

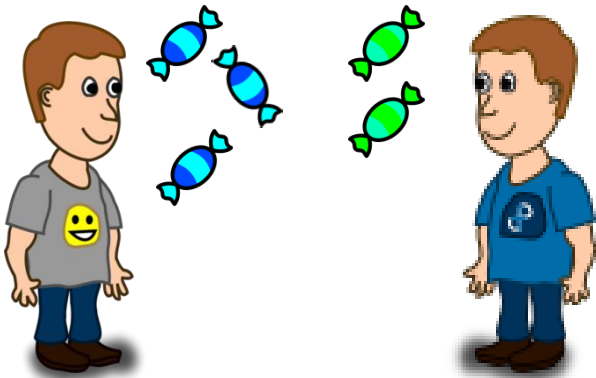
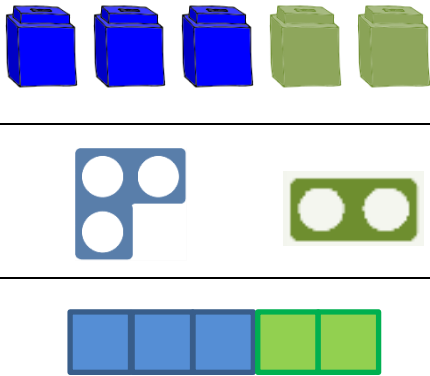
Progression in Calculation – Addition

Methods should be introduced with the support of resources that enable pictorial representation and so develop conceptual understanding.

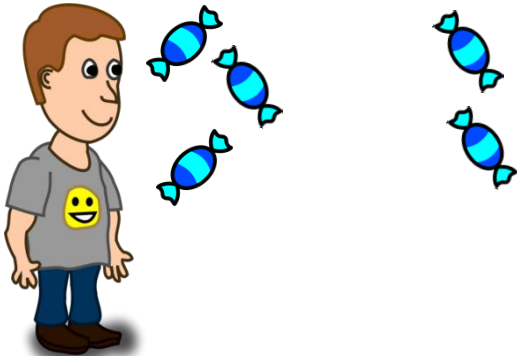
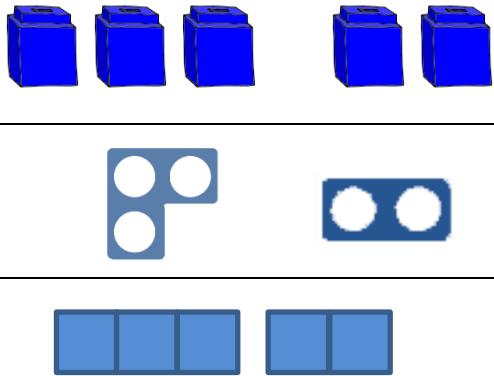
Before recording, it is essential that pupils have experience of adding (aggregation & augmentation) using practical apparatus.

This can then be represented pictorially.

eg 1. Tom has 3 sweets, James has 2 sweets. How many do they have altogether?

<p>Aggregation – combining two quantities</p> 	
--	---

eg 2. Tom has 3 sweets and buys 2 more sweets. How many does he have altogether?

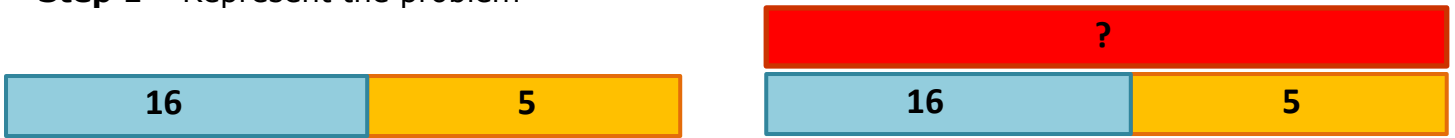
<p>Augmentation – increasing one quantity</p> 	
---	--

Once this conceptual understanding is in place, pupils should start developing mental methods. These should then be supported by written methods. Every new step must be supported by concrete resources, then pictorial representations before becoming abstract calculations.

