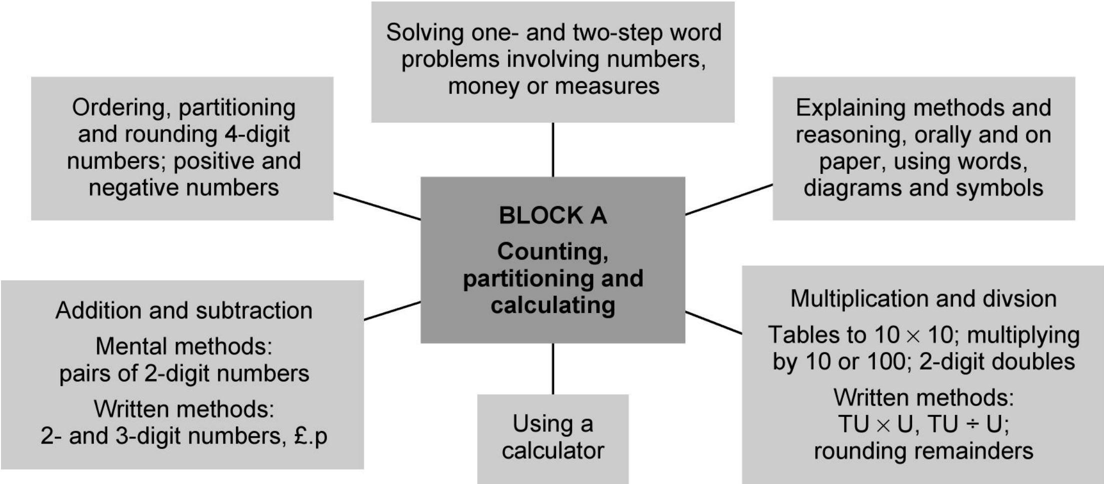
Year 4: Block A Three 2-week units

Counting, partitioning and calculating



Objectives	**Units**		
End-of-year expectations (key objectives) are highlighted	1	2	3
• Report solutions to puzzles and problems, giving explanations and reasoning orally and in writing, using diagrams and symbols	✓	✓	
• Solve one-step and two-step problems involving numbers, money or measures, including time; choose and carry out appropriate calculations, using calculator methods where appropriate			✓
• Partition, round and order four-digit whole numbers; use positive and negative numbers in context and position them on a number line; state inequalities using the symbols < and > (e.g. –3 > –5, –1 < +1)	✓		✓
• Recognise and continue number sequences formed by counting on or back in steps of constant size	✓	✓	✓
• Use decimal notation for tenths and hundredths and partition decimals; relate the notation to money and measurement; position one-place and two-place decimals on a number line		✓	✓
• Use knowledge of addition and subtraction facts and place value to derive sums and differences of pairs of multiples of 10, 100 or 1000	✓		
• Add or subtract mentally pairs of two-digit whole numbers (e.g. 47 + 58, 91 – 35)	✓	✓	✓
• Refine and use efficient written methods to add and subtract two-digit and three-digit whole numbers and £.p		✓	✓
• Derive and recall multiplication facts up to 10 × 10, the corresponding division facts and multiples of numbers to 10 up to the tenth multiple	✓	✓	✓
• Multiply and divide numbers to 1000 by 10 and then 100 (whole-number answers), understanding the effect; relate to scaling up or down	✓	✓	
• Identify the doubles of two-digit numbers; use these to calculate doubles of multiples of 10 and 100 and derive the corresponding halves	✓		

Objectives End-of-year expectations (key objectives) are highlighted	**Units**		
	1	2	3
• Develop and use written methods to record, support and explain multiplication and division of two-digit numbers by a one-digit number, including division with remainders (e.g. 15 × 9, 98 ÷ 6)		✓	✓
• Use a calculator to carry out one-step and two-step calculations involving all four operations; recognise negative numbers in the display, correct mistaken entries and interpret the display correctly in the context of money	✓		✓
• Use knowledge of rounding, number operations and inverses to estimate and check calculations	✓	✓	✓

