

Year 5 and 6 Maths Workshop

- The changes and raised expectations in the New Curriculum 2014
- The importance of mental calculation and **fluency**
- Written calculations strategies
- Other useful strategies

General Aims of the New Curriculum

- **Fluency** – become fluent in the fundamentals of mathematics: recall and apply knowledge quickly and accurately
- **Reasoning** – use mathematical reasoning to identify, explain and prove patterns and answers, including developing their own lines of mathematical enquiry
- **Solve problems** – apply knowledge to a variety of increasingly difficult problem solving situations

Changes in the New Curriculum 2014

Year 5

- Read, write and order numbers up to at least **1 000 000** and understand the place value of each digit
- Be able to count in steps of **powers of 10** for any given number up to **1 000 000**
- Rounding up numbers to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
- Read and understand Roman Numerals
- **Be able to use formal written column method for numbers more than 4 digits.**
- Recall prime numbers up to 19
- **Be able to use long multiplication for two digit numbers**
- **To be able to use short division for dividing numbers up to 4 digits by a 1 digit number**
- To be able to use cubed (3) numbers and write these
- Greater emphasis on fractions, percentages and decimals and the relationship between them **(including adding and subtracting fractions).**
- Understand equivalences between metric and imperial units such as; inches, pounds and pints.

Changes in the New Curriculum 2014

Year 6

- Read, write and order numbers up to at least **10 000 000** and understand the place value of each digit
- **Be able to use the formal written method of long multiplication for 4 digit number by 2 digit numbers.**
- **Be able to use the formal written method of long division for 4 digit number by 2 digit numbers and interpret remainders as fractions or rounding as appropriate.**
- Use a much greater understanding of fractions, including **multiplication and division of fractions.**
- Find pairs of numbers to satisfy algebraic equations using 2 unknowns.
- Be able to convert between miles and kilometres up to 3 decimal places.
- Be able to calculate the volume of shapes, including cubes and cuboids
- Be able to illustrate and name parts of a circle including radius, diameter, and circumference and know that the diameter is twice the radius.

Mental Calculation - Fluency

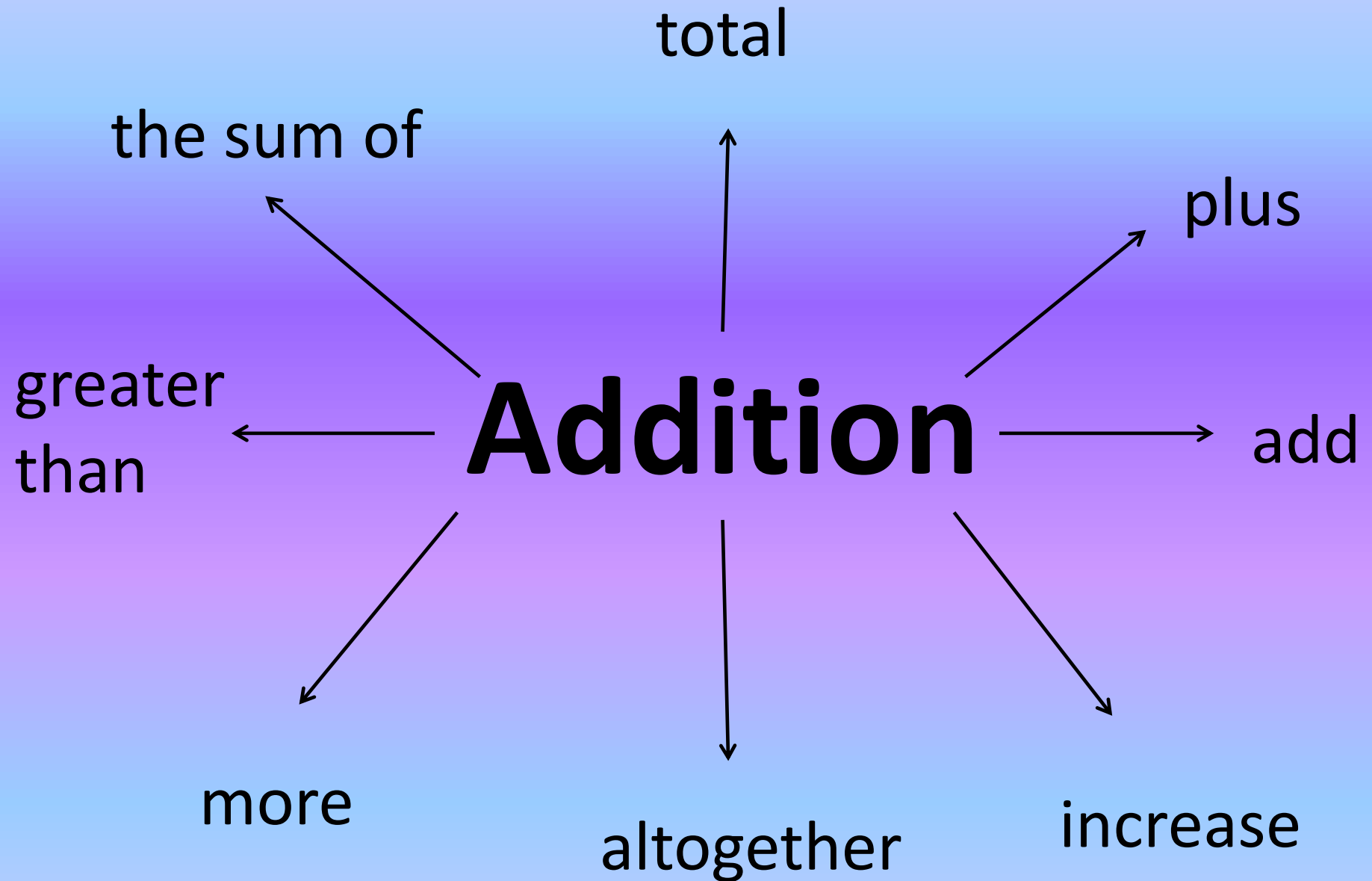
- The bank of knowledge that underpins all calculation in mathematics, e.g. Number bonds to 10, 20 and 100, times tables and related division facts.
- Being fluent in mental calculation makes everything else easier.

