# Preston Primary School Adacemy – Calculation methods

## Multiplication

### Year 4

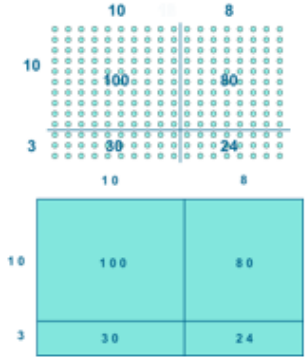
Continue with a range of equations as in Year 2 but with appropriate numbers. Also include equations with missing digits
□2 x 5 = 160

**Mental methods**
Counting in multiples of 6, 7, 9, 25 and 1000, and steps of 1/100.

Solving practical problems where children need to scale up. Relate to known number facts. (e.g. how tall would a 25cm sunflower be if it grew 6 times taller?)

- Multiply two digit and three-digit numbers by a one-digit number using formal written method

**Written methods (progressing to 3d x 2d)**
Children to embed and deepen their understanding of the grid method to multiply up 2d x 2d. Ensure this is still linked back to their understanding of arrays and place value counters.




### Year 5

Continue with a range of equations as in Year 2 but with appropriate numbers. Also include equations with missing digits

**Mental methods**
X by 10, 100, 1000 using moving digits ITP

Use practical resources and jottings to explore equivalent statements (e.g. 4 x 35 = 2 x 2 x 35)

Recall of prime numbers up 19 and identify prime numbers up to 100 (with reasoning)

Solving practical problems where children need to scale up. Relate to known number facts.

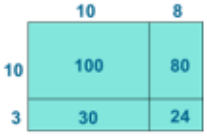
Identify factor pairs for numbers

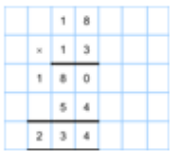
- Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.

**Written methods (progressing to 4d x 2d)**

Long multiplication using place value counters

Children to explore how the grid method supports an understanding of long multiplication (for 2d x 2d)




### Year 6

Continue with a range of equations as in Year 2 but with appropriate numbers. Also include equations with missing digits

**Mental methods**
Identifying common factors and multiples of given numbers
Solving practical problems where children need to scale up. Relate to known number facts.

- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.

**Written methods**
Continue to refine and deepen understanding of written methods including fluency for using long multiplication

| X | 1000 | 300 | 40 | 2 |
|---|---|---|---|---|
| 10 | 10000 | 3000 | 400 | 20 |
| 8 | 8000 | 2400 | 320 | 16 |

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  1342
x   18
------
 10736   (8 x 1342)
 2 3 1
+13420   (10 x 1342)
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 24 156
 1
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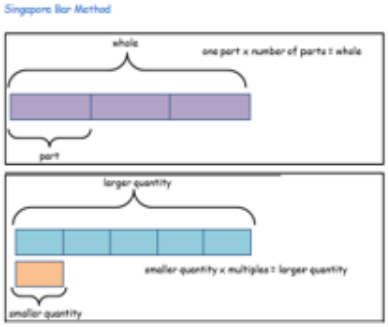
### Year 4

Use the Singapore Bar method to help solve multiplication problems.




### Year 5

Continue to use the Singapore Bar method to solve multiplication problems.

### Year 6

Continue to use the Singapore Bar method to solve multiplication problems.

| Year 4 | Year 5 | Year 6 |
|---|---|---|
| **Mental Strategies**<br>• Children should continue to count regularly, on and back, now including multiples of 6, 7, 9, 25 and 1000, and steps of 1/100.<br>• Become fluent and confident to recall all tables to x 12<br>• Use the context of a week and a calendar to support the 7 times table (e.g. how many days in 5 weeks?)<br>• Use of finger strategy for 9 times table.<br>• Multiply 3 numbers together<br>• The number line should continue to be used as an important image to support thinking, and the use of informal jottings should be encouraged.<br><br>• They should be encouraged to choose from a range of strategies:<br>- Partitioning using x10, x20 etc<br>- Doubling to solve x2, x4, x8<br>- Recall of times tables<br>- Use of commutativity of multiplication<br><br>**Vocabulary**<br>Factor<br><br>**Generalisations**<br>Children given the opportunity to investigate numbers multiplied by 1 and 0.<br><br>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?)<br><br>**Some Key Questions**<br>What do you notice?<br>What's the same? What's different?<br>Can you convince me?<br>How do you know? | **Mental Strategies**<br>• Children should continue to count regularly, on and back, now including steps of powers of 10.<br>• Multiply by 10, 100, 1000, including decimals (Moving Digits ITP)<br>• The number line should continue to be used as an important image to support thinking, and the use of informal jottings should be encouraged.<br>• They should be encouraged to choose from a range of strategies to solve problems mentally:<br>- Partitioning using x10, x20 etc<br>- Doubling to solve x2, x4, x8<br>- Recall of times tables<br>- Use of commutativity of multiplication<br>• If children know the times table facts to 12 x 12. Can they use this to recite other times tables (e.g. the 13 times tables or the 24 times table)<br><br>**Vocabulary**<br>cube numbers<br>prime numbers<br>square numbers<br>common factors<br>prime number, prime factors<br>composite numbers<br><br>**Generalisation**<br>Relating arrays to an understanding of square numbers and making cubes to show cube numbers.<br>Understanding that the use of scaling by multiples of 10 can be used to convert between units of measure (e.g. metres to kilometres means to times by 1000)<br><br>**Some Key Questions**<br>What do you notice?<br>What's the same? What's different?<br>Can you convince me?<br>How do you know?<br>How do you know this is a prime number? | **Mental Strategies**<br>• Consolidate previous years.<br><br>• Children should experiment with order of operations, investigating the effect of positioning the brackets in different places, e.g. 20 – 5 x 3 = 5; (20 – 5) x 3 = 45<br><br>• They should be encouraged to choose from a range of strategies to solve problems mentally:<br>- Partitioning using x10, x20 etc<br>- Doubling to solve x2, x4, x8<br>- Recall of times tables<br>- Use of commutativity of multiplication<br><br>• If children know the times table facts to 12 x 12. Can they use this to recite other times tables (e.g. the 13 times tables or the 24 times table)<br><br>**Vocabulary**<br>See previous years<br>common factor<br><br>**Generalisations**<br>Order of operations: brackets first, then multiplication and division (left to right) before addition and subtraction (left to right). Children could learn an acrostic such as PEMDAS, or could be encouraged to design their own ways of remembering.<br>Understanding the use of multiplication to support conversions between units of measurement.<br><br>**Some Key Questions**<br>What do you notice?<br>What's the same? What's different?<br>Can you convince me?<br>How do you know? |