Year 2: Block D　　　　　　　Three 2-week units

Calculating, measuring and understanding shape

Following and giving instructions for movement using mathematical language

Solving problems involving numbers, money, measures or time

Estimating, comparing and measuring lengths, weights and capacities

Using units of time and reading time to the quarter hour

**BLOCK D
Calculating, measuring and understanding shape**

Mental calculations: adding and subtracting 1-digit number or multiple of 10 to/from a 2-digit number

Informal written calculations: adding and subtracting 1- and 2-digit numbers

Reading scales and interpreting the divisions

Objectives	Units		
End-of-year expectations (key objectives) are highlighted	1	2	3
• Solve problems involving addition, subtraction, multiplication or division in contexts of numbers, measures or pounds and pence	✓	✓	✓
• Add or subtract mentally a one-digit number or a multiple of 10 to or from any two-digit number; use practical and informal written methods to add and subtract two-digit numbers	✓	✓	✓
• Estimate, compare and measure lengths, weights and capacities, choosing and using standard units (m, cm, kg, litre) and suitable measuring instruments	✓	✓	✓
• Read the numbered divisions on a scale, and interpret the divisions between them (e.g. on a scale from 0 to 25 with intervals of 1 shown but only the divisions 0, 5, 10, 15 and 20 numbered); use a ruler to draw and measure lines to the nearest centimetre	✓	✓	✓
• Use units of time (seconds, minutes, hours, days) and know the relationships between them; read the time to the quarter hour; identify time intervals, including those that cross the hour	✓	✓	✓
• Recognise and use whole, half and quarter turns, both clockwise and anticlockwise; know that a right angle represents a quarter turn		✓	✓
• Follow and give instructions involving position, direction and movement	✓	✓	

Speaking and listening objectives for the block

Objectives	Units		
	1	2	3
• Listen to others in class, ask relevant questions and follow instructions	✓	✓	✓

Opportunities to apply mathematics in science

Activities		Units		
		1	2	3
2a	Health and growth: Time and count how many times you can jump up and down or hop in 1 minute.	✓		
2b	Plants and animals in the local environment: Use a time line to make a record of plants and animals found in an environment over time.		✓	
2d	Grouping and changing materials: Make observations of ice cubes melting over time. Check and record findings every quarter hour.			✓

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, puzzle, pattern, method, sign, operation, symbol, number sentence, equation, mental calculation, written calculation, informal method, jottings, diagrams, pictures, images

one thousand, multiple of, nearest, about

add, plus, sum, total, subtract, take away, minus, difference, inverse

coin, pound (£), penny/pence (p), price, cost, pay, costs more/less, change, total, how much?

measuring scale, compare, measure, weigh, metre (m), centimetre (cm), tape measure, kilogram (kg), half-kilogram, gram (g), capacity, contains, litre (l), half-litre, millilitre (ml)
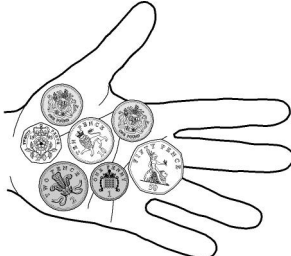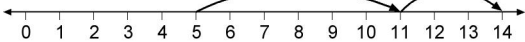
direction, route, clockwise, anticlockwise, quarter turn, right angle, straight line, geostrip
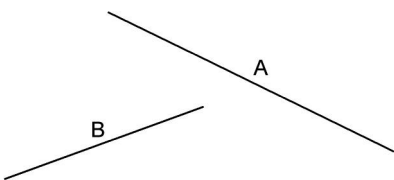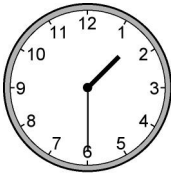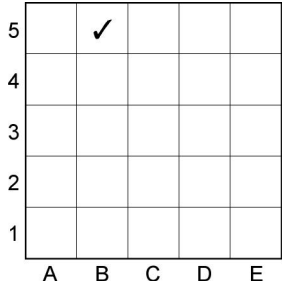
time, clock, watch, digital, analogue, hour (h), minute (min), second (s), quarter to, quarter past

