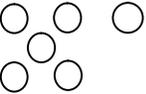
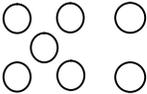
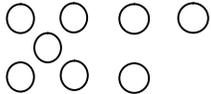
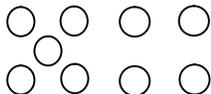
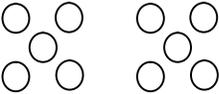


Teaching Formal Methods of Addition and Subtraction in a Multisensory Way

To help get a clear picture of the steps, use 1p coins for the units, 10p coins for the tens and £1 coins for the hundreds. Use the following pattern for setting out the coins every time so that the learner begins to build up a 'sense of number', automatically associating the pattern with the number, and thereby being able to reduce reliance on having to count individual coins:

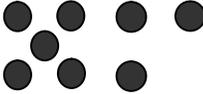
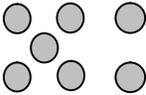
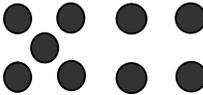
				
1	2	3	4	5
				
6	7	8	9	10

Use the vocabulary of 'trading' rather than carrying and decomposing.

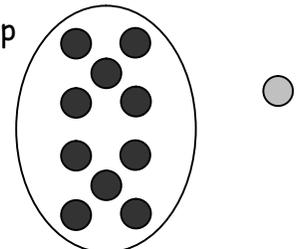
Here is an addition example to illustrate the process:

$$\begin{array}{r} 158 \\ +279 \\ \hline \end{array}$$

1. Lay out the coins as follows:

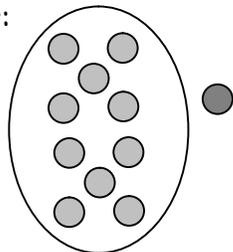
		
1	5	8
		
2	7	9

2. Start with the units as in formal column addition. Encourage the child to notice that there are two sets of 5, which make 10. Trade the ten 1p coins for a 10p coin and place this with the other 10p coins:



3. Count the remaining 1p coins and record the answer in the units column (in this case: 7).
Again, encourage the child to notice the patterns for 4 and 3 coins.

4. Now move to the tens column and add the 10p coins. Again, encourage the child to notice that there are two sets of 5, which make 10. Trade the ten 10p coins for a £1 coin and place this with the other £1 coins:



5. Count the remaining 10p coins (including the one we traded for the ten 1p coins) and record the answer in the tens column (in this case: 3).

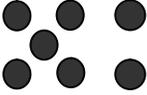
6. Finally count the £1 coins (including the one we traded for the ten 10p coins) and record the answer in the hundreds column (in this case: 4, making the full answer: 437).

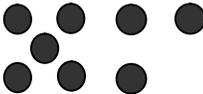
7. As the learner gains in confidence, after plenty of practice using the coins, the child may be able to use the symbols for the coins rather than needing to physically manipulate the coins. If this is the case, remind him/her to continue to set out the symbols for the coins in the patterns illustrated above. This will continue to reinforce the child's 'sense of number'.

Here is a subtraction example to illustrate the process, using the same numbers to illustrate the fact that subtraction is the inverse operation to addition:

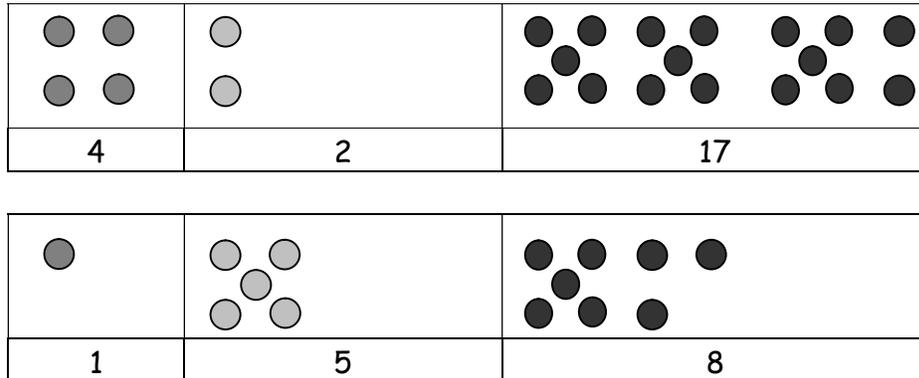
$$\begin{array}{r} 437 \\ -158 \\ \hline \end{array}$$

1. Lay out the coins as before:

		
4	3	7

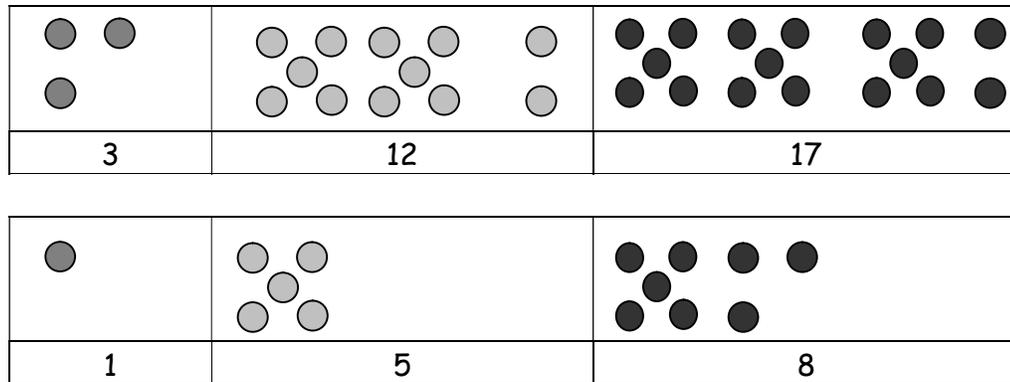
		
1	5	8

2. Start with the units as in formal column subtraction. We have to take away 8 coins from 7 coins, which is not possible without obtaining some more 1p coins. Trade a 10p coin for ten 1p coins. Our sum now looks like this:



3. Now we can take away eight 1p coins, leaving nine 1p coins. 9 is the units digit of our answer.

4. There are now two 10p coins and we need to take away five 10p coins which, again, is not possible without obtaining some more 10p coins. Trade a £1 coin for ten 10p coins. Our sum now looks like this:



5. Now we can take away five 10p coins, leaving seven 10p coins. 7 is the tens digit of our answer.

6. The last step is to subtract in the hundreds column. There are three £1 coins left. Take away one £1 coin and we are left with two £1 coins. 2 is the hundreds digit of our answer.

7. Our final answer is 279, which is what we added to 158 to get an answer of 437 in the addition sum we did as our first example.