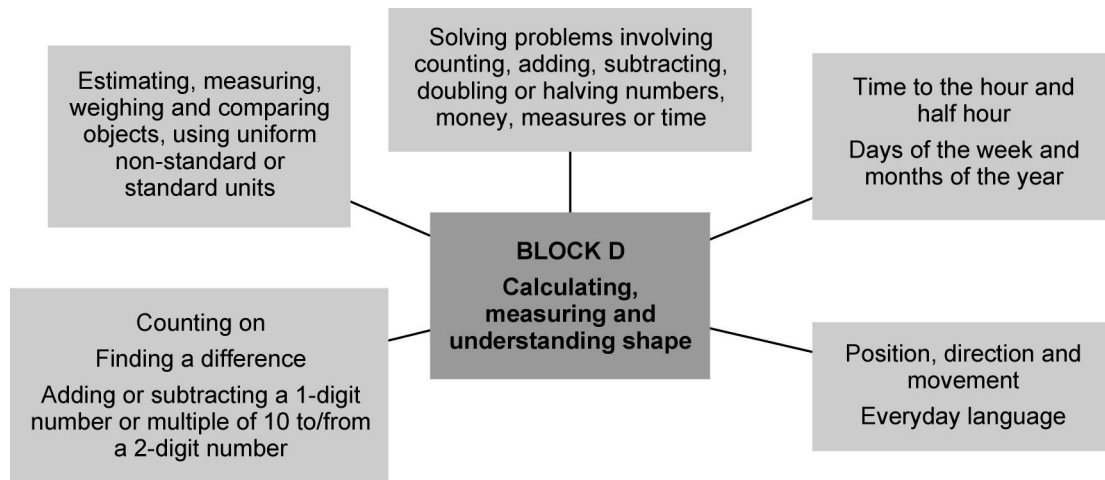


**Calculating, measuring and understanding shape**



Objectives	Units		
	1	2	3
<b>End-of-year expectations (key objectives) are highlighted</b>			
• Solve problems involving counting, adding, subtracting, doubling or halving in the context of numbers, measures or money, for example to 'pay' and 'give change'	✓	✓	✓
• Count reliably at least 20 objects, recognising that when rearranged the number of objects stays the same; estimate a number of objects that can be checked by counting	✓		
• Relate addition to counting on; recognise that addition can be done in any order; use practical and informal written methods to support the addition of a one-digit number or a multiple of 10 to a one-digit or two-digit number		✓	✓
• Understand subtraction as 'take away' and find a 'difference' by counting up; use practical and informal written methods to support the subtraction of a one-digit number from a one-digit or two-digit number and a multiple of 10 from a two-digit number		✓	✓
• <b>Estimate, measure, weigh and compare objects, choosing and using suitable uniform non-standard or standard units and measuring instruments (e.g. a lever balance, metre stick or measuring jug)</b>	✓	✓	✓
• Use vocabulary related to time; order days of the week and months; read the time to the hour and half hour	✓	✓	✓
• Identify objects that turn about a point (e.g. scissors) or about a line (e.g. a door); recognise and make whole, half and quarter turns		✓	✓
• Visualise and use everyday language to describe the position of objects and direction and distance when moving them, for example when placing or moving objects on a game board	✓	✓	✓

## Speaking and listening objectives for the block

Objectives	Units		
	1	2	3
• Retell stories, ordering events using story language	✓		✓
• Experiment with and build new stores of words to communicate in different contexts		✓	

## Opportunities to apply mathematics in science

Activities		Units		
		1	2	3
1a	Ourselves: Make direct comparisons of heights.	✓		
1b	Growing plants: Observe and measure seedlings at regular intervals using vocabulary: yesterday, tomorrow, days of the week, last week.		✓	
1e	Pushes and pulls: Describe position, direction and movement of toys.			✓

## Key aspects of learning: focus for the block

Enquiry	<b>Problem solving</b>	Reasoning	Creative thinking
<b>Information processing</b>	Evaluation	Self-awareness	Managing feeling
<b>Social skills</b>	<b>Communication</b>	Motivation	Empathy

