Year 5 Teacher Edition	KEY LESSON ★	★	• is a key lesson
	COMBINED |⊢⊣| |⊢⊣| • can be combined with other lessons in the chapter
	INTEGRATED ⌐+	⌐+	• can be integrated with lessons from other year groups
	INDEPENDENT 🔖	🔖	• can be tackled independently
	NON-STATUTORY ⊖	⊖	• non statutory

Ready to Progress?

Above each unit is a copy of the Ready to Progress Criteria.

Access Maths Guidance for hyperlinks to teacher guidance, assessment questions & supporting materials, inc PowerPoints for pre-teaching & interventions.

Hyperlink to teacher guidance: https://www.gov.uk/government/publications/teaching-mathematics-in-primary-schools

Hyperlink to supporting resources (for intervention/pre-teaching): https://www.ncetm.org.uk/classroom-resources/exemplification-of-ready-to-progress-criteria/

Hyperlink to NCETM curriculum planning support: https://www.ncetm.org.uk/classroom-resources/cp-year-5-curriculum-map/

Place Value

Check they've got this, if not do this before moving on.

Year 4 conceptual prerequisite	Year 5 ready-to-progress criteria	Future applications
Know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100.	**5NPV–1** Know that 10 tenths are equivalent to 1 one, and that 1 is 10 times the size of 0.1. Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01. Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10 times the size of 0.01.	Solve multiplication problems that have the scaling structure, such as 'ten times as long'. Understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal fraction.
Recognise the place value of each digit in four-digit numbers, and compose and decompose four-digit numbers using standard and non-standard partitioning.	**5NPV–2** Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and non-standard partitioning.	Compare and order numbers, including those with up to 2 decimal places. Add and subtract using mental and formal written methods.
Reason about the location of any four-digit number in the linear number system, including identifying the previous and next multiple of 1,000 and 100, and rounding to the nearest of each.	**5NPV–3** Reason about the location of any number with up to 2 decimals places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each.	Compare and order numbers, including those with up to 2 decimal places. Estimate and approximate to the nearest 1 or 0.1.
Divide 1,000 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts.	**5NPV–4** Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts.	Read scales on graphs and measuring instruments.

Assessment Questions

These questions could be incorporated into Maths Workout or lessons at any point to assess understanding.

Maths No Problem Chapter Consolidation can also be used as assessment tasks.

In addition to the DfE example questions – **use the NCETM Checkpoint diagnostic questions. See Batch 1 – Place Value (click image)**

Key ideas

Key idea	Code
Understand place value in integers	1.1.1.1
Understand place value in decimals, including recognising exponent and fractional representations of the column headings	1.1.1.2
Understand place value in the context of measure	1.1.1.3
Order and compare numbers and measures using <, >, =	1.1.1.4

1. An apple weighs about 0.1kg. Approximately how many apples are there in a 1.8kg bag?

2. I have a 0.35m length of wooden rod. How many 0.01m lengths can I cut it into?

3. Mrs Jasper is juicing oranges. Each orange makes about 0.1 litres of juice. If Mrs Jasper juices 22 oranges, approximately how many litres of orange juice will she get?

4. Circle all of the numbers that are equal to a whole number of tenths.

$$0.2 \qquad 4.8 \qquad 1 \qquad 0.01 \qquad 10 \qquad 0.83$$

5. Fill in the missing numbers.

$0.01 \times \boxed{} = 1 \qquad 0.1 \times \boxed{} = 1 \qquad 0.01 \times \boxed{} = 0.1$

6. Fill in the missing numbers.

$\boxed{}$ tenths $= 3.9$

$\boxed{}$ hundredths $= 0.22$

$\boxed{}$ hundredths $= 8$

7. Match the numbers on the left with the equivalent fractions on the right.

0.20		$\frac{2}{100}$
0.02		$\frac{21}{100}$
0.12		$\frac{2}{10}$
0.21		$\frac{12}{100}$

3. Fill in the missing numbers.

$3.87 - 0.8 = \boxed{}$ $\qquad 25.14 - 0.04 = \boxed{}$ $\qquad 19.7 - 9 = \boxed{}$

$99.99 - 90 = \boxed{}$ $\qquad 84.51 = 50 + \boxed{}$ $\qquad 0.3 + 5.61 = \boxed{}$

$95.75 - 0.5 = \boxed{}$ $\qquad 6.14 = 5 + \boxed{} + 0.04$ $\qquad 2 + 1.43 + 0.05 = \boxed{}$

4. I have 3.7kg of modelling clay. If we use 2kg, how much will be left?

5. I will use 0.65 litres of milk for one recipe, and 0.23 litres of milk for another. How much milk will I use altogether?

6. Ilaria jumped 3.19m in a long jump competition. Emma jumped 3.12m. How much further did Ilaria jump than Emma?

7. Maya cycled 7.3km to get to her friend's house, and then cycled a further 0.6km to the park. How far did Maya cycle altogether?

1. Complete the calculations.

$4 + 0.07 + 0.2 = \boxed{}$

$0.4 + 0.02 + 70 = \boxed{}$

$20 + 0.07 + 4 = \boxed{}$

$0.4 + 20 + 700 = \boxed{}$

2. Circle the numbers that add together to give a total of 0.14

$$0.04 \qquad 0.12 \qquad 0.1 \qquad 0.2$$

1. Place each of these numbers on the number line.
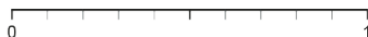
   0.6   0.16   0.91   0.09   0.69

   0 ————————————————————————— 1

2. The table shows how far some children jumped in a long-jump competition.

Name	Distance jumped (m)
Jamal	3.04
Reyna	3.4
Faisal	2.85
Ilaria	3.19
Charlie	3.09
Kagendo	2.9

   a. Who jumped the furthest and won the competition?

   b. Who came third in the competition?

   c. How much further did Kagendo jump then Faisal?

3. Fill in the missing symbols (<, > or =).

   0.3 ☐ 0.5   0.03 ☐ 0.05   0.50 ☐ 0.5

   9 ☐ 9.00   0.2 ☐ 0.15   0.11 ☐ 0.09

   1.01 ☐ 1.1   3 ☐ 2.99   140 ☐ 1.40

4. Here is a weighing scale. Estimate the mass in kilograms that the arrow is pointing to.
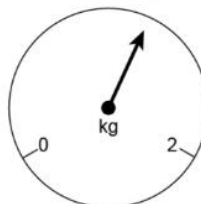
5. Estimate and mark the position of 0.7 litres on this beaker.

6. Fill in the missing numbers.

			5.01	5.02	5.03	

3.65			3.95			4.25	4.35

|			27.9	27.8	27.7

7. A farmer weighed each of 6 new-born lambs. Round the mass of each lamb to the nearest whole kilogram.

	Rounded to nearest whole kilogram
5.19kg	
6.7kg	
4.08kg	
6.1kg	
6.45kg	
4.91kg	

8. I need 4.25 metres of ribbon.

   a. How much is this to the nearest tenth of a metre?

   b. How much is this to the nearest metre?

   c. If ribbon is sold only in whole metres, how many metres do I need to buy?

1. Fill in the missing parts, and write as many different equations as you can think of to represent the bar model.

	1		
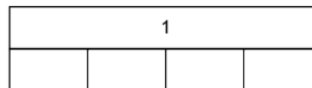
2. Fill in the missing numbers.

	7.5	7		6		

		4.4	4.6			5.2

2.5		3		3.75

Ready-to-progress criteria addressed by this unit
Teaching of this unit supports the following criteria from the 'DfE Mathematics Guidance: key stages 1 & 2' (the 335-page document available as a download)
- 4NPV-1 Page 146
- 4NPV-2 Page 149
- 4NPV-3 Page 150
- 4NPV-4 Page 155
- 4NF-3 Page 166

Prior learning
If the following ready-to-progress criteria, contained in the same DfE guidance document as above, were secured in Year 3, children will be ready to start on this unit.
- 3NPV-1 Page 86
- 3NPV-2 Page 88
- 3NPV-3 Page 91
- 3NPV-4 Page 95
- 3NF-3 Page 103

Linked NCETM Prioritisation:
- https://www.ncetm.org.uk/classroom-resources/cp-year-4-unit-2-numbers-to-10-000/

MNP Chapter 1	**Numbers to 1,000,000**
	Continue to use concrete resources such as place value counters, and Dienes & Numicon. Other resources: place value & calculation mats, place value headings on board & working wall, double sided or coloured counters, which change value according to position, arrow cards (inc ones on whiteboard), Gattegno grid with clear counters, counting stick and large number line (possibly blank so it can be changed using Post-Its over the year), place value dice & spinners, place value flips,

- To read and represent numbers to 100 000.
- To read and represent numbers to 1 000 000.
- To compare numbers to 1 000 000 using place value.
- To compare numbers to 1 000 000 using pictorial representations and proportionality.
- To compare numbers to 1 000 000 from pictorial representations, using lists and number lines.
- To make and identify patterns in numbers using knowledge of place value.
- To make number patterns that decrease in multiples of 10 000 or 100 000.
- To round numbers to the nearest 10 000 using number lines and bar graphs.
- To round numbers to the nearest 100 000 using number lines and bar graphs.
- To round numbers to the nearest 100, 1000, 10 000 and 100 000 using number lines.

