MathsHUBS Resources

National Centre for Excellence in the Teaching of Mathematics

Mastery Professional Development

Multiplication and Division

2.1 Counting, unitising and coins

Teacher guide | Year 1

Teaching point 1:

We can count efficiently by counting in groups of two.

Teaching point 2:

We can count efficiently by counting in groups of ten.

Teaching point 3:

We can count efficiently by counting in groups of five.

Teaching point 4:

A coin has a value which is independent of its size, shape, colour or mass.

Teaching point 5:

The *number* of coins in a set is different from the *value* of the coins in a set; knowledge of counting in groups of two, five or ten can be used to work out the value of a set of identical low-denomination coins.

Teaching point 6:

Knowledge of counting in groups of two, five or ten can be used to work out how many identical low-denomination coins are needed to make a given value.

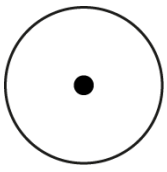
Overview of learning

In this segment children will:

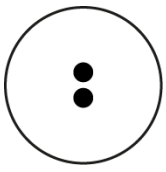
- build on previous experience of skip counting in multiples of two and ten (*Spine 1: Number, Addition and Subtraction,* segments *1.4* and *1.8*)
- develop fluency with skip counting in multiples of five
- gain experience with the idea of unitising
- explore the low-denomination coins (1 p, 2 p, 5 p and 10 p), learning that the value of a coin is unrelated to various physical attributes (particularly size)
- move from skip counting with ordinal representations (for example, counting the even numbers on a number line) or cardinal representations (for example, counting the number of wheels on eight bicycles) to skip counting with objects where the cardinality is not 'visible' (for example, counting to find the value of a set of 2 p coins).

While this segment is outwardly largely about money, the main purpose is to give children experience with the idea of unitising, in preparation for their work on multiplication. Building on previous work in *Spine 1*, segment *1.8*, children will come to realise that a 'unit' does not need to have a value of one, specifically through exploring units of two, five and ten. This means considering one group of objects as a unit in its own right. For example, if we look at some shoes, we might see ten shoes (with a unit equal to one shoe) or five *pairs* of shoes (with a unit equal to two shoes). Children will count in different units (one, two, five and ten), learning to recognise the number of units (five units in the example of five pairs of shoes), the unit size (two in the example of five pairs of shoes) and the total value (ten shoes in the example of five pairs of shoes). This serves as preparation for segment *2.2 Structures: multiplication representing equal groups*, in which children start to explore the concept of multiplication in the context of equal groups; there, children will need to identify the number of equal groups and the size of each group. The ability to see the same collection of objects in two different ways (for example, ten shoes or five *pairs* of shoes) is essential in various areas of mathematics, including multiplication (as discussed), place value (for example, 100 can be seen as 100 ones, 10 tens, or one 100) and fractions (for example, one cake can also be viewed as four units of one quarter).

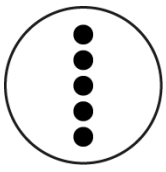
Each of the first three teaching points in this segment follow the same progression, as children learn to count in groups of (one,) two, five and ten. For each unit, counting should go up to at least ten groups (10 for ones, 20 for twos, 50 for fives and 100 for tens). In each of these teaching points, children will count with the support of both ordinal and cardinal representations. In preparation for *Teaching point 4*, the cardinal representations include pre-money tokens:



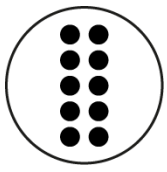
1 p pre-money token



2 p pre-money token



5 p pre-money token



10 p pre-money token

Once coins are introduced, the pre-money tokens will help children to move from a representation in which the cardinality *can* be seen (for example, two dots on the 2 p token) to one where the cardinality *cannot* be seen (for example, a 2 p coin).

Pre-money tokens can be made by sticking coloured dots onto counters. The size and colour of both the counters and the dots should be the same for all of the pre-money tokens, so that children's attention is focused on the defining feature: the number of dots on a token. The dots should only be placed on one

side of each counter to avoid confusion about the value of a counter (for example, if there are five dots on each side of a counter, there are ten dots in total; in this case does the token have a value of five or a value of ten?).

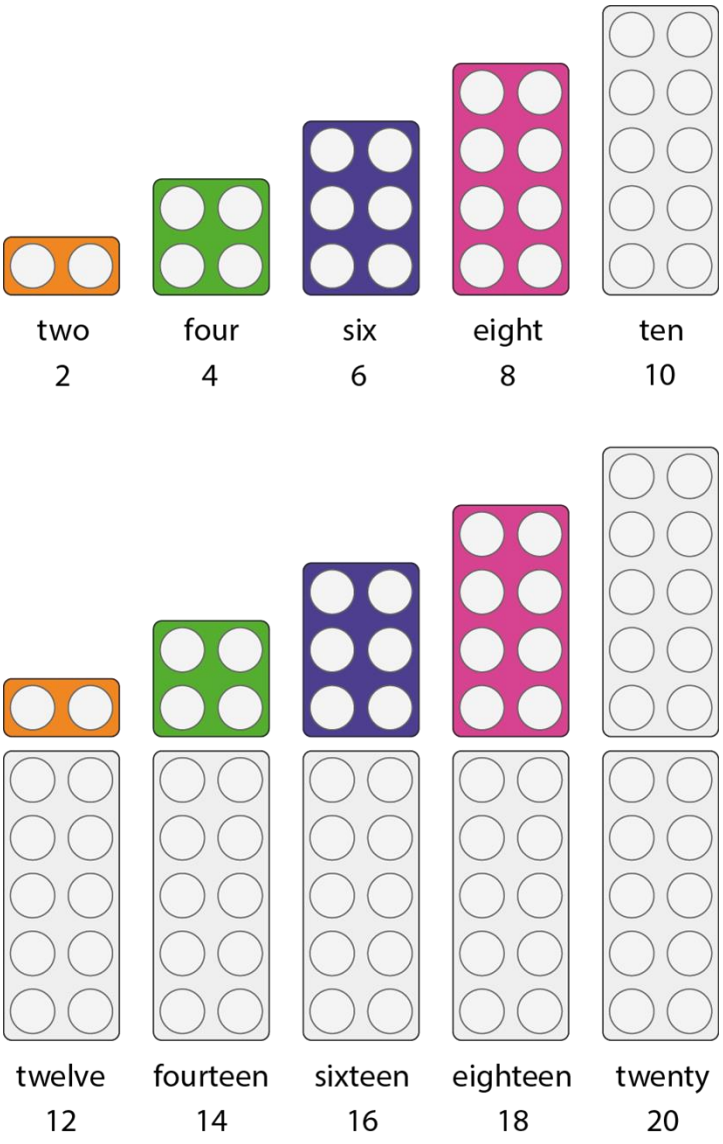
Once children have fully explored the different coin denominations in *Teaching point 4* (using real coins if possible), the pre-money tokens also help children to apply their experience of skip counting (from *Teaching points 1–3*) to finding the value of a set of identical coins (*Teaching point 5*) and to finding the number of identical coins needed to make a particular value (*Teaching point 6*). The ability to simultaneously think about the number of identical coins, the value of each coin and the total value of the set of coins, will prepare children for future work on multiplication and division.

