

<p><b>Links to prior learning/ objectives</b></p> <p>~ Understanding of strategies for addition, subtraction, multiplication and division.</p> <p>~ Multiplication facts up to 12 x 12.</p> <p>~ Awareness of how to multiply and divide by 10, 100 and 1000.</p> <p>~ Factors and multiples.</p> <p>~ Using manipulatives to demonstrate mathematical concepts.</p> <p>~ Mental strategies for calculation.</p> <p>~ Understanding of units of measure and the conversion facts between them.</p> <p>~ Knowledge of money and how to calculate with money.</p> <p>~ Understanding of decimal place and how to read amounts that have decimal places.</p>	<p><b>Resources</b></p> <p>Base ten, place value counters, place value sliders, money, measuring equipment, multiplication table.</p> <p><b>Mastery:</b> (where to find some resources)</p> <ul style="list-style-type: none"> <li>• Teaching for Mastery</li> <li>• White Rose <b>New and old documents</b></li> <li>• Mastery maths stickers</li> <li>• Nrich (curriculum mapping)</li> </ul>	<p><b>Vocabulary:</b></p> <p>Multiplication, multiply, formal method, long multiplication, multiplication facts, multiples.</p> <p>Division, divide, formal method, bus shelter, short division, multiplication facts, remainder, decimal, fraction, context.</p> <p>Place value, multiplying, dividing, decimals, left, right, larger, smaller, convert, conversion, metric, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and milliliter</p> <p>Approximate, metric, imperial, conversion, inches, pounds, pints, equivalence</p> <p>Addition, subtraction, multiplication, division, add, sum, subtract, difference, multiply, times, divide, share, altogether, total, equals, +, -, X, ÷, =, multi-step, interpret, explain, justify</p> <p>Money, decimal notation, place value, scaling.</p>
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**Objectives and Teaching**

<p><b>Week 1</b></p> <p><b>Barriers to ARE (misconceptions)</b></p> <p>Multiplication facts may be missing.</p> <p>Lack of place value understanding may lead to lining the digits up incorrectly and miscalculating.</p> <p>Addition skills may lead to inaccuracy when combing the multiplication of the ones and the tens answer.</p> <p>Children may not understand the need for the 0 when multiplying each digit by the tens digit.</p>	<p>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</p> <ul style="list-style-type: none"> <li>• To know how to multiply a 4-digit number by a 1-digit number.</li> <li>• To know how to multiply a 2-digit number by a 2-digit number.</li> <li>• To understand how to multiply a 2-digit number by a 2-digit number.</li> <li>• To know how to multiply a 3-digit number by a 2-digit number.</li> <li>• To know how to multiply a 4-digit number by a 2-digit number.</li> </ul>
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<b>Fluency</b>	<b>Reasoning</b>	<b>Problem solving</b>
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Complete the calculation.

TH	H	T	O
1	0	2	3
x			3

Write the multiplication calculation represented and find the answer.

TH	H	T	O
1	0	2	3
x			3

Remember if there are ten or more counters in a column, make an exchange.

Sam earns £1,325 per week.  
How much would he earn in 4 weeks?

TH	H	T	O
1	3	2	5
x			4

Use the place value counters to solve the problem.

Joshua uses the Base 10 to solve  $23 \times 22$

Step 1 - build the length and the width using the multiplication calculation

$23 \times 22 =$

Step 2 - Multiply the length by the width

$23 \times 22 =$

Step 3 - Find the total of your area

$23 \times 22 =$

Use Base 10 to solve  $32 \times 24$ ,  $25 \times 31$ ,  $34 \times 23$

Sammy adapts the Base 10 method to solve  $44 \times 32$

Step 1 - build the length and the width using the multiplication calculation

$44 \times 32 =$

30	40	4
2		

Step 2 - Multiply the length by the width

$44 \times 32 =$

30	40	4
2		

Step 3 - Find the total of your area

$44 \times 32 =$

30	1200	120
2	80	8

1200  
120  
+ 80  
+ 8  
1400

Use place value counters and a grid to solve  $45 \times 42$ ,  $52 \times 24$ ,  $34 \times 43$

Megan worked out the answer to  $1,432 \times 4$

Here is her answer:

TH	H	T	O
1	4	3	2
x			4
4	16	12	8

$$1,432 \times 4 = 416,128$$

Can you explain what Megan has done wrong?

Tabby says,

"If I multiply  $23 \times 57$ , I can just do these calculations,  $20 \times 50$  and  $3 \times 7$  and then add the totals."

Do you agree? Convince me!

Farmer Joe has a field that measures 53 m long by 25 m wide.

Farmer Sally has a field that measures 52 m long by 24 m wide.