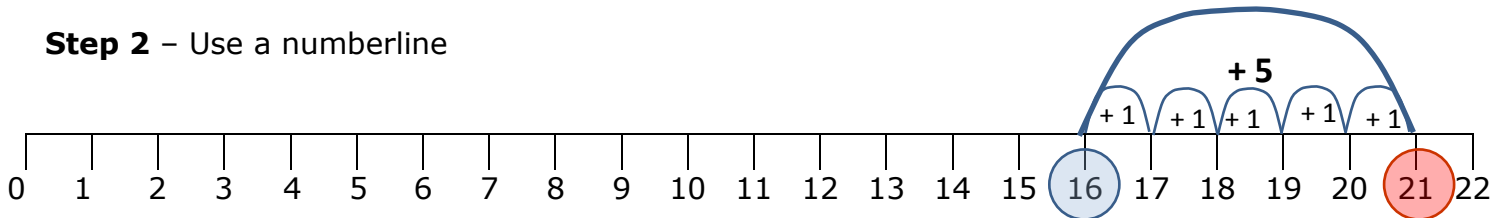
1. Introduction of a numberline

Tom has 16 marbles. He wins 5 in a match, how many does he have now?

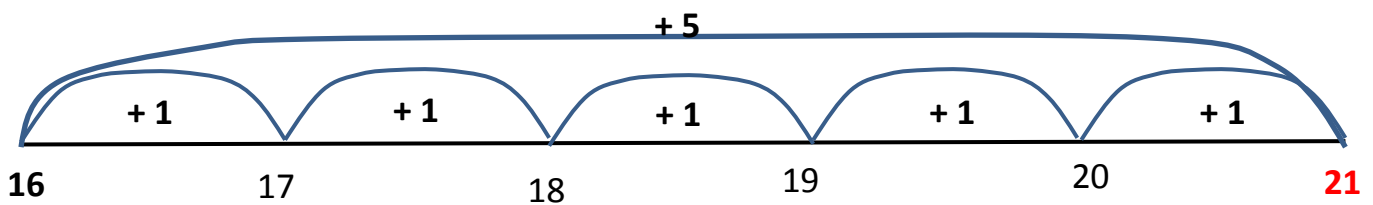
Step 1 – Represent the problem



Step 2 – Use a numberline



Step 3 – Use a blank numberline



2. Introduction of partitioning

Tom has 18 grapes. He is given another 15. How many does he have now?

Step 1 – Represent the problem

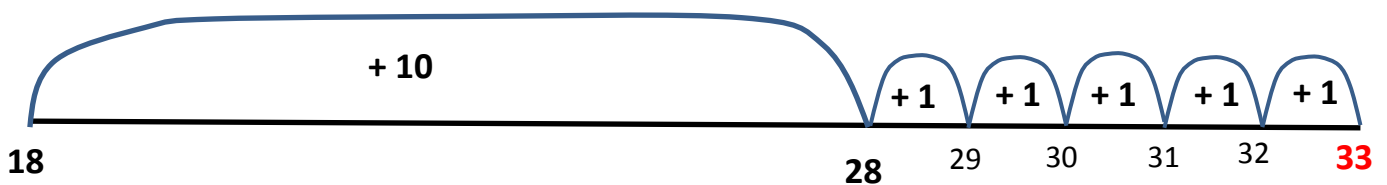


Step 2 – Partition the second number

$15 = 10 + 5$



Step 3 – Add using a numberline



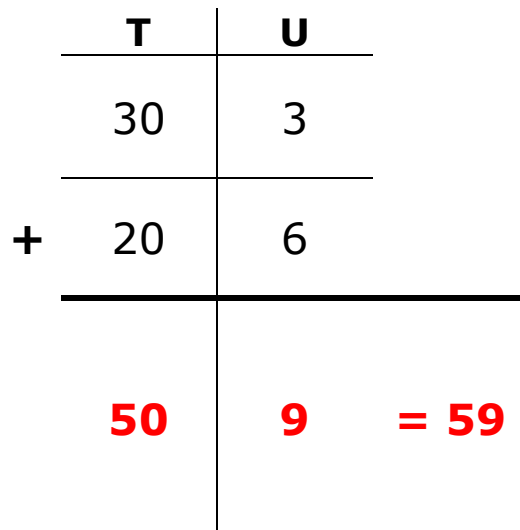
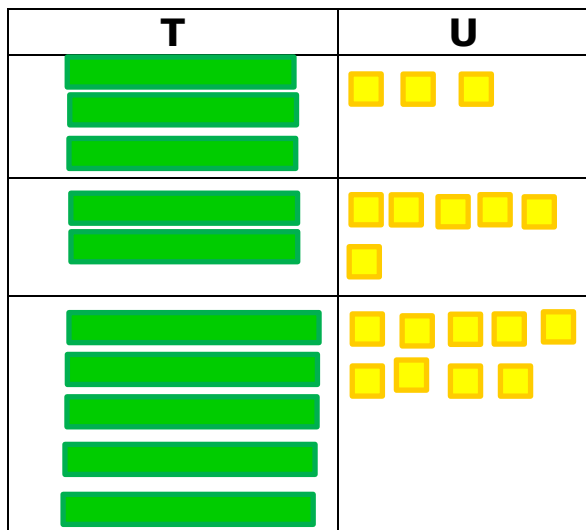
3. Introduction of an expanded written method