How can **fluency** be achieved?

- Frequent practise
- Varied methods of practise (e.g. quick fire questions, games, chanting, singing, writing) to enable recall and conceptual understanding

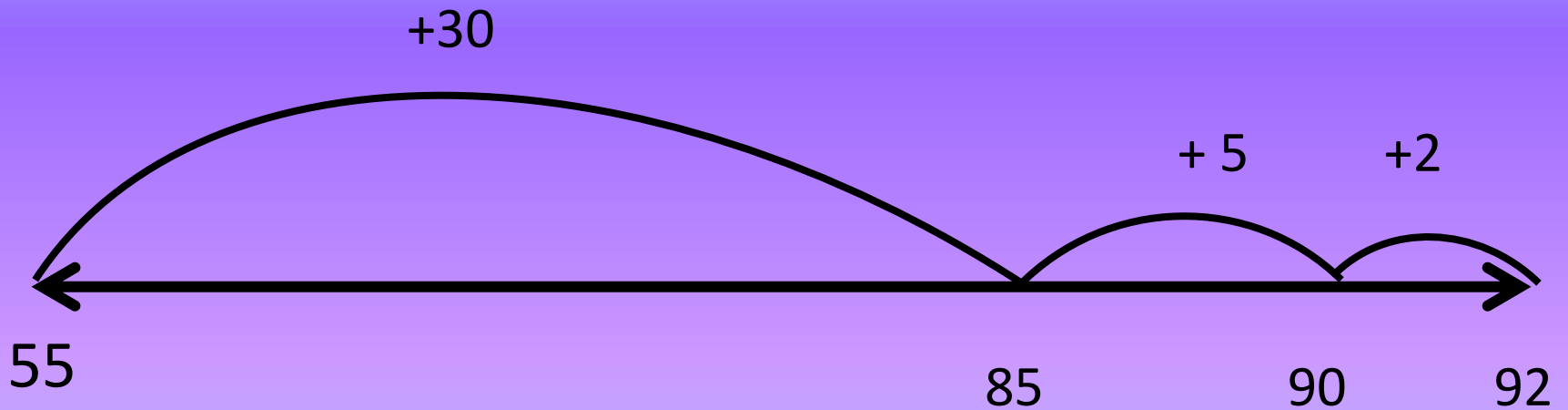
Written Calculations

After interpreting the problem and looking at the numbers involved you realise that mental methods and informal jottings will not be as efficient as a written calculation