## Vocabulary

problem, method, number sentence, explain, record, compare, order, measure, weigh

count, guess, estimate, roughly, enough, not enough, too much, too little, too many, too few, more, less, the same number as, equals (=), add, plus (+), sum, total, altogether, subtract, minus (–), take away, difference, double, halve, half, quarter, how many ...?, how much ...?

money, coin, pence, penny, pound, pay, change, buy, sell, price, spend

long, longer, longest, short, shorter, shortest, tall, taller, tallest, light, lighter, lightest, heavy, heavier, heaviest, holds more, holds less, ruler, tape measure, metre stick, balance, scales, measuring jug


time, clock, hands, morning, afternoon, evening, midnight, mid-day, noon, hour, night, day, week, month, year, days of the week, months and seasons of the year

position, direction, grid, outside, inside, beside, next to, front, back, between, centre, underneath, above, on top of, below, halfway, near, far, whole turn, half turn, quarter turn, right, left

## Building on previous learning

Check that children can already:

- use language such as 'more' or 'less' to compare two numbers
- relate addition to combining two groups of objects and subtraction to 'taking away'
- use some of the vocabulary involved in adding and subtracting
- use everyday words to describe position
- use language such as 'greater', 'smaller', 'heavier' or 'lighter' to compare quantities
- use everyday language related to time and sequence familiar events

Objectives <i>Children's learning outcomes in italic</i>	Assessment for learning
<ul style="list-style-type: none"> <li>Solve problems involving counting, adding, subtracting, doubling or halving in the context of numbers, measures or money, for example to 'pay' and 'give change' <i>I can use counting to solve problems involving measures</i></li> </ul>	<p>How did you find out which of these two objects was the lighter, shorter, held the least amount, ...?</p> <p>I am giving each of you six paper strips. Find two strips in your set which are the same length. Show them to me. Now find a strip in your set which is longer than this one.</p> <p>What is each of these coins worth?</p> <p>In how many different ways can you make 10p using only 2p and 1p coins?</p>
<ul style="list-style-type: none"> <li>Count reliably at least 20 objects, recognising that when rearranged the number of objects stays the same; estimate a number of objects that can be checked by counting <i>I can find out how long a room is by counting the paces I take to cross it</i></li> </ul>	<p>Guess how many cubes are in the jar. Now check by counting. Why did you think it was that number of cubes?</p> <p>How many cubes will balance the parcel on the scales?</p> <p>How many glasses will fill the jug?</p> <p>How many jumbo bricks do you need to make a tower that is as tall as you are?</p>
<ul style="list-style-type: none"> <li>Estimate, measure, weigh and compare objects, choosing and using suitable uniform non-standard or standard units and measuring instruments (e.g. a lever balance, metre stick or measuring jug) <i>I can guess how many cubes will balance a parcel</i> <i>I can use a metre stick to measure how far it is across the hall</i></li> </ul>	<p>Where do you start to measure the length of the carpet?</p> <p>Ann measured the height of these two dolls in blocks. How many blocks taller is the large doll?</p> 
<ul style="list-style-type: none"> <li>Use vocabulary related to time; order days of the week and months; read the time to the hour and half hour <i>I know the days of the week and can say them in order</i> <i>I can remember the order of a favourite story</i></li> </ul>	<p>What day is it today? So what will tomorrow be?</p> <p>Which are the weekend days?</p> <p>Which days are we at school?</p> <p>Look at these pictures. Point to a picture which shows something that you think happened in the morning.</p> <p>Point to a picture which shows something that you think happened in the afternoon.</p> <p>Point to a picture which shows something that you think happened in the evening.</p>
<ul style="list-style-type: none"> <li>Visualise and use everyday language to describe the position of objects and direction and distance when moving them, for example when placing or moving objects on a game board <i>I can describe where something is using words like 'next to', 'in front of', 'underneath', 'on top of', ...</i></li> </ul>	<p>Who is sitting next to you?</p> <p>Put the pencil pot in front of/behind the tray of crayons.</p> <p>Stand in front of the board. Stand in front of, behind, beside, opposite a partner. Stand between two other children.</p> <p>Show me your left hand.</p> <p>Tell me something in the classroom that is higher than, lower than, above, below, between, beside, next to, in the middle of, at the edge of, in the corner of the ...</p> <p>We can't see the hall, but what is next to the piano? What is below the big window?</p>
<ul style="list-style-type: none"> <li>Retell stories, ordering events using story language <i>I can tell the robot step by step how to go around the chair and back to me</i> <i>I can tell the story of Goldilocks and the three bears</i></li> </ul>	<p>What happens first? And next?</p> <p>What happens at the end of your story?</p> <p>These cards tell a story of how some children built a snowman. Put the cards in order.</p>

