National Curriculum Aims: Reasoning, Fluency, Problem solving

Prior learning: non- negotiables

Mental imagery/ representations of number: concrete resources and number lines

Number and Place value

Y1:

- count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens
- identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least

Y2

- recognise the place value of each digit in a two-digit number (tens, ones)
- identify, represent and estimate numbers using different representations, including the number line **(including flexible partitioning)**
- compare and order numbers from 0 up to 100; use <, > and = signs

Y3:

- count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
- recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
- compare and order numbers up to 1000
- identify, represent and estimate numbers using different representations (**inc flexible partitioning**)
- read and write numbers up to 1000 in numerals and in words

Y4:

- recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)
- order and compare numbers beyond 1000
- identify, represent and estimate numbers using different representations
- round any number to the nearest 10, 100 or 1000

Multiplication and division

Y1 Pupils should be taught to:

- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher

Y2 Pupils should be taught to:

- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Y3 Pupils should be taught to:

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- 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
- solve problems, including missing number problems, involving multiplication and division, including integer scaling problems and correspondence problems in which n objects are connected to m objects.

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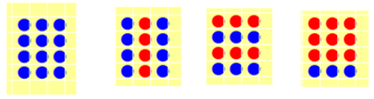
3 forms of knowledge: Factual, procedural and conceptual
Some researchers also include 'utilisational knowledge'.

Modelling formal calculation recording

Arrays eg 12

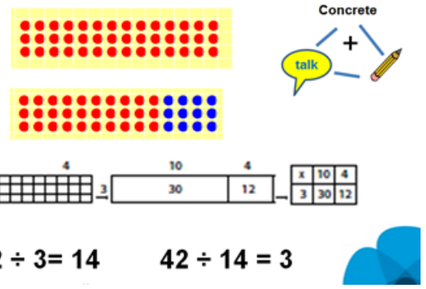


3 x 4 = 12
4 x 3 = 12
12 ÷ 3 = 4
12 ÷ 4 = 3

1/2 of 12 = 6
1/4 of 12 = 3
2/4 of 12 = 6
3/4 of 12 = 8

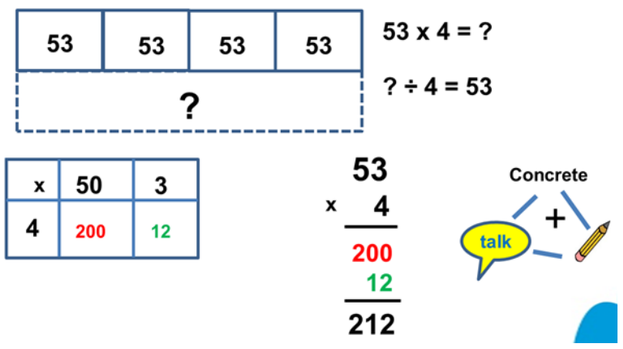
1/3 of 12 = 4
2/3 of 12 = 8
3/3 of 12 = 12

14 x 3 = 42



42 ÷ 3= 14 **42 ÷ 14 = 3**

53 x 4 = 212



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If you know this, what else do you know?

Relationships:
A x B=C; B x A=C; C/B=A; C/A=B

Patterns of calculation involving place value:
3x4= 12; 30 x 4= 120; 40x3= 120; 300 x4 =1200
12÷4= 3; 120÷4=30 ; 1200÷4= 300 etc

12x 10=120; 12x 100= 1200
1200 ÷10= 120; 1200 ÷100= 12; 12÷10=1.2 etc

Doubling and halving
35x2= 70 so 35x4= 140;
50x 10 =500 so 50x5 =250 etc

Division and fractions
1/2 of 70= 70÷2
1/4 of 36 = 36÷4
1/3 of 36= 36÷3
1/10 of 12= 12÷10 etc

Y4 Multiplication and division

Pupils should be taught to:

- 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
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Hampshire County Council