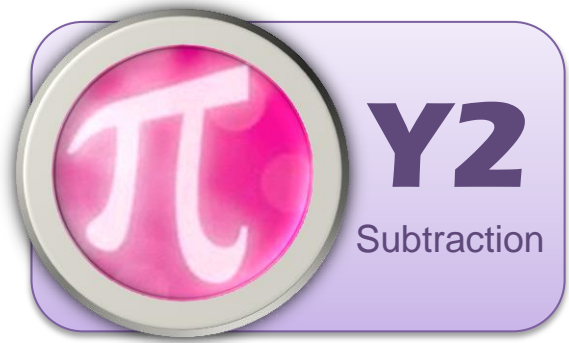


## National Curriculum Programme of Study;

Subtract numbers using concrete objects, pictorial representations, and mentally, including:

- a two-digit number and ones
- a two-digit number and tens
- two two-digit numbers

[Non-statutory - Recording subtraction in columns supports place value and prepares for formal written methods with larger numbers.]



### BY THE END OF YEAR 2...

Children will be confident in using a range of base 10 equipment in columns. They will be able to subtract two 2-digit numbers and start to record the value of the digits on the baseboard in tens and units columns.

#### Using grouped objects for subtraction, without exchanging

Once secure with the understanding of place value for two-digit numbers, teachers should demonstrate, using concrete objects grouped in tens, how numbers can be represented on base boards (A3 in size) and then used for calculating.



'Familiar' objects should be used initially. Balloons packaged into boxes of ten are ideal, and they clearly show the number contained on the labelling. Discuss the contents and count the contents of a box with the children. Discuss the value of the single balloons as both 'units' and 'ones'.

Show how a number such as 28 can be represented using the balloons. *How many packs of ten balloons can we use? How many balloons will that be? How many single balloons will we need to make our total?*

Place the balloons on the base board



*We need to give away 5 balloons, so we will subtract them from the 28. Write the subtraction calculation '28 - 5'. Ensure the units being subtracted do not exceed those in the initial number, i.e. 8, and thus exchanging from tens to ones will not be necessary.*

Demonstrate how to subtract the 5 single balloons from the 8, by moving them down on the grid. *Do we need to move any of these packs of 10 away? Why not?* Ensure children understand that the ones/units digit is changing, but the tens digit is not.



Model how the remaining balloons are moved to the 'answer line' at the bottom of the grid. *How many balloons do we have left? How many tens? How many ones?*

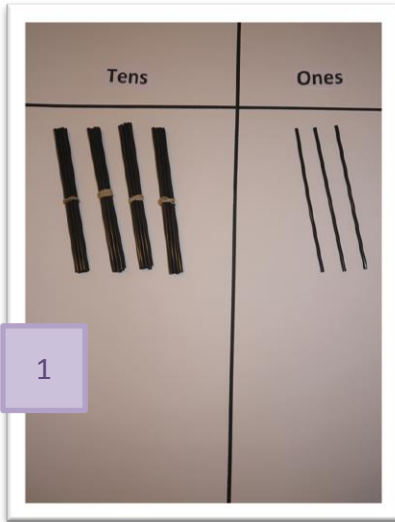
Once secure, teachers can annotate the base board alongside the concrete objects. This starts to link to the next stage in the progression towards a formal written method, where calculations are laid out vertically.

Ensure the inverse operation of addition is integrated as much as possible. *If I added my 5 balloons back on, how many balloons would I have? Model this by working backwards, up the grid, resulting in the same image the children started with.*



## Using grouped objects for subtraction, with exchanging

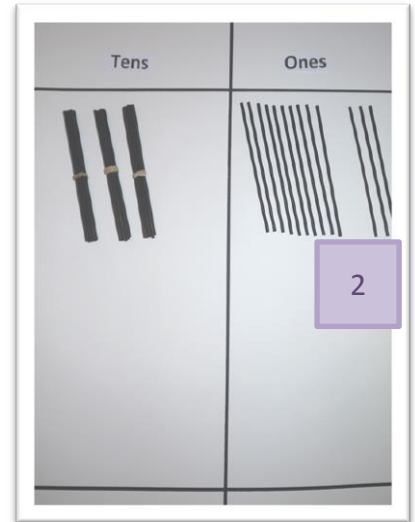
Once children are secure with the concept of subtracting the grouped objects for numbers that do not require exchanging (i.e. the units in the number being subtracted do not exceed those in the starting number), then numbers can be chosen that will require exchanging. Bundles of straws are the next step in the progression of being really secure with base-ten place value. They are easy to manipulate, yet allow the children to still see the 'ten-ness' of ten, allowing for simple regrouping.