Building on previous learning

Check that children can already:

- solve problems involving counting, adding or subtracting, doubling or halving
- use practical and informal written methods for addition and subtraction of a one-digit number or a multiple of 10 to and from a one- or two-digit number
- estimate, measure and compare objects, choosing suitable uniform non-standard or standard units and instruments
- use vocabulary related to time; order days of the week and months; read the time to the hour and half hour
- visualise and use everyday language to describe the position of objects and direction and distance when moving them

Unit 2D1 2 weeks

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Solve problems involving addition, subtraction, multiplication or division in contexts of numbers, measures or pounds and pence *I can decide what calculation to do to solve a problem*	Solve these problems. What calculations are needed? How did you decide? Mina and Ben play a game. Mina scores 70 points. Ben scores 42 points. How many more points does Mina score than Ben? I think of a number then halve it. The answer is 9. What was my number? Rosie spent 48p. Suzy spent 36p more than Rosie. How much did Suzy spend? How much money is in the hand?
• Add or subtract mentally a one-digit number or a multiple of 10 to or from any two-digit number; use practical and informal written methods to add and subtract two-digit numbers *I can add and subtract some numbers in my head*	Look at the number line. It shows the sum that Fred did. Which of these sums did Fred do? 5 + 7 + 2 = 14 5 + 6 + 3 = 14 5 + 5 + 4 = 14 5 + 8 + 1 = 14 What is 34 + 8? What number facts might you use to help you work this out? What do you need to add to 34 to get to the next multiple of 10? How might you partition 8 to help you? Find the answer for each of these. Explain how you worked out your answers. 58 + 9 = 35 + 40 = 72 − 8 = Find the missing number. 1 + □ + 5 = 35
• Read the numbered divisions on a scale, and interpret the divisions between them (e.g. on a scale from 0 to 25 with intervals of 1 shown but only the divisions 0, 5, 10, 15 and 20 numbered); use a ruler to draw and measure lines to the nearest centimetre *I can read numbers on a scale*	[Point to 65 cm on a metre stick marked in centimetres and numbered in tens.] What measurement is this? [Point to half a litre on a 1 litre measuring jug.] What measurement is this?

Objectives *Children's learning outcomes in italic*	Assessment for learning

• Estimate, compare and measure lengths, weights and capacities, choosing and using standard units (m, cm, kg, litre) and suitable measuring instruments
I can use a metre rule to mark out 1 metre
I can measure out a litre of water
	Measure these two lines.
	
	How much longer is line A than line B?
	Suggest things that:
	    are longer than 1 m
	    are shorter than 10 cm
	    are lighter than 1 kg
	    hold more than 1 litre
	Show me where the 2 metre mark is on the tape measure. And the 3 metre mark?
	How could you mark out 2 metres using a metre stick?
	How could you find out how much water this bucket will hold?
	If you have a half-kilogram weight, how could you use it to weigh out a kilogram of sand to go in this bucket?

• Use units of time (seconds, minutes, hours, days) and know the relationships between them; read the time to the quarter hour; identify time intervals, including those that cross the hour *I can estimate how long an activity might take, then check using a timer* *I can tell the time when it is something o'clock or half past the hour*	What takes about 10 seconds? 1 minute? 1 hour? Look at these pictures of different events. [Point to a picture.] How long would this activity take? Use this seconds timer. Time me while I walk across the room and back again. How long did I take? How many minutes are there in 1 hour? It is half past 4. How many minutes have passed since 4 o'clock? What is the time on this clock? What time was it 2 hours ago?
• Follow and give instructions involving position, direction and movement. *I can follow and give instructions to mark a position on a grid*	The tick is in square B5. Follow my instructions. Draw a cross in square D2. Draw a circle in square E4. Draw a triangle in square A5. Now tell me where to put a cross, a circle and a triangle.
• Listen to others in class, ask relevant questions and follow instructions *I can listen to others and ask them questions about their work*	Listen while these children explain how they tackled a problem. What questions would you like to ask them?

