

# Unit overview: Multiplication & Division – Year 1

## National Curriculum requirements

By the end of the year, the children will be able 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.

## Vocabulary

- number / digit
- multiplication / multiply / times
- division / divide
- equally
- group / groups of
- share
- array
- equal to

## Manipulatives

- counters
- dienes
- interlocking cubes
- toys

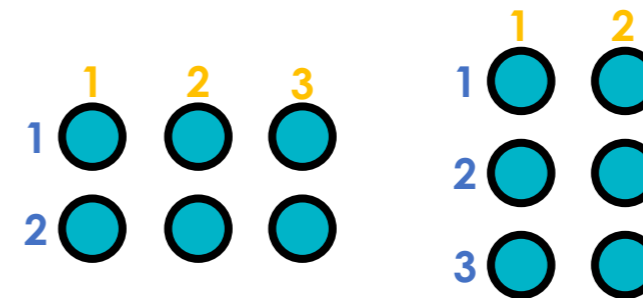
## Visual representations

$$\boxed{2} \times \boxed{3} = \boxed{6}$$

multiplicand      multiplier      product

$$\boxed{6} \div \boxed{2} = \boxed{3}$$

dividend      divisor      quotient



## Sentence stems

The multiplicand is \_\_\_\_\_.

The multiplier is \_\_\_\_\_.

The product is \_\_\_\_\_.

The dividend is \_\_\_\_\_.

The divisor is \_\_\_\_\_.

The quotient is \_\_\_\_\_.

There are \_\_\_\_\_ groups of \_\_\_\_\_

\_\_\_\_\_ times \_\_\_\_\_ is equal to \_\_\_\_\_.

\_\_\_\_\_ multiplied by \_\_\_\_\_ is equal to \_\_\_\_\_.

When I share \_\_\_\_\_ equally into \_\_\_\_\_ groups, each group has \_\_\_\_\_

\_\_\_\_\_ divided by \_\_\_\_\_ is equal to \_\_\_\_\_.

## Learning sequence

- understand the words multiplication and multiply
- understand that multiplication is the same as repeatedly adding the same number
- use concrete objects to demonstrate and describe the multiplication process and its results
- use pictures to show how to multiply (linked to concrete materials)
- understand the words division / divide
- use concrete objects to demonstrate and describe the division process and its results
- use pictures to show how to divide (linked to concrete materials)
- understand and interpret an array
- use arrays to solve multiplication and division problems
- explore the ways in which multiplication and division are connected

# Unit overview: Multiplication & Division – Year 2



## National Curriculum requirements

By the end of the year, the children will be able 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 ( $\times$ ), division ( $\div$ ) 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.

## Vocabulary

- number / digit
- multiplication / multiply / times
- multiplicand / multiplier / product
- division / divide
- dividend / divisor / quotient
- equally
- group / groups of
- share
- array
- equal to

## Manipulatives

- counters
- dienes
- place value counters
- interlocking cubes
- place value slider white boards
- number lines

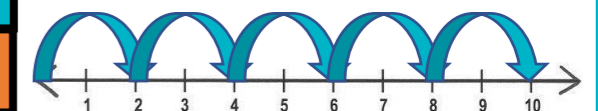
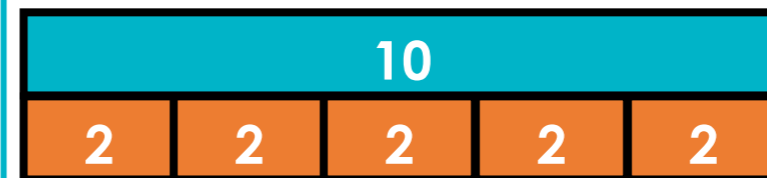
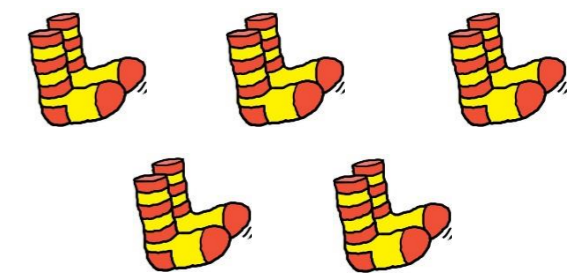
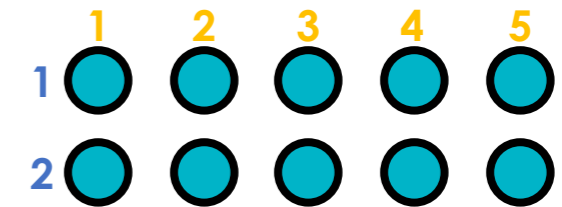
## Visual representations

$$\boxed{2} \times \boxed{5} = \boxed{10}$$

multiplicand      multiplier      product

$$\boxed{10} \div \boxed{5} = \boxed{2}$$

dividend      divisor      quotient



## Sentence stems

The multiplicand is \_\_\_\_.

