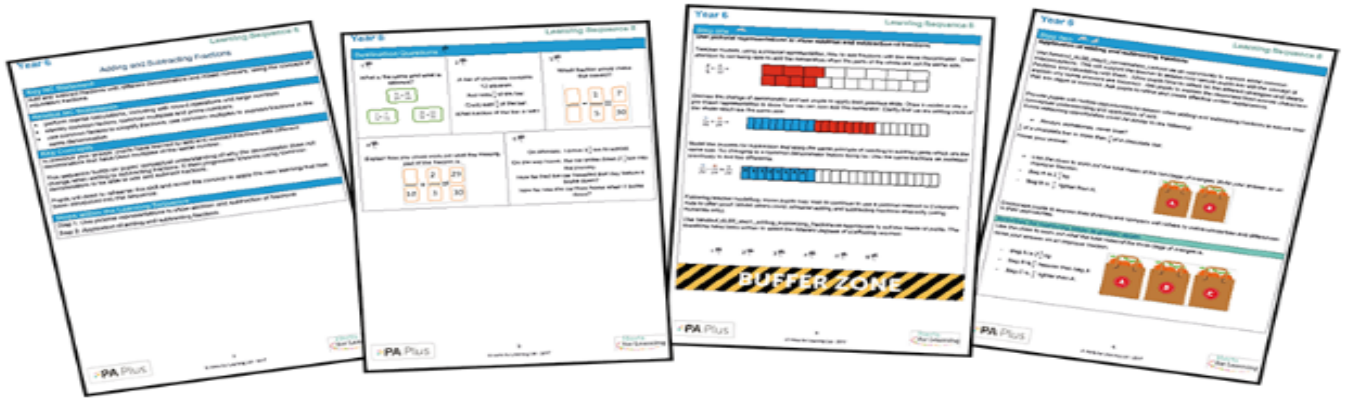
How is maths taught in KS2?

Thursday 11th May 2023

Mr Douglas-Rose
Miss Buckley

What is Herts Essentials and why do we use it?

Our maths subject experts have designed an easy to pick up and use set of sequences with step by step guidance covering the entire mathematics curriculum from Year 1 to Year 6. Designed to support teachers, the planning includes examples of how concrete and pictorial representations can benefit pupils' learning as well as other mastery techniques. The **ESSENTIAL**maths planning tool has a wealth of ideas to deepen and extend mathematical thinking for all learners.



The **ESSENTIAL**maths sequences have been design to benefit schools, teachers and pupils delivering carefully planned progression that ensures consistency. The inbuilt examples of what children should be able to achieve through destination questions allows teachers to keep assessing and informing the children's learning against age-related expectations. In addition, the fun and easily adaptable games, activities and resources are built in, saving time for teachers enabling them to reinvest their valuable time and focus on the needs of their pupils.

What is Concrete, Pictorial and Abstract?

Concrete manipulatives: Concrete manipulatives are objects that can be touched and moved by pupils to introduce, explore or reinforce a mathematical concept. They provide a vehicle to help pupils make sense of complex, symbolic and abstract ideas through exploration and manipulation. Furthermore, they support the development of internal models and help build stronger memory pathways.

Pictorial (including jottings): The act of translating the concrete experience into a pictorial representation helps focus attention on what has happened and why. This supports deeper understanding and a stronger imprint on memory. Pictorial representations are more malleable than concrete resources and, once understanding is secured, allow exploration of complex problems that may be challenging to reproduce with manipulatives.

Abstract – Written: The aim, within this policy, is for compacted forms of notation. These have developed through the history of mathematics. Explicit individual steps in procedure are hidden or they have been shortcut. The informal and expanded methods expose all the intermediate steps, replicating thought processes more closely and support understanding prior to compaction.

Abstract - Spoken Learning: to use the correct mathematical vocabulary is vital for the development of mathematical proficiency. The ability to articulate accurately allows pupils to communicate and build meaning. Ideas become more permanent. This can be scaffolded effectively using speaking frames.

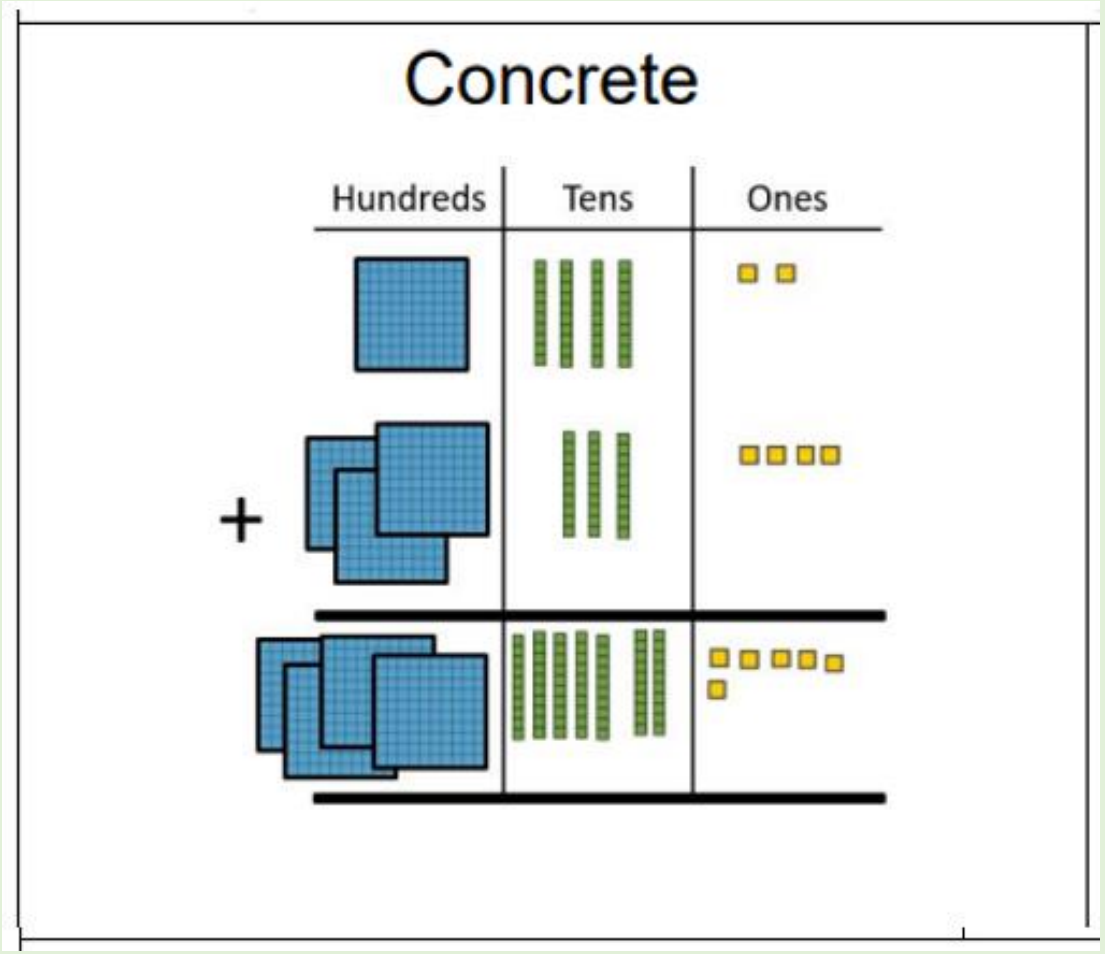
Addition

Year 3 then builds on knowledge of addition from Year 2. Children will be familiar with dienes, and will be introduced to the 100 square for the dienes. Their knowledge of tens and ones will support with their knowledge of hundreds.

In Year 4, the children will become familiar with place value up to 10s thousands. In year 5 and 6, the children will understand place value in the millions. The column method is used throughout KS2, with a focus on concrete, pictorial and abstract in Year 3 and the children being able to access this way of thinking further up the school to support with addition of larger numbers.