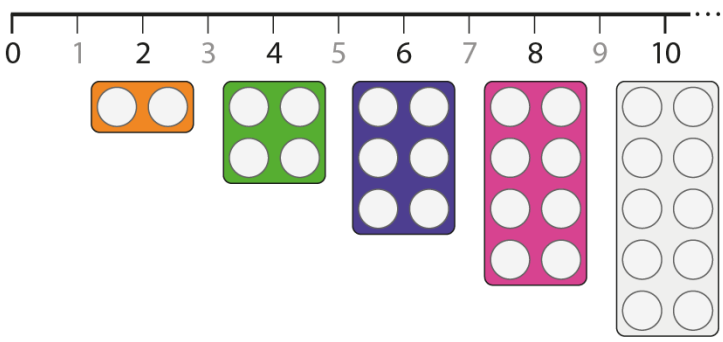
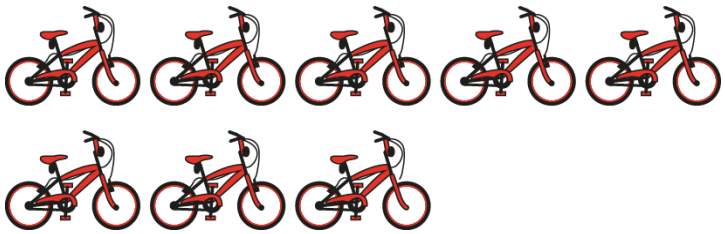
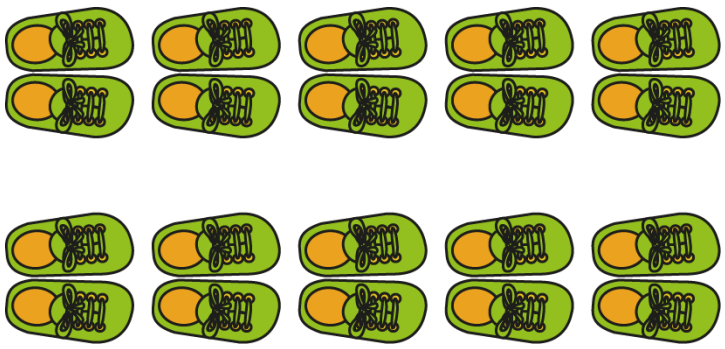
An explanation of the structure of these materials, with guidance on how teachers can use them, is contained in this NCETM podcast: www.ncetm.org.uk/primarympdpodcast. The main message in the podcast is that the materials are principally for professional development purposes. They demonstrate how understanding of concepts can be built through small coherent steps and the application of mathematical representations. Unlike a textbook scheme they are not designed to be directly lifted and used as teaching materials. The materials can support teachers to develop their subject and pedagogical knowledge and so help to improve mathematics teaching in combination with other high-quality resources, such as textbooks.

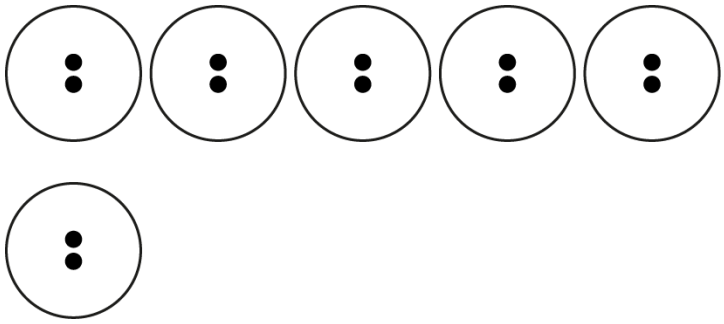
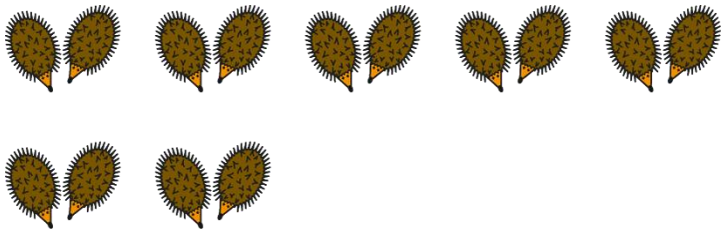
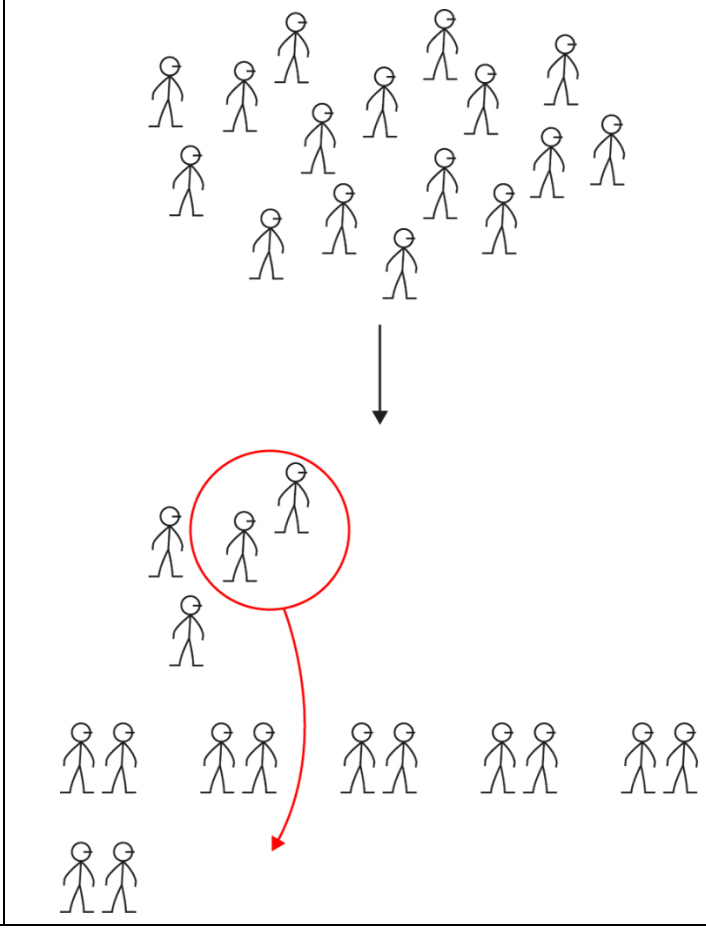
Teaching point 1:

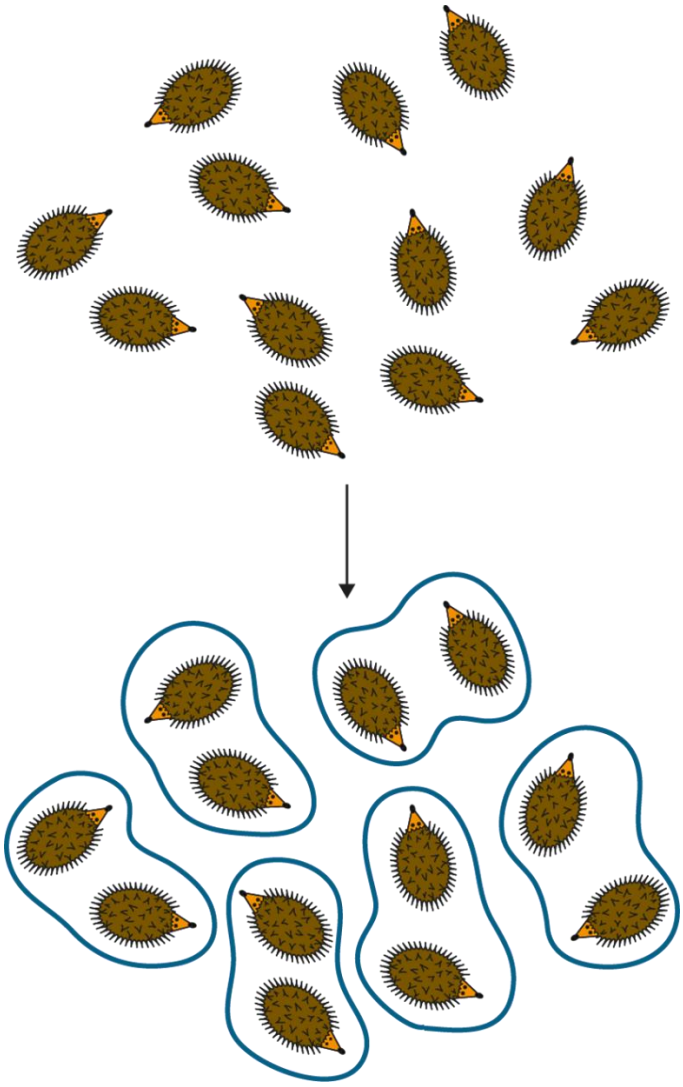
We can count efficiently by counting in groups of two.

