UKS2 Calculation Policy

Concrete, Pictorial, Abstract Approach

One of the key principles behind the Singapore Maths approach and Maths Mastery is based on the concrete, pictorial, abstract approach. This approach identifies three steps (or representations) that are necessary for pupils to develop an understanding of different concepts.

1. Concrete Representation

Pupils are first introduced to an idea or skill using real objects. In division, for example, this might be done by separating apples amongst children. This is a 'hands on' approach and all classrooms have a wide range of practical resources available for pupils to use.

2. Pictorial Representation

Pupils are encouraged to relate their concrete understanding to pictorial representations. These representations may be a diagram or a picture of the Mathematical problem.

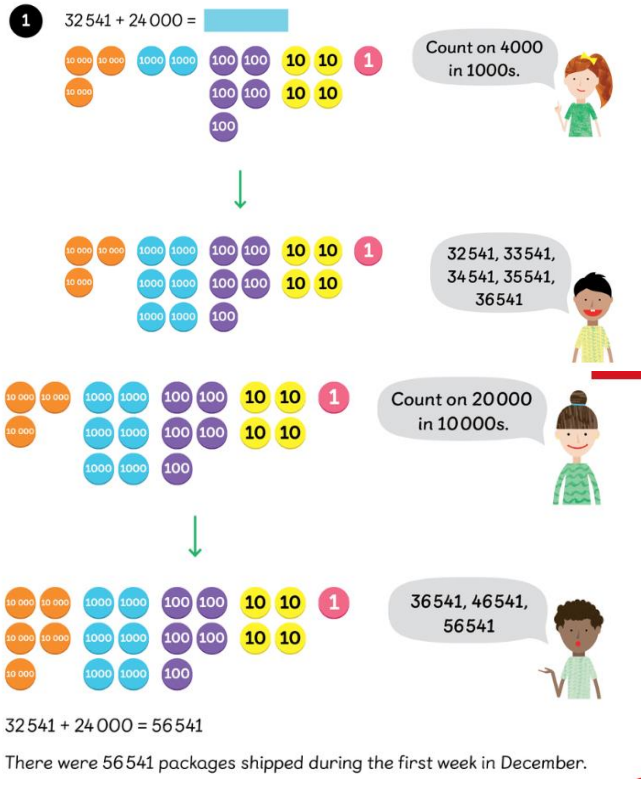
3. Abstract Representation

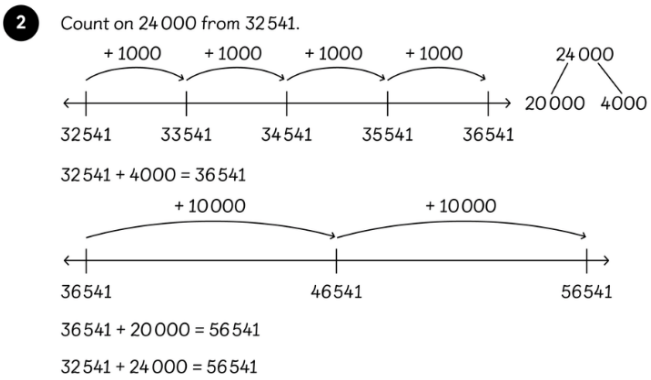
This is the symbolic stage – the pupils use Mathematical symbols to represent problems, for example 12 x 2 = 24. Whilst this Calculation Policy aims to show the Concrete / Pictorial / Abstract approach to the different calculations, it is not always noted further up the year groups. However, it is expected that the Concrete / Pictorial / Abstract approach is used continuously in all new learning and calculations, even when not noted.

Year 5 - Addition
Jersey Curriculum for Mathematics – Statutory Requirements for Year 5: Number – Addition and Subtraction Pupils should be taught to: • Add and subtract whole numbers with more than 4 digits, including using written methods (column addition and subtraction). • Add and subtract numbers mentally with increasingly large numbers. • Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy. • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
Key Vocabulary efficient written method, add, addition, more, plus, increase, sum, total, altogether, score, tens boundary, hundreds boundary, thousands boundary, units boundary, tenths boundary, inverse.

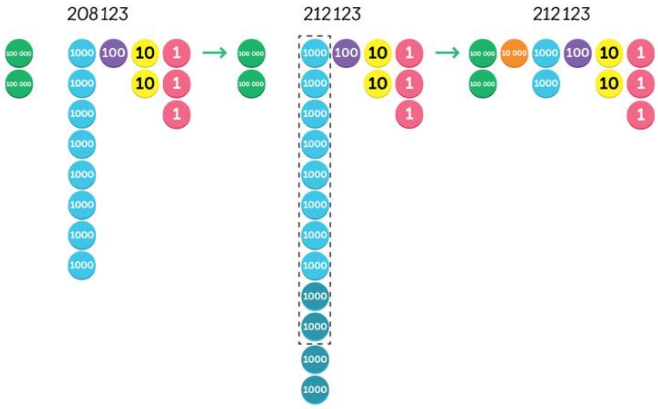
In Year 5, pupils will be exploring addition of numbers to 1 000 000. They will begin the unit by using simple strategies to add, such as counting on. They will then focus on adding within 1 000 000. Pupils will use multiple key methods, such as the column method and number bonds to add numbers. Pupils will have access to concrete materials throughout, improving their visualisation and mental skills.

Method 1 – Addition by counting on





3 Add 4000 to 208 123.
Start at 208 123. Count on in 1000s.



208 123 + 4000 = ☐

Method 2 – Addition using the column method

1

```
  1
  1 5  0 0 0
+ 1 7  0 0 0
  3 2  0 0 0
```

5 thousands + 7 thousands = 12 thousands
12 thousands = 1 ten thousand + 2 thousands

15 000 + 17 000 = 32 000

The approximate total number of spectators at these events was 32 000.