## Learning overview

Children **count, compare, add and subtract** in contexts involving measures or money. This helps them to transfer their calculation skills from the context of number and apply them to the measures, and vice versa.

When they are working with **money**, children initially use only 1p coins or only £1 coins to 'pay' in the classroom shop, counting out coins for an object that they want to buy. They buy a number of 2p stamps using 2p coins. Slowly, they understand that a 2p coin has the same value as two 1p coins, and that a £2 coin has the same value as two £1 coins. They begin to read and write prices such as 8p or £4, responding to instructions such as:

*Tell me how much you think this toy boat costs. Watch while I write how much it is.*

*This toy car costs 9 pence. Find a price label to match how much.*

These activities can be demonstrated on an interactive whiteboard to a large group. They can also be linked to counting in twos to 10 and back again to zero, and to hops of 2 on a number line.

Children continue to make **direct comparison of the length, weight or capacity of two objects without any counting**. They begin to use **uniform non-standard units** to estimate and then measure length, using objects such as cubes or art-straws that are all the same size. They select an eggcup to measure the capacity of a small jug, and a larger jug to measure the capacity of a bucket, recognising that it would not be appropriate to measure the capacity of the bucket using the eggcup. They weigh on the scales parcels that have been carefully prepared by the teacher to match an equivalent number of identical bricks or weights, estimating first how many bricks will balance the parcel.

Children continue to develop the **concept of time** in terms of time passing and sequencing events in familiar story or day-to-day routines. They use terms such as *morning*, *afternoon* and *evening*, *yesterday* and *tomorrow*. They learn to order the days of the week and learn that weekend days are Saturday and Sunday. They listen to stories and rhymes about time, such as *The Very Hungry Caterpillar* or *The Bad-Tempered Ladybird* by Eric Carle, *Monster Monday* by Susanna Gretz or *Hard Boiled Legs* by Michael Rosen and Quentin Blake. They count how many times they can clap in a steady rhythm while a child writes their name on the board, and discuss who took more time and who took less time. They count regular beats on a drum while children pace across a room or cut out a square of paper. They estimate whether they can pack the bricks away while someone counts to 20.

Children use **everyday language to describe position, direction or movement**. For example, they place objects above, below, to the right of and to the left of other objects on a magnetic board or interactive whiteboard. They follow instructions to put play-people in a scene. In PE, they follow instructions to roll or slide, or to make whole and half turns on the spot. They turn to the left and they turn to the right.

