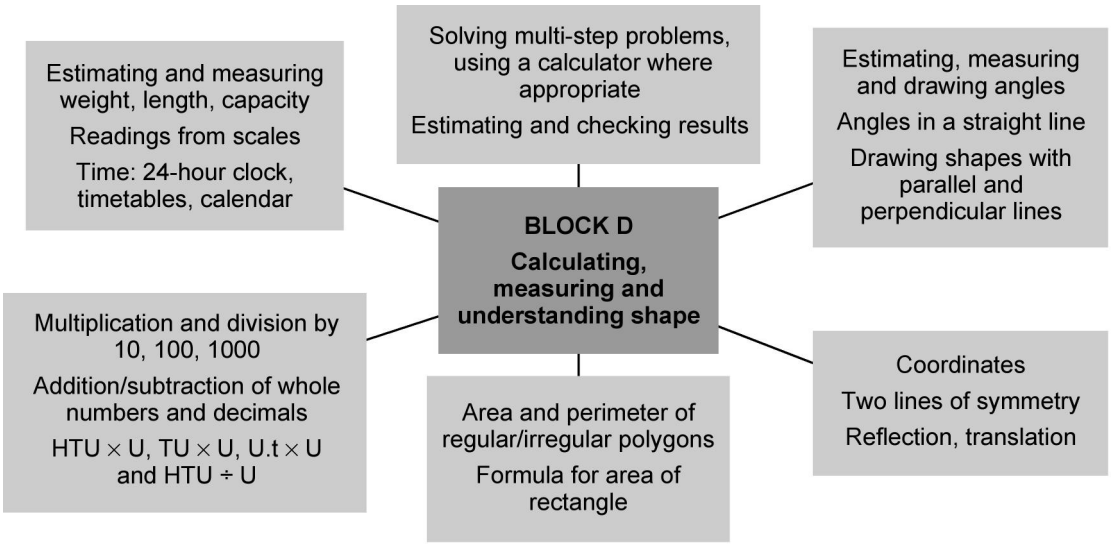
Year 5: Block D — Three 2-week units

Calculating, measuring and understanding shape



Objectives End-of-year expectations (key objectives) are highlighted	Units 1	 2	 3
• Solve one-step and two-step problems involving whole numbers and decimals and all four operations, choosing and using appropriate calculation strategies, including calculator use	✓	✓	✓
• Use knowledge of rounding, place value, number facts and inverse operations to estimate and check calculations		✓	✓
• Use efficient written methods to add and subtract whole numbers and decimals with up to two places		✓	✓
• Use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 or 1000	✓	✓	
• Refine and use efficient written methods to multiply and divide HTU × U, TU × TU, U.t × U and HTU ÷ U		✓	✓
• Use a calculator to solve problems, including those involving decimals or fractions (e.g. to find $^{3}/_{4}$ of 150 g); interpret the display correctly in the context of measurement	✓	✓	✓
• Read and plot coordinates in the first quadrant; recognise parallel and perpendicular lines in grids and shapes; use a set-square and ruler to draw shapes with perpendicular or parallel sides	✓	✓	✓
• Complete patterns with up to two lines of symmetry; draw the position of a shape after a reflection or translation			✓
• Estimate, draw and measure acute and obtuse angles using an angle measurer or protractor to a suitable degree of accuracy; calculate angles in a straight line		✓	✓
• Read, choose, use and record standard metric units to estimate and measure length, weight and capacity to a suitable degree of accuracy (e.g. the nearest centimetre); convert larger to smaller units using decimals to one place (e.g. change 2.6 kg to 2600 g)	✓	✓	✓

Objectives End-of-year expectations (key objectives) are highlighted	Units		
	1	2	3
• Interpret a reading that lies between two unnumbered divisions on a scale	✓	✓	✓
• Draw and measure lines to the nearest millimetre; measure and calculate the perimeter of regular and irregular polygons; use the formula for the area of a rectangle to calculate the rectangle's area	✓	✓	✓
• Read timetables and time using 24-hour clock notation; use a calendar to calculate time intervals	✓		✓

Speaking and listening objectives for the block

Objectives	Units		
	1	2	3
• Plan and manage a group task over time by using different levels of planning	✓		
• Understand the process of decision making		✓	
• Understand different ways to take the lead and support others in groups			✓

Opportunities to apply mathematics in science

Activities		Units		
		1	2	3
5e	Earth, Sun and Moon: Use secondary data from timetables and calendars to describe sunrise, sunset and day length.	✓		
5e	Earth, Sun and Moon: Model different position of the Sun in the sky and the effect on the length of shadows by shining a torch on an object from different measured angles.		✓	
5c	Gases around us: Illustrate evaporation by chalking round the edge of puddles; make annotated drawings to describe and explain what happens.			✓