Roman numerals & recognising years can be practised over the year as opportunities arise, eg: writing date – MNP lessons at the end of the year – also some good Nrich investigations using Roman numerals to delve deeper into place value

These objectives will continue to be revisited throughout the year during fact fluency sessions and checked through questioning in lessons.

Suitable Nrich for this unit:
Swimming Pool https://nrich.maths.org/5836

Tug Harder https://nrich.maths.org/5898
Sea Level https://nrich.maths.org/5929
Space Distances https://nrich.maths.org/13270
Carroll Diagrams and More Carroll Diagrams https://nrich.maths.org/13211
Consecutive numbers https://nrich.maths.org/31
Coded Hundred Square https://nrich.maths.org/6554/note

Addition & Subtraction

Check they've got this, if not do this before moving on.

There are no ready to progress for addition and subtraction from year 4 to 5. Children should be fluent with written methods however the focus should be on using mental methods where it is more efficient to do so.

Year 4 conceptual prerequesite	Year 5 ready-to-progress criteria	Future applications
Recall multiplication and division facts up to 12 × 12. Solve division problems, with two-digit dividends and one-digit divisors, that involve remainders, for example: $74 \div 9 = 8\, r\, 2$	5NF–1 Secure fluency in multiplication table facts, and corresponding division facts, through continued practice.	Use multiplication facts during application of formal written layout. Use division facts during short division and long division.
Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10 or 100), for example: $8 + 6 = 14$ $80 + 60 = 140$ $800 + 600 = 1,400$ $3 \times 4 = 12$	5NF–2 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 1 tenth or 1 hundredth), for example: $8 + 6 = 14$ $0.8 + 0.6 = 1.4$ $0.08 + 0.06 = 0.14$ $= 12$ $4 = 1.2$ $4 = 0.12$	Recognise number relationships within the context of place value to develop fluency and efficiency in calculation.

Future applications

Add and subtract mentally where digits sum to more than 10, for example:
$26 + 37 = 63$
Add and subtract across other powers of 10, without written methods, for example:
$1.3 - 0.4 = 0.9$
Add within a column during columnar addition when the column sums to more than 10 (regrouping), for example, for:
$126 + 148$
Subtract within a column during columnar subtraction when the minuend of the column is smaller than the subtrahend (exchanging), for example, for:
$453 - 124$

Assessment Questions:

RTP do not have assessment questions for year 5 addition and subtraction. Use the MNP consolidation lessons for example assessment questions.

use the NCETM Checkpoint diagnostic questions. See Batch 2 – arithmetic procedures (click image)

Key ideas

Understand and use the structures that underpin addition and subtraction strategies	Code
Understand the mathematical structures that underpin addition and subtraction of positive and negative integers	2.1.1.1*
Generalise and fluently use written addition and subtraction strategies, including columnar formats, with decimals	2.1.1.2*

Also NCETM Assessment documents. Examples below:

Set out and solve these calculations using a column method.

3254 + [____] = 7999

2431 = [____] – 3456

6373 – [____] = 3581

6719 = [____] – 4562

True or False?
- 3999 – 2999 = 4000 – 3000
- 3999 – 2999 = 3000 – 2000
- 2741 – 1263 = 2742 – 1264
- 2741 + 1263 = 2742 + 1264
- 2741 – 1263 = 2731 – 1253
- 2741 – 1263 = 2742 – 1252

Explain your reasoning.

Using this number statement, 5222 – 3111 = 5223 – 3112 write three more pairs of equivalent calculations.

Pupils should not calculate the answer to these questions but should look at the structure and relationships between the numbers.

Captain Conjecture says, 'When working with whole numbers, if you add two 2-digit numbers together the answer cannot be a 4-digit number.'

Do you agree?
Explain your reasoning.

The table shows the cost of train tickets from different cities.

What is the total cost for a return journey to York for one adult and two children?
How much more does it cost for two adults to make a single journey to Hull than to Leeds?

		York	Hull	Leeds
Adult	Single	£13·50	£16·60	£11·00
	Return	£24·50	£30·00	£20·00
Child	Single	£9·75	£11·00	£8·00
	Return	£15·00	£18·50	£13·50

Children should be fluent with addition and subtraction by year 5. If they are not, track back the the Y3&4 NCETM resources.

Ready-to-progress criteria addressed by this unit
Teaching of this unit supports the following criteria from the 'DfE Mathematics Guidance: key stages 1 & 2' (the 335-page document available as a download)
- **3AS-2 Page 109**

NCETM Prioritisation:
- https://www.ncetm.org.uk/classroom-resources/cp-year-4-unit-1-review-of-column-addition-and-subtraction/

MNP Chapter 2	**Whole Numbers: Addition and Subtraction**
	By year 5 children should be fluent with addition and subtraction - continue to use concrete resources for new teaching, for assessment, to prompt discussion and explanation and for investigations. Range of base ten equipment inc Dienes, pv counters, Numicon, double sided counters, range of dice, calculation mats. Paper strips and post it notes to support bar modelling throughout. When using formal written methods, evaluate efficiency – mental first when appropriate. • To add using the 'counting on' strategy with concrete materials and number lines. • To add numbers within 1 000 000 using rounding.

- To add numbers within 1 000 000 using the column method of addition.
- To subtract using the 'counting backwards' strategy.
- To subtract using the column method using numbers to 1 000 000.
- To subtract using the column method using numbers to 1 000 000.
- To use addition and subtraction to solve comparison problems with numbers to 1 000 000.

NCETM Mastery Professional Development Materials, Addition and Subtraction:
https://www.ncetm.org.uk/resources/50640#yr5

Suitable Nrich:
Roll these dice https://nrich.maths.org/53
Cuisenaire https://nrich.maths.org/12222
Cuisenaire Environment https://nrich.maths.org/4348
Strike it Out game https://nrich.maths.org/6589/note
Dicey Addition game https://nrich.maths.org/11863/note
Six Ten Total https://nrich.maths.org/10917/note
Six Numbered Cubes https://nrich.maths.org/10918/note

Multiplication & Division

Year 4 conceptual prerequesite	Year 5 ready-to-progress criteria	Future applications
Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotient) understand this as equivalent to scaling a number by 10 or 100.	5MD–1 Multiply and divide numbers by 10 and 100; understand this as equivalent to making a number 10 or 100 times the size, or 1 tenth or 1 hundredth times the size.	Convert between different metric units of measure.

Check they've got this, if not do this before moving on.

The Y4 RtP criteria is the essential learning for the end of Y4 in order to be ready for Y5.

		Recall multiplication and division facts up to 12 × 12, and recognise products in multiplication tables as multiples of the corresponding number. Recognise multiples of 10, 100 and 1,000. Apply place-value knowledge to known additive and multiplicative number facts. Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients).	**5MD–2** Find factors and multiples of positive whole numbers, including common factors and common multiples, and express a given number as a product of 2 or 3 factors.	Solve contextual division problems. Simplify fractions. Express fractions in the same denomination.
		Recall multiplication facts up to 12 × 12. Manipulate multiplication and division equations.	**5MD–3** Multiply any whole number with up to 4 digits by any one-digit number using a formal written method.	Solve contextual and non-contextual multiplication problems using a formal written method.
		Recall multiplication and division facts up to 12 × 12. Manipulate multiplication and division equations. Solve division problems, with two-digit dividends and one-digit divisors, that involve remainders, for example: 74 ÷ 9 = 8 r 2 and interpret remainders appropriately according to the context.	**5MD–4** Divide a number with up to 4 digits by a one-digit number using a formal written method, and interpret remainders appropriately for the context.	Solve contextual and non-contextual division problems using a formal written method.

