Chalkhill Primary School

Maths Recovery Curriculum

DfE Guidance on Teaching of Mathematics

National Curriculum

Illustration Credit – Sir Quentin Blake

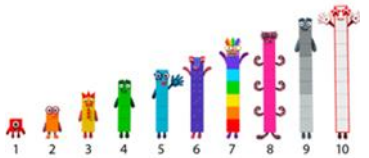
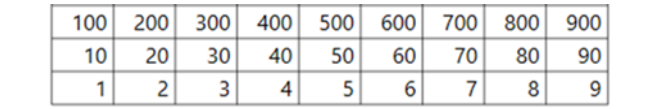
Curriculum Recovery - Maths: Year 1

An Overview of Objectives

The purpose of this document is to support recovery curriculum as children move through the planned learning. It includes the DfE published guidance on Teaching of Mathematics (July 2020) to bring greater coherence to National Curriculum Objectives and to prioritise key concepts, its knowledge and understanding within each year group. The teacher may have prioritised other elements as key learning as per their own planning and assessment. The planning framework consists of three 2-week modules which tackle consolidation of Development Matters statements and the Early Learning Goals and move towards introducing Year 1 objectives.

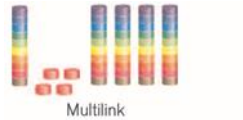
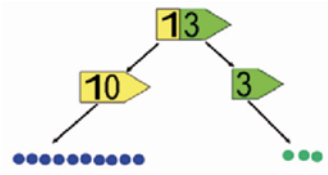
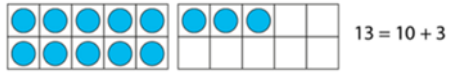
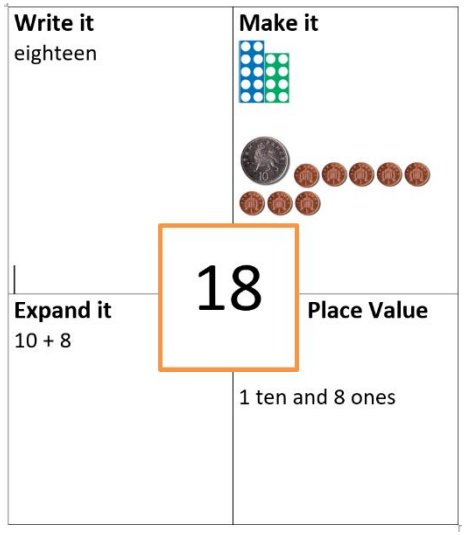
Objectives: Taken from ELGs and Development Matters (Consolidation/Revision/Recap)	Year 1 Objectives (May be impacted by gaps in Rec)
Number • Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. ➢ Recites numbers in order to 10 ➢ Knows that numbers identify how many objects are in a set ➢ Beginning to represent numbers using fingers, marks on paper or pictures ➢ Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same ➢ Sometimes matches numeral and quantity correctly ➢ Compares 2 groups of objects, saying when they have the same number ➢ Shows an interest in numerals in the environment ➢ Shows an interest in representing numbers ➢ Realises not only objects, but anything that can be counted, including steps, claps, or jumps	Number and Place Value • Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number • Count, read and write numbers to 100 in numerals, count in multiples of twos, fives, and tens • Given a number, identify one more and one less • Identify and represent numbers using objects and pictorial representations including the number line, and use the language of equal to, more than, less than (fewer), most, least • Read and write numbers from 1 to 20 in numerals and words INPV–1 Count within 100, forwards and backwards, starting with any number. INPV–2 Reason about the location of numbers to 20 within the linear number system, including comparing using < > and =
Number • Using quantities and objects, they add and subtract two	Number: Addition and Subtraction

single-digit numbers and count on or back to find the answer ➢ Shows an interest in number problems ➢ Separates a group of 3 or 4 objects in different ways, beginning to recognise that the total is still the same	• 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 INF–1 Develop fluency in addition and subtraction facts within 10. IAS–1 Compose numbers to 10 from 2 parts, and partition numbers to 10 into parts, including recognising odd and even numbers. IAS–2 Read, write and interpret equations containing addition ( ), subtraction ( ) and equals ( ) symbols, and relate additive expressions and equations to real-life contexts.
Key Vocabulary:	**Key Vocabulary:**
Counting, recognising, comparing and ordering numbers: zero, one, two, three… to twenty, count, count (up) to, count on (from, to), count back (from, to), none, how many…? many, few, how many times? pattern, pair, guess, estimate, the same as, equal to, nearly, close to, about the same as, just over, just under, too many, too few, enough, not enough, as many as, greater than, more than, larger, bigger, less, fewer, smaller, comparing three or more objects/amounts: greatest, most, biggest, largest least, fewest, smallest, compare, order size, first, second, third… tenth last, last but one, before, after, next, between, above, below Adding and subtracting: add, more, and make, sum, total altogether, score, double, one more, two more, how many more to make… ? how many more is… than…? take (away), leave, how many are left/left over? how many have gone? one less, two less…, how many fewer is… than…? difference between is the same as	Number and place value: number, number names: zero, one, two, three… to one hundred, count, count (up) to, count on (from, to) count back (from, to), none, how many…? count in ones, twos… tens… more, less, one more, one less, many, few, fewer, fewest, the same as, equal to, odd, even, every other, how many times? pattern, pair, guess, estimate, nearly, close to, about the same as, just over, just under, too many, too few, enough, not enough, as many as, comparing two objects/amounts: greater than, more than, larger, bigger less, fewer, smaller, comparing three or more objects/amounts: greatest, most, biggest, largest least, fewest, smallest, one more, ten more, one less, ten less, compare, order, size, first, second, third… tenth, eleventh, twentieth, last, last but one before, after, next, between, halfway between, above, below, units, ones, tens, exchange, digit, 'teens' number Addition and subtracting: add, more, plus make, sum, total, altogether, score double, near double, one more, two more… ten more, how many more to make…? how many more is… than…? how much more is…? subtract, take (away), minus, leave, how many are left/left over? how many have gone? one less, two less, ten less… how many fewer is… than…? how much less is…? difference between half, halve, equals, sign, is the same as

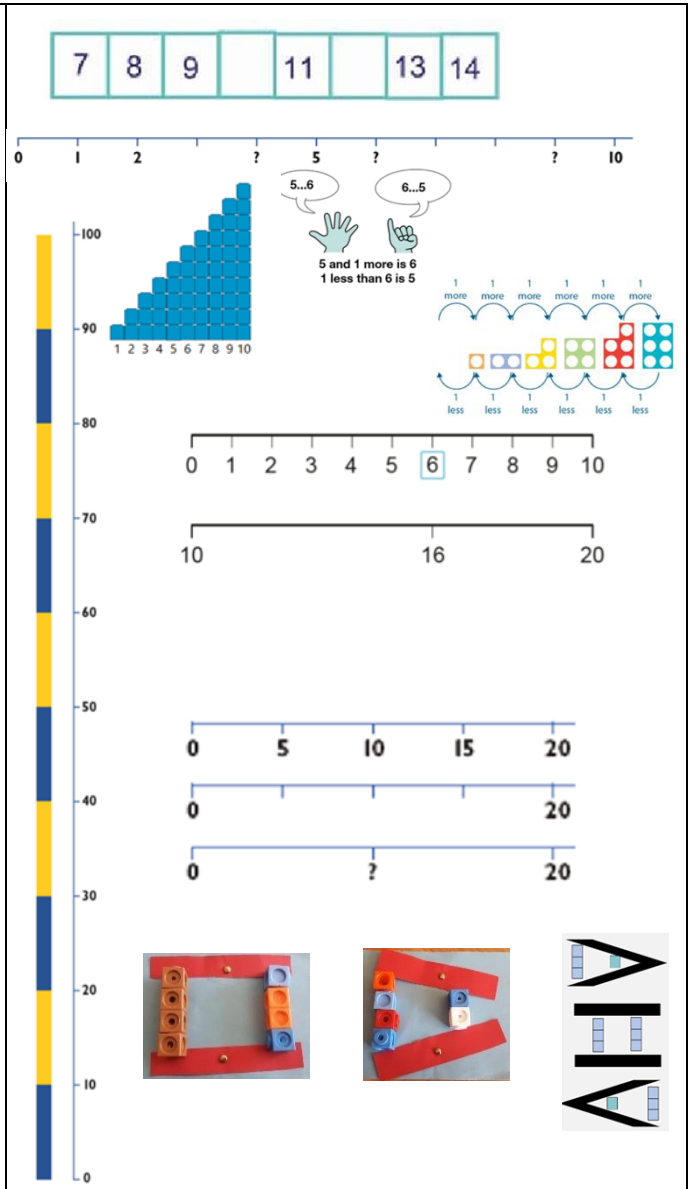
	Objectives (taken from DM, ELG and YI where appropriate)	Suggested Learning Activities	Representations and links to resources
Module 1	• count reliably with numbers from one to 20 (and within 100) INPV–1 Count within 100, forwards and backwards, starting with any number. • Read and write numbers from 1 to 20 in numerals and words	• Practise oral counting forwards and backwards from different starting points, (pause and emphasise multiples of 10): 'Can you count on from 0 and back from 10, 20? Can you start counting at 3 and stop when you get to 9 ? Can you count back from 8 and stop when you get to 4? Can you count on from 16 to 25? 93 to 105? Back from 56 to 32? 97 to 89?' (Use number tracks, number lines, 100 squares for visual prompts and to spot patterns in the number system) Use a puppet to practise spotting counting errors '11, 12, 13, 14, 16, 17, 18' What went wrong? How do you know? • Use percussion instruments: 'can you count the number of beats' Find the number word which represents the number of beats • Practise counting objects/ things for a purpose: 'How many pupils are in our class today, compare with yesterday, are there more children? Fewer? The same amount? Count how many are having a hot dinner/ walked to school. Etc. 'How many toys do you have in your bedroom? Write down the numbers/number words 'What is one more?' 'The number after?' 'The number before? 'One fewer?' What else do we need to count?' (in school or at home) • Count using the Gattegno chart to expose the structure of the numbers in our number system, e.g. 11 is one ten one. Reinforce with Numicon and other structured apparatus. Look at the numbers between 11 and 20, 'what do you notice?' • Complete missing number box statements. e.g ☐ + 3 = 13 50 = tens ☐ and ones ☐ • Use teacups and teenagers to support pupils to differentiate between 'ty' and 'teen' numbers: 'match the 'ty' number to the teacup and the 'teen' number to the teenager, complete number sequences,	  Number Blocks – BBC iplayer      

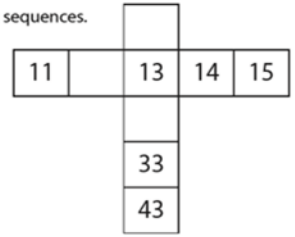
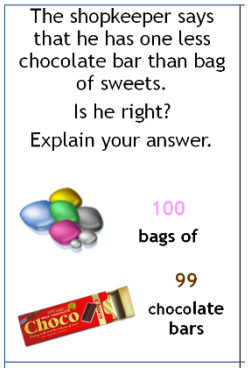
1	2	3	4	5	6	7	8	9	10
one	two	three	four	five	six	seven	eight	nine	ten

100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

	• Identify and represent numbers using objects and pictorial representations including the number line, and use the language of equal to, more than, less than (fewer), most, least	e.g. 20, ▭, 40, ▭, ▭, 70 ▭, 17, 16, ▭, 14 • How do you know the difference between thirteen and thirty-one? What would you rather have 13p or 31p? Why? Can you represent 13 and 31 with Numicon/ straws? What do you notice? What's the same? What's different?' • Go on a number hunt around your school/ home, 'what numbers do you see? What do they mean?' Read, write and order the numbers you find. 'Can you write the numbers in words?' Make it with equipment? • Read and say number words, form the numerals in shaving foam, glitter, sand, etc. 'How do you know this is the number 5 ? How is it different from the number 3? Can you match the number word to the numeral? Tell me what is the same/ different about these two numbers 4 and 7: (include number value and formation, i.e. 4 is even, 7 is odd, they are both formed using straight lines, etc.) 'Look at the digit cards, can you find me a number less than 10? Can you write this number in words?' • Ask questions to talk about properties of number, e.g.: ➢ 'I'm thinking of a number, it's less than thirty and greater than 10, what could it be?' What couldn't it be? ➢ Play 'guess my number', ask yes/no questions to identify properties and guess number (Play in French or Spanish too) ➢ Play 'odd one out and why?': choose 3 numbers, consider properties, choose odd one out and suggest reason why. • Read a counting book, e.g. 'One is a snail, ten is a crab', practise counting in ones, compare/ order the numbers and talk about them, e.g. 'the spider has more legs than the insect' • Estimate numbers of objects, e.g. number of cubes in the glass, 'If we added one more, how many now?'	     

			www.mathsthroughstories.org Steve Wyborney 'Estimation Station'  https://stevewyborney.com/2018/11/esti-mysteries-estimation-meets-math-mysteries/ https://classroom.thenational.academy/subjects-by-year/reception/subjects/maths https://classroom.thenational.academy/subjects-by-year/year-1/subjects/maths

	• order numbers within 20 • say which number is one more or one less than a given number INPV–2 Reason about the location of numbers to 20 within the linear number system, including comparing using < > and	• Look at this number track, 'Can you point to 7? 11? Which number is in between 11 and 13? Point to a number on the number line, e.g. 15, can you name the number? What is 1 more? 1 less? Can you place the number 7 onto the partially demarcated number line and explain why you have put it there? What is the number before/ after 7? 18? 21? Play games that involve moving along a numbered track 'What do you notice about the numbers?' (understand that larger numbers are further along the track, link one more to the number after and one less to the number before) • Estimate the position of numbers on an empty number line and justify choices. Use a double number line to highlight the patterns in our number system. • Ask questions about the location of numbers, e.g.: Talk about and highlight the importance of the midpoint Look at this number line. 0 5 9 10 Harry has placed some numbers on the line. Has he placed his numbers in the correct place? Explain your answer. • Using cards with numbers to 20, pick 3 at random, 'which is the largest? Put them in order and explain how you've done it (Extend to numbers within specific bands as appropriate, e.g. 1-30, 1-50, 1-100) • Pick 2 numbers or quantities and compare, model inequality symbols • Roll 2 dice, talk about numbers generated, biggest/ smallest/ one more/ number before odd/even, etc.	

	Solve problems involving ordering numbers	• Complete missing number sequences or sections of the 100 square justifying reasons for choices, e.g. Write the numbers missing from these sequences.  • Order a set of letters to be delivered on counting street (all houses are on counting street, not just odd or even) to make it easier for the postman • Ordering heights, weights, prices in the shop etc. • Make mathematical statements about given numbers to show understanding of inverse relationship between 1 more and 1 less e.g. 'I know 16 is one less than 17 as 17 is one more than 16' • What would you rather have, 15p or 16p, why? • True or false? True or false? © 10 is one more than 9 True or false? Show me. 	https://nrich.maths.org/content/99/07/letmel/RS%20Biscuit%20Decortions.pdf https://nrich.maths.org/4332?utm_source=primary-map https://nrich.maths.org/7514?utm_source=primary-map https://nrich.maths.org/7337?utm_source=primary-map https://nrich.maths.org/8303?utm_source=primary-map https://www.schoolimprovementliverpool.co.uk/lets-talk-maths SIL problem solving document 

Language and Vocabulary focus:

Language focus: number names don't always reflect the structure of the numbers, practise dual counting:
"ten, eleven, twelve, thirteen.. twenty, twenty-one, twenty-two/ one-ten, one-ten-one, one-ten-two, one-ten-three... two-tens, two-tens-one, two-tens two..."
Use structured apparatus to support, e.g. numicon/ straws

Language focus: Using efficient strategies and appropriate reasoning, including working backwards from a multiple of 10, to identify or place numbers on marked number lines:

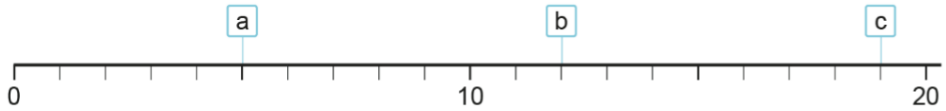


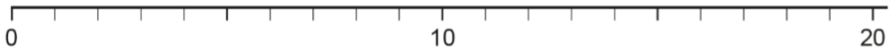
Figure 5: identifying 5, 12 and 19 on a marked 0 to 20 number line

"a is 5 because it is halfway between 0 and 10."
"b is 12 because it is 2 more than 10."
"c is 19 because it is one less than 20." Language focus "10 hundreds is equal to 1 thousand."

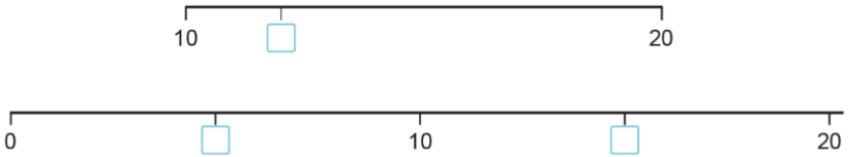
Assessment Questions:

- Count the objects in each of the baskets and label how many are there
- Write the following numbers as I say them? 14 8 20 12 7
- Here are some pennies, put six pennies into the purse. Repeat with other objects.
- What is the number after 6? 3? 11? 15? 20? What is the number before 5? 2? 9? 13? 12? 17?
- What is 1 more than 11? What is the number after 11? What do you notice?
- . Label these numbers on the number line.

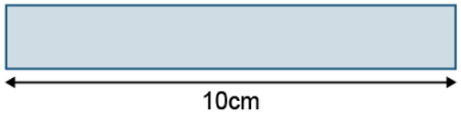
  9 15 3 12



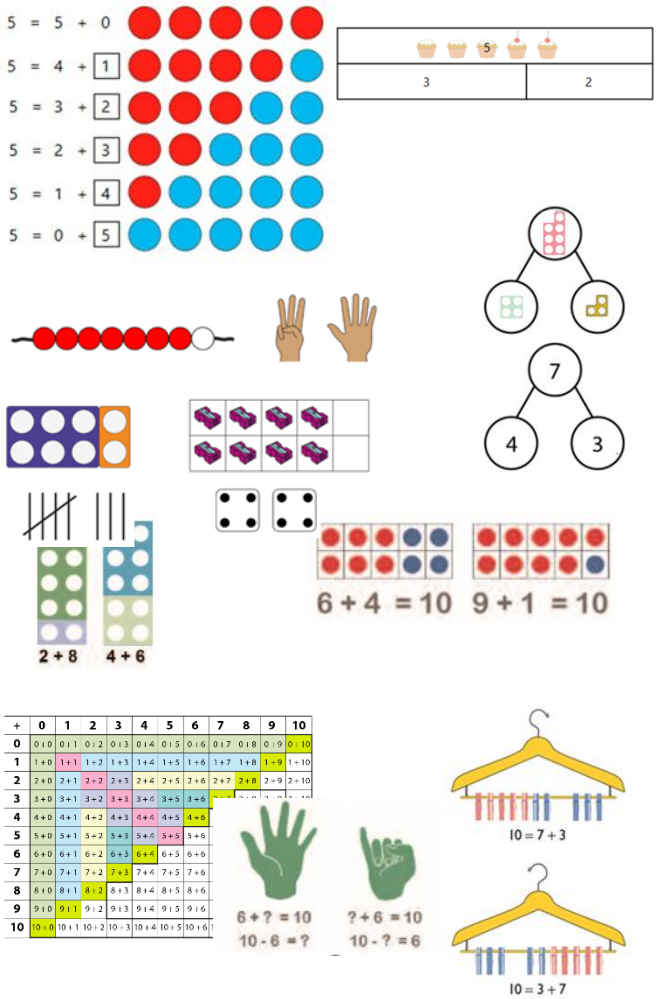
- . Estimate the value of the missing numbers.

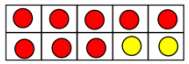
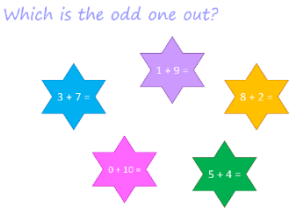


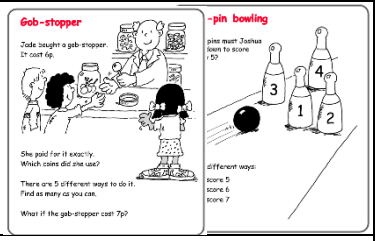
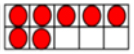
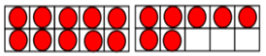
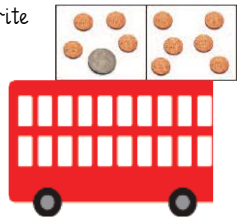
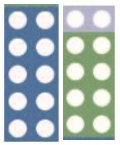
- Mahmood is using 10cm paper strips to measure things in the classroom.

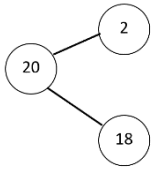


a. How long do you think the eraser is?