An empty numberline

$$37 + 55 =$$



Partitioning

$$34 + 55 =$$

$$(30 + 4) + (50 + 5) =$$

$$30 + 50 + 4 + 5 =$$

$$80 + 9 = 89$$

Expanded Column Method

$$551 + 439 = 990$$

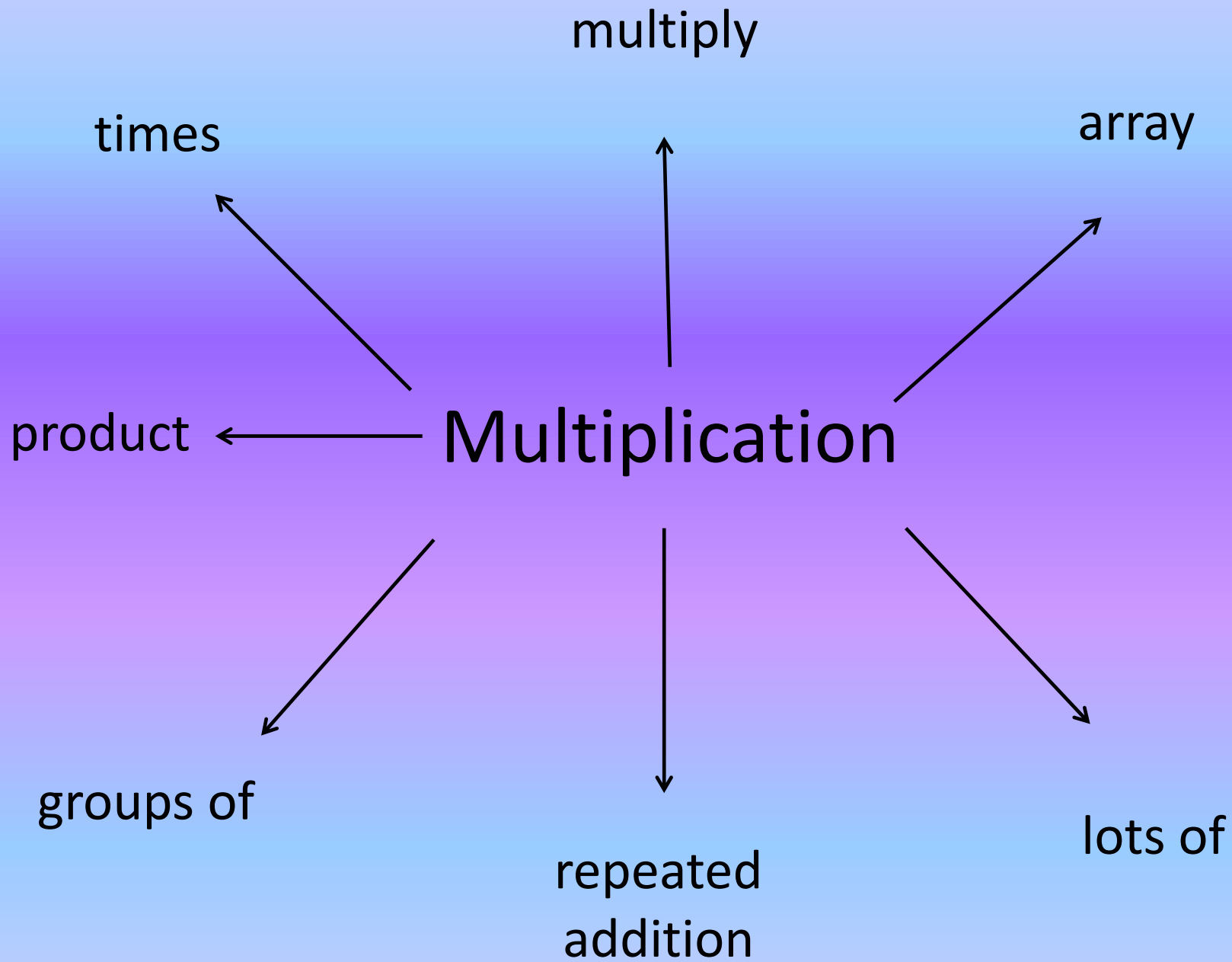
$$\begin{array}{r} 500 + 50 + 1 \\ + 400 + 30 + 9 \\ \hline 900 + 80 + 10 \\ \hline \end{array}$$