Assessment Questions

These questions could be incorporated into Maths Workout or lessons at any point to assess understanding.

Maths No Problem Chapter Consolidation can also be used as assessment tasks.

In addition to the DfE example questions – **use the NCETM Checkpoint diagnostic questions. See batch 1 (Properties of number), and batch 2 (arithmetic procedures) (click image)**

Key ideas

Understand multiples	Code
Understand what a multiple is and be able to list multiples of *n*	1.2.1.1
Identify and explain whether a number is or is not a multiple of a given integer	1.2.1.2*
Understand integer exponents and roots	**Code**
Understand the concept of square and cube	1.2.2.1
Understand the concept of square root and cube root	1.2.2.2
Understand and use correct notation for positive integer exponents	1.2.2.3
Understand how to use the keys for squares and other powers and square root on a calculator	1.2.2.4
Understand and use the unique prime factorisation of a number	**Code**
Understand what a factor is and be able to identify factors of positive integers	1.2.3.1
Understand what a prime number is and be able to identify prime numbers	1.2.3.2
Understand that a positive integer can be written uniquely as a product of its prime factors	1.2.3.3
Use the prime factorisation of two or more positive integers to efficiently identify the highest common factor	1.2.3.4**
Use the prime factorisation of two or more positive integers to efficiently find their lowest common multiple	1.2.3.5

Understand and use the structures that underpin multiplication and division strategies	Code
Understand the mathematical structures that underpin multiplication and division of positive and negative integers	2.1.2.1
Factorise multiples of 10n in order to simplify multiplication and division of both integers and decimals, e.g. 300 × 7 000, 0.3 × 0.007, 0.9 ÷ 0.03, etc.	2.1.2.2
Generalise and fluently use written multiplication strategies to calculate accurately with decimals	2.1.2.3
Generalise and fluently use written division strategies to calculate accurately with decimals	2.1.2.4

Key ideas

Use the laws and conventions of arithmetic to calculate efficiently	Code
Know the commutative law and use it to calculate efficiently	2.1.5.1
Know the associative law and use it to calculate efficiently	2.1.5.2
Know the distributive law and use it to calculate efficiently	2.1.5.3
Calculate using priority of operations, including brackets, powers, exponents and reciprocals	2.1.5.4
Use the associative, distributive and commutative laws to flexibly and efficiently solve problems	2.1.5.5*
Know how to fluently use certain calculator functions and use a calculator appropriately	2.1.5.6

4. The length of a new-born crocodile is about 0.25m. The length of an adult female crocodile is about 2.5m. Approximately how many times as long as a new-born crocodile is an adult female crocodile?

5. Fill in the missing numbers.

$\boxed{} \times 100 = 5$ $273 = \boxed{} \times 100$

$\boxed{} \times 10 = 6$ $42 = \boxed{} \times 10$

$\boxed{} \div 100 = 0.79$ $1.35 = \boxed{} \div 100$

$\boxed{} \div 10 = 0.75$ $16.2 = \boxed{} \div 10$

6. Use the following to complete the equations:

     $\times 10$ $\times 100$ $\div 10$ $\div 100$

Use each term only once.

$543\boxed{} = 5.43$ $0.12\boxed{} = 1.2$

$51.5\boxed{} = 5{,}150$ $40.3\boxed{} = 4.03$

1. Write all of the numbers from 1 to 30 in the correct places on this Venn diagram.

48

Multiples of 3   Multiples of 4
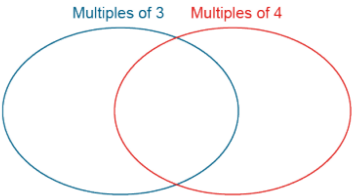
2. Circle any number that is a multiple of both 3 and 7.

    42   43   47   49

3. Find a common factor of 48 and 64 that is greater than 6.

4. How many common multiples of 4 and 6 are there that are less than 40?

5. Circle any number that is a factor of both 24 and 36.

   2   4   6   8   10   12

6. a. Find a multiple of 30 that is between 200 and 300.

   b. Find a multiple of 40 that is between 300 and 400.

   c. Find a multiple of 50 that is between 400 and 500.

7. Show that 3 is a factor of 231.

1. Fill in the missing numbers.
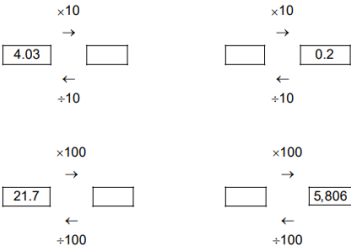
2. Ruby ran 2.3km. Her mum ran 10 times this distance. How far did Ruby's mum run?

3. A zookeeper weighs an adult gorilla and its baby. The adult gorilla has a mass of 149.3kg. The baby gorilla has a mass one-tenth times that of the adult gorilla. How much does the baby gorilla weigh, in kilograms?

8. Fill in the table with examples of 2-, 3- and 4-digit numbers that are multiples of 9, 25 and 50.

	2-digit number	3-digit number	4-digit number
Multiples of 9			
Multiples of 25			
Multiples of 50			

9. Give two 2-digit factors of 270.

10. Find 3 numbers which are multiples of 25 but not multiples of 50.

11. Fill in the missing numbers.

$6 \times 32 = 6 \times 4 \times \boxed{}$ $6 \times 5 \times 4 = 5 \times \boxed{}$ $480 = 8 \times 10 \times \boxed{}$

$72 = 2 \times 6 \times \boxed{}$ $\boxed{} \times 5 \times \boxed{} = 105$ $7 \times \boxed{} \times \boxed{} = 140$

2. Draw a line to match each multiplication expression with the correct addition expression.

48 × 3		120 + 18
6 × 23		80 + 4
26 × 4		120 + 24

3. Josh cycles 255 metres in 1 minute. If he keeps cycling at the same speed, how far will he cycle in 8 minutes?

4. A factory packs biscuits into boxes of 9. The factory produces 1,350 packets of biscuits in a day. How many biscuits is that?

5. Ellen has 1 large bag of 96 marbles, and 4 smaller bags each containing 76 marbles. How many marbles does she have altogether?

6. There are 6 eggs in a box. If a farmer needs to deliver 1,275 boxes of eggs to a supermarket, how many eggs does she need?

7. Aryan's grandmother lives 235 kilometres away from Aryan. His aunt lives 3 times that distance away from Aryan. How far away does Aryan's aunt live from him? How far is this to the nearest 100 kilometres?

8. Felicity can make 5 hairbands in 1 hour. A factory can make 235 times as many. How many hairbands can the factory make in 1 hour?

9. Fill in the missing numbers.

$$\begin{array}{r} \boxed{}\,1\ 6 \\ \times\quad\boxed{} \\ \hline 2,\,8\ 6\ 4 \\ {\scriptstyle 2} \end{array} \qquad \begin{array}{r} \boxed{}\,5\,\boxed{}\,7 \\ \times\qquad 4 \\ \hline 6,\,1\ 0\ 8 \\ {\scriptstyle 2\ \ 1\ \ 2} \end{array}$$

10. Liyana writes:

$9{,}565 \div 7 = 1{,}365$

Use short multiplication to check whether Liyana's equation is correct.

7. Maria makes 1,531g of cake mix. She puts 250g into a small cake tin and wants to share the rest equally between 3 large cake tins. How many grams of cake mix should she put in each large cake tin?

8. 174 children are going on a trip. 4 children can fit into each room in the hostel. How many rooms are needed?

9. Fill in the missing numbers.

$$\begin{array}{r} 5\ 4\ 3 \\ \boxed{}\,\overline{\smash{)}2,\,7\,{}^{2}1\,{}^{1}5} \end{array} \qquad \begin{array}{r} 2\ 1\,\boxed{} \\ 7\,\overline{\smash{)}1,\,\boxed{}\,{}^{1}2\,{}^{5}6} \end{array}$$

10. David writes:

$785 \times 9 = 7{,}065$

Use short division to check whether David's calculation is correct.

Ready-to-progress criteria addressed by this unit

Teaching of this unit supports the following criteria from the 'DfE Mathematics Guidance: key stages 1 & 2' (the document available as a download)

- **5MD-2 Page 245**
- **5MD-3 Page 248**
- **5MD-4 Page 252**

Prior learning

If the following ready-to-progress criteria, contained in the same DfE guidance document as above, were secured in Year 4, children will be ready to start on this unit.