Speaking and listening objectives for the block

Objectives	**Units**		
	1	2	3
• Use and reflect on some ground rules for dialogue (e.g. making structured, extended contributions, speaking audibly, making meaning explicit and listening actively)	✓		
• Respond appropriately to the contributions of others in the light of alternative viewpoints		✓	
• Identify the main points of each speaker, and compare their arguments and how they are presented			✓

Opportunities to apply mathematics in science

Activities		**Units**		
		1	2	3
4a	Moving and growing: When measuring relative sizes of bones, subtract mentally to calculate the differences.	✓		
4e	Friction: When investigating streamlining, calculate differences between times that different Plasticine shapes take to drop in a cylinder of water.		✓	
4b	Habitats: When carrying out surveys, calculate differences, e.g. between the numbers of different types of organisms found in different habitats.			✓

Key aspects of learning: focus for the block

Enquiry	**Problem solving**	Reasoning	Creative thinking
Information processing	**Evaluation**	Self-awareness	Managing feeling
Social skills	**Communication**	**Motivation**	Empathy

Vocabulary

problem, solution, calculate, calculation, equation, operation, answer, method, explain, predict, reason, reasoning, pattern, relationship, rule, sequence

place value, partition, thousands, digit, four-digit number, decimal point, decimal place, tenths, hundredths

positive, negative, above/below zero, compare, order, greater than (>), less than (<), equal to (=), round, estimate, approximately add, subtract, multiply, divide, sum, total, difference, plus, minus, product, quotient, remainder

calculator, display, key, enter, clear, constant

pound (£), penny/pence (p), units of measurement and abbreviations, degrees Celsius (°C)

Building on previous learning

Check that children can already:

- identify the calculation needed to solve a word problem
- explain and record their methods and solutions to problems and calculations
- read, write, partition and order whole numbers to 1000
- use £.p notation
- understand and use the < and > signs
- round two- or three-digit numbers to the nearest 10 or 100
- recall addition and subtraction facts for each number to 20
- add or subtract mentally combinations of one- and two-digit numbers
- derive number pairs that total 100
- use informal written methods to add and subtract two- and three-digit numbers
- estimate sums and differences of two- or three-digit numbers
- recall multiplication and division facts for the 2, 3, 4, 5, 6 and 10 times-tables
- multiply one- and two-digit numbers by 10 and 100
- use informal written methods to multiply and divide two-digit numbers
- round remainders up or down, depending on the context

Unit 4A1 — 2 weeks

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Report solutions to puzzles and problems, giving explanations and reasoning orally and in writing, using diagrams and symbols *I can explain to someone else how I solve problems and puzzles*	How did you solve this problem? If you had to solve it again would you do anything differently? Why? Suppose the problem had these numbers. Would that change the way you would solve the problem? What diagram did you draw to help you to solve the problem? Did anyone use a different diagram? Which diagram is more helpful? Why?
• Partition, round and order four-digit whole numbers; use positive and negative numbers in context and position them on a number line; state inequalities using the symbols < and > (e.g. –3 > –5, –1 < +1) *I can read, write and put in order four-digit numbers and positive and negative numbers* *I can use the < and > signs with positive and negative numbers (e.g. –3 < 1)*	What is the biggest whole number that you can make with these four digits: 3, 0, 6, 5? What is the smallest whole number that you can make with the digits? Look at this number sentence: ☐ + ◇ = 1249. What could the missing numbers be? What tips would you give someone who is learning how to round numbers to the nearest 10, or 1000? I rounded a number to the nearest 10. The answer is 340. What number could I have started with? The local newspaper said that 800 people attended the summer fair. The newspaper gave the number to the nearest 100. What is the smallest number of people that could have attended? What is the largest number? I measured the temperature in the morning. By the evening it had fallen by 8 degrees and was below freezing point. What could the morning and evening temperatures be? Tell me two temperatures that lie between 0 degrees and –10 degrees. Which of the two temperatures is the warmer? What number can you put in the box to make this statement true? ☐ < –2
• Use knowledge of addition and subtraction facts and place value to derive sums and differences of pairs of multiples of 10, 100 or 1000 *I can work out sums and differences of multiples of 100 or 1000*	Add or subtract these numbers. Tell me how you did it. 30 + 80 70 – 50 800 + 500 900 – 400 5000 + 3000 8000 – 6000
• Add or subtract mentally pairs of two-digit whole numbers (e.g. 47 + 58, 91 – 35) *I can add and subtract two-digit numbers in my head (e.g. 26 + 47, 43 – 16)*	Work out 37 + 58 (or 91 – 35) in your head. Tell me how you did it. Did anyone do it a different way? How could we record the method that you used? What number do you need to add to 46 to make 92? How did you work it out? Is there a different way to do it?
• Recognise and continue number sequences formed by counting on or back in steps of constant size *I can count on and back in eights*	Count on in eights from zero. Now count back to zero. This time, count on seven eights from zero. Show me seven hops of eight from zero on the number line.
• Derive and recall multiplication facts up to 10 × 10, the corresponding division facts and multiples of numbers to 10 up to the tenth multiple *I know my 8 times-table and my 9 times-table*	How can you work out the 8 times-table from the 4 times-table? Or the 9 times-table from the 3 times-table? If you know that 9 × 8 = 72, what is 72 ÷ 9? What is 720 ÷ 9? What is the relationship between 8 × 7 = 56, 6 × 7 = 42 and 14 × 7 = 98?