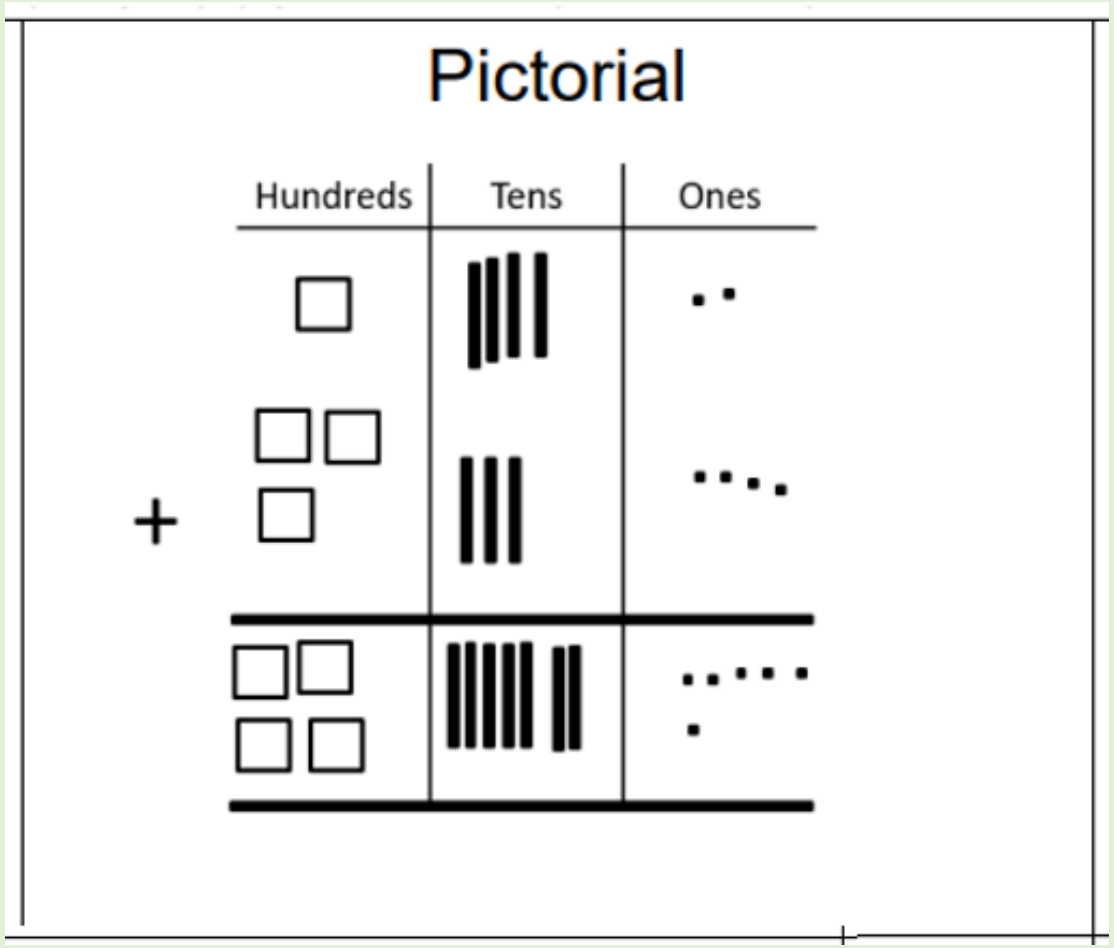
Addition – Without Carrying

142 + 334 = 476



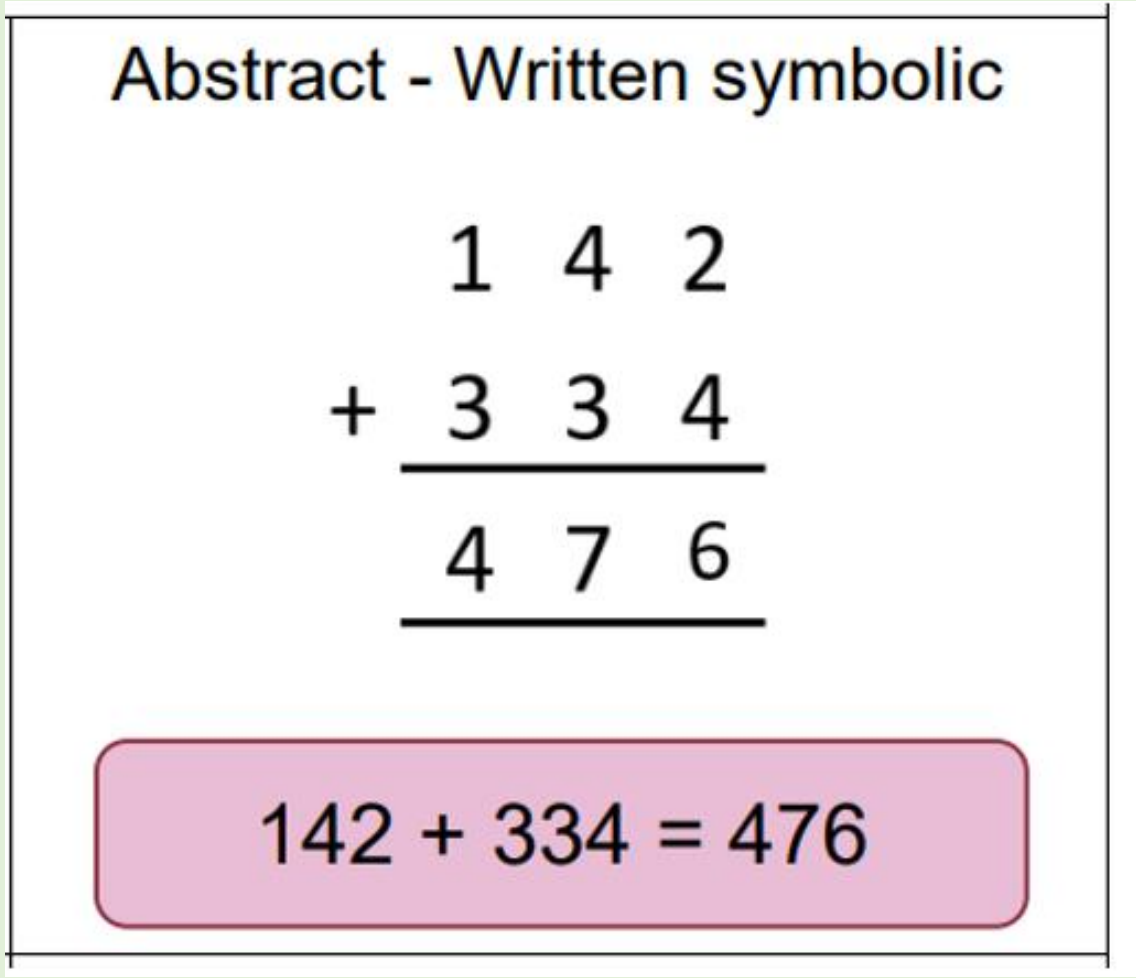
Addition – Without Carrying

142 + 334 = 476

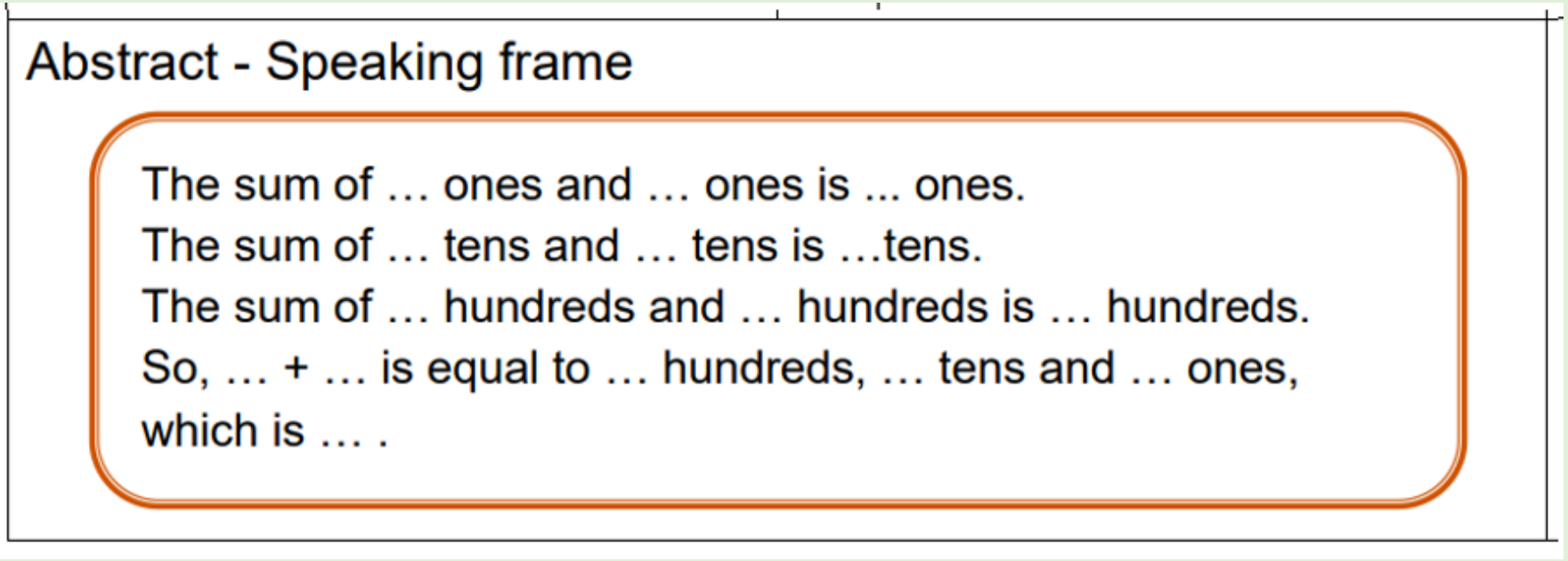


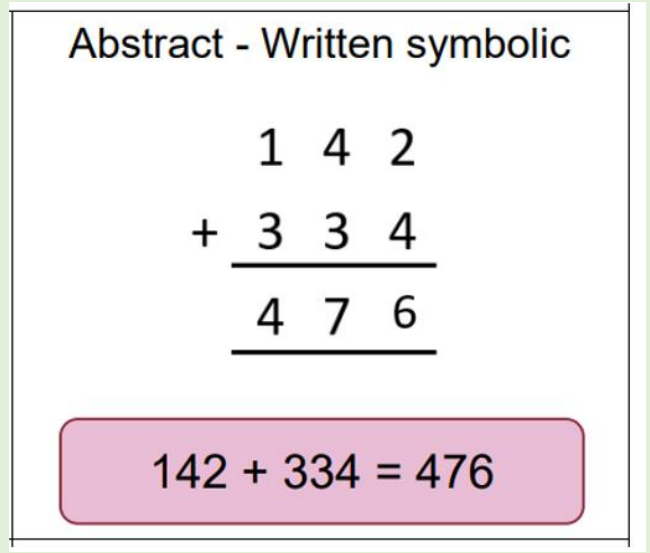
Addition – Without Carrying

142 + 334 = 476



Addition – Without Carrying





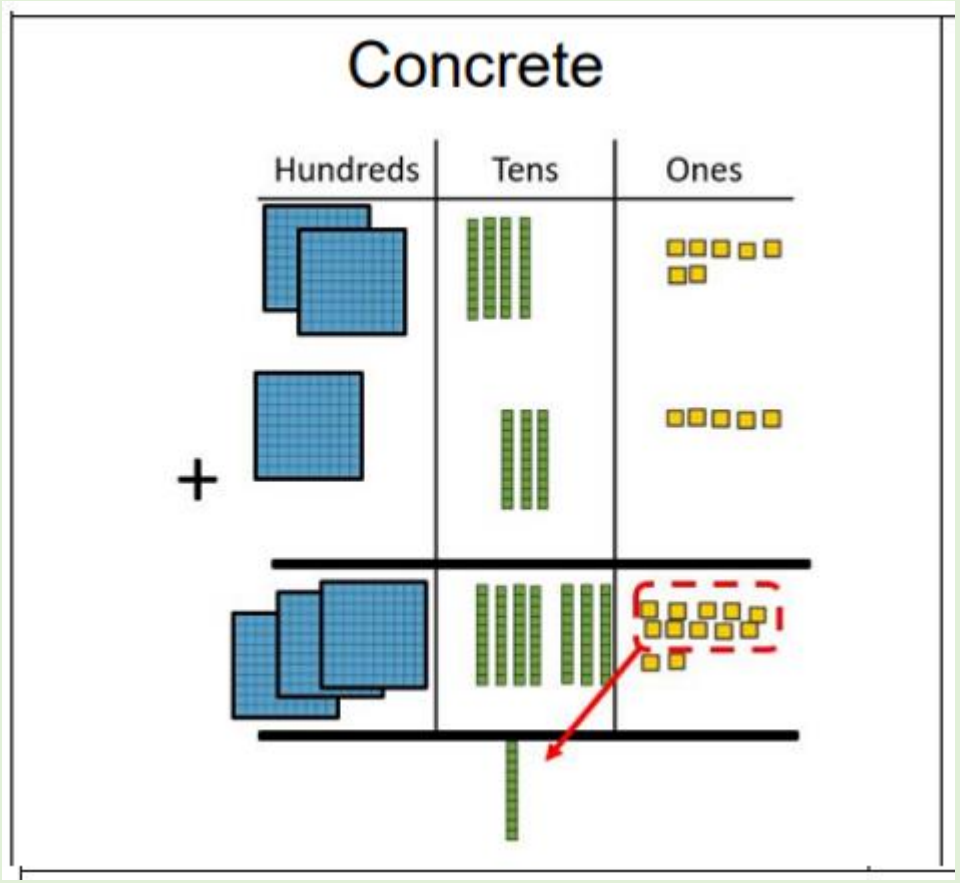
142 + 334 = 476

Example:

$$1325 + 1243 =$$

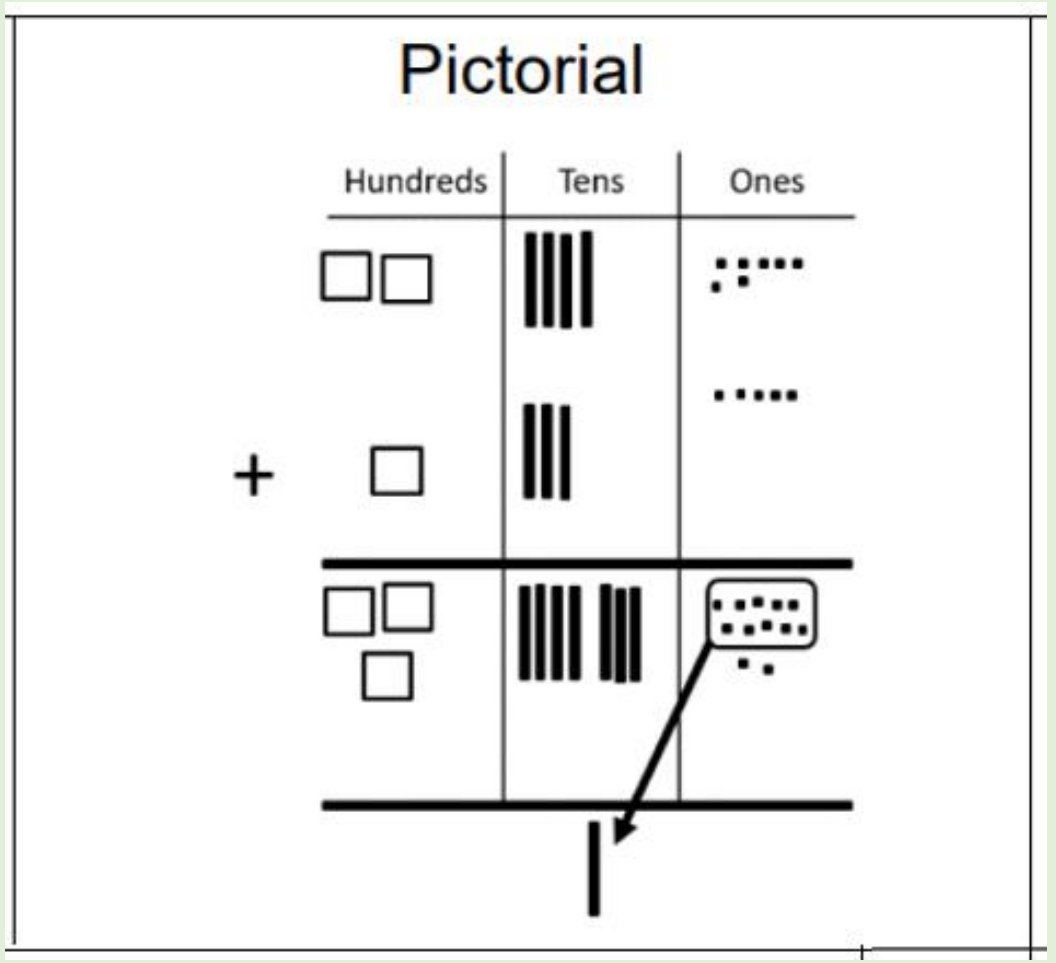
Addition - with Carrying

247 + 135 = 382



Addition - with Carrying

247 + 135 = 382



Addition - with Carrying

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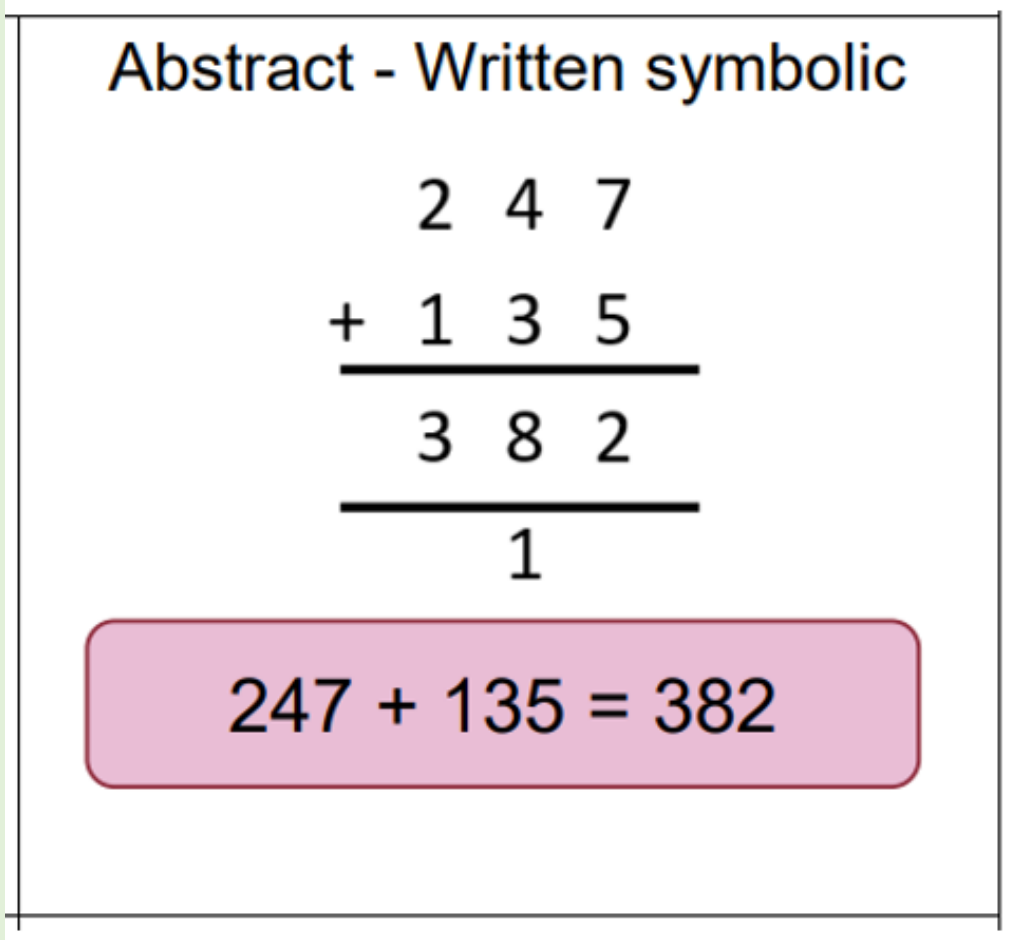
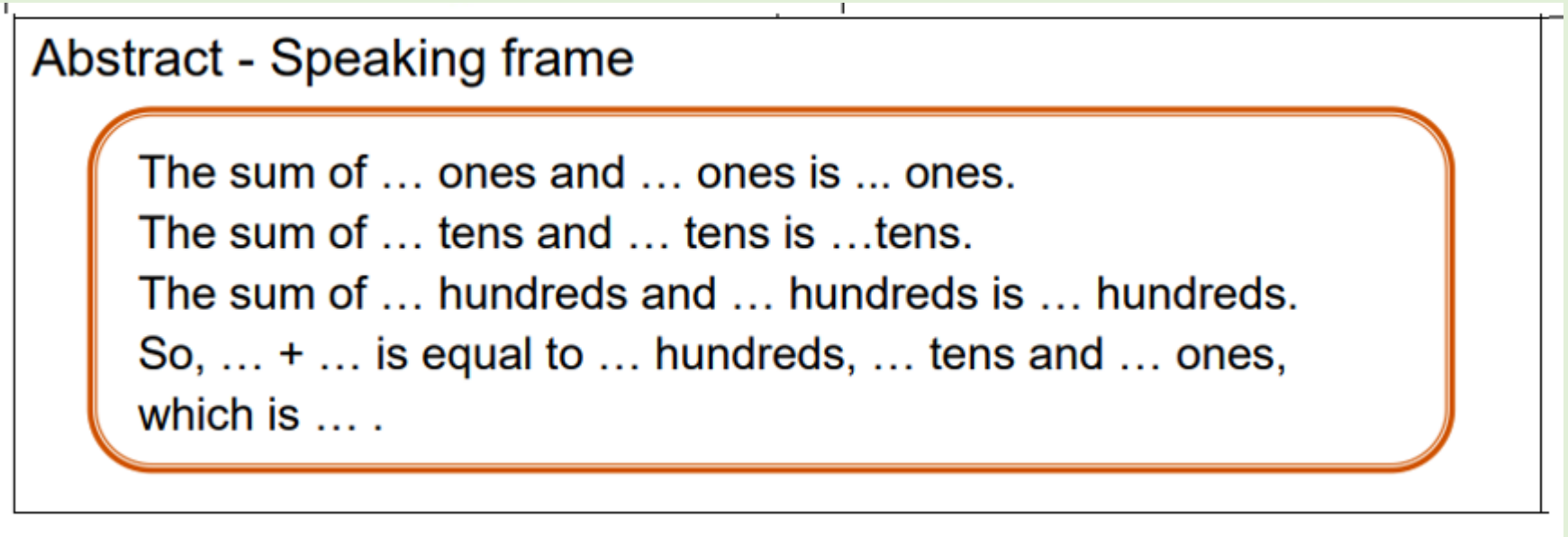
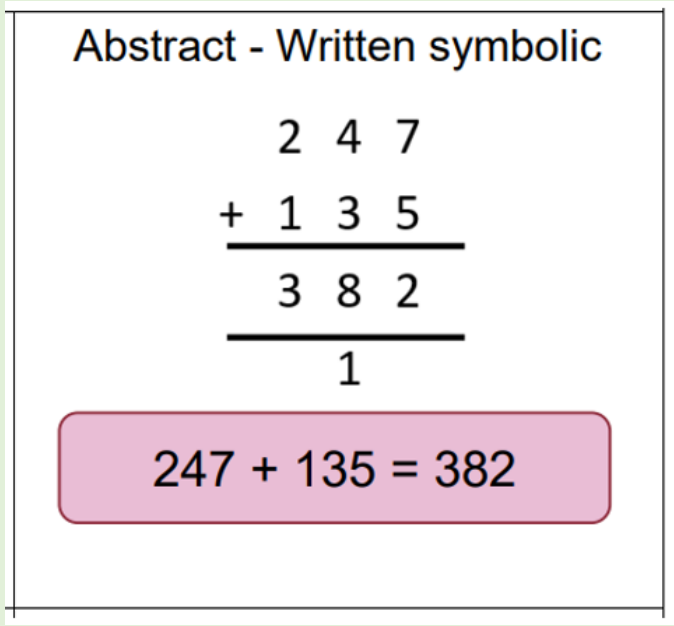