Objectives <i>Children's learning outcomes in italic</i>	Assessment for learning
<ul style="list-style-type: none"> <li>Solve problems involving counting, adding, subtracting, doubling or halving in the context of numbers, measures or money, for example to 'pay' and 'give change'</li> </ul> <p><i>I can add up and take away when I measure</i></p>	<p>Which of these:</p> <ul style="list-style-type: none"> <li>containers holds the most water?</li> <li>ribbons is the longest?</li> <li>packages is the heaviest?</li> </ul> <p>How do you know? How could you check?</p> <p>Look at the five paper strips. Put all your five strips in order, from longest to shortest.</p> <p>Now put your longest strip on its own on the table. Find two strips which, put together, are the same length as your longest strip.</p> <p>Show me how to find half of this strip of paper. How do you know it is exactly half?</p>
<ul style="list-style-type: none"> <li>Relate addition to counting on; recognise that addition can be done in any order; use practical and informal written methods to support the addition of a one-digit number or a multiple of 10 to a one-digit or two-digit number</li> </ul> <p><i>I can buy two toys and work out how much they cost altogether</i></p>	<p>How did you work out how much they cost altogether?</p> <p>Does it cost more if I buy them in a different order?</p> <p>Make up a question using the words 'sum of' and tell me how to do it.</p> <p>Tell me some addition questions that have 20p as an answer.</p>
<ul style="list-style-type: none"> <li>Understand subtraction as 'take away' and find a 'difference' by counting up; use practical and informal written methods to support the subtraction of a one-digit number from a one-digit or two-digit number and a multiple of 10 from a two-digit number</li> </ul> <p><i>I can work out how much I have left from 20p when I buy a toy</i></p>	<p>How did you work out how much you had left?</p> <p>Make up a 'take away' question and show me how to do it.</p> <p>Tell me some subtraction questions that have 10p as an answer.</p>
<ul style="list-style-type: none"> <li>Estimate, measure, weigh and compare objects, choosing and using suitable uniform non-standard or standard units and measuring instruments (e.g. a lever balance, metre stick or measuring jug)</li> </ul> <p><i>I can guess how many jugs of water I will put into the bowl to fill it</i></p> <p><i>I can use the red weights to balance a parcel</i></p>	<p>Is this stick longer or shorter than this straw? How do you know?</p> <p>Is the red parcel heavier than this other one? How do you know?</p> <p>Does this container hold more than this other one? How do you know?</p> <p>Which of these three containers holds the most water? How do you know? How could you check?</p> <p>Which of these objects are sensible to use for measuring? Why? What sort of measuring could you use them for?</p> <p>Would it be fair to measure with ...? Why or why not?</p> <p>Estimate how many art-straws will fit across this table. How many of the long paintbrushes will fit across the table? Why do you think that there will be fewer paintbrushes?</p>
<ul style="list-style-type: none"> <li>Use vocabulary related to time; order days of the week and months; read the time to the hour and half hour</li> </ul> <p><i>I know that it is 3 o'clock when the big hand points to the 12 and the small hand points to the 3</i></p>	<p>Turn the hands of this clock so that it shows 4 o'clock.</p> <p>Who took the shortest time to ...?</p>

Objectives <i>Children's learning outcomes in italic</i>	Assessment for learning
<ul style="list-style-type: none"> <li>Visualise and use everyday language to describe the position of objects and direction and distance when moving them, for example when placing or moving objects on a game board <i>I can tell my partner where to place their cubes to make the same shape as mine</i> <i>I can follow instructions to make the same shape as my partner</i></li> </ul>	<p>Make a model using six interlocking cubes. Tell me how to build a model the same as yours.</p> <p>Take a green cube. Put a second green cube on top of it. Put a yellow cube to the right of the top green cube. Put a red cube behind the yellow cube. Now show me your models. Are they all the same?</p> <p>Here is a birthday card that I have cut up into interesting shapes. I have shuffled the shapes on the table. Give me instructions so that I can put the card together.</p>
<ul style="list-style-type: none"> <li>Identify objects that turn about a point (e.g. scissors) or about a line (e.g. a door); recognise and make whole, half and quarter turns <i>I know how to turn right and to turn left</i></li> </ul>	<p>Which of these shapes will roll in a straight line? Which will roll in a curved line?</p> <p>Follow my instructions to get through the maze. Move forwards, turn left, go straight on, turn the corner, ...</p>
<ul style="list-style-type: none"> <li>Experiment with and build new stores of words to communicate in different contexts <i>I can use words that describe position and direction</i></li> </ul>	<p>Michelle and Solomon are going to take the register to the school office. Give them instructions to tell them how to get there. Use words like <i>forwards, left, right, ...</i></p>