Objectives *Children's learning outcomes in italic*	**Assessment for learning**
• Multiply and divide numbers to 1000 by 10 and then 100 (whole-number answers), understanding the effect; relate to scaling up or down *I can multiply and divide by 10 and 100. I can explain what happens to the digits when I do this*	Why do 6 × 100 and 60 × 10 give the same answer? I have 37 on my calculator display. How can I change it to 3700 in one operation? Is there another way to do it? What number is 10 times smaller than 2450? What number is 100 times bigger than 36? I divide a four-digit number by 100. The answer is between 70 and 75. What could the four-digit number be? Change 4527 pence into pounds. Change £10.39 to pence. Write a price ticket for four pounds and six pence.
• Identify the doubles of two-digit numbers; use these to calculate doubles of multiples of 10 and 100 and derive the corresponding halves *I can double two-digit numbers*	Work out double 47 in your head. Tell me how you did it. Is there a different way to do it? What is double 470? Double 4700? What is half of 72? How did you work it out? Is there a different way to do it? What is half of 720? Half of 7200? How do you know?
• Use a calculator to carry out one-step and two-step calculations involving all four operations; recognise negative numbers in the display, correct mistaken entries and interpret the display correctly in the context of money *I can use a calculator to help me solve one-step and two-step problems* *I know how to enter prices such as £1.29 and £2.30 into a calculator* *I know that –7 on a calculator means negative 7*	What can go wrong when you are doing a calculation on a calculator? How would you put it right? I typed in 124 on my calculator. I meant to type in 125. What keys should I press to correct my mistake? Add these prices on your calculator. I will read them one at a time for you to enter: six pounds and seventy-six pence; nine pounds and ten pence; seven pounds and six pence. What is the total? Did you get £22.92? What do you need to add to get £23?
• Use knowledge of rounding, number operations and inverses to estimate and check calculations *I can estimate and check the result of a calculation*	Roughly, what will the answer to this calculation be? How do you know that this calculation is probably right?
• Use and reflect on some ground rules for dialogue (e.g. making structured, extended contributions, speaking audibly, making meaning explicit and listening actively) *I can explain how I add and subtract two-digit numbers in my head*	Tell everyone about the method you used. Explain to the group why you chose that method. Listen carefully while Mai tells you about her method. Now use Mai's method to work out this calculation.

Learning overview

Children **read, write and order** numbers with four digits. They partition them into multiples of 1000, 100, 10 and 1 and understand the importance of zero as a place holder in numbers such as 2036. They use their understanding of place value to add or subtract 1, 10, 100 or 1000 to or from whole numbers, responding to questions such as:

What needs to be added/subtracted to change 4782 to 9782? Or 2634 to 2034?

What is 100 ml more/less than 3250 ml? What is 10 m more/less than 5000 m?

Which is less: 4 hundreds or 41 tens?