Addition - with Carrying





247 + 135 = 382

Example:

$$1348 + 2574 =$$

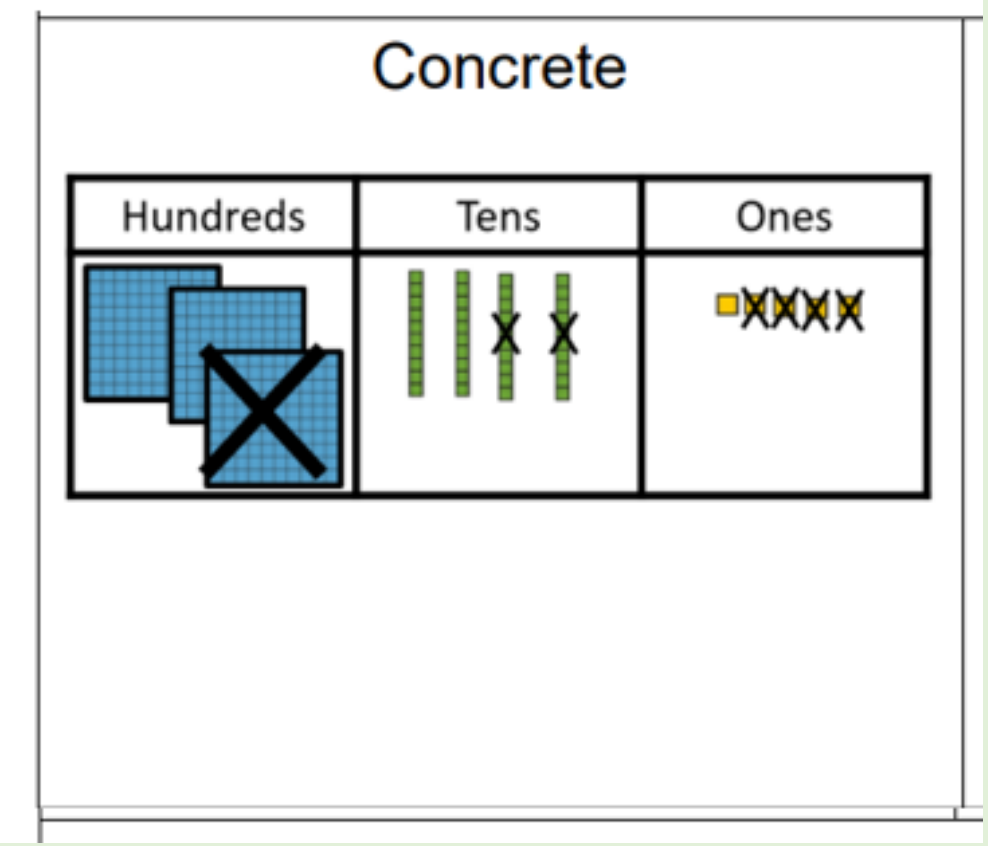
Subtraction

Year 3 then builds on knowledge of subtraction from Year 2. Children will be familiar with dienes and drawings, and will be introduced to the 100 square for the dienes. Their knowledge of tens and ones will support with their knowledge of hundreds and then thousands etc.

In Year 4, the children will become familiar with place value up to 10s thousands. In year 5 and 6, the children will understand place value in the millions. The column method is used throughout KS2, with a focus on concrete, pictorial and abstract in Year 3 and the children being able to access this way of thinking further up the school to support with subtraction of larger numbers.

Subtraction – Without exchanging

345 – 124 = 221



Subtraction – Without Exchanging

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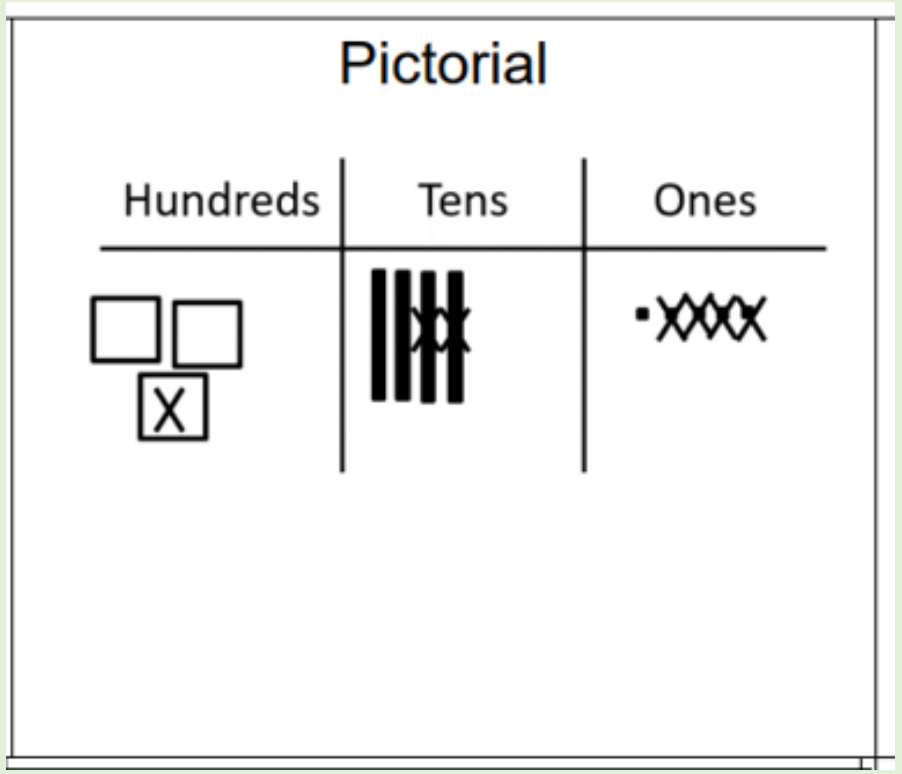

Subtraction – Without Exchanging

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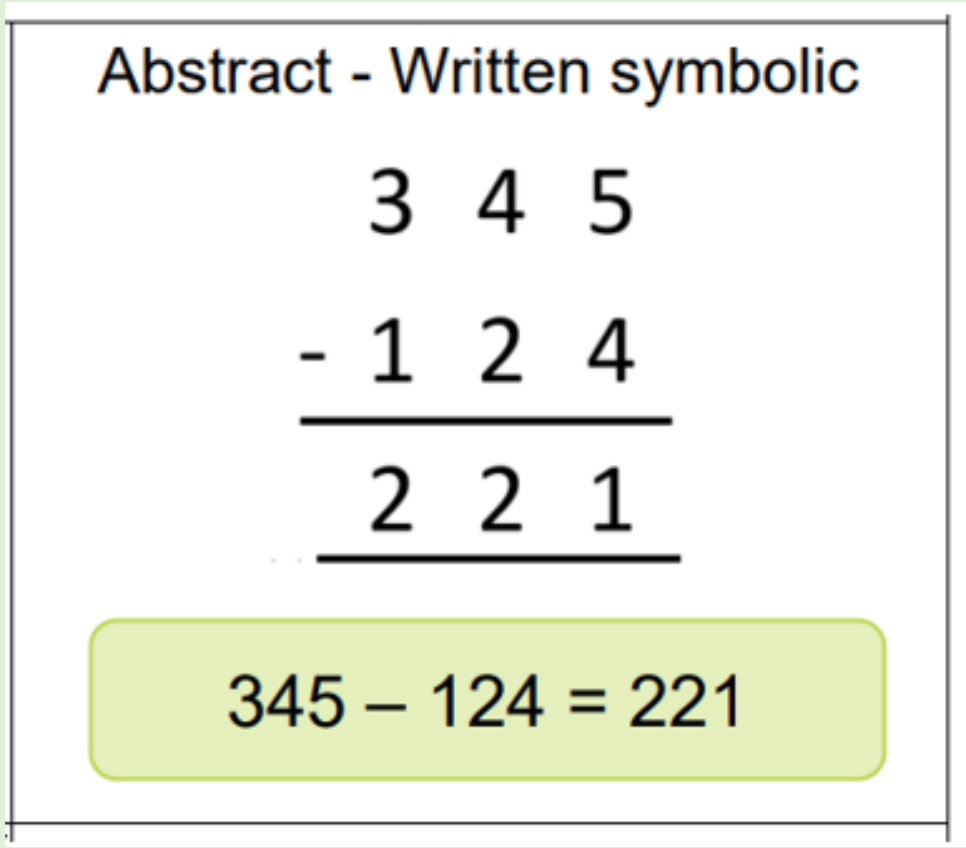

Subtraction – Without Exchanging

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Abstract - Speaking frame

… ones take away … ones leaves … ones.
… tens take away … tens leaves … tens.
… hundreds take away … hundreds leaves … hundreds.
So, … – … is equal to … hundreds, … tens and … ones, which is …

Abstract - Written symbolic

$$\begin{array}{r} 3\ 4\ 5 \\ -\ 1\ 2\ 4 \\ \hline 2\ 2\ 1 \end{array}$$

345 – 124 = 221

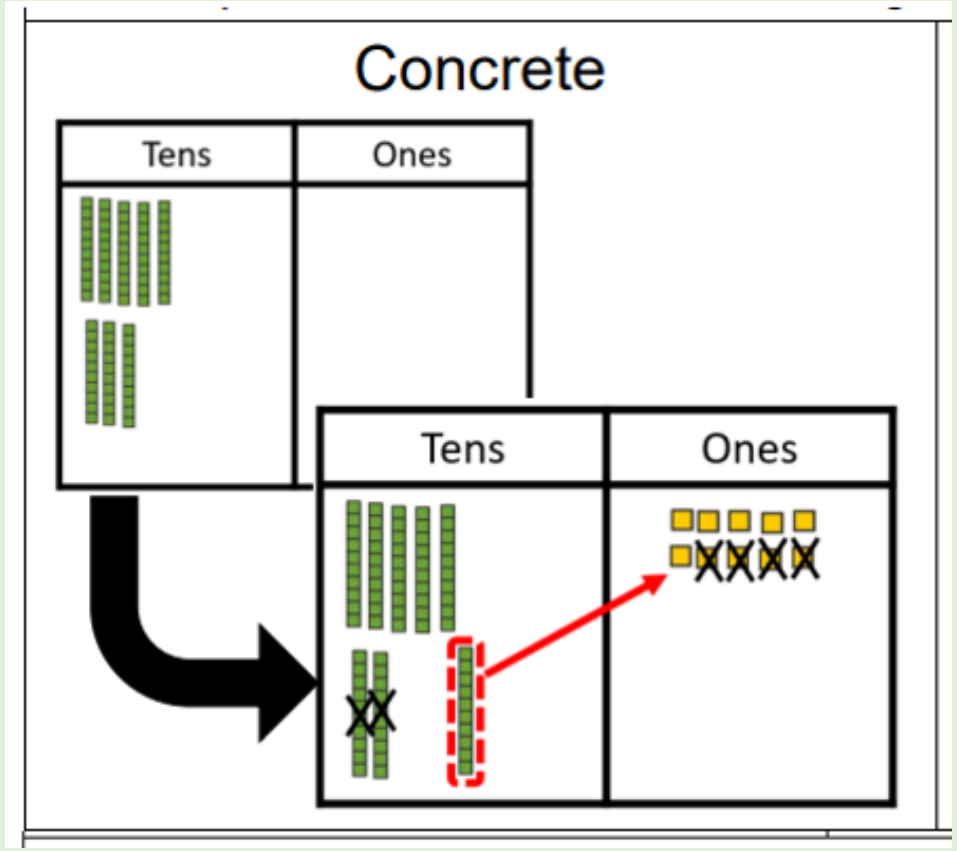
345 – 124 = 221

Example:

