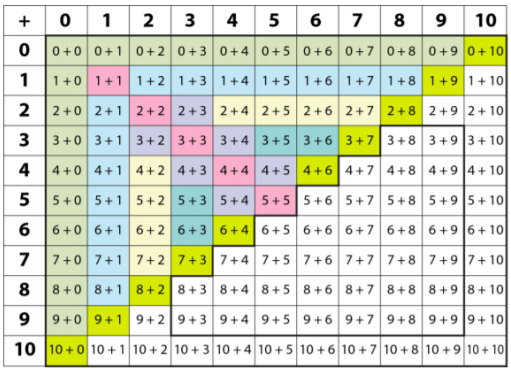
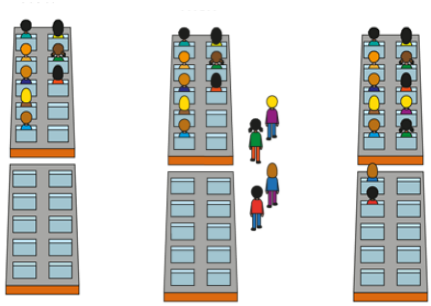
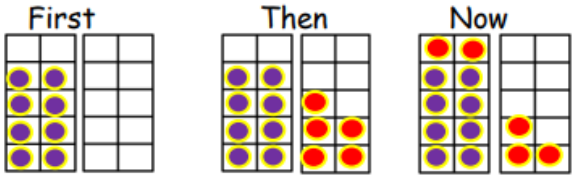
Planning Overview
Year 1 Addition and Subtraction to 20

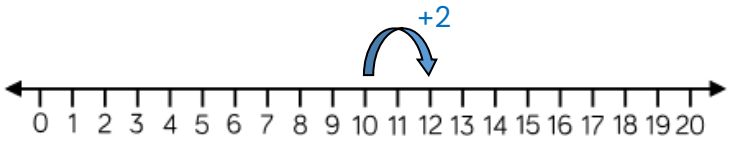
Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
Represent and use number bonds and related subtraction facts within 20
Add and subtract one-digit and two-digit numbers to 20, including zero
Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ☐ – 9.

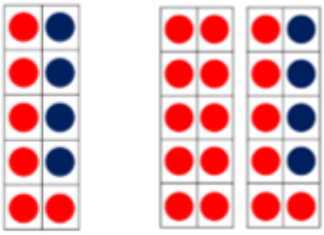
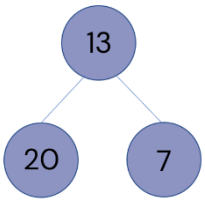
1AS–1 Compose numbers to 10 from 2 parts, and partition numbers to 10 into parts, including recognising odd and even numbers.
1AS–2 Read, write and interpret equations containing addition (+), subtraction (–) and equals (=) symbols, and relate additive expressions and equations to real-life contexts.
1NF–1 Develop fluency in addition and subtraction facts within 10

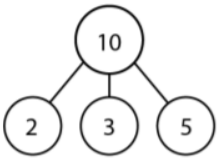
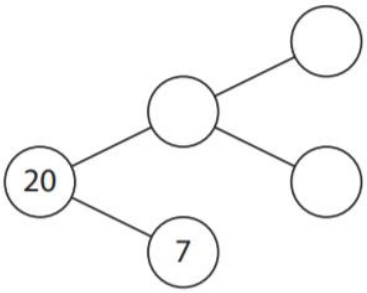
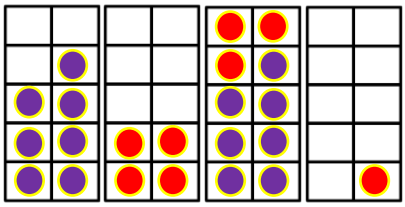
This is the second of 2 units on addition and subtraction. The first unit covered addition and subtraction within 10.