	Objectives (taken from DM, ELG and Year 1 where appropriate)	Suggested Learning Activities	Representations and links to resources
Module 2	• Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same IAS–1 Compose numbers to 10 from 2 parts, and partition numbers to 10 into parts, including recognising odd and even numbers. (Knowing numbers are made up of two or more other smaller numbers involves 'part–whole' understanding. Learning to 'see' a whole number and its parts at the same time is a key development in children's number understanding. Partitioning numbers into other numbers and putting them back together again underpins understanding of addition and subtraction as inverse operations)	• Make a number with two different kinds of things, e.g. make a fruit skewer with five pieces of fruit, using bowls of bananas/strawberries to choose from 'Tell me about your skewer' Compare it with a partner's: 'What is the same about your skewers? What is different?' • Discuss/ model combinations to highlight patterns and support children to be systematic, e.g. 5 = 5 + 0, 5 = 4 + 1..etc. • Use double-sided counters, bead strings, coloured cubes, numicon etc. to explore different ways to make the same total and talk about your representation, e.g. 'there is a 4 and a 3 hiding in 7' or 'there is a 2 and a 5 hiding in 7', etc. • Ten frame activities: Put counters onto a ten frame and describe what you can see. 'I can see 5 and 1' Show 6 on the ten frame in a different way, 'what do you notice?', e.g. 6 = 3 + 3 • Record or display 'facts we know' and begin to use to derive unknown or nearby facts, e.g. 'If I know 3 + 3 = 6, then 3 + 4 must equal 7': • Use bead strings or coat hanger and pegs to highlight commutativity of addition and say 'if I know 3 + 7 = 10, then I know 7 + 3 = 10' Cover some pegs with a piece of cloth, 'how many can you see now?' Talk about what has happened, e.g. there were 10 pegs, 2 are covered, now we have 8; link to calculation 10 – 2 = 8 • Play shake and add with 10 counters in a box, record statement, turn box round and record new statement, what do you notice?	

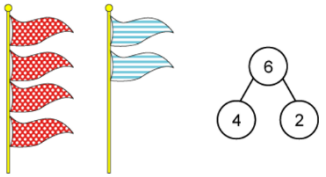
	• Represent and use number bonds and related subtraction facts within 10 (memorise and reason with number bonds to 10: Non-stat. guidance) INF–1 Develop fluency in addition and subtraction facts within 10.	• Cover half of shake box and say what you can see now, e.g. '10 subtract 7 = 3' Model calculation, 'what do you notice? What's the same? What's different?' • Put 10 people/ counters onto the bus, remove some and describe what has happened. 'Can you record as a subtraction statement?'  • Play ten frame games using pennies or counting objects to explore number bonds to 10. 'How much money have you got in the frame?' 'How much more do you need to have 10p? What if you spend 4p, how much will you have left?' • Place ten double sided counters onto a ten frame and using knowledge of commutativity and inverse relationships, describe what you see, e.g. 8 and 2 equals 10, 2 less than 10 is 8, etc.  • Play 'Ten Nice Things': Give each player 10 small, appealing objects. Throw a dice (with numerals or spots up to 6), the player is allowed to take that number of objects from the other player and describe what has happened to their group of objects, e.g. '10 and 3 more equals 13' The second player then has a turn. Ask questions e.g. 'Who has more? fewer?' 'How many more?', 'How many more do you need you make 10?' etc. As a variation, player A has to give away to player B the number of items specified by the number on the dice. • Ask questions to encourage children to recall and reason about number facts, e.g. 	    https://www.schoolimprovementliverpool.co.uk/lets-talk-maths

			'Mathematical Challenges for more able pupils' 
	• Represent and use number bonds and related subtraction facts within 20 Understanding how numbers within 10 can be composed and partitioned (1AS–1) underpins fluency in addition and subtraction facts within 10.	• Recap number bonds and related subtraction facts within 10 on ten frames and model how they can be used to derive and recall bonds and subtraction facts within 20: e.g. 7 + 3 =  10 add a full ten frame  17 + 3 = 20 'What do you notice?' 'What's the same? What's different?' • Repeat with other examples, rearrange calculations and encourage children to spot patterns 3 + ☐ = 10 13 + ☐ = 20 20 – ☐ = 13 5 + ☐ = 10 15 + ☐ = 20 20 – ☐ = 15 6 + ☐ = 10 16 + ☐ = 20 20 – ☐ = 16 • Provide opportunities for children to derive related facts, 'If you know 3 + 7 = 10, what else do you know?' • Play 'Shake and Add' with a 10p and 10 pennies. Shake and describe what you see, e.g. 14p + 6p = 20p 'Can you write a subtraction fact?' • Put 20 people/ counters onto the bus, remove some and record/ draw what has happened; e.g. 	 8 + 2 = 10  18 + 2 = 20 NCETM videos: https://www.youtube.com/playlist?list=PLQqF8sn28L9wsQ8csk9Ymc56zJDkrH2hL https://nrich.maths.org/1816?utm_source=primary-map https://nrich.maths.org/192?utm_source=primary-map https://nrich.maths.org/number-lines?utm_source=primary-map https://nrich.maths.org/229?utm_source=primary-map https://nrich.maths.org/4940?utm_source=primary-map https://nrich.maths.org/7233?utm_source=primary-map https://nrich.maths.org/150?utm_source=primary-map https://nrich.maths.org/6227?utm_source=primary-map https://nrich.maths.org/6885?utm_source=primary-map https://nrich.maths.org/175?utm_source=primary-map https://nrich.maths.org/8296?utm_source=primary-map https://nrich.maths.org/10479?utm_source=primary-map

		 20 2 | 18 Model equation: 20 – 2 = 18 • Apply knowledge of number bonds and related subtraction facts within 10 and 20 in role play shop e.g. find total of items, calculate change from 10p? 20p? 'You buy 2 items from the shop and the total cost is 20p, how much could the items cost? How do you know you have every possibility?' • Use manipulatives to model relationship between facts, e.g. 3 + 9 = 12, 9 + 3 = 12, 12 – 3 = 9, 12 – 9 = 3 'Using 5, 8 and 13, can you write 4 mathematical statements?' • Playing cards: choose a card, e.g. 8 and record different ways to make the number	https://nrich.maths.org/2354?utm_source=primary-map https://www.schoolimprovementliverpool.co.uk/lets-talk-maths

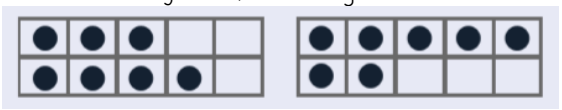
Language and Vocabulary Focus:

Language focus: understanding that numbers can be composed from, and partitioned into, smaller numbers
"There are 6 flags. 4 are spotty and 2 are stripy."
"6 is the whole. 4 is a part. 2 is a part." "I can see a 4 and a 2 hiding in the number 6"



Assessment Questions:

- Look at the ten frames, what do you notice?

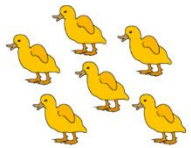


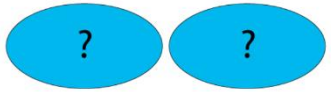
Use the counters to show this number in a different way. Which numbers are hiding in 8?

- Here are 7 counters and 2 plates, put the counters onto the plates and record what you have done, e.g.
  Is there another way you could arrange the counters?

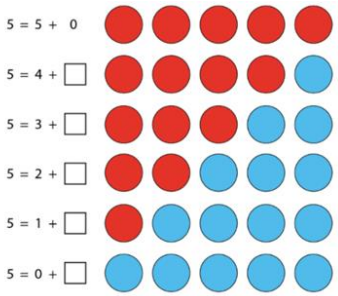
4 and 3 equals 7

- Mother duck is in the water with her 6 ducklings. There are 2 ponds. How many ducklings could be in each pond?



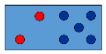
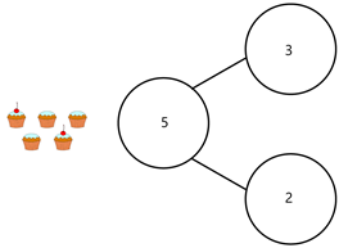


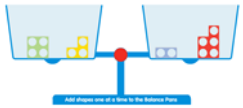
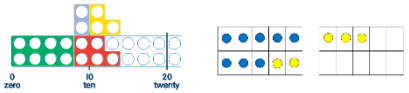
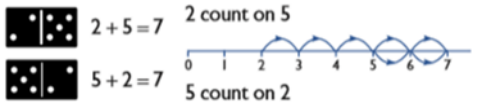
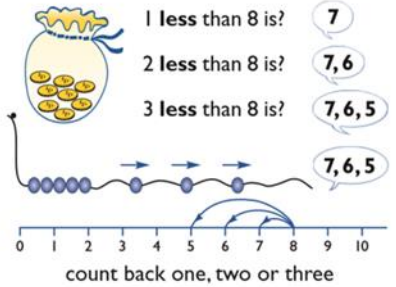
- Fill in the missing numbers:

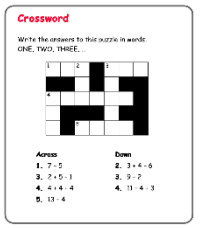
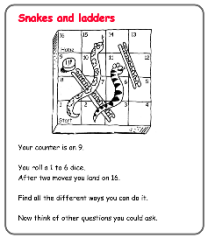


7 + □ = 7
6 + □ = 7
5 + □ = 7
4 + □ = 7
3 + □ = 7
2 + □ = 7
1 + □ = 7
0 + □ = 7

- I cycled 4km to get to my friend's house, and then cycled another 3km with my friend. How far have I cycled?
- There are 9 children. 6 of them have scooters and the rest do not. How many of the children do not have scooters?
- Sarah had £6. Then she spent £3. How much money does she have left?
- I have 1 metre of red ribbon. I have 5 metres of blue ribbon. How many metres of ribbon do I have altogether?

	Objectives (taken from ELG and Year 1 PoS)	Suggested Learning Activities	Representations and links to resources
Module 3	• Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs IAS–2 Read, write and interpret equations containing addition ( ), subtraction ( ) and equals ( ) symbols, and relate additive expressions and equations to real-life contexts.	• Use small worlds, toys or counting objects to model and talk about addition and subtraction structures, introduce symbols and create equations as a way to represent/record the situation. e.g. animals on the farm. 'How many pigs/ sheep are on the farm? How many animals are there altogether?' (aggregation, combining two parts to make a whole) Model and describe the scenario, e.g. 'There are 3 pigs and 4 sheep on the farm, there are 7 animals altogether' 3 + 4 = 7 Reinforce language of + and – 3 plus 4 equals 7 (children are ready to record the expression or equation using symbols when they can describe what is happening) • Repeat with other real-life contexts and include examples using: ➢ Partitioning (separating 1 whole into 2 parts) in these situations, the subtraction symbol represents a splitting up of the whole, e.g' there are 5 fairy cakes, 2 have cherries, how many do not have cherries?' 5 – 2 = 3 ➢ the increase structure of addition (augmentation), e.g. 'the sunflower is 12cm tall, it grows another 3cm, how tall is it now? 12cm and 3cm more equals 15cm, 12cm + 3cm =15cm. ➢ the reduction (take away) structure of subtraction, e.g. there are 5 frogs on lily pads, 2 jump in the pool, how many are left on the lily pads? 5-2=3 • Lay dominoes face down on the table, take turns to turn one over and say and write an equation to describe it, e.g. ➢ '2 spots and 5 spots equals 7 spots  altogether', 2 + 5 = 7, 7 = 2 + 5 'there are 7 spots altogether, 2 are red, how many are blue?' 7 – 2 = 5	 

		Extend to using double 9 dominoes • Model balance equations to highlight '=' means the expressions on each side of the symbol have the same value  • Use symbol cards and numeral cards to create equations, extend to solving problems, e.g: Fill in the missing symbols to make the expression true: 12 5 7 0 □ □ □	 5 – □ = 3 □ – 2 = 3
	• Using quantities and objects, add and subtract two single-digit numbers and count on or back to find the answer • Add and subtract one-digit and two-digit numbers to 20, including zero (pupils need to be able carry out these calculations when they are presented as equations, and when they are presented as contextual word problems DfE guidance)	• State an expression, e.g. 2 + 5 discuss and model how we could work out the answer; by counting all, by counting on, or by using a known fact. Model counting on using a number line, in ones and then using number facts to 'bridge through 10' • Use manipulatives, e.g. Numicon to practise the bridging through 10 strategy to add 2 numbers. Discuss facts you are using, e.g to solve 8 + 5 ; 'add 2 to 8 to equal 10 and 2 + 3 = 5, so answer is 13 • Repeat with subtraction calculations, e.g. 9 – 3, model counting out objects (reduction) and counting back on the number line  • Use small world scenarios as above to practise adding and subtracting numbers to 20, e.g. 'there are 11 boys in the class and 8 girls, how many pupils are there altogether?' 'I had 13p in my purse, I spent 6p, how much do I have left?' 'there are 18 yellow and red counters in the pot, 9 are yellow, how many are red?' 'Sam had 14p, he got 5p from his brother, how much does he have now?' • Use playing cards to practise addition and subtractions skills, choose 2 cards and find total/ difference • Pick 2 digit cards 0- 9 out of feely bags, talk to partner about how you could add them together – share strategies, record in a table, check answers with equipment/ number line • Use a pile of number cards 10 – 20 and a pile of digit cards 0-9, turn over the top card from each pile and subtract the smaller number from	 2 + 5 = 7 5 + 2 = 7 2 count on 5 5 count on 2 https://www.ncetm.org.uk/resources/50640  1 less than 8 is? 7 2 less than 8 is? 7, 6 3 less than 8 is? 7, 6, 5 7, 6, 5 count back one, two or three

		the larger number . 'How can you check if your answer is correct?' Use equipment and/or check through counting back on the number line • 'The answer is _ , what is the question?' Record equations for a given total. Think of another addition calculation where you could use this number fact, e.g. If I know 4 + 4 = 8, I know 4 + 5 = 9, 8 – 4 = 4, 5 + 4 = 9 • Making numbers: use digits 0 1 2 3 4 5 6 7 8 9 and + or – signs try to make different totals. •	
	• Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ☐ 1	• As above, use small world scenarios and real-life contexts to provide opportunities to solve addition and subtraction problems • Share an equation, e.g. 17 – 5 = 12, ask children tell a story about the statement using the correct language • Roll 2 0-9 die, tell a story and record + or - equation • Solve missing number problems, changing position of missing box and the = sign e.g: 12 + ☐ = 17 20 - ☐ = 11 ☐ + 3 = 14 15☐ 3 = 18 (Model with equipment as appropriate)	'Mathematical Challenges for more able pupils'   SIL problem solving document NRICH addition and subtraction problems (see links in module 2)

Language Focus:

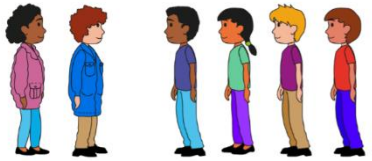
Language focus: addition as aggregation:
"There are 5 flowers in one bunch. There are 2 flowers in the other bunch. There are 7 flowers altogether."
"We can write this as 5 plus 2 is equal to 7."
"The 5 represents the number of flowers in 1 bunch."
"The 2 represents the number of flowers in the other bunch."
"The 7 represents the total number of flowers."

How many flowers are there altogether?

Language focus: subtraction as partitioning:

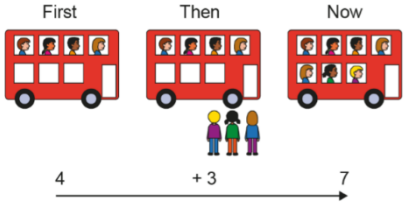
How many children are not wearing coats?

"There are 6 children altogether. 2 children are wearing coats. 4 children are not wearing coats."
"We can write this as 6 minus 2 is equal to 4."
"The 6 represents the total number of children."
"The 2 represents the number of children that are wearing coats."
"The 4 represents the number of children that are not wearing coats."



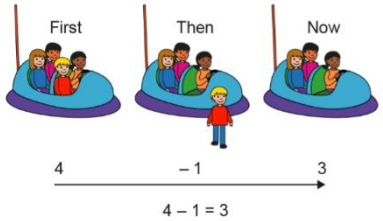
Language focus: addition as augmentation:
"First 4 children were sitting on the bus. Then 3 more children got on the bus. Now 7 children are sitting on the bus."
"We can write this as 4 plus 3 is equal to 7."
"The 4 represents the number of children that were on the bus at the start."
"The 3 represents the number of children that got on the bus."
"The 7 represents the number of children that are on the bus now."

How many children are on the bus now?



Language focus: subtraction as reduction:
"First there were 4 children in the bumper car. Then 1 child got out. Now there are 3 children in the bumper car."
"We can write this as 4 minus 1 is equal to 3."
"The 4 represents the number of children that were in the car at the start."
"The 1 represents the number of children that got out of the car."
"The 3 represents the number of children that are in the car now."

How many children are in the bumper car now?

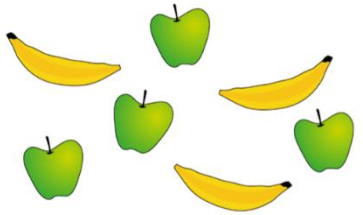


Assessment Questions:

Write an equation to represent this story.
First I had 6 balloons. Then 2 floated away. Now I have 4 balloons.

Write an equation to represent this story.
There are 2 apples. There are 3 oranges. Altogether there are 5 pieces of fruit.

Which equation matches the picture? Can you explain your choice?



3 + 3 = 6 8 = 4 + 3 4 = 3 + 1 4 + 3 = 7

Holly looks at this picture. She writes **4–1 3 =.** Explain how Holly's equation represents the picture.

Write an equation to represent the picture. Explain how your equation matches the picture:

Curriculum Recovery - Maths: Year 2

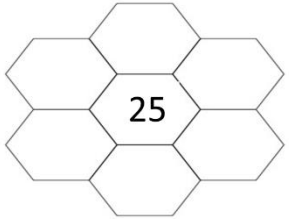
An Overview of Objectives

The purpose of this document is to support recovery curriculum as children move through the planned learning. It includes the DfE published guidance on Teaching of Mathematics (July 2020) to bring greater coherence to National Curriculum Objectives and to prioritise key concepts, its knowledge and understanding within each year group. The teacher may have prioritised other elements as key learning as per their own planning and assessment. The planning framework consists of three 2-week modules which tackle consolidation of Year 1 objectives and move towards introducing Year 2 objectives. Text in blue is taken directly from the Guidance for teaching mathematics and are objectives deemed to be core concepts.

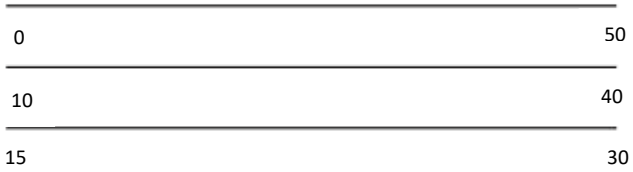
Objectives: Taken from Year 1 PoS (Consolidation/Revision/Recap)	Year 2 Objectives (May be impacted by gaps in Year 1)
Number and Place Value • count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number • count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens • given a number, identify one more and one less • identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least • read and write numbers from 1 to 20 in numerals and words. • INPV–1 Count within 100, forwards and backwards, starting with any number. • INPV–2 Reason about the location of numbers to 20 within the linear number system, including comparing using < > and = • INF–2 Count forwards and backwards in multiples of 2, 5 and 10, up to 10 multiples, beginning with any multiple, and count forwards and backwards through the odd numbers	Number and Place Value • count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward • recognise the place value of each digit in a two-digit number (tens, ones) • identify, represent and estimate numbers using different representations, including the number line • compare and order numbers from 0 up to 100; use <, > and = signs • read and write numbers to at least 100 in numerals and in words • use place value and number facts to solve problems. • 2NPV–1 Recognise the place value of each digit in two-digit numbers, and compose and decompose two-digit numbers using standard and nonstandard partitioning. • 2NPV–2 Reason about the location of any two digit number in the linear number system, including identifying the previous and next multiple of 10.

Number: Addition and Subtraction
• 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.
• INF–1 Develop fluency in addition and subtraction facts within 10.
• IAS–1 Compose numbers to 10 from 2 parts, and partition numbers to 10 into parts, including recognising odd and even numbers.
	Number: Addition and Subtraction
	• solve problems with addition and subtraction:
	  ○ using concrete objects and pictorial representations, including those involving numbers, quantities and measures
	  ○ applying their increasing knowledge of mental and written methods
	• recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
	• add and 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

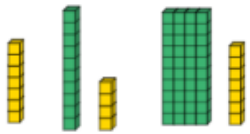
• 1AS–2 Read, write and interpret equations containing addition ( ), subtraction ( ) and equals ( ) symbols, and relate additive expressions and equations to real-life contexts.	○ adding three one-digit numbers • show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot • recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems. • 2NF–1 Secure fluency in addition and subtraction facts within 10, through continued practice. • 2AS–1 Add and subtract across 10. • 2AS–2 Recognise the subtraction structure of 'difference' and answer questions of the form, "How many more. . .?" • 2AS–3 Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract only ones or only tens to/from a two digit number. • 2AS–4 Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract any 2 two digit numbers.
Key Vocabulary:	**Key Vocabulary:**
Forwards Backwards One – digit Two – digit Plus, add, addition, altogether, total, more Subtraction, take away, difference, less	Ones Tens hundreds Greater than less than equals to Largest smallest Digit Plus, add, addition, altogether, total, increase, sum Subtraction, take away, difference, less, decrease

	Objectives (taken from Year 1 PoS)	Suggested Learning Activities	Link to resources
Module 1	• count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number • count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens • given a number, identify one more and one less • identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least • read and write numbers from 1 to 20 in numerals and words. • INPV–2 Reason about the location of numbers to 20 within the linear number system, including comparing using < > and =	• Ensure counting is an integral part of every day daily routines • Practise oral counting forwards and backwards from different starting points • Use your counting stick/number lines/ hundred squares to secure forwards and backwards counting from different starting points • Use concrete resources to represent numbers 1 – 100 and show 1 more, 1 less. • Use concrete resources to make sentences using the language of equal to, more than etc modelled first by the teacher. 	A useful website for showing pictorial representations: https://mathsbot.com/#Manipulatives Place value games: https://thirdspacelearning.com/blog/ks1-ks2-place-value-games/ Skip counting resources for x2, x5 and x10: https://www.schoolimprovementliverpool.co.uk/maths-multiplication-resource What else do you know?  Encourage children to show you how they can represent 25. Pictures, number sentences etc.

