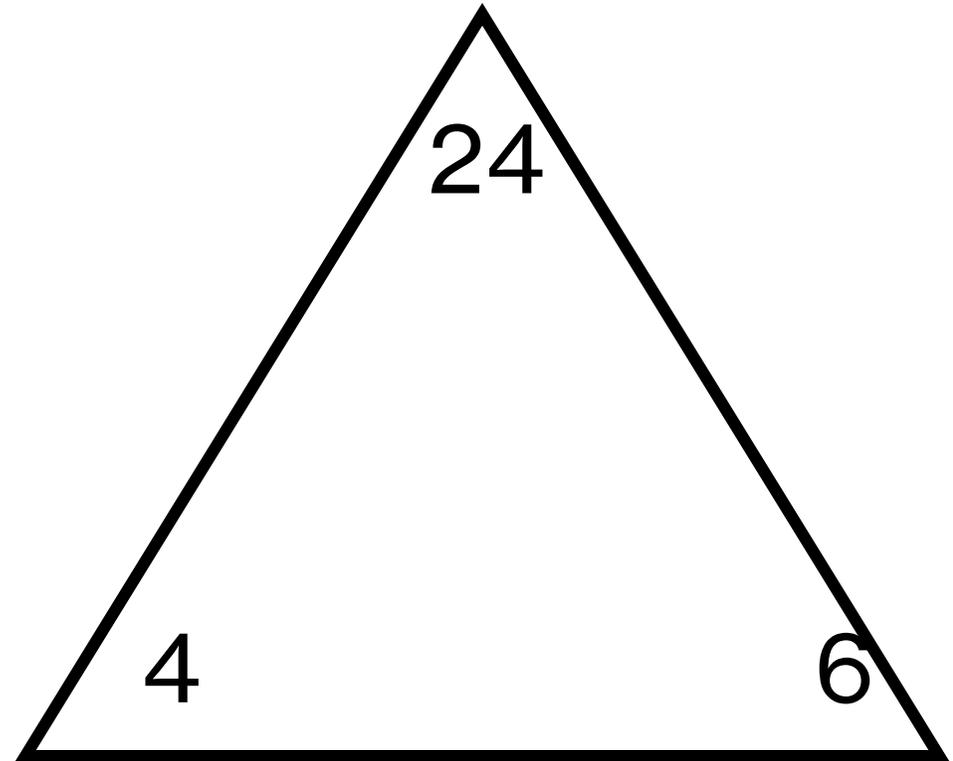
Step 13 Solve problems with division

Step 14 Solve multi-step problems

Step 15 Order of operations
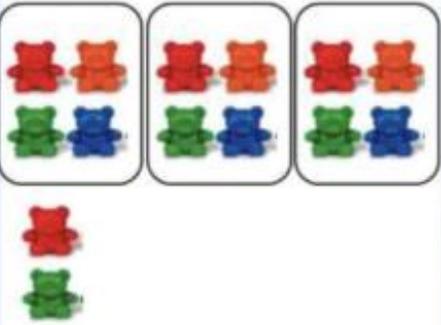
Step 16 Mental calculations and estimation
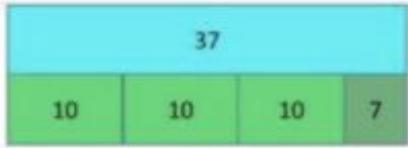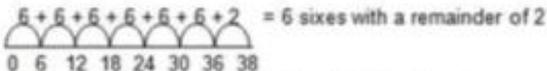
Step 17 Reason from known facts

Practicing Multiplication Facts

24

4   6

Year 4-6 Division

Objective & Strategy	Concrete	Pictorial	Abstract
Division with remainders.	$14 \div 3 =$ 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. remainder 2 Use bar models to show division with remainders. 	Complete written divisions and show the remainder using r. $29 \div 8 = 3$ REMAINDER 5 ↑ ↑ ↑ ↑ dividend divisor quotient remainder

Example without remainder:
$40 \div 5$
Ask "How many 5s in 40?"

$5 + 5 + 5 + 5 + 5 + 5 + 5 + 5$ = 8 fives
0 5 10 15 20 25 30 35 40
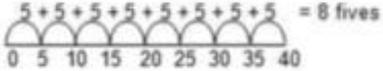
Example with remainder:
$38 \div 6$

$6 + 6 + 6 + 6 + 6 + 6 + 2$ = 6 sixes with a remainder of 2
0 6 12 18 24 30 36 38

For larger numbers, when it becomes inefficient to count in single multiples, bigger jumps can be recorded using known facts.
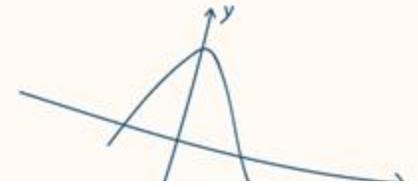
Meet the Bus Stop

Why 'Bus Stop'?

It's called the bus stop method because the division box looks like a shelter!

We use it to divide numbers quickly — one digit at a time.

We work from **left to right**, starting with the largest place value.

Just like reading, we go digit by digit!

How to Use the Bus Stop

Quotient

2 1

4 | 8 4

Divisor   Dividend

2

4 | 8 4

8 tens ÷ 4 = 2 tens

2 1

4 | 8 4

4 ÷ 4 = 1

Set It Up

Write the dividend inside the bus stop, divisor outside.