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, answer, method, strategy, compare, order, explain, predict, reason, reasoning, pattern, relationship

operation, calculation, calculate, calculator, equation, add, subtract, multiply, divide, sum, total, difference, plus, minus, product, quotient, remainder, calculator, memory, display, key, enter, clear

place, place value, decimal, decimal point, decimal place, estimate, approximate, approximately

measure, measurement, measuring scale, scales, balance, metre stick, tape measure, ruler, measuring cylinder, metric unit, standard unit, length, distance, perimeter, area, surface area, mass, weight, capacity, units of measurement and their abbreviations

days of the week, months of the year, second (s), minute (min), hour (h), day, month, calendar, timetable, 12-hour clock, 24-hour clock, am and pm

angle, degree (°), angle measurer, protractor, set-square, acute, obtuse, right angle

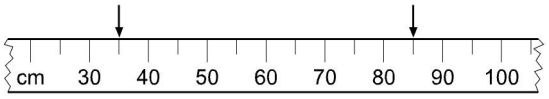
position, direction, parallel, perpendicular, reflection, reflective symmetry, line of symmetry, mirror line, translation, coordinates, x-coordinate, y-coordinate, origin, x-axis, y-axis

Building on previous learning

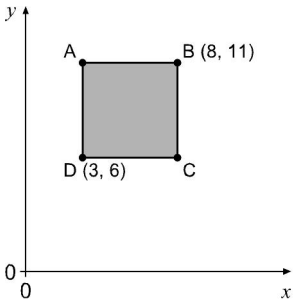
Check that children can already:

- talk about their methods and solutions to one- and two-step problems
- partition, round and order four-digit whole numbers and decimals to two places, and use decimal notation to record measurements, e.g. 1.3 m or 0.6 kg
- multiply and divide numbers to 1000 by 10 and 100 (whole-number answers)
- use written methods to add and subtract two- and three-digit whole numbers and £.p, and to multiply and divide two-digit numbers by a one-digit number, including division with remainders, e.g. 15 × 9, 98 ÷ 6
- know that addition is the inverse of subtraction and that multiplication is the inverse of division, and vice versa
- use a calculator to carry out one- and two-step calculations involving all four operations
- know that angles are measured in degrees and that one whole turn is 360°
- read scales to the nearest tenth of a unit
- measure and calculate perimeters of rectangles and find the area of shapes drawn on a square grid by counting squares
- read time to the nearest minute; use am, pm and 12-hour clock notation, and calculate time intervals from clocks and timetables

Unit 5D1 2 weeks

Objectives *Children's learning outcomes in italic*	**Assessment for learning**
• Solve one-step and two-step problems involving whole numbers and decimals and all four operations, choosing and using appropriate calculation strategies, including calculator use *I can identify the steps I need to take to solve problems* *I can decide whether to do a calculation using mental methods, written methods or a calculator*	What information did you use to solve the problem? How did you decide what calculations to do? Solve a problem such as: Three prize pigs weigh 850 kg altogether. The heaviest pig is 378 kg. The lightest pig is half the mass of the heaviest pig. How heavy is the middle-sized pig? How did you work out your answer?
• Use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 or 1000 *I can multiply and divide whole numbers by 10, 100 and 1000*	Tell me a quick way of multiplying a number by 10. By 100. Tell me a quick way of dividing a number by 10. By 100. Explain what happens to the digits when you multiply or divide a whole number by 1000. What do you notice about the digits in your answer? How many times larger than 60 is 600?
• Use a calculator to solve problems, including those involving decimals or fractions (e.g. to find $^3/_4$ of 150 g); interpret the display correctly in the context of measurement *I can use a calculator to solve problems that involve decimal measurements*	The perimeter of a regular pentagon is 285 cm. What is the length of each side? Explain your method. The perimeter of a square field is 1300 m. It has a hedge along one side. How much fencing does the farmer have to buy to fence the other three sides? A relay team has 5 members. They run a race that is 28 km long. Each member of the team runs the same distance. How far does each team member run?
• Read, choose, use and record standard metric units to estimate and measure length, weight and capacity to a suitable degree of accuracy (e.g. the nearest centimetre); convert larger to smaller units using decimals to one place (e.g. change 2.6 kg to 2600 g) *I can choose appropriate units to measure length and distance* *I can read metre sticks, tape measures and rulers marked in cm and mm accurately* *I can make sensible estimates of length in everyday contexts* *I know how many millimetres there are in a centimetre or metre, and how many metres there are in a kilometre*	How tall is the tree at the top of the playground? How do I write 6 metres 4 centimetres as a decimal? Tell me an example of something you would measure in kilometres. What about metres? Centimetres? Millimetres? What unit of measurement would you use for: the length of fencing to go around the playground? the distance around your head? a 'fun run' to raise money for charity? the width of a pin head? Is the height of the classroom about 3 m, 6 m or 12 m? Is the length of this crayon about 5 mm, 55 mm or 555 mm?
• Interpret a reading that lies between two unnumbered divisions on a scale *I can interpret a reading between two unnumbered divisions on a ruler, tape measure or metre stick*	What is the distance between the two arrows?  How many of these cherries weigh between 85 g and 90 g?