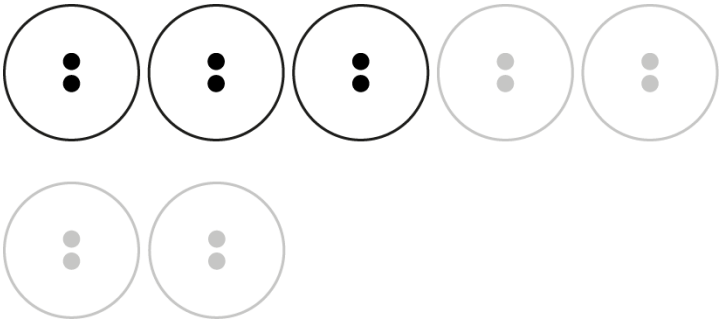
Steps in learning

	Guidance	Representations
1:1	Children may already have some experience of skip counting in twos/counting even numbers from *Spine 1: Number, Addition and Subtraction*, segment *1.4*. Since this segment focuses on groups of two (as preparation for multiplication) we are only considering counting even numbers. However, in general, children will also need to be able to count odd numbers fluently (see *Spine 1*, segment *1.4* for more on odd and even numbers). Using both cardinal representations (for example, base-ten number boards) and ordinal representations (for example, number lines and the Gattegno chart), practise counting both forwards and backwards in even numbers between zero and 20. To begin with, you may wish to whisper the odd numbers and say the even numbers at full volume, before moving to saying the even numbers only. When using the Gattegno chart, encourage children to tap the numbers as they are spoken (one tap for single-digit numbers; two taps for two-digit numbers, for example, tap '10' then '2' for twelve). In this and the next step, you can use songs, rhymes and classroom routines to develop children's fluency in skip counting in twos.	Skip counting in twos/counting even numbers – base-ten number boards:  Skip counting in twos/counting even numbers – number line: 

		Skip counting in twos/counting even numbers – combined representation:  Gattegno chart: 1000 2000 3000 4000 5000 6000 7000 8000 9000 100 200 300 400 500 600 700 800 900 10 20 30 40 50 60 70 80 90 1 2 3 4 5 6 7 8 9
1:2	Now practise enumerating pairs of items, using real-life contexts, both concrete and pictorial. Initially, use items that come naturally in pairs (for example, wheels on bikes or pairs of shoes) before counting objects that are simply grouped into twos (for example, 14 hedgehogs arranged in pairs). Count a range of different even quantities, as exemplified opposite. Note that the items are not yet laid out as arrays ($2 \times n$ or $n \times 2$); rather, the *pairs* are laid out in a five-and-a-bit arrangement to support children's ability to subitise the number of groups (see *Spine 1: Number, Addition and Subtraction*, segment *1.3*). So that children connect, for example, 'three groups of two' with 'six', count in two ways (dual counting): • *'One group of two, two groups of two, three groups of two…'* • *'Two, four, six…'* You can begin to abbreviate the former to '*One two, two twos, three twos, …*'. However, it is important to expose	'Natural' pairs: • *'How many wheels are there? Count in groups of two.'*  • *'How many shoes are there? Count in groups of two.'* 

	children to the language of 'groups' some of the time in preparation for future work on multiplication as the repeated addition of equal groups. Include pre-money tokens, as shown opposite, to begin to familiarise children with this representation.	Pre-money tokens: *'How many dots are there? Count in groups of two.'*  Objects grouped into twos: *'How many hedgehogs are there? Count in groups of two.'* 
1:3	Now move on to using counting in groups of two as a more efficient way to enumerate objects (compared to counting in ones). Using concrete resources, or working practically to count children, begin by presenting an even quantity of identical objects. As a class, first count in ones, moving each item from an uncounted area to a counted area as you go. Then count the objects again, this time counting in groups of two, moving *pairs* of items as you count. Discuss which was the quickest/easiest/most efficient way of finding the total number of objects. Note that all sets should contain an even number of objects to keep the focus on groups of two (the idea of remainders will be covered in later segments). After completing the count, children can check the total value by counting backwards, checking that	

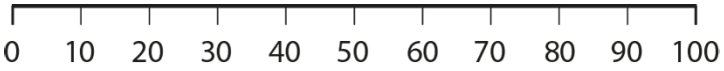
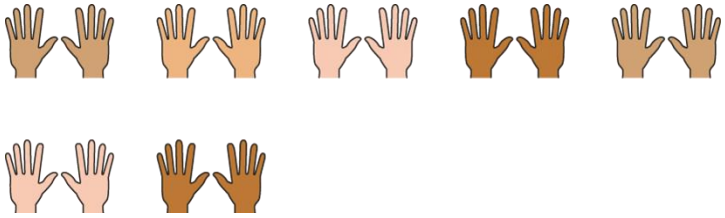
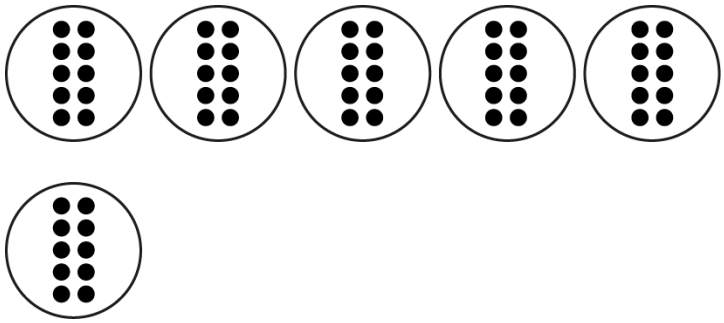
	they reach zero once the objects have been 'counted back off'. Give children lots of opportunities to practise counting in groups of two themselves with concrete resources. Think carefully about which resources to choose. Sometimes additional features (for example, counters of different colours and shapes) can *distract* children from what we want them to focus on, whilst sometimes additional features can *help* children to think about the relevant mathematical structure; for example, when using objects that resemble children or animals, children may be able to make connections with their own experience of working in pairs.	
1:4	Once children can confidently 'pair off' concrete resources, progress to counting even quantities that are represented pictorially. Now encourage children to draw rings around each group of two to support their counting.	

