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| **Year 5 - Building and assessing the conceptual understanding and learning – Multiplication and Division** |
| **End of Year Expectations:**Pupils should be taught to: * identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.
* solve problems involving multiplication and division where larger numbers are used by decomposing them into their factors
* know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
* establish whether a number up to 100 is prime and recall prime numbers up to 19
* 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
* multiply and divide numbers mentally drawing upon known facts
* divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
* multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
* recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)
* solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
* solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.

 simple rates.   | **Non-statutory guidance:** Pupils practise and extend their use of the formal written methods of short multiplication and short division (see Appendix 1). They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations. They use and understand the terms factor, multiple and prime, square and cube numbers. Pupils interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (e.g. 98 ÷ 4 = 24 r 2 = 241/2 = 24.5 ≈ 25). Pupils use multiplication and division as inverses to support the introduction of ratio in year 6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres. Distributivity can be expressed as a(b + c) = ab + ac in preparation for using algebra. **See NCETM “Teaching for Mastery” Year 5 book – multiplication and division**https://www.ncetm.org.uk/public/files/23305632/Mastery\_Assessment\_Y5\_Low\_Res.pdf |
| **Autumn** | **Spring** | **Summer** |
| * confidently recall multiplication and division facts for multiplication tables up to 12 x 12
* use and apply known facts to work out other calculations that are not explicitly in the tables up to 12 x 12 (e.g. 14 x 7, 15 x 9)
* Use known facts to solve multiplication and division problems mentally where appropriate
* recognize and use knowledge of multiples and factor pairs.
* Use a grid method to multiply a two and three digit x one digit number, and two digit by two digit numbers.
* Begin to work towards understanding and using a formal written layout of short and long multiplication
* Use and apply division facts to solve division calculations using the sort written method (related to arrays, using PV counters) (two and three digit numbers x 1 digit – including with remainders)
* multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
* use known strategies confidently to solve problems involving multiplication and division, including explaining remainders appropriately for the context.
* Begin to identify and understand square and cube numbers and how we write them.
* Solve simple multi-step problems involving all four operations or a combination of these.
 | * Use and understand the formal written layout for long multiplication, using 2 and three digit numbers
* divide numbers up to 4 digits by a one-digit number using the efficient written method of short division and interpret remainders appropriately for the context
* Confidently identify and use knowledge of factor pairs and multiples
* Investigate prime numbers and prime factors
* Confidently recognize and use knowledge of square and cube numbers – writing them accurately.
* Use multiplication and division to solve problems including scaling up and scaling down (e.g. by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of 1000 in converting between units such as kilometers and metres.)
* Begin to apply increasing knowledge and understanding of factors, multiples, squares and cubes to solving problems. Solve multi-step problems involving all four operations or a combination of these.
 | * Multiply numbers up to 4 digits by a noe or two digit number using a formal written method, including long multiplication for two-digit numbers
* Multiply and divide numbers mentally drawing upon known facts
* Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
* Begin to use and apply known facts to use a chunking strategy for division of up to four digit numbers by a one or two-digit number
* Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.
* Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
* Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
* Establish whether a number up to 100 is prime and recall prime numbers up to 19
* Recognise and use square numbers and cube numbers, and notation for squared (2) and cubed (3)
* Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
* Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
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| **Key questions:*** Can I confidently recall multiplication and division facts for multiplication tables up to 12 x 12?
* Can I use and apply known facts to work out other calculations that are not explicitly in the tables up to 12 x 12 (e.g. 14 x 7, 15 x 9)?
* Can I Use known facts to solve multiplication and division problems mentally where appropriate?
* Can I recognize and use knowledge of multiples and factor pairs?
* Can I use a grid method to multiply a two and three digit x one digit number, and two digit by two digit number?
* Can I use and apply division facts to solve division calculations using the short written method for two and three digit numbers x 1 digit – including with remainders)?
* Can I multiply and divide whole numbers and those involving decimals by 10, 100 and 1000?
* Can I use known strategies confidently to solve problems involving multiplication and division, including explaining remainders appropriately for the context?
* Can I solve simple multi-step problems involving all four operations or a combination of these?
 | **Key questions:*** Can I use and understand the formal written layout of short multiplication (two or three digit numbers multiplied by by a one-digit number?
* Can I use and understand the formal written layout for long multiplication, using 2 and three digit numbers?
* Can I divide numbers up to 4 digits by a one-digit number using the efficient written method of short division and interpret remainders appropriately for the context?
* Can I identify and use knowledge of factor pairs and multiples?
* Can I explain what a prime number is?
* Can I explain square numbers and record them correctly?
* Can I explain cube numbers and record them correctly?
* Can I use multiplication and division to solve problems including scaling up and scaling down (e.g. by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of 1000 in converting between units such as kilometers and metres.)
* Can I solve simple multi-step problems involving all four operations or a combination of these?
 | **Key questions:*** Can I 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?
* Can I multiply and divide numbers mentally drawing upon known facts where appropriate?
* Can I divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context?
* Can I multiply and divide whole numbers and those involving decimals by 10, 100 and 1000?
* Can I identify multiples and factors, including finding all factor pairs of a number, and common factor pairs of two numbers?
* Can I confidently use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers?
* Can I establish whether a number up to 100 is prime and recall prime numbers up to 19?
* Can I recognize and use square numbers and cube numbers, and the correct notation for both?
* Can I solve problems involving multiplication and division, including using knowledge of factors and multiples, squares and cubes?
* Can I solve problems involving addition and subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign?
* Can I solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates?
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