Objectives *Children's learning outcomes in italic*	**Assessment for learning**
• Read timetables and time using 24-hour clock notation; use a calendar to calculate time intervals *I can use a calendar to work out how many days and weeks it is to my birthday* *I can change am or pm times to 24-hour clock times, and vice versa*	Here is the calendar for August 1998. **August 1998** Sun Mon Tues Wed Thur Fri Sat 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 Simon's birthday is on August 20th. In 1998 he had a party on the Sunday after his birthday. What was the date of his party? Tina's birthday is on September 9th. On what day of the week was her birthday in 1998? What time will this clock show in 20 minutes? 14 : 53 How would quarter past four in the afternoon be shown on a 24-hour digital clock? A plane takes off on Tuesday at 22:47. It lands on Wednesday at 07:05. How long in hours and minutes is the flight? Here is part of a train timetable. Birmingham New Street 09:40 10:05 11:05 12:35 Birmingham International 09:50 10:15 11:15 12:45 Coventry 10:10 10:30 11:30 13:00 Leamington Spa 10:25 .... 11:45 13:15 Banbury 10:45 .... 12:05 .... Oxford 11:05 11:20 12:25 13:55 Reading 11:30 11:55 12:50 14:25 Which is the fastest train from Birmingham New Street to Reading? You have to arrive at Oxford at 2:00 pm. Which train would you catch from Coventry?
• Draw and measure lines to the nearest millimetre; measure and calculate the perimeter of regular and irregular polygons; use the formula for the area of a rectangle to calculate the rectangle's area *I can draw and measure lines to the nearest millimetre* *I can measure the sides of polygons and add them to find the perimeter*	Draw these lines accurately using a 300 mm ruler marked in cm: 5.2 cm 0.7 cm 83 mm 7 mm Measure the sides of these polygons in centimetres and millimetres. What is the perimeter of each shape in centimetres? In millimetres? Solve these problems: What is the perimeter of: a regular octagon with sides of 25 mm? An equilateral triangle with sides of 8.7 cm? A square has a perimeter of 64 cm. How long is each side? A rectangle has a perimeter of 72 m. The shortest side is 9 m long. What is the length of the longest side? Explain how you worked them out.

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Read and plot coordinates in the first quadrant; recognise parallel and perpendicular lines in grids and shapes; use a set-square and ruler to draw shapes with perpendicular or parallel sides *I can read and plot coordinates to make shapes*	Here is a shaded square.  Write the coordinates for point A and point C. Three of the four corners of a square are (3, 10), (5, 12) and (7, 10). Work out the coordinates of the fourth corner. (8, 10) and (10, 8) are two vertices of a right-angled triangle. What are the coordinates of the third vertex? Are there any other possibilities?
• Plan and manage a group task over time by using different levels of planning *I can plan and manage my time to work on an extended group task* *I can make an overall plan of the tasks to be done and a detailed plan for each task*	I want you to measure the perimeter of the playground as accurately as you can. Work in a group. Draw a plan of the playground and write the measurements on it. Then work out the area of the playground. Plan your work carefully. You will have 2 hours during the week to do it.

Learning overview

Children continue to develop their **problem-solving skills in the context of measurement**, focusing on length and time, including using a calendar. They solve real-life problems involving one or two steps and any of the four operations. They interpret the wording, then decide the best way to solve a problem, which calculations to do and how to do them: mentally, with jottings, using an efficient written method or using a calculator. They learn to change any units to the same unit before they calculate. They estimate and check their answers.

Children **multiply and divide whole numbers by 10, 100 and 1000**. They answer questions like:

How many times bigger than 60 is 6000?

How many times smaller than 5000 is 5?

What did I multiply 6 by to get 600?

What did I divide 7500 by to get 75?

They see the effect of these operations. They combine this knowledge with their knowledge of relationships between units of measurement to **convert units of length**. They respond to questions such as:

How many centimetres are there in 7 metres?

How many metres are there in 8 kilometres?

How many centimetres is 50 millimetres?

How many kilometres is 10 000 metres?

Children work in small groups to **measure lengths and distances** using tape measures, metre sticks and rulers to a suitable degree of accuracy, for example to the nearest metre, centimetre or millimetre. They **read unnumbered divisions on measuring scales**, for example on a ruler marked in millimetres and numbered every centimetre. They **estimate the length, height and**

width of everyday objects, explaining how they made their estimates and discussing the benchmarks they have used; where possible, they then measure to see how accurate their estimates were. They measure the sides of regular and irregular polygons and **calculate the perimeter**, either by totalling the sides or, for regular polygons, multiplying the length of one side.

Children use their knowledge of **parallel and perpendicular lines** and of measurement to **construct squares, rectangles and right-angled triangles** using a **set-square and ruler**. They measure a dimension such as a diagonal of a rectangle or the hypotenuse of a right-angled triangle for their teacher to check the accuracy of their drawings.