$$3542 - 1321 =$$

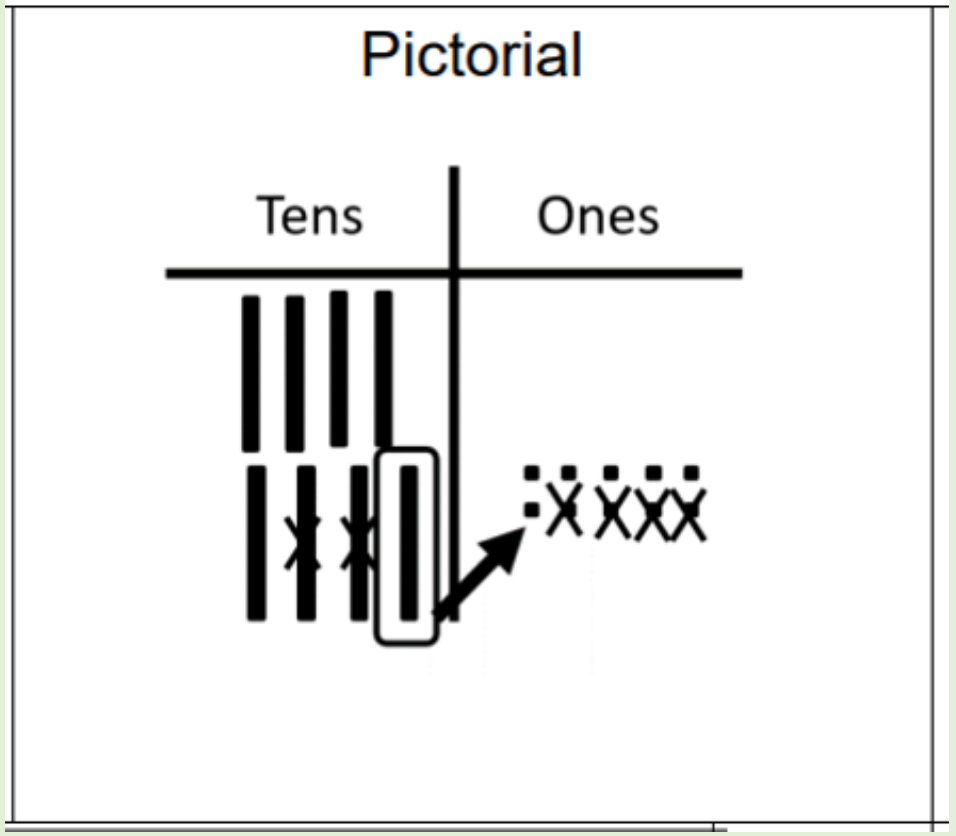
Subtraction – With Exchanging

80 – 24 = 56



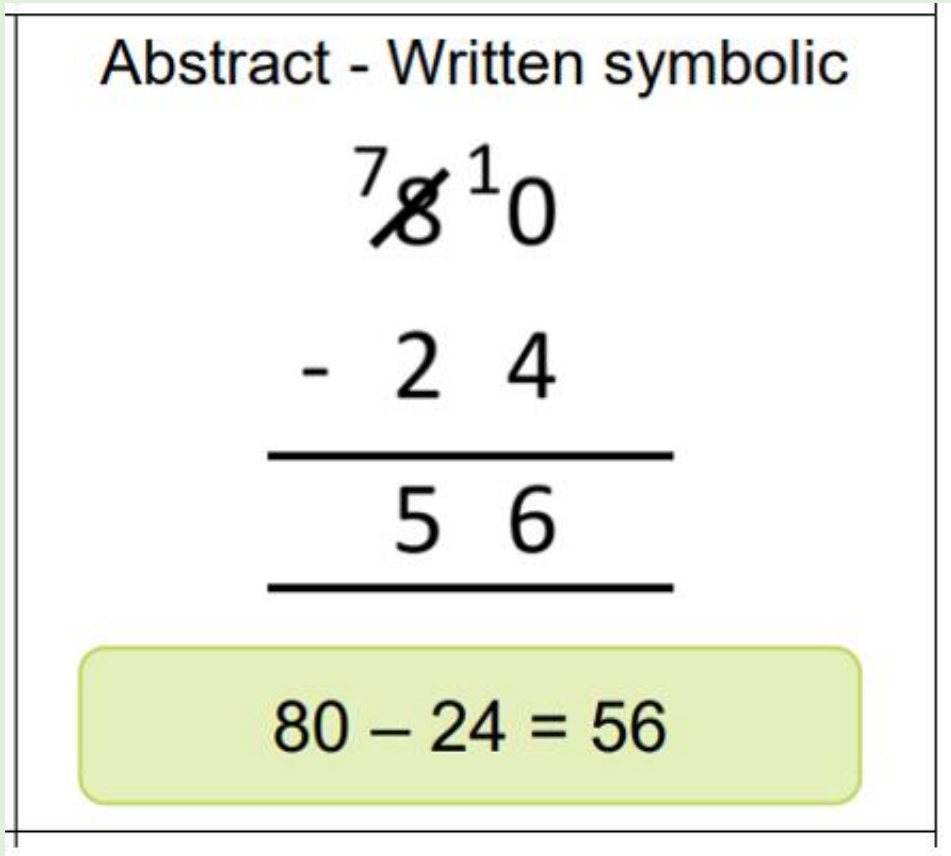
Subtraction – With Exchanging

80 – 24 = 56



Subtraction – With Exchanging

80 – 24 = 56



Subtraction – With Exchanging

Bovingdon Primary Academy

Abstract - Speaking frame

I can see that there aren't enough ones for me to take away … ones without regrouping.
Regroup one ten into ten ones.
There are now … tens and … ones.
… ones take away … ones leaves … ones.
… tens take away … tens leaves … tens.
So, … – … is equal to… tens and … ones, which is … .

Abstract - Written symbolic

$$\begin{array}{r} {}^{7}\cancel{8}\,{}^{1}0 \\ -\ 2\ 4 \\ \hline 5\ 6 \\ \hline \end{array}$$

80 – 24 = 56

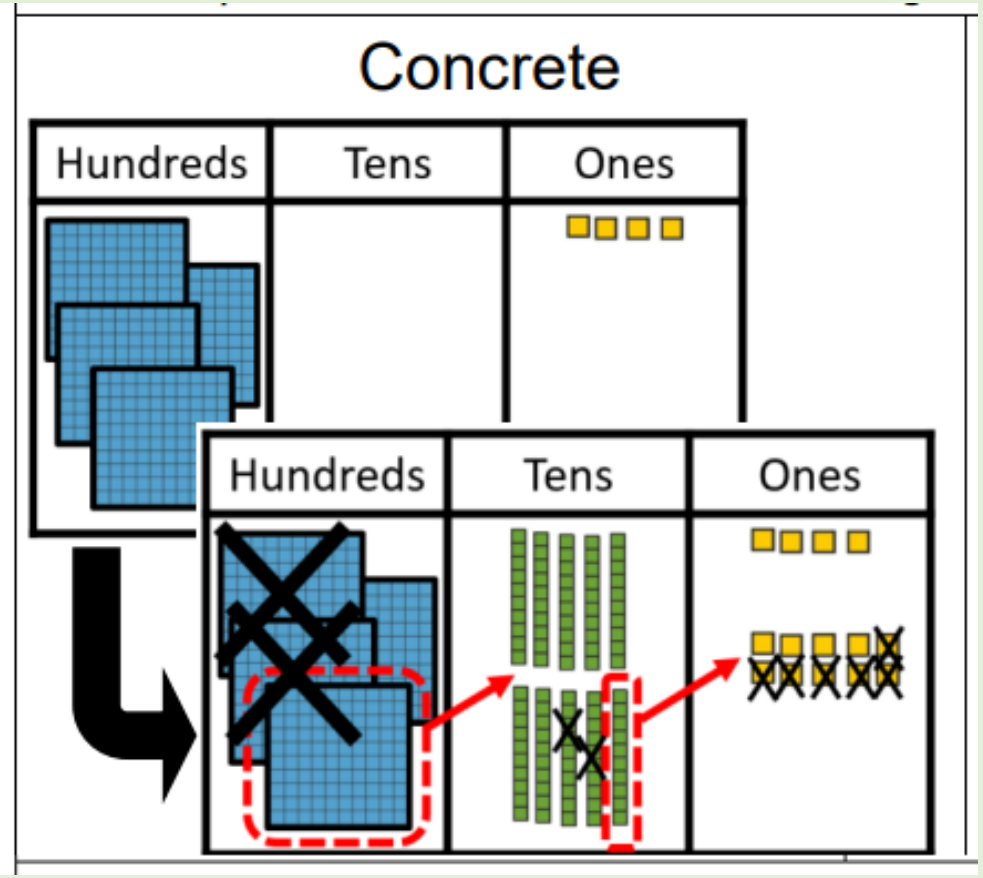
80 – 24 = 56

Example:

$$323 - 141 =$$

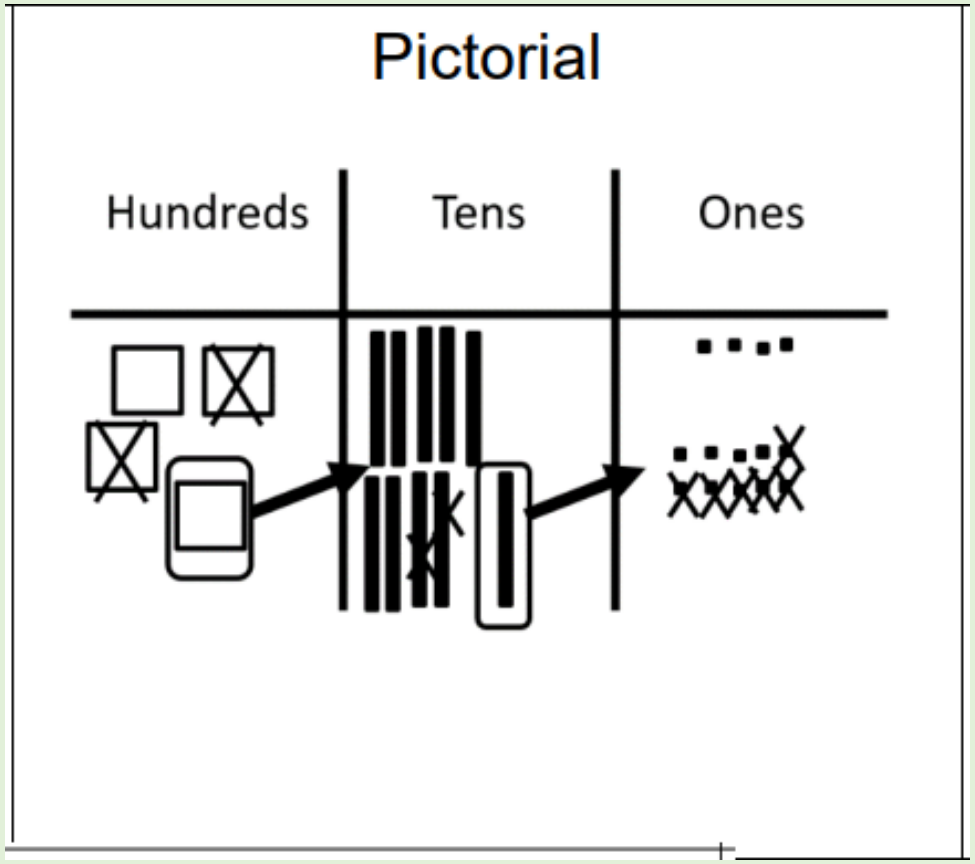
Subtraction – Exchanging when there is a zero