Max thinks they will have the same area because the numbers have only changed by one digit each.

Do you agree? Prove it!

Can you work out the missing numbers using the clues?

				6
x				

- The 4 digits being multiplied by 6 are consecutive numbers.
- The first 2 digits of the answer are the same.
- The 4th and 5th digits in the answer add to make the 3rd.

Ryan hasn't finished his calculation. Can you complete the missing information and record his calculation with an answer?

	40	2
40		
6		

<p>Week 2 Multiplication knowledge may be poor, so they may struggle to use this to support division. Children may not understand what a remainder is and how it can relate to the context of the problem. Children may not have the place knowledge understanding to know that after a whole number is .000 etc which will be necessary when interpreting a remainder as a decimal. Children may struggle to identify what happens to the remainder when a divisor doesn't fit exactly into a digit that is within the whole number. Children may only pass a single reminder on rather than the whole amount that is left e.g. <math>68 \div 4</math> – there is one 4 within 6 and two left over so the 8 ones become 28 ones.</p>	<p>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</p> <ul style="list-style-type: none"> <li>• To know how to use a formal method of division.</li> <li>• To understand how to use a formal method of division.</li> <li>• To know how to interpret remainders as a fraction.</li> <li>• To know how to interpret remainders as decimals.</li> <li>• To understand how to interpret remainders appropriately for the context.</li> </ul>	
<p style="text-align: center;"><b>Fluency</b></p>	<p style="text-align: center;"><b>Reasoning</b></p> <p>Sam is working out 2,240 divided by 7 He says you can't do it because 7 is larger than all of the digits in the number.</p> <p>Do you agree with Sam? Explain your answer.</p>	<p style="text-align: center;"><b>Problem solving</b></p> <p>I am thinking of a three-digit number.</p> <ul style="list-style-type: none"> <li>• When it is divided by 9, the remainder is 3.</li> <li>• When it is divided by 2, the remainder is 1.</li> <li>• When it is divided by 5, the remainder is 4.</li> </ul> <p>What is my number?</p>

Here is a method to solve 4,892 divided by 4 using place value counters and short division.

Use this method to solve the following questions.

6,610 ÷ 5      2,472 ÷ 3      9,360 ÷ 4

Mr Porter has saved £8,934 pounds.  
He shares it between his three grandchildren.  
How much does each grandchild receive?

Use < > or = to compare the statements

3,495 ÷ 5 ○ 3,495 ÷ 3

8,064 ÷ 7 ○ 9,198 ÷ 9

7,428 ÷ 4 ○ 5,685 ÷ 5

**Spot the mistake.**  
Explain and correct the working.

$$\begin{array}{r} 3101 \\ 3 \overline{) 9414} \end{array}$$

765 ÷ 4 = 191 remainder 1  
876 ÷ 5 = 175 remainder 1

Does a three-digit number descending in digits divided by the next descending digit always have remainder 1?

Prove your answer.

**Week 3**  
Children may struggle with their place value understanding and the fact that our number system works on a base ten system.  
Children may struggle to recognise that when dividing an amount will decrease in size whereas when multiplying an amount will increase in size.  
Children may not know the conversion facts between units of measure.  
Children may not understand what a unit of measure is.

- ~ Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.  
~ Convert between different units of metric measure (for example, millilite and metre; milliliter and metre; millilitre and millilitre; gram and kilogram; litre and milliliter.
- To know how to multiply and divide by 10,100 and 1000.
  - To understand how to multiply and divide by 10,100 and 1000.
  - To know the relationship between units of measure.
  - To develop the skill of converting between units of measure.
  - To understand how to convert between units of measure.

**Fluency**

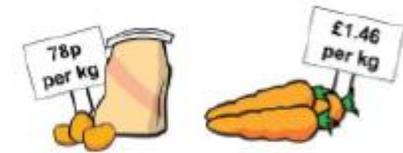
**Reasoning**

**Problem Solving**

## Spring 2 Year 5



Laura buys 3,500 grams of potatoes and 1,500 grams of carrots. [Drive](#)



She pays with a £5 note.  
How much change does she get?

Cola is sold in bottles and cans.



Yasmin buys 5 cans and 3 bottles.  
She sells the cola in 100 ml glasses.  
She sells all the cola.  
How many glasses does she sell?

Yasmin charges 50p per glass.  
How much profit does she make?

Complete the conversions.