- Use Target Boards to practise 1 more, 1 less (Extend to Y2 objectives if appropriate e.g. 10 more/less)
- Go on a number hunt around your school/ home, 'what numbers do you see? What do they mean?' Read, write and order the numbers you find. 'Can you write the numbers in words?' Make it with equipment?
- Use empty number lines and identify where number the number goes.
  e.g. 28 then reason why those choices have been made. *Adapted from NCETM document.



- Step counting puzzles
- Apply to a money context, counting in 2p, 5p, 10p, count into a tin etc
- Play games such as. 'I'm thinking of a number – e.g. It's an odd number, the number is less than 40 etc'
- Play 'what's my rule' (See Basic Skills document)
- Explore a 100 square, look for patterns.
- Order numbers using apparatus such as base 10 - which is the biggest/smallest etc?



Use Mathsbot to support this

- Get children to think about a number and it's size:

https://www.ncetm.org.uk/public/files/25627338/Mastery_Assessment_Yr2_Low_Res.pdf

Use two of the digit cards to make a number greater than 50.
Use two of the digit cards to make a number less than 30.
Use two of the digit cards to make an odd/even number.
Use two of the digit cards to make a number between 47 and 59.

What is the smallest 2-digit number you can make?
What is the largest 2-digit number you can make?

Explain your reasoning.

Write 25 in the correct place on the number grid.

8	9	10	11	12	13
14	15	16	17		

Write the numbers missing from these sequences.

11		13	14	15
		33		
		43		

Use the Let's talk maths to reason around to further develop location of number on number lines.
https://www.schoolimprovementliverpool.co.uk/lets-talk-maths
https://stevewyborney.com/2018/04/the-estimation-clipboard/

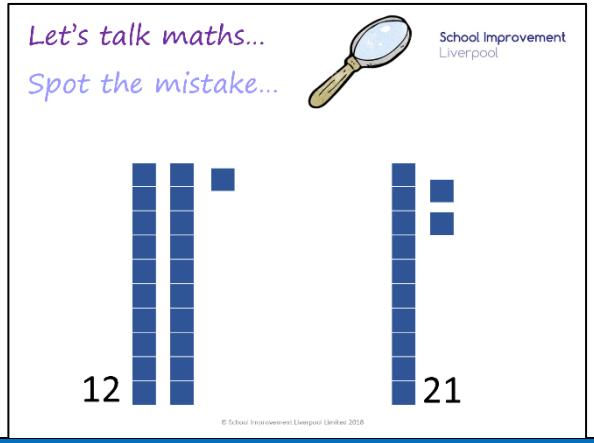
Number Sense Routine
Big or Small

45 is BIG or SMALL when describing the...

- Number of hot dogs you ate at a picnic?
- Number of sweaters you wore to school one day?
- Number of goals you scored in one soccer game?
- Number of minutes you slept last night?

- Provide as many opportunities as possible for children to explain choices and reasoning e.g. How can you turn 4 into 14?
- Practice estimation by using stage 1 of Steve Wyborney PowerPoints
- Practice writing numbers and words in sand, shaving foam, glitter, etc
- Match cards with numerals to words
- Use 'Let's talk maths' resources to support discussion of number e.g. spot the mistake, true or false etc.

https://www.schoolimprovementliverpool.co.uk/lets-talk-maths



Language and Vocabulary focus:

It is important to draw pupils' attention to structures in the number system, for example, linking 1, 2, 3, 4, 5... to 31, 32, 33, 34, 35..., and this can be supported by the use of the visual representations above.

Because number names in English do not always reflect the structure of the numbers, pupils should also practise using dual counting, first counting with number names, and then repeating the count with words based on the number structures.

"...seven, eight, nine, ten, eleven, twelve, thirteen... twenty, twenty-one, twenty-two..."
"...seven, eight, nine, one-ten, one-ten-one, one-ten-two, one-ten-three... two-tens, two-tens-one, two-tens two..."

When counting backwards, pupils often find it challenging to identify which number they should say after they have said a multiple of 10. A partially marked number line can be used for support.

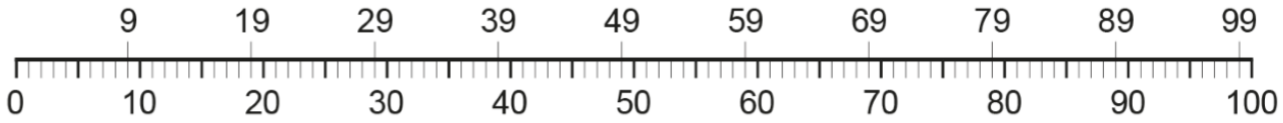


Figure 4: 0 to 100 number line to support backwards counting

Counting backwards from 20 down to 10 requires additional focused practice, due to the irregularity of these number names. By the end of year 1, pupils must be able to count forwards and backwards, within 100, without visual aids.

Assessment Questions:

1. Fill in the missing numbers.

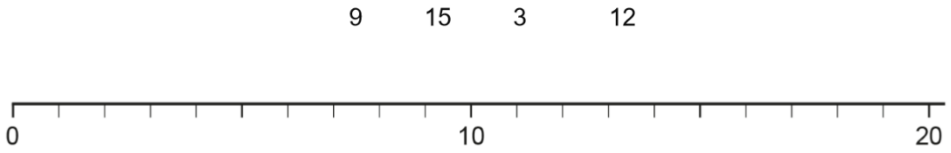
	8	9		11	12

37	38		40		42	43

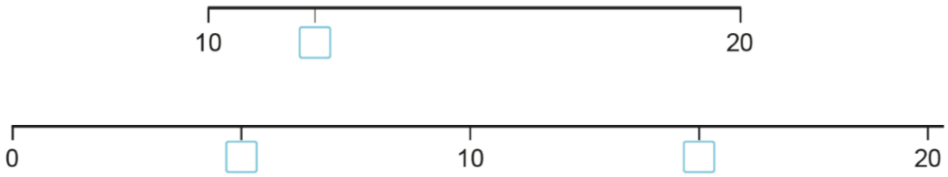
63	62		60		58	57

Assessment guidance: To assess criterion INPV–1, teachers must listen to each pupil count. This can be done through specifically planned tasks, or by carefully watching and listening to an individual pupil during daily counting as part of class routines.

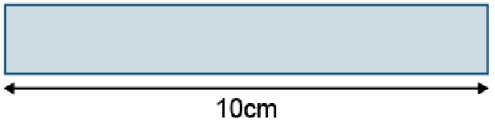
2.Label these numbers on the number line.



3. Estimate the value of the missing numbers.

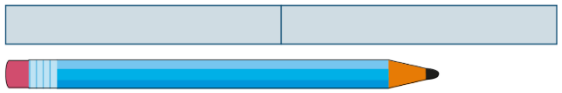


4. Mahmood is using 10cm paper strips to measure things in the classroom.



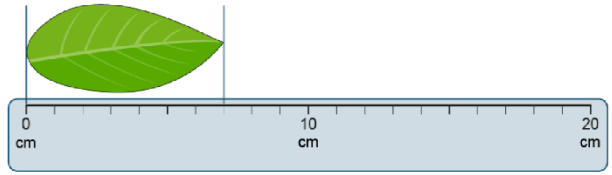
a. How long do you think the eraser is?

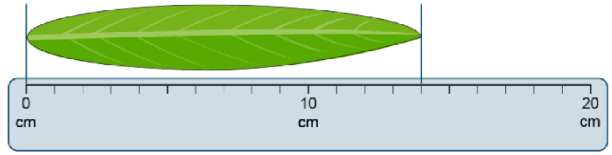
b. How long do you think the pencil is?

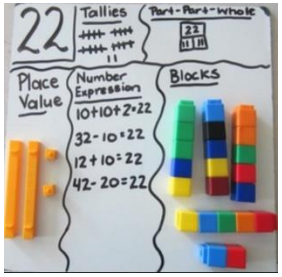
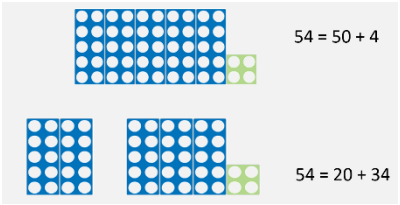
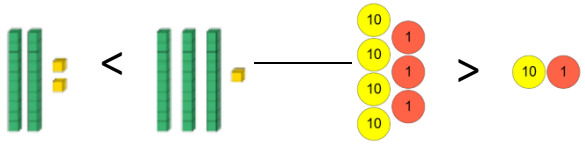
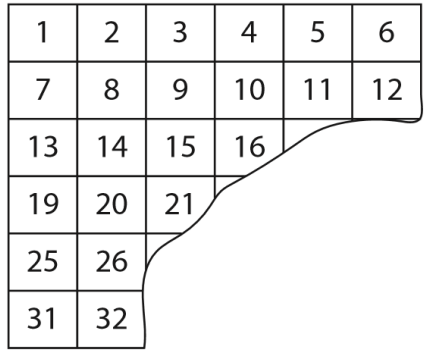


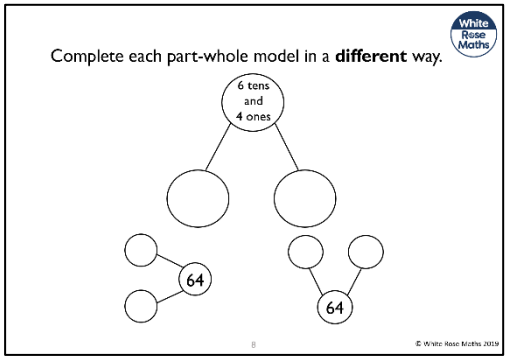
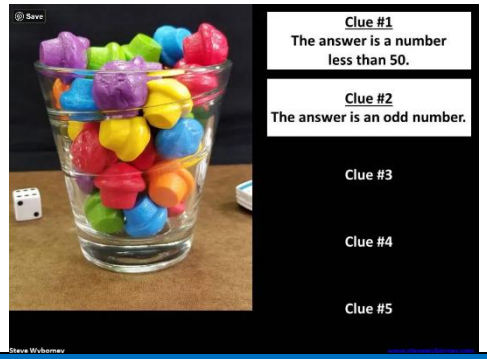
Assessment guidance: The example questions above can be set as a written task. However, teachers will need to watch pupils closely to assess whether pupils are developing efficient strategies and appropriate proportional reasoning skills. Teachers should assess pupils in small groups.

4. Mia measures 2 different leaves with a ruler. How long is each leaf?





	Objectives (taken from Year 1 PoS and Year 2 where appropriate)	Suggested Learning Activities	Link to resources
Module 2	• count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward • recognise the place value of each digit in a two-digit number (tens, ones) • identify, represent and estimate numbers using different representations, including the number line • compare and order numbers from 0 up to 100; use <, > and = signs • read and write numbers to at least 100 in numerals and in words • use place value and number facts to solve problems. • 2NPV–1 Recognise the place value of each digit in two-digit numbers, and compose and decompose two-digit numbers using standard and nonstandard partitioning. • 2NPV–2 Reason about the location of any two digit number in the linear number system, including identifying the previous and next multiple of 10.	• Ensure counting is an integral part of every day daily routines • Use your counting stick/number lines/ hundred squares to secure forwards and backwards counting from different starting points • Step counting puzzles • Apply to a money context, counting in 2p, 5p, 10p, count into a tin etc • Make numbers with place value cards, is it an odd number? Even? How do you know? • Make 2 digit numbers using Base 10, PV counters, straws etc. to support partitioning two digit numbers:     • Use the concrete resources to also use the signs greater than and less than. 	https://www.ncetm.org.uk/public/files/23305594/Mastery_Assessment_Y2_Low_Res.pdf Insert numbers to make these number sentences correct. 13 – ___ < 6 13 – ___ < 6 13 – ___ < 6 13 – ___ < 6 13 – ___ < 6 13 – ___ < 6 13 – ___ < 6 Here is part of a number square. What is the largest number on the whole square?  https://nrich.maths.org/12720 Use Nrich to reason around place value. https://whiterosemaths.com/resources/schemes-of-learning/primary-sols/

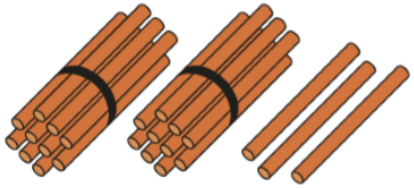
		• When writing any answers ensure that they are written in words as well as numerals. • Use a strip of paper and use it as a blank number line. Imagine it was 0 – 50 and ask 'where would 35 go?' How do you know? Repeat and ask, 'where would it go if the number line was between 0 – 100?' • Can you make a two digit odd number with the sum of those digits being 6? An even number with the sum of those digits being 9? • Practice estimation skills, use Steve Wyborney resources moving from estimations (in module 1 to Esti mysteries in module 2).	Problem solving and reasoning PowerPoints.  https://stevewyborney.com/2018/11/esti-mysteries-estimation-meets-math-mysteries/ 

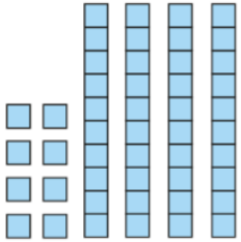
Language and Vocabulary Focus:

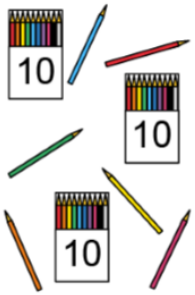
Pupils need to be able to connect the way two-digit numbers are written in numerals to their value. They should demonstrate their reasoning using full sentences.

"This is the number 42. The 4 shows we have 4 groups of ten. The 2 shows we have 2 extra ones."

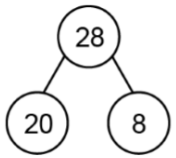
Pupils should recognise that 42, for example, can be composed either of 42 ones, or of 4 tens and 2 ones. They should be able to group objects into tens, with some left over ones, to count efficiently and to demonstrate an understanding of the number. Pupils need to be capable of identifying the total quantity in different representations of groups of ten and additional ones. Within these representations the relative positions of the tens and the ones should be varied.

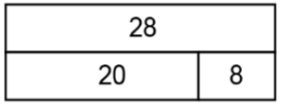






Pupils need to be able to partition two-digit numbers into tens and ones parts, and represent this using diagrams, and addition and subtraction equations.





It is also important for pupils to be able to think flexibly about number, learning to:

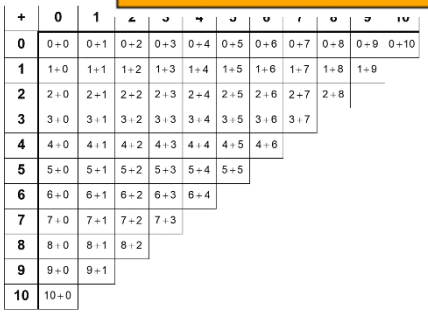
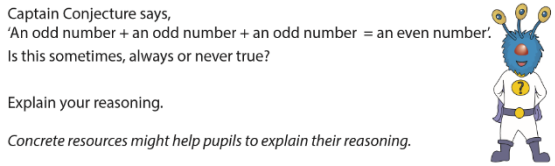
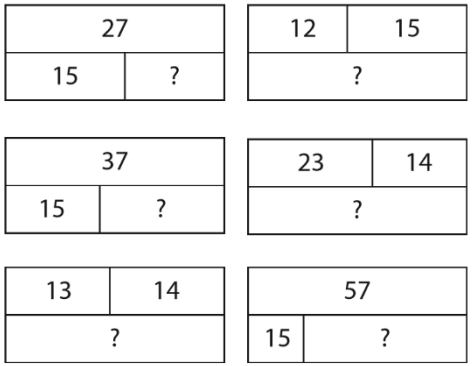
- partition into a multiple of ten and another two-digit number, in different ways (for example, 68 can be partitioned into 50 and 18, into 40 and 28, and so on)
- partition into a two-digit number and a one-digit number, in different ways (for example, 68 can be partitioned into 67 and 1, 66 and 2, and so on)

Assessment Questions:

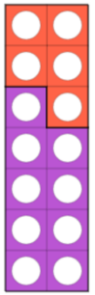
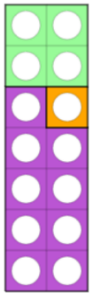
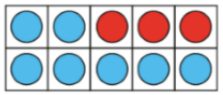
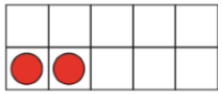
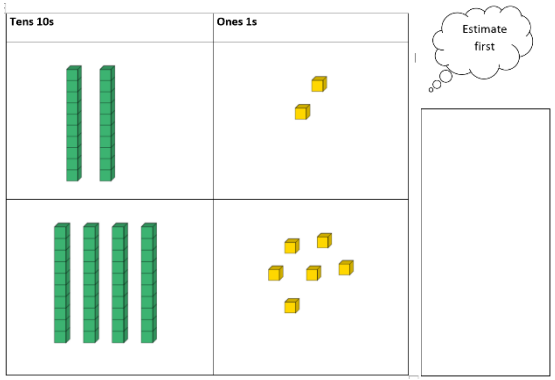
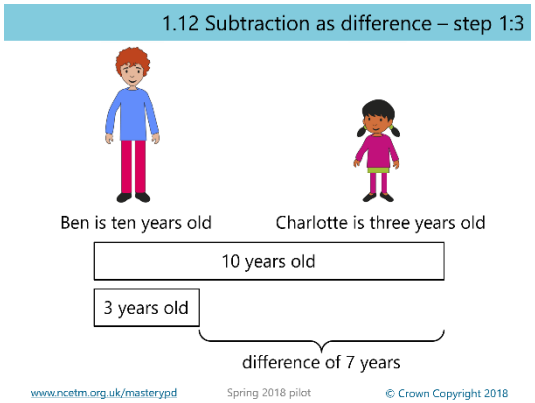
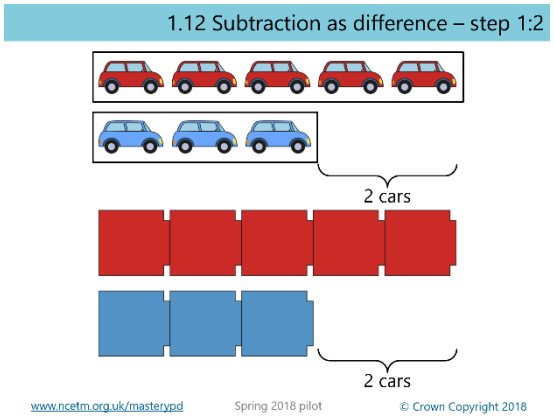
2NPV–1 Example assessment questions

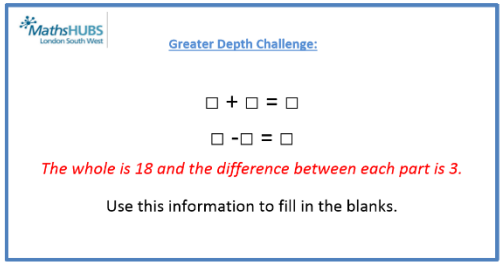
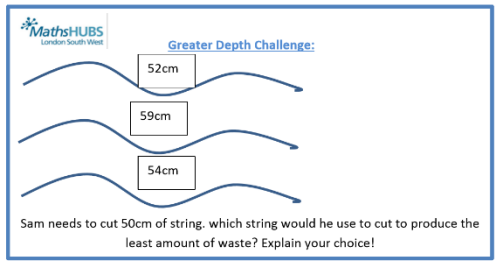
1. Daisy has used 10cm rods and 1cm cubes to measure the length of this toy boat. How long is the boat?
2. What is the total value of these coins?

3. Monika watches a cartoon for 20 minutes and a news programme for 5 minutes. How long does she watch television for?
4. Fill in the missing numbers. $47 - \square = 7$ $\square = 8 + 60$
5. Jed collects 38 conkers and gives 8 of them to Dylan. How many conkers does Jed have left?