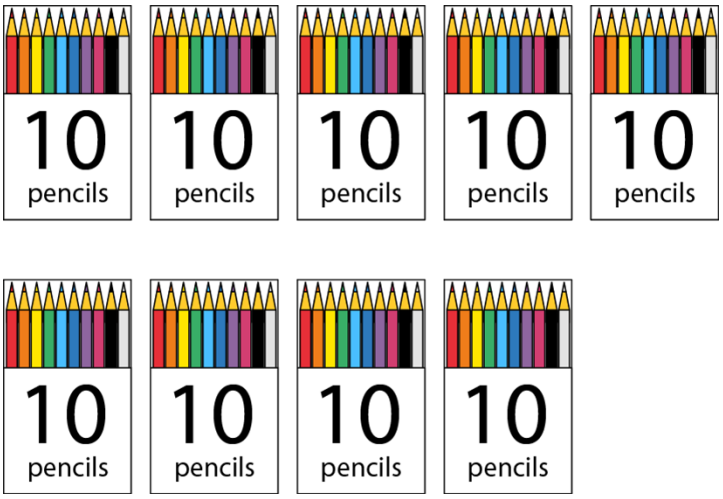
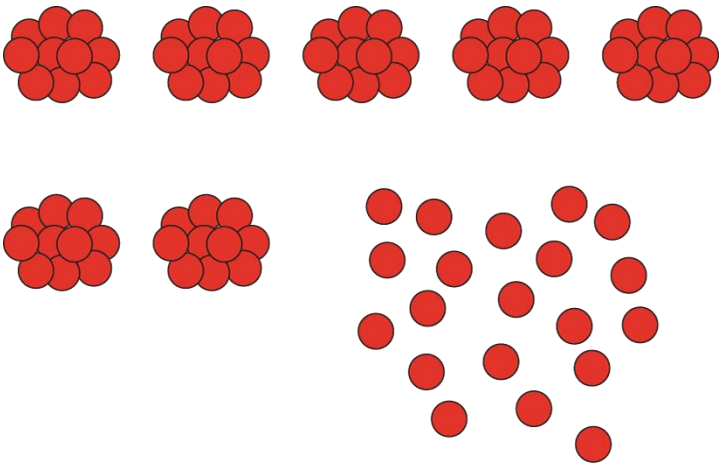
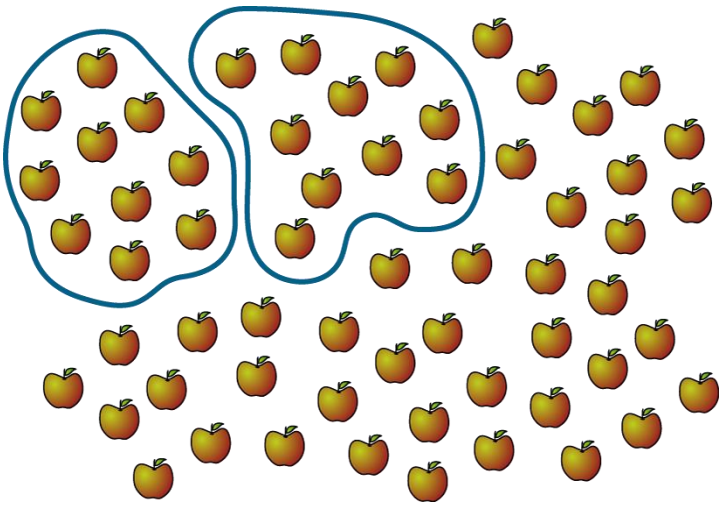
1:5	To complete this teaching point, practise counting forwards and backwards in twos from different multiples of two (for example, counting forwards starting at six rather than zero, as exemplified opposite). Use a variety of cardinal representations, including pre-money tokens as shown opposite.	 • *'Three groups of two, four groups of two, five groups of two…'* • *'Three twos, four twos, five twos…'* • *'Six, eight, ten…'*

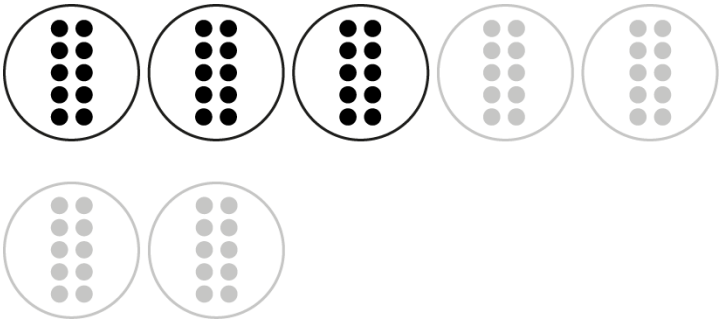
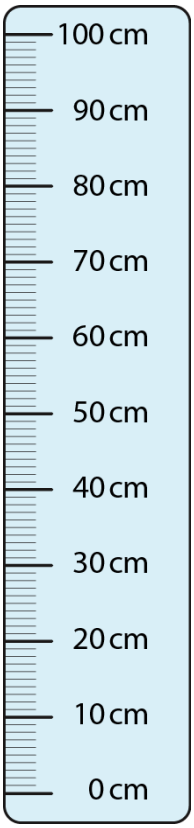
Teaching point 2:

We can count efficiently by counting in groups of ten.

Steps in learning

	Guidance	Representations
2:1	The sequence in this teaching point is the same as for *Teaching point 1*, but now we are counting in groups of ten, rather than two. The guidance here is kept brief, and any differences to the progression/representations are highlighted. Refer back to *Teaching point 1* for more detail. You can also refer to *Spine 1: Number, Addition and Subtraction*, segment *1.8*, which introduces ten as a unit, including counting in groups of ten. Begin by counting in tens, forwards and backwards, between 0 and 100, using a number line or the Gattegno chart for support.	
2:2	Now practise counting groups of ten items, using real-life contexts, both concrete and pictorial. Initially, use items that 'come in tens' (for example, ten fingers on two hands, ten pins in a bowling lane, dots on a 10 p pre-money token), before counting objects that are simply grouped into tens (for example, pack of ten pencils, bundle of ten straws). Again, count in two ways: • *'One group of ten, two groups of ten, three groups of ten…'* • *'Ten, twenty, thirty …'* As you continue practising, you can begin to shorten the former to: *'One ten, two tens, three tens…'*	'Natural' tens: *'How many fingers (and thumbs) are there? Count in groups of ten.'*  Pre-money tokens: *'How many dots are there? Count in groups of ten.'* 

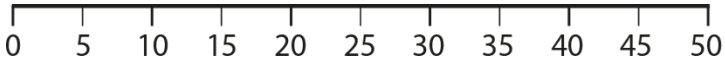
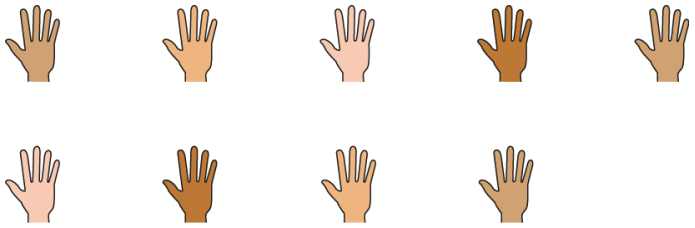
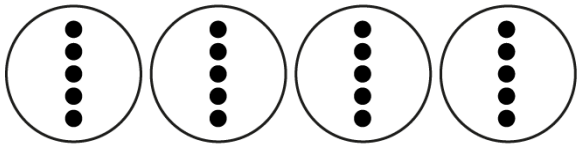
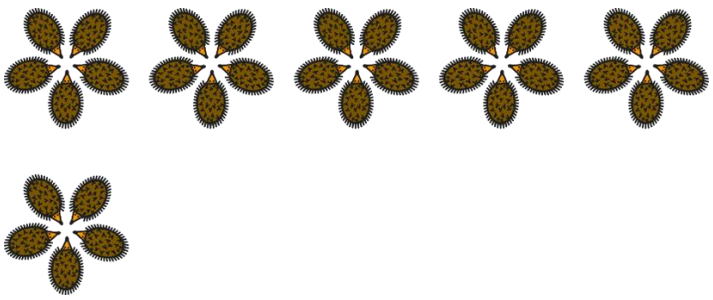
		Objects grouped into tens: *'How many pencils are there? Count in groups of ten.'* 
2:3	Now use counting in tens to count objects efficiently, initially using concrete resources, with children moving the objects into groups of ten (keep all totals equal to multiples of ten, so that there are no remainders). As in step *1:3*, children can check the total value by counting backwards, checking that they reach zero once the objects have been 'counted back off'.	
2:4	Then progress to using pictorial resources (with children circling groups of ten).	