- **4MD-2 Page 173**
- **4MD-3 Page 178**
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NCETM Prioritisation:

- https://www.ncetm.org.uk/classroom-resources/cp-year-5-unit-4-short-multiplication-and-short-division/
- https://www.ncetm.org.uk/classroom-resources/cp-year-5-unit-7-factors-multiples-and-primes/

MNP Chapter 3	**Whole Numbers: Multiplication and Division**

Whole Numbers: Multiplication and Division

Most fluent with all tables from Y4 – see MTC results. For those who are not, set TTRS homework and track. Those fluent may have more challenging tasks connected to tables during fact fluency sessions set on Mathletics. Use multiplication calculation mat to scaffold & plain laminated A3 paper for division. Speak to maths lead for guidance on written division.

Long division (with 2 digit divisor) not required on NC until Y6 but the expanded written strategy is in MNP in Y4, I have advised the Y4 teams to stick with short division. In Y5, IF the children are secure with the necessary prerequisite skills (strong place value, fluent subtraction and secure with short division – conceptually as well as procedurally, you may wish to explore long division. If the you are in doubt, teach short division while continuing to practice partial tables as this supports long division which the year 6 team will pick up. See Rach or Claire of you're unsure.

Assessment guidance: Pupils need to be able to identify when multiplication is the appropriate operation to use to solve a given problem. Assessment of whether a pupil has mastered multiplication sufficiently to progress to year 6 should also include questions which require other operations to solve.

- To consolidate and review multiplication; to find the result of multiplying by a number.
- To consolidate and review multiplication; to find the numbers we can multiply by to get a number.
- To define and find common factors of numbers to 100.
- To identify and name the prime numbers; to recognise prime numbers as numbers that only have 2 factors.
- To define and determine prime numbers and composite numbers.
- To create and determine square and cubed numbers.
- To multiply 1- and 2-digit numbers by 10, 100 and 1000.
- To multiply 2- and 3-digit numbers by a 1-digit number using multiple strategies.
- To multiply a 4-digit number by a 1-digit number, with regrouping from the ones, tens and hundreds, using multiple methods.
- To multiply a 2-digit number by a 2-digit number using multiple methods, including the grid method, number bonds and column method, with regrouping.
- To multiply a 3-digit number by a 2-digit number, with the grid method and column method as key strategies.
- To find thousands, hundreds and tens in a 4-digit number
- To divide 3- and 4-digit numbers by 1-digit numbers, using number bonds and long division as the key methods (see notes above).
- To divide 3-digit numbers by 1-digit numbers, using long division, short division and mental methods, that give rise to remainders (see notes above)

NCETM Mastery Professional Development Materials, multiplication and division:
https://www.ncetm.org.uk/resources/52830

Suitable Nrich:
Venn Diagrams https://nrich.maths.org/6290

	Mystery Matrix *https://nrich.maths.org/1070* Factors and Multiples game https://nrich.maths.org/5468 Method in Multiplying Madness? https://nrich.maths.org/5612 One Wasn't Square https://nrich.maths.org/1119/note Cycling Squares https://nrich.maths.org/1151/note Multiplication Jigsaw https://nrich.maths.org/5573/note What do you need? https://nrich.maths.org/5950/note How did you do it? (good for evaluative journaling) https://nrich.maths.org/6901/note Sweets in a Box investigation *https://nrich.maths.org/84/note* Zios and Zepts https://nrich.maths.org/1005/note Make 100 game https://nrich.maths.org/1013/note The Moons of Vuvv https://nrich.maths.org/1066/note For Goodness Sake https://nrich.maths.org/1081/note Factor Lines https://nrich.maths.org/1138/note Cubes within Cubes https://nrich.maths.org/1155/note Remainders https://nrich.maths.org/1783/note Odd Squares https://nrich.maths.org/2280/note Division Rules https://nrich.maths.org/10490/note Multiples Grid https://nrich.maths.org/5429/note Always, sometimes, never https://nrich.maths.org/12672/note Countdown https://nrich.maths.org/6499 (good for fact fluency) Plus many more …..
MNP Chapter 4	**Whole Numbers: Word Problems** • Solve word problems involving addition, subtraction, multiplication and division, and a combination of these (bar model should be embedded as a key representation by now **– use paper strips and post it notes as the concrete resource**). • NB: Could include further problems around negative numbers in context here. Ensure concrete resources are used to support bar modelling as well as diagrams. ****Do NOT teach children to look for key words and underline the them** – teach children to understand the problem in context and represent it, this will include understanding key terminology** • To identify the operation needed to carry out the plan. • To solve word problems involving multiplication and division Scaling is covered in lesson 2 – do not miss. Scaling is important. Use double sided counters. • To solve word problems involving multiple operations
	Statistics
MNP Chapter 5	Apply these skills across the curriculum – in particular in Science. • To read the information presented in a table and interpret its meaning. • To read and respond to information presented in a table.

- To read and respond to tables that have a variety of data sets.
- To read and interpret information provided in a line graph where a single line represents the data.
- To read and interpret information presented on a line graph where the data is represented by more than one line.
- To read and interpret information presented in a table and turn it into a line graph; to determine relationships between data sets.

Suitable Nrich:
Plants https://nrich.maths.org/36
Presenting the project https://nrich.maths.org/4922

Fractions

Check they've got this, if not do this before moving on.

The Y4 RtP criteria is the essential learning for the end of Y4 in order to be ready for Y5.

Year 4 conceptual prerequesite	Year 5 ready-to-progress criteria	Future applications
Recall multiplication and division facts up to 12 × 12. Find unit fractions of quantities using known division facts (multiplication-tables fluency). Unitise using unit fractions (for example, understand that there are 3 one-fifths in three-fifths).	**5F–1** Find non-unit fractions of quantities.	Solve multiplication problems that have the scaling structure.
Recall multiplication and division facts up to 12 × 12. Reason about the location of fractions in the linear number system.	**5F–2** Find equivalent fractions and understand that they have the same value and the same position in the linear number system.	Compare and order fractions. Use common factors to simplify fractions. Use common multiples to express fractions in the same denomination. Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.
Divide powers of 10 into 2, 4, 5 and 10 equal parts.	**5F–3** Recall decimal fraction equivalents for $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$ and $\frac{1}{10}$, and for multiples of these proper fractions.	Read scales on graphs and measuring instruments. Know percentage equivalents of common fractions.

Assessment Questions

These questions could be incorporated into Maths Workout or lessons at any point to assess understanding.

Maths No Problem Chapter Consolidation can also be used as assessment tasks.
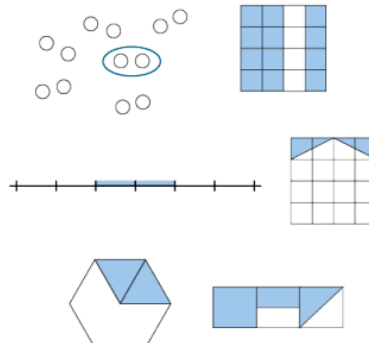
1. Find:

   $\frac{3}{8}$ of 32 $\frac{2}{9}$ of 45 $\frac{3}{5}$ of 30

   $\frac{2}{7}$ of 630 $\frac{4}{9}$ of 315 $\frac{2}{5}$ of 3,500 $\frac{5}{8}$ of 2,720

1. Stan bought 15 litres of paint and used $\frac{2}{3}$ of it decorating his house. How much paint has he used?

2. My granny lives 120km from us. We are driving to see her and are $\frac{5}{6}$ of the way there. How far have we driven so far?

3. I am $\frac{3}{4}$ of the way through my holiday. I have 3 days of holiday left. How many days have I already been on holiday for?

4. A school is trying to raise £7,500 for charity. They have raised $\frac{5}{6}$ of the total so far. How much have they raised?

5. $\frac{4}{5}$ of the runners in a race have finished the race so far. If 92 people have finished, how many runners were in the race altogether?

6. There are 315 cows on a farm. $\frac{3}{5}$ of the cows are having calves this year. How many cows are not having calves?

3. Mark each fraction on the number line.

   $\frac{9}{24}$ $\frac{36}{48}$ $\frac{12}{16}$ $\frac{10}{40}$ $\frac{9}{72}$

   Hint: convert each fraction to an equivalent fraction with a denominator of 8.