Children recognise and interpret **negative numbers** on the number line and in practical contexts, and use this knowledge to solve problems. For example, they read positive and negative numbers representing temperatures on a thermometer. They compare temperatures from different places around the world, or from their work in science, and can say which are warmer or colder. They **compare and order** positive and negative numbers, and position them on a number line, for example, to identify temperatures that are warmer than –9°C but colder than –6°C. They use the **< and > signs** to record statements such as –3 < –1 or –1 > –3. They solve problems such as:

The temperature is –2°C. How much must it rise to reach 3°C?

Children **count** forwards and backwards in steps of equal sizes, starting from a positive or negative number. They count back in fours from 40 and discuss what happens when they reach 0. They **predict** numbers that will occur in the sequence, using their counting skills to answer questions such as: *If I keep on subtracting 3 from 10 will –13 be in my sequence?* They use a calculator to check, recognising how negative numbers appear in the display.

Children **multiply and divide numbers up to 1000 by 10 and then 100**. They understand and can explain that when a number is divided by 100 the digits of the number move two places to the right and when a number is multiplied by 100 the digits move two digits to the left. They use a **calculator** to investigate whether dividing by 10 and then 10 again has the same effect as dividing by 100. They apply their knowledge of multiplying and dividing by 10 and 100 to solve problems involving scaling, such as: *A giant is 100 times bigger than you. How wide is the giant's hand span? How long is the giant's foot?* They extend their knowledge of **multiplication and division facts to 10 × 10**, and use this knowledge and their understanding of place value to begin to **multiply and divide multiples of 10** such as 50 × 6, 90 × 3, 80 ÷ 4, 150 ÷ 3.

Children **add and subtract pairs of two-digit numbers** by drawing on their knowledge of place value and number facts. They identify when to use mental strategies such as partitioning or rounding and adjusting. They recognise that 49 + 37 is equivalent to 50 + 37 – 1, or that 98 – 43 can be calculated as 98 – 40 – 3. They record the steps of a mental calculation, for example on an empty number line, and compare their approach with the approaches used by others.

Children **solve problems,** including those involving money. They identify what calculations to do, when to calculate mentally (with or without jottings) and when to use a calculator. They learn how to clear a calculator display before starting a calculation and how to correct an accidental wrong entry with the clear-entry key. They learn also how to enter money and how to interpret the display in the context of the question. For example, to calculate £4.35 + £3.85, they key in 4.35 [+] 3.85 [=] and interpret the outcome of 8.2 as £8.20. They write down the keys pressed as a record of their method.

Children **solve puzzles** involving addition and subtraction. For example, they use numbers 37, 52, 77 and 87 to satisfy statements such as □ – ○ = 35, or □ + ○ = 114.

Children contribute to paired, grouped and whole-class discussions about their calculation strategies. They **listen** to others' explanations and ask questions if they need clarification. They explain their solutions in **writing**, recording the stages in the problem in a **systematic way**.