Learning overview

Children continue to **count** in ones, twos, fives and tens. They use these skills to help them to tot up **a mixed set of 10p, 5p, 2p and 1p coins**. They learn to count up the 10p coins first, then the 5p coins, then the 2p coins and finally the 1p coins.

Children use **mental strategies** to add or subtract **one-digit numbers to or from two-digit numbers**, bridging through a multiple of 10 where appropriate. They first practise adding on a number to reach the next multiple of 10; for example, they find the missing number in 47 + □ = 50. They use a 100-square to add or subtract a multiple of 10 to or from any two-digit number by counting on or back in tens. They begin to make use of number facts to partition the number being added or subtracted; for example, to add 7 to 56, they add on 4 to make 60, then another 3 to make 63. They transfer their calculation skills from the context of number and **apply them to measures and money**, and vice versa. They use their new skills to count on from zero in steps of 3 or 4.

Children undertake **practical measurement** activities, estimating first. For example, they use a balance to find how many pencils or counters weigh the same as a 100 g weight. They use a measuring jug to measure a litre of water to find out how many yogurt pots could be filled from a litre of water. They add 10 g weights to a balance scale, and see that 10 of the weights balance a 100 g weight.

Children **position numbers** on a number line or scale numbered in 2s, 5s or 10s. They read a measurement to the nearest centimetre on a metre stick numbered in 10 cm intervals or a ruler numbered in 5 cm intervals, using the numbered divisions as reference points.

Children become familiar with **minutes and seconds**. They estimate and time how long activities take. For example, they estimate how many times in 1 minute they can walk across the hall or jump on the spot, then use a minute timer to check. They count each second as a second hand moves round a clock, then use what they have learned to count how many seconds it takes a friend to write their name or put on their shoes. They count how many seconds it takes for the sand to run through a 1-minute timer to discover that 1 minute is the same as 60 seconds. They **consolidate reading the time to the hour and half hour** on a clock with hands.

Children **follow and give instructions** involving position and movement. For example, they give instructions for a partner to follow a maze drawn on squared paper or describe how to get to an object that is hidden in the classroom. They evaluate the accuracy of their instructions and adjust them accordingly.

Children apply their calculation skills to solving **word problems involving money and measures**. For example:

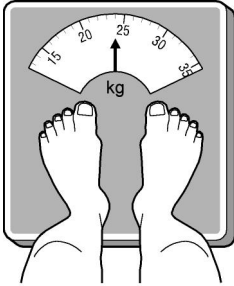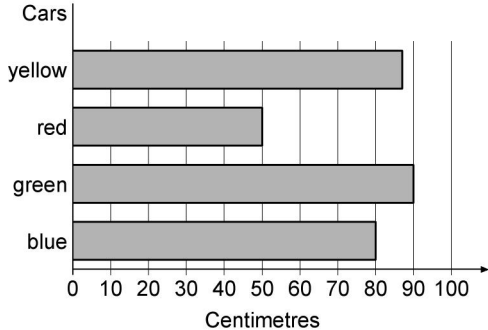*I have 72p in my purse. I add another 5p. How much do I have now?*

Sam's shoe is 25 cm long. His father's shoe is 31 cm long. How much longer is his father's shoe?

23 children are on the bus. 8 more children get on. How many children are on the bus now?

Mary buys a notebook for 37p. What coins could she use to pay for it?

Children decide on the calculation(s) needed to solve the problem, justify their decisions and check their answers.