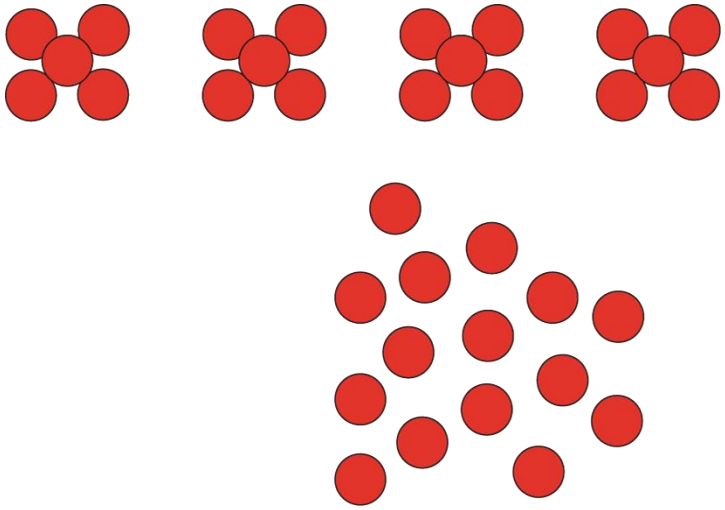
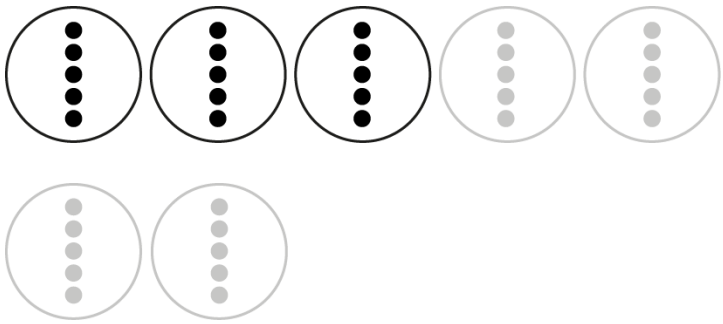
2:5	Practise counting forwards and backwards in tens from different multiple-of-ten starting points, using a variety of cardinal representations, including pre-money tokens as shown opposite.	 • *'Three groups of ten, four groups of ten, five groups of ten...'* • *'Three tens, four tens, five tens...'* • *'Thirty, forty, fifty…'*
2:6	You can include a simple measures context, such as the example opposite.	

Teaching point 3:

We can count efficiently by counting in groups of five.

Steps in learning

	Guidance	Representations
3:1	Again, this teaching point follows the same sequence as *Teaching point 1*. Here we are counting in groups of five, which children may not yet have any experience of. Begin by counting forwards and backwards in fives between 0 and 50, using a number line or the Gattegno chart for support.	
3:2	Now practise counting groups of five items, using real-life contexts, both concrete and pictorial. Initially, use items that 'come in fives' (for example, five fingers on a hand, a car filled with five people, dots on a 5 p pre-money token), before counting objects that are simply grouped into fives (for example, bead string/bar with alternating five-red-beads/five-white-beads or groups of five hedgehogs). Again, count in two ways: • *'One group of five, two groups of five, three groups of five…'* • *'Five, ten, fifteen …'* As you continue practising, you can begin to shorten the former to: *'One five, two fives, three fives…'*	'Natural' fives: *'How many fingers (and thumbs) are there? Count in groups of five.'*  Pre-money tokens: *'How many dots are there? Count in groups of five.'*  Objects grouped into tens: *'How many hedgehogs are there? Count in groups of five.'* 

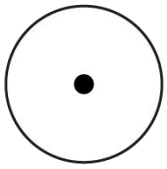
3:3	Now use counting in fives to count objects efficiently; as before keep the total number of objects equal to a multiple of the unit you are counting in (here, five). Initially use concrete resources, with children moving the objects into groups of five (then back to zero again, as described in steps *1:3* and *2:3*).	
3:4	Then progress to using pictorial resources (with children circling groups of five).	
3:5	Practise counting forwards and backwards in fives from different multiples-of-five starting points, using a variety of cardinal representations, including pre-money tokens as shown opposite.	 • *'Three groups of five, four groups of five, five groups of five…'* • *'Three fives, four fives, five fives…'* • *'Fifteen, twenty, twenty-five…'*
3:6	To round off the first three teaching points, you could present dòng nǎo jīn problems such as: • *'Dara and Maya are skip counting.* • *Dara says the number 25. What unit could he be counting in?* • *Maya says the number 20. What unit could she be counting in?'*	

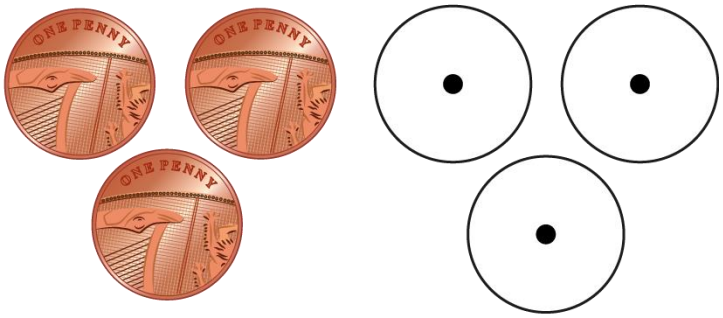
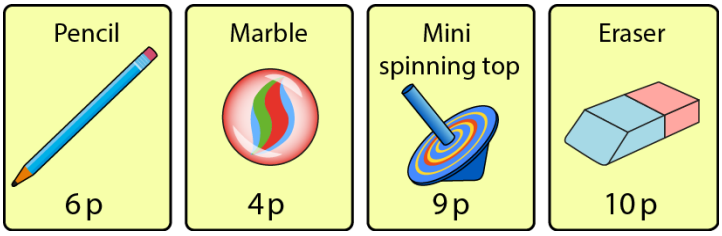
	• *'Charlotte is skip counting in fives. Arthur is skip counting in tens. They each say a number on every beat. Who will say fifty first?'*	

Teaching point 4:

A coin has a value which is independent of its size, shape, colour or mass.

Steps in learning

	Guidance	Representations
4:1	In this teaching point children will be formally introduced to one-penny, two-pence, five-pence and ten-pence coins. Throughout, pre-money counters will be used to help children link the coins to their values. Begin by introducing the 1 p coin, explaining that it is the smallest unit of money currently used in the UK. Show a penny and introduce the language used to describe it: • *'This is a one-penny coin, also called a one-pence coin, or just a penny.'* • *'We can say it has a value of "one p".'* (say *'pee'*) Suggest that we can represent a penny using a token with one dot. Spend some time comparing different (real) 1 p coins, asking children: • *'What's the same?'* (size, picture of the queen, colour) • *'What's different? '* (pictures on the back, date) Draw attention to the fact that even though there are some differences, these are all one-penny coins and they all have the same value. Discuss any questions raised, such as whose head is on the coin and what the four-digit number (i.e. the date) represents, and introduce the vocabulary of heads and tails.	The one-penny coin:  heads  tails Representing a penny with a pre-money token:  