Unit 4A2 2 weeks

Objectives *Children's learning outcomes in italic*	**Assessment for learning**
• Report solutions to puzzles and problems, giving explanations and reasoning orally and in writing, using diagrams and symbols *I can explain how I solve problems, using diagrams and symbols to help me*	What information did you use to solve this problem? Why? Tell me why you chose this way to record your solution to the problem. Could you have done it differently? Make up a word problem that could be solved using each calculation: 6 × 5, 30 ÷ 3, 30 – 7, 26 + 19 Sort these problems into those you would do mentally and those you would do with pencil and paper. Explain your decisions.
• Use decimal notation for tenths and hundredths and partition decimals; relate the notation to money and measurement; position one-place and two-place decimals on a number line *I can use decimals when I work with money and measurement*	Can you tell me what the digit 7 represents in each of these amounts: £2.70, 7.35 m, £0.37, 7.07 m? Which is larger: 239p or £2.93? Why? Put these in order: £0.56, 125p, £3.60, 250p, 7p, £5, 205p. Which is the smallest? How do you know? Which is the largest? How do you know? What amount of money comes next: £1.76, £1.86, £1.96, …?
• Add or subtract mentally pairs of two-digit whole numbers (e.g. 47 + 58, 91 – 35) *I can add and subtract mentally pairs of two-digit numbers and find a difference by counting on*	What strategies would you use to work out the answers to these calculations: 47 + 58, 91 – 35? Could you use a different method? How could you check that your answer is correct? The difference between a pair of two-digit numbers is 13. What could the pair of numbers be? How would you calculate the answer to 93 – 86? Why would you choose that strategy?
• Refine and use efficient written methods to add and subtract two- and three-digit whole numbers and £.p *I can add and subtract three-digit numbers using a written method*	Which of these are correct/incorrect? What has this person done wrong? How could you help them to correct it? How does partitioning help to solve 436 + 247? What tips would you give to someone to help them with column addition/subtraction?
• Recognise and continue number sequences formed by counting on or back in steps of constant size *I can count on and back in sevens*	Count on in sevens from zero. Now count back to zero. This time, count on eight sevens from zero. Show me seven hops of eight from zero on the number line. Now show me eight hops of seven. What do you notice?
• Derive and recall multiplication facts up to 10 × 10, the corresponding division facts and multiples of numbers to 10 up to the tenth multiple *I know my tables to 10 × 10* *I can use the multiplication facts I know to work out division facts*	The product is 40. What two numbers could have been multiplied together? How many multiplication and division facts can you make, using what you know about 24 (or 20, 30)? How did you work out the division facts?
• Multiply and divide numbers to 1000 by 10 and then 100 (whole-number answers), understanding the effect; relate to scaling up or down *I can multiply and divide numbers by 10 or 100 and describe what happens to the digits*	What number is ten times bigger than 500? Explain the calculation you would use to change 25 to 2500. How many tens are there in 200? How many hundreds in 2000? If 4 × 6 = 24, what is 40 × 6 and 400 × 6? How could you quickly work out the answers to these calculations: 3 × 80, 120 ÷ 4? The product of two numbers is 2000. What could the two numbers be?

Objectives *Children's learning outcomes in italic*	**Assessment for learning**
• Develop and use written methods to record, support and explain multiplication and division of two-digit numbers by a one-digit number, including division with remainders (e.g. 15 × 9, 98 ÷ 6) *I can multiply and divide a two-digit number by a one-digit number*	How would partitioning help you to calculate 27 × 6? How does knowing that 10 × 6 = 60 help you to calculate the answer to 72 ÷ 6? Do all divisions have remainders? Make up some division questions that have no remainder. How did you do this? Why don't they have a remainder? Make up some division questions that have a remainder of 1. How did you do it?
• Use knowledge of rounding, number operations and inverses to estimate and check calculations *I can estimate and check the result of a calculation*	Roughly, what answer do you expect to get? How did you arrive at that estimate? Do you expect your answer to be greater or less than your estimate? Why?
• Respond appropriately to others in the light of alternative viewpoints *I can explain how I solved a problem and can decide whether someone else solved it in a better way*	Explain what information you used to solve the problem. What stages did you go through to complete it? What calculations did you do? Did you draw any diagrams? Why? Did anyone solve the problem in a different way? Which do you think was the best way to solve the problem? Why?

Learning overview

Children develop understanding of **decimal notation** for tenths and hundredths in the context of money and length. They understand that the decimal point is used to separate whole amounts and parts of the whole. They respond to questions such as: *What does the digit 6 represent in £1.65?* and recognise that because there are ten lots of 10p in £1, then 60p is six tenths of £1. They **count on and back** in equal steps to develop a sequence. They use patterns and relationships between numbers to **predict** the next term in a sequence such as £1.37, £1.47, £1.57, and they describe the pattern or rule. They **order** money and measurements involving decimals. For example, they locate 1.2 m, 2.1 m, 1.5 m and 2.5 m on a line numbered from 0 to 3 metres and marked in tenths.

Children continue to **add or subtract mentally pairs of two-digit whole numbers**. They use a 100-square to derive pairs of numbers that sum to 100. When presented with calculations such as 93 – 86 (e.g. *I have 93p and Sam has 86p. How much more money do I have?*) they recognise that the numbers are close together and can **find the difference by counting up**. They suggest other calculations where counting up would be an appropriate strategy, e.g. 403 – 386.

