

Kindness - Determination – Resilience – Teamwork – Communication – Respect **'Together we learn – United we achieve'** 

> TOWNVILLE INFANTS' SCHOOL Maths calculation policy

Calculation Policy

This policy is a working document and will be revised and amended as necessary. It includes some examples of children's work. Some images have been copied from the NCETM PD materials.

		Year 1 - Addition	
Objective, Strategy & Key Vocabulary	Concrete	Pictorial	Abstract
Comparing Objects, groups of objects Length, weight, mass, heavier, light- er, same, equal	People's height, distance, mass. Use of pan balances using numicon to show equivalence, < > Comparing multiple objects Use of concrete materials eg. Compare bears, jewels, cubes etc to create groups of different sizes to compare		
Using < > and = Fewer, more, less than, more than, equal to, fewer than	Use a multilink staircase in two colours.		Use variation with missing boxes and missing symbols. $3 \bigcirc 4 \qquad 4 > \square$ $2 \bigcirc 2 \qquad \square < 6$
Finding one more, finding one less		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	One more/less sentences – example one: 1 more than 3 is 1 less than 2 is 1 more than is 1 1 less than is 1

		Year 1 - Addition	
Objective, Strategy & Key Vocabulary	Concrete	Pictorial	Abstract
Adding 1 gives 1 more	First Then Now 3 +1 4	First Then Now	6 + 1 7 $6 + 1 = 7$
Increasing an amount - Augmentation	Use FIRST, THEN, NOW and range of practical situations for showing augmentation. E.g. first there were three children on carpet then 2 more came. Now there are 5 children on the carpet.	First Then Now	4 + 3 7 $4 + 3 = 7$
Stories of numbers within 10	Children should work with doubled sided counters and ten frame. Start with 7 red, turn one over, tell me the 'story'? Turn one more over. What is the 'story'? Continue. Complete this for stories of all numbers up to 10.	$\begin{array}{c c} \bullet & \bullet \\ \bullet & \bullet$	7 + 0 = 7 6 + 1 = 7 5 + 2 = 7 4 + 3 = 7 3 + 4 = 7 2 + 5 = 7 1 + 6 = 7 0 + 7 = 7

		Year 1 - Addition	
Objective & Strategy & Key Vocabulary	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part- whole model	Use part part whole model. Use cubes to add two numbers together as a group or in a bar.	Use pictures to add two numbers together as a group or in a bar.	Use the part-part whole diagram as shown below to move into the abstract. 4 + 3 = 7 $5$ $10 = 6 + 4$ $3$
Regrouping to make 10. This is an essential skill for column addition later.	6 + 5 = 11 2 more than 5.	Start at the larger number on the number line and count on in ones or in one jump to find the answer. 3+9= 10 11 12 13 14 15 16 17 18 19 20	If I am at seven, how many more do I need to make 10. How many more do I add on now? 7 + 4 = 11
Represent & use number bonds and related subtraction facts within 20	Start with the bigger number and use the smaller number to make 10. Use tens frames.	Use pictures or a number line. Regroup or partition the smaller number using the part part whole model to make 10. 9 + 5 = 14 1 4 1 5 1 6 7 8 9 10 1 1 12 13 14 15 16 17 18 19 20	Emphasis should be on the language '1 more than 5 is equal to 6.' '2 more than 5 is 7.'
		Image: State 2	'8 is 3 more than 5.'

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Regrouping to make 10. This is an essential skill for column addition later.	6 + 5 = 11 2 more than 5.	Start at the larger number on the number line and count on in ones or in one jump to find the answer. 3 + 9 = 10 11 12 13 14 15 16 17 18 19 20	If I am at seven, how many more do I need to make 10. How many more do I add on now? 7 + 4 = 11
Represent & use number bonds and related subtraction facts within 20	Start with the bigger number and use the smaller number to make 10. Use tens frames.	Use pictures or a number line. Regroup or partition the smaller number using the part part whole model to make 10. 9+5=14 1 4 1 4 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 10	Emphasis should be on the language '1 more than 5 is equal to 6.' '2 more than 5 is 7.' '8 is 3 more than 5.'