	Objectives (taken from Year 3 PoS and Year 4 PoS)	Suggested Learning Activities	Link to resources
Module 3	• solve problems with addition and subtraction: ○ using concrete objects and pictorial representations, including those involving numbers, quantities and measures ○ applying their increasing knowledge of mental and written methods • recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 • add and 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 ○ adding three one-digit numbers • show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot • recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems • 2AS–1 Add and subtract across 10. • 2AS–2 Recognise the subtraction structure of 'difference' and answer questions of the form, "How many more...?"	• Become secure with simple number bonds using manipulatives. • Use the Cuisenaire rods to support finding the difference.   2NF–1 Teaching guidance. The importance of knowing all 66 facts and their commutative facts. • Use concrete resources to support bridging through 10:	A useful website for showing pictorial representations: https://mathsbot.com/#Manipulatives  https://www.ncetm.org.uk/public/files/23305594/Mastery_Assessment_Y2_Low_Res.pdf Use these PowerPoints to support objectives. They are useful to support with visual representations.  https://www.ncetm.org.uk/resources/50640

+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8		
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7			
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6				
5	5+0	5+1	5+2	5+3	5+4	5+5					
6	6+0	6+1	6+2	6+3	6+4						
7	7+0	7+1	7+2	7+3							
8	8+0	8+1	8+2								
9	9+0	9+1									
10	10+0										

	• 2AS–3 Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract only ones or only tens to/from a two digit number. • 2AS–4 Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract any 2 two digit numbers.	 9 + 5 = 14 9 + 1 + 4 = 14 Ensure children know their number bonds to support this.    • Use calculation mats to support adding and subtracting.  The following is a list of strategies to revisit: • Related facts: use what you know e.g. 6 +3 = 9 therefore 60 +30 = 90. • Calculate complements to 100 using number bond fluency 46 + ?=100	 

		• Not crossing, then crossing: use the calculation mat to support this and gain conceptual understanding. • Partitioning: use this skill to ensure an understanding of subtraction and how the number that is being subtracted from doesn't change. • Near doubles: **5 + 6 = 11, 5 + 5 = 10** add 1 more is 11. • Compensating (see 9 think 10)	https://www.londonsouthwestmathshub.co.uk/data/dynamic/spaw/documents/Year%202%20%20addition%20and%20subtraction%20final.pdf  

Language Focus:

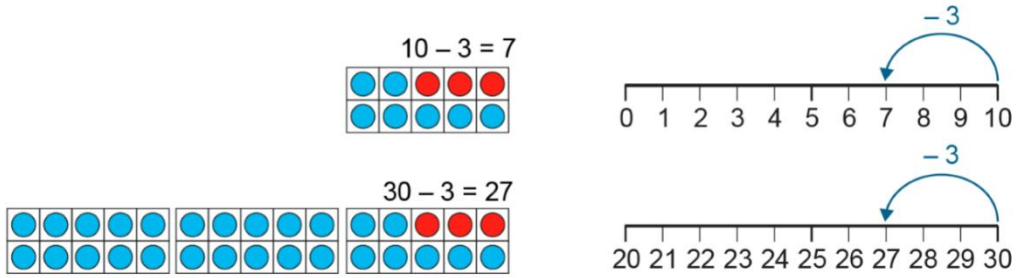


Figure 10: tens frames with counters, and number lines, to support subtracting ones from a multiple of 10

"4 plus 3 is equal to 7. So 4 tens and plus 3 tens is equal to 7 tens."
"10 minus 3 is equal to 7. So 30 minus 3 is equal to 27."

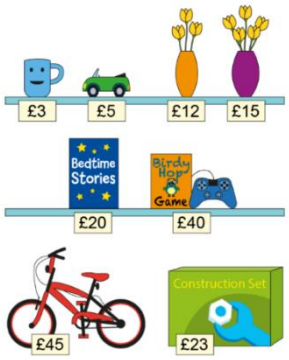
Pupils should also be able to apply strategies for addition or subtraction across 10, from above, to addition or subtraction bridging a multiple of 10.
You can find out more about fluency and recording for all of these calculation types here in the calculation and fluency section: 2AS–3

Assessment Questions:

2AS–1 Example assessment questions

1. Amisha spends £5 on a book and £8 on a T-shirt. How much does she spend altogether?
2. I have a 15cm length of ribbon. I cut off 6cm. How much ribbon is left?
3. I have 17 pencils. 9 have been sharpened. How many have not been sharpened?
4. A garden fence was 8m long. Then the gardener added 7 more metres of fencing. How long is the garden fence now?

2AS–4 Example assessment questions



a. Daisy spends £32 in the shop. Circle the 2 items she buys.
b. What is the total cost of the bicycle and construction set?
c. Jalal pays for the bicycle using a £50 note. How much change does he get?
d. Yu Yan wants to buy the construction set. She has saved £15. How much more money does Yu Yan need to save?

Curriculum Recovery - Maths: Year 3

An Overview of Objectives

The purpose of this document is to support recovery curriculum as children move through the planned learning. It includes the DfE published guidance on Teaching of Mathematics (July 2020) to bring greater coherence to National Curriculum Objectives and to prioritise key concepts, its knowledge and understanding within each year group. The teacher may have prioritised other elements as key learning as per their own planning and assessment. The planning framework consists of three 2-week modules which tackle consolidation of Year 2 objectives and move towards introducing Year 3 objectives. Blue text is taken from the Guidance for teaching mathematics DfE and deemed to be a core concept in the 'ready to progress criteria'

Objectives: Taken from Year 2 PoS (Consolidation/Revision/Recap)	Year 3 Objectives (May be impacted by gaps in Year 2)
Number and Place Value • count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward • recognise the place value of each digit in a two-digit number (tens, ones) • identify, represent and estimate numbers using different representations, including the number line • compare and order numbers from 0 up to 100; use and = signs • read and write numbers to at least 100 in numerals and in words • use place value and number facts to solve problems. ➢ 2NPV–1 Recognise the place value of each digit in two-digit numbers and compose and decompose two digit numbers using standard and nonstandard partitioning. ➢ 2NPV–2 Reason about the location of any two digit number in the linear number system, including identifying the previous and next multiple of 10.	Number and Place Value • Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number • Recognise the place value of each digit in a three-digit number (hundreds, tens, ones) • Compare and order numbers up to 1000 • Identify, represent and estimate numbers using different representations • Read and write numbers up to 1000 in numerals and in words Solve number problems and practical problems involving these ideas. ➢ Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10; apply this to identify and work out how many 10s there are in other three-digit multiples of 10. ➢ 3NPV–2 Recognise the place value of each digit in three-digit numbers and compose and decompose three-digit numbers using standard and non-standard partitioning. ➢ 3NPV–3 Reason about the location of any three-digit number in the linear number system, including identifying the previous and next multiple of 100 and 10. ➢ 3NPV–4 Divide 100 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 100 with 2, 4, 5 and 10 equal parts.
Number: Addition and Subtraction • solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures	Number: Addition and Subtraction • Add and subtract numbers mentally, including: • a three-digit number and ones • a three-digit number and tens

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applying their increasing knowledge of mental and written methods
recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
add and 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
adding three one-digit numbers
show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

➢ 2AS–1 Add and subtract across 10.
➢ 2AS–2 Recognise the subtraction structure of 'difference' and answer questions of the form, "How many more. . .?"
➢ 2AS–3 Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract only ones or only tens to/from a two digit number.
➢ 2AS–4 Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract any 2 two digit numbers.
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a three-digit number and hundreds
Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
Estimate the answer to a calculation and use inverse operations to check answers
Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.

➢ 3AS–2 Add and subtract up to three-digit numbers using columnar methods.
➢ 3AS–3 Understand the inverse relationship between addition and subtraction, and how both relate to the part–part–whole structure. Understand and use the commutative property of addition, and understand the related property for subtraction.
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<td colspan="2">Key Vocabulary:</td>
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<td>Numbers to one hundred
Hundreds
Partition, recombine
Hundred more/less
Predict
Describe the pattern,</td>
<td>describe the rule
Find,
find all,
find different Investigate
Language of place value
Language of addition and subtraction</td>
<td>Year 2 vocabulary plus
Columnar
Inverse
Part-part-whole
Commutative
Estimate
Partition</td>
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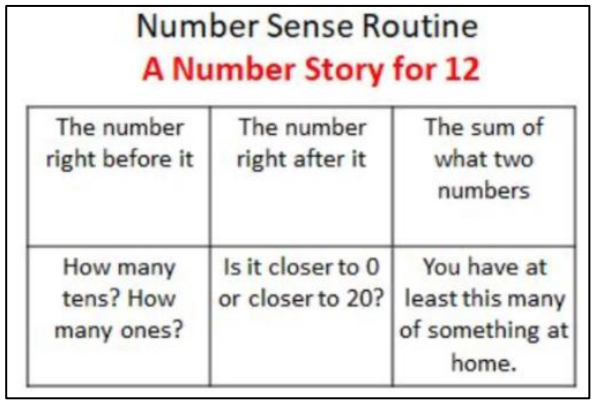
	Objectives (taken from Year 2)	Suggested Learning Activities	Link to resources
Module 1	• recognise the place value of each digit in a two-digit number (tens, ones) • identify, represent and estimate numbers using different representations, including the number line ➢ 2NPV–1 Recognise the place value of each digit in two-digit numbers, and compose and decompose two digit numbers using standard and nonstandard partitioning. • Solve number problems and practical problems involving these ideas.	• In PE lessons, set up 4 teams. Give each child a post it note with a number 1-9 on. Each team has 3 hoops H,T,O. You call a number, the first team to make the number by standing in the correct hoop is the winner. • Encourage children to talk about numbers in terms of relative size. When is ___ big? When is ___ small? When is ___ a lot? When is ___ very little? Make ___ using three addends. Make ___ by subtracting two numbers. Divide ___ in half. Double ___. Divide ___ into four equal parts. What other ways do you think about___? • Estimation • Comparison	www.londonsouthwestmathshub.co.uk How many students will you need to show this number with fingers in groups of tens and ones? How do you know? sixty-one Let's prove it! Number Sense Routine Big or Small **12** is BIG or SMALL when describing the... • Number of hot dogs you ate at a picnic? • Number of sweaters you wore to school one day? • Number of goals you scored in one soccer game? • Number of minutes you slept last night? Pick up sticks



Draw spots on lolly sticks. 10 on one side, 1 on the other. Children drop them on the desk, work with a partner. How have they landed? What is the number they have made? 24 in this case. Who has the biggest number? How do you know?

https://thirdspacelearning.com/blog/ks1-ks2-place-value-games/

https://nrich.maths.org/8303?utm_source=primary-map
https://nrich.maths.org/6343?utm_source=primary-map
https://nrich.maths.org/152?utm_source=primary-map
https://nrich.maths.org/13272?utm_source=primary-map – representing numbers and making them 10 times bigger
Steve Wyborney Estimation Station
https://stevewyborney.com/2018/11/esti-mysteries-estimation-meets-math-mysteries/

Language and Vocabulary focus:

This is the number 42. The 4 shows we have 4 groups of ten. The 2 shows we have 2 extra one.
partition into a multiple of ten and another two-digit number, in different ways (for example, 68 can be partitioned into 50 and 18, into 40 and 28, and so on) • partition into a two-digit number and a one-digit number, in different ways (for example, 68 can be partitioned into 67 and 1, 66 and 2, and so on)

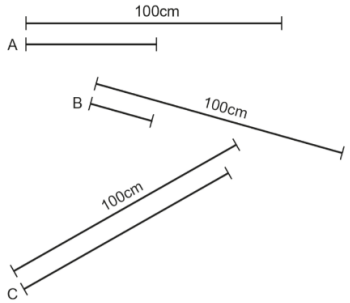
Assessment Questions: Taken from Guidance for the teaching of mathematics

- Daisy has used 10cm rods and 1cm cubes to measure the length of this toy boat. How long is the boat?

- What is the total value of these coins?

- Monika watches a cartoon for 20 minutes and a news programme for 5 minutes. How long does she watch television for?
- Fill in the missing numbers. 47- ? = 7
- Jed collects 38 conkers and gives 8 of them to Dylan. How many conkers does Jed have left?

1. Look at lines A, B and C. Estimate how long they are by comparing them to the 100cm lines?



The table shows the results of a survey which asked pupils to choose their favourite sport. Which sports were chosen by between 20 and 30 pupils?

Favourite sport	Number of pupils
netball	24
basketball	19
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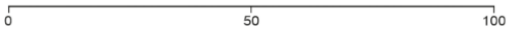
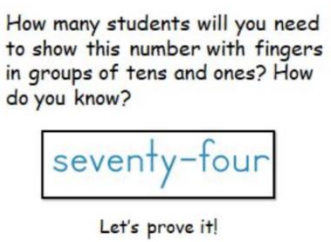
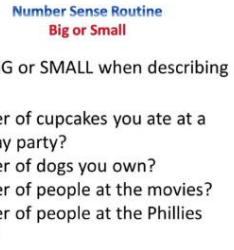
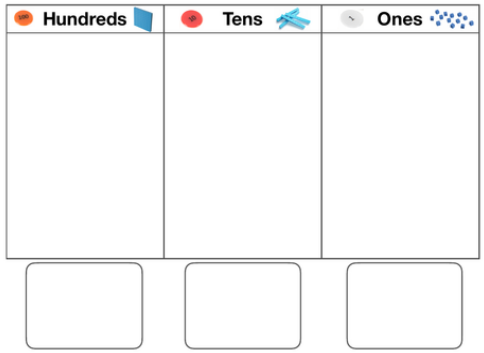
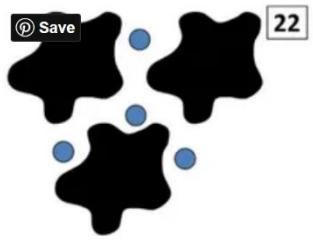
football	32
hockey	6
swimming	28
gymnastics	15

Sophie thinks of a number. She says, "My number is between 40 and 50. It has 7 in the ones place." What is Sophie's number?

Estimate the position of 60 on this number line:



	Objectives (Year 3 where appropriate)	Suggested Learning Activities	Link to resources
Module 2	➢ Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10; apply this to identify and work out how many 10s there are in other three-digit multiples of 10. ➢ 3NPV–2 Recognise the place value of each digit in three-digit numbers and compose and decompose three-digit numbers using standard and non-standard partitioning. ➢ 3NPV–3 Reason about the location of any three-digit number in the linear number system, including identifying the previous and next multiple of 100 and 10. ➢ 3NPV–4 Divide 100 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 100 with 2, 4, 5 and 10 equal parts.	• Make 2 and 3 digit numbers using Base 10, PV counters • Looking at vertical and horizontal number lines and movement across zero   As above for Year 2 but using appropriate year 3 objectives. Provide 'What would happen if……questions.' I added another 100, I added 10 tens etc. Hide and reveal – My number has an odd number of thousands, and even number of ones and 12 tens in it. When rounded to the nearest 100, my number is 110. What could I be? 	https://www.schoolimprovementliverpool.co.uk/lets-talk-maths https://stevewyborney.com/2017/02/splat/  https://nrich.maths.org/6342?utm_source=primary-map https://nrich.maths.org/10426 Rounding investigation https://nrich.maths.org/6554?utm_source=primary-map which script? https://www.schoolimprovementliverpool.co.uk/lets-talk-maths https://nrich.maths.org/8169?utm_source=primary-map That Number Square https://nrich.maths.org/8063?utm_source=primary-map Take three numbers

		674 is made of 6 hundreds, 7 tens and 4 ones. 674 is also made of 67 tens and 4 ones. 674 is also made of 6 hundreds and 74 ones. Find different ways of expressing: ■ 630 ■ 704 ■ 867	

Language and Vocabulary Focus:

Pupils need to experience what 100 items looks like

Making a unit of 1 hundred out of 10 units of 10, for example using 10 bundles of 10 straws to make 100, or using ten 10-value place-value counters.

10 tens is equal to 100

Figure 1: ten 10-value place-value counters in a tens frame

Pupils must then be able to work how many tens there are in other three-digit multiplies of 10

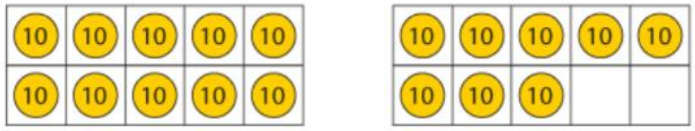
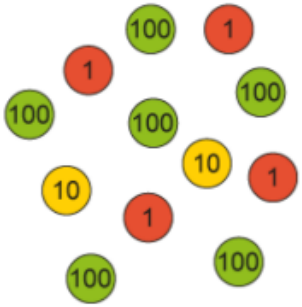


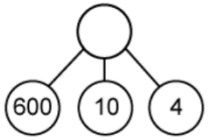
Figure 2: eighteen 10-value place-value counters in 2 tens frames

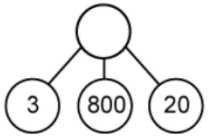
3NPV–1 Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10;

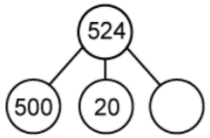
Assessment Questions:

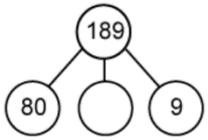
- What number is represented by these counters?
- What number is represented by this expression? 1+ 10 + 10+ 100+ 100+ 10 + 10

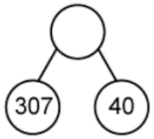


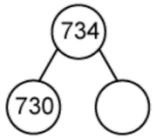






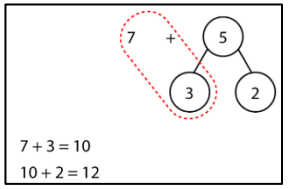
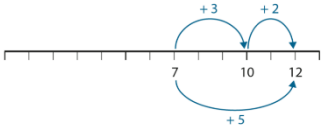
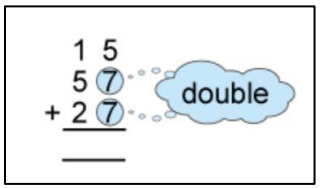
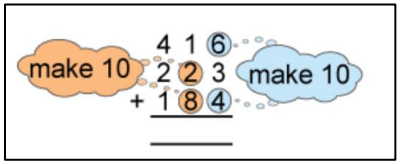




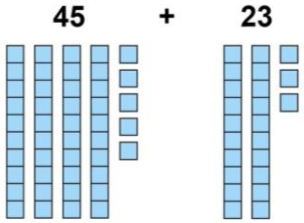
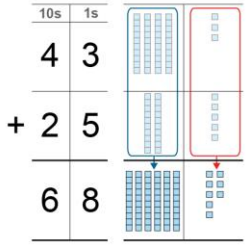
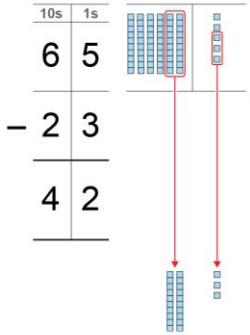
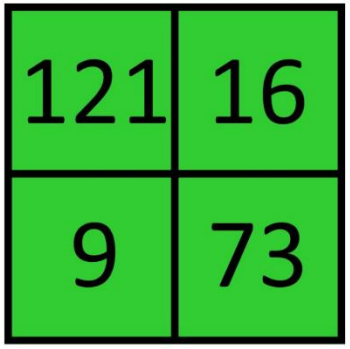


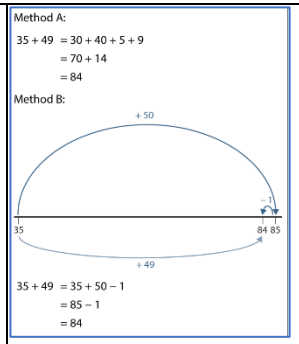
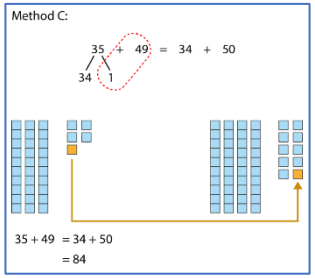
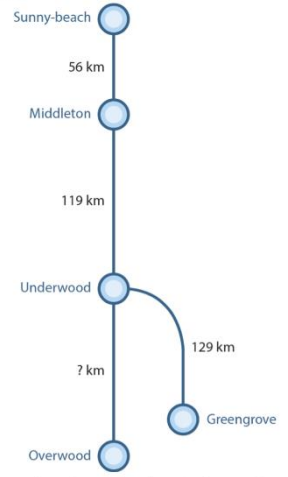
Complete these models

- There are 365 days in a year. If it rains on 65 days of the year, on how many days does it not rain?
- A bamboo plant was 4m tall. Then it grew by another 83cm. How tall is the bamboo plant now? Express your answer in centimetres.
- In the school library there are 25 books on the trolley and 250 books on the shelves. How many books are there altogether?
- Francesco had 165 marbles. Then he gave 45 marbles to his friend. How many marbles does Francesco have now?

	Objectives (taken from Year 2 PoS and Year 3 PoS)	Suggested Learning Activities	Link to resources
Module 3	➢ 2AS–1 Add and subtract across 10. ➢ 2AS–2 Recognise the subtraction structure of 'difference' and answer questions of the form, "How many more. . .?" ➢ 2AS–3 Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract only ones or only tens to/from a two digit number. ➢ 2AS–4 Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract any 2 two digit numbers. ➢ 3AS–2 Add and subtract up to three-digit numbers using columnar methods. ➢ 3AS–3 Manipulate the additive relationship: Understand the inverse relationship between addition and subtraction, and how both relate to the part–part–whole structure. Understand and use the commutative property of addition, and understand the related property for subtraction. ➢ 3AS–3 Manipulate the additive relationship: Understand the inverse relationship between addition and subtraction, and how both relate to the part–part–whole structure. Understand and use the commutative property of addition, and understand the related property for subtraction.	• Informal AfL: Play the actions game – show the children some calculations – ask them to put hands on their heads if they would do it mentally, wave in the air, if they would make a jotting, hands on the desk for a formal written method. The following list, below, is a list of strategies to revisit: Provide regular practice at using these strategies, encouraging children to visualise how to partition to make 10 then move on.   *'Can you think of more than one strategy to find the answer to each calculation?'* 7 + 6 9 + 4 9 + 8 7 + 7 7 + 4 8 + 8 6 + 8 9 + 3 7 + 9 8 + 6 8 + 3 9 + 7 8 + 5 8 + 4 9 + 6 7 + 5 4 + 8 7 + 8 6 + 6 5 + 7 5 + 8 • Calculate complements to 100 using Y2 number bond fluency 46 + ?=100	https://www.topmarks.co.uk/maths-games/7-11-years/mental-maths   https://t.co/74wAuAnkC4?amp=1 online apparatus

		'Create similar stories using these number cards.' **Starting number**: 88, 76, 67, 59 **Multiple of ten**: 10, 20, 30, 40 **Single-digit number**: 6, 4, 3, 2 • Provide practice with stories, structured such that the tens and ones are subtracted separately, e.g. Charlie counted thirty six mini-beasts on a patch of grass; ten of them were grasshoppers, and four of them were ladybirds; the rest were ants. How many ants were there? • Not crossing, then crossing • Partitioning • Related facts • Near doubles • Strategies including recognising complements • Compensating (see 9 think 10) • Rounding – see above for entry level rounding • Games – What's my number? E.g. I doubled my number then took away 2, my new number is 22. What was my original number?	

