Preston Primary School Adacemy – Calculation methods

Multiplication

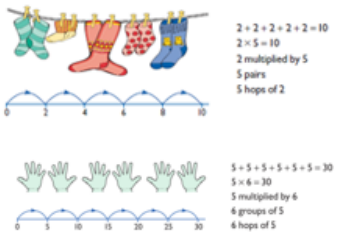
Year 1

Obj Gui Ex

- Solve one-step multiplication problems using concrete objects, pictorial representations and arrays

Understand multiplication is related to doubling and combing groups of the same size (repeated addition)

Washing line, and other practical resources for



Problem solving with concrete objects (including money and measures

Use cuissenaire and bar method to develop the vocabulary relating to 'times' – Pick up five, 4 times.

Use arrays to understand multiplication can be done in any order (commutative).

Year 2

Obj Gui Vid Ex

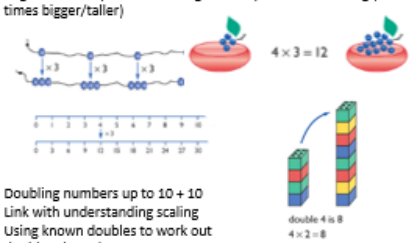
Expressing multiplication as a number sentence using x
Using understanding of the inverse and practical resources to solve missing number problems.

7 x 2 = □ □ = 2 x 7
7 x □ = 14 14 = □ x 7
□ x 2 = 14 14 = 2 x □
□ x ◯ = 14 14 = □ x ◯

- Solve multiplication problems, including missing number problems.

Develop understanding of multiplication using array and number lines (see Year 1). Include multiplications not in the 2, 5 or 10 times tables.

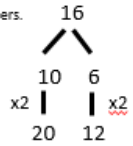
Begin to develop understanding of multiplication as scaling (3 times bigger/taller)



Doubling numbers up to 10 + 10
Link with understanding scaling
Using known doubles to work out double 2d numbers
(double 15 = double 10 + double 5)

Towards written methods

Use jottings to develop an understanding of doubling two digit numbers.



Year 3

Obj Gui Vid Ex

Missing number problems
Continue with a range of equations as in Year 2 but with appropriate numbers.

Mental methods
Doubling 2 digit numbers using partitioning

Demonstrating multiplication on a number line – jumping in larger groups of amounts

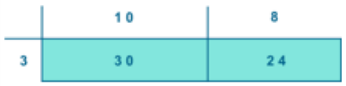
13 x 4 = 10 groups 4 = 3 groups of 4

- Write and calculate mathematical statements for multiplication using x tables they know including 2d x 1d

Written methods (progressing to 2d x 1d)

Developing written methods using understanding of visual images

Develop onto the grid method

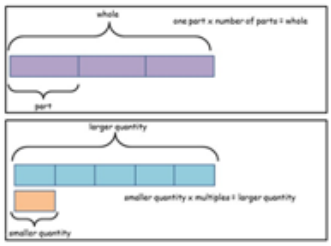


Give children opportunities for children to explore this and deepen understanding using Dienes apparatus and place value counters.

Year 1

Obj Gui Ex

Use the Singapore bar method for multiplication.



Year 2

Obj Gui Vid Ex

Use the Singapore bar method for multiplication.

Year 3

Obj Gui Vid Ex

Use the Singapore bar method for multiplication.

Multiplication

Year 1

Mental Strategies

- Children should experience regular counting on and back from different numbers in 1s and in multiples of 2, 5 and 10.
- Children should memorise and reason with numbers in 2, 5 and 10 times tables
- They should see ways to represent odd and even numbers. This will help them to understand the pattern in numbers.

Children should begin to understand multiplication as scaling in terms of double and half. (e.g. that tower of cubes is double the height of the other tower)

Vocabulary
Ones, groups, lots of, doubling
repeated addition
groups of, lots of, times, columns, rows
longer, bigger, higher ~~etc~~
times as (big, long, wide ...~~etc~~)

Generalisations

- Understand 6 counters can be arranged as 3+3 or 2+2+2
- Understand that when counting in twos, the numbers are always even.

Some Key Questions
Why is an even number an even number?
What do you notice?
What's the same? What's different?
Can you convince me?
How do you know?

Year 2

Mental Strategies

- Children should count regularly, on and back, in steps of 2, 3, 5 and 10.
- Number lines should continue to be an important image to support thinking, for example
- Children should practise times table facts
  2 x 1 =
  2 x 2 =
  2 x 3 =

Use a clock face to support understanding of counting in 5s.
Use money to support counting in 2s, 5s, 10s, 20s, 50s

Vocabulary
multiple, multiplication array, multiplication tables / facts
groups of, lots of, times, columns, rows

Generalisation

- Commutative law shown on array (video)
- Repeated addition can be shown mentally on a number line
- Inverse relationship between multiplication and division. Use an array to explore how numbers can be organised into groups.

Some Key Questions
What do you notice?
What's the same? What's different?
Can you convince me?
How do you know?

Year 3

Mental Strategies

- Children should continue to count regularly, on and back, now including multiples of 4, 8, 50, and 100, and steps of 1/10.
- The number line should continue to be used as an important image to support thinking, and the use of informal jottings and drawings to solve problems should be encouraged.
- Children should practise times table facts
  3 x 1 =
  3 x 2 =
  3 x 3 =

Vocabulary
partition
grid method
inverse

Generalisations

- Connecting x2, x4 and x8 through multiplication facts
- Comparing times tables with the same times tables which is ten times bigger. If 4 x 3 = 12, then we know 4 x 30 = 120. Use place value counters to demonstrate this.
- When they know multiplication facts up to x12, do they know what x13 is? (~~i.e.~~ can they use 4x12 to work out 4x13 and 4x14 and beyond?)

Some Key Questions
What do you notice?
What's the same? What's different?
Can you convince me?
How do you know?