   0   $\frac{1}{8}$ $\frac{2}{8}$ $\frac{3}{8}$ $\frac{4}{8}$ $\frac{5}{8}$ $\frac{6}{8}$ $\frac{7}{8}$ 1
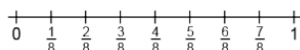
4. Use the numbers 3, 24, 8 and 1 to complete this chain of equivalent fractions.

   $\frac{2}{6} = \frac{\square}{\square} = \frac{\square}{\square}$

5. Fill in the missing digits.

   $\frac{4}{8} = \frac{12}{\square}$ $\frac{3}{5} = \frac{\square}{40}$ $\frac{3}{\square} = \frac{21}{63}$ $\frac{20}{30} = \frac{\square}{15}$

1. Find different ways to write the fraction of each shape or quantity that is shaded or highlighted.

2. Draw lines to match the unit fractions on the left with their equivalent fractions on the right.

   $\frac{1}{5}$ $\frac{3}{12}$

   $\frac{1}{4}$ $\frac{4}{20}$

   $\frac{1}{3}$ $\frac{3}{9}$

1. Fill in the missing symbols (<, > or =).

   $\frac{1}{10} \square$ 0.75   0.4 $\square \frac{1}{4}$

   0.5 $\square \frac{1}{5}$ $\frac{3}{4} \square$ 0.75

   0.8 $\square \frac{4}{5}$ $\frac{1}{2} \square$ 0.2

2. Write these measurements as mixed numbers.

   1.2km   5.75m   25.5kg

3. Write these measurements as decimals.

   $1\frac{1}{4}$ litres $10\frac{1}{2}$ cm $4\frac{4}{5}$ m

4. My brother weighs 27.3kg. I weigh $27\frac{1}{2}$ kg. How much more than my brother do I weigh?

5. Year 6 set off on a $2\frac{3}{4}$ km woodland walk. By lunch, they had walked 1.75km. How much further do they need to walk?

Ready-to-progress criteria addressed by this unit

Teaching of this unit supports the following criteria from the 'DfE Mathematics Guidance: key stages 1 & 2' (the 335-page document available as a download)

- 5NPV-5 Page 229
- 5F-1 Page 255
- 5F-2 Page 258
- 5F-3 Page 262

Prior learning

If the following ready-to-progress criteria, contained in the same DfE guidance document as above, were secured in Year 3, children will be ready to start on this unit.

- **3F-2 Page 124**

Prioritisation:

- https://www.ncetm.org.uk/classroom-resources/cp-year-5-unit-8-fractions/

MNP Chapter 6	**Fractions**
	Use arrays & paper strips for calculation. Big focus on efficiency & drawing on what is already known. ALWAYS refer to 'equal' parts and the whole.

- To create mixed numbers and improper fractions when dividing whole numbers.
- To write improper fractions and mixed numbers using a number line and pictorial methods.
- To find equivalent fractions
- To compare and order fractions
- To compare and order improper fractions
- To compare mixed numbers
- To find common denominators where one fraction is already the common denominator for all fractions in the question.
- To make number pairs (number bonds) with fractions with different denominators.
- To add unlike fractions by finding a common denominator
- To add together unlike fractions where the sum is greater than 1, creating mixed numbers or improper fractions.
- To add unlike fractions which create improper fractions and mixed numbers that give rise to simplification.
- To subtract fractions with different denominators; to subtract fractions from whole numbers.
- To subtract fractions where the denominators are not the same; to use bar models as a key strategy for subtracting fractions.
- To subtract fractions and mixed numbers from mixed numbers with different denominators.
- To multiply fractions by whole numbers creating other fractions, mixed numbers or improper fractions.
- To multiply fractions by whole numbers where the product is an improper fraction or mixed number.
- To multiply mixed numbers by whole numbers, creating larger mixed numbers.
- To multiply mixed numbers by whole numbers in multi-step word problems.

NCETM Mastery Professional Development Materials, fractions:
https://www.ncetm.org.uk/resources/53253#yr5

Suitable Nrich:
Fraction subtraction https://nrich.maths.org/12955
Fraction addition https://nrich.maths.org/12937
Fraction Wall https://nrich.maths.org/4519
World of Tan – Fractions https://nrich.maths.org/14189
Fractional Triangles https://nrich.maths.org/2124/note

Bryony's Triangle (good links with geometry) https://nrich.maths.org/7392
Matching Fractions (good support for intervention/additional practice):
https://nrich.maths.org/8283/note
Fraction Fascination https://nrich.maths.org/5061/note

Textbook 5B (speak to Claire or Rachel if not at this point by beginning February)
Fractions: Decimals

Year 4 conceptual prerequesite	Year 5 ready-to-progress criteria	Future applications
Reason about the location of any four-digit number in the linear number system, including identifying the previous and next multiple of 1,000 and 100, and rounding to the nearest of each.	5NPV–3 Reason about the location of any number with up to 2 decimals places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each.	Compare and order numbers, including those with up to 2 decimal places. Estimate and approximate to the nearest 1 or 0.1.
Divide 1,000 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts.	5NPV–4 Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts.	Read scales on graphs and measuring instruments.
Divide 100 and 1,000 into 2, 4, 5 and 10 equal parts. Find unit fractions of quantities using known division facts (multiplication tables fluency).	5NPV–5 Convert between units of measure, including using common decimals and fractions.	Read scales on measuring instruments, and on graphs related to measures contexts. Solve measures problems involving different units by converting to a common unit.
Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10 or 100), for example: $8 + 6 = 14$ $80 + 60 = 140$ $800 + 600 = 1,400$ $3 \times 4 = 12$ $30 \times 4 = 120$ $300 \times 4 = 1,200$	5NF–2 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 1 tenth or 1 hundredth), for example: $8 + 6 = 14$ $0.8 + 0.6 = 1.4$ $0.08 + 0.06 = 0.14$ $3 \times 4 = 12$ $0.3 \times 4 = 1.2$ $0.03 \times 4 = 0.12$	Recognise number relationships within the context of place value to develop fluency and efficiency in calculation.
Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to scaling a number by 10 or 100.	5MD–1 Multiply and divide numbers by 10 and 100; understand this as equivalent to making a number 10 or 100 times the size, or 1 tenth or 1 hundredth times the size.	Convert between different metric units of measure.

Assessment Questions

These questions could be incorporated into Maths Workout or lessons at any point to assess understanding.

Maths No Problem Chapter Consolidation can also be used as assessment tasks.

Use NCETM Checkpoint resources – see batch 4 (arithmetic procedures including fractions). Click image and see TEAMS.

Work interchangeably with terminating decimals and their corresponding fractions	Code
Understand that 1 can be written in the form $\frac{n}{n}$ (where n is any integer) and vice versa	1.3.1.1
Understand that fractions of the form $\frac{a}{b}$ where a > b are greater than 1 and use this awareness to convert between improper fractions and mixed numbers	1.3.1.2
Understand that a fraction represents a division and that performing that division results in an equivalent decimal	1.3.1.3
Appreciate that any terminating decimal can be written as a fraction with a denominator of the form 10^n (e.g. $0.56 = \frac{56}{100}, \frac{560}{1000}$, etc.)	1.3.1.4
Understand the process of simplifying fractions through dividing both numerator and denominator by common factors	1.3.1.5*
Know how to convert from fractions to decimals and back again using the converter key on a calculator	1.3.1.6
Know how to enter fractions as divisions on a calculator and understand the limitations of the decimal representation that results	1.3.1.7

Compare and order positive and negative integers, decimals and fractions	Code
Compare negative integers using < and >	1.3.2.1
Compare decimals using < and >	1.3.2.2
Compare and order fractions by converting to decimals	1.3.2.3
Compare and order fractions by converting to fractions with a common denominator	1.3.2.4
Order a variety of positive and negative fractions and decimals using appropriate methods of conversion and recognising when conversion to a common format is not required	1.3.2.5
Appreciate that for any two numbers there is always another number in between them	1.3.2.6

Know, understand and use fluently a range of calculation strategies for addition and subtraction of fractions	Code
Understand the mathematical structures that underpin the addition and subtraction of fractions	2.1.3.1
Generalise and fluently use addition and subtraction strategies to calculate with fractions and mixed numbers	2.1.3.2
Know, understand and use fluently a range of calculation strategies for multiplication and division of fractions	**Code**
Understand the mathematical structures that underpin the multiplication of fractions	2.1.4.1*
Understand how to multiply unit, non-unit and improper fractions	2.1.4.2*
Generalise and fluently use strategies to multiply with mixed numbers (e.g. $2\frac{3}{4} \times 1\frac{2}{3}$)	2.1.4.3
Understand the mathematical structures that underpin the division of fractions	2.1.4.4
Divide a fraction by a whole number	2.1.4.5
Divide a whole number by a fraction	2.1.4.6
Divide a fraction by a fraction	2.1.4.7

d. How much further did Ilaria jump than Charlie?