## Learning overview

Children continue **use and apply their calculation skills to solve problems involving** measures. For example, they solve problems such as:

*One bottle of water will fill 10 cups. How many cups will two bottles fill?*

*Which is heavier: the large roll of cotton wool or the small tin of tomatoes?*

*Estimate how many art-straws will fit across this table. How many of the long paintbrushes will fit across the table?*

They **order** small sets of objects according to their weight, capacity, length, height or width. At first they use direct comparisons to order the objects. They then use **uniform non-standard units** to match each object and count the number of units. They record each count in a table and work out which of the set of objects is longest or shortest, heaviest or lightest, and so on. These activities involve children in making decisions about the accuracy of the measure; for example: *The shelf is 6 and a bit exercise books long. Is it nearer to 6 or 7 exercise books?* They discuss questions such as: *If the book is 24 cubes long, will it also be 24 counters long?*

Children continue to work with **money**. They distinguish coins by sorting them and start to understand their value. They begin to recognise that some coins have a greater value than others, and will buy more: for example, 2p is worth more than 1p; 5p is worth more than 2p; £2 is worth more than £1. They play money games and collect 1p or 2p coins to the value of 10p and begin to count up 'how much this is altogether'. They extend their activities in the classroom shop, paying for items that cost 1p, 3p, 5p, 7p or 9p using only 2p coins, and receiving the appropriate amount of change in 1p coins. They use coins to help them to respond to questions such as:

*Michael had £5. He spent £3. How much did he have left?*

*Rosie had a 10p coin. She spent 3p. How much change did she get?*

*How much altogether is 1p and 2p and 5p?*

*Sunita spent 5p and 6p on toffees. What did she pay altogether?*

*Chews cost 2p each. How much do three chews cost?*

*An apple costs 12p. Which two coins would pay for it?*

*Which three coins make 11p? How else could you make 11p?*

*James paid 13p for chews. What coins could he use? What if he paid 17p?*

This unit continues to develop the **concept of time**. Children use the language of clock time in rhymes such as *Hickory Dickory Dock* or stories such as *Mr Wolf's Week* by Colin Hawkins. They begin to know key times of the day such as assembly at 9 o'clock, going home at 3 o'clock and bed time at 8 o'clock. They read and record the **time to the hour** on a clock with hands and use the clock hands to respond to questions such as:

*It's 5 o'clock. What time will it be in two hours' time? What time was it three hours ago?*

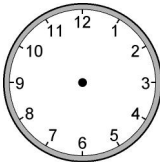
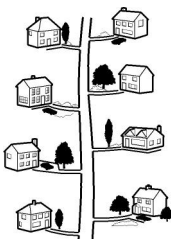
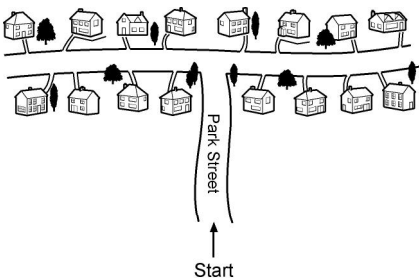
*Mum cooked a cake. She put it in the oven at 8 o'clock. She took it out at 10 o'clock. How long was the cake in the oven?*

Children continue to develop the use of everyday language to describe **position, direction and movement**, capitalising on opportunities in classroom games and in PE, for example, playing 'Simon says ...' or 'Follow my leader'. They describe where objects are in a picture or on a playing board, or how things are stored on shelves or in a cupboard.