2 The actual number of spectators was 15 473 and 16 524.

15 473 + 16 524 = ☐

Add the ones.

```
  1 5  4 7 3
+ 1 6  5 2 4
         7
```

3 ones + 4 ones = 7 ones

Add the tens.

```
  1 5  4 7 3
+ 1 6  5 2 4
       9 7
```

7 tens + 2 tens = 9 tens

Add the hundreds.

```
  1 5  4 7 3
+ 1 6  5 2 4
     9 9 7
```

4 hundreds + 5 hundreds = 9 hundreds

Add the thousands.

```
  1
  1 5  4 7 3
+ 1 6  5 2 4
    1 9 9 7
```

5 thousands + 6 thousands = 11 thousands

11 thousands = 1 ten thousand + 1 thousand

Add the ten thousands.

```
  1
  1 5  4 7 3
+ 1 6  5 2 4
  3 1  9 9 7
```

Is this close to the approximate total?

Mental Strategies

- Add numbers mentally with increasingly large numbers (eg: 10,162 + 2300 = 12,462).
- Mentally add tenths (eg: 0.2 + 0.6 = 0.8) and one-digit numbers and tenths (eg: 8 + 0.3 = 8.3).
- Use number bonds to one hundred knowledge to calculate complements to one using hundredths (eg: 0.83 + 0.17 = 1).
- Use rounding to check answers to calculation and determine, in the context of a problem, levels of accuracy.

Year 5 - Subtraction

Jersey Curriculum for Mathematics – Statutory Requirements for Year 5: Number – Addition and Subtraction

Pupils should be taught to:

- Add and subtract whole numbers with more than 4 digits, including using written methods (column addition and subtraction).
- Add and subtract numbers mentally with increasingly large numbers.
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Key Vocabulary

efficient written method, subtract, subtraction, minus, decrease, difference between inverse, decimals, units and tenths boundary, column subtraction, exchange.

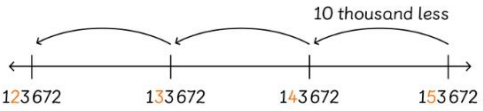
In Year 5, pupils will be exploring subtraction of numbers to 1 000 000. They will use simple strategies to subtract, such as counting back. Pupils will then focus on subtracting within 1 000 000. Pupils will use multiple key methods, such as the column method and number bonds to subtract numbers. Pupils will have access to concrete materials throughout, improving their visualisation and mental skills.

Method 1 – Subtraction by counting back

1 Count back 300 000 from 453 672.

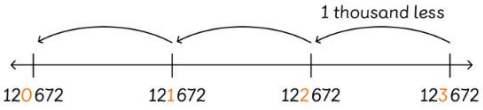
453 672 − 300 000 = ☐

Count back 30 000 from 153 672.



153 672 − 30 000 = ☐

Count back 3000 from 123 672.

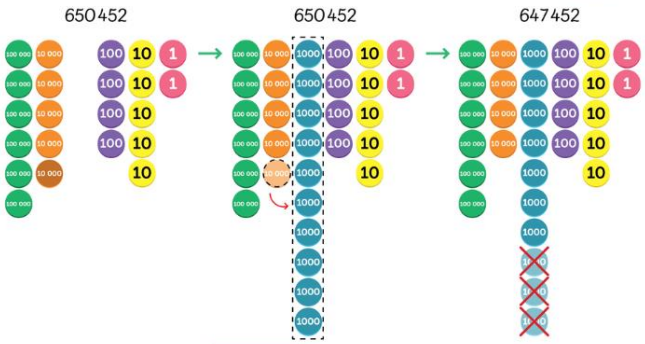


123 672 − 3000 = ☐

2

Mr Nightingale has £120 672 left in his bank account.

3 Subtract 3000 from 650 452.
Start at 650 452. Count back by 1000s.



650 452 − 3000 = ☐

4 Count back in 100s.

650 452, 650 352, ☐ , ☐

650 452 − 300 = ☐

5 Count back in 10s.

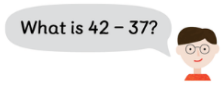
650 452, 650 442, ☐ , ☐

650 452 − 30 = ☐

[Method 2 – Subtraction using the column method]

1 Subtract the number of runners in the two cities to compare them.

$$\begin{array}{r} 42\,270 \\ -\,37\,000 \\ \hline \square\square\,270 \end{array}$$



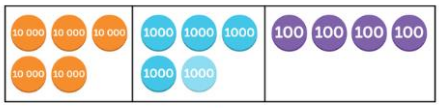
42 270 – 37 000 = ☐

There were ☐ more runners in the London marathon than in the Boston marathon.

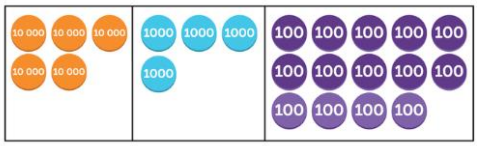
Find the difference between the number of runners in the New York City marathon and the Rome marathon.

Subtract the hundreds.

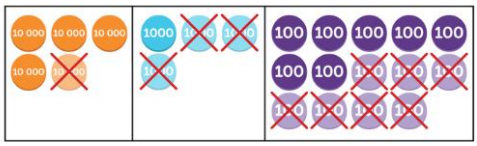
55 400 – 13 700 = ☐



Rename 1 thousand as 10 hundreds.