1,000 metres = 1 kilometre  
2,000 m = \_\_\_\_ km  
20,000 g = \_\_\_\_ kg  
200 m = \_\_\_\_ km  
2,200 g = \_\_\_\_ kg

1,000 grams = 1 kilogram  
\_\_\_\_ m = 5 km  
\_\_\_\_ g = 15 kg  
500 g = \_\_\_\_ kg  
\_\_\_\_ m = 1.5 km

Complete the missing information

$\frac{1}{10}$  kilogram = \_\_\_\_ grams       $\frac{3}{10}$  km = \_\_\_\_ metres

$7 \text{ kg} + \frac{1}{4} \text{ kg} =$  \_\_\_\_ g       $12 \text{ km} +$  \_\_\_\_ km = 12,500 m

Compare the measurements using <, > or =

5 kg  4,500 g      12 kg  12,000 g

3.7 km  370 m      37,000 m  3.7 km

Complete the conversions.

1,000 mm = 1 m  
5,000 mm = \_\_\_\_ m  
50,000 mm = \_\_\_\_ m  
500 mm = \_\_\_\_ m  
5,500 mm = \_\_\_\_ m

1,000 ml = 1 l  
\_\_\_\_ ml = 3 l  
\_\_\_\_ ml = 30 l  
300 ml = \_\_\_\_ l  
\_\_\_\_ ml = 0.3 l

Complete the missing information

$\frac{1}{1,000}$  m = \_\_\_\_ mm       $\frac{1}{100}$  m = \_\_\_\_ mm       $\frac{1}{10}$  m = \_\_\_\_ mm

$3 \text{ l} + \frac{1}{4} \text{ l} =$  \_\_\_\_ ml       $2 \text{ l} +$  \_\_\_\_ ml = 2,500 ml

Compare the measurements using <, > or =

2 l  1,500 ml      60 l  6,000 ml

2.8 m  280 mm      3,700 m  3.7 mm

Tiegan is converting measurements.  
She says:

'I have divided by 1,000 to convert the measurements.'

Which conversions could Tiegan have completed?

- 3 km  $\longrightarrow$  3,000 m
- 3,000 m  $\longrightarrow$  3 km
- 5,500 g  $\longrightarrow$  5.5 kg
- 2.8 kg  $\longrightarrow$  2,800 g

Ribbon is sold in 200 mm pieces.  
Georgie buys 4 metres of ribbon.  
How many pieces does she buy?

Ribbon costs 26 p per piece.  
There are 2 special offers on the ribbon.

Five pieces for the price of four.

1 metre of ribbon for only £1

Which is the best offer?  
Explain your answer.



### Spring 2 Year 5

Measure the height of the piles of books in centimetres.



Find the difference between the tallest and shortest pile of books in millimetres.

Line A is 5 centimetres long.  
Line B is 54 millimetres longer than line A.  
Draw line A and line B.

Here are the heights of 4 people.

Jim 194 cm	Tess 175 cm	Lui 180 cm	Paul 205 cm
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Write the heights in metres.  
Can you write the heights in millimetres?

A 10 pence coin is 2 mm thick.

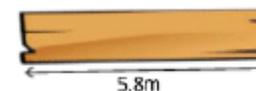


Daniel makes a pile of 10 pence coins worth £1.30  
What is the height of the pile of coins in centimetres?

Kim says;  
'One metre is 100 times bigger than one centimetre. One centimetre is 10 times bigger than one millimetre. So, one metre is 110 times bigger than one millimetre.'

Is Kim correct?  
Explain your answer.

A plank of wood is 5.8 metres long.

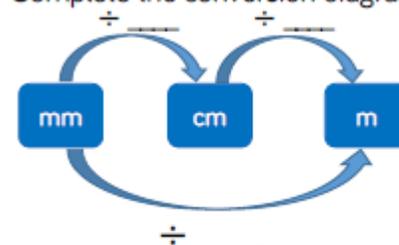


Two lengths are cut from the wood.



How much of the wood is left?

Complete the conversion diagram.



Can you make a diagram to show the inverse of multiplying?

#### Week 4

Children may not understand what a unit of measure is.

Children may not know the conversion facts between units of measure.

Children may not understand the terminology of metric and imperial.

Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints.

- To know what imperial measure are.
- To know how to find equivalences between metric and imperial units.
- To develop the skill of finding equivalences between metric and imperial units.
- To understand how to find equivalences between metric and imperial units.

**Fluency**

**Reasoning**

**Problem Solving**



### Spring 2 Year 5

One inch is approximately 2.54 centimetres

1 inch  $\approx$  2.54 cm

Use this information to complete the table.

Imperial	Metric
10 inches	
	50.8 cm
	5 m 8 cm
400 inches	

1 kilogram is approximately 2.2 pounds

1 kg  $\approx$  2.2 lbs

Use this information to complete the conversions.