Children use **24-hour clock times**. They recognise the difference between am times from midnight to before noon and pm times from noon to before midnight, and they convert these to 24-hour clock times. They complete a simple conversion table, such as:

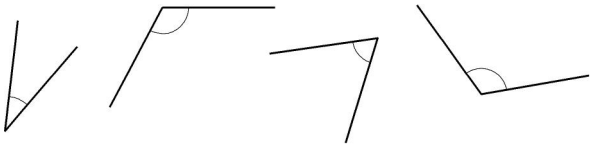
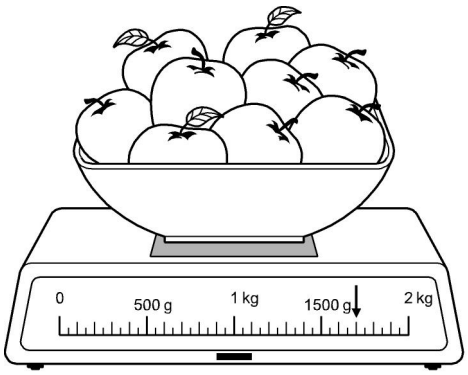
seven o'clock in the evening	19:00	7:00 pm
quarter to ten in the morning		
	14:20	
	22:15	
midnight		
17 minutes past 4 in the afternoon		

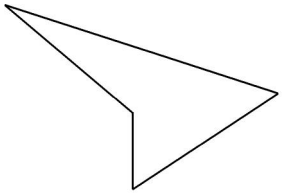
Children rehearse how many days there are in each month. They understand how a calendar is organised and understand the significance of a leap year. They **use a calendar** to work out the day of the week for a particular date, or the **time interval** between one date and another, for example how long they have to wait for their birthday or how many days it has been since they last had their pocket money. Given part of a calendar for a month they can say whether a given date will fall on a particular day.

Children **read and plot coordinates** in the first quadrant. They explain why the point (4, 1) is not the same as (1, 4). Given some of the vertices of squares or rectangles, they plot the missing points, recognising that there may be more than one solution to the problem. For example, if (6, 5) and (8, 5) are two vertices of a square, they find all three possibilities for the pair of missing vertices.

Unit 5D2 2 weeks

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Solve one-step and two-step problems involving whole numbers and decimals and all four operations, choosing and using appropriate calculation strategies, including calculator use *I can decide what calculations to do to solve a problem and how to do them (mental methods, jottings, written methods, calculator)*	The answer is 15.4 kg. What was the question? Solve these problems: A spoonful is 5 ml. How many spoonfuls can you get from a bottle that holds one quarter of a litre? A tin of baked beans weighs 400 grams. How many grams less than 1 kilogram is this? Did you have to change any of the information to help you solve the problem, e.g. convert units of measurement? Did you need to use the calculator to solve the problem? What key sequence did you use?
• Use knowledge of rounding, place value, number facts and inverse operations to estimate and check calculations *I can use rounding to estimate and check calculations*	Roughly, what will the answer to this calculation be? How did you arrive at that estimate? Do you expect your answer to be greater or less than your estimate? Why? How do you know that this calculation is probably right? Could you check it a different way? This answer is wrong. How can I tell? Find two different ways to check the accuracy of this answer.
• Use efficient written methods to add and subtract whole numbers and decimals with up to two places *I can add and subtract whole numbers and decimals with two places in columns*	What tips would you give to someone to help with column addition of decimals? What about subtraction? Show me your method for solving these problems: Three parcels weigh 785 g, 55 g and 0.25 kg. How much do they weigh altogether? I had 0.6 kg of sugar. I have 247 g left after I make a cake. How much sugar did I use?
• Use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 or 1000 *I can multiply and divide whole numbers and decimals by 10, 100 and 1000*	Explain what happens to the digits in whole numbers and decimals when you multiply or divide by 10, 100 or 1000. What happens if you multiply or divide a number by 10 then by 10 again? And by 10 again? I divide a measurement by 10, and then again by 10. The answer is 0.7 mm. What measurement did I start with? How do you know?
• Refine and use efficient written methods to multiply and divide HTU × U, TU × TU, U.t × U and HTU ÷ U *I can use an efficient method to multiply HTU by U and TU by TU*	How would you solve these problems? I have 9 parcels each weighing 346 g. How much do they weigh altogether? 72 boxes of dog food weigh 38 kg each. How much do they weigh altogether?
• Use a calculator to solve problems, including those involving decimals or fractions (e.g. to find $\frac{3}{4}$ of 150 g); interpret the display correctly in the context of measurement *I can use a calculator to solve weight problems involving decimals*	What key presses would you make on a calculator to work out 14.6 × 4 × 13.8? Explain how to use your calculator to solve these problems. What key sequences will you use? I use 1375 g of sugar to make 5 cakes. How much sugar do I need for 1 cake? For 3 cakes? There are 75 g of rice in a portion. How many portions are there in a 3 kg bag of rice? How will you check your answers to the problems?