Subtract 7 hundreds from 14 hundreds.



$$\begin{array}{r} {\scriptstyle 4}\ {\scriptstyle 14} \\ 5\,\not{5}\ \not{4}\,00 \\ -\,13\ 7\,00 \\ \hline 7\,00 \end{array}$$

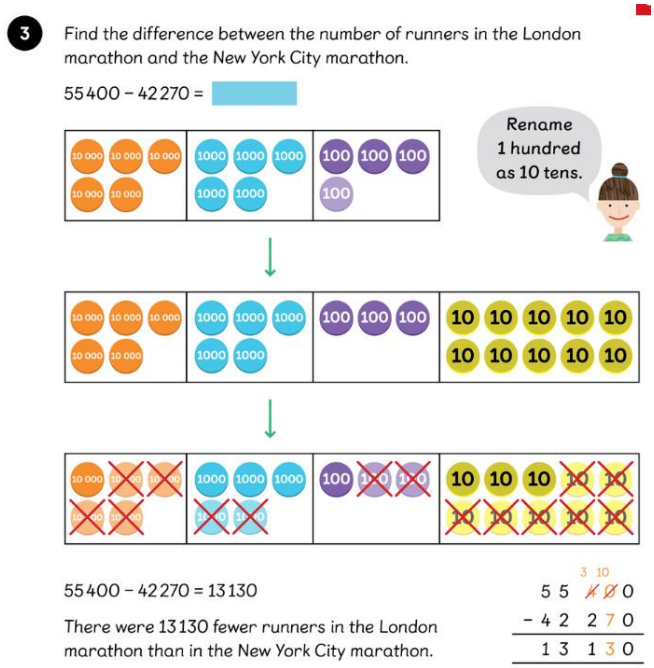
Subtract the thousands.

$$\begin{array}{r} {\scriptstyle 4}\ {\scriptstyle 14} \\ 5\,\not{5}\ \not{4}\,00 \\ -\,13\ 7\,00 \\ \hline 1\ 7\,00 \end{array}$$

Subtract the ten thousands.

$$\begin{array}{r} {\scriptstyle 4}\ {\scriptstyle 14} \\ 5\,\not{5}\ \not{4}\,00 \\ -\,13\ 7\,00 \\ \hline 41\ 7\,00 \end{array}$$

There were 41 700 more runners in the New York City marathon than in the Rome marathon.



Mental Strategies

- Subtract increasingly large numbers mentally (eg: 12,654 – 1,341 = 11,213).
- Mentally subtract tenths (eg: 0.7 – 0.5 = 0.2) and one-digit whole numbers and tenths (eg: 8 – 0.3 = 7.7).
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.

Year 5 - Multiplication

Jersey Curriculum for Mathematics – Statutory Requirements for Year 5: Number – Multiplication and Division

Pupils should be taught 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 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 a written method of division and interpret remainders appropriately for the context. Use a calculator to reinforce results.
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.

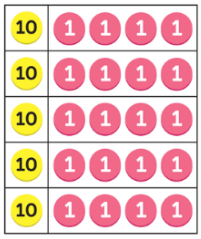
Key Vocabulary

composite numbers, prime number, prime factor, cube number, square number, derive, factor pairs, formal written method, times, multiply, multiplied by, multiple of, product, short multiplication, partition, long multiplication, scaling, decimal place, units, tenths and hundreds.

In Year 5, pupils are taught to multiply 3- and 4-digit numbers by single- and double-digit numbers. Pupils are taught to find and define multiples and factors and common factors. Pupils work with prime numbers and determine what makes a number prime or composite. Pupils work with square and cube numbers before moving on to multiplying by 10, 100 and 1000. When multiplying, pupils are encouraged to use a variety of methods, including number bonds, column methods and the grid method. Number bonds are used to represent multiplicative word problems. Pupils then move on to multiply by 2-digit numbers before beginning to divide by 10, 100 and 1000.

Method 1 – Multiplication using the column method

1 £14 × 5 = ☐



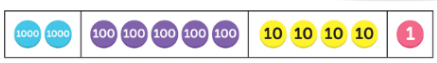
$$\begin{array}{rl} 1\ 4 & \\ \times\ \ 5 & \\ \hline 2\ 0 & \longrightarrow 5 \times\ \ 4 = 20 \\ +\ 5\ 0 & \longrightarrow 5 \times 10 = 50 \\ \hline 7\ 0 & \longrightarrow 5 \times 14 = 70 \end{array}$$

4 An adult membership to the golf course costs £356 for the year. How much would it cost for five adults to each buy a membership for one year?

$$\begin{array}{rl} 3\ 5\ 6 & \\ \times\ \ \ \ 5 & \\ \hline 3\ 0 & \longrightarrow 5 \times\ \ 6 = \ \ 30 \\ 2\ 5\ 0 & \longrightarrow 5 \times\ \ 50 = \ 250 \\ +\ 1\ 5\ 0\ 0 & \longrightarrow 5 \times 300 = 1500 \\ \hline 1\ 7\ 8\ 0 & \quad 5 \times 356 = 1780 \end{array}$$

It would cost £1780 for five adults to each buy a membership for one year.