4:2	Then show two or more pennies together. Ask children: • *'What is the value of this group of coins?'* • *'How many one-dot tokens would you need to represent this value?'* Encourage children to use the following stem sentence: ***'There are ___ one-penny coins; the total value is ___ p.'*** You can also take this opportunity to explain that 'pence' is the plural of 'penny', modelling the correct use of language: ***'There are ___ one-penny coins; the total value is ___ pence.'*** Now use this as an opportunity for children to experience exchanging money for goods, exploring how many pennies would be needed to buy different items, as shown opposite. Initially, work practically, with children preparing the correct amounts, before moving on to them just saying how many pennies they would need. Throughout this exercise, continue to use the stem sentences above.	Group of pennies:  • *'There are three one-penny coins; the total value is three p.'* or • *'There are three one-penny coins; the total value is three pence.'* Buying goods:  *'How many pennies do you need to buy:* • *one marble?* • *one eraser?* • *one spinning top?* • *one pencil?'* Dòng nǎo jīn: *'How many pennies do you need to buy a pencil and an eraser?'*

4:3

Introduce, in turn, the 2 p, 5 p and 10 p coins:

- Show and describe each coin.
- Ask children to describe the value of each coin using the stem sentence: ***'This is a ___-pence coin. It has a value of ___ p.'***

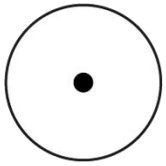
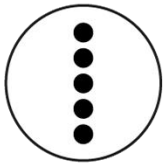
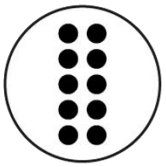
Now that children have experienced the one-to-one correspondence between a dot on a token and a value of 1 p, you can ask them, for example, *'How many dots would we need on a token to represent a five-pence coin?'* (Take care when showing a pre-money token alongside both heads and tails faces of the coins that children are clear that the pre-money token represents only one of the coin in question, not two.)

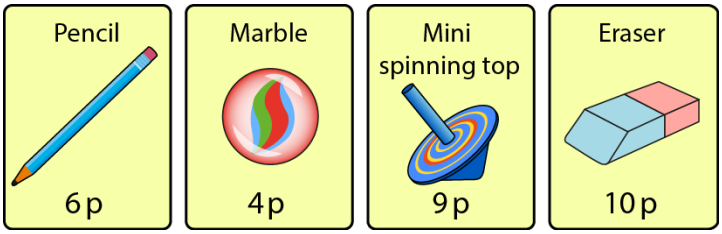
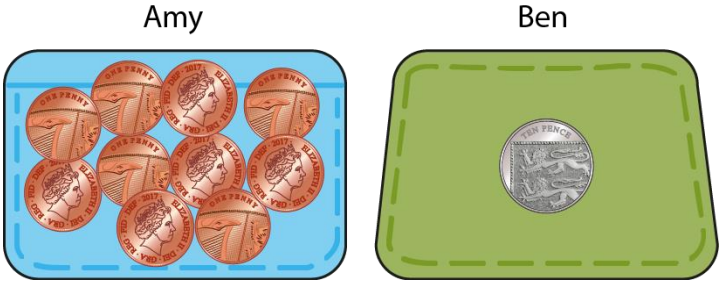
Spend some time looking at the physical attributes of the coins, comparing different mintages for each coin.

Once you have introduced all of the denominations, compare the coins:

- In an art lesson, children could do some observational drawing of coins.
- Ask children to order the 1 p, 2 p, 5 p, and 10 p coins, initially without any guidance on what attribute to sort by. Many children will order by size, rather than value. Then give more guidance, for example:
  - *'Put the coins in order from the smallest to largest size.'*
  - *'Put the coins in order from the smallest to largest value.'*
    This draws attention to the fact that the value of a coin is independent of its size (and colour etc.).
- Play a guessing game, where you (and then the children) describe a coin, and others guess which it is; for

Different denominations:

Coin	Heads	Tails	Pre-money token
1 p			
2 p			
5 p			
10 p			

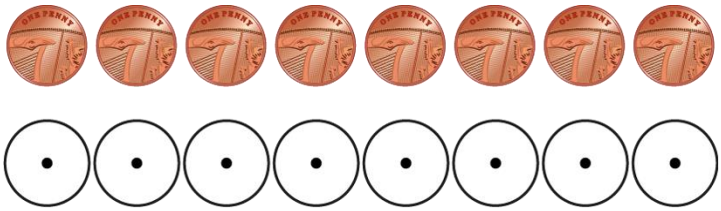
	example: *'I am thinking of a coin. It is silver. It is about the same size as a penny. Which coin is it?'* Before moving on, you can use the following dòng nǎo jīn problem to assess children's depth of understanding: *'Sara says* "The bigger the size of the coin, the greater its value." *Is she correct? Explain how you know.'*	
4:4	It is important that children understand that a single coin can be worth the same as several pennies. You can use the same shop scenario as in step *4:2*, as exemplified opposite. You can either show images of purses containing different quantities of money, or have children create the purses (for example, by placing the coins on top of printed empty purses). Note that here the focus is on comparing one single coin with the equivalent value in pennies (not, for example, one 10 p coin vs. five 2 p coins). Encourage children to use the stem sentences from earlier steps to describe the value of the purses, for example: • *'This is a ten-pence coin. It has a value of ten p.'* (Ben's purse) • *'There are ten one-penny coins; the total value is ten p.'* (Amy's purse) In the example, Amy has ten coins and Ben has only one coin, but they can buy the same thing. Ben's one coin has the same value as Amy's ten pennies. This will not be obvious to all children, so really highlight it: *'Wow! Ben only has one coin, but he has the same value of money/can buy the same thing as Amy!'* Children can use the following generalised sentences to make the link between pennies and the other denominations:	Purchasing power – ten pennies vs. ten-pence coin:   • *'Can Amy buy an eraser?'* • *'Can Ben buy an eraser?'*

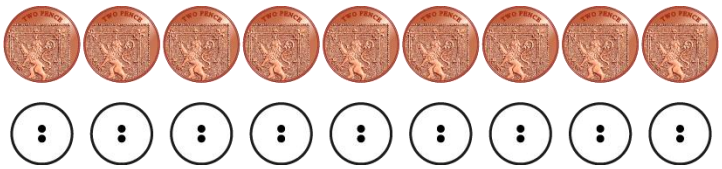
	• ***'I say two pence, but I think two one-pennies.'*** • ***'I say five pence, but I think five one-pennies.'*** • ***'I say ten pence, but I think ten one-pennies.'***	
4:5	To complete this teaching point, provide children with practice, including: • identifying the value of a group of pennies • identifying how many pennies are needed to buy certain items • comparing pairs of purses (concrete or pictorial), for example: • two pennies vs. one 2 p coin • five pennies vs. one 5 p coin • ten pennies vs. one 10 p coin • nine pennies vs. one 10 p coin • one penny vs. one 10 p coin. For each pair, ask children to state whether the purses have the same value or not. To draw attention to the fact that there are no 3 p coins, 4 p coins, 6 p coins etc., you could present true/false statements, for example: *'I have a bag of coins. Which of the following statements <u>can't</u> be true:* • *I take one coin out of the bag; it has a value of three pence.* • *I take three coins out of the bag; together they have a value of three pence.'*	

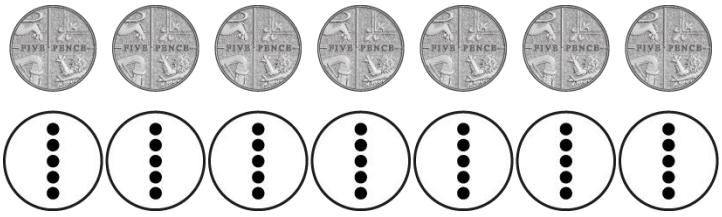
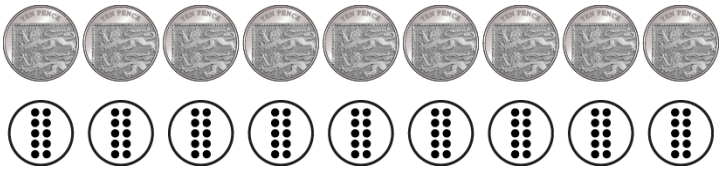
Teaching point 5:

The *number* of coins in a set is different from the *value* of the coins in a set; knowledge of counting in groups of two, five or ten can be used to work out the value of a set of identical low-denomination coins.