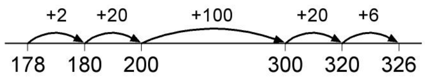
For additions and subtractions that cannot easily be done mentally, children **develop written methods**. They rehearse **rounding** two- and three-digit numbers to the nearest 10 and 100. They use rounding to **estimate** a calculation; for example, they recognise that the answer to 367 + 185 is less than 400 + 200, and that 725 – 477 is about 700 – 500. They build on their understanding of place value and partitioning to refine and use efficient methods of recording for addition and subtraction. For example, for 367 + 185 children use an expanded method, then move on to recording this vertically:

$$\begin{array}{rl} 367 & = 300 + 60 + 7 \\ +\ 185 & = \underline{100 + 80 + 5} \\ & 400 + 140 + 12 = 552 \end{array}$$

$$\begin{array}{r} 367 \\ \underline{+185} \\ 400 \\ 140 \\ \underline{12} \\ 552 \end{array} \qquad \begin{array}{r} 367 \\ \underline{+185} \\ 12 \\ 140 \\ \underline{400} \\ 552 \end{array}$$

Children discuss how adding the ones first gives the same answer as adding the hundreds first. Over time, they move to consistently adding the ones digits first.

For 326 – 178, they extend their understanding of ‘difference’ by counting up from 178 to 326, initially using an empty number line and then moving on to vertical recording.



$$\begin{array}{rl} 326 & \\ -\underline{178} & \\ 2 & \rightarrow 180 \\ 20 & \rightarrow 200 \\ 100 & \rightarrow 300 \\ \underline{26} & \rightarrow 326 \\ 148 & \end{array}$$

Children explain orally how their method of calculation works and demonstrate an understanding of the place value that underpins written methods. Children with a firm understanding of the expanded methods move towards refining their recording to make them more efficient.

Children continue to derive and practise recalling **multiplication and division facts to 10 × 10**. They consolidate **multiplying and dividing numbers to 1000 by 10 and 100**. They work out how many 10p coins there are in £15 or £150 and can complete equations such as 4000 ÷ ☐ = 400. They **apply** their knowledge of multiplying by 10 to known multiplication and division facts. For example, they recognise that if they know the answer to 3 × 6 they can calculate 30 × 6 or 3 × 600; equally if they know 21 ÷ 3 they also know 210 ÷ 3. They use this knowledge to **develop written methods for multiplying and dividing** a two-digit by a one-digit number. When calculating 38 × 7 they approximate first (approximately 40 × 10 = 400), partition into 30 × 7 and 8 × 7 and represent this on a grid.

38 × 7 = (30 × 7) + (8 × 7) = 210 + 56 = 266

×	7
30	210
8	56
	266

The number with the most digits is always placed in the left-hand column of the grid so that it is easier to add the partial products.

	30 + 8
×	7
	210
	56
	266

The next step is to move the number being multiplied (38) to an extra row at the top of the grid. Presenting the grid like this helps children to set out and add the partial products 210 and 56.

$$\begin{array}{rl} 30+8 & \\ \times\ \underline{\ \ 7} & \\ 210 & 30\times 7=210 \\ \underline{56} & \ \ 8\times 7=\ \ 56 \\ \underline{266} & \end{array}$$

The next step is to reduce the method of recording to a column format, but showing the working. Point out the links with the grid method on the left.

When dividing 64 by 4 children approximate first. They recognise that the answer must lie between 40 ÷ 4 = 10 and 80 ÷ 4 = 20, and use this approximation to do a calculation such as:

$$\begin{aligned} 64\div 4 &= (40+24)\div 4 \\ &= (40\div 4)+(24\div 4) \\ &= 10+6=16 \end{aligned}$$

$$\begin{array}{rl} 64 & \\ -\underline{40} & (4\times 10) \\ 24 & \\ \underline{24} & (4\times 6) \\ 0 & \qquad \text{Answer: 16} \end{array}$$

Remainders after division are recorded similarly.

$$\begin{aligned} 96\div 7 &= (70+26)\div 7 \\ &= (70\div 7)+(26\div 7) \\ &= 10+3\text{ R }5=13\text{ R }5 \end{aligned}$$

$$\begin{array}{rl} 96 & \\ -\underline{70} & (7\times 10) \\ 26 & \\ \underline{21} & (7\times 3) \\ 5 & \qquad \text{Answer: 13 R 5} \end{array}$$

Children use their knowledge of calculations to **solve problems and puzzles**. Given an equation with missing digits such as 7☐ + ☐8 = 1☐☐, they find how many different ways they can complete it. They find three consecutive numbers which add up to 39 and then consider what other numbers up to 50 they can make by adding three consecutive numbers. They record the stages in the problem using calculations and/or drawings. They explain what information they selected and why. They **evaluate** the work of other children and modify their thinking in the light of comments and questions from others.