3. Fill in the missing symbols (<, > or =).

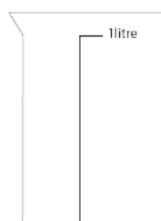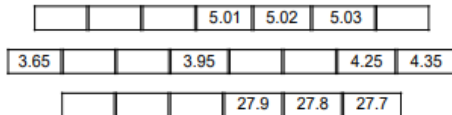|		
0.3 ☐ 0.5	0.03 ☐ 0.05	0.50 ☐ 0.5
9 ☐ 9.00	0.2 ☐ 0.15	0.11 ☐ 0.09
1.01 ☐ 1.1	3 ☐ 2.99	140 ☐ 1.40

4. Here is a weighing scale. Estimate the mass in kilograms that the arrow is pointing to.

5. Estimate and mark the position of 0.7 litres on this beaker.

1litre

6. Fill in the missing numbers.

		5.01	5.02	5.03	

3.65		3.95		4.25	4.35

			27.9	27.8	27.7

7. A farmer weighed each of 6 new-born lambs. Round the mass of each lamb to the nearest whole kilogram.

	Rounded to nearest whole kilogram
5.19kg	
6.7kg	
4.08kg	
6.1kg	
6.45kg	
4.91kg	

8. I need 4.25 metres of ribbon.
a. How much is this to the nearest tenth of a metre?
b. How much is this to the nearest metre?
c. If ribbon is sold only in whole metres, how many metres do I need to buy?

5NPV–3 Example assessment questions

1. Place each of these numbers on the number line.

0.6   0.16   0.91   0.09   0.69

0   1

2. The table shows how far some children jumped in a long-jump competition.

Name	Distance jumped (m)
Jamal	3.04
Reyna	3.4
Faisal	2.85
Ilaria	3.19
Charlie	3.09
Kagendo	2.9

a. Who jumped the furthest and won the competition?
b. Who came third in the competition?
c. How much further did Kagendo jump then Faisal?

$\frac{1}{10}$ ☐ 0.75	0.4 ☐ $\frac{1}{4}$
0.5 ☐ $\frac{1}{5}$	$\frac{3}{4}$ ☐ 0.75
0.8 ☐ $\frac{4}{5}$	$\frac{1}{2}$ ☐ 0.2

2. Write these measurements as mixed numbers.
1.2km   5.75m   25.5kg

3. Write these measurements as decimals.
$1\frac{1}{4}$ litres $10\frac{1}{2}$ cm $4\frac{4}{5}$ m

4. My brother weighs 27.3kg. I weigh $27\frac{1}{2}$ kg. How much more than my brother do I weigh?

5. Year 6 set off on a $2\frac{3}{4}$ km woodland walk. By lunch, they had walked 1.75km. How much further do they need to walk?

6. Here are two parcels:
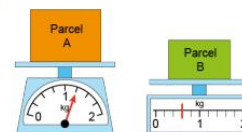
What is the total combined weight of the parcels, in kilograms?

7. Put each set of numbers in order from smallest to greatest.
a. 1.4 $4\frac{1}{4}$ 4.1   4.4
b. $3\frac{1}{5}$ 3.5 $1\frac{3}{5}$ 1.3

Ready-to-progress criteria addressed by this unit
Teaching of this unit supports the following criteria from the 'DfE Mathematics Guidance: key stages 1 & 2' (the document available as a download)

Prior learning

If the following ready-to-progress criteria, contained in the same DfE guidance document as above, were secured in Year 4, children will be ready to start on this unit.

NCETM Prioritisation:

- **https://www.ncetm.org.uk/classroom-resources/cp-year-5-unit-1-decimal-fractions/**
- **https://www.ncetm.org.uk/classroom-resources/cp-year-5-unit-6-calculating-with-decimal-fractions/**

MNP Chapter 7	Decimals (fractions & percentages)
	Continue to use concrete resources such as Dienes, Numicon, inc 100 boards. Plus Gattegno grid & function machine. Include decimals in counting activities. Make links to money and other measures. Ensure children see how fractions, decimals and percentage are related and inc all three in questioning. See NCETM Guidance.
	Do NOT use Place Value Counters for comparing decimals.
	- To write decimal numbers. - To read and write decimals. - To compare tenths and hundredths written as decimals **(use base 10 or Numicon).** - To order and compare decimals. - To compare and order decimals of amounts. - To write fractions as decimals. - To add and subtract amounts in decimals. - To add and subtract decimals; money - To add and subtract decimals to find the smallest possible sum and difference. - To add and subtract decimals; to find number pairs that add up to 1. - To add and subtract the perimeter of an object using decimals. - To round decimals to the nearest whole number; to round numbers to nearest tenth.

	Suitable Nrich:
	Spiralling Decimals https://nrich.maths.org/10326/note Matching fractions, decimals and percentages game https://nrich.maths.org/1249 (see also ATM grid for matching) Round the Dice Decimals game https://nrich.maths.org/10438

Fractions: Percentages	
MNP Chapter 8	**Percentages** **Use Numicon with 100 base board (this doesn't appear in the MNP), or/and blank 100 squares. Make links with shopping & supermarket offers. If going on a trip there's great ways to apply skills – speak to maths lead for guidance.** • To convert fractions to decimals and percentages. • To convert values of an amount into percentages; to convert fractions into percentages. • To convert values of an amount into percentages; to convert fractions into percentages. **Suitable Nrich:** Bird Watch *https://nrich.maths.org/7553* Compare the Squares https://nrich.maths.org/4939 100 percent https://nrich.maths.org/1283

Geometry		

Year 4 conceptual prerequesite	Year 5 ready-to-progress criteria	Future applications
Recognise right angles as a property of shape or a description of a turn, and identify right angles in 2D shapes presented in different orientations. Identify whether the interior angles of a polygon are equal or not.	**5G–1** Compare angles, estimate and measure angles in degrees (°) and draw angles of a given size.	Solve problems involving missing angles.
Compose polygons from smaller shapes. Recall multiplication facts up to 12 × 12.	**5G–2** Compare areas and calculate the area of rectangles (including squares) using standard units.	Calculate the area of compound rectilinear shapes and other 2D shapes, including triangles and parallelograms, using standard units. Use the relationship between side-length and perimeter, and between side-length and area to calculate unknown values.

Assessment Questions
These questions could be incorporated into Maths Workout or lessons at any point to assess understanding. Maths No Problem Chapter Consolidation can also be used as assessment tasks.
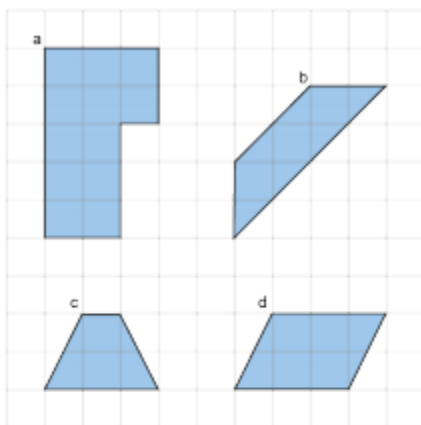
5G–1 Example assessment questions

Do not use a protractor for questions 1, 2 and 3.
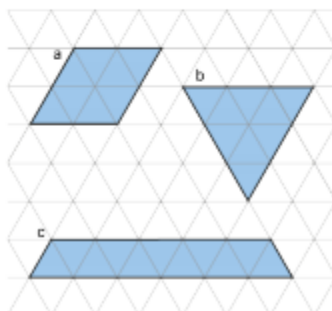
1. Here is an irregular pentagon.
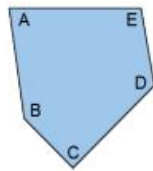
   a. Which is the largest angle in this pentagon?
   b. Which is the smallest angle?
   c. Which angle is 100°?