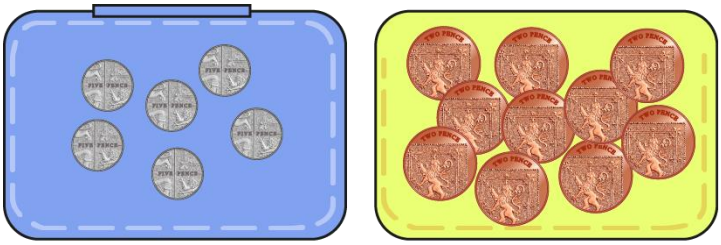
Steps in learning

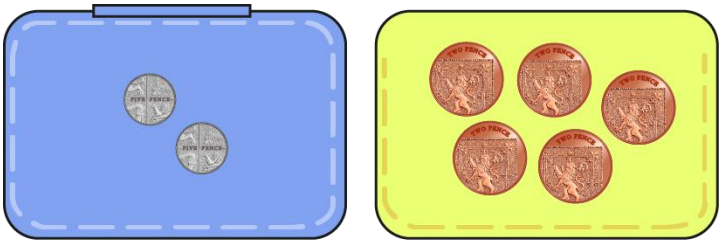
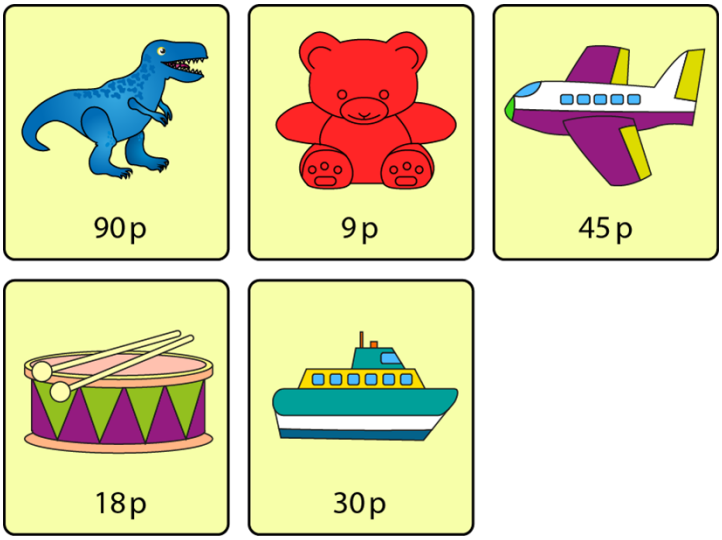
	Guidance	Representations
5:1	Now that children know the value of different coins and can count in groups of two, five and ten, they can combine the knowledge to find the value of a set of the same coins (for example, the value of nine 2 p coins). In Year 2, this will be linked to multiplication, but for now children will use skip counting to find the value of a set of like coins; as such, avoid using the multiplication symbol. However, to prepare children for work on multiplication, in each example, draw attention to: • the number of coins • the value of each coin • the value of the set of coins. In *Teaching points 1–3*, children gained experience counting using pre-money tokens as a supporting representation; this link will be used here. Begin by reinforcing the one-to-one correspondence between a penny and one dot on a pre-money token. Present a set of pennies alongside the corresponding pre-money tokens and count up the value of the set of coins. In a similar way to *Teaching points 1–3*, count in two ways in preparation for counting in units other than one (steps *5:2 –5:5*): • *'One one-penny, two one-pennies, three one-pennies…'* • *'One p, two p, three p…'* Summarise the total count by asking children: • *'How many coins are there?'*	Finding the value of a set of pennies – coins and pre-money tokens:  • *'One one-penny, two one-pennies, three one-pennies…'* • *'One p, two p, three p…'* • *'There are eight coins.'* • *'Each coin has a value of one p.'* • *'This is eight p.'*

	• *'What is the value of each coin?'* • *'What is the value of the set of coins?'* Use the stem sentences: • ***'There are ___ coins.'*** • ***'Each coin has a value of ___ p.'*** • ***'This is ___ p.'***	
5:2	Then present a set of 2 p coins alongside the corresponding pre-money tokens. Ask children *'How could we work out the value of the set of coins?'*. Proceed to count in groups of two to find the value of the set. Note the dual counting opposite, with the language of *'one two-pennies'* instead of *'one two-pence coin'*; this emphasises the meaning of the coin denomination. Again, encourage children to describe the completed count, in context, as shown opposite. Practise counting for a few different set sizes of 2 p coins, gradually removing the scaffold of the 'expanded count' *('one two-pennies, two two-pennies…')* and the pre-money tokens. As you do, children will need to recognise that each coin represents 2 p, and that they should still count in groups of two, not in groups of one (i.e. not counting each coin as one). Include counting with piles of real 2 p coins, moving the coins from an uncounted to a counted pile.	Finding the value of a set of 2 p coins – coins and pre-money tokens:  • *'One two-pennies, two two-pennies, three two-pennies…'* • *'Two p, four p, six p…'* • *'There are nine coins.'* • *'Each coin has a value of two p.'* • *'This is eighteen p.'*
5:3	Now present a word problem without an associated concrete or pictorial representation, for example: *'I have three two-pence coins. What is the total value of the coins?'* Discuss with children what they could do to help them solve the problem. They could, for example: • use real/toy 2 p coins to support their skip counting • draw three 2 p coins to support their skip counting	

	• draw three 2 p (two-dot) pre-money tokens to support their skip counting (this method will become very inefficient when counting 5 p and 10 p coins) • use three fingers to represent the three coins as they skip count in twos. Some children may even recall that *'three twos is six'* from dual counting, but this is not necessary at this stage.	
5:4	Now repeat steps *5:2* and *5:3* for sets of 5 p coins. Ensure that you continue to use the stem sentences from step *5:1* to highlight: • the number of coins • the value of each coin • the value of the set of coins.	Finding the value of a set of 5 p coins – coins and pre-money tokens:  • *'One five-pennies, two five-pennies, three five-pennies…'* • *'Five p, ten p, fifteen p…'* • *'There are seven coins.'* • *'Each coin has a value of five p.'* • *'This is thirty-five p.'*
5:5	Again, repeat steps *5:2* and *5:3*, but now for sets of 10 p coins.	Finding the value of a set of 10 p coins – coins and pre-money tokens:  • *'One ten-pennies, two ten-pennies, three ten-pennies…'* • *'Ten p, twenty p, thirty p…'* • *'There are nine coins.'* • *'Each coin has a value of ten p.'* • *'This is ninety p.'*

<table>
<tr>
<td>5:6</td>
<td>Once children are able to find the value of a set of like coins, they can begin to compare different sets, as shown opposite. As in steps 5:2–5:5, each set should be composed of like coins. Note that the second example draws attention to the fact that different sets of coins can have the same value.

Continue to use the language from previous steps to describe each set of coins, for example:
• ‘There are five coins.’
• ‘Each coin has a value of two p.’
• ‘This is ten p.’</td>
<td>Comparing sets – example 1 (different quantities):
‘Which purse would you rather have?’
 
A B

Comparing sets – example 2 (same quantity, different denominations):
• ‘Which purse would you rather have?’
 