Objectives <i>Children's learning outcomes in italic</i>	Assessment for learning												
<ul style="list-style-type: none"> <li>Solve problems involving counting, adding, subtracting, doubling or halving in the context of numbers, measures or money, for example to 'pay' and 'give change' <i>I can find out which of three objects is the heaviest by using the scales</i> <i>I can work out which coins to use to pay the exact price for something</i> <i>I can work out what something costs when it is half price</i></li> </ul>	<p>At the shop, all packets of crisps cost the same. Hannah buys two packets. She pays 40 pence. How much does one packet cost?</p> <p>In how many different ways can you make 30p using only silver coins?</p> <p>Put this box on one side of the balance (scales). Find two other boxes that together balance this one. [Point to the box on the balance.] Tell me when both sides balance.</p> <p>Use the balance (scales) to find out which of these three boxes is heaviest, which is the lightest, and which is in between.</p> <p>[Use statements like: The taller the container, the more water it holds. The larger the package, the heavier it is.]</p> <p>Do you agree? Can you find an example that shows that the statement is wrong?</p>												
<ul style="list-style-type: none"> <li>Relate addition to counting on; recognise that addition can be done in any order; use practical and informal written methods to support the addition of a one-digit number or a multiple of 10 to a one-digit or two-digit number <i>I can work out how many 10p badges I can buy for £1</i></li> </ul>	<p>What if the badges cost 5p? How many could you buy £1? Tell me how you worked it out.</p> <p>Tell me some addition questions that have 80p as an answer.</p> <p>Make up a question that uses the word <i>total</i> and tell me how to do it.</p>												
<ul style="list-style-type: none"> <li>Understand subtraction as 'take away' and find a 'difference' by counting up; use practical and informal written methods to support the subtraction of a one-digit number from a one-digit or two-digit number and a multiple of 10 from a two-digit number <i>I can count up to find how much I have left from 50p when I buy an object</i></li> </ul>	<p>How will you check your change?</p> <p>Build me two towers that have a difference of four cubes in their heights.</p> <p>Tell me some subtraction questions that have 50p as an answer.</p> <p>Make up a question that uses the words <i>difference between</i> and tell me how to do it.</p>												
<ul style="list-style-type: none"> <li>Estimate, measure, weigh and compare objects, choosing and using suitable uniform non-standard or standard units and measuring instruments (e.g. a lever balance, metre stick or measuring jug) <i>I can estimate how many straws I need to measure this table</i> <i>I can find out how many kilogram weights I need to balance the big bag of potatoes</i></li> </ul>	<p>What did know that helped you to estimate?</p> <p>Before you measure, what are the important things to remember about measuring?</p> <p>Five children used cubes to balance one of their shoes. This table shows the number of cubes they needed.</p> <table border="1"> <thead> <tr> <th></th><th>Cubes</th></tr> </thead> <tbody> <tr> <td>Roma</td><td>16</td></tr> <tr> <td>Tina</td><td>13</td></tr> <tr> <td>Gareth</td><td>18</td></tr> <tr> <td>Ali</td><td>20</td></tr> <tr> <td>Susan</td><td>15</td></tr> </tbody> </table> <p>Whose shoe is heaviest? Whose shoe is two cubes lighter than Gareth's shoe?</p>		Cubes	Roma	16	Tina	13	Gareth	18	Ali	20	Susan	15
	Cubes												
Roma	16												
Tina	13												
Gareth	18												
Ali	20												
Susan	15												



Objectives <i>Children's learning outcomes in italic</i>	Assessment for learning
<ul style="list-style-type: none"> <li>Use vocabulary related to time; order days of the week and months; read the time to the hour and half hour <i>I know that the big hand points to the 6 when it is half past the hour</i> <i>I can say the months of the year in order</i></li> </ul>	<p>Starting at 12, which number is halfway around the clock face? What month is your birthday? Is it in the summer? Which month comes after March? At what time of the year do the leaves fall off the trees? Sam's school starts at 9 o'clock. Sam went to the dentist and got to school half an hour late. Draw the time Sam got to school on the clock.</p>  <p>Imagine a clock with hands on the wall in front of you. The long hand is pointing to the 6. The small hand is pointing between 8 and 9. What time is it?</p>
<ul style="list-style-type: none"> <li>Visualise and use everyday language to describe the position of objects and direction and distance when moving them, for example when placing or moving objects on a game board <i>I know how to program the robot to move around the skittles</i></li> </ul>	<p>How did you decide which way the robot should turn? How did you decide how many steps the robot needed to move to reach ...? Look at this map. Start at the bottom. Point to the second house on the left.</p> 
<ul style="list-style-type: none"> <li>Identify objects that turn about a point (e.g. scissors) or about a line (e.g. a door); recognise and make whole, half and quarter turns <i>I can turn myself through a number of whole and half turns</i> <i>I can tell you some objects that turn, such as windmill sails or a water tap</i></li> </ul>	<p>The big hand of the clock is pointing to the 3. What number will it point to when it has made half a turn? If you face the door and make half a turn, what can you then see? Look at the map. Go to Start. Follow this route from there. Go to the end of Park Street. Turn left. Go to the fourth house on the right. Draw a ring around it.</p> 
<ul style="list-style-type: none"> <li>Experiment with and build new stores of words to communicate in different contexts <i>I can retell a story that I have heard</i></li> </ul>	<p>The pictures on the cards tell the story that you heard on the tape. Put the cards in time order. What do you think happens next?</p>