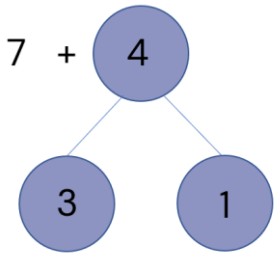
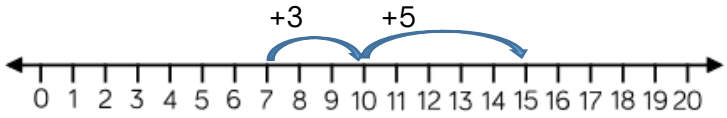
	Teaching and Learning
Recap addition facts within 10 - developing fluency using a variety of strategies **Include the effect of adding zero**	What do they already know? It is important that children know all the addition and related subtraction facts below 10 off by heart by the end of Year 1. Keep practising them often. Image taken from NCETM – professional development materials  Recap strategies for remembering or deriving the coloured addition facts: Adding zero – answer is the other addend unchanged Adding one – answer is one more (the next counting number) Doubles – learn off by heart Near doubles – answer is one more/less than nearest doubles answer you prefer to use e.g. 4+5 could use one more than 4+4 or 1 less than 5+5 Adding 2 – if adding 2 to an odd number answer is next odd number, same for even numbers Number pairs to 10 – learn off by heart 3 + 5 & 3 + 6 – learn off by heart (or derive 3+6 from 3+7 number bond)

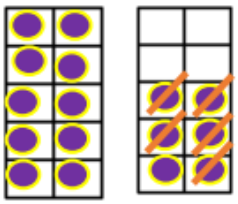
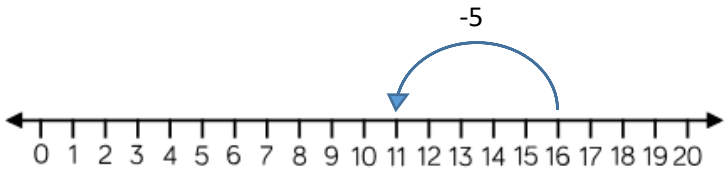
	Mastery Captain Conjecture says, 'If you add 0 to a number, the number stays the same.' Do you agree? Explain your reasoning.  **Mastery with Greater Depth** Captain Conjecture says, 'If you add together six 0s the answer is 6.' Do you agree? Explain your reasoning. 
Recap addition by counting on and extend to 20	Use first, then, now stories as real-life contexts for addition by counting on. E.g. 8 children on a fair ride, then 4 more children get on, how many are there now? Children could act this out.  Image taken from NCETM – professional development materials Use tens frames to model adding an amount to a given amount, first within ten, then adding another tens frame to count past 10 towards 20.  Do children apply place value understanding to recognise the answer without counting when the counters are combined on the 2 tens frames? Do they apply this place value understanding when adding 10 to a single digit number e.g. 10+3=13? Do some children begin to adjust mentally for calculations such as 9 + 2 (realising that one of the 2 will move to fill the final space leaving 10 +1 which is easy to calculate)? Include calculations where the first number is a 2-digit number e.g. 12 + 2 = Do they realise that they only need to calculate 2+2 as the full tens frame is unaffected?

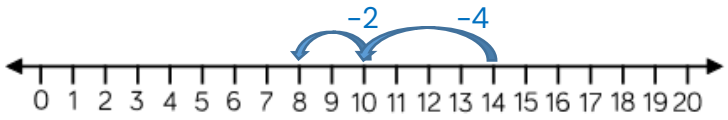
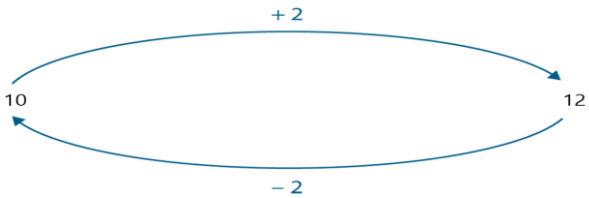
Include the effect of adding zero	Show the counting on process using a number line. Reinforce adding zero by saying zero as you put your finger on the start number. Why do we do that? What would the answer be if we added zero? Investigate why it's best to begin from the largest number (more efficient) and make sure children are confident about the commutativity of addition. Step one would be to jump in ones with each jump being the equivalent of a counter. Step two would be to make bigger jumps all in one go and label them.  Can children write a word problem for a given number sentence? Can children work out the number sentence needed to solve a word problem? **Mastery** Robert has 5 more cherries than John. John has 11 cherries. How many does Robert have? Write a number sentence you would use to solve the problem. ☐ ☐ ☐ = ☐ **Mastery** Complete: 10 + ☐ = 10 6 + ☐ = 6 20 – ☐ = 20 16 – ☐ = 16 What do you notice? **Mastery with Greater Depth** Write a pair of numbers in the boxes to add to 12. ☐ + ☐ = 12 And another pair, and another, and another. Can you find all possibilities? Convince me! **Mastery with Greater Depth** I'm thinking of a number. I've added 8 and the answer is 19. What number was I thinking of? Explain how you know. nRich – Two dice – working systematically