2541 × 3 = ☐



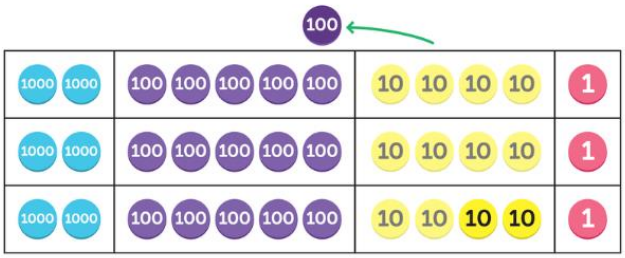
25 hundreds × 3 = 75 hundreds

$$\begin{array}{rl} 3 \times \ \ \ 1 = & \ \ 3 \\ 3 \times \ \ 40 = & 120 \\ 3 \times \ 500 = & 1500 \\ 3 \times 2000 = & 6000 \\ \hline 3 \times 2541 = & 7623 \end{array}$$

$$\begin{array}{rl} 3 \times 1 \text{ one} = & 3 \text{ ones} \\ 3 \times 4 \text{ tens} = & 12 \text{ tens} \\ 3 \times 5 \text{ hundreds} = & 15 \text{ hundreds} \\ 3 \times 2 \text{ thousands} = & 6 \text{ thousands} \end{array}$$

Amira's dad needs to order 7623 tiles.

Is the answer close to the estimate?

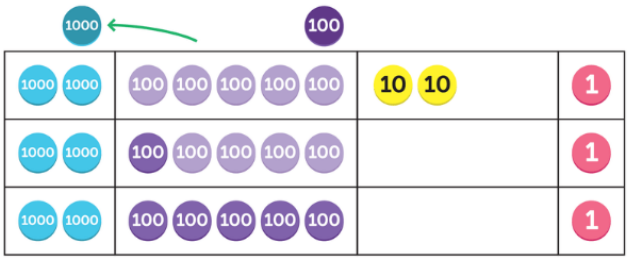


Step 1 Multiply the ones.

$$\begin{array}{r} 2\,5\,4\,1 \\ \times \quad\quad 3 \\ \hline \quad\quad\quad 3 \end{array}$$

Step 2 Multiply the tens.

$$\begin{array}{r} {\scriptstyle 1}\quad\quad\quad \\ 2\,5\,4\,1 \\ \times \quad\quad 3 \\ \hline \quad\quad 2\,3 \end{array}$$



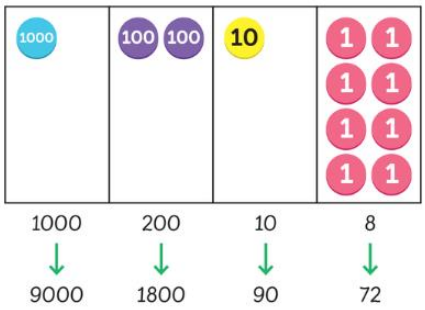
Step 3 Multiply the hundreds.

$$\begin{array}{r} {\scriptstyle 1\ 1}\quad\quad\quad \\ 2\,5\,4\,1 \\ \times \quad\quad 3 \\ \hline \quad\quad 6\,2\,3 \end{array}$$

Step 4 Multiply the thousands.

$$\begin{array}{r} {\scriptstyle 1\ 1}\quad\quad\quad \\ 2\,5\,4\,1 \\ \times \quad\quad 3 \\ \hline \quad 7\,6\,2\,3 \end{array}$$

$1218 \times 9 =$ ▭

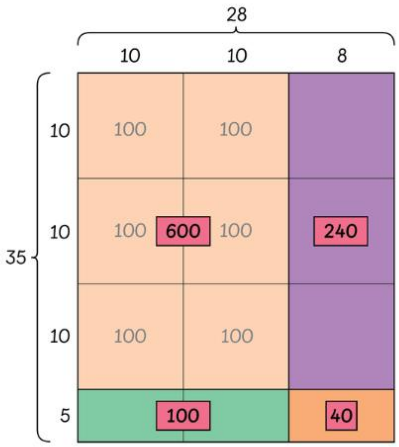


$1000 \times 9 = 9000$
$200 \times 9 = 1800$
$10 \times 9 = 90$
$8 \times 9 = 72$
$1218 \times 9 = 10\,962$

The total mass of the 9 cars is 10 962 kg.

[Method 2 – Multiplication using the grid method]

1 $35 \times 28 =$ ▭



$30 \times 20 = 600$
$30 \times 8 = 240$
$30 \times 28 = 840$

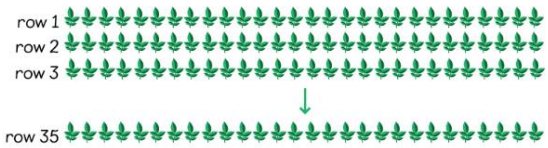
$5 \times 20 = 100$
$5 \times 8 = 40$
$5 \times 28 = 140$

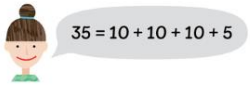
$840 + 140 = 980$
$35 \times 28 = 980$

There are 980 potato plants.

2 There are 35 rows and each row has 28 potato plants.

$35 \times 28 =$ ▭

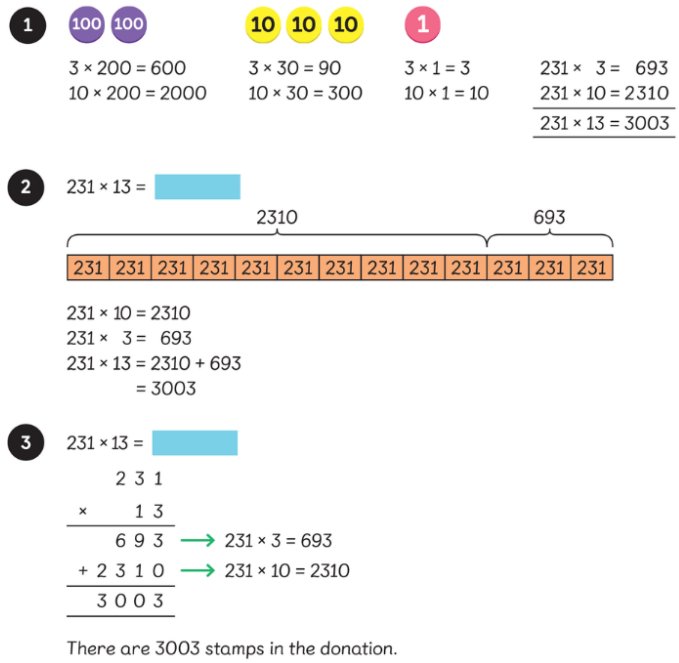




$10 \times 28 = 280$
$10 \times 28 = 280$
$10 \times 28 = 280$
$5 \times 28 = 140$
$35 \times 28 = 980$