Unit 4A3 — 2 weeks

Objectives *Children's learning outcomes in italic*	**Assessment for learning**
• Solve one-step and two-step problems involving numbers, money or measures, including time; choose and carry out appropriate calculations, using calculator methods where appropriate *I can work out how to solve problems with one or two steps* *I can choose what calculation to work out and I can decide whether a calculator will help me*	What are the important things to remember when you solve a word problem? Explain what you did to get your answer. How did you know whether to add, subtract, multiply or divide? What clues did you look for in the problem? Show me how you recorded any calculations you needed to do to solve the problem. Did you have to do anything to your answer to make it fit with the problem? Tell me what you did.
• Recognise and continue number sequences formed by counting on or back in steps of constant size *I can count on and back using negative numbers*	Count back in twos from six. Show me seven hops of two forwards from negative five on the number line.
• Partition, round and order four-digit whole numbers; use positive and negative numbers in context and position them on a number line; state inequalities using the symbols < and > (e.g. –3 > –5, –1 < +1) *I can read, write and put in order positive and negative numbers* *I can use the < and > signs with positive and negative numbers (e.g. –3 < 1)*	What numbers could go in the boxes to make these correct? $\square + \bigcirc < 20$ $\quad$ $30 > \square - \bigcirc$ Write a statement using two negative numbers and the 'greater than' symbol. Write a statement using a positive number and a negative number and the 'less than' symbol.
• Use decimal notation for tenths and hundredths and partition decimals; relate the notation to money and measurement; position one-place and two-place decimals on a number line *I know how to use decimal notation to write numbers such as one and one tenth, two and three tenths, three hundredths* *I can write two pounds forty and three pounds seven pence using decimal points* *I can put three numbers written in decimal notation in the correct places on a number line*	What does the digit 7 represent in each of these numbers: 3.7, 7.3, 0.37, 3.07? What if I put a pound sign in front of each of these numbers? What if they are all lengths given in metres? Write these lengths in order: 47 cm, 1.14 m, 3.6 m, 250 cm, 0.85 m. Which is the shortest? How do you know? Which is the longest? How do you know? Enter 5.3 on to your calculator display. How can you change this to 5.9 in one step (operation)? A CD costs between £5.50 and £5.65. How much could it cost? I am nearly 1.65 m tall. How tall could I be?
• Add or subtract mentally pairs of two-digit whole numbers (e.g. 47 + 58, 91 – 35) *I can add and subtract mentally any two-digit numbers you give me, such as 56 + 22, 58 + 39, 64 – 37, 98 – 89*	Work out 56 + 27. Explain what you did. What did you notice about the numbers that helped you choose how to do it? Repeat with other calculations. The difference between a pair of two-digit numbers is 17. What could the pair of numbers be?