404 – 226 = 178



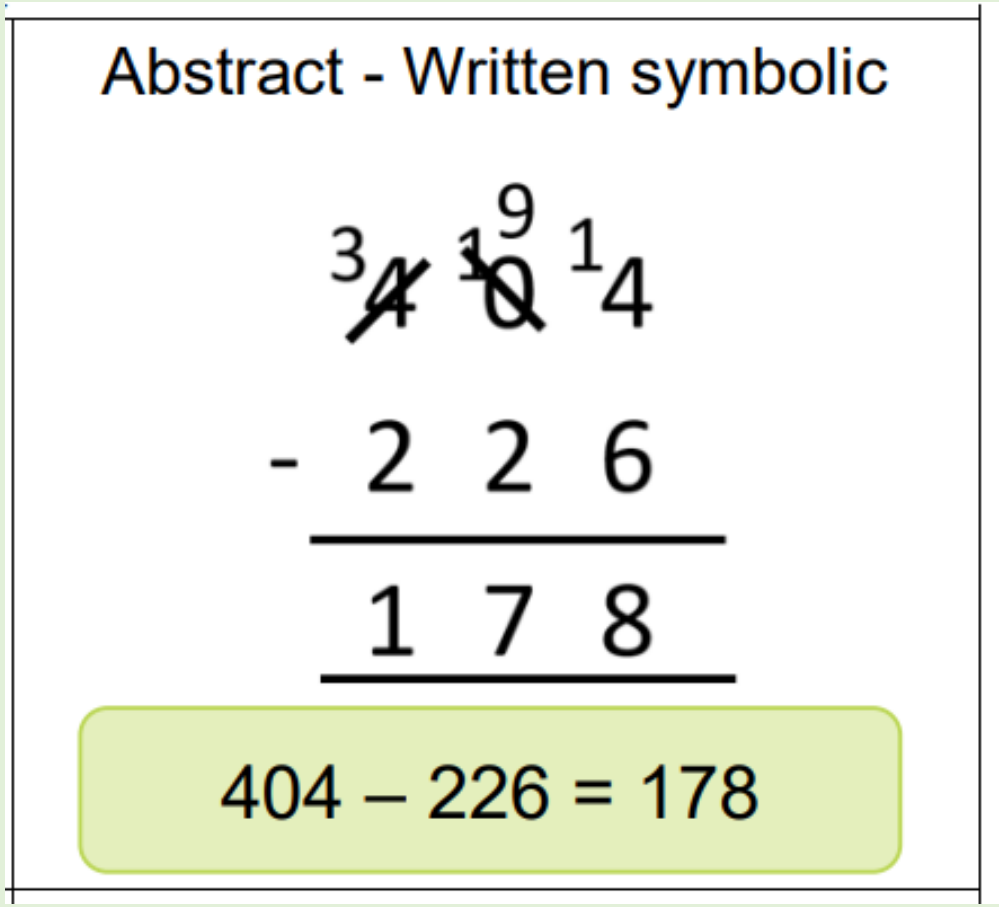
Subtraction – Exchanging when there is a zero

404 – 226 = 178

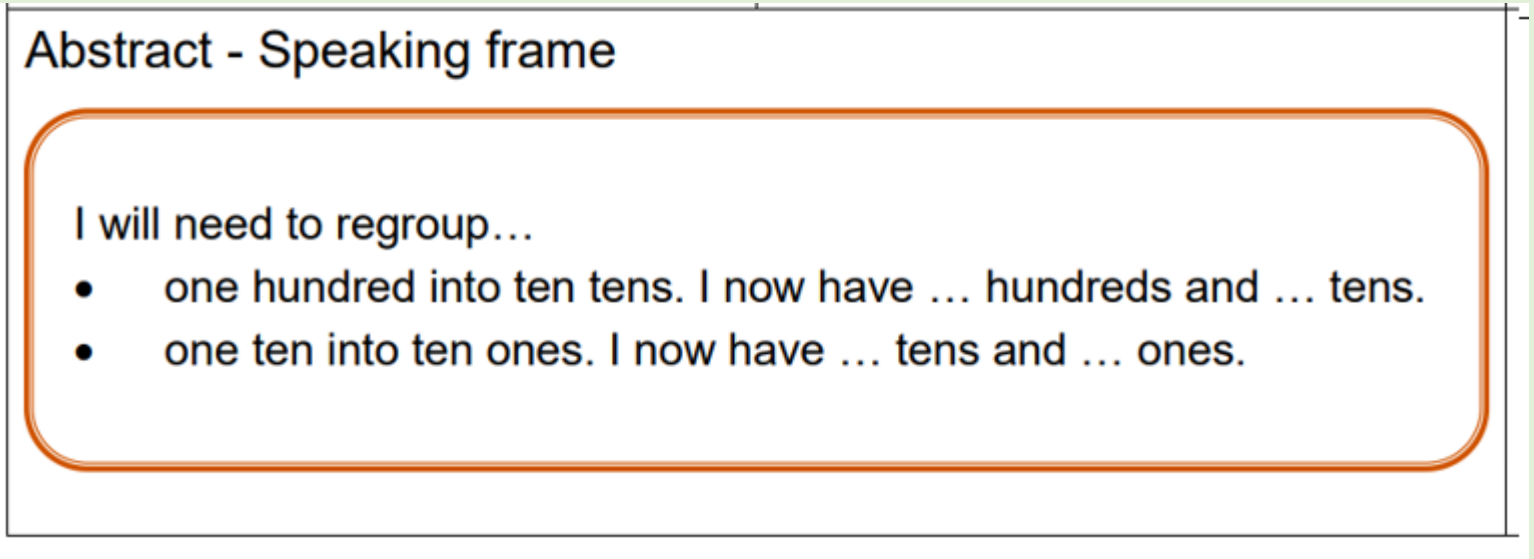


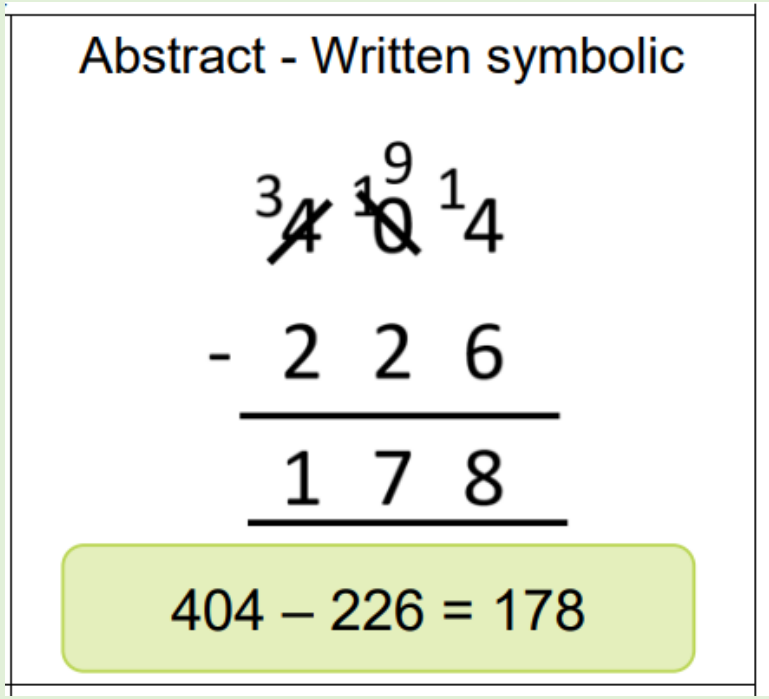
Subtraction – Exchanging when there is a zero

404 – 226 = 178



Subtraction – Exchanging when there is a zero





404 – 226 = 178

Example:

$$7023 - 426 =$$

Multiplication

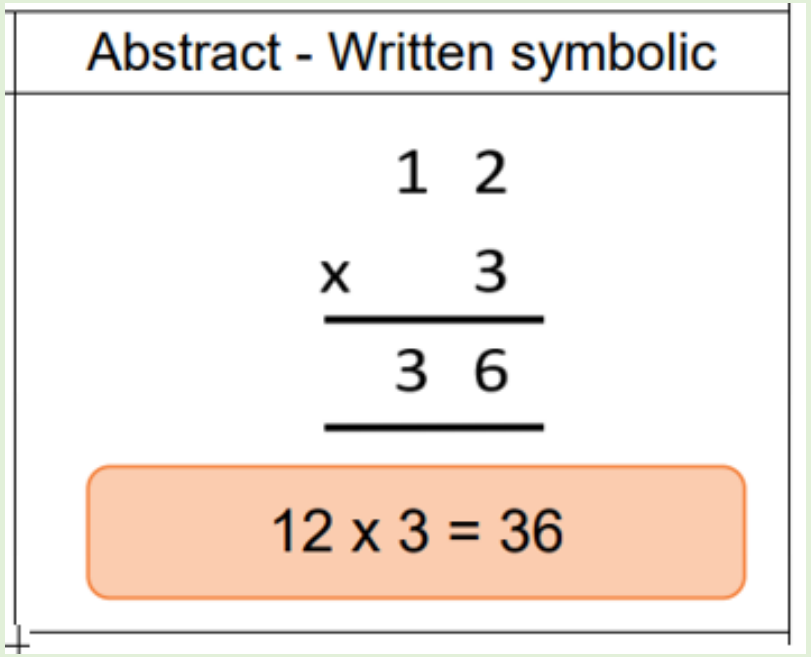
Key Stage 2

Year 3 then builds on knowledge of multiplication and groups from Year 2. Children will be familiar with dienes, part-part whole models and bar models. The methods are then broken down.

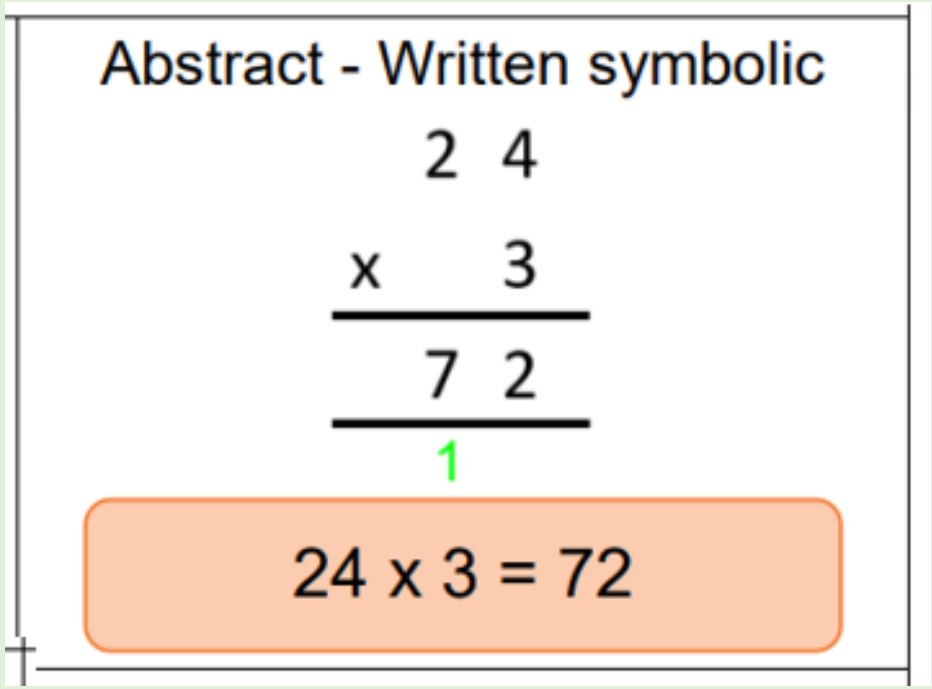
In Year 4, the children will become familiar with place value up to 10s thousands. In year 5 and 6, the children will understand place value in the millions. The column method is used throughout KS2, with a focus on concrete, pictorial and abstract in Year 3 and the children being able to access this way of thinking further up the school to support with multiplication of larger numbers.