There are 980 potato plants.

[Method 3 – Multiplication using bar models]



Mental Strategies

- Recognise and calculate factor pairs for any number.
- Use times table knowledge to derive multiples of any number.
- Establish whether a number is a prime number (up to 100) or a composite number and recall prime numbers up to 19.
- To know what a square number is and recall all square numbers up to and including 144.
- To know what a cube number is and recall the first five cube numbers.

Year 5 – Division

Jersey Curriculum for Mathematics – Statutory Requirements for Year 5: Number – Multiplication and Division

Pupils should be taught 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 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 a written method of division and interpret remainders appropriately for the context. Use a calculator to reinforce results.
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.

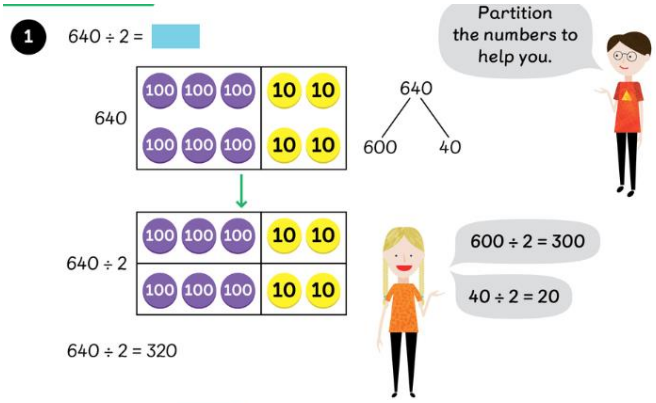
Key Vocabulary

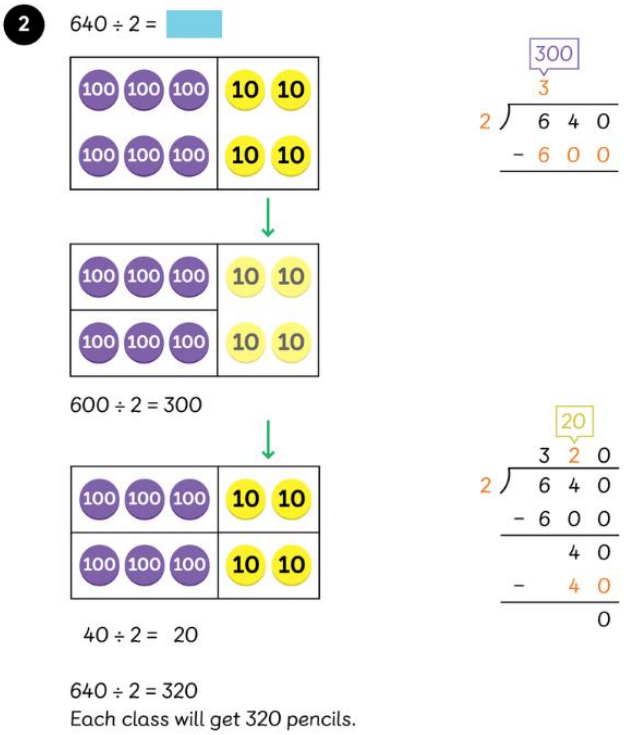
divide, divided by, divided into, divisible by, remainder, quotient, inverse, factor, decimal place, units, tenths, scaling, short division

In Year 5, pupils are taught to divide 3- and 4-digit numbers by single-digit numbers. Pupils are first taught to divide by 10, 100 and 1000. Next, they are taught to divide divide 3- and 4-digit numbers by single-digit numbers without remainders and are encouraged to use a variety of methods, including number bonds and long division. Pupils then move on to divide 3- and 4-digit numbers by single-digit numbers with remainders. They are encouraged to use a variety of methods, including number bonds, short division and bar models.

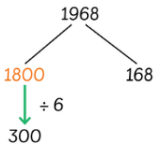
Method 1 –Division using number bonds and long division

Dividing without a remainder



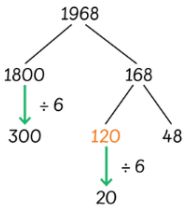


1 1968 ÷ 6 = ☐

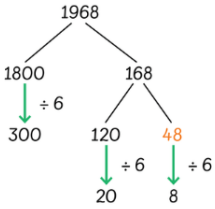


Look for multiples of 6.