		• Written methods supported with calculation mats and apparatus • 2 digit addition/3 digit no crossing the boundary , then crossing • 2/ 3 digit subtraction no decomposition • 2 / 3 digit subtraction with decomposition • Develop mental strategies: To progress to Year 3 pupils should be able to carry out calculations such as these, using their own jottings and without the need to rely on manipulatives  Ensure that you teach the most efficient mental strategies for addition and subtraction.	https://www.youtube.com/watch?v=sjmEjSQAuRA  Figure 20: columnar addition with no regrouping: calculation and Dienes representation  Figure 21: columnar subtraction with no exchange: calculation and Dienes representation https://www.ncetm.org.uk/resources/50640 https://wodb.ca/numbers.html 

	Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.	  Use these strategies to extend to 3 digit numbers. Set into real life contexts where possible. • A bottle of juice contains 290ml. How much juice is there in two bottles? How much is there in three bottles? • Stephanie had 39 pence. Then she saved another 22 pence. How much does she have now?	Measures context: *'The diagram shows the distances between stations on a railway route.'*  • *'How far is it from Sunny-beach to Underwood?'* • *'How far is it from Middleton to Greengrove?'* • *'The journey from Underwood to Overwood is 44 km longer than from Underwood to Greengrove. How far is it from Underwood to Overwood?'*

Language Focus:

"3 ones plus 5 ones is equal to 8 ones." "4 tens plus 2 tens is equal to 6 tens." "5 ones minus 3 ones is equal to 2 ones." "6 tens minus 2 tens is equal to 4 tens." "1000 is 10 times the size of 100." "

"10 tens is equal to 1 hundred."

"18 tens is equal to 10 tens and 8 more tens." "10 tens is equal to 100." "So 18 tens is equal to 100 and 8 more tens, which is 180."

Pupils must then be able to work out how many tens there are in other three-digit multiples of 10.

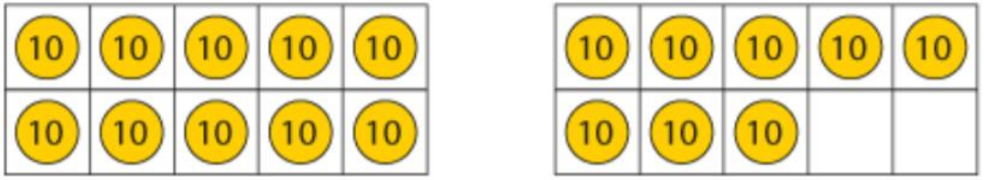
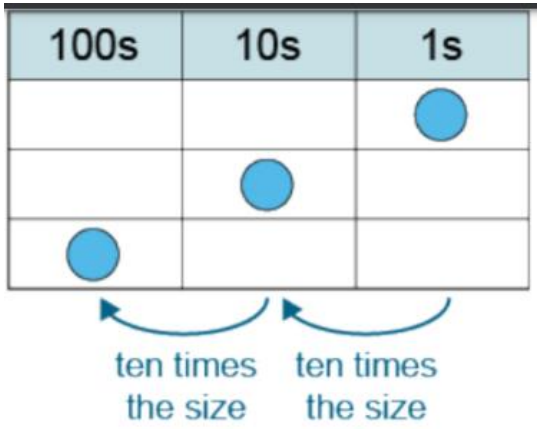


Figure 2: eighteen 10-value place-value counters in 2 tens frames

"100 is 10 times the size of 10."



Assessment Questions:

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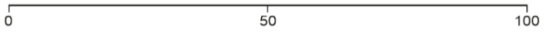
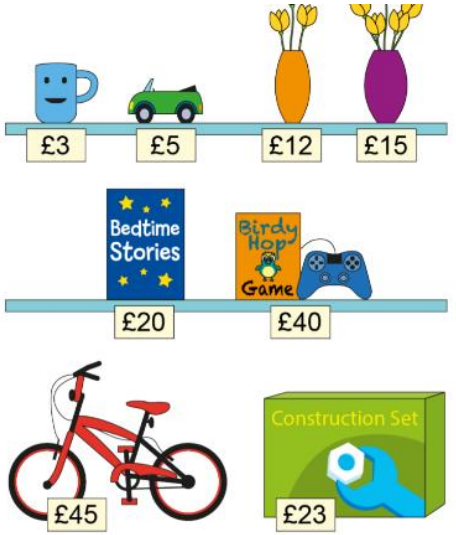
gymnastics	15

Sophie thinks of a number. She says, "My number is between 40 and 50. It has 7 in the ones place." What is Sophie's number?

Estimate the position of 60 on this number line:



Assessment guidance: For pupils to have met criterion 2AS–1, they need to be able to add and subtract across 10 without counting forwards or backwards in ones on their fingers, on a number line or in their heads. Teachers should assess pupils in small groups – simply providing the correct answers to the example questions above does not demonstrate that a pupil has met the criterion. The full set of addition and subtraction facts which children need to be fluent in is shown in the appendix.



a. Daisy spends £32 in the shop. Circle the 2 items she buys.

b. What is the total cost of the bicycle and construction set?

c. Jalal pays for the bicycle using a £50 note. How much change does he get?

d. Yu Yan wants to buy the construction set. She has saved £15. How much more money does Yu Yan need to save?

Assessment guidance: For pupils to have met criterion 3NF–1:

- Pupils need to be able to:
- add and subtract within and across 10 without counting forwards or backwards in ones on their fingers, on a number line or in their heads.
- automatically recall the facts within 10, and be able to mentally apply strategies for calculation across 10, with accuracy and speed.

Which of these are correct complements to 100 and which have an extra 10? Tick the correct column. Explain your answers.

	Correct bond to 100	Incorrect bond to 100 (extra 10)	Explanation
28 + 72			
61 + 49			
55 + 45			
43 + 67			
84 + 16			
39 + 71			

Fill in the missing numbers. 65+ 100 = ? 100 - 29 = ? 100 - 42 = ? 100 - 83 = ?

- A dressmaker had 1m of ribbon. Then she used 22cm of it. How many centimetres of ribbon does she have left?
- A toy shop sells ping-pong balls for 65p each. If I use a £1 coin to pay for a ping-pong ball, how much change will I get, in pence?
- Mr Jones has 100 stickers. 47 of them are gold and the rest are silver. How many are silver?
- Mr Kahn drove 8km to get to his friend's house, and then drove another 3km with his friend to get to the gym. How far did Mr Kahn drive?
- There are 12 children. 5 of them can ride a bicycle and the rest cannot. How many of the children cannot ride a bicycle?
- Maja had £17. Then she spent £9. How much money does she have left?
- I have 6 metres of red ribbon and 6 metres of blue ribbon. How many metres of ribbon do I have altogether? 27
- Hazeem is growing a sunflower and a bean plant. So far, his sunflower plant is 14cm tall and his bean plant is 8cm tall. How much taller is the sunflower plant than the bean plant?

➢ For pupils to have met criterion 3NF–1, they need to be able to add and subtract within and across 10 without counting forwards or backwards in ones on their fingers, on a number line or in their heads. Pupils need to be able to automatically recall the facts within 10, and be able to mentally apply strategies for calculation across 10, with accuracy and speed. Teachers should assess pupils in small groups – simply providing the correct answers to the example questions above does not demonstrate that a pupil has met the criterion.

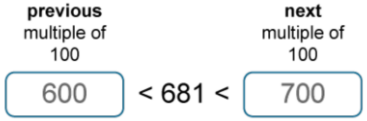
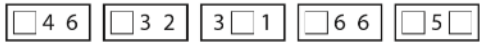
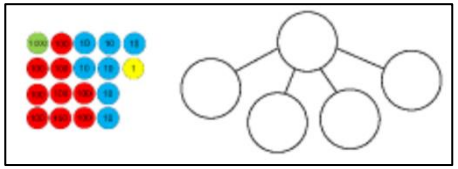
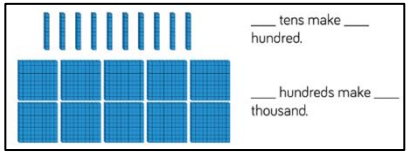
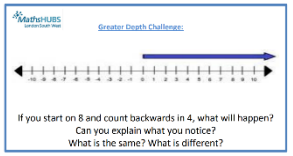
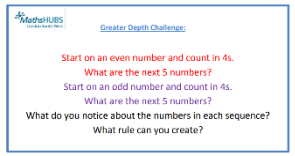
Curriculum Recovery - Maths: Year 4

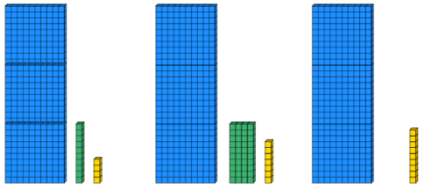
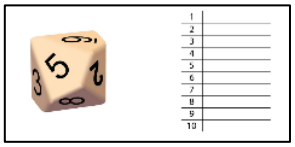
An Overview of Objectives

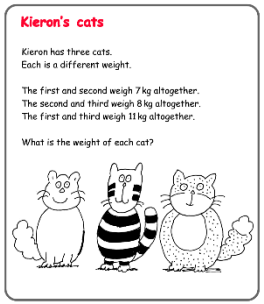
The purpose of this document is to support recovery curriculum as children move through the planned learning. It includes the DfE published guidance on Teaching of Mathematics (July 2020) to bring greater coherence to National Curriculum Objectives and to prioritise key concepts, its knowledge and understanding within each year group.. The teacher may have prioritised other elements as key learning as per their own planning and assessment. The planning framework consists of three 2-week modules which tackle consolidation of Year 3 objectives and move towards introducing Year 4 objectives. Blue text is taken from the Guidance for teaching mathematics DfE and deemed to be a core concept in the 'ready to progress criteria'

Objectives: Taken from Year 3 PoS (Consolidation/Revision/Recap)	Year 4 Objectives (May be impacted by gaps in Year 3)
Number and Place Value • Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number • Recognise the place value of each digit in a three-digit number (hundreds, tens, ones) • Compare and order numbers up to 1000 • Identify, represent and estimate numbers using different representations • Read and write numbers up to 1000 in numerals and in words • Solve number problems and practical problems involving these ideas. ➢ 3NPV–1 Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10; apply this to identify and work out how many 10s there are in other three digit multiples of 10. ➢ 3NPV–2 Recognise the place value of each digit in three-digit numbers, and compose and decompose three-digit numbers using standard and non-standard partitioning. ➢ 3NPV–3 Reason about the location of any three digit number in the linear number system, including identifying the previous and next multiple of 100 and 10. ➢ 3NPV–4 Divide 100 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 100 with 2, 4, 5 and 10 equal parts.	Number and Place Value • Count in multiples of 6, 7, 9, 25 and 1000 • Find 1000 more or less than a given number • Count backwards through zero to include negative numbers • Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) • Order and compare numbers beyond 1000 • Identify, represent and estimate numbers using different representations • Round any number to the nearest 10, 100 or 1000 • Solve number and practical problems that involve all of the above and with increasingly large positive numbers • Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value. ➢ 4NPV–1 Know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100. ➢ 4NPV–2 Recognise the place value of each digit in four-digit numbers, and compose and decompose four-digit numbers using standard and nonstandard partitioning. ➢ 4NPV–3 Reason about the location of any four digit number in the linear number system, including identifying the previous and next multiple of 1,000 and 100, and rounding to the nearest of each.

	➢ 4NPV–4 Divide 1,000 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts.
Number: Addition and Subtraction • Add and subtract numbers mentally, including: • a three-digit number and ones • a three-digit number and tens • a three-digit number and hundreds • Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction • Estimate the answer to a calculation and use inverse operations to check answers • Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction. ➢ 3AS–1 Calculate complements to 100. ➢ 3AS–2 Add and subtract up to three-digit numbers using columnar methods. ➢ 3AS–3 Manipulate the additive relationship: Understand the inverse relationship between addition and subtraction, and how both relate to the part–part–whole structure. Understand and use the commutative property of addition, and understand the related property for subtraction.	Number: Addition and Subtraction • Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate • Estimate and use inverse operations to check answers to a calculation ➢ 4NF–3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 100)
Key Vocabulary:	**Key Vocabulary:**
hundreds one hundred and one one hundred and two one hundred and three etc. up to one thousand multiple(s) inverse operations integer(s) decimal(s) remainder Language of addition and subtraction Equal, equal to, equal value,	thousands round rounding Roman numerals to 100 'C' negative operation factor factor pairs distributive associative derive remainder

	Objectives (taken from Year 3 PoS)	Suggested Learning Activities	Link to resources
Module 1	• Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number • Recognise the place value of each digit in a three-digit number (hundreds, tens, ones) • Compare and order numbers up to 1000 • Identify, represent and estimate numbers using different representations • Read and write numbers up to 1000 in numerals and in words ➢ 3NPV–3 Reason about the location of any three digit number in the linear number system, including identifying	• Ensure counting is an integral part of every day daily routines • Use your counting stick/number lines to secure forwards and backwards counting from different starting points • Use Target Boards to practise 10 more, 10 less, 100 more, 100 less etc (Extend to Y4 objectives if appropriate e.g. 1000 more/less) • Divide 100 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 100 with 2, 4, 5 and 10 equal parts. • identify and work out how many 10s there are in other three digit multiples of 10. Understanding that 100 is 10 times the size of 10 • All children to partitions 3 digit numbers in standard and non standard ways e.g. 324 = 300 + 20 + 4 but could also be 300 + 10 +14 • Use number tracks and missing boxes to identify multiples of 100 – using measures where appropriate. e.g.  • Step counting puzzles • Play games such as. 'I'm thinking of a number – e.g. It's a multiple of 4, the sum of the digits is 12 etc' 'What's my rule' (See Basic Skills document) • Explore patterns in a 100 square • Apply to a money context, counting in 50p • Use Place Value grids to practice 100 more, 100 less • Complete number sequences, identifying the pattern and explaining what is happening. Create your own e.g. _ 8 _ 24_ _ _ 514 ___ 494 ___ (What do you notice? Are we increasing or decreasing? Will 203 ever be in your sequence? Why? Why not? Convince me.)	Insert a digit into each box so that the numbers are in order from smallest to largest.    Skip counting resources: https://www.schoolimprovementliverpool.co.uk/maths-multiplication-resource www.Londonsouthwestmathshub.co.uk for examples as below   https://nrich.maths.org/6554?utm_source=primary-map Coded 100 square

		• Order numbers using apparatus such as base 10 – which is the biggest/smallest/has the largest number of 10s etc?  Use Mathsbot to support this • Extend this to order price tags in £s. Parcel weights in g. • Provide as many opportunities as possible for children to explain choices and reasoning e.g. How can you turn 240 into 210? You could add 5 tens, or 70 ones or 6 tens and 10 ones. …. • Simple rounding game in pairs using a 10 sided dice. Child 1 receives a point each time a 1,2,3,4,10 is rolled as they are the rounding done team Child 2 receives a point each time 5,6,7,8,9 is rolled as they are the rounding up team. • Play bingo using words and numbers, giving clues linked to multiplication facts etc. 	

	• Solve number problems and practical problems involving these ideas.	• Consider real life contexts e.g. Have an enterprise day/charity day – make and label items. Order objects and prices. Sort prices from highest to lowest. Or consider a sports day and compare distances, times, points scored into hoops etc. • In PE lessons, set up 4 teams. Give each child a post it note with a number 1-9 on. Each team has 4 hoops Th,H,T,O. You call a number, the first team to make the number by standing in the correct hoop is the winner. • Investigations (MCforMA) • Real Life problems • Estimation • Comparison - Provide e.g. of this exploring 3 digits numbers – London Maths HUB etc	SIL problem solving document  **Kieron's cats** Kieron has three cats. Each is a different weight. The first and second weigh 7 kg altogether. The second and third weigh 8 kg altogether. The first and third weigh 11 kg altogether. What is the weight of each cat? https://nrich.maths.org/13272?utm_source=primary-map – representing numbers and making them 10 times bigger Steve Wyborney Estimation Station https://stevewyborney.com/2018/11/esti-mysteries-estimation-meets-math-mysteries/

Language and Vocabulary focus:

Pupils need to experience what 100 items looks like

Making a unit of 1 hundred out of 10 units of 10, for example using 10 bundles of 10 straws to make 100, or using ten 10-value place-value counters.
10 tens is equal to 100

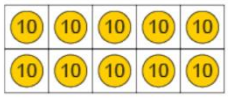


Figure 1: ten 10-value place-value counters in a tens frame

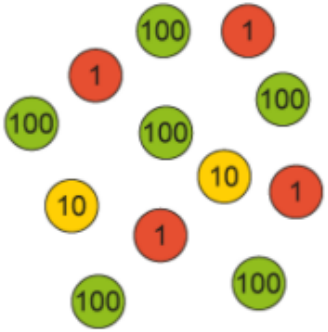
Pupils must then be able to work how many tens there are in other three-digit multiples of 10

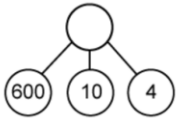
Figure 2: eighteen 10-value place-value counters in 2 tens frames

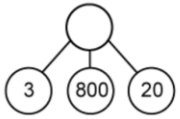
3NPV–1 Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10;

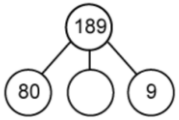
Assessment Questions:

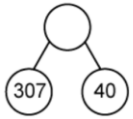
- What number is represented by these counters?
- What number is represented by this expression? 1+ 10 + 10+ 100+ 100+ 10 + 10

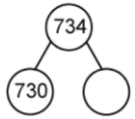






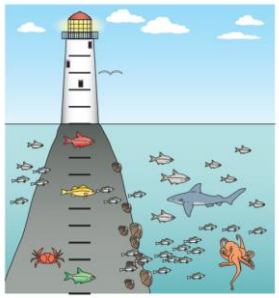
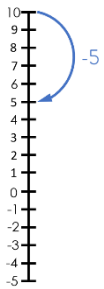




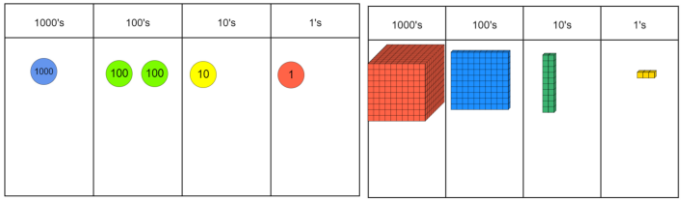


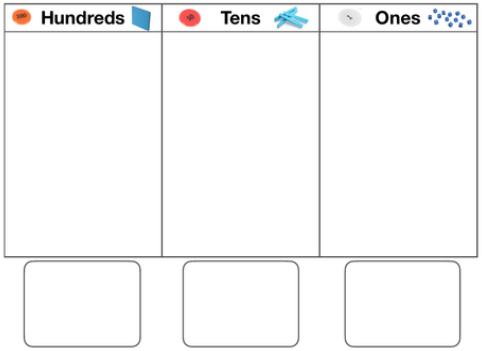
Complete these models

- There are 365 days in a year. If it rains on 65 days of the year, on how many days does it not rain?
- A bamboo plant was 4m tall. Then it grew by another 83cm. How tall is the bamboo plant now? Express your answer in centimetres.
- In the school library there are 25 books on the trolley and 250 books on the shelves. How many books are there altogether?
- Francesco had 165 marbles. Then he gave 65 marbles to his friend. How many marbles does Francesco have now?

	Objectives (taken from Year 3 PoS and Year 4 where appropriate)	Suggested Learning Activities	Link to resources
Module 2	• Count in multiples of 6, 7, 9, 25 and 1000 • Find 1000 more or less than a given number • Count backwards through zero to include negative numbers ➢ 4NPV–1 follows on from what children learnt in year 3 about the relationship between the units of 10 and 100. ➢ Pupils need to experience: what 1,000 items looks like making a unit of 1 thousand out of 10 units of 100, for example using 10 bundles of 100 straws to make 1,000, or using ten 100-value place-value counters	• Continue as above with appropriate multiples • Make 3 and 4 digit numbers using Base 10, PV counters • Skip counting puzzles for x6, x7, x9 • Practice recall of tables – use multiplication grid and look for patterns and connections • Introduce negative numbers using real life application • Looking at vertical and horizontal number lines and movement across zero	https://www.schoolimprovementliverpool.co.uk/lets-talk-maths  Can you draw a fish at –35 m? Can you draw a seagull at 20 m above sea level? What would the position of your fish and the seagull be if each of the intervals on the lighthouse represented 7 m?  NCETM Mastery materials I know that 5 less than 10 is 5. What is 5 less than 7? What is 5 less than 4? What is 5 less than 1?