## Learning overview

Children continue to **solve problems involving measurements**. They begin to understand the relationship between the size of the unit and the number of units needed for the measurement. They predict whether they will need more counters or more matchboxes to measure the length of a book.

They fill a container such as a watering can with jugs of water and then beakers of water. They discover, say, that the watering can holds 4 jugs but 20 beakers, so fewer are needed of the larger unit and more are needed of the smaller unit.

Children **begin to use standard units** such as a metre stick to estimate, measure and compare how far they can throw a bean bag, recording distances to the nearest metre. They use a litre jug to fill three different large bowls or buckets, estimating first. They use their calculation skills to respond to questions such as:

*The telegraph pole is 7 metres tall. The tree is 11 metres tall. How much taller is the tree?*

*Tom bought 18 litres of lemonade for a party. Children at the party drank 15 litres of lemonade.*

*How many litres were left?*

Children continue to work with **money** and understand the value of all coins. They exchange 20p and 50p coins for smaller coins in different ways. They count up 'how much altogether' there is in a purse containing several 2p coins, or several 5p coins or several 10p coins, linking the counting to counting in twos, fives and tens. They then count up how much there is in a purse with a few mixed coins. They learn that when they are counting up coins it is usually easier to start with the largest coin or coins, and finish with the smallest. They link this to putting the larger number first when adding.

Children extend their activities in the classroom shop, paying exactly for items costing less than 50p using 10p, 5p, 2p and 1p coins. They then pay for an item costing, say, 17p by rounding up to 20p and paying that amount. They work out the change that they expect to get from the shopkeeper.

They use coins to help them to respond to questions such as:

*Fatima paid 57p for a yogurt. What coins could she use?*

*Carole has 30p. She spends 25p. How much does she have left?*

*Robert had a 50p coin. He spent 3p. How much change did he get?*

*How much altogether is 5p and 10p and 10p?*

*Ahmed spent 14p and 9p on apples. What did he pay altogether?*

*Lollipops cost 5p each. How much do six lollipops cost?*

*An orange costs 17p. Which three coins would pay for it?*

*Which three coins make 32p? How else could you make 32p?*

Children continue to develop the **concept of time**. They order the **months of the year** and make a 12-page classroom 'calendar' with pictures of each month, writing significant events underneath, such as Divali, Pancake Day or Midsummer's Day, or the dates of their birthdays. They **read time to the hour and half hour** on a clock with hands and recognise half past the hour in day-to-day routines. They use time lines or clocks to help them to respond to questions such as:

*It's half past seven. What time will it be in four hours' time? What time was it two hours ago?*

*John went to the park at 9 o'clock. He left at half past eleven. How long was he at the park?*

Children continue to use everyday language to describe **position, direction and movement**. For example, they follow and give instructions to make whole, half and quarter turns to the left or right. They describe the route through a simple maze. They program a simple floor robot to follow a route that is marked on the floor, using previous moves and 'trial and improvement' to estimate how many 'robot steps' are needed.