Objectives *Children's learning outcomes in italic*	**Assessment for learning**
• Read and plot coordinates in the first quadrant; recognise parallel and perpendicular lines in grids and shapes; use a set-square and ruler to draw shapes with perpendicular or parallel sides *I can recognise parallel and perpendicular lines in shapes and in the environment*	Give an example of parallel lines in everyday life. How can you recognise them? What about perpendicular lines? Points A (3, 4) and B (3, 7) are joined by a straight line. Plot the coordinates of two points C and D so that line CD is parallel to AB. Now plot two points E and F so that line EF is perpendicular to AB.
• Estimate, draw and measure acute and obtuse angles using an angle measurer or protractor to a suitable degree of accuracy; calculate angles in a straight line *I can estimate and measure angles less than 180°* *I can recognise acute, obtuse and right angles*	Look at these angles.  Which of them are acute angles? Which are obtuse angles? Estimate the size of each of the angles. Now use your protractor to measure the angles to the nearest 5 degrees.
• Read, choose, use and record standard metric units to estimate and measure length, weight and capacity to a suitable degree of accuracy (e.g. the nearest centimetre); convert larger to smaller units using decimals to one place (e.g. change 2.6 kg to 2600 g) *I can choose and use a suitable metric unit to estimate and measure weight* *I can use benchmarks to help me to estimate weight* *I know how many grams there are in a kilogram*	How do I write 6 kilograms 400 grams as a decimal? What about 9 kilograms 50 grams? Tell me an example of something you would measure in kilograms. What about grams? What unit of measurement would use for: weighing a tomato? weighing yourself? Circle one amount each time to make these sentences correct. The distance from London to Manchester is about: 320 cm 320 m 320 km A tea cup is likely to hold about: 15 ml 150 ml 1500 ml A hen's egg is likely to weigh about: 6 g 60 g 600 g
• Interpret a reading that lies between two unnumbered divisions on a scale *I can work out the reading between two unnumbered divisions on kitchen and bathroom scales*	What is the total mass of the apples on the scales?  A piece of cheese has a mass of 350 grams. Mark an arrow on the scale to show the reading for 350 g. 

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Draw and measure lines to the nearest millimetre; measure and calculate the perimeter of regular and irregular polygons; use the formula for the area of a rectangle to calculate the rectangle's area *I can explain the difference between perimeter and area* *I can solve problems involving calculating a perimeter or area*	Measure accurately the longest side of this shape. Give your answer in millimetres.  What tips would you give someone who wanted to measure a line in millimetres? Solve these problems: What is the area of a rectangle measuring 34 cm by 29 cm? The area of a rectangle is of 132 m^2. The shortest side is 4 m long. What is the length of the longest side? Explain how you worked out your answers.
• Understand the process of decision making *I can explain why I decided to use a particular method to solve a problem* *I can describe what was special about the problem that prompted my decision*	Why did you decide to use a mental/written/calculator method for this calculation? Why did you decide to change all the units to metres rather than centimetres? Why did you decide to use the scales rather than the balance?

Learning overview

Children continue to develop their **problem-solving skills in the context of measurement**, focusing on mass. They continue to solve real-life problems involving one or two steps and any of the four operations. They recognise that they may need to change the units of measurement to the same unit in problems such as:

A horse eats 560 g of feed from a 2 kg bag. How much of the feed is left?

Children refine their written methods of calculation to make them efficient. They decide the best way to solve a problem and explain why they chose, say, a written method rather than a mental method. They use their knowledge of number facts, place value, inverse operations and rounding to make estimates and **check calculations**.

Children extend their knowledge of **multiplication and division by 10, 100 and 1000 to include decimals**. They use this knowledge to **convert units of mass**; for example, they convert grams to kilograms and vice versa. They work out mentally conversions such as:

How many grams are there in 3.6 kilograms?

How many kilograms is 4200 grams?

Children use **efficient written methods** to add and subtract whole numbers (up to five digits) and numbers with up to two decimal places. They refine their multiplication methods to multiply TU × U and HTU × U.

$$\begin{array}{r} \times \quad 50 \quad 6 \\ 7 \;\big|\; 350 \quad 42 \quad 392 \end{array} \quad \rightarrow \quad \begin{array}{r} 56 \\ \times \quad 7 \\ \hline 350 \\ 42 \\ \hline 392 \end{array} \quad \rightarrow \quad \begin{array}{r} 56 \\ \times \quad 7 \\ \hline 392 \\ 4 \end{array} \qquad \begin{array}{r} 354 \\ \times \quad 6 \\ \hline 1800 \\ 300 \\ 24 \\ \hline 2124 \\ 1 \end{array} \quad \rightarrow \quad \begin{array}{r} 354 \\ \times \quad 6 \\ \hline 2124 \\ 3\,2 \end{array}$$

They multiply, for example, 5.6 × 7 by relating this to 56 × 7 and dividing the answer by 10.