The dividend is \_\_\_\_.

The multiplier is \_\_\_\_.

The divisor is \_\_\_\_.

The product is \_\_\_\_.

The quotient is \_\_\_\_.

There are \_\_\_\_ groups of \_\_\_\_

\_\_\_\_ times \_\_\_\_ is equal to \_\_\_\_.

\_\_\_\_ multiplied by \_\_\_\_ is equal to \_\_\_\_.

When I share \_\_\_\_ equally into \_\_\_\_ groups, each group has \_\_\_\_

\_\_\_\_ divided by \_\_\_\_ is equal to \_\_\_\_.

## Learning sequence

- identify and use the multiplication, division and equals signs
- complete calculations by inserting missing signs
- identify and describe patterns in the 1, 2, 5, and 10 times tables
- recognise if a two digit number is multiple of 2, 5, or 10
- recognise and give examples of odd and even numbers
- express a multiplication problem as repeated addition, e.g. on a number line, and use this information to solve a problem
- use arrays to solve multiplication problems
- demonstrate that multiplication is commutative (the multiplicand and multiplier are interchangeable)
- demonstrate that multiplication and division are inverse operations and give corresponding multiplication/division facts
- use arrays to solve division problems (sharing and grouping)
- perform divisions using the same numbers to show that different results are obtained (demonstrating that division is not commutative)
- solve multiplication and division problems in context

# Unit overview: Multiplication & Division – Year 3

## National Curriculum requirements

By the end of the year, the children will be able 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 positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

## Vocabulary

- number / digit
- multiplication / multiply / times
- multiplicand / multiplier / product
- multiple
- inverse operation
- division / divide
- dividend / divisor / quotient
- equally
- group / groups of
- share
- array
- equal to

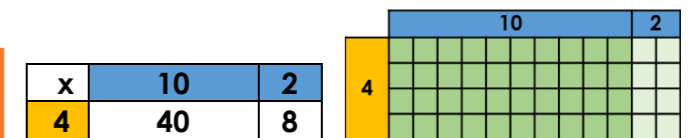
## Manipulatives

- dienes
- place value counters
- place value charts
- place value slider white boards
- number lines

## Visual representations

$$\boxed{12} \times \boxed{4} = \boxed{48}$$

multiplicand multiplier product

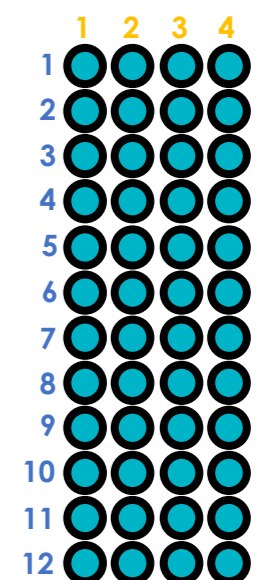
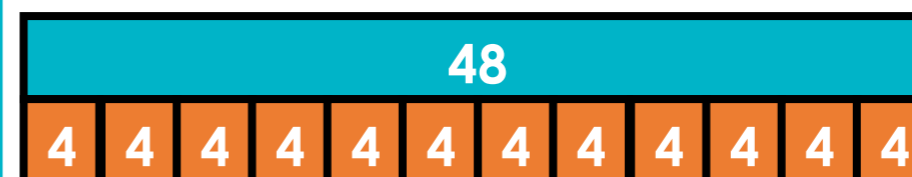


$$40 + 8 = 48$$

$$\boxed{48} \div \boxed{4} = \boxed{12}$$

dividend divisor quotient

$$4 \overline{) 48}$$



## Sentence stems

The multiplicand is \_\_\_\_.

The dividend is \_\_\_\_.

The multiplier is \_\_\_\_.

The divisor is \_\_\_\_.

The product is \_\_\_\_.

The quotient is \_\_\_\_.

\_\_\_\_ is commutative; \_\_\_\_ is not commutative.

There are \_\_\_\_ groups of \_\_\_\_

\_\_\_\_ times \_\_\_\_ is equal to \_\_\_\_.

\_\_\_\_ multiplied by \_\_\_\_ is equal to \_\_\_\_.