Divide Left

Divide the tens first: 8 ÷ 4 = 2. Write 2 above the 8.

Then the Ones

Divide 4 ÷ 4 = 1. Write 1 above the 4. Answer is 21.

Watch the Exchange!

Tens   Ones

$7 \div 4 = 1$
remainder **3**

$$4 \overline{) \begin{array}{cc} 1 & 9 \\ 7 & {}^{3}6 \end{array}}$$

$36 \div 4 = 9$

3 tens → 30 ones
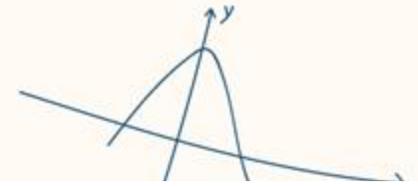
Why We Exchange

I exchange because...

...7 tens cannot be shared equally into 4 groups without leftovers.
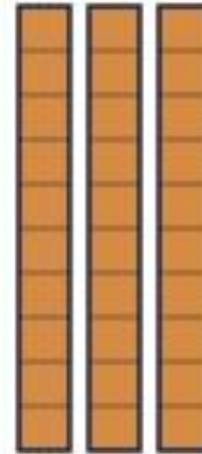
I regroup 3 tens into 30 ones because...

...we need to combine them with the 6 ones to keep dividing.

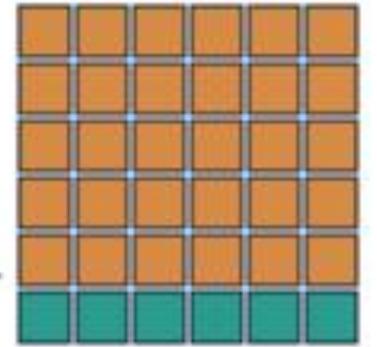The difference is that now we can divide 36 ones by 4 — that's 9 each!

3 Tens

6 Ones

Regroup

36 Ones
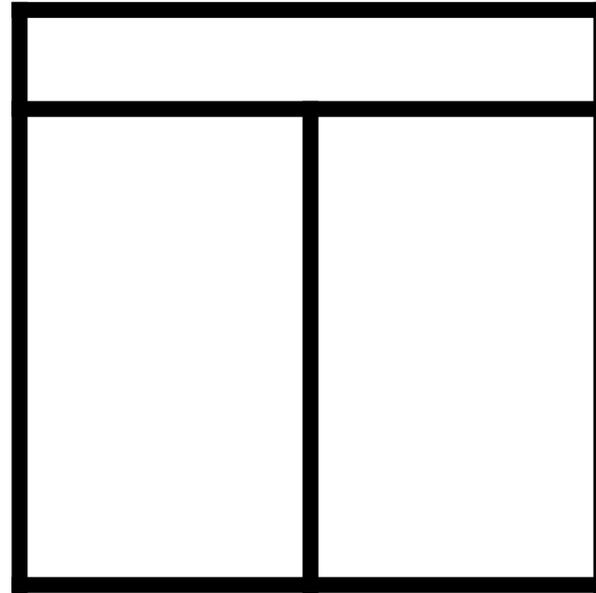
$30 + 6 = 36$

Long Division

K.F.C. (Key Fact Chart)

Language	Number of Equal Groups	
I know		
Double		
Double again		
Double again		
I know		
Half		

0   1   2   3   4   5   6   7   8   9   10
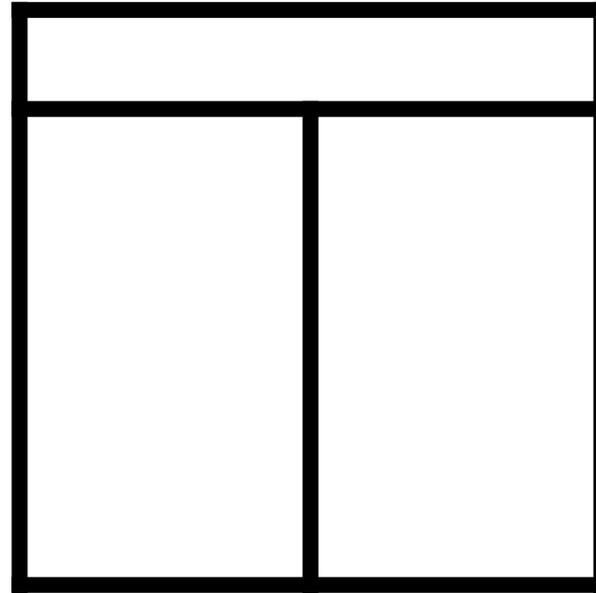
Factor Tables

Factor Tables for Long Division

Factors

$480 \div 15 =$

Factors

744 ÷ 24 =

Home Support Strategies

You don't need worksheets!

- ☑ Use everyday objects

- ☑ Encourage drawing maths

- ☑ Talk about numbers out loud

- **<u>Around the house</u>**

Cooking. Measure ingredients and set the timer together. Get your child to work out how much more food you will need if extra people are coming for dinner.

- When you are sharing food like pizza or cake, ask your child to help you share it equally between the number of people eating.

- Solve problems at home. For example, ask your child how many apples to buy at the shop and why, or how long it will take you to get to Gran's house if you go to the library on the way.

Any questions, comments or feedback?

Thank you for coming!