Children extend their knowledge of division to short division of HTU by U, by repeated subtraction of multiples of the divisor (taking away chunks), aiming to subtract as few chunks as necessary.

$$
\begin{array}{rl}
7\overline{)959} & \\
-700 & 7\times 100 \\
259 & \\
-210 & 7\times\ 30 \\
49 & \\
-49 & 7\times\ \ 7 \\
0 & \\
\text{Answer:} & \quad 137
\end{array}
$$

Children use these methods when they solve word problems involving mass to give meaning to their work, such as:

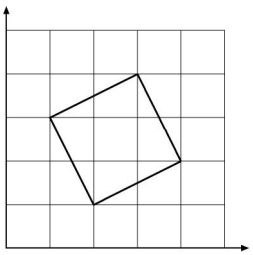
Two parcels together weigh 2.4 kg. One parcel weighs 1.68 kg. What is the mass of the other parcel?

Mary posts seven identical parcels. Each parcel weighs 3.2 kg. What is the total mass of the parcels?

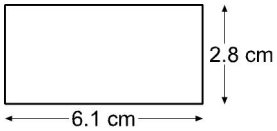
When they **measure weight**, children use a range of weighing scales, kitchen scales, bathroom scales. They weigh to a suitable degree of accuracy, depending on the object, for example to the nearest 100 g or to the nearest 1 g. They **read scales** with some unnumbered divisions, for example kitchen scales with divisions of 10 g numbered every 100 g, or bathroom scales with divisions of 1 kg numbered every 10 kg. They estimate the masses of everyday objects, say how they made their estimates and then measure to see how accurate their estimates were. They investigate the cost of sending different parcels by first class post, researching postage costs on the Post Office website (www.postoffice.co.uk/portal/rm/).

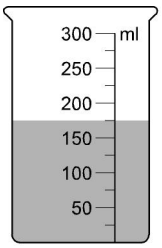
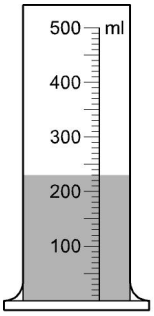
Children use their knowledge of measuring lengths to revise how to measure the sides of regular and irregular polygons and **calculate the perimeter**, either by totalling the sides or, for regular polygons, by multiplying the length of one side. They derive a **formula for the area of a rectangle** and calculate areas of rectangles and squares.

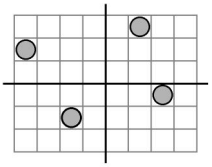
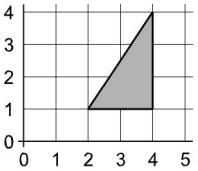
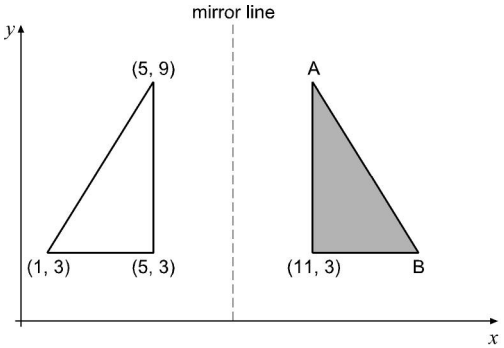
Children know that **angles** are measured in degrees and learn to say whether an angle is acute, obtuse or a right angle. Given a set of cards with pictures of angles on, they sort them into sets or order them from smallest to largest. They make sensible estimates of the size of angles less than 180° and then measure them to within 5 degrees using a protractor or angle measurer. They apply this knowledge to work with shapes drawn on a coordinate grid. For example, they plot the missing vertex of a square with sides not parallel or perpendicular to the axes and then check that each angle is 90°.

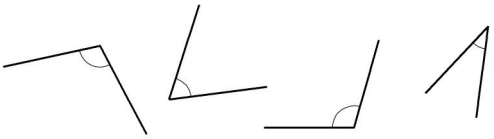
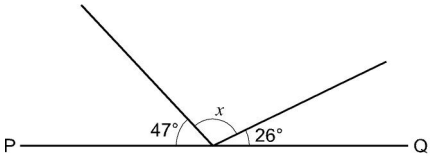