Objectives *Children's learning outcomes in italic*	**Assessment for learning**
• Refine and use efficient written methods to add and subtract two-digit and three-digit whole numbers and £.p *I can add and subtract two-digit and three-digit numbers using a written method*	Show me how you would calculate 257 + 47 + 35. Give an example of a calculation where it is helpful to change pounds into pence before you work out the calculation.
• Derive and recall multiplication facts up to 10 × 10, the corresponding division facts and multiples of numbers to 10 up to the tenth multiple	The product is 36. What two numbers have been multiplied together? If 7 × 8 = 56, what is 7 × 9?
• Develop and use written methods to record, support and explain multiplication and division of two-digit numbers by a one-digit number, including division with remainders (e.g. 15 × 9, 98 ÷ 6) *I can multiply and divide a two-digit number by a one-digit number* *I know how to interpret a remainder*	Give me an example of a two-digit by one-digit multiplication you could do mentally. Give me an example of a similar multiplication where you would use a written method. Describe a problem that will give you a remainder that you will need to round up. What is the largest remainder you can have when you divide by 6?
• Use a calculator to carry out one-step and two-step calculations involving all four operations; recognise negative numbers in the display, correct mistaken entries and interpret the display correctly in the context of money *I know that when I am working with money, 5.4 on a calculator display means £5.40*	Use a calculator to add these amounts of money: 62p, £1.50, 550p, £15, 8p. What will you have to do before you can add them using a calculator? What does the answer in the display, 22.7, mean? My calculator display says 1.2. What was the question? What other possibilities are there? What would the display of 1.2 mean if you were working with pounds? With metres?
• Use knowledge of rounding, number operations and inverses to estimate and check calculations *I can estimate and check the result of a calculation*	Roughly, what answer do you expect to get? How did you arrive at that estimate? Is this calculation correct? How do you know?
• Identify the main points of a speaker, compare their arguments and how they are presented *I can listen to ways that other people solve problems and compare their answer with my own*	What was the main difference between Jyoti's method and your method? These two displays which children have made show all the ways of making 50p using only silver coins. Which display is organised in a better way? Why?

Learning overview

Children rehearse **counting forwards and backwards** and developing number sequences involving positive and negative numbers. They start their own sequence and challenge others to continue it, describing the rule and pattern. They **extend number sequences**, including those involving **decimals** in the context of money and length, e.g. they count in steps of 50p in a sequence such as £0.50, £1.00, £1.50, £2.00, or in steps of 25 cm in a sequence like 1.25 m, 1.5 m, 1.75 m. They **predict** numbers that will occur in the sequence and ask **What if?** questions, such as: *What would my sequence look like if I counted in steps of 20p from £1.10?* They recognise that to enter £1.10 in a calculator they press the 1.1 keys. They use the constant function to check their predictions (e.g. by pressing 1.1 [+] [+] 0.2 the calculator counts in steps of 0.2 every time the = sign is pressed). They relate this back to counting in steps of 20p in the context of money.

Children continue to derive pairs of numbers that total 100. They extend this to find pairs of multiples of 50 that total 1000, such as 150 + 850. They continue to **add and subtract two-digit numbers mentally,** choosing their strategy based on the numbers involved. They investigate how many different ways they can complete an equation such as ☐☐ – 47 = ☐9, and they find the largest and smallest possible differences. They solve **mathematical problems and puzzles**, such as:

Lisa went on holiday. In 5 days she made 80 sandcastles. Each day she made 4 fewer castles than the day before. How many sandcastles did she make each day?'

Children continue to refine their **written methods of calculation** to make them more efficient. Those who can confidently explain how an expanded method works move on to a more compact method of recording, while others continue with an expanded method. They tackle calculations with different numbers of digits; for example, they find 754 + 86 and 518 – 46. They begin to add two or more three-digit sums of money, first adjusting them from pounds to pence and then moving on to using decimal notation; for example, they find the total of £4.21 and £3.87. They also begin to find the difference between sums of money such as £7.50 – £2.84. Before they begin a calculation they use rounding to **estimate** the answer.

Children continue to develop **written methods to multiply and divide TU by U**. They estimate the answer before calculating, and recognise how partitioning helps to break down the calculation into manageable parts. They give a remainder as a whole number, recognising that it represents what is left over after a division and is always smaller than the divisor. They make sensible decisions about rounding up or down after division according to the context. When faced with a problem such as: *A box holds 6 cakes. How many boxes will be need for 80 cakes?* they recognise the need to round up, while for: *I have £62. Tickets cost £8 each. How many tickets can I buy?* they recognise the need to round down.

Children solve one and two-step **word problems** involving all four operations, some of which are in the context of money, measures or time. For each problem they select relevant information and the calculation(s) that they need to do. They also decide whether to calculate mentally, use jottings to keep track of the calculation, use a written method or use a calculator. They learn how to set out a solution to a word problem by recording the calculation they have done. They **communicate the main points** of their solutions to each other, **comparing their approaches** and explaining their decisions.