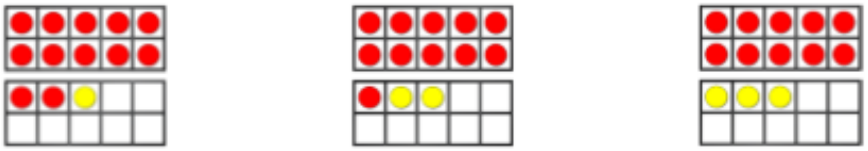
Recall number bonds to 10 and use them to make bonds to 20	Use songs and games to continue to reinforce number bonds to 10 e.g. Beam 5-7 Making up tens https://www.youtube.com/watch?v=jZi-6_-Uhwc Help children to spot patterns between numbers that add to make 10 and those that add to make 20. Present children with tens frames featuring representations of 6 + 4 and 16 + 4 – what's the same, what's different? Explore the idea of an additional 10. Manipulate the image to also create 14 + 6. What patterns can they see?  Make a Numicon '10 Sandwich' - all the pairs that combine to make 10 piled on top of a ten piece. How would we make a 20 version? What would we add? Deconstruct the model and look at how the difference is the extra 10. Record pairs in part whole models and look at the patterns of numbers that make 10 and 20, assigning the extra 10 to both one-digit numbers. Check understanding using questions like this 'Spot the mistake'.  Can children explain the connections between the calculations below? **Mastery** Complete: 3 + ☐ = 10 10 – ☐ = 3 13 + ☐ = 20 20 – ☐ = 13 ☐ + 5 = 10 10 – 5 = ☐ 15 + ☐ = 20 20 – ☐ = 15 ☐ + ☐ = 10 10 – ☐ = ☐ 16 + ☐ = 20 20 – ☐ = 16 What do you notice? **Mastery with Greater Depth** Show children a price list with items costing up to 20p. I have 20p to spend. If I spend 20p exactly, which two items could I buy? And another two, and another two. If I bought one of the items how much change would I have? And another one, and another one.

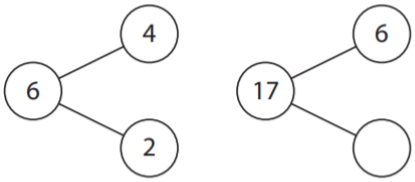
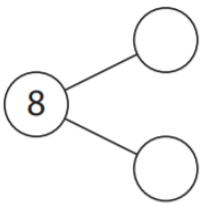
Partitioning 10 into 3 numbers **Include examples where zero is one of the 3 numbers**	Use numicon to make a known bond to 10, then replace one of the plates with 2 others that are equivalent e.g. make 7 + 3 then exchange the 7 for a 2 and a 5 Stack them on top of a 10 to show they still make 10. Investigate different ways to make 10 by splitting down a known bond. Record them as part whole models.  **Mastery** Fill in the missing numbers: 3 + 5 + ☐ = 10 1 + 5 + ☐ = 10 **Mastery with Greater Depth** Complete:  Now create a similar diagram. Can you extend your diagram?
Adding within 20 by using bonds up to 10 and partitioning to bridge	Use tens frames and counters to model the two steps to calculate 7 + 4 i.e. 7 + 3 to make 10 then the remaining 1 to make 11.  Record this understanding by writing addition expressions with the second number partitioned appropriately using a part whole model.

	 Show images of tens frames and write the calculations they show with second number partitioned. Children to add single digit numbers where answer is >10 and record the answers showing one of the numbers split to create a pair to 10 as above. Allow children time to become confident with each stage before moving onto the next. Model the same process using a blank number line.  Can children write the calculation that is shown? GD – move towards using this as a mental strategy e.g. 7+4 is equivalent to 7+3+1 which they can calculate mentally with number bonds and place value.
Recap subtraction by reduction (taking away) and by partitioning (not structure) and extend to 20	Explore language around both types of subtraction – present a series of real-life problems involving having/not having something (not structure – can still see both parts) and spending, losing, giving away (taking away structure) and make a word bank with children. e.g. There are 13 cakes altogether and the baker has put cherries on 5 of them. How many cakes still need cherries? (i.e. do not have cherries)  e.g. Jo has 12 sweets. She gives 3 to Callum. How many does she have left?  Images taken from NCETM – professional development materials