2 kg  $\approx$  \_\_\_ lbs

5 kg  $\approx$  \_\_\_ lbs

\_\_\_ kg  $\approx$  22 lbs

55 kg  $\approx$  \_\_\_ lbs

There are 568 millilitres in a pint.

How many millilitres are there in:

■ 10 pints

■ 5 pints

■ 0.5 pints

■ 2.5 pints

Kate and Saira weigh 185 lbs.

Saira and Lucy weigh 186 lbs.

Kate and Lucy weigh 201 lbs.

How much do Kate, Saira and Lucy weigh altogether?

Convert your answer into kilograms.

Jeni has two children, Owen and Caitlin.

- Owen weighed 8.8 lbs when he was born.
- Caitlin weighed 3.5 kg when she was born.

Who was heavier, Owen or Caitlin? Explain your answer.

A milkman delivers milk, 4 times a week. On each delivery day, he delivers three pints of milk to the doctors' surgery. How many millilitres of milk does the surgery have delivered each week?



Week 5

Children may have inaccuracy when completing calculations.

Children may have a limited recall of multiplication facts.

Place value understanding may result in inaccuracy when organising and using formal methods.

Same as week 1 and 2.

Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign

- To know the meaning of the equal sign.
- To understand the meaning of the equal sign.
- To know how to interpret a problem.
- To develop the skill of interpreting problems.
- To understand how to interpret problems.

**Fluency**

**Reasoning**

**Problem Solving**



### Spring 2 Year 5

<p>I have 84 marbles. I keep 19 for myself and share the rest between 5 of my friends. How many marbles will each friend get?</p> <p>There are 7 tubes of tennis balls each with 6 balls in and a box of 31 balls. How many balls are there altogether?</p> <p>I read 25 pages of a book each day for 5 days and 78 pages over the weekend. How many pages do I read over the week?</p> <p>I have 47 trading cards. I buy 7 new cards each week. How many cards will I have in 8 weeks' time?</p> <p>A cinema has 4 screens each with 60 seats. There are 195 people in the cinema. How many empty seats are there?</p>	<p>Complete the number sentences using the same number in both boxes.</p> $24 + \square = \square \times 4$ $24 \div \square = \square - 2$ <p>Using the number cards 1 – 9 and the four operations how many ways can you make 100? You must use each of the number cards once but can you use the four operations as many times as you like.</p> <p>Use four operations in the number sentences below to balance each side of the equals sign.</p> $21 \square 3 = 12 \square 6$ $21 \square 3 = 12 \square 5$ $21 \square 3 = 12 \square 2$ <p>What's the same and what's different about each of the number sentences?</p>	<p>Sally bought five tickets to watch a game of football with her friends. The tickets were numbered in order. When the numbers are added together, they total 110. What were the ticket numbers?</p>
<p>Week 6 Same as above. Understanding of what a decimal place represents and they may have a limited understanding of money/measure and how to record them with decimal notation.</p>	<p>Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.</p> <ul style="list-style-type: none"> <li>• To know how to interpret a problem involving measure.</li> <li>• To develop the skill of interpreting a problem involving measure.</li> <li>• To understand how to interpret a problem involving measure.</li> </ul>	

Children may not have the multiplication knowledge to support scaling and struggle see the relationship between two shapes that have been scaled.

- To know how to solve problems involving scaling.
- To understand how to solve problems involving scaling.

### Fluency

A shop sold 6 bottles of water for £2.89.  
Each bottle was 1.5L.  
She bought 27L of water. How much money did she spend?

The flight from London to Alicante is 1465km the flight from Manchester is 289km longer.  
How long is the flight from Manchester to Alicante?

A family of four spent £1517.56 on a holiday.  
If split equally, how much would it cost each person?

Raisins are £1.45 for a packet.  
I have £10 to spend on raisins.  
What is the highest number of packets I can buy?

### Reasoning

These are being measured.  
What unit of measurement should they be measured in.  
Explain why.

Glass of milk 

Walking up 25 steps 

The distance from Edinburgh to Cornwall



Annie is adding up these mass values:  
1kg + 343g + 700g  
She does this calculation:

$$\begin{array}{r} 100 \\ 343 \\ + 700 \\ \hline 1143 \end{array}$$

Explain her mistake.

### Problem Solving

James is making buns for his friend's birthday. He finds a recipe on the internet for 20 people.

The ingredients he needs are:  
200g caster sugar  
200g butter  
5 eggs  
200g self-raising flour  
2.5g baking powder  
15ml milk

He only wants to make 12.  
Write the list of ingredients with the amount he needs of each item.

These lemons and limes are sold in a bag in a local shop.

 6 lemons  
520g  
£1.00

 12 limes  
900g  
£2.40

Work out the price and weight of a single lemon and a single lime.