Multiplication Progression through KS2

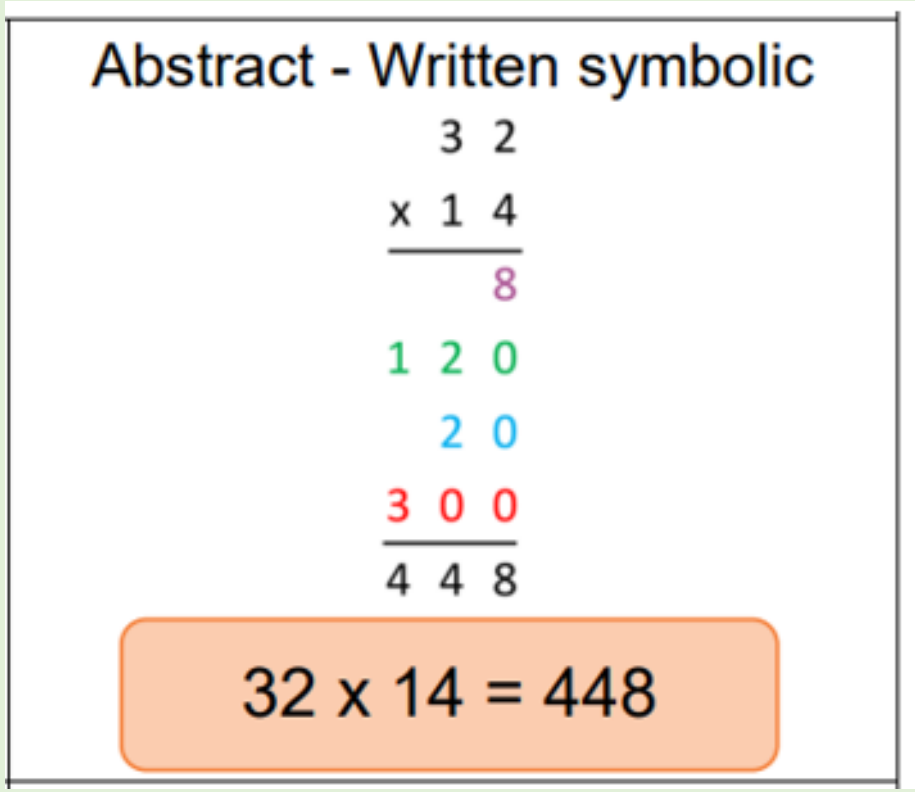
Short multiplication, no regrouping.



Short multiplication with regrouping

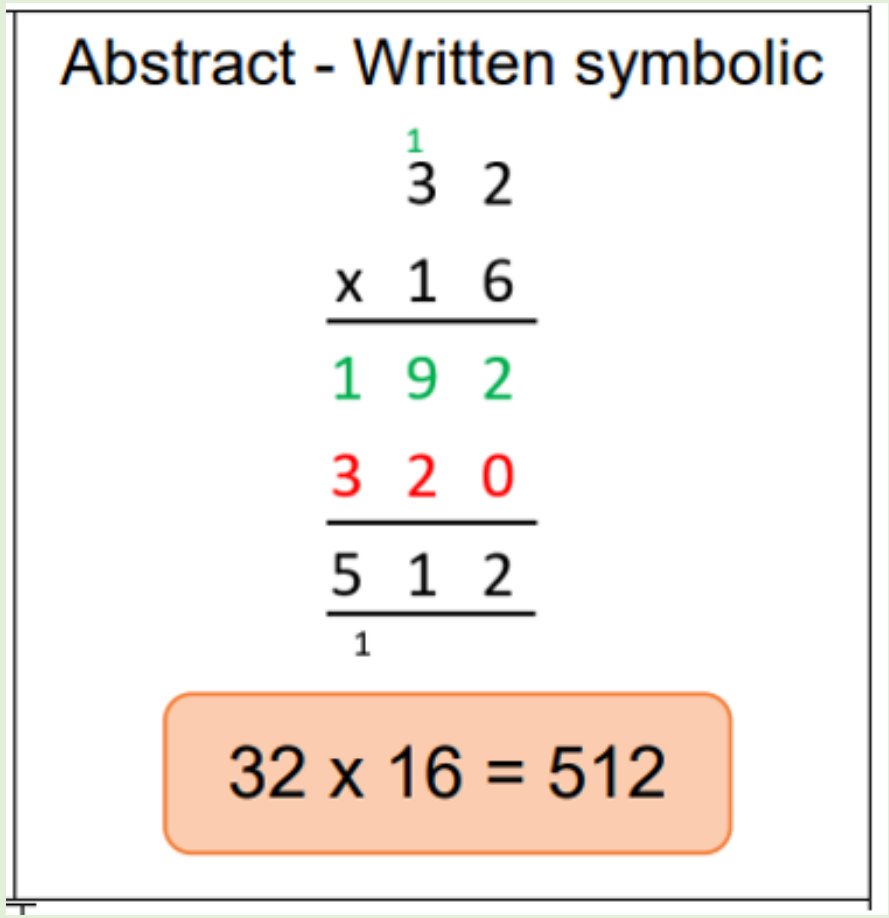


Long multiplication, no regrouping

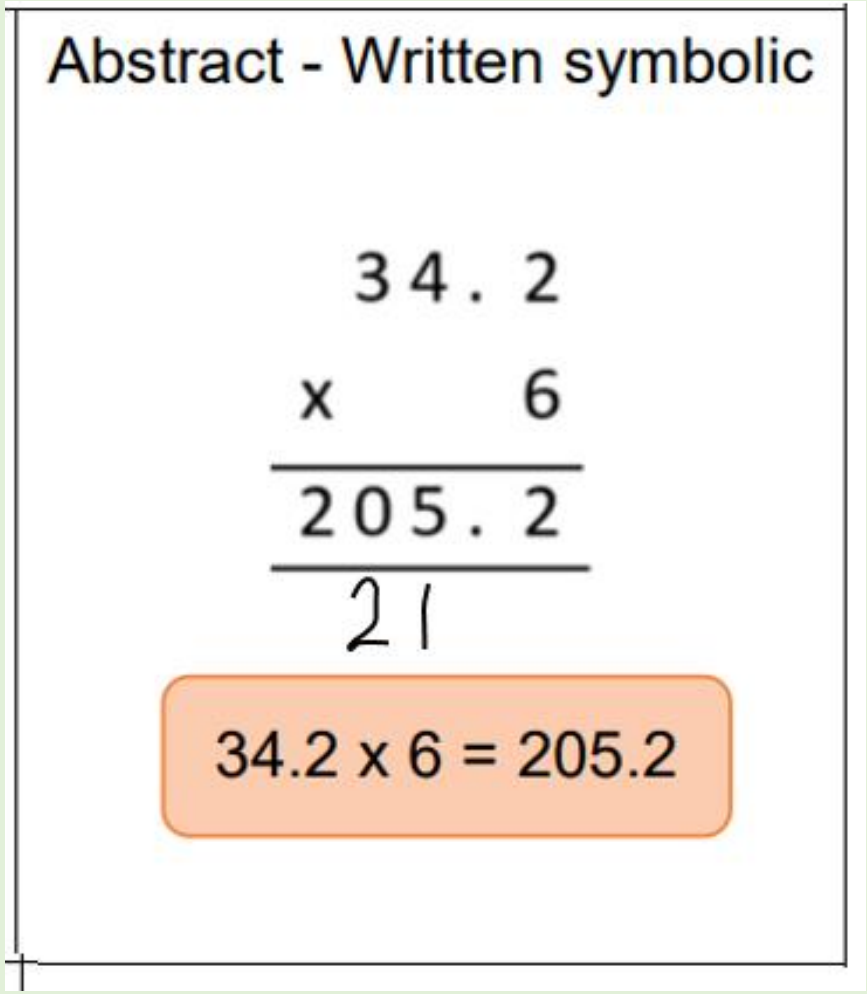


Example Question

Long multiplication with regrouping



Long multiplication up to 2 decimal places



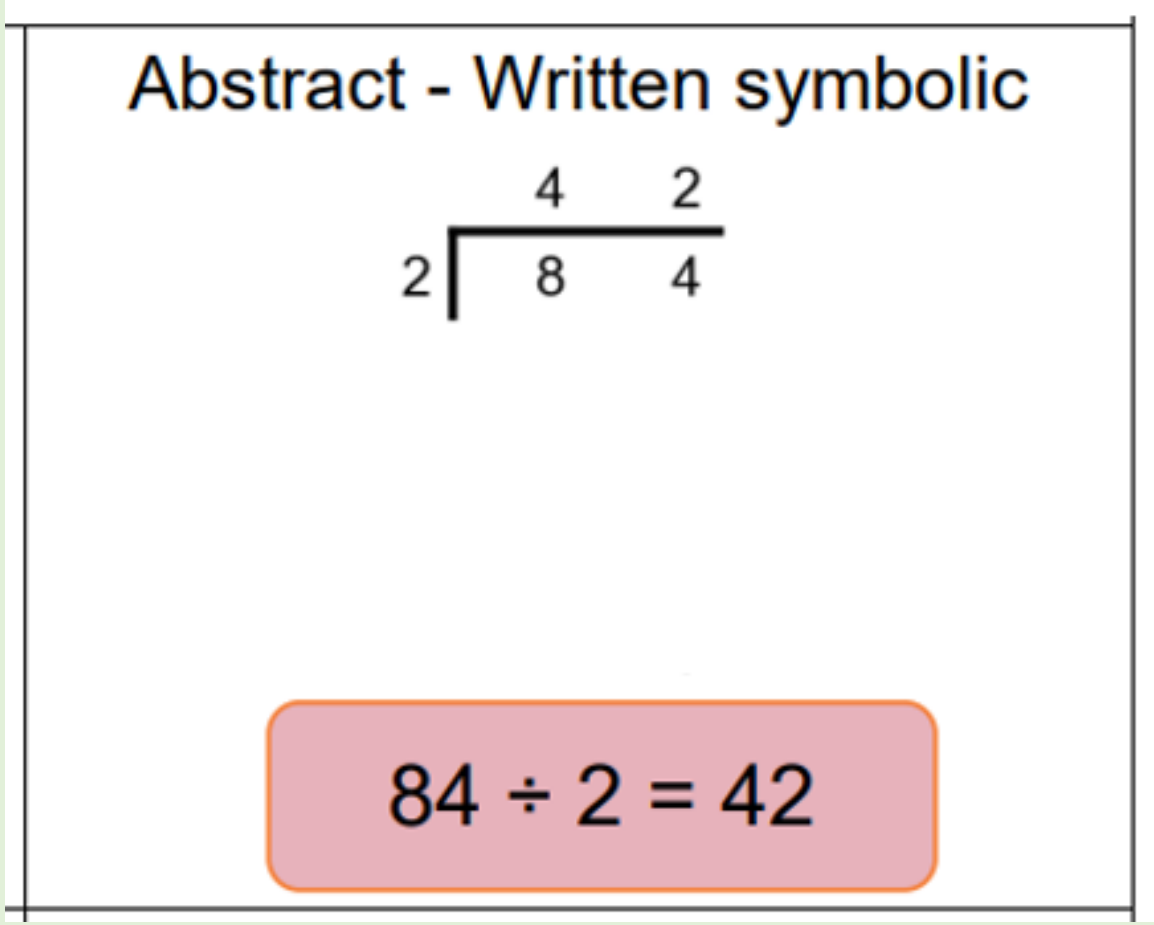
Division in KS2

Year 3 then builds on knowledge of division and grouping and sharing from Year 2. Children will be familiar with dienes, part-part whole models and bar models and column method. The methods are then broken down and expanded as they move up the school.

