

## National Curriculum Programme of Study;

Add numbers using concrete objects and pictorial representations, including:

- A two digit number and ones
- A two digit number and tens
- Two two-digit numbers
- Adding three one-digit numbers

Show that addition of two numbers can be done in any order (commutative)

[Non-statutory - Recording addition 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 add two 2-digit numbers and start to record the value of the digits on the baseboard in the tens and units columns.

#### Using grouped objects for addition, without recombining

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 23 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?*

We also have 12 balloons. Write an addition calculation such as '23 + 12'. Ensure the units do not add to more than 9, and thus won't need to be recombined. *How can we show the extra 12 balloons?* (One pack of ten and 2 single balloons). Place the 23 balloons and the 12 balloons on the baseboard, directly underneath each other.



Demonstrate how to combine the single balloons first, using the vocabulary of addition, bringing them to the bottom of the board. Bring the packs of ten balloons down in the same way. Allow the children to determine how to calculate the total number of balloons, encouraging the use of 'tens and ones/units' vocabulary. Model the counting in tens for the packs of balloons, and in ones for the single balloons.



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.

Try to integrate the inverse operation of subtraction as much as possible. *How many would we have left if we subtracted 12 from our total? How do you know? What if we subtracted 23?* Demonstrate this on the base board by moving the balloons back up the grid.

## Using grouped objects for addition, with recombining

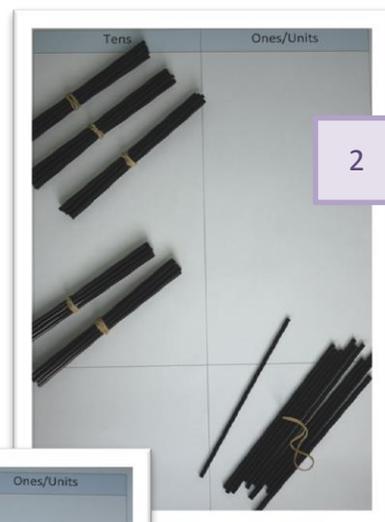
Once children are secure with the concept of combining the grouped objects for numbers that do not require re-grouping (i.e. units do not add to more than 9), then numbers can be chosen that will require re-grouping. Bundles of straws are the next step in the progression of being really secure with base-ten place value. They are easy to manipulate, yet allow the children to still see the 'ten-ness' of ten, allowing for simple regrouping.



Show '34 + 27'. Lay the 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.

Combine the 'units/ones' straws and move them to the bottom of the grid. Use mental calculation skills to find how many single straws there are altogether. *What can we do now that we have 11 straws?*

Explain the 'regrouping' of ten of the straws (using an elastic band) and then position these at the bottom of the tens column. *What do we need to do now?*



Bring the tens bundles down to the bottom of the grid. *How many straws do we have altogether?*

As before, the link with subtraction can be integrated here, discussing what would happen if 34 straws were subtracted from the total. *What if we subtracted 27?* Note that to demonstrate this, one of the straw bundles would need to be split (see decomposition for subtraction), and so a careful discussion would need to take place.



Children working confidently with bundles of straws can move on to using Dienes base-ten equipment. This is also grouped in tens, but cannot be split apart or recombined easily, and requires an understanding of exchange. The Dienes equipment should be introduced alongside the straws, enabling the children to see what is the same and what is different.