18 hundreds ÷ 6 = 3 hundreds
1800 ÷ 6 = 300



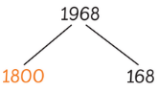
12 tens ÷ 6 = 2 tens
120 ÷ 6 = 20



48 ones ÷ 6 = 8 ones
48 ÷ 6 = 8

1968 ÷ 6 = 328

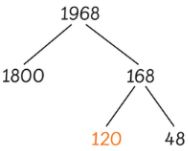
2 1968 ÷ 6 = ☐



300

$$\begin{array}{r} 3 \\ 6\overline{)\,1\,9\,6\,8} \\ -\,1\,8\,0\,0 \end{array}$$

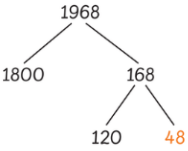
1800 ÷ 6 = ☐



20

$$\begin{array}{r} 3\,2 \\ 6\overline{)\,1\,9\,6\,8} \\ -\,1\,8\,0\,0 \\ \hline 1\,6\,8 \\ -\,\,1\,2\,0 \end{array}$$

120 ÷ 6 = ☐



$$\begin{array}{r} 3\,2\,8 \\ 6\overline{)\,1\,9\,6\,8} \\ -\,1\,8\,0\,0 \\ \hline 1\,6\,8 \\ -\,\,1\,2\,0 \\ \hline 4\,8 \\ -\,\,4\,8 \\ \hline 0 \end{array}$$

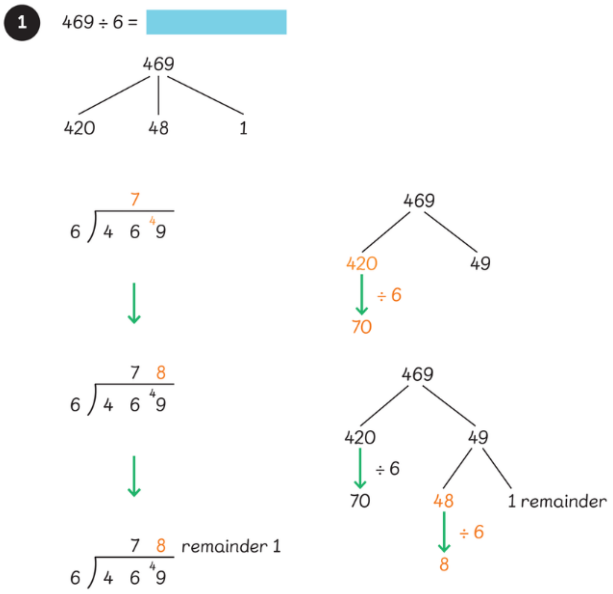
48 ÷ 6 = ☐

1968 ÷ 6 = 328

Each of the charities received £328.

Method 2 – Division using the short division method with number bonds

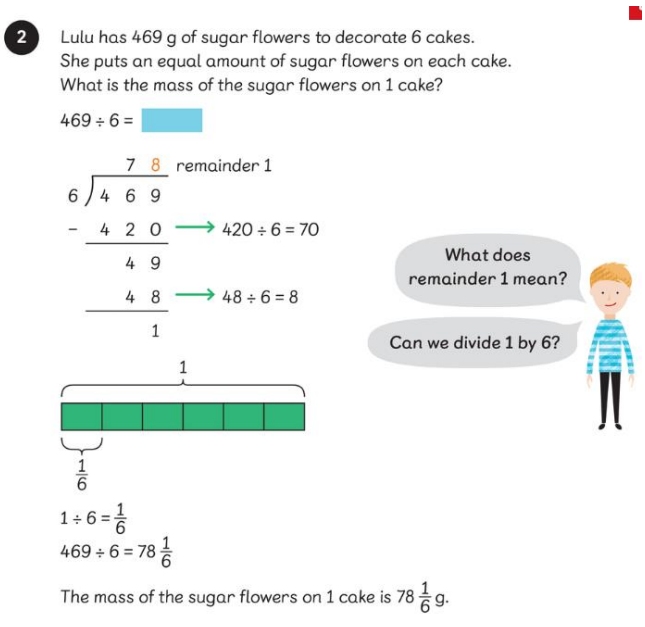
Dividing with remainders



78 full boxes are packed by the end of each day.
There will be 1 watermelon left unpacked.

Method 3 – Division using bar models

Dividing with remainders



Mental Strategies

- Multiply and divide numbers mentally drawing upon known facts.
- Associate fractions with division.

Year 6 – Order of Operations

Jersey Curriculum for Mathematics – Statutory Requirements for Year 6: Number – Addition, Subtraction, Multiplication and Division

Pupils should be taught to:

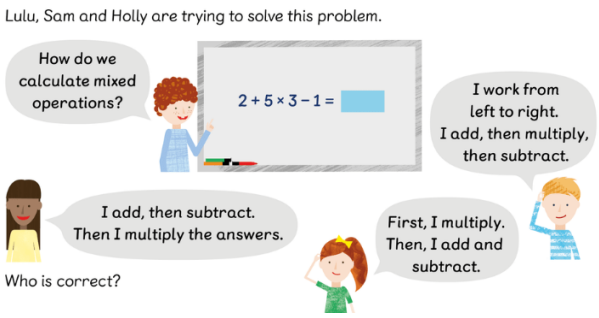
- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using a written method of multiplication.
- Divide numbers up to 4 digits by a two-digit whole number using a written method of division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.
- Perform mental calculations, including with mixed operations and large number.
- 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 addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
- 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.

Key Vocabulary

order of operations, column addition, add, in total, answer, tens boundary, hundreds boundary, thousands boundary, millions boundary, units boundary, tenths boundary, hundredths boundary, decimal place, inverse, BODMAS, Triangle of Truth.

In Year 6, pupils will use previous methods taught to solve addition problems. Pupils will be exploring the four operations, in combination and in isolation. They will solve expressions involving brackets, exponents, multiplication, division, addition and subtraction. **Addition and Subtraction are not explicitly taught and are intertwined within Order of Operations.**

Using mixed operations - without brackets



1 First, multiply or divide, working from left to right. Then, add or subtract, working from left to right.

Does it matter if I subtract the 1 before adding the 2?