When I share \_\_\_\_ equally into \_\_\_\_ groups, each group has \_\_\_\_

\_\_\_\_ divided by \_\_\_\_ is equal to \_\_\_\_.

## Learning sequence

- times tables practise (Term 1: 2, 3, 4, 5, 10; Term 2: 6, 8, 11; Term 3: 7, 9, 12)
  - through doubling, they connect the 2, 4 and 8 multiplication tables; the 5 and 10 multiplication tables; the 6 and 12 multiplication tables
- describe the link between multiplication and division; using times tables facts for division
- make the link between multiplication as repeated addition and scaling, e.g.  $4 \times 3$  as four groups of three children, giving a total of 12 children and/or one boat is 4m long and another boat is three times the length, meaning it is 12m long.
- using times table facts, e.g.  $12 \times 4 = 48$ , therefore  $12 \times 40 = 480$  and  $48 \div 4 = 12$  therefore  $480 \div 4 = 120$
- combine multiplication facts, e.g.  $18 \times 6 = (10 \times 6) + (8 \times 6) = 60 + 48 = 108$
- make the link between arrays and grid multiplication
- use the expanded column method of multiplication; progressing to the formal written method if appropriate
  - two-digit multiplicand and a one digit multiplier
- make the link between arrays and chunking
- progress to the formal written method of division if appropriate

# Unit overview: Multiplication & Division – Year 4

## National Curriculum requirements

By the end of the year, the children will be able to:

- recall multiplication and division facts for multiplication tables up to  $12 \times 12$
- 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.

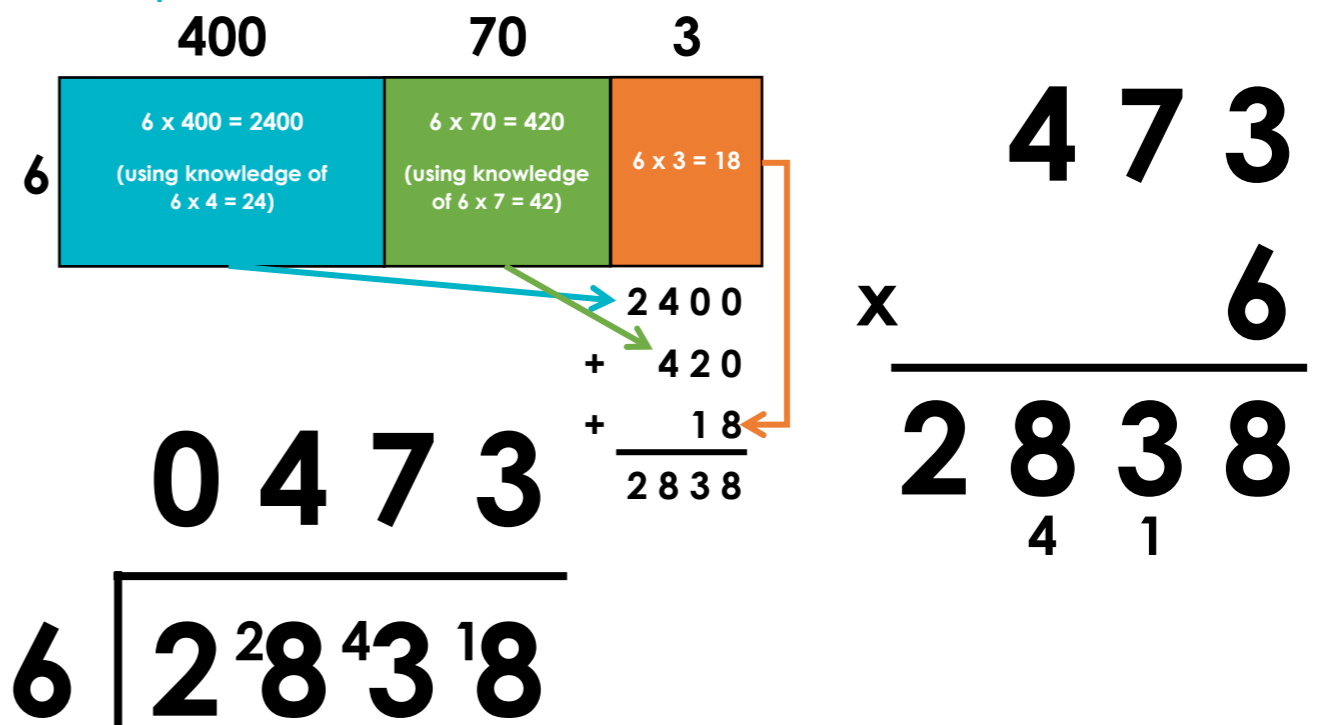
## Vocabulary

- number / digit
- multiplication / multiply / times
- multiplicand / multiplier / product
- multiple
- inverse operation
- division / divide
- dividend / divisor / quotient
- equally
- group / groups of
- share
- array
- equal to

