

Year 3 Key Representations

Dienes equipment

An important resource for demonstrating the relative size of place value columns. Supports the process of **regrouping** – one ten is equal to ten ones, one hundred is equal to ten tens and so on. Can also be used to represent addition and subtraction with 2- and 3-digit integers.

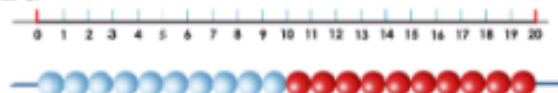
One ten is regrouped for ten ones. Ten ones is regrouped for one ten.



234 is two hundreds, three tens and four ones. I can represent subtracting 20 by removing two ten sticks.

Number lines

Number lines can be used to represent and compare numbers and can be used alongside a bead string. They demonstrate the continuous nature of the number system. When calculating, number lines may act as a jotting of the steps of a mental calculation and may begin 'empty' i.e. not have numbered divisions. Pupils will have experienced this most through adding tens then ones as shown. The use of number lines is extended during Year 3.



Equations

The phrase '**is equal to**' is used consistently to refer to the = symbol. Equations should be presented with symbols and missing numbers in different positions:

$$38 = 25 + 13$$

$$\square = 37 + 44$$

$$12 + \square = 4$$

Number bond knowledge

Pupils should be increasingly fluent in number bond recall for all numbers to 20. Make use of transitions and Maths Meetings to develop this.

$$17 = 12 + 5$$

$$17 = 11 + 6$$

$$17 = 10 + 7$$

Deriving facts

Pupils use known facts such as number bonds and understanding of place value and magnitude to derive further facts.

If I know $12 + 5 = 17$ then $22 + 5 = 27$.
If I know $12 + 5 = 17$ then $17 - 12 = 5$
If I know $17 - 12 = 5$ then $37 - 12 = 25$

Bead strings

Bead strings help support the ordinality of number. They are repurposed e.g. beads have the value 101-200 for representation when rounding.



Part-whole language and representations

A part-whole model is used to represent the relationship between numbers in all four operations. The model is made of a **whole** and two or more **parts**.



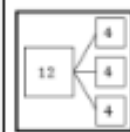
The whole is ten. One part is six and one part is four. Six plus four is equal to ten.

By moving the manipulatives the model represents subtraction.



The whole is ten. I subtract one part of six. The missing part is four. Ten subtract six is equal to four.

Multiplication, division and fractions of quantities can be represented using multiple equal parts.



There are three equal parts with a value of four. The whole is 12. Three multiplied by four is equal to 12. 12 divided into three equal parts is equal to four. One third of 12 is four.

The 'make 10' strategy

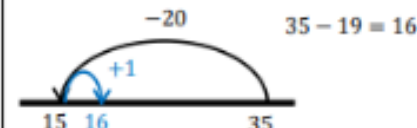
Pupils apply number bonds to 10 to calculate how many more/less to the next multiple of ten. They partition the part into two parts to calculate mentally. Using concrete or pictorial representations can scaffold thinking.

$36 + 27 = ?$ I can partition 27 into 4 and 23. 36 plus 4 is equal to 40. 40 plus 23 is equal to 63.



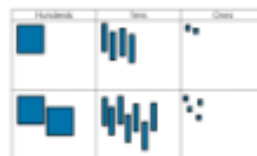
Round and adjust

Pupils apply understanding of ordinality of number, recognising when a part or whole is close to a multiple of 10 e.g. 29, 32. They round before calculating, then adjust their answer accordingly. Concrete or pictorial models are used to represent this.



Place value charts

Place value charts have been used to represent two-digit numbers and can be used alongside concrete, pictorial and abstract representations of number to secure understanding of the positional aspect of the number system. Pupils have made use of place value charts when adding two 2-digit numbers and their use is extended in Year 3.



Representing fractions

A range of concrete and pictorial representations are used for fractions including fractions of a whole, as part of a set of objects and as part of a quantity such as a length or volume. Pupils should be familiar with a range of representations.



One of four equal parts.

numerator → 1
vinculum → —
denominator → 4



One quarter of 12 is three.

One quarter of a metre is 25 cm.

Arrays

Concrete and pictorial arrays demonstrate the **commutativity** of multiplication and **inverse relationship** of multiplication and division. Pupils should be familiar with considering rows and columns. **Part-whole language** may be used alongside.

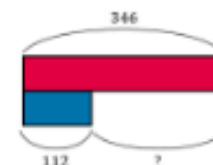


There are four parts/groups each with a value of three. The whole is 12. Four multiplied by three is equal to 12.

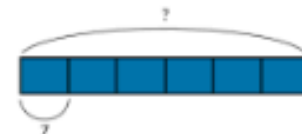
The whole is 12. There are three parts/groups each with a value of 4. 12 divided by three is equal to four. One third of 12 is equal to four.

Bar models

Pictorial bar models and concrete Cuisenaire as bar models are used throughout the year and represent **part-whole relationships and knowns and unknowns** within problems. See PD videos for further exemplification.



I know the whole is 346, and one of the parts is 112. I do not know the value of the missing part. I can subtract 112 from 346.



The value of each part is 7 and there are 6 equal parts. The whole is unknown. $7 \times 6 = 42$