Tom has 33 marbles. He wins another 26. How many does he have?

Step 1 – Represent the problem



Step 2 – Use Base 10 equipment and partition the numbers. Add the units first.



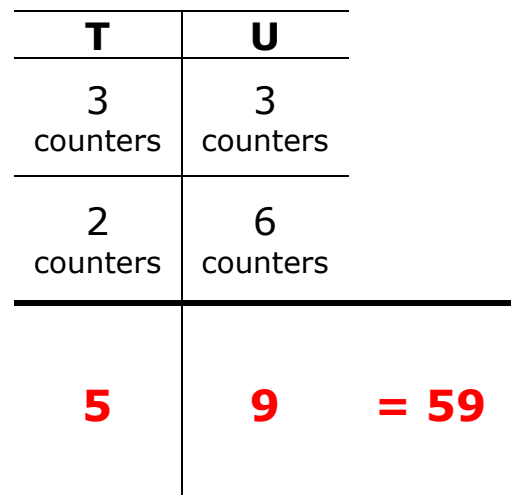
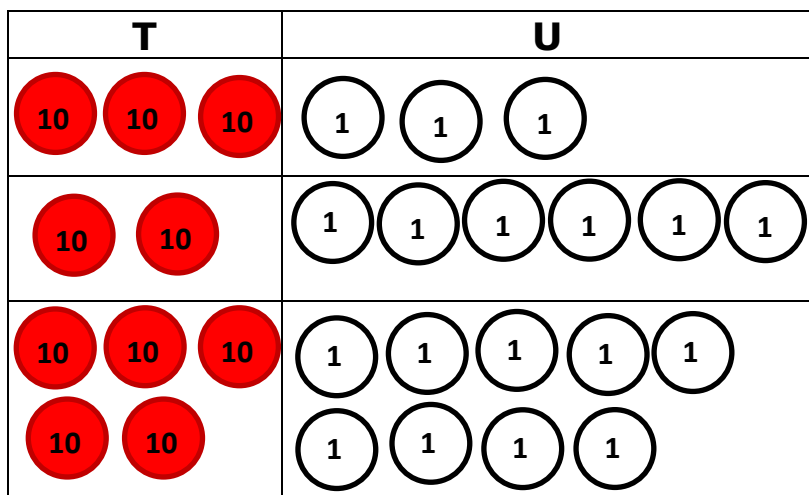
4. Introduction of a compact written method

Tom has 33 marbles. He wins another 26. How many does he have?

Step 1 – Represent the problem



Step 2 – Use Place value discs to represent the number of tens, units etc. Add units first.



5. Recording the compact written method

a) without exchange

In his model, Tom has 153 pieces of blue lego and 36 pieces of red lego. How many pieces of lego are in the model?

	H	T	U
	1	5	3
+		3	6
	1	8	9

= 189 pieces of lego

b) with exchange

In his model, Tom has 267 pieces of blue lego and 128 pieces of red lego. How many pieces of lego are in the model?

	H	T	U
	2	6	7
+	1	2	8
	3	9	5

= 395 pieces of lego

c) with further exchange

In his model, Tom has 867 pieces of blue lego and 428 pieces of red lego. How many pieces of lego are in the model?

	Th	H	T	U
		8	6	7
+		4	2	8
	1	2	9	5

= 1295 pieces of lego