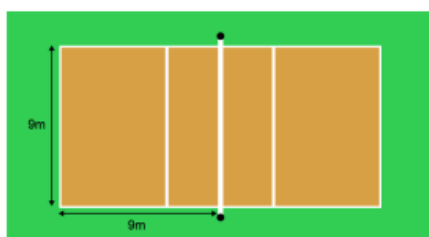2. Find the area of these shapes drawn on a square-centimetre grid.

   Drawn to actual size.

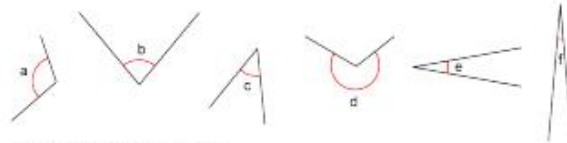3. Here are three shapes on a triangular grid. Put the shapes in order from smallest to largest according to their area.

7. Each half of a volleyball court is a 9m × 9m square. What is the total area of a volleyball court?

   9m
   9m

   Drawn to scale.

8. Estimate the area of your classroom floor.

2. Here are 6 angles.

   a. Which is the largest angle?
   b. Which is the smallest angle?
   c. Which angle is 45°?

3. This pentagon has a line of symmetry. Estimate the size of each angle.
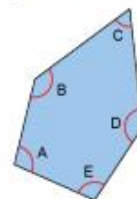
4. Measure and label each of the angles in these shapes using a protractor.
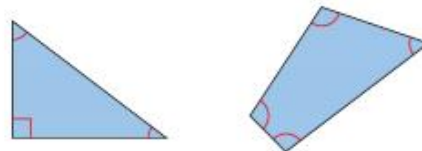
5. a. Draw an angle of 68°.
   b. Draw an angle of 103°.

5G–2 Example assessment questions

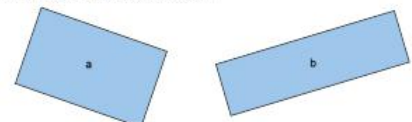1. For each pair of shapes, tick the shape with the larger shaded area.

   a   b   c   d

4. a. Draw a rectangle with an area of 12cm² on this square-centimetre grid.
   b. Draw a hexagon with an area of 12cm² on this square-centimetre grid.

   Drawn to actual size.

5. Find the area of each of these rectangles.

   a   b
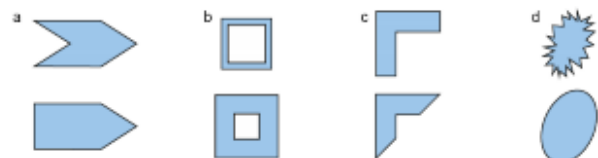
6. Leila is putting some tiles on the wall behind her kitchen sink. Each tile is square, with sides equal to 10cm.

   10cm
   10cm

   Here is the area she has tiled so far.

   If Leila adds one more row of tiles on top of these ones, what is the total area she will have tiled?

Ready-to-progress criteria addressed by this unit

Teaching of this unit supports the following criteria from the 'DfE Mathematics Guidance: key stages 1 & 2' (the document available as a download)

- **5G-1 Page 265**

NCETM Prioritisation:

- https://www.ncetm.org.uk/classroom-resources/cp-year-5-unit-10-angles/

MNP Chapter 9	**Geometry**
	Definition mats available if required as scaffold. Utilise Mathletics. Isometric paper can be printed. Range of resources in maths store, inc plastic shapes, construction equipment (large and small), and string, rope, chalk etc for outdoor investigations.
	• To know the names and qualities of acute, right, obtuse and reflex angles. • To measure angles using a protractor. • To draw, measure and add angles using a protractor. • To measure angles using a protractor; to identify two angles which add up to 180 degrees on a straight line. • To investigate angles that, when combined, make 360 degrees. • To draw angles using a protractor. • To draw lines and angles with a high level of accuracy. • To describe the sides and angles of both rectangles and squares. • To investigate the angles of various quadrilaterals, including squares and rectangles. • To solve problems involving angles in rectangles. • To use our understanding of angles to solve problems. • To investigate regular polygons.
	Some great ATM activities/problems for geometry – shared in SKE – speak to maths lead for access.
	Suitable Nrich: Cut Nets https://nrich.maths.org/2315 Stringy Quads https://nrich.maths.org/2913 Shape Draw https://nrich.maths.org/10368

Geometry Position & Symmetry

Use NCETM Check Point Materials.
See batch 3 – plotting co-ordinates (see TEAMS, click on link)

Key ideas

Connect coordinates, equations and graphs	Code
Describe and plot coordinates, including non-integer values, in all four quadrants	4.2.1.1
Solve a range of problems involving coordinates	4.2.1.2

Ready-to-progress criteria addressed by this unit – this is a year 4 unit

Teaching of this unit supports the following criteria from the 'DfE Mathematics Guidance: key stages 1 & 2' (the 335-page document available as a download)

- **4G-1 Page 192**
- **4G-3 Page 201**

Prior learning

If the following ready-to-progress criteria, contained in the same DfE guidance document as above, were secured in Year 3, children will be ready to start on this unit.

- **3G-1 Page 134**
- **3G-2 Page 137**

NCETM Prioritisation:

- https://www.ncetm.org.uk/classroom-resources/cp-year-4-unit-7-coordinates/
- https://www.ncetm.org.uk/classroom-resources/cp-year-4-unit-10-symmetry-in-2d-shapes/

MNP Chapter 10	**Position and Movement** **Recap language – including parallel and perpendicular** - To name and plot points. - To describe the position of a shape following a translation. - To describe movements and reflecting shapes. - To describe the movement of a 2-D shape when reflected. - To reflect a shape more than once. Some suitable Nrich problems: https://nrich.maths.org/9024

Measures

Assessment Questions

These questions could be incorporated into Maths Workout or lessons at any point to assess understanding. Maths No Problem Chapter Consolidation can also be used as assessment tasks.

5NPV–5 Example assessment questions

1. Fill in the missing numbers to complete these conversions between units.

1.8 litres = ☐ ml	$\frac{3}{4}$ km = ☐ m	$5\frac{1}{2}$ cm = ☐ mm
£8.12 = ☐ p	$4\frac{1}{4}$ kg = ☐ g	3.4m = ☐ cm
21mm = ☐ cm	2,250ml = ☐ litres	650cm = ☐ m
8,300m = ☐ km	165p = £☐	750g = ☐ kg

2. Put these volumes in order from smallest to largest.

   0.75 litres   1.1 litres   0.3 litres $\frac{1}{5}$ litre   900ml $1\frac{1}{2}$ litres

3. Put these lengths in order from smallest to largest.

   0.45m   10mm   208cm $2\frac{1}{2}$m   80cm   0.9m $\frac{1}{2}$cm

4. Maya needs to post 3 parcels. The mass of each parcel is shown below. How much do the parcels weigh altogether, in kilograms?

Parcel	Mass of parcel
A	3.2kg
B	4,500g
C	$1\frac{1}{2}$kg

5. Finn has a $7\frac{1}{2}$m length of wood. How many $\frac{3}{4}$m length pieces can he cut from it?

6. What is the reading on each of these scales, in kilograms?
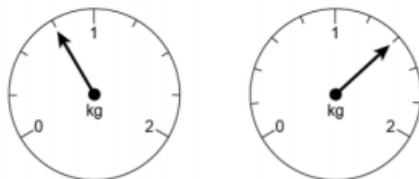
7. Here is a 1 litre beaker with some liquid in. How much more liquid, in litres, do I need to add to the beaker to make 1 litre?
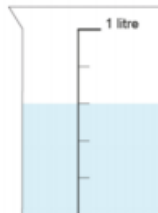
8. A motorway repair team can build 0.2km of motorway barrier in 1 day. In 6 working days, how many kilometres of motorway barrier can they build?
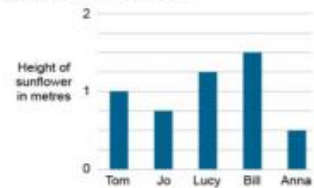
9. How many 0.25 litre servings of orange juice are there in a 2 litre carton?

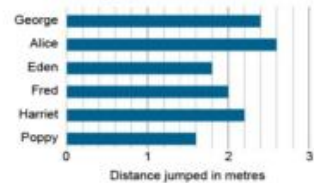10. 0.25m of ribbon costs £1. How much does 2m of ribbon cost?