Unit 5D3 2 weeks

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Solve one-step and two-step problems involving whole numbers and decimals and all four operations, choosing and using appropriate calculation strategies, including calculator use *I can use the most efficient method of solving a problem, including using a calculator*	Write instructions for a friend to solve the problem. What estimates did you make before you worked out the calculations? How did you check your answer? Could you have checked it in a different way? How? Write another problem using the information in this problem.
• Use knowledge of rounding, place value, number facts and inverse operations to estimate and check calculations *I can use rounding of whole numbers and decimals to estimate and check calculations* *I can round numbers to the nearest whole unit*	Round these measurements to the nearest whole unit: 4275 ml 3.25 kg 5.85 km What is the approximate perimeter and area of this rectangle?  About how heavy are 8 boxes of apples weighing 5.6 kg each? About how many 185 ml glasses of water can you pour from a 2 litre bottle?
• Use efficient written methods to add and subtract whole numbers and decimals with up to two places *I can add and subtract whole numbers and decimals with up to two places in columns*	Show me your method for solving these problems: Max jumped 2.35 metres on his second try at the long jump. This was 68 centimetres longer than on his first try. How far in metres did he jump on his first try? Nasreen made some fruit punch. She poured 2.4 litres of water, 1.35 litres of pineapple juice and 780 ml of mango juice into a large bowl. How much fruit punch did she make? Did you make any estimates? Explain how you worked out the answers.
• Refine and use efficient written methods to multiply and divide HTU × U, TU × TU, U.t × U and HTU ÷ U *I can use efficient methods to multiply U.t by U and divide HTU by U* *I can recognise when to round up or down, depending on the problem*	Show me your method for solving these problems: I fill 6 jugs with water. Each jug holds 2.3 litres. How much water do I have altogether? 5 boxes of chocolates weigh 645 g. How much does each box of chocolates weigh? What is the total mass of 235 screws each weighing 6 grams? What estimates did you make? Explain how you worked out the answers.
• Use a calculator to solve problems, including those involving decimals or fractions (e.g. to find ¾ of 150 g); interpret the display correctly in the context of measurement *I can use a calculator to solve a measurement problem and interpret the display correctly*	Show me how you used your calculator to solve these problems: I use 2.4 kg of apples to make 4 pies. How many grams of apples are there in each pie? What mass of apples would I need to make 3 pies? A piece of wood is 3.25 m long. I use all the wood to make five shelves of equal length. How long is each shelf in metres? In centimetres? What key sequence did you use?

Objectives *Children's learning outcomes in italic*	**Assessment for learning**
• Read, choose, use and record standard metric units to estimate and measure length, weight and capacity to a suitable degree of accuracy (e.g. the nearest centimetre); convert larger to smaller units using decimals to one place (e.g. change 2.6 kg to 2600 g) *I can choose and use the correct metric unit to estimate and measure capacity* *I can use benchmark objects to help me to estimate capacity* *I know how many millilitres there are in a litre*	What unit of measurement would you use to measure the amount of water in: a drinking glass? a teaspoon? a bath? Kate's glass holds a quarter of a litre when it is full. She fills it nearly to the top with juice. Tick the approximate amount of juice she puts in the glass. 4 millilitres ☐ 20 millilitres ☐ 120 millilitres ☐ 220 millilitres ☐ 420 millilitres ☐
• Interpret a reading that lies between two unnumbered divisions on a scale. *I can interpret a reading between two unnumbered divisions on a scale on measuring cylinders and jugs* *I can read accurately the number of millilitres in a litre jug*	50 millilitres of water are poured out from this container. How much water is left in the container?  180 ml of water are added to the water in this container. Draw a line to show the new level of the water in the container. 
Read timetables and time using 24-hour clock notation; use a calendar to calculate time intervals. *I can solve problems using a timetable written in 24-hour clock notation*	Here is part of a train timetable. **Edinburgh** – 09:35 – – 13:35 – **Glasgow** 09:15 – 11:15 13:15 – 13:45 **Stirling** 09:57 – 11:57 13:57 – 14:29 **Perth** 10:34 10:51 12:34 14:34 14:50 15:15 **Inverness** – 13:10 – – 17:05 – How long does the first train from Edinburgh take to travel to Inverness? Ellen is at Glasgow station at 1:30 pm. She wants to travel to Perth. She catches the next train. At what time will she arrive in Perth?

Objectives *Children's learning outcomes in italic*	**Assessment for learning**
• Draw and measure lines to the nearest millimetre; measure and calculate the perimeter of regular and irregular polygons; use the formula for the area of a rectangle to calculate the rectangle's area *I can find the area of a rectangle using the formula length × width* *I know that area is measured in cm²*	Tell me a rule for working out the area of a rectangle. The area of a rectangle is 24 cm². What are the lengths of the sides? Are there other possible answers? Tell me something that has an area of approximately 30 m². What did you use to help you? Estimate the area of the front cover of this exercise book. How did you go about doing that?
• Read and plot coordinates in the first quadrant; recognise parallel and perpendicular lines in grids and shapes; use a set-square and ruler to draw shapes with perpendicular or parallel sides *I can use a set-square and ruler to draw shapes with parallel and perpendicular sides*	How would you check if two lines are parallel? How would you check that two lines are perpendicular? On plain paper, use a ruler and set-square to construct: a square with sides 56 mm a rectangle with length 6.3 cm, width 4.9 cm Construct a right-angled triangle with the two shorter sides measuring 3.5 cm and 4.2 cm. What is the length of the third side?
• Complete patterns with up to two lines of symmetry; draw the position of a shape after a reflection or translation *I can complete a pattern with one or two lines of symmetry* *I can draw where a shape will be after it has been reflected or translated*	The heavy lines are lines of symmetry. Complete the pattern.  This triangle is translated two squares to the left. Draw the triangle in its new position.  The shaded triangle is a reflection of the white triangle in the mirror line. Write the coordinates of point A and point B. 