As above for Year 3 but using appropriate year 4 objectives.





Provide 'What would happen if……questions.' I added another 1000, I added 10 tens etc. Hide and reveal – My number has an odd number of thousands, and even number of ones and 12 tens in it. When rounded to the nearest 100, my number is 1100. What could I be?

- Link to measurements and to PE, Geography with rivers, mountains etc

Four-digit Targets

Age 7 to 11 ★

You have two sets of the digits from 0 to 9.

0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9

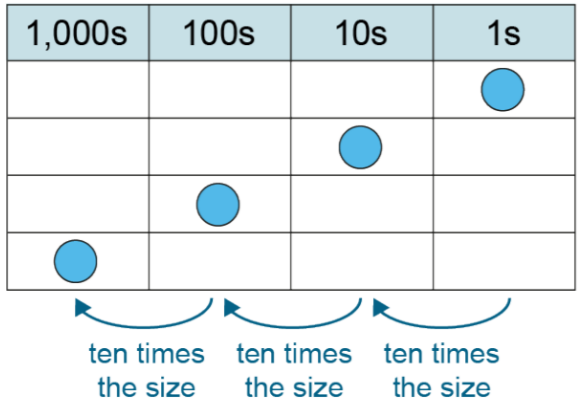
The idea is to arrange these digits in the five boxes to make four-digit numbers as close to the target number as possible.
You may use each digit once only.

- ☐ largest odd number
- ☐ largest even number
- ☐ largest multiple of 3
- ☐ smallest multiple of 5
- ☐ number closest to 5000

https://nrich.maths.org/6342?utm_source=primary-map
https://nrich.maths.org/10426 Rounding investigation
https://www.schoolimprovementliverpool.co.uk/lets-talk-maths

Language and Vocabulary Focus:

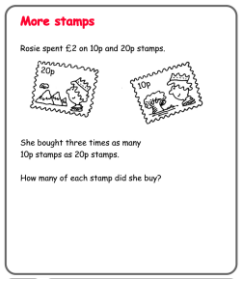
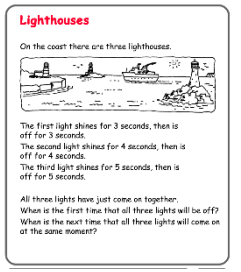
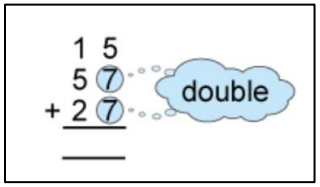
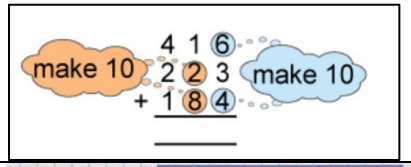
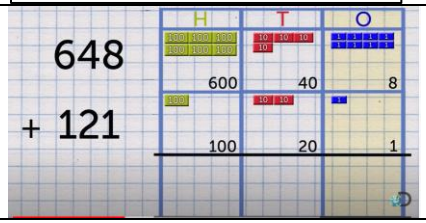
Pupils should be able to explain that numbers such as 1,800 and 3,000 are multiples of 100, because they are each equal to a whole number of hundreds. They should be able to identify multiples of 100 based on the fact that they have zeros in both the tens and ones places. As well as understanding 1,000 and other four-digit multiples of 100 in terms of grouping and repeated addition, pupils should be able to describe these numbers in terms of scaling by 10.

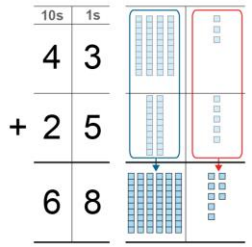
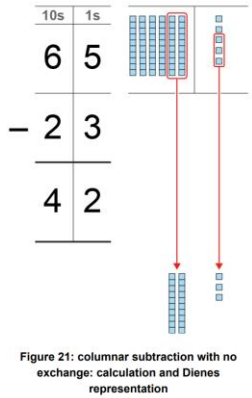
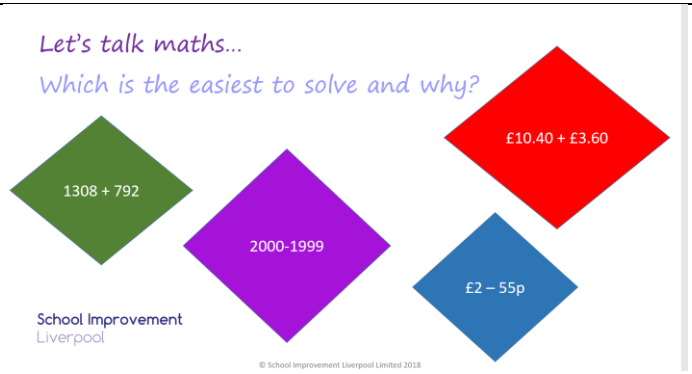
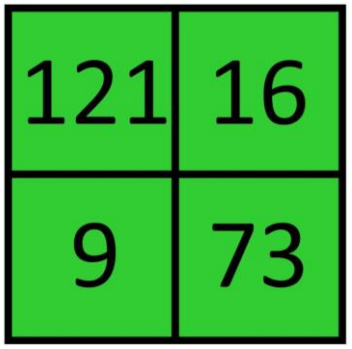


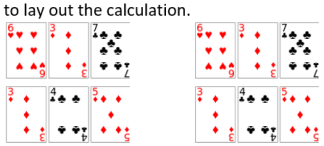
Assessment Questions:

4NPV–1 Example assessment questions

- How many 100g servings of rice are there in a 2,500g bag?
- One large desk costs a school £100. How much will 14 large desks cost?
- My school field is 100m long. How many times do I have to run its length to run 3km?
- My cup contains 100 ml of fizzy drink. The bottle contains 10 times as much. How many millilitres are there in the bottle?
- A rhino mother weighs about 1,000kg. She weighs about 10 times as much as her baby. What is the approximate weight of the baby rhino?
- Circle the lengths that could be made using 1 metre (100cm) sticks. 3,100cm 8,000cm 1,005cm 6,600cm 7,090cm 1,000cm

	Objectives (taken from Year 3 PoS and Year 4 PoS)	Suggested Learning Activities	Link to resources
Module 3	• Add and subtract numbers mentally, including: • a three-digit number and ones • a three-digit number and tens • a three-digit number and hundreds	Informal AfL: Play the actions game – show the children some calculations – ask them to put hands on their heads if they would do it mentally, wave in the air, if they would make a jotting, hands on the desk for a formal written method. The following is a list of strategies to revisit: • Calculate complements to 100 using Y2 number bond fluency **46 + ?=100** • Not crossing, then crossing • Partitioning • Related facts • Near doubles • Strategies including recognising complements • Compensating (see 9 think 10) • Rounding – see above for entry level rounding • Games – What's my number? E.g. I doubled my number then took away 20, my new number is 220. What was my original number?	  https://www.topmarks.co.uk/maths-games/7-11-years/mental-maths  
	• Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction	• Written methods supported with calculation mats and apparatus • 3 digit addition/4 digit no crossing the boundary , then crossing	

	• Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate (YEAR 4) • Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate • Estimate and use inverse operations to check answers to a calculation • Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	• 3 / 4 digit subtraction no decomposition • 3 / 4 digit subtraction with decomposition *'Which place-value chart correctly shows three hundred and five plus forty?'* **100s** | **10s** | **1s** 3 | 0, 40 | 5 **100s** | **10s** | **1s** 3 | 0, 4 | 5, 0	https://www.youtube.com/watch?v=sjmEjSQAuRA  10s 1s 4 3 + 2 5 6 8 Figure 20: columnar addition with no regrouping: calculation and Dienes representation  10s 1s 6 5 – 2 3 4 2 Figure 21: columnar subtraction with no exchange: calculation and Dienes representation https://www.ncetm.org.uk/resources/50640
	• Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.	 Let's talk maths... Which is the easiest to solve and why? 1308 + 792 2000-1999 £10.40 + £3.60 £2 – 55p School Improvement Liverpool © School Improvement Liverpool Limited 2018 • Set into real life contexts where possible. See above.	 121 16 9 73

			https://wodb.ca/numbers.html Find a partner and a 0-9 dice. **Game 1: Each of you draw an addition grid like this:** ☐☐☐☐ + ☐☐☐☐ = Take turns to throw the dice or use Virtual Dice http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks1/maths/dice/index.htm After each throw of the dice, you each decide which of your cells to put that number in. Throw the dice 8 times each until all the cells are full. **Whoever has the sum closest to 1000 wins** 1. Take 3 or 4 playing cards (1-9) – lay them out in 2 rows. Beneath them use rods/base ten/place value counters to lay out the calculation.  Using the calculation mats we can regroup physically. Alongside partner scribes using the expanded columnar. Then, move the cards so that you can make the biggest total. Where will you place your highest numbers? Play with a friend. Add your biggest and smallest totals together. Encourage exchanging 10 ones for 1 ten.

Language Focus:

"3 ones plus 5 ones is equal to 8 ones." "4 tens plus 2 tens is equal to 6 tens." "5 ones minus 3 ones is equal to 2 ones." "6 tens minus 2 tens is equal to 4 tens." "1000 is 10 times the size of 100." "1,800 is 10 times the size of 180.

Assessment Questions:

Assessment guidance: For pupils to have met criterion 3NF–1:

Pupils need to be able to:

- add and subtract within and across 10 without counting forwards or backwards in ones on their fingers, on a number line or in their heads.

- automatically recall the facts within 10, and be able to mentally apply strategies for calculation across 10, with accuracy and speed.

Which of these are correct complements to 100 and which have an extra 10? Tick the correct column. Explain your answers.

	Correct bond to 100	Incorrect bond to 100 (extra 10)	Explanation
28 + 72			
61 + 49			
55 + 45			
43 + 67			
84 + 16			
39 + 71			

Fill in the missing numbers. 65+ 100 = ? 100 - 29 = ? 100 - 42 = ?

100 - 83 = ?

- A dressmaker had 1m of ribbon. Then she used 22cm of it. How many centimetres of ribbon does she have left?
- A toy shop sells ping-pong balls for 65p each. If I use a £1 coin to pay for a ping-pong ball, how much change will I get, in pence?
- Mr Jones has 100 stickers. 47 of them are gold and the rest are silver. How many are silver?
- A football stadium can hold 6,430 people. So far 4,000 tickets have been sold for a match. How many tickets are left?
- On a field trip, the children need to walk 4,200m. So far they have walked 3km. How much further do they have to walk?
- Mr. Davis has 2 cats. One cat weighs 4,200g. The other cat weighs 3,050g. Their basket weighs 2kg. How much does the basket weigh with both cats inside it?

Curriculum Recovery - Maths: Year 5

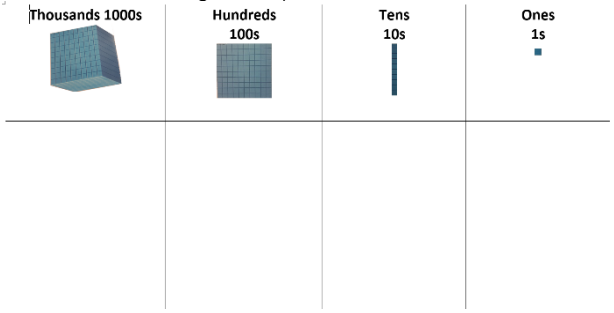
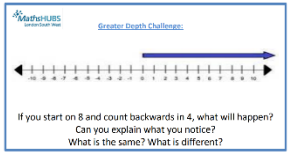
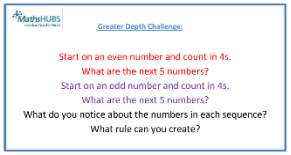
An Overview of Objectives

The purpose of this document is to support recovery curriculum as children move through the planned learning. It includes the DfE published guidance on Teaching of Mathematics (July 2020) to bring greater coherence to National Curriculum Objectives and to prioritise key concepts, its knowledge and understanding within each year group.. The teacher may have prioritised other elements as key learning as per their own planning and assessment. The planning framework consists of three 2-week modules which tackle consolidation of Year 4 objectives and move towards introducing Year 5 objectives. Text in blue is taken directly from the Guidance for teaching mathematics and are objectives deemed to be core concepts.

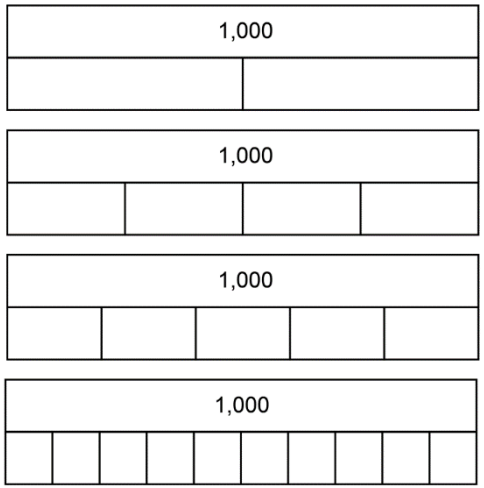
Objectives: Taken from Year 4 PoS (Consolidation/Revision/Recap)	Year 5 Objectives (May be impacted by gaps in Year 4)
Number and Place Value • Count in multiples of 6, 7, 9, 25 and 1000 • Find 1000 more or less than a given number • Count backwards through zero to include negative numbers • Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) • Order and compare numbers beyond 1000 • Identify, represent and estimate numbers using different representations • Round any number to the nearest 10, 100 or 1000 • Solve number and practical problems that involve all of the above and with increasingly large positive numbers Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value. ➢ 4NPV–1 Know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100. ➢ 4NPV–2 Recognise the place value of each digit in four-digit numbers, and compose and decompose four-digit numbers using standard and nonstandard partitioning. ➢ 4NPV–3 Reason about the location of any four-digit number in the linear number system, including identifying the previous and next multiple of 1,000 and 100, and rounding to the nearest of each.	Number and Place Value • read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit • count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 • interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero • round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 • solve number problems and practical problems that involve all of the above • read Roman numerals to 1000 (M) and recognise years written in Roman numerals. ➢ 5NPV–1 Know that 10 tenths are equivalent to 1 one, and that 1 is 10 times the size of 0.1. Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01. Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10 times the size of 0.01. ➢ 5NPV–2 Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and nonstandard partitioning ➢ 5NPV–3 Reason about the location of any number with up to 2 decimals places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each

➢4NPV–4 Divide 1,000 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts.	➢ 5NPV–4 Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts
Number: Addition and Subtraction • Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate • Estimate and use inverse operations to check answers to a calculation • Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why. • 4NF–3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 100)	Number: Addition and Subtraction • add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • add and subtract numbers mentally with increasingly large numbers • use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

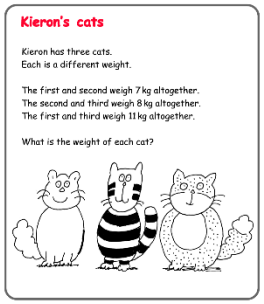
Key Vocabulary:	Key Vocabulary:	
thousands round rounding Roman numerals to 100 'C' negative operation factor factor pairs distributive associative derive remainder	ones tens hundreds thousands ten thousand, hundred thousand, million digit, one-, two-, three- or four-digit number numeral value stands for,	represents exchange the same number as, as many as equal to

	Objectives (taken from Year 4 PoS)	Suggested Learning Activities	Link to resources
Module 1	• Count in multiples of 6, 7, 9, 25 and 1000 • Find 1000 more or less than a given number • Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) ➢ 4NPV–2 Recognise the place value of each digit in four-digit numbers, and compose and decompose four-digit numbers using standard and nonstandard partitioning. ➢ 4NPV–1 Know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100.	• Ensure forwards/ backwards and step counting is an integral part of everyday daily routines, solve step counting puzzles • Use your counting stick/number lines to secure forwards and backwards counting from different starting points, apply to a money context e.g counting in steps of 50p • Use Target Boards to practise 1000 more, 1000 less, 100 more, 100 less etc (Extend to Y5 objectives if appropriate e.g. powers of 10) • Use Place Value grids to practice 1000 more, 1000 less  • Ask questions about the value of the digits and relationships between them, e.g. know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100, e.g. Explain why 20 hundreds is 2000, How many 100s in 3600? Etc. Use the <> symbols to compare numbers: 30 hundreds ☐ 2400 Provide as many opportunities as possible for children to explain choices and reasoning e.g. How can you turn 2100 into 2400? You could add 3 hundreds or, or 33 tens or 2 hundreds and 13 tens etc	Skip counting resources: https://www.schoolimprovementliverpool.co.uk/maths-multiplication-resource WWW.Londonsouthwestmathshub.co.uk for examples as below   https://nrich.maths.org/13268?utm_source=primary-map link to countries and distance

	• Order and compare numbers beyond 1000 • Identify, represent and estimate numbers using different representations • Round any number to the nearest 10, 100 or 1000 ➢ 4NPV–3 Reason about the location of any four-digit number in the linear number system, including identifying the previous and next multiple of 1,000 and 100, and rounding to the nearest of each. ➢4NPV–4 Divide 1,000 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts.	• Use number tracks and missing boxes to identify multiples of 1000 – using measures where appropriate. • Use the vocabulary and equipment to partition numbers in different ways 4,329 is equal to * thousands * hundreds * tens and * ones. How else could we partition this number? • All children to partition 4-digit numbers in standard and non-standard ways e.g. 1324 = 1000 + 300 + 20 + 4 but could also be 13 hundreds + 10 +14 • Order numbers using apparatus such as base 10 - which is the biggest/smallest/has the largest number of 10s etc? (Use Mathsbot to support with different representations) • Extend to measures context, order price tags in £s, parcel weights in g, etc. • Complete number sequences, identifying the pattern and explaining what is happening. Create your own **e.g. _ 8 _ 24_ _ _ 514 ___ 494 ___** (What do you notice? Are we increasing or decreasing? Will 203 ever be in your sequence? Why? Why not? Convince me.) • Use partially demarcated number line to locate numbers to 1000 and round to nearest 10, 100 or 1000. Play a simple rounding game in pairs using a 10-sided dice. Child 1 receives a point each time a 1,2,3,4,10 is rolled and they state a rounding down fact as they are the 'rounding down' team, e.g. 183 is 180 to the nearest 10. Child 2 receives a point each time 5,6,7,8,9 is rolled as they are the 'rounding up' team. Use decimal numbers if appropriate • Play games such as 'I'm thinking of a number – e.g. It's a multiple of 4, it's 200 more than…etc' 'What's my rule' (See Basic Skills document) • Explore patterns in a 100 square and make connections with numbers to 1000, pairs of numbers etc. • Divide 1000 into 2 equal parts first, making connections with prior knowledge, **e.g. 10 ÷ 2 = 5, 100 ÷ 2 = 50, so 1000 ÷ 2 = 500,** then progress to dividing by 4, 5 and 10. Count forwards and backwards in steps, e.g. zero, two hundred and fifty, five hundred, seven hundred and fifty, one thousand.	



- Use horizontal and vertical scales, units of measure and ask questions, e.g. If I count in steps of two hundred, what comes after 400? Before 1,000?

	• Solve number problems and practical problems involving these ideas	• Consider real life contexts e.g. Have an enterprise day/charity day – make and label items. Order objects and prices. Sort prices from highest to lowest. Or consider a sports day and compare distances, times, points scored into hoops etc. • In PE lessons, set up 4 teams. Give each child a post it note with a number 1-9 on. Each team has 4 hoops Th,H,T,O. You call a number, the first team to make the number by standing in the correct hoop is the winner. Add a further hoop for decimal numbers. Then round that number and see how the children deal with the change.	SIL problem solving document Year 4 term 1  **Kieron's cats** Kieron has three cats. Each is a different weight. The first and second weigh 7 kg altogether. The second and third weigh 8 kg altogether. The first and third weigh 11 kg altogether. What is the weight of each cat? 'Maths Challenges for more able children' https://nrich.maths.org/13272?utm_source=primary-map – representing numbers and making them 10 times bigger Steve Wyborney Estimation Station https://stevewyborney.com/2018/11/esti-mysteries-estimation-meets-math-mysteries/

Language and Vocabulary focus:

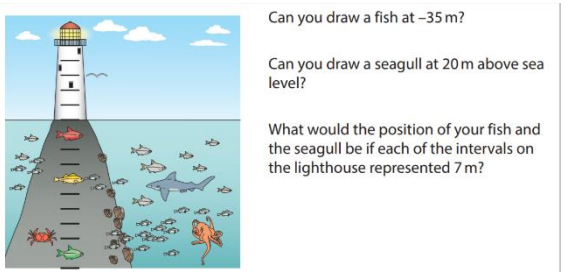
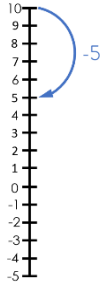
Know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100.Language focus "10 hundreds is equal to 1 thousand."
10 hundreds is equal to 1 thousand
18 hundreds is equal to 10 hundreds and 8 more hundreds
10 hundreds is equal to 1000
So, 18 hundreds is equal to 1,000 and 8 more hundreds which is 1,800

Pupils must then be able to work out how many hundreds there are in other four-digit multiples of 100.