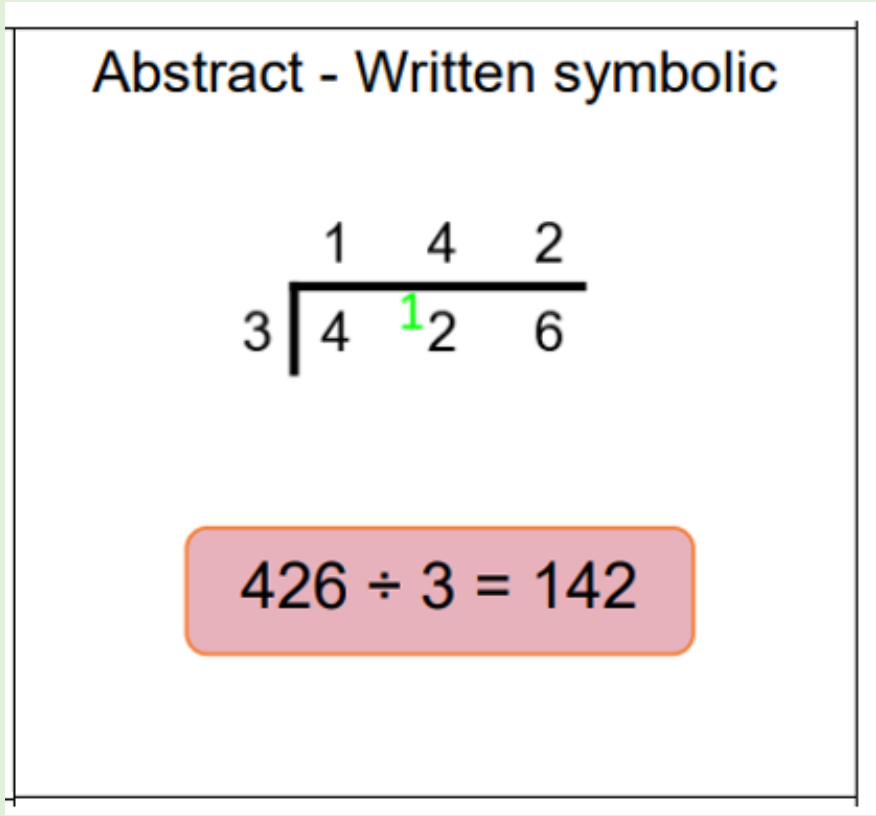
In Year 4, the children will become familiar with place value up to 10s thousands. In year 5 and 6, the children will understand place value in the millions. The column method is used throughout KS2, with a focus on concrete, pictorial and abstract in Year 3 and the children being able to access this way of thinking further up the school to support with division of larger numbers.

Division Progression through KS2

Bus stop method, no remainders.

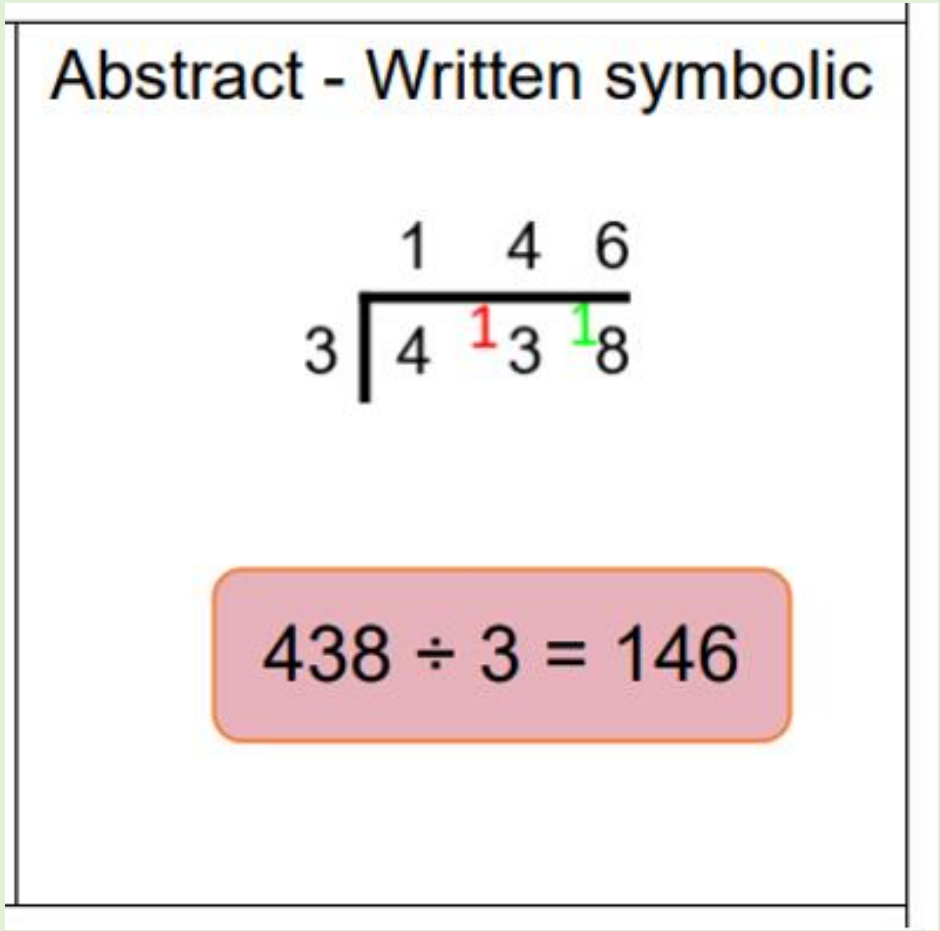


Division - With Regrouping

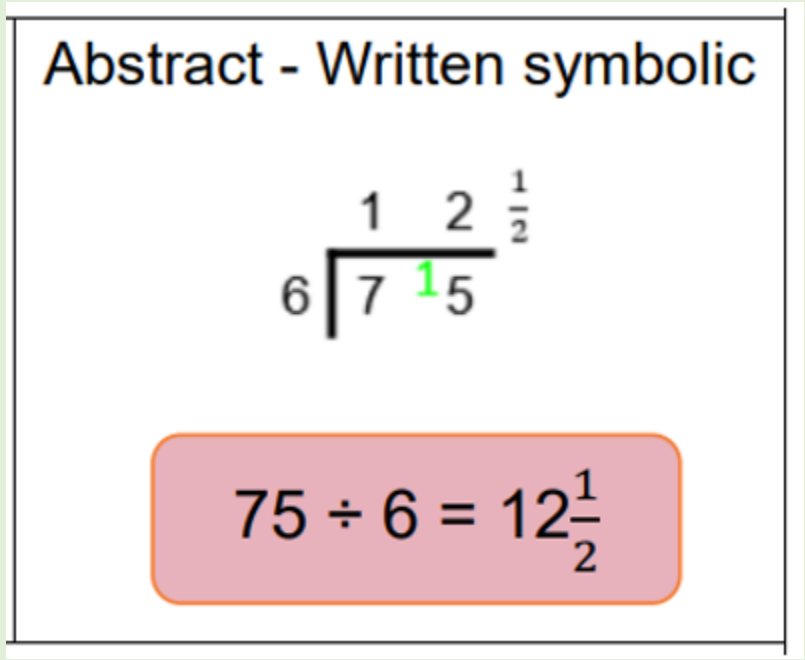


Example Question

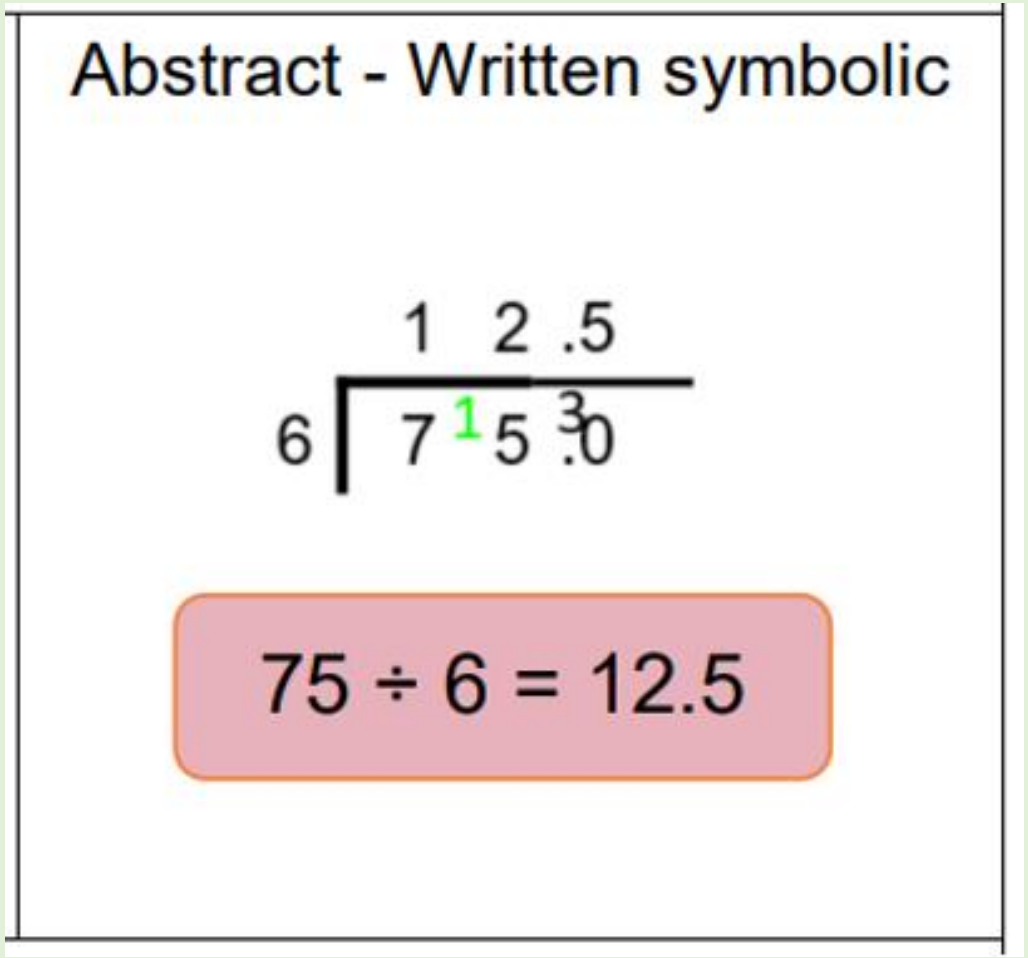
Division - With Regrouping



Division – Bus stop method with fractions as remainders



Division – Bus stop method with decimals as remainders



BPA's Calculation Policy

This will be uploaded on to our website within the next two weeks. All information contained in this presentation will be available for you to view at your leisure, alongside your child at home.

The KS1 presentation will also be available.

We will email an update when the calculation policy is live.

Please also refer to the national curriculum should you wish to know expectations by the end of your child's year group.

http://bovingdonacademy.org.uk/

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Thank you for attending this afternoon's maths meeting.