$2 + 5 \times 3 - 1$

$= 2 + 15 - 1$

$= 17 - 1$

$= 16$

Holly is correct.

2 Calculate $12 + 30 \div 5 \times 4$.

$12 + 30 \div 5 \times 4$

$= 12 + 6 \times 4$

$= 12 + 24$

$= 36$

When there are mixed operations, always multiply or divide first.

Calculate from left to right.

Using mixed operations - with brackets

Ruby and Charles are working on 2 equations.

Both solutions are the same.

$15 - 4 \times 3 =$ ☐

$(15 - 4) \times 3 =$ ☐

I think they are different.

How can they solve the equations?

1 $15 - 4 \times 3 =$ ☐

$15 - 4 \times 3 = 15 - 12$

$= 3$

$15 - 4 \times 3 = 3$

Follow the order of operations. Multiply, then subtract.

2 $(15 - 4) \times 3 =$ ☐

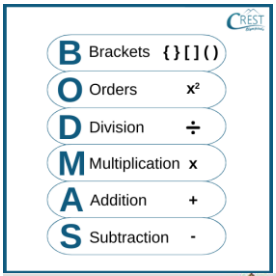
$(15 - 4) \times 3 = 11 \times 3$

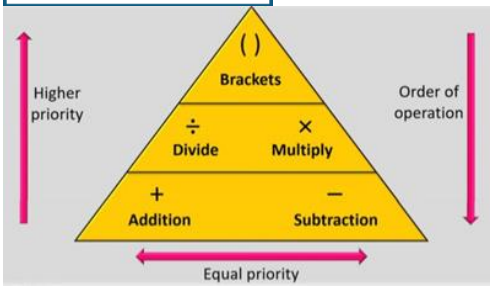
$= 33$

$(15 - 4) \times 3 = 33$

Complete the calculation in the ( ) first. Then, multiply.

BODMAS / Triangle of Truth





Mental Strategies

- Add numbers mentally with increasingly large numbers (eg: 10,162 + 2,300 = 12,462).
- Add decimal numbers mentally (up to two decimal places).
- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

Year 6 - Multiplication

Jersey Curriculum for Mathematics – Statutory Requirements for Year 6: Number – Addition, Subtraction, Multiplication and Division

Pupils should be taught to:

- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using a written method of multiplication.
- Divide numbers up to 4 digits by a two-digit whole number using a written method of division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for 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 addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
- 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.

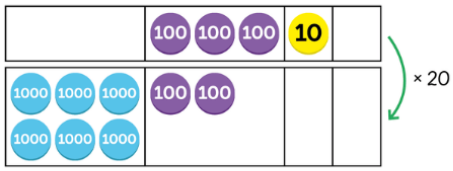
Key Vocabulary

common factors, multiples, prime, formal written method, multiply, product, multiplied by, multiple of, product, short and long multiplication, partition, scaling, decimal place, units, tenths and hundredths.

In Year 6, pupils are taught to Multiply multi-digit numbers up to 4 digits by a two-digit whole number using a written method of multiplication. Pupils are taught to find and define common multiples and factors. Pupils work with prime numbers and determine what makes a number prime or composite. Pupils will also work with square and cube numbers. When multiplying, pupils are encouraged to use a variety of methods they have used in the past, however, are encouraged to use partitioning and the column method of multiplication.

Method 1 – Multiplication using partitioning and column method

1 310 × 20 = ☐



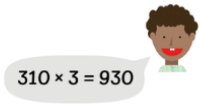
310 × 20 = 6200

2 310 × 23 = ☐

th	h	t	o
	3	1	0
3	1	0	0

× 10

310 × 10 = 3100
310 × 20 = 6200
310 × 23 = 6200 + 930
= 7130



3 310 × 23 = ☐

	3	1	0	
×		2	3	
	9	3	0	→ 310 × 3 = 930
+ 6	2	0	0	→ 310 × 20 = 6200
7	1	3	0	→ 310 × 23 = 7130

There are 7130 question cards in 23 sets of the game.

4 Find the product of 1310 and 23.

	1	3	1	0
×			2	3
	3	9	3	0 → 1310 × 3 = 3930
+ 2	6	2	0	0 → 1310 × 20 = 26200
☐				→ 1310 × 23 = ☐

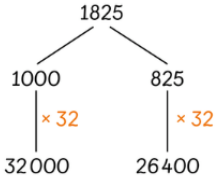
1 825 kg × 16 = ☐

		$^{1}8$	$^{3}2$	5	
×				1	6
	4	9	5	0	→ 825 × 6 = 4950
+	8	2	5	0	→ 825 × 10 = 8250
1	3	2	0	0	→ 825 × 16 = 13200

The keeper prepares 13200 kg of food for the elephants over 16 weeks.