A B
• ‘Can you draw another purse with the same amount of money in? ‘
• ‘And another?’</td>
</tr>
<tr>
<td>5:7</td>
<td>It is important for children to make connections between what they have learnt and the real-world experience of shopping. Complete this teaching point by providing children with practice in the context of a shop.</td>
<td> 
</td>
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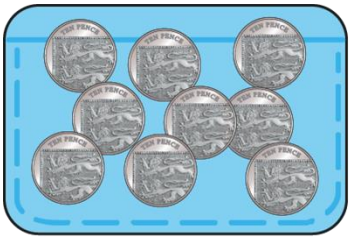
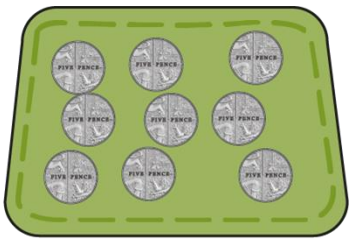
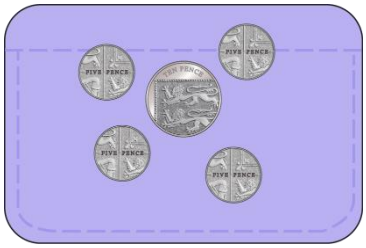
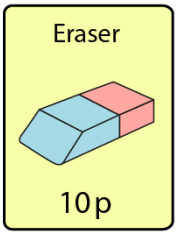
</table>

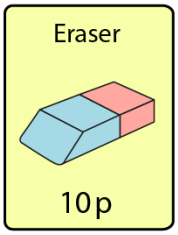
		'What could you buy with the coins in each of these purses?'  A  B  C Dòng nǎo jīn: *'What could you buy with this purse?'* 

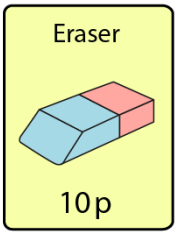
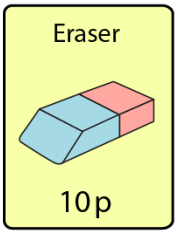
Teaching point 6:

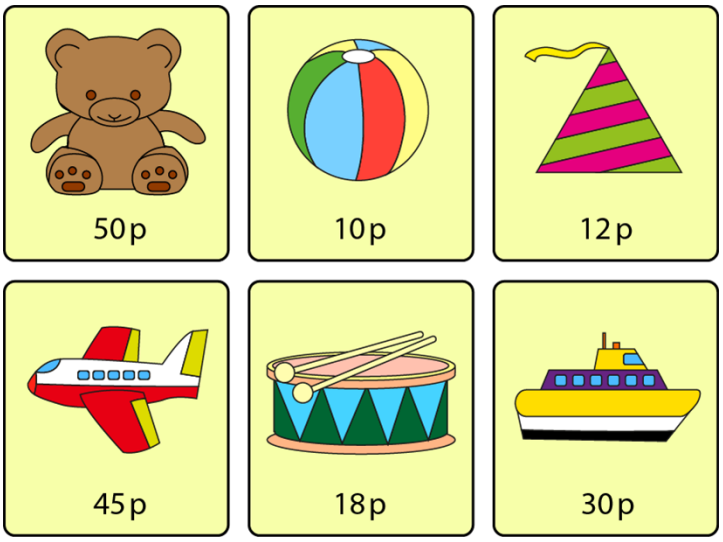
Knowledge of counting in groups of two, five or ten can be used to work out how many identical low-denomination coins are needed to make a given value.

Steps in learning

	Guidance	Representations
6:1	In this teaching point, we are looking at the inverse of *Teaching point 5*; instead of finding the value of a given set of like coins, children will now be finding how many like coins they need to make a given value. *Teaching point 5* essentially dealt with multiplication problems; for example, $5 \times 2p = 10p$ gives the value of five two-pence coins. This teaching point essentially deals with division, solved using a multiplication approach; for example, $? \times 2p = 10p$ is used to find the number of two-pence coins needed to make 10 p. As in *Teaching point 5*, at this stage children will simply be using what they already know about skip counting to solve the problems and should not yet be exposed to the terms *'multiplication'* and *'division'* and the corresponding symbols. Begin with pennies, asking how many pennies would be needed to buy a particular item (costing no greater than 10 p). First ask children to describe the cost of the item and the value of each coin, using familiar language: • ***'The ___ costs ___ p.'*** • ***'Each coin has a value of ___ p.'*** From their work in *Teaching point 4*, children should be able to immediately say how many pennies they need, but to prepare them for the next steps use concrete or pictorial pennies to count out the required value (children can move the pennies, or cross them off as they count to keep track of the number of pennies). Use dual counting as described in step *5:1*. When you reach	*'How many pennies would you need to buy this eraser?'*  • *'The eraser costs ten p.'* • *'Each coin has a value of one p.'*  • *'One penny, two pennies, three pennies… ten pennies.'* • *'One p, two p, three p… ten p.'* • *'So I need ten coins.'*

	the desired total value, stop, and ask children to describe the outcome, using the following stem sentences: • ***'The ___ costs ___ p.'*** • ***'Each coin has a value of ___ p.'*** • ***'So I need ___ coins.'***	
6:2	Repeat step *6:1*, now finding how many 2 p coins are needed to buy the same item. The dual counting used in the previous step (and in *Teaching point 1*) will support children in seeing that they are now counting in a different unit (2 p instead of 1 p). Draw attention to the fact that fewer coins are needed to buy the same item than when paying with pennies.	*'How many two-pence coins would you need to buy this eraser?'*  • *'The eraser costs ten p.'* • *'Each coin has a value of two p.'*  • *'One two-pence coin, two two-pence coins, three two-pence coins… five two-pence coins.'* • *'Two p, four p, six p… ten p.'* • *'So I need five coins.'*

6:3	Again, repeat, now finding how many 5 p coins are needed to buy the same item. Emphasise the fact that, now, even fewer coins are needed to buy the same item.	*'How many five-pence coins would you need to buy this eraser?'*  • *'The eraser costs ten p.'* • *'Each coin has a value of five p.'*  • *'One five-pence coin, two five-pence coins.* • *'Five p, ten p.'* • *'So I need two coins.'*
6:4	Finally, repeat using 10 p coins. Many children will immediately see that they only need one coin, but follow a similar process as in previous steps, and use the same language to describe the context.	*'How many ten-pence coins would you need to buy this eraser?'*  • *'The eraser costs ten p.'* • *'The value of each coin is ten p.'*

		 • *'One ten-pence coin.'* • *'Ten p.'* • *'So I need one coin.'*
6:5	Repeat the whole process (steps *6:1–6:4*) using an item that costs 20 p. As more coins are needed, make sure that children can keep a clear record of the number of coins as they count, moving coins into a 'counted' pile, circling/crossing off coins in an image or drawing simplified coins (for example, a circle for each coin).	
6:6	To complete this teaching point, provide children with practice working out how many like coins they need to make various values: *'How many coins do you need to make:* • *100 p using 10 p coins?* • *40 p using 10 p coins?* • *40 p using 5 p coins?* • *45 p using 5 p coins?* • *16 p using 2 p coins?* • *18 p using 2 p coins?* • *7 p using 1 p coins?'* Provide coins (toy ones or real), or encourage children to use drawings, a number line or the Gattegno chart for support. To finish, you can use a dòng năo jīn problem such as that shown opposite.	Dòng năo jīn *'Find a way to pay for each of these toys.'* 

	This is quite an open-ended question with opportunities for children to evaluate their answers, for example: • *'Did I make a sensible choice of coins?'* (for example, using 2 p coins, not 5 p coins, to try to make 18 p; or using 10 p coins, not 2 p coins, to make 50 p, since the former is more efficient) • *'Is there more than one way of paying for each toy?'*. If some children combine different coins, for example, one 10 p coin and four 2 p coins to make 18 p, ask *'How did you know that you needed four 2 p coins?'*. Put the focus on the part of their solution that is based on multiplication and division (i.e. the *like* coin portion of the solution).	