Formal Written (column) Method

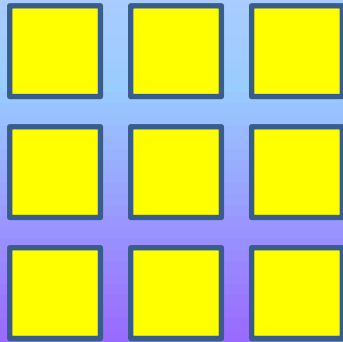
$$\begin{array}{r} 345 \\ + \underline{289} \\ \hline \end{array} \quad + \quad \begin{array}{r} 345 \\ + \underline{289} \\ \hline 4 \end{array} \quad + \quad \begin{array}{r} 345 \\ + \underline{289} \\ \hline 34 \end{array} \quad + \quad \begin{array}{r} 345 \\ + \underline{289} \\ \hline 634 \end{array}$$

$\quad \quad \quad 1 \quad \quad \quad 11 \quad \quad \quad 11$

Be able to use formal written column method for numbers more than 4 digits.

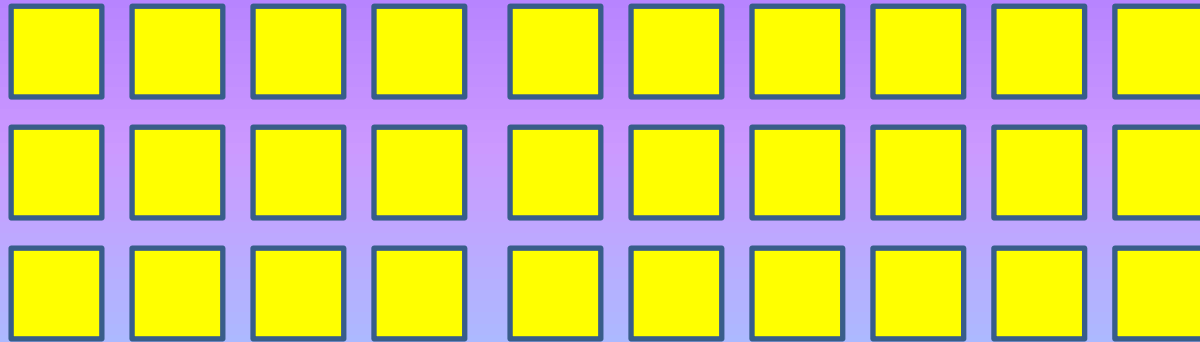


Arrays

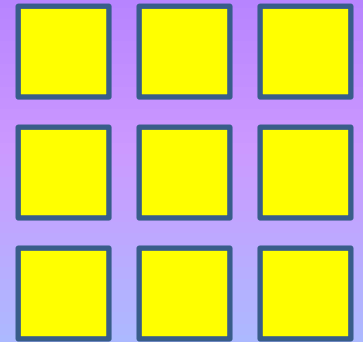


$$3 \times 3 = 9$$

$$10 \times 3 = 30$$



$$3 \times 3 = 9$$



$$13 \times 3 = 39$$

Partitioning

What happens when a number is multiplied by 10?

$$47 \times 3 = 120 + 21 = 141$$

Break 47 in to 40 and 7.

$$40 \times 3 = 120$$

4 x 3 and increase the answer by 10 x.

$$7 \times 3 = 21$$

Grid Method

$$32 \times 12 =$$

x	30	2	
10	300	20	=320
2	60	4	=64

$$\begin{array}{r} 320 + \\ \underline{64} \\ 384 \end{array}$$

Formal (short) multiplication

$$\begin{array}{r} 324 \\ \times \quad 3 \\ \hline 972 \\ \hline 1 \end{array}$$

By the end of Year 5 children should be able to use long multiplication for two digit numbers

$$56 \times 27 = 1512$$

$$\begin{array}{r} 56 \\ \times 27 \\ \hline 392 \\ 1120 \\ \hline 1512 \\ \hline 1 \end{array}$$