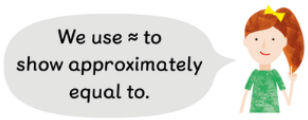
4 1825 × 32 = ☐

1825 × 32 = 32000 + 26400
= 58400



1 Estimate the product of 28 and 1229.

$28 \times 1229 \approx 30 \times 1000$
$= 30\,000$



2 $28 \times 1229 =$ ☐

$$\begin{array}{r} {}^{1}{}^{2}{}^{7}1229 \\ \times \quad\quad 8 \\ \hline 9832 \end{array} \qquad \begin{array}{r} 1229 \\ \times \quad\quad 20 \\ \hline 24580 \end{array}$$

$28 \times 1229 = 9832 + 24\,580$
$= 34\,412$

Mental Strategies

- Use scaling to solve decimal number problems as whole number problems using the rule the number of decimal digits in the question is the same as the number of decimal digits in the answer.
- Identify common factors, common multiples and prime numbers.
- Use common factors to simplify fractions mentally.
- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

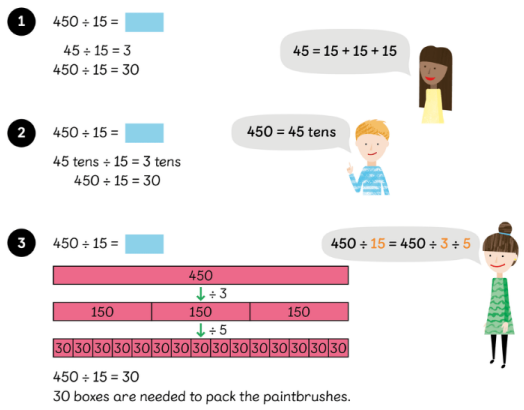
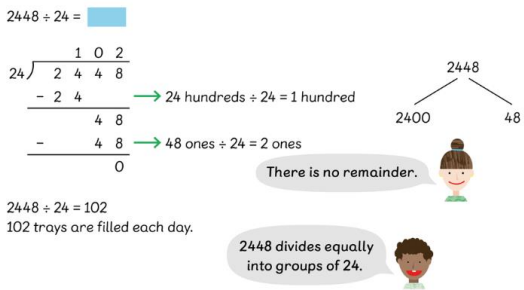
Year 6 – Division

Jersey Curriculum for Mathematics – Statutory Requirements for Year 6: Number – Addition, Subtraction, Multiplication and Division

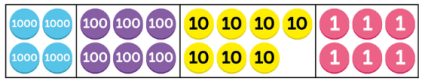
Pupils should be taught to:

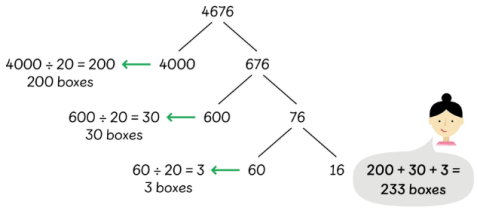
- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using a written method of multiplication.
- Divide numbers up to 4 digits by a two-digit whole number using a written method of division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for 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 addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
- 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.

Key Vocabulary

divide, divided by, divided into, divisible by, remainder, factor, quotient, inverse, decimal place, units, tenths, hundredths, formal written methods , HMS↓ (How many?, Multiply, Subtract, Bringdown).
In Year 6, pupils are taught to numbers up to 4 digits by a two-digit whole number using a written method of division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. Pupils are encouraged to use a variety of methods, including bar models, place value, partitioning, long division and short division. Method 1 – Division using bar models and place value      Method 2 – Division using long division and partitioning   

1 4676 ÷ 20 = ☐





4676 ÷ 20 = 233 remainder 16
The machine can pack 233 boxes of 20 pens with 16 pens left over.

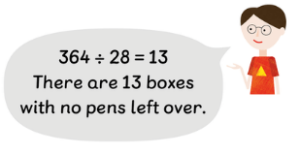
2 4676 ÷ 28 = ☐

```
      1
28 ) 4 6 7 6
   - 2 8          → 28 hundreds ÷ 28 = 1 hundred
     ↓
      1 6
28 ) 4 6 7 6
   - 2 8          → 28 hundreds ÷ 28 = 1 hundred
     1 8 7
   - 1 6 8        → 168 tens ÷ 28 = 6 tens
     ↓
      1 6 7
28 ) 4 6 7 6
   - 2 8          → 28 hundreds ÷ 28 = 1 hundred
     1 8 7
   - 1 6 8        → 168 tens ÷ 28 = 6 tens
       1 9 6
   -   1 9 6      → 196 ones ÷ 28 = 7 ones
         0
```

Method 3 – Division using the short division method

3 Can the machine pack 364 pens into boxes of 28?

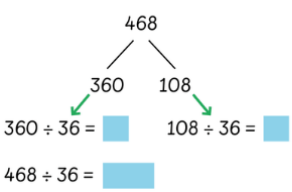
```
      1   → 280 ÷ 28 = 10
28 ) 3 6 8 4

      1 3 → 84 ÷ 28 = 3
28 ) 3 6 8 4
```



All 3 Methods

1 Charles used three different methods to calculate 468 ÷ 36.

Method 1



Method 2

```
      ☐☐
36 ) 4 6 8
   - 3 6
     1 0 8
   - 1 0 8
         0
```

Method 3

```
      ☐☐
36 ) 4 6 10 8
```

All 3 Methods – with remainders

1 581 ÷ 18 = ☐

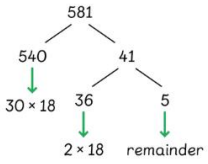
```
      3  2   remainder 5
18 ) 5  8  1
   - 5  4   → 3 tens × 18 = 54 tens
   ------
      4  1
   -  3  6   → 2 ones × 18 = 36 ones
   ------
         5
```

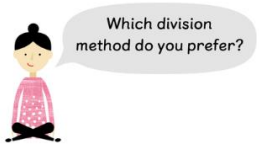
581 ÷ 18 = 32 remainder 5

Each classroom will receive 32 rulers.
The remaining 5 rulers will be kept in the school office.

2 Ruby worked out the division this way.

```
      3  2   remainder 5
18 ) 5  8 ⁴1
```





Mental Strategies

- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.
- Calculate a fraction of an amount.