## Manipulatives

- dienes
- place value counters
- place value charts
- place value slider white boards
- number lines

## Visual representations



The visual representations show the distributive law for multiplication. A grid is divided into three columns representing 400, 70, and 3. The multiplier 6 is on the left. The products are  $6 \times 400 = 2400$  (using knowledge of  $6 \times 4 = 24$ ),  $6 \times 70 = 420$  (using knowledge of  $6 \times 7 = 42$ ), and  $6 \times 3 = 18$ . These are added to get 2400 + 420 + 18 = 2838. To the right, a formal written multiplication shows 473 multiplied by 6, with the result 2838 and a carry of 41.

## Sentence stems

The multiplicand is \_\_\_\_\_. The dividend is \_\_\_\_\_.  
 The multiplier is \_\_\_\_\_. The divisor is \_\_\_\_\_.  
 The product is \_\_\_\_\_. The quotient is \_\_\_\_\_.

\_\_\_\_\_ is commutative; \_\_\_\_\_ is not commutative.

There are \_\_\_\_\_ groups of \_\_\_\_\_  
 \_\_\_\_\_ times \_\_\_\_\_ is equal to \_\_\_\_\_.  
 \_\_\_\_\_ multiplied by \_\_\_\_\_ is equal to \_\_\_\_\_.

When I share \_\_\_\_\_ equally into \_\_\_\_\_ groups, each group has \_\_\_\_\_  
 \_\_\_\_\_ divided by \_\_\_\_\_ is equal to \_\_\_\_\_.

## Learning sequence

- times tables practice (all times tables up to  $12 \times 12$ ), including corresponding division facts
- identify factors and use to solve mental multiplication and division problems
- practise mental methods and extend this to three-digit numbers to derive facts, for example  $600 \div 3 = 200$  can be derived from  $2 \times 3 = 6$
- use times tables knowledge to solve number problems, including multiplying together three numbers
- explore the relationship between multiplication and division
  - use multiplication facts to solve a division problem
  - use division facts to solve a multiplication problem
- prove that multiplication is commutative, but division is not
- practise to become fluent in the formal written method of short multiplication and short division with exact answers
  - two-digit multiplicand and a one digit multiplier
  - three-digit multiplicand and a one digit multiplier
- write statements about the equality of expressions, for example, use the distributive law  $39 \times 7 = 30 \times 7 + 9 \times 7$  and associative law  $(2 \times 3) \times 4 = 2 \times (3 \times 4)$
- combine knowledge of number facts and rules of arithmetic to solve mental and written calculations, for example:  $2 \times 6 \times 5 = 10 \times 6 = 60$
- solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the numbers of choices of a meal on a menu, or three cakes shared equally between 10 children.



# Unit overview: Multiplication & Division – Year 5

## National Curriculum requirements

By the end of the year, the children will be able to:

- 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
- 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 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
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.

## Visual representations

**Square numbers:**  
 $4^2 = 4 \times 4 = 16$

**Cube numbers:**  
 $4^3 = 4 \times 4 \times 4 = 64$

**Prime numbers:**

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

**Factor pairs:**

1 x	6				
2 x	3	3			
3 x	2	2	2		
6 x	1	1	1	1	1

**Visual representations:**

0 4 7 9 r4

$6 \overline{) 2^2 8^4 7^5 8}$

$4^2 = 4 \times 4 = 16$

$4^3 = 4 \times 4 \times 4 = 64$

**Multiplication:**

	Th	H	T	O		
	7	4	1	6		
X			2	3		
<hr/>						
	2	2	2	4	8	
		1		1		
	1	4	8	3	2	0
			1			
<hr/>						
	1	7	0	5	6	8
		1				

## Sentence stems

The multiplicand is \_\_\_\_\_. The dividend is \_\_\_\_\_.

The multiplier is \_\_\_\_\_. The divisor is \_\_\_\_\_.

The product is \_\_\_\_\_. The quotient is \_\_\_\_\_.

\_\_\_\_\_ is commutative; \_\_\_\_\_ is not commutative.