By the end of Year 6 children should Be able to use the formal written method of long multiplication for 4 digit number by 2 digit numbers.

$$1256 \times 27 =$$

$$\begin{array}{r} 1256 \\ \times \quad 27 \\ \hline \begin{array}{r} 1 \ 3 \ 4 \\ 8792 \end{array} \\ \begin{array}{r} 1 \ 1 \\ 25120 \end{array} \\ \hline 33912 \\ \hline \begin{array}{r} 1 \quad 1 \end{array} \end{array}$$

Subtraction

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graph TD; S[Subtraction] --> TA[take away]; S --> L[less]; S --> M[minus]; S --> C[counting up or back]; S --> LE[leave]; S --> D[difference between];
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take away

less

minus

difference
between

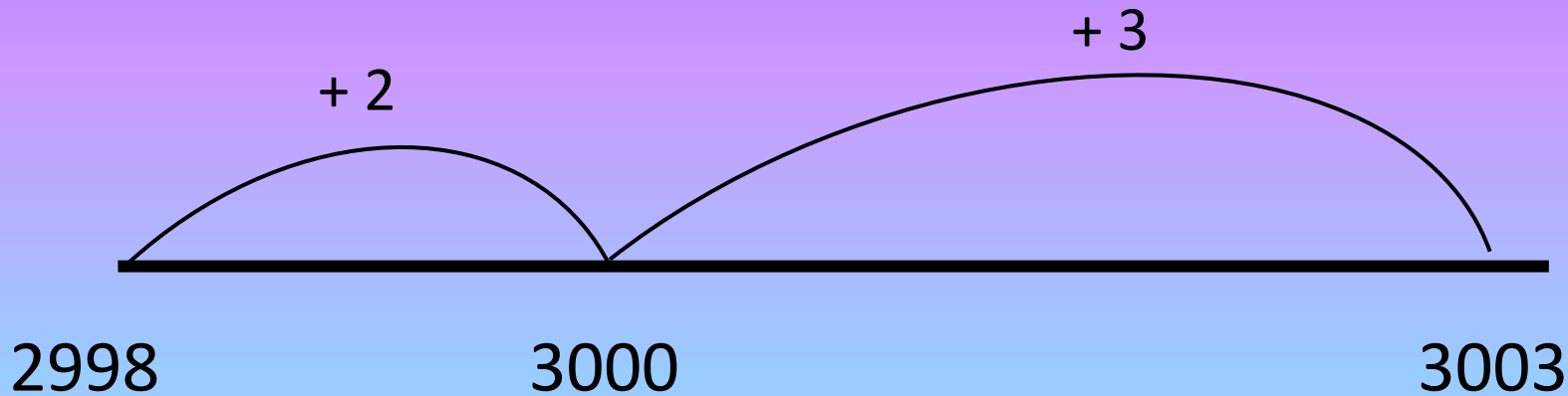
leave

counting up or
back

Subtraction on a number line

- Counting backwards when the numbers are far apart
- Finding the difference when the numbers are close together