Unit 2D2 2 weeks

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Solve problems involving addition, subtraction, multiplication or division in contexts of numbers, measures or pounds and pence *I can decide what calculation to do to solve a problem*	Choose three of these numbers: 14, 15, 16, 17. Add them up. What different totals can you make? Using coins if necessary, show me how to find the total of 29p and 36p. Solve these problems. What calculations are needed? How did you decide? These beads weigh 2 kg. What would a quarter of them weigh? Susan bought three chocolate bars at 15p each. How much change from 50p did she get? Jo has three 20p and two 15p stamps. What values can he make using one or more of the stamps? How many different ways can you find to pay 50p using only silver coins? A week has 7 days. How many weeks are there in 35 days?
• Add or subtract mentally a one-digit number or a multiple of 10 to or from any two-digit number; use practical and informal written methods to add and subtract two-digit numbers *I can add and subtract some numbers in my head* *I can add and subtract bigger numbers using practical equipment or written notes to help me*	What is 37 + 50? How did you work this out? Find the answer for each of these. 36 + 29 = 30 − 15 = 25 + 10 + 9 = Explain how you worked out your answers.
• Estimate, compare and measure lengths, weights and capacities, choosing and using standard units (m, cm, kg, litre) and suitable measuring instruments *I can estimate length in centimetres* *I can estimate length in metres* *I can decide whether it is better to use centimetres or metres for measuring different lengths*	How long is a line 3 cm longer than this [4 cm] line? Use a ruler. How long do you think this crayon is? Tell me what you do to help you estimate. Use this 10 cm strip to estimate the width of your table. Now use the tape measure to measure it. How close were you? Point out something that you think is about two metres away from you. Ten metres away? Find something that is about 50 cm long. Think of something that would be better measured in metres rather than centimetres. Explain why. Choose a word from the box to finish each sentence. kilograms litres metres hours I can measure the length of the classroom in … I can measure the capacity of a bucket in …

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Read the numbered divisions on a scale, and interpret the divisions between them (e.g. on a scale from 0 to 25 with intervals of 1 shown but only the divisions 0, 5, 10, 15 and 20 numbered); use a ruler to draw and measure lines to the nearest centimetre *I can use a ruler or metre rule to measure how long something is* *I can read numbers on a scale and can work out the numbers between them*	How do you work out the numbers between the ones that are shown on the scale? If this scale continued, what other numbers would be marked? Here is a ruler [marked in centimetres] and here are some lines [measuring for example 8 cm, 15 cm]. Tell me how you would measure the lines using the ruler. How heavy is Peter? Some children rolled toy cars down a slope. How far did the blue car roll? How much further did the green car roll than the red car? Estimate how far the yellow car rolled. **How far the cars rolled**
• Use units of time (seconds, minutes, hours, days) and know the relationships between them; read the time to the quarter hour; identify time intervals, including those that cross the hour *I know that one hour is the same as 60 minutes* *I can tell the time when it is quarter past, half past or quarter to the hour* *I know that a quarter past three is the same time as three fifteen*	How many minutes are there in one hour? Reading takes 20 minutes, and playing takes 40 minutes. Think of some more pairs of activities to make up one hour. Turn the hands of this clock so that it shows a quarter past 4. What time will it show in half an hour's time? Who took the shortest time to …? Anya went into the library at a quarter to eleven and came out at a quarter past twelve. How long was she in the library? Jane left home at ten fifteen. It took her half an hour to get to the seaside. At what time did Jane get to the seaside? The bus left at 9 o'clock to go to the zoo. It arrived 1 hour and 15 minutes later. Draw a ring around the time it got to the zoo. 9:15 11:15 9:30 10:45 10:15
• Recognise and use whole, half and quarter turns, both clockwise and anticlockwise; know that a right angle represents a quarter turn *In PE I can turn on the spot through whole, half or quarter turns, either clockwise or anticlockwise*	Turn this picture half a turn clockwise. Now turn the picture a quarter turn anticlockwise. How can we get it back to where it started from? Is there any other way? Look at this picture. Close your eyes while I turn it. Now open your eyes. What did I do? Are you sure? How could you check?