Include the effects of subtracting zero	Use counting objects e.g. counters on tens frames to practically demonstrate what happens when we subtract – reinforce that the answer is always smaller than the first number unless we are subtracting zero. Move onto images of counting objects where children can cross out the number that is subtracted. Do children apply place value understanding when they subtract 13-10 or 13-3 ? Do they apply number bond knowledge when subtracting 10-6 or 20-6 or 20-16? **Mastery** Complete: $10 + \square = 10$ $\quad 6 + \square = 6$ $20 - \square = 20$ $\quad 16 - \square = 16$ What do you notice? Do some children realise that the whole ten will remain unaffected if you are subtracting less than the ones part of the teens number?  16-5= Transfer thinking to a number line, showing the jumps backwards as those we subtract. What's the same, what's different about the image above and the number line?  Can children write a problem to match a given number sentence? **Mastery with Greater Depth** Together Sam and Tom have 19 football stickers. Tom has 8 stickers. How many stickers does Sam have? Write a number sentence you could use to solve the problem.

Subtracting within 20 by using partitioning and bonds up to 10 to bridge	Use apparatus such as bundles of straws and single straws in a different colour to show how to subtract in 2 parts. (When you look at the straws you have taken away, the 2 colours reveal the 2 steps). Alternatively use tens frames with counters on each ten frame being a different colour. Move onto bead strings. The red and white groups of 10 help to demonstrate the amount needed to bridge back to ten and then what's left. They are also most similar to the number line representation you will move onto eventually. Alongside the practical apparatus, introduce part whole models to show how partitioning reveals the second number to subtract. Use a number line to jump back to 10 and then the rest. Again scaffold the number to be subtracted with a part whole model.  Make sure children are really clear about where each part of the original calculation is shown in the representation. Where is the 14? Where is the 6? How do we know the answer?
Understand inverse operations and fact families	Use 2 numicon plates or towers of multilink (any apparatus where you can still count in ones) to model joining the 2 parts to show an addition. Count on (or bridge if appropriate) to solve.  10 + 2 = 12 Now show the 2 numicon plates (or towers) together and remove one. What number sentence does that represent? 12 - 2 = 10 Look at how the 2 operations undo each other.  Revisit bead strings to show how the 2 jumps you make when bridging, have 2 equivalent jumps in the opposite direction too.  7+3+2 = 12 12-2-3=7

	Revisit tens frames to explore the idea that the same pictorial representation can represent four related number sentences and associated word problems. Which image matches the question? Timmy had 13 football cards and he ripped 3 of them. How many did he have left? Write a number sentence to show this. Timmy had 10 football cards and he bought 3 new ones. How many did he have then? Write a number sentence to show this. What do you notice?  Explore the other tens frame patterns and write all the number sentences you can see. Consider how these inverse calculations relate to the part whole model. Record the 3 numbers in the correct circles for the whole and the 2 parts. Make sure children can say what each number represents e.g. 13 is the total number of counters, 10 is the red counters, 3 is the yellow counters. 13 + 10 = 3 – is this correct? Why not? Move onto using a bar model to show the relationships between three numbers. Use multilink to represent the 2 parts on the bottom row if needed. **Mastery** Can you see these number sentences in the picture below? 3 + 2 = 5 2 + 3 = 5 5 – 3 = 2 5 – 2 = 3  Now write the four number sentences for the picture below: 

Missing Number Problems	Use bar models to solve missing number problems e.g. this one in the Year 1 National Curriculum objective "Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = □ – 9."  Or 17 = 6 + □  **Mastery** Use the first number sentence to complete the second number sentence. 4 + 3 = □ 7 + □ = 9 7 – □ = 4 9 – □ = 7 5 + 2 = □ □ + 3 = 9 □ – □ = 2 □ – □ = □ **Mastery** Complete:  **Mastery with Greater Depth** Draw a bar model for 7 + 2 = 9 and write four number sentences. Complete and write the number sentences using this model.  **Mastery with Greater Depth** I'm thinking of a number. I've subtracted 5 and the answer is 7. What number was I thinking of? Explain how you know. I'm thinking of a number. I've added 8 and the answer is 19. What number was I thinking of? Explain how you know. GD – NRich The Add and Take Away Path

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