$$3003 - 2998 =$$



$$3 + 2 = 5$$

Expanded Column Subtraction

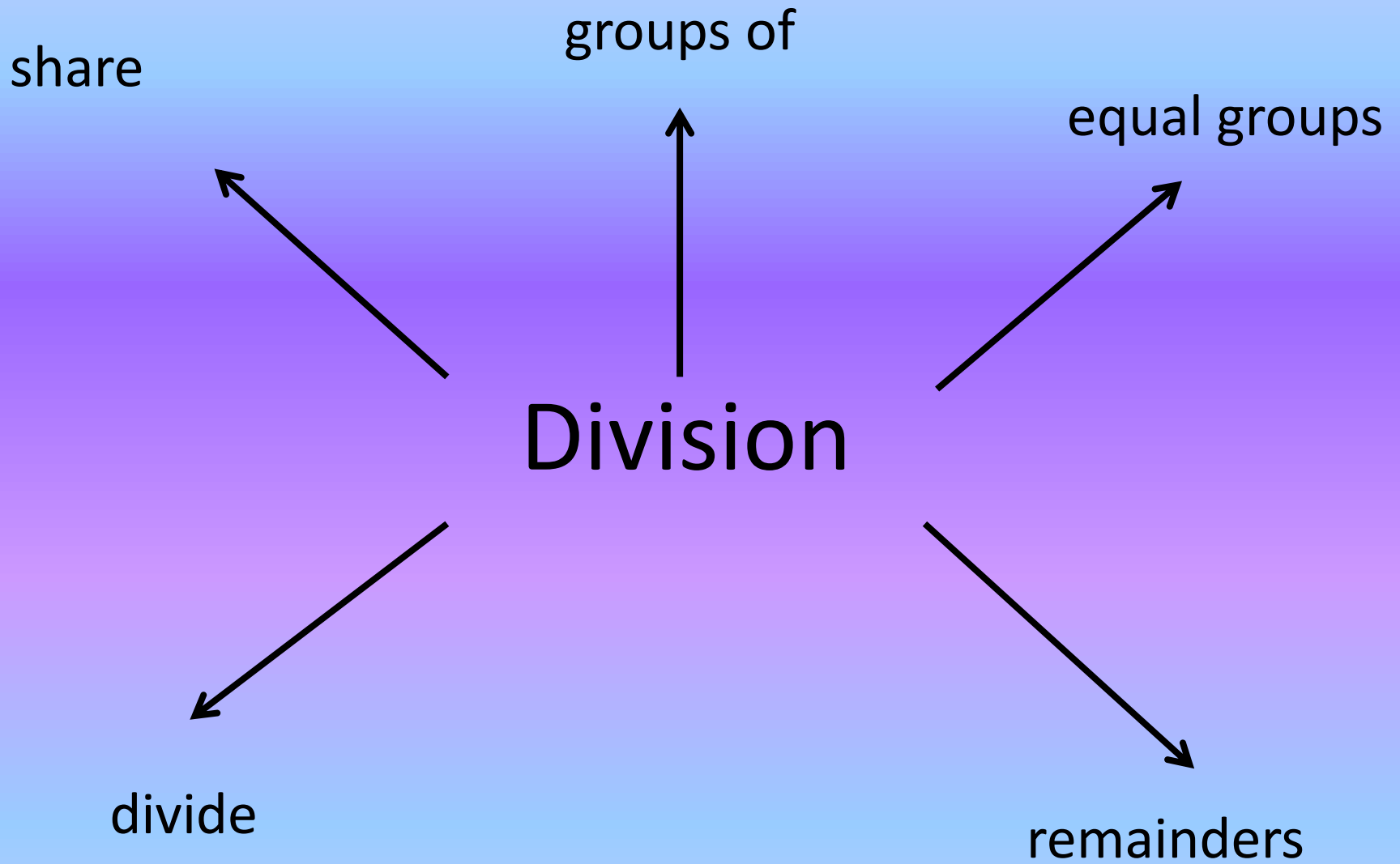
$$364 - 273 = 91$$

$$\begin{array}{r} 200 \\ \cancel{300} + \overset{1}{60} + 4 \\ - 200 + 70 + 3 \\ \hline 0 + 90 + 1 \\ \hline \end{array}$$