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Follow and give instructions involving position, direction and movement *I can make a floor robot follow a path marked out on the floor* *I can estimate the number of robot steps that the robot must take to reach the traffic cone*	How could you make the robot come back to its starting point? What instructions would you give? The robot went too far/hasn't gone far enough. What do we need to change in our instructions? Roughly, how many centimetres is one robot step? How can we find out?
• Listen to others in class, ask relevant questions and follow instructions *I can listen to others and ask them questions about their work*	Listen while these children explain how they tackled a problem. What questions would you like to ask them?

Learning overview

Children **add or subtract multiples of 10**, **find the sum or difference of one- and two-digit numbers** and **use doubling and halving** in the **context of money or measures**. They answer questions such as:

A plant is 48 cm tall. It grows another 30 cm. How tall is it now?

There are 18 pencils in a pack. How many pencils are there in two packs?

Children **find differences** in practical situations. For example:

How much longer/shorter than the red ribbon is the blue ribbon? Cut a strip of paper to show the difference.

How much lighter than half a kilogram is each of these objects – just a bit lighter, a lot lighter, or about the same? How could we check?

Children continue to **estimate and measure length**. For example, they estimate approximately how far you can step in one stride, then measure, giving the distance as 'just more than/just less than/about' a number of centimetres They use metre sticks to measure distances up to 10 metres and a measuring tape to measure longer distances in metres. They begin to estimate in metres. For example, they work in pairs to estimate, and then measure, the distance from the classroom to the hall. They agree where to start and finish, how to record the distance and then decide how close their estimate was. They suggest lengths that you could measure using centimetres and lengths to measure in metres.

Children **read a scale to the nearest division**. They **use a ruler to draw lines and measure** to the nearest centimetre. They create their own 'tape measure', marked every 10 cm, and use it to measure longer objects to the nearest 10 cm.

Children **give instructions involving position, direction and movement**, including those that involve turn. For example, they give instructions to a simple floor robot to follow a route marked out on the floor. They use whole, half and quarter turns and recognise that a quarter turn produces a right angle.

Children recognise that as the minute hand of a clock turns through a quarter turn that represents a quarter of an hour. They use this to **tell the time** to the quarter hour. They know that one hour is the same as 60 minutes, that a quarter of 60 (found by halving and halving again) is 15, and that a quarter past 3 is also said as 'three fifteen'. They look at a digital clock and read the time 3:15.

Using money, they know that £1 is equal to 100p. They answer **problems involving finding change** and know that this is **linked to subtraction**. For example:
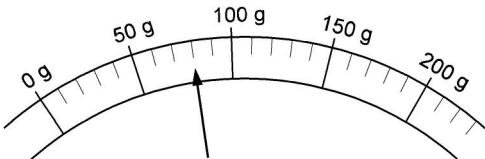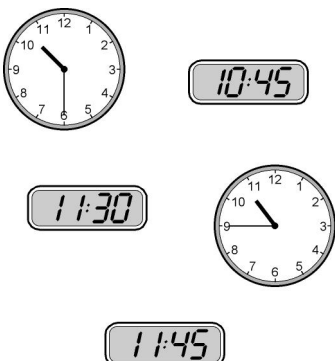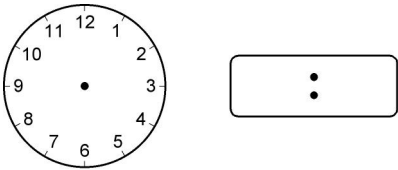
I want to buy a toy costing £1. I have saved 70p so far. How much more money do I need?
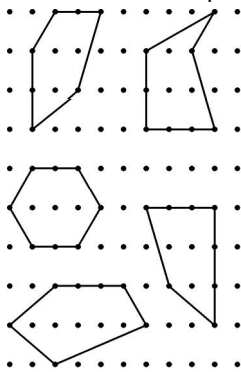
Children **use a range of calculation strategies** to **solve one and two-step problems** involving money and measures. For example:

A piece of string is 50 cm long. I cut off two pieces each 15 cm long. What length of string is left?