Figure 2: eighteen 100-value place-value counters in 2 tens frames

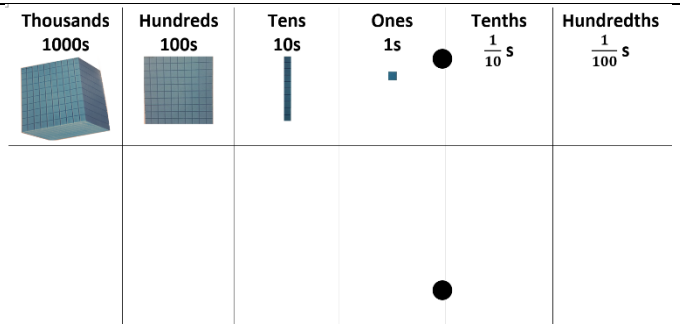
Assessment Questions:

- How many 100g servings of rice are there in a 2,500g bag?
- One large desk costs a school £100. How much will 14 large desks cost? My school field is 100m long.
- How many times do I have to run its length to run 3km?
- My cup contains 100 ml of fizzy drink. The bottle contains 10 times as much. How many millilitres are there in the bottle?
- A rhino mother weighs about 1,000kg. She weighs about 10 times as much as her baby. What is the approximate weight of the baby rhino?
- Circle the lengths that could be made using 1 metre (100cm) sticks. 3,100cm 8,000cm 1,005cm 6,600cm 7,090cm 1,000cm

	Objectives (taken from Year 4 PoS and Year 5 where appropriate)	Suggested Learning Activities	Link to resources
Module 2	• Count in multiples of 6, 7, 9, 25 and 1000 • Count backwards through zero to include negative numbers • interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero • Find 1000 more or less than a given number • read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit • count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 • round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 • 5NPV–1 Know that 10 tenths are equivalent to 1 one, and	• Continue as above with counting activities in appropriate multiples • Solve skip counting puzzles for x6, x7, x9 • Practice recall of tables – use multiplication grid and look for patterns and connections • Introduce negative numbers using real life application, look at vertical and horizontal number lines and movement across zero, keep a temperature log and compare to other places in the world – find differences. • Make 4- and 5-digit numbers using Base 10, PV counters, discuss value, find 1000 more or less and continue pv activities as in module 1 • Know that 10 tenths are equivalent to 1 one, and that 1 is 10 times the size of 0.1. Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01. Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10 times the size of 0.01. Use practical activities to explore this - Cuisenaire activities showing the white is 1/10 of 1	https://www.schoolimprovementliverpool.co.uk/lets-talk-maths   NCETM Mastery materials I know that 5 less than 10 is 5. What is 5 less than 7? What is 5 less than 4? What is 5 less than 1? https://nrich.maths.org/6342?utm_source=primary-map https://nrich.maths.org/10426 Rounding investigation https://www.schoolimprovementliverpool.co.uk/lets-talk-maths https://www.pencoedprimary.co.uk/partitioning-a-decimal/

that 1 is 10 times the size of 0.1. Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01. Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10 times the size of 0.01.

- Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and nonstandard partitioning
- 3 Reason about the location of any number with up to 2 decimals places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each.



- Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and nonstandard partitioning. Use Maths bot to show how you can compose and decompose numbers
- Rounding, beginning with numbers up to
- Using a vertical scale, such as a thermometer, explore ideas of zero, values above zero and values below zero values before zero. At the stage, do not use the negative/minus symbol to indicate numbers below zero. Restrict examples to vertical scales

Number pair		Positive number further from zero	Negative number further from zero	Both numbers same distance from zero
−6	12	✓		
−12	6		✓	
−6	6			✓
10	−1	✓		
10	−10			✓
10	−10 0		✓	

Same number but different representations.

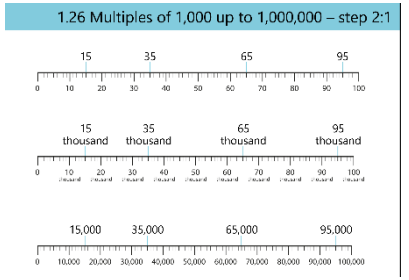
Provide 'What would happen if.....questions.' I added another 1000, I added 10 tens etc. Hide and reveal – My

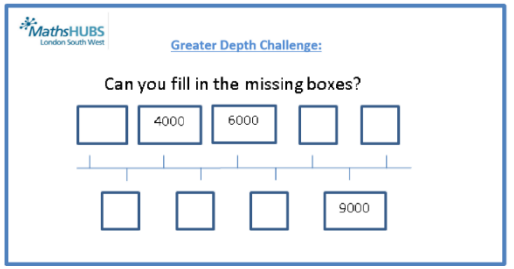
1 litre × 10 bottles

= 10 litres

= 10,000 ml

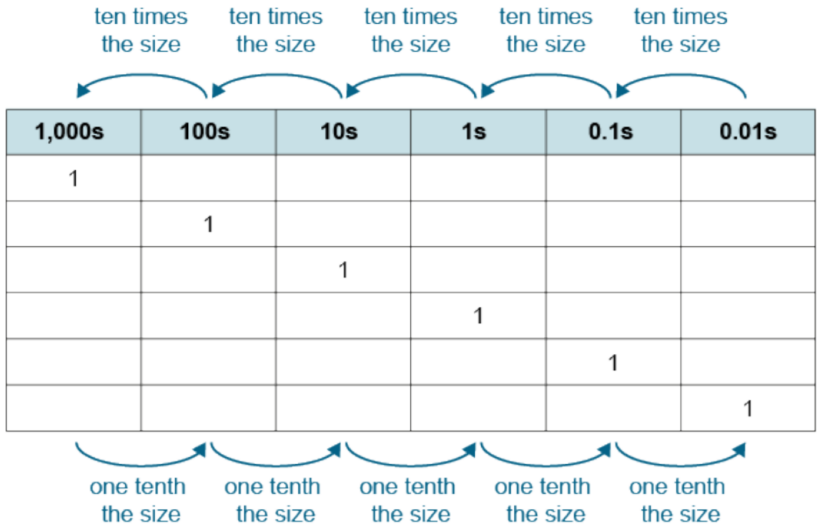
https://www.ncetm.org.uk/resources/50640#topofpage





		number has an odd number of thousands, and even number of ones and 12 tens in it. When rounded to the nearest 100, my number is 1100. What could I be? • Link to measurements and to PE, Geography with rivers, mountains etc • Use Top Trump Cards such as twitter followers and ask the children to order, compare, reason, find how many more etc	

Language and Vocabulary Focus:



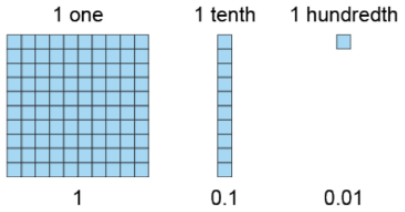


Figure 2: using Dienes to represent 1, one-tenth and one-hundredth

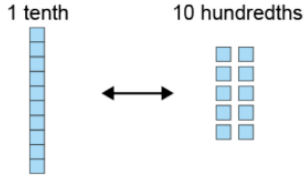


Figure 3: using Dienes to represent the equivalence of 1 tenth and 10 hundredths

Pupils should understand that:
• a '1' in the tenths column has a value of one tenth, and is one tenth the size of 1
• a '1' in the hundredths column has a value of one hundredth, and is one hundredth the size of 1 Pupils should learn that the decimal point is used between the ones digit and the tenths digit, so that we can write decimal numbers without using a place-value chart. They should learn that one tenth is written as 0.1 and one hundredth is written as 0.01. 14 Pupils must be able to describe the relationships between 1, 0.1 and 0.01.
Language focus "1 is 10 times the size of one-tenth." "One-tenth is 10 times the size of one-hundredth." "1 is 100 times the size of one-hundredth."

Language focus

"a is 0.14 because it is 1 hundredth less than the midpoint of 0.1 and 0.2, which is 0.15."

"b is 0.41 because it is 1 hundredth more than 0.4."

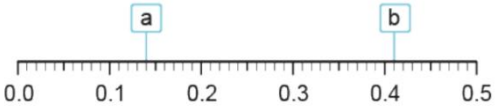


Figure 11: identifying 0.14 and 0.41 on a 0 to 0.5 number line marked with intervals of hundredths

Assessment Questions:

1. An apple weighs about 0.1kg. Approximately how many apples are there in a 1.8kg bag?
2. I have a 0.35m length of wooden rod. How many 0.01m lengths can I cut it into?
3. Mrs Jasper is juicing oranges. Each orange makes about 0.1 litres of juice. If Mrs Jasper juices 22 oranges, approximately how many litres of orange juice will she get?
4. Circle all of the numbers that are equal to a whole number of tenths.

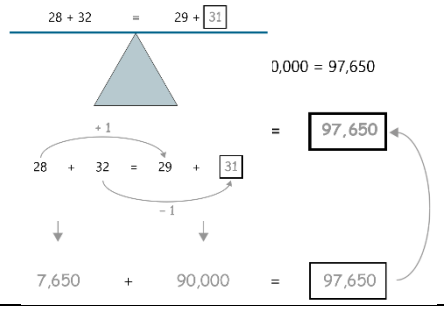
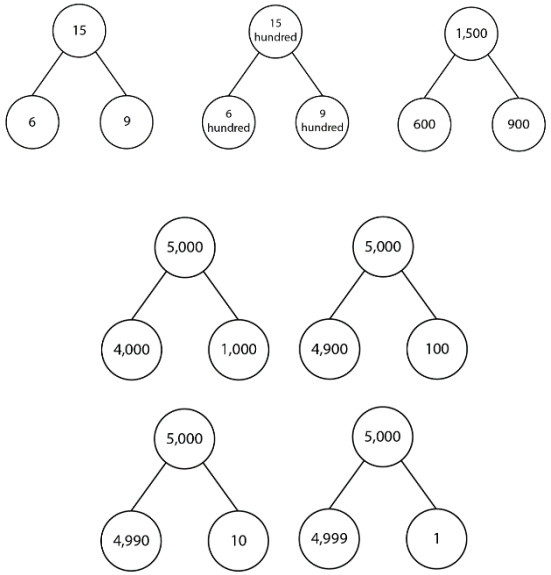
   0.2 4.8 1 0.01 10 0.83
5. Fill in the missing numbers.

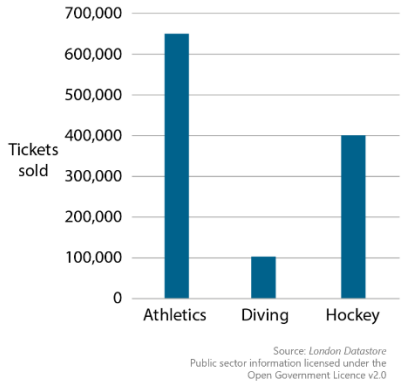
   $0.01 \times \square = 1$ $0.1 \times \square = 1$ $0.01 \times \square = 0.1$
6. Fill in the missing numbers.

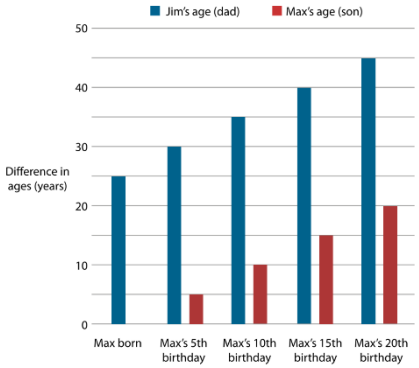
   $\square$ tenths $= 3.9$

   $\square$ hundredths $= 0.22$

   $\square$ hundredths $= 8$

	Objectives (taken from Year 4 PoS and Year 5PoS)	Suggested Learning Activities	Link to resources
Module 3	• Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate • Estimate and use inverse operations to check answers to a calculation • Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why. (year 4) • add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • add and subtract numbers mentally with increasingly large numbers • use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. (year 5)	Informal AfL: Play the actions game – show the children some calculations – ask them to put hands on their heads if they would do it mentally, wave in the air, if they would make a jotting, hands on the desk for a formal written method. The following is a list of strategies to revisit: • Calculate complements to 1000 using number bond fluency • Not crossing, then crossing • Partitioning • Related facts • Near doubles • Strategies including recognising complements • Equivalence and Compensating There is the same number of children in Year 5 as there is in Year 6. In Year 5, there are 28 boys and 32 girls. In Year 6, there are 29 boys. How many girls are there in Year 6? •  • Rounding – see above for entry level rounding	https://www.topmarks.co.uk/maths-games/7-11-years/mental-maths https://www.ncetm.org.uk/resources/50640 Ensure that children are given the opportunity to make and explain connections: 

		• Games – What's my number? E.g. I doubled my number then took away 20, my new number is 220. What was my original number?	
		• Written methods supported with calculation mats and apparatus • 4 digit addition/5 digit no crossing the boundary , then crossing • 4/ 5 digit subtraction no decomposition • 4 / 5 digit subtraction with decomposition Set into real life contexts where possible.  	https://www.schoolimprovementliverpool.co.uk/lets-talk-maths

		The graph shows the approximate number of tickets sold for three different events at the 2012 London Olympics. Each value is rounded to the nearest 50,000. Felicity says that about 1,100,000 tickets were sold in total for these three events. Is she correct? Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 1 tenth or 1 hundredth), for example: 8 + 6 = 14 0.8 + 0.6 = 1.4 0.08 + 0.06 = 0.14  • Jim was 25 years old when his son, Max, was born. What is the difference between their ages? • When Jim is 30, Max is 5. What is the difference between their ages? • When Jim is 35, Max is 10. What is the difference between their ages? • When Jim is 40, Max is 15. What is the difference between their ages? • Is the difference between their ages always going to remain the same? • How old will Max be when Jim is 75?	
Language Focus:			

As above

Assessment Questions:

- An apple weighs about 0.1kg. Approximately how many apples are there in a 1.8kg bag?
- I have a 0.35m length of wooden rod. How many 0.01m lengths can I cut it into?
- Mrs Jasper is juicing oranges. Each orange makes about 0.1 litres of juice. If Mrs Jasper juices 22 oranges, approximately how many litres of orange juice will she get?
- Circle all of the numbers that are equal to a whole number of tenths. 0.2 4.8 1 0.01 10 0.83
- Fill in the missing numbers

$0.01 \times \square = 1$ $0.1 \times \square = 1$ $0.01 \times \square = 0.1$

Fill in the missing numbers.

$\square$ tenths = 3.9

$\square$ hundredths = 0.22

$\square$ hundredths = 8

Curriculum Recovery - Maths: Year 6

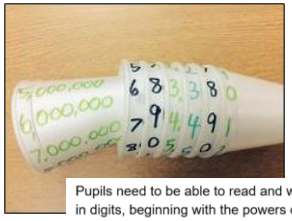
An Overview of Objectives

The purpose of this document is to support recovery curriculum as children move through the planned learning. It includes the DfE published guidance on Teaching of Mathematics (July 2020) to bring greater coherence to National Curriculum Objectives and to prioritise key concepts, its knowledge and understanding within each year group. The teacher may have prioritised other elements as key learning as per their own planning and assessment. The planning framework consists of three 2-week modules which tackle consolidation of Year 5 objectives and move towards introducing Year 6 objectives. Text in blue is taken directly from the Guidance for teaching mathematics and are objectives deemed to be core concepts.

Objectives: Taken from Year 5 PoS (Consolidation/Revision/Recap)	Year 6 Objectives (May be impacted by gaps in Year 5)
Number and Place Value • read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit • count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 • interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero • round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 • solve number problems and practical problems that involve all of the above • read Roman numerals to 1000 (M) and recognise years written in Roman numerals. ➢ 5NPV–1 Know that 10 tenths are equivalent to 1 one, and that 1 is 10 times the size of 0.1. Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01. Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10 times the size of 0.01. ➢ 5NPV–2 Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and nonstandard partitioning	Number and Place Value • read, write, order and compare numbers up to 10 000 000 and determine the value of each digit • round any whole number to a required degree of accuracy • use negative numbers in context, and calculate intervals across zero • solve number and practical problems that involve all of the above. ➢ 6NPV–1 Understand the relationship between powers of 10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000). ➢ 6NPV–2 Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and nonstandard partitioning. ➢ 6NPV–3 Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system, and round numbers, as appropriate, including in contexts. ➢ 6NPV–4 Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts.

➢ 5NPV–3 Reason about the location of any number with up to 2 decimals places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each ➢ 5NPV–4 Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts Number: Addition and Subtraction • add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • add and subtract numbers mentally with increasingly large numbers • use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. Number: Multiplication and Division • identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers • know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers • establish whether a number up to 100 is prime and recall prime numbers up to 19 multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers • multiply and divide numbers mentally drawing upon known facts • divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context • multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 • recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3) • solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes • solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.	Number: Addition, Subtraction, Multiplication and Division • multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication • divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context • divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context • perform mental calculations, including with mixed operations and large numbers identify common factors, common multiples and prime numbers • use their knowledge of the order of operations to carry out calculations involving the four operations • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • solve problems involving addition, subtraction, multiplication and division • use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. ➢ 6AS/MD–1 Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number). ➢ 6AS/MD–2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding. ➢ 6AS/MD–3 Solve problems involving ratio relationships ➢ 6AS/MD–4 Solve problems with 2 unknowns.

Key Vocabulary:	Key Vocabulary:	
thousands round rounding Roman numerals to 100 'C' negative operation factor factor pairs distributive associative derive remainder scaling squared cubed	ones tens hundreds thousands ten thousand, hundred thousand, million digit, one-, two-, three- or four-digit number numeral value stands for, decimal fractions	represents exchange the same number as, as many as equal to

Objectives (taken from Year 5 PoS)		Suggested Learning Activities	Link to resources
Module 1	• read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit ➢ 5NPV–2 Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and nonstandard partitioning • count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000	• Play dice games to create numbers, which is the largest? Smallest? How do you know if it is a multiple of 3? Order them, compare them. Write the numbers you throw in words and round them.  Use cups to read numbers and determine the value of each digit. Use this for decimals too. Pupils need to be able to read and write numbers from 1 hundredth to 10 million, written in digits, beginning with the powers or 10, as shown below, and should understand the relationships between these powers of 10. 0 . 0 1 one hundredth 0 . 1 one tenth 1 one 1 0 ten 1 0 0 one hundred 1 , 0 0 0 one thousand 1 0 , 0 0 0 ten thousand 1 0 0 , 0 0 0 one hundred thousand 1 , 0 0 0 , 0 0 0 one million 1 0 , 0 0 0 , 0 0 0 ten million How many × 100 ÷ 100 |								
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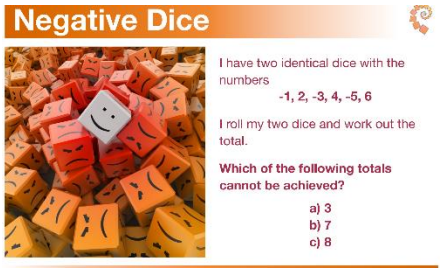
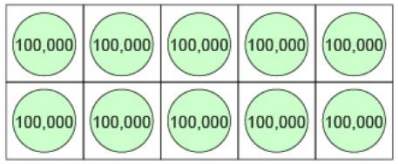
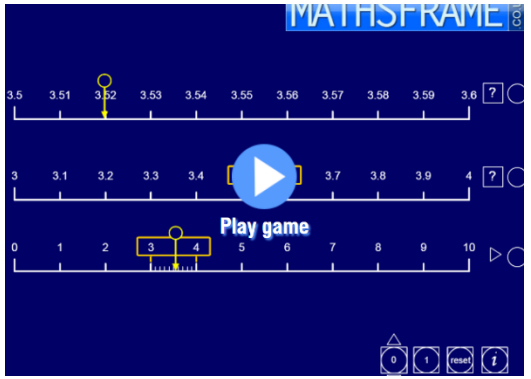
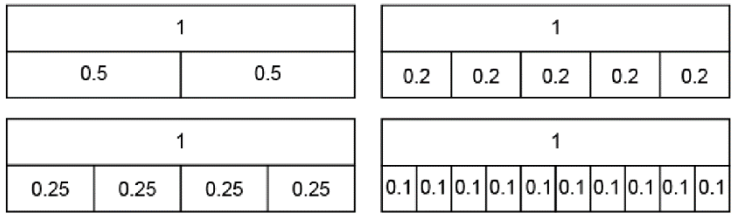
10,000,000	20,000,000	30,000,000	40,000,000	50,000,000	60,000,000	70,000,000	80,000,000	90,000,000
1,000,000	2,000,000	3,000,000	4,000,000	5,000,000	6,000,000	7,000,000	8,000,000	9,000,000
100,000	200,000	300,000	400,000	500,000	600,000	700,000	800,000	900,000
10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000	90,000
1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	 different ways can you represent 0.36. Can you show it on a blank number line? Gattengo chart? Place value counters? Part whole model?	Skip counting resources: https://www.schoolimprovementliverpool.co.uk/maths-multiplication-resource www.Londonsouthwestmathshub.co.uk mastery development materials https://mathsbot.com/ visual resources https://nrich.maths.org/5898 negative number game 'Tug Harder'  https://nrich.maths.org/13271 Roman numerals Steve Wyborney Estimation Station https://stevewyborney.com/2018/11/esti-mysteries-estimation-meets-math-mysteries/

	• interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero • round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 *Pupils need to know that what they learnt in year 3 and year 4 about the relationship between 10, 100 and 1,000 (see 3NPV–1 and 4NPV–1), and in year 5 about the relationship between 1, 0.1 and 0.01 (5NPV–1) extends through the number system. By the end of year 6, pupils should have a cohesive understanding of the whole place-value system, from decimal fractions through to 7-digit numbers. ➢ 5NPV–4 Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts	• Ensure counting is an integral part of everyday daily routines, ensuring to count in decimals and fractional steps. • Use your counting stick/number lines to secure forwards and backwards counting from different starting points (include negative numbers) • Use real life situations to think about negative numbers. Use https://mathsframe.co.uk/en/resources/resource/89/itp-thermometer To support with this. • Use Target Boards to practise 1000 more, 1000 less, 100 more, 100 less etc (Extend to Y5 objectives if appropriate e.g. powers of 10) • Know that 10 hundreds are equivalent to 1 thousand, use apparatus to show this. Also, that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100. • Divide 1,000 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts. • Use ten frames to show equality  • Use number tracks and missing boxes to identify multiples of 10000 – using measures where appropriate. e.g. Using the ≤≥ symbols. • Step counting puzzles • Play games such as. 'I'm thinking of a number – e.g. It's a multiple of 4, the sum of the digits is 12 etc' 'What's my rule' (See Basic Skills document) • Order price tags in £s. Parcel weights in g. temperatures in ° • Practise counting in multiples of 0.1, 0.2, 0.25 and 0.5 from 0, or from any multiple of these numbers, both forwards and backwards. • Use bar modelling images to support conceptual understanding of whole numbers and decimals.	https://mathsframe.co.uk/en/resources/resource/400/ITP-Decimal-Number-Line Rounding game 

	• solve number problems and practical problems that involve all of the above	 • Provide as many opportunities as possible for children to explain choices and reasoning e.g. How can you turn 2100 into 2400? You could add 3 hundreds or, or 33 tens or 2 hundreds and 13 tens etc • Explain why 200 hundreds is 20000. • Use the vocabulary: 231,329 is equal to *hundred thousands* ten thousands * thousands, * hundreds * tens and * ones How else could we partition this number? • Consider real life contexts e.g. Have an enterprise day/charity day – make and label items. Order objects and prices. Sort prices from highest to lowest. Or consider a sports day and compare distances, times, points scored into hoops etc.	