Column Method

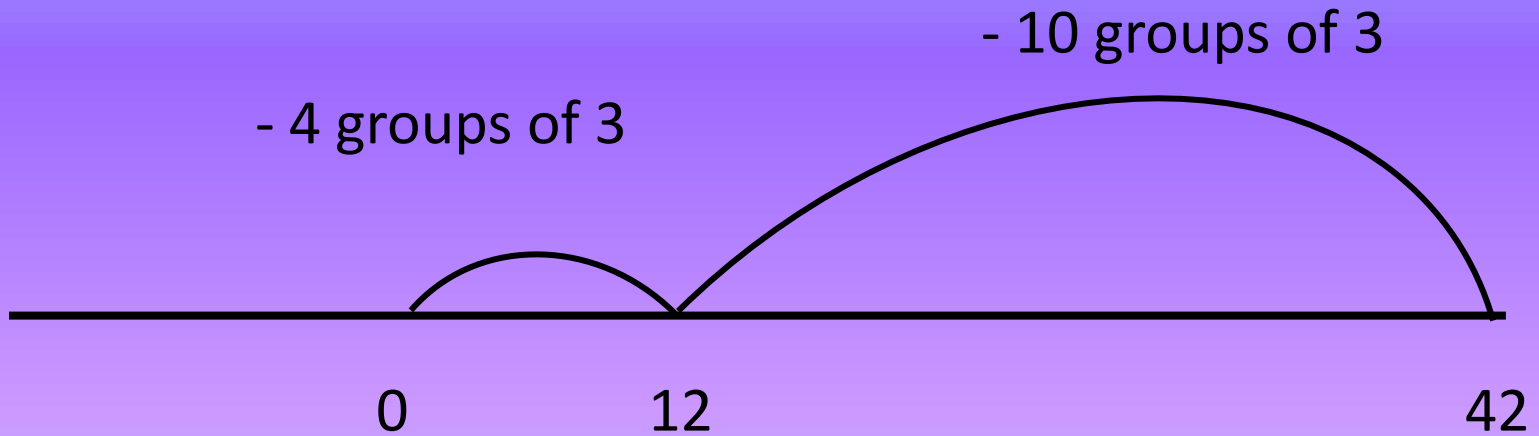
$$\begin{array}{r} 2 5 \\ 3 4 \\ - 1857 \\ \hline 1507 \end{array}$$

Be able to use formal written column method for numbers more than 4 digits.



Division using grouping

$$42 \div 3 = 14$$



How many groups have we taken away altogether?

Division using 'chunking'

$$42 \div 3 = ?$$

$$10 \times 3 = 30$$

$$4 \times 3 = 12$$

14 groups of 3 equal 42

Division using 'chunking'

$$560 \div 24$$

$$\begin{array}{r} 23 \text{ r } 8 \\ 24 \overline{) 560} \\ \underline{- 480} \quad (20 \times 24) \\ 80 \\ \underline{- 72} \quad (3 \times 24) \\ 8 \end{array}$$

$$560 \div 24 = 23 \text{ r } 8$$

Short Division (Bus Stop) Method

$$9820 \div 8 =$$

$$\begin{array}{r} 1227 \text{ r } 4 \\ 8 \overline{) 9820} \end{array}$$

By the end of Year 5 children should be able to use short division for 4 digit numbers divided by a one digit number, interpreting remainders appropriately given the context.

Long Division Method

$$5634 \div 72 = 78 \frac{1}{4}$$

$$\begin{array}{r} 0078 \frac{18}{72} \\ 72 \overline{) 5634} \\ \underline{-5040} \quad (72 \times 70) \\ 594 \\ \underline{-576} \quad (72 \times 8) \\ 18 \end{array}$$

By the end of Year 6 children should be able to use short division or long division (where appropriate) for 4 digit numbers divided by 2 digit numbers, recording remainders as fractions or rounding appropriately given the context.

Other Key Strategies

- Percentages
- Calculating the percentage of a number
- Find key percentages: 50%, 10%, 5% or 1% then adjust to find answer

47% of 250	10% of 250 = 25	$25 \times 4 = 100$
	5% of 250 = 12.5	$12.5 + (2 \times 2.5) = 17.5$
	1% of 250 = 2.5	
		$100 + 17.5 = 117.5$

Other Key Strategies

- Fractions of numbers
- E.g. $\frac{3}{5}$ of 300

$$\frac{1}{5} \text{ of } 300 = 300 \div 5 = 60$$

$$\frac{3}{5} \text{ of } 300 = 3 \times 60 = 180$$

How can you support at home?

- My Maths <http://www.mymaths.co.uk/>
- BBC Bitesize www.bbc.co.uk
- Number hunts around town; *house numbers, bus numbers etc.*
- TV programmes such as *Strictly Come Dancing, Bargain Hunt, Flog it, Storage Hunters*
- Shopping-
- Walking to school
- Ask open ended questions- *“what if...”, “prove it!”, “how do you know?”*
- Cooking/ baking-
- Times tables- *at every opportunity.*