They **use informal recording, pictures and diagrams** where appropriate to support calculation. They work in small groups to discuss problems and ways of solving them and agree on what mathematics is needed.

Unit 2D3

2 weeks

Objectives	Assessment for learning
Children's learning outcomes in italic	

• Solve problems involving addition, subtraction, multiplication or division in contexts of numbers, measures or pounds and pence
 	
I can decide which calculations are needed to solve a two-step word problem
	Ellen has a £5 note. She spends £1.99. Draw a ring around each coin she gets in her change.
	
	Write the two missing amounts in this sequence. The same amount is added each time.
	
	£2.65 £2.75 □ £2.95 □ £3.15
	
	Look at these [two-step] problems. Tell me what calculations you will do. Show me how to do those calculations.
	   There are 38 bean bags. Kerry takes 15 and Paul takes 11. How many are left?
	   There are 60 sweets in a bag. 20 sweets are red. 16 sweets are yellow. The rest are green. How many sweets are green?
	Make up a story that would mean that you need to work out 2 × 9 then add 16.

• Add or subtract mentally a one-digit number or a multiple of 10 to or from any two-digit number; use practical and informal written methods to add and subtract two-digit numbers *I can add and subtract two-digit numbers using practical equipment or written notes to help me*	What is 34 + 48? What number facts might you use to help you to work this out? How many do you need to add to 34 to get to the next multiple of 10? How might you partition 8 to help you? Show me how you could work out the answer to 47 – 29. What about 72 – 12? Can you work out your answer in a different way? Which way do you find most helpful? Why? Find the missing number: 12 + □ + 25 = 58
• Estimate, compare and measure lengths, weights and capacities, choosing and using standard units (m, cm, kg, litre) and suitable measuring instruments *I know that a metre is 100 centimetres long* *I know that a kilogram is 1000 grams* *I know that a litre is 1000 millilitres*	Draw a line which is twice as long as this [5 cm] line. Use a ruler. About how long do you think this line is? How could you measure it? Tell me two lengths that make 1 metre. Another two lengths? Tell me two weights that make 1 kilogram. Another two weights? Look at the mug I am holding. Which of these amounts is the estimate of the capacity of the mug? 1 metre 1 litre 1 centimetre ¼ kilogram ¼ litre

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Read the numbered divisions on a scale, and interpret the divisions between them (e.g. on a scale from 0 to 25 with intervals of 1 shown but only the divisions 0, 5, 10, 15 and 20 numbered); use a ruler to draw and measure lines to the nearest centimetre *I can read scales marked in 2s, 5s and 10s* *I can measure and draw lines to the nearest centimetre*	Look at the number line. The arrow points to 50. Draw an arrow to show where the number 125 belongs. 0 50 100 150 This scale shows the weight of a letter. How much does the letter weigh? 0 g 50 g 100 g 150 g 200 g Tell me some important tips when you measure the length of something using a measuring tape or ruler. How do you work out the numbers not shown on a scale?
• Use units of time (seconds, minutes, hours, days) and know the relationships between them; read the time to the quarter hour; identify time intervals, including those that cross the hour *I know that there are 24 hours in a day* *I can use a clock face to help me to count in steps of 5 minutes*	Roughly, how long does it take you to walk home? To sleep each night? To count to 50? To grow 5 cm taller? Bethany says she sleeps for 19 hours every night. Can that be right? How do we know? How do you use a clock face to help you to work out how many minutes there are between a quarter past 2 and a quarter to 3? Two clocks show the same time. Which are they? 10:45 11:30 11:45 I went for a walk at 4 o'clock. My walk took me 45 minutes. Draw on these clocks what time it was when I ended my walk. Mark got into the pool at 4:30. He was in the pool for 45 minutes. At what time did he get out? Jane left home at ten fifteen. It took her half an hour to get to the seaside. At what time did Jane get to the seaside?