11. Fill in the missing numbers.

1−0.2 = ☐	5 × ☐ m = 1m	1 ÷ 5 = ☐
1−0.8 = ☐	4 × ☐ m = 1m	1 ÷ 5 = 1− ☐
1− ☐ = 1−0.2−0.2	5 × 0.2m = 4 × ☐ m	

3. 5 children have been growing sunflowers. The bar chart shows how tall each child's sunflower has grown. How tall is each flower?'

4. The bar chart below shows long-jump distances for 6 children.

   a. How far did the winning child jump?
   b. What was the difference between the two longest jumps?

5. Complete the labelling of these scales.

Ready-to-progress criteria addressed by this unit

Teaching of this unit supports the following criteria from the 'DfE Mathematics Guidance: key stages 1 & 2' (the document available as a download)

- **5NPV-5 Page 229**

There are no RtP's for Negative Numbers.

NCETM Prioritisation:

- **https://www.ncetm.org.uk/classroom-resources/cp-year-5-unit-9-converting-units/**
- **https://www.ncetm.org.uk/classroom-resources/cp-year-5-unit-3-negative-numbers/**
- **https://www.ncetm.org.uk/classroom-resources/cp-year-5-unit-2-money/**

NCETM guidance on teaching time:
Introducing Roman numerals on a clock face
Show the children two clock faces – one with familiar 1 to 12 numbers, and one with Roman numerals. Ask them what is the same and what is different? The numerals on both are in the same position and there are 12 of them.

Look at the Roman numerals and look at how many symbols have been used - only three: I, V and X.

Ensure that the children know that I represents 1, V represents 5 and X represents 10. Use this knowledge to see how the other numbers are represented.

Use their understanding from Year 1 and Year 2 to tell the time using an analogue clock with Roman numerals as well as to draw hands on this type of clock to indicate a given time to the nearest five minutes.

Introducing a 12-hour digital clock

Introduce a 12-hour digital clock alongside an analogue clock. Focus on the hands on the analogue clock separately. Compare to the digital clock where the time runs from midnight (00:00), is divided into 12 hours in the morning (am) and 12 hours after midday (pm), and indicates hours passed since midnight.

As the hour hand moves around the clock compare what is happening to the numbers to the left of the digital clock (often separated by a colon). The numbers show 00 to 12, usually with a zero in front of the single-digit numbers. Midnight is written as 00:00 as there have been zero hours of the new day. Because of the need to know if the time is before midday or after midday introduce the use of am and pm. These terms will be shown on a digital clock but not on an analogue clock.

Then look at the minute hand and focus on minutes past each hour. As the minute hand moves around the clock face see how the numbers change from 00 to 59. Draw attention to the fact that it doesn't show 60 even though there are 60 minutes in an hour because at the end of the 59th

minute the next hour begins, and the digital clock will show 00 again. Focusing on minutes past the hour, introduce the stem sentence alongside both types of clock:

"__ minutes past __ is the same time as__ __." E.g. Thirty-five minutes past six is the same as six thirty-five.

MNP Chapter 11	**Measurements**
	Continue to revisit conversions through Maths Workout sessions using Mathletics.
	Mass, and length: Practical work is essential – not just a demonstration
	- To convert units of length. - To convert units of length, including *millimetres*, centimetres and metres. (**mm not included in MNP - -please add them in**) - To solve problems by converting units of length. - To convert units of mass, including grams into kilograms. - To convert units of time (numberline is the key representation) - To convert units of time from days into weeks and months. - To solve problems by converting units of time. - To read the temperature on a thermometer (negative numbers)
	Some suitable Nrich: https://nrich.maths.org/10411

Area & Perimeter

Assessment Questions

These questions could be incorporated into Maths Workout or lessons at any point to assess understanding. Maths No Problem Chapter Consolidation can also be used as assessment tasks.

Use the NCETM Checkpoint resources as a diagnostic tool. See batch 3 – perimeter and area. Click image – see TEAMS

Key ideas

Understand the concept of perimeter and use it in a range of problem-solving situations	Code
Use the properties of a range of polygons to deduce their perimeters	6.2.1.1
Understand the concept of area and use it in a range of problem-solving situations	**Code**
Derive and use the formula for the area of a trapezium	6.2.2.1*
Understand that the areas of composite shapes can be found in different ways	6.2.2.2

5G–2 Example assessment questions

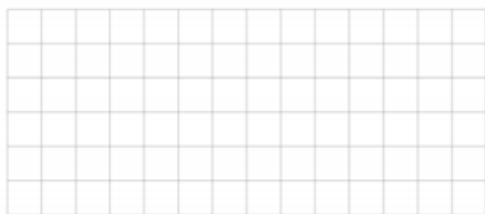1. For each pair of shapes, tick the shape with the larger shaded area.

a   b   c   d
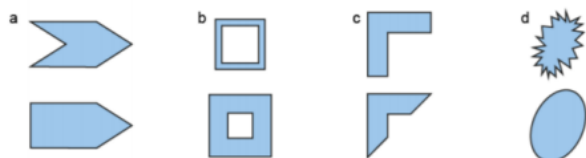
2. Find the area of these shapes drawn on a square-centimetre grid.
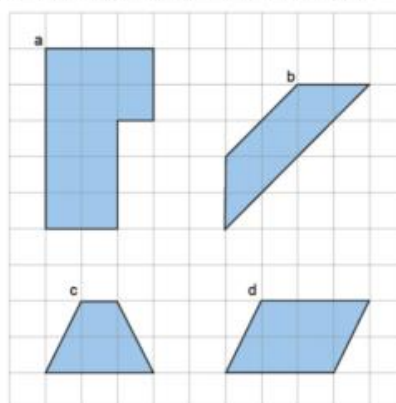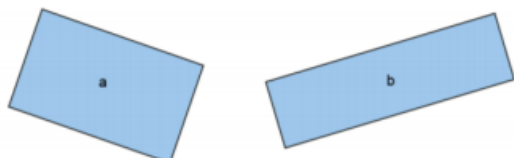
Drawn to actual size.

4. a. Draw a rectangle with an area of 12cm² on this square-centimetre grid.

   b. Draw a hexagon with an area of 12cm² on this square-centimetre grid.
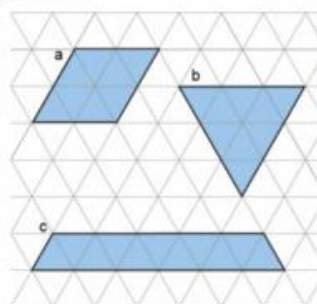
Drawn to actual size.

5. Find the area of each of these rectangles.

a   b

3. Here are three shapes on a triangular grid. Put the shapes in order from smallest to largest according to their area.

a   b   c

Ready-to-progress criteria addressed by this unit

Teaching of this unit supports the following criteria from the 'DfE Mathematics Guidance: key stages 1 & 2' (the document available as a download)

- 5G-2 Page 269

NCETM Prioritisation:

- **https://www.ncetm.org.uk/classroom-resources/cp-year-5-unit-5-area-and-scaling/**

MNP Chapter 12	**Area and Perimeter**
	• To find the perimeter of shapes.
	• To find shapes with a specific perimeter.
	• To find the perimeter of different shapes.
	• To use scale diagrams to find the perimeter of a shape.
	• To measure the area of shapes by counting squares.
	• To measure the area of squares.
	• To measure the area of a shape.
	• To measure area in square metres.
	• Area To measure area in square metres.
	• Area To find the area of shapes in square metres.
	• To make an estimation of area in kilometres.

	Suitable Nrich: Area and Perimeter https://nrich.maths.org/7280 Dicey Perimeter, Dicey Area https://nrich.maths.org/10333
MNP Chapter 13	**Volume** **Use Multilink to construct/explore solids, which will support visualisation. Make explicit the use of the associative law and post it notes.** • To understand the volume of solids. • To find the volume of 3-D shapes. • To find the capacity of a cuboid. • To compare and convert units of volume. • To convert units of volume (metric and imperial). • To solve problems involving volume. **Suitable Nrich:** Making boxes https://nrich.maths.org/89
MNP Chapter 14	**Roman Numerals** **Dates written in Roman Numerals all year.** • To write Roman numerals to 1000. • To write numbers in their thousands in Roman numerals. **Suitable Nrich:** Roman Numerals https://nrich.maths.org/13271