1

Show the calculation '43 - 27'. Lay the 43 grouped concrete objects (moving on to straws bundled into tens) onto the base ten board and discuss the value of the different groups in the same way as above.

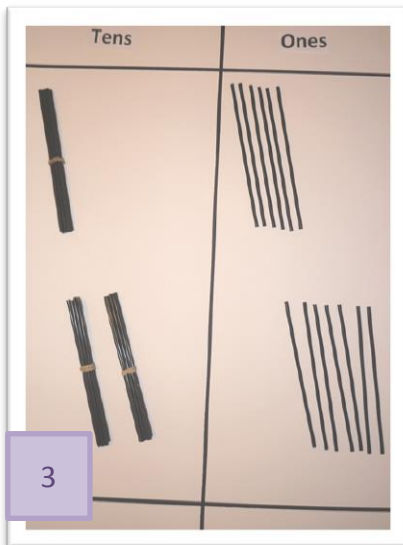
Discuss the fact that 7 ones or single straws need to be removed. *Why is this difficult? Do we have enough straws?* Discourage the children from saying that they 'can't do it', and explain that they need to split one of the groups of ten into ten separate straws. Demonstrate this by removing the elastic band from one bundle of ten, and move the ten separate straws to the



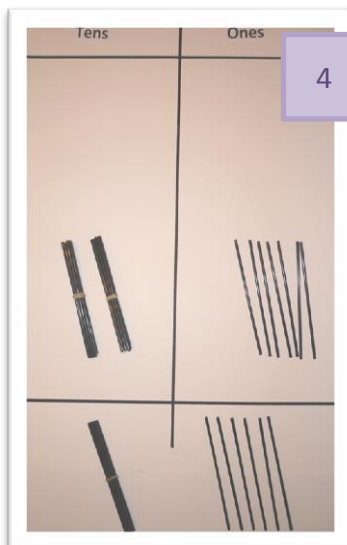
2

'ones' column. Emphasise that 43 is now 'thirty twelve', simply arranged in a different way.

Using the same action as previously, model how the 7 'ones' straws can be moved down the grid, followed by the 2 tens bundles. Explain each step carefully to the children.



3

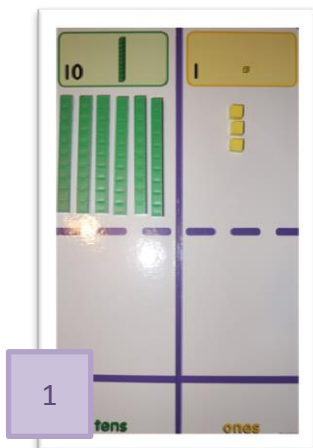


4

Model how the remaining straws are moved to the 'answer line' at the bottom of the grid. *How many straws do we have left? How many tens? How many ones? How many straws did we start with? How many did we take away?*

Ensure the inverse operation of addition is integrated as much as possible. *If I added my remaining 16 straws to the 27 I took away, how many would I have? Why?* Model this by working backwards, up the grid. Show how, with regrouping of one bundle of ten straws, the result is the same image the children started with.

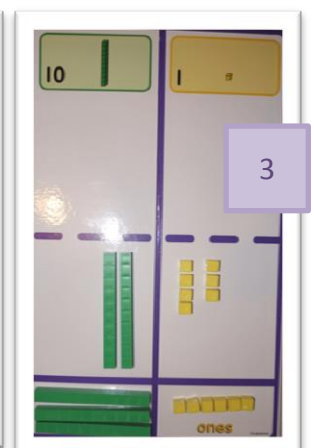
As understanding develops, children should move onto using grouped base-ten equipment that requires an understanding of exchange, such as 'Dienes'. This new equipment should be introduced alongside the straws, enabling the children to see what is the same and what is different.



1



2



3