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Recognise and use whole, half and quarter turns, both clockwise and anticlockwise; know that a right angle represents a quarter turn *I know that a quarter turn make a right angle* *I can point out right angles in the classroom*	Use these geostrips to show me what a right angle looks like Point out some right angles in the classroom. For those we can reach, how could we check? Which of these shapes has a right angle?
• Listen to others in class, ask relevant questions and follow instructions *I can listen to others and ask them questions about their work*	Listen while these children explain how they tackled a problem. What questions would you like to ask them?

Learning overview

Children **add or subtract mentally a one-digit number** or a **multiple of 10** to or from any two-digit number. They use informal jottings, number lines, number grids and practical equipment to **add and subtract two-digit numbers.**

Children use their knowledge of number facts to respond quickly to questions such as:

> *How many 5p coins do you need to make 35p?*
>
> *A cheese string is 12 cm long. I bite off and eat 4 cm. How long is the cheese string now?*
>
> *The yellow ribbon is 15 cm long. The green ribbon is twice as long. How long is the green ribbon? I put the yellow and green ribbons end to end. How far do they reach?*

They explain what calculation they did and why.

Children continue to count along number lines in 2s, 5s and 10s. They estimate positions of numbers on a number line where only multiples of 2, 5 or 10 are marked. They develop this understanding to **read a range of scales**, giving their answers to the nearest division. They discuss their answers and explain their thinking.

Children **solve practical problems involving measures**. For example, they make a paper 'scale' showing 'cupfuls' to stick on a bottle, and use this to find the number of cups that different containers will hold or fill. They progress to using 100 ml measures for the scale. By counting in hundreds, they establish that 1000 ml of water is needed to fill up to 1 litre. They explain why 1000 ml is the same as 1 litre by making use of the scale; they point to each division as they count up in 100s of millilitres to reach 1 litre. They combine their knowledge of number facts and place value to answer questions such as:

> *There is 600 ml of water in a container. I pour out 100 ml. How many millilitres of water are left in the container?*

Children pour 1 litre of water into various bottles and containers. They use what they have learned to **estimate** where half a litre will reach. They **check** how close their estimate was.

Children recognise that 1 metre is a measurement of length, 1 litre is a measurement of capacity and 1 kilogram is a measurement of weight. They **suggest suitable units and measuring instruments** to measure, for example, the capacity of a watering can or the height of the door.

Children recognise whole, half and quarter turns. They continue to describe turns and to **give and follow instructions** to turn. For example, they give instructions to a friend to follow a route around the playground. They make and draw half and quarter turns from the same starting point using, for example, two geostrips.
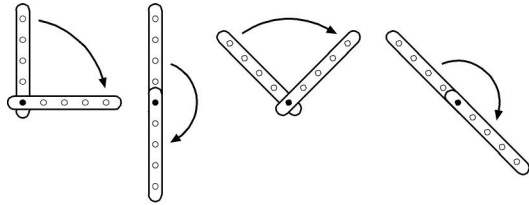
Children **read time to the quarter hour** on analogue and digital clocks. They know that there are 24 hours in a day. They know what they are doing at key times in the day, and find **time intervals**. For example, they find how long they have been out at play using a clock face to help them to count in steps of 5 minutes. They use the time line or clock face to explain how they work out time intervals, pointing to appropriate divisions to support their explanation.

Children **solve word problems** involving money and measures. They use practical resources where helpful, recording their work using jottings, pictures, number lines or number sentences. For example:

I rolled a toy car 47 cm. I pushed it another 39 cm. How far did the car travel?

Patrick has 46p. Someone gave him another 56p. How much money does he have now?

Four friends picked a total of 12 kg of strawberries. They each picked the same amount of strawberries. How many kilograms of strawberries did each of the friends pick?

A baker bought six bags of flour. Each bag weighed 3 kg. How many kilograms of flour did the baker buy?

Children discuss the difficulty of the problems that they are given. They respond to questions such as: *Which did you find easy/difficult? Why?* They evaluate the usefulness of the strategy they chose, for example: *Was the number line helpful? How did the number line help you?*