I know that \_\_\_\_\_ is a prime number because \_\_\_\_\_

I know that \_\_\_\_\_ is a composite number because \_\_\_\_\_

\_\_\_\_\_ squared is equal to \_\_\_\_\_

The square root of \_\_\_\_\_ is \_\_\_\_\_

## Vocabulary

- multiplication / multiply / times
- multiplicand / multiplier / product
- multiple / factor
- inverse operation
- division / divide
- dividend / divisor / quotient
- equal to
- prime number
- square / cubed number

## Manipulatives

- dienes
- place value counters
- place value charts
- place value slider white boards
- number lines

## Learning sequence

- times tables practice (all times tables up to  $12 \times 12$ ), including corresponding division facts
- multiply and divide by 10, 100 and 1000, including decimal numbers
- identify multiples of a given number
- find all factors of given number, including all factor pairs
- find common multiples of two numbers
- understand and use the vocabulary of prime numbers
- understand and use the vocabulary of composite numbers
- establish if a number up to 100 is prime; recall prime numbers up to 19
- investigate and recognise square numbers; use this knowledge to solve problems
- investigate and recognise cube numbers; use this knowledge to solve problems
- grid / area method of multiplication (see Year 4 visual representation)
  - two digits x one digit; three digits x one digit; four digits x one digit
  - two digits x two digits; three digits x two digits; four digits x two digits
- long multiplication (expanded column method)
  - two digits x one digit; three digits x one digit; four digits x one digit
  - two digits x two digits; three digits x two digits; four digits x two digits
- formal written method of multiplication (column method)
- formal written method of short division, including remainders

# Unit overview: Multiplication & Division – Year 6

## National Curriculum requirements

By the end of the year, the children will be able to:

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations
- solve problems involving addition, subtraction, multiplication and division
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

## Sentence stems

The multiplicand is \_\_\_\_\_. The dividend is \_\_\_\_\_.

The multiplier is \_\_\_\_\_. The divisor is \_\_\_\_\_.

The product is \_\_\_\_\_. The quotient is \_\_\_\_\_.

The remainder is \_\_\_\_\_.

\_\_\_\_\_ is commutative; \_\_\_\_\_ is not commutative.

If I know that \_\_\_\_\_ then I know that \_\_\_\_\_

I know that \_\_\_\_\_ is a prime number because \_\_\_\_\_

I know that \_\_\_\_\_ is a composite number because \_\_\_\_\_

The common factors are \_\_\_\_\_

\_\_\_\_\_ squared is equal to \_\_\_\_\_

The square root of \_\_\_\_\_ is \_\_\_\_\_

## Manipulatives

- dienes
- place value counters
- place value charts
- place value slider white boards
- number lines

## Vocabulary

- multiplication / multiply / times
- multiplicand / multiplier / product
- multiple / factor
- inverse operation
- division / divide
- dividend / divisor / quotient
- remainder
- known facts
- equal to
- prime number
- square / cubed number
- estimate

## Visual representations

In a supermarket, a bag of five apples costs £1.80; a bag of four oranges also costs £1.80. What is the difference in price between one apple and one orange?

£1.80				
?				

£1.80				
?				

$$£1.80 = 180p$$

$$180p \div 5 = 36p$$

$$180p \div 4 = 45p$$

$$45p - 36p = 9p$$

One orange is 9p more expensive than one apple.

17	$\begin{array}{r} 0169r5 \\ \hline 2878 \\ -17 \\ \hline 117 \\ -102 \\ \hline 158 \\ -153 \\ \hline 5 \end{array}$	$1 \times 17 = 17$ $2 \times 17 = 34$ $3 \times 17 = 51$ $4 \times 17 = 68$ $5 \times 17 = 85$ $6 \times 17 = 102$ $7 \times 17 = 119$ $8 \times 17 = 136$ $9 \times 17 = 153$
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## Learning sequence

- multiply large numbers mentally using known facts, e.g.  $6000 \times 800$  using the knowledge of  $6 \times 8$
- divide large numbers mentally using known facts, e.g.  $56000 \div 700$  using the knowledge of  $56 \div 7$
- use estimation for the solution to a calculation, based on known facts
- identify common factors, common multiples and prime numbers
- use the formal written method to multiply a four-digit number by a two-digit number (including decimal numbers)
- revise short division using a single digit divisor
- short division with a two-digit divisor (no remainders)
- short division with remainders
- interpreting remainders as fractions and/or decimals (rounding where necessary)
- long division with a single-digit divisor
  - no remainder
  - with a remainder: interpret the remainder as fractions and/or decimals
- long division with a two-digit divisor
  - no remainder
  - with a remainder: interpret the remainder as fractions and/or decimals
- use their knowledge of the order of operations to carry out calculations involving the four operations