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Estimate, draw and measure acute and obtuse angles using an angle measurer or protractor to a suitable degree of accuracy; calculate angles in a straight line *I can draw angles less than 180° to within 5°* *I can calculate angles on a straight line*	Estimate then use a protractor to measure these angles to the nearest 5 degrees.  Use a protractor to draw an angle of 35°. PQ is a straight line. Calculate the size of angle x. 
• Understand different ways to take the lead and support others in a group *I can lead a group and make sure that tasks are shared fairly* *I can support others in a group by helping them with their tasks when I have finished mine*	I want you to plan an itinerary for a journey around the world. You will have one week to do your research and make your plans. Start by deciding on your roles in the group and what tasks you need to carry out.

Learning overview

Children continue to develop their **problem-solving skills in the context of measurement.** They now focus on capacity, and on using the 24-hour clock to measure time. They continue to solve real-life problems involving one or two steps and any of the four operations. They use efficient written methods for all four operations and are able to explain the methods they have used. They change the units of measurement to the same unit before doing any calculations. They estimate their answers and check them by using an alternative calculation method. They interpret their answers in the context of the problem. For example, they recognise when to round up or down after a division in problems such as:

256 children attend a summer camp. They sleep in tents that hold 7 children. How many tents are needed? [round up]

A farmer's chickens lay 152 eggs. How many boxes of 6 eggs can he fill? [round down]

Children also interpret the calculator display after division in problems such as:

The twins have saved save £356. A computer game costs £42. How many computer games can the twins buy?

Children divide 356 by 42 and interpret the calculator display of 8.4761904. They give the answer of 8 computer games.

When they **estimate and measure capacity**, children compare the sizes of containers using a benchmark such as a 1 litre bottle or jug. They put a range of containers in order of capacity from smallest to largest, estimate the capacity to the nearest 100 ml and then measure the capacity to see how accurate their estimates were. They solve problems such as:

How many cups of water do you think it would take to fill this jug?

How many teaspoons of water can I put in this coffee cup?

Children **read scales** such as measuring cylinders with divisions of 10 ml numbered every 100 ml, or with divisions of 25 ml numbered every 100 ml.

Children reflect on the units that they are familiar with. They suggest suitable units to measure, say, the area of the school hall, the amount of liquid in a tablespoon or the mass of a baby. They solve

more problems involving **time**, including using the 24-hour clock. They record their work, using jottings such as time lines to support their calculations. They interpret train and bus timetables, flights of long-distance planes, and TV schedules like the one below.

BBC 1		**ITV 1**	
7:00 pm:	Doctor Who	6:45 pm:	X Factor
7:40 pm:	Strictly Come Dancing	8:00 pm:	The Bill
8:50 pm:	News and Weather	8:45 pm:	X Factor Results
9:15 pm:	Film Special	9:05 pm:	News and Weather
11:05 pm:	Match of the Day	9:35 pm:	Movie Special
12:20 am:	Live Music Special	11:15 pm:	Sport Round-up
1:10 am:	Open University	12:20 am:	Planet Earth

They answer questions such as:

How long does Dr Who last?

If I turn over to ITV 1 at the end of Dr Who, what programme is on?

I switch the TV on at 8:00 pm. What programme is on BBC 1?

I switch on the TV at 10:25 pm. How long do I have to wait for Match of the Day?

Planet Earth lasts 45 minutes. At what time does it finish?

Which is longer: Film Special on BBC 1 or Movie Special on ITV 1?

Children know that a right angle is equal to 90°. They recognise that a straight line can be formed from two right angles and is equivalent to 180°. They use this to **calculate angles on a straight line**. They **draw and measure angles using a protractor**. For example, children take four card semicircles. They draw a line from the centre of each semicircle to the edge, and cut along the line to form two card 'angles'. They shuffle the eight angles on the table top and label them randomly from A to H. They estimate the size of each angle, recording their estimates and using these to suggest which pairs will go together to form a straight line. Children then use a protractor to measure each angle, and calculate whether their predictions were correct. They check by placing the angles together to form straight lines.

Children consolidate their understanding of **perimeter and area**, appreciating the difference between the two. They solve problems such as:

Create different T-shapes which have an area of 26 cm^2. Do they all have the same perimeter?

Find as many rectangles as you can with whole-number sides and an area of 36 cm^2. Which has the smallest perimeter?

A picture frame is created from a narrow length of wood 60 cm long. Suggest some possible measurements for the frame. Work out the area inside each frame.

A rectangle drawn on a centimetre coordinate grid has three vertices at (1, 5), (1, 3) and (5, 3). Complete the rectangle and find its perimeter and area.

A rectangular mirror has a perimeter of 1.7 m. It is 50 cm long. Work out its area.

Children construct shapes that have **parallel or perpendicular sides**. For example, they draw a right-angled triangle where they are given the lengths of the two shorter sides. They then measure the third side to the nearest millimetre. They draw a rectangle with a perimeter of 28 cm and a longest side of 8 cm. They measure the length of the diagonal, again to the nearest millimetre.

Children develop their ideas of **reflection and symmetry** to complete patterns and reflect and translate shapes. They reflect shapes in a mirror line where not all the sides of the shape are parallel or perpendicular to the mirror line. They translate shapes in directions parallel to the axes of a coordinate grid, giving the coordinates of the new position.