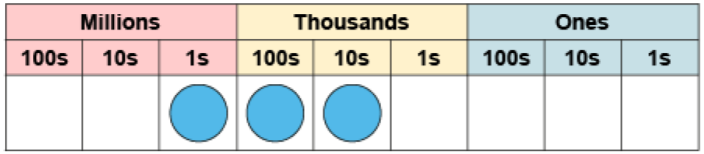
Language and Vocabulary focus:

10 hundred-thousands is equal to 1 million
1,000,000 is 10 times the size of 100,000
100,000 is one-tenth times the size of 1,000,000
Pupils must also understand the relationships between non-adjacent powers of 10 up to a scaling by 1,000 or 1 thousandth (or grouping of up to 1,000 of a given power)
10 thousands is equal to 10,000."
"10,000 is 10 times the size of 1,000." "1,000 is one-tenth times the size of 10,000

Assessment Questions:

1. Complete the sentences.
   a. 500 made 1,000 times the size is _____.
   b. 0.7 made 100 times the size is _____.
   c. 800,000 made 10 times the size is _____.
   d. 4,000,000 made one-thousandth times the size is _____.
   e. 9,000 made one-hundredth times the size is _____.
   f. 3 made one-tenth times the size is _____.
2. The distance from London to Bristol is about 170km. The distance from London to Sydney, Australia is about 100 times as far. Approximately how far is it from London to Sydney?
3. A newborn elephant weighs about 150kg. A newborn kitten weighs about 150g. How many times the mass of a newborn kitten is a newborn elephant?

4. Walid has a place-value chart and three counters. He has represented the number 1,110,000.

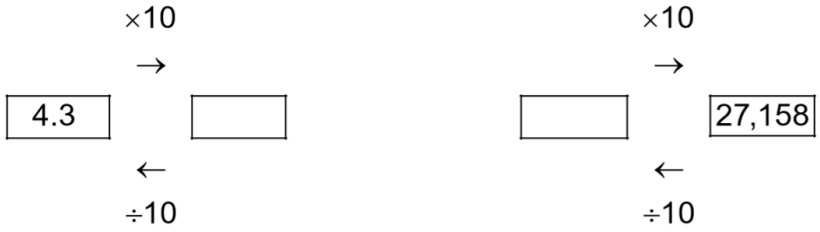


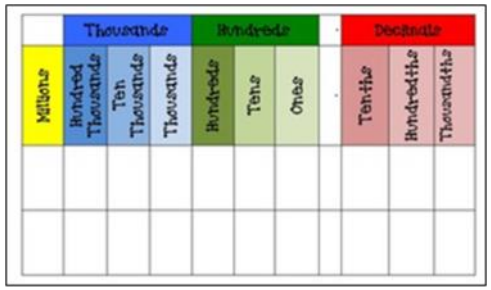
Millions			Thousands			Ones		
100s	10s	1s	100s	10s	1s	100s	10s	1s
		●	●	●				

   a. Find 2 different numbers that Walid could make so that 1 number is one-hundredth times the size of the other number.

   b. Find 2 different numbers that Walid could make so that 1 number is 1,000 times the size of the other number.

5. Fill in the missing numbers.



	Objectives (taken from Year 6)	Suggested Learning Activities	Link to resources
Module 2	• read, write, order and compare numbers up to 10 000 000 and determine the value of each digit • 6NPV–2 Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and nonstandard partitioning. • 6NPV–3 Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system, and round numbers, as appropriate, including in contexts. • solve number and practical problems that involve all of the above. • round any whole number to a required degree of accuracy	• Use gattengo charts/ place value counters/ place value grids to make numbers up to 10,000,000, ensuring that decimal fractions are included. Gattegno Tens Chart Min Power: -3 Max Power: 3 Standard Form at: 6 digits Switch Random Hide All |							
---	---	---	---	---	---	---	---	---
1000	2000	3000	4000	5000	6000	7000	8000	9000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009 |   • Use real life million numbers of singers, sports people etc. on Twitter and compare them, order them write them. • Repeat the exercise with footballers wages and round them to the nearest degree of accuracy. • Think of a number e.g. 9,345,210 and provide 'What would happen if……questions.' I added another 1000, I added 10 tens etc. • Play hide and reveal – My number has an odd number of thousands, and even number of ones and 12 tens in it etc. What could my number be?	https://mathsbot.com/tools/gattegnoChart https://nrich.maths.org/10741 activities on Gattengo chart https://www.schoolimprovementliverpool.co.uk/lets-talk-maths https://mathsbot.com/tools/placeValue https://nrich.maths.org/6342?utm_source=primary-map **Place Value challenges:** Use virtual/actual dice. Roll the dice, 6 times, - children rearrange the numbers to make the: **Biggest, smallest**, biggest odd, biggest even, number with the biggest possible amount of 10s etc https://www.pencoedprimary.co.uk/partitioning-a-decimal/

- use negative numbers in context, and calculate intervals across zero

- 6NPV–1 Understand the relationship between powers of 10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000).

- When rounded to the nearest 1000, my number is 26000. What could my number be? What couldn't it be?
- Link to measurements and to PE, Geography with rivers, mountains, distance travelled etc
- Use Top Trump Cards such as twitter followers and ask the children to order, compare, reason, find how many more etc

Pupils should be able to carry out calculations based on their understanding of place-value as well as non-standard partitioning, for example:

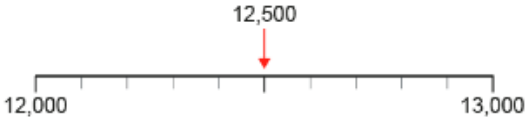
$4{,}000 + 30{,}000 + 0.2 + 5{,}000{,}000 =$ ☐

$381{,}920 - 900 =$ ☐

$518.32 + 30 =$ ☐

$381{,}920 - 60{,}000 =$ ☐

- Reason around where the numbers sit on a number line



Place the number 12,500 on different number lines.

- Why does it go there? Explain your thinking.
- Use real life situations to think about negative numbers. Use https://mathsframe.co.uk/en/resources/resource/89/itp-thermometer
- Use money to understand negative numbers. E.g. Jack has £125 in her bank account. How much would she have if she withdrew £150? Deposited 15? Withdrew a further £45 Etc.

Think about the number 34 567 800.

Say this number aloud.
Round this number to the nearest million.

What does the digit '8' represent?
What does the digit '7' represent?

Divide this number by 100 and say your answer aloud.
Divide this number by 1000 and say your answer aloud.

1 litre × 10 bottles

= 10 litres

= 10,000 ml

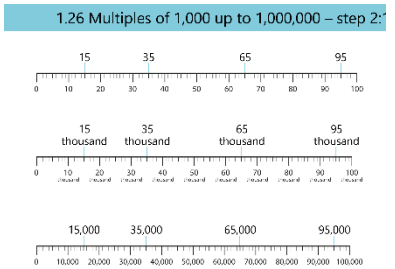
Miss Wong, the teacher, has four cards. On each card is a number:

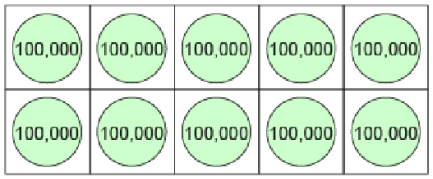
59 996	59 943	60 026	62 312

She gives one card to each pupil. The pupils look at their card and say a clue.
Anna says, 'My number is 60 000 to the nearest 10 thousand.'
Bashir says, 'My number has exactly 600 hundreds in it.'
Charis says, 'My number is 59900 to the nearest hundred.'
David says, 'My number is 60 000 to the nearest 10.'

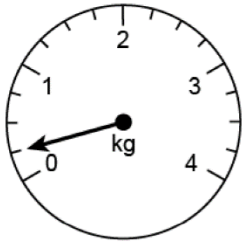
Can you work out which card each pupil had? Explain your choices.

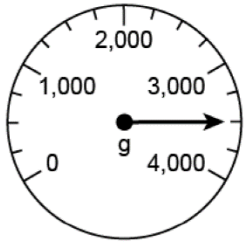
https://www.ncetm.org.uk/resources/50640#topofpage



	• 6NPV–4 Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts.	 Use a tens frame to support conceptual understanding of powers of 10. • How many times bigger is 50,000 to 500? 500 multiplied by 100 is equal to ? • Compete questions such as: 1,659 × 100 = 165,900 165,900 ÷ 100 = 1,659 21,156 × 10 = 211,560 211,560 ÷ 10 = 21,156 47.1 × 1,000 = 47,100 47,100 ÷ 1,000 = 47.1 • Skip count in intervals of whole numbers, decimals and fractional steps, such as counting in 10,000 forwards and backwards and 0.25.Use bar modelling strategy to support this. 1,000,000 250,000 250,000 250,000 250,000 1,000 250 250 250 250 1 0.25 0.25 0.25 0.25	https://whiterosemaths.com/wp-content/uploads/2020/08/Year-6-Autumn-block-1-Place-Value.pdf

What mass does each scale show?





Language and Vocabulary Focus:

Language focus

"In 67,000.4…

- the 6 represents 6 ten-thousands; the value of the 6 is 60,000
- the 7 represents 7 thousands; the value of the 7 is 7,000
- the 4 represents 4 tenths; the value of the 4 is 0.4"

Pupils must be able to combine units from millions to hundredths to compose numbers, and partition numbers into these units, and solve related addition and subtraction calculations. Pupils need to experience variation in the order of presentation of the units, so that they understand, for example, that 5,034,000.2 is equal to 4,000 + 30,000 + 0.2 + 5,000,000. Pupils should be able to represent a given number in different ways, including using place-value counters and Gattegno charts, and write numbers shown using these representations.
Pupils should then have sufficient understanding of the composition of large numbers to compare and order them by size
Pupils also need to be able to solve problems relating to subtraction of any single place value part from a number, for example:

$381{,}920 - 900 = \square$

$381{,}920 - \square = 380{,}920$

As well as being able to partition numbers in the 'standard' way (into individual place value units), pupils must also be able to partition numbers in 'non-standard' ways, and carry out related addition and subtraction calculations, for example:

518.32 30 548.32+=
381,920–60,000 321,920 =

Pupils can initially use place-value counters for support with this type of partitioning and calculation, but by the end of year 6 must be able to partition and calculate without them

Language focus

"50,000 is 100 times the size of 500."
"500 multiplied by 100 is equal to 50,000."

"500 is one-hundredth times the size of 50,000."
"50,000 divided by 100 is equal to 500."

Pupils should recognise the inverse relationship between, for example making a number 100 times the size, and returning to the original number by making it one-hundredth times the size. This understanding should then be extended to multiplicative calculations that involve numbers with more than one significant digit, extending what pupils learnt in 5MD–1 about multiplying and dividing by 10 and 100. 1,659 100 165,900 165,900 100 1,659 ×= ÷= 21,156 10 211,560 211,560 10 21,156 ×= ÷= 47.1 1,000 47,100 47,100 1,000 47.1 ×= ÷=

Pupils can use the Gattegno chart for support throughout this criterion, but by the end of year 6 they must be able to calculate without it

Assessment Questions:

Fill in the missing numbers.

Use the following to complete the equations:

$\times 10$ $\times 100$ $\times 1{,}000$ $\div 10$ $\div 100$ $\div 1{,}000$

Use each term only once.

$543 \square = 5.43$ $3{,}169 \square = 3{,}169{,}000$ $515 \square = 5{,}150$

$276{,}104 \square = 27{,}610.4$ $35{,}000 \square = 35$ $427 \square = 42{,}700$

Fill in the missing symbols (< or >).

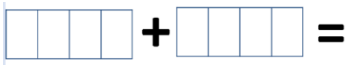
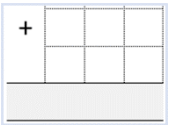
$7{,}142{,}294 \square 7{,}124{,}294$ $99{,}000 \square 600{,}000$

$6{,}090{,}100 \square 690{,}100$ $1{,}300{,}610 \square 140{,}017$

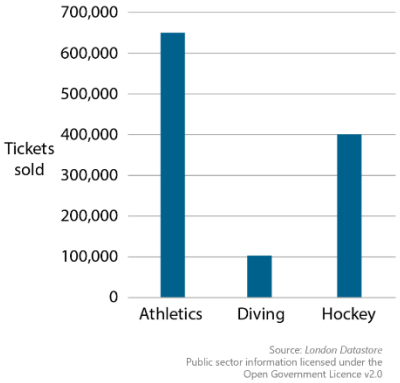
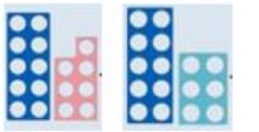
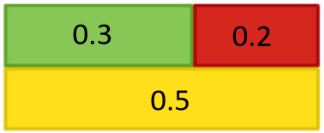
$589{,}940 \square 1{,}010{,}222$

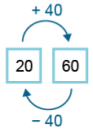
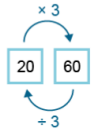
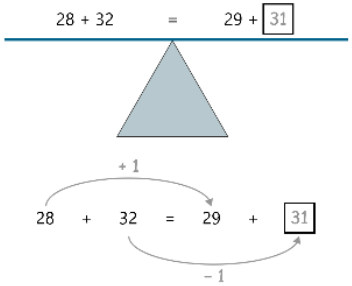
Put these numbers in order from smallest to largest.

8,102,304 8,021,403 843,021 8,043,021

	Objectives (taken from Year 5 PoS and Year 6 PoS)	Suggested Learning Activities	Link to resources
Module 3	• add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	• Play addition and subtraction games to practise computational skills, e.g. Find a partner and a 0-9 dice. Game 1: Each player draws an addition grid like this:  • Take turns to throw the dice or use Virtual Dice After each throw of the dice, you each decide which of your cells to put that number in. Throw the dice 8 times each until all the cells are full. Whoever has the sum closest to 10 000 wins. Game 2: Each player draws an addition grid like this:  Throw the dice six times each until all the cells are full. Whoever has the sum closest to 1000 wins. • Practise formal written methods for 4 operations (use structured apparatus and calculation mats and provide additional support if necessary) and then apply into meaningful contexts, e.g. You have a budget of £1200 and have to plan a party for party for 80 people. Consider invitations, room hire, food/refreshments, balloons, cake, disco/ entertainment etc. Look on amazon, what could you buy and how much change will you have left. (Budgets for different sizes, if no internet use magazines, brochures or newspapers etc). • Cut a range of items from a catalogue/ magazine, if you buy 4 items, how many different totals can you make? What would make the biggest total? The least? Which prices would make a total between ? and ?	https://www.topmarks.co.uk/maths-games/7-11-years/mental-maths Virtual dice http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ksl/maths/dice/index.htm https://www.schoolimprovementliverpool.co.uk/lets-talk-maths

		• Apply calculations into a measurement context: measure the height of all family members or mark the heights of classmates on a wall with chalk, then measure. Add up the total height in cm, m and cm, show in just m. If you grouped the people you've measured, make a list of questions such as. . .what's the difference in heights, how much taller is x than y? etc • What are you going to make for lunch? I made a cheeseburger in a bun and fries. When I weighed the ingredients my lunch weighed 875g. What does yours weigh? What if you made the same lunch for 3 people? **Freddie's Fairground has 4,568 visitors on Friday, 10,832 visitors on Saturday and 6,789 visitors on Sunday.** **How many visitors did Freddie's Fairground have altogether between Friday and Sunday?** • The graph shows the approximate number of tickets sold for three different events at the 2012 London Olympics. Each value is rounded to the nearest 50,000.	

	• add and subtract numbers mentally with increasingly large numbers **Throughout key stage 2, pupils have learnt about additive and multiplicative relationships, the commutativity and associativity of addition and the commutative, associative and distributive properties of multiplication. 6AS/MD–1 Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number In year 6, they will also use the compensation properties and combine understanding of these properties with their understanding of place value and apply in additive and multiplicative contexts to derive related equations. • solve problems involving addition, subtraction, multiplication and division and a combination	Felicity says that about 1,100,000 tickets were sold in total for these three events. Is she correct?  Source: London Datastore Public sector information licensed under the Open Government Licence v2.0 • Recap mental strategies, give children a selection of calculations and discuss efficient mental strategies to solve them, e.g: Complements to 10, 100, 1000 Partitioning Use related facts Use doubles/ near doubles Equivalence and Compensation • Use structured apparatus to explore relationships, and apply to decimals e.g.   	

	of these, including understanding the meaning of the equals sign • 6AS/MD–2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.	• Practise representing the relationship between 2 numbers both additively and multiplicatively, e.g.: 20 and 60: Additive relationship: 20 + 40 = 60 60 – 40 = 20  Multiplicative relationship: 20 x 3 = 60 60 ÷ 3 = 20  • Solve real life problems and balance equations using compensation, e.g. there is the same number of children in Year 5 as there is in Year 6. In Year 5, there are 28 boys and 32 girls. In Year 6, there are 29 boys. How many girls are there in Year 6?  • If I know 234 x 10 = 2340, what else do I know?	

- $21{,}760 = 256 \times 85$

  Use this calculation to complete the following equations.

  $256 \times 8.5 = \square$

  $2{,}560 \times 85 = \square$

  $2{,}156 \div 85 = \square$

- Explain how you would use 921 = 349 +572 help you to solve 92.1 = 44.9 + ☐

  First divide each part of the calculation by 10 (make both the sum and the two addends a tenth of the size)

  92.1 = 34.9 + 5.72

  then apply compensation property:

  92.1 = 34.9 + 5.72

  + 10 - 10

  92.1 = 44.9 + 4.72

- What

  $8 + 6 = 14$

  $0.8 + 0.6 = 1.4$

  $0.08 + 0.06 = 0.14$

  What do you notice? else do you know?

Language Focus:

"The relationship between 2 numbers can be expressed additively or multiplicatively."

"If one addend is increased and the other is decreased by the same amount, the sum stays the same."

"If I multiply one factor by a number, I must divide the other factor by the same number for the product to stay the same."

"If I multiply one factor by a number, and keep the other factor the same, I must multiply the product by the same number."

Assessment Questions:

Write an expression in each box to show the relationship between numbers 25 and 75. Is there more than one way to answer this question? Explain.

Fill in the missing numbers.

$300 + \square = 1{,}200$ $\quad 75 = 3 + \square$ $\quad \square + 0.1 = 10$

$300 \times \square = 1{,}200$ $\quad 75 = 3 \times \square$ $\quad \square \times 0.1 = 10$

Complete these sequences.

0.5	5	9.5				27.5	32
	0.5	0.75	1				
	25	125	625				
0.2	6	180					

The examples below show the first 2 numbers in a sequence. Find 2 different ways to continue each sequence, using addition for the first and multiplication for the second.

a.	4	16		or	4	16	
b.	2	200		or	2	200	
c.	0.01	10		or	0.01	10	

327 + 515 = 842

Use this calculation to complete the following equations.

$\square + 61.5 = 84.2$

$8{,}420 - \square = 3{,}270$

$85{,}200 - 52{,}500 = \square$

$21{,}760 = 256 \times 85$

Use this calculation to complete the following equations.

$256 \times 8.5 = \square$

$2{,}560 \times 85 = \square$

$2{,}156 \div 85 = \square$

Fill in the missing numbers.

$327 + 278 = 330 + \square$ $\quad 25 \times 48 = 50 \times \square$

$3{,}128 \div 23 = 136$

Use the division calculation so solve the following calculation. Explain your answer.

$24 \times 136 = \square$

Fill in the missing number.

$25 \times 60 = \square \times 60 + 120$