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

		Year 2 - Addition	
Objective & Strategy & Key Vocabulary	Concrete	Pictorial	Abstract
Adding multiples of ten	Model using dienes and bead strings. 50 = 30 + 20	Use representations for base tentens andtens makestens	20 + 30 = 50 70 = 50 + 20 $40 + \Box = 60$ $\Box + 30 = 50$
Use known number facts Part part whole	Children explore ways of making numbers within 20.	20 - = = = = = = = = = = = = = = = = = =	$\Box + 1 = 16$ 16 - 1 = $\Box$ 1 + $\Box = 16$ 16 - $\Box = 1$
Using known facts	Ted Sam	Children draw representations of H, T and O. $\begin{array}{cccccccccccccccccccccccccccccccccccc$	3 + 4 = 7 Leads to 30 + 40 = 70 Leads to 300 + 400 + 700 '3 things and 4 things is always 7 things'
Bar model	3 + 4 = 7 ♥♥♥♥	3 + 5 = 8 8 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	14 + 16 = 30 30 14 16

		Year 2 - Addition	
Objective & Strategy	Concrete	Pictorial	Abstract
Add a two digit number and ones	<ul> <li>17 + 5 = 22</li> <li>Use ten frame to make 'magic ten'.</li> <li>Children explore the pattern.</li> <li>17 + 5 = 22</li> <li>27 + 5 = 32</li> </ul>	Use part-part-whole and number line to model. 17 + 5 = 22 $3 2$ $+ 3 + 2$ $20 17 20 22$	Explore related facts         17 + 5 = 22       22 = 17 + 5         5 + 17 = 22       22 = 5 + 17         22-17=5       17 = 22 - 5         22-5=17       5 = 22 - 17
Add a 2-digit number and tens	Explore that the ones digit does not change. 25 + 10 = 35	25 + 30 = 55 +10 +10 +10 25 35 45 55	27 + 10 = 37 27 + 20 = 47 $27 + \Box = 57$ $\Box + 30 = 67$
Add two 2-digit numbers without bridging. 'Friendly numbers'	Model using base 10, place value counters and numicon. Dienes and part-part-whole model: 45 + 23 = 68	Use number line and bridge ten using part whole if necessary. $\begin{array}{r} +20 +5 \\ 47 & 67 & 72 \end{array} \xrightarrow{Or} +20 +3 +2 \\ 47 & 67 & 70 & 72 \end{array}$	25 + 47 20 + 5  40 + 7 20 + 40 = 60 5 + 7 = 12 60 + 12 = 72

		Year 2 - Addition	
Objective & Strategy & Key Vocabulary	Concrete	Pictorial	Abstract
Add any two 2-digit numbers	Base 10 and part-part- whole models. 26 + 37 = 63 $4 + 13 = 63$	26 + 30 + 7 $+ 30$ $+ 7$ $7$ $+ 30$ $+ 7$ $+ 4$ $+ 3$	24 + 38 = 29 + = 57 $38 + 24 = + 22 = 51$
Add three 1-digit numbers	Combine to make magic 10 first where relevant, or bridge 10 then add third.	Use language of first, then, then, now. Pictorial: First Then Then Now Concernent of the second o	Combine the two numbers that make/ bridge ten then add on the third. 4 + 7 + 6 = 10 + 7 $= 17$
Adding two numbers that bridge 10.	Use double sided counters and ten frames. Move counters to fill the ten frame and make Magic 10	Show on a number line how 5 is portioned into adding three, then adding 2. +3 +2 7 10 12 +5	7 + 5 3 2



		Year 1 - Subtraction	
Objective & Strategy & Key Vocabulary	Concrete	Pictorial	Abstract
Represent and use number bonds and related subtraction facts within 20 Part-Part-Whole model	Link to addition. Use part-part-whole model to model the inverse. If 10 is the whole and 6 is one of the parts, what is the other part? 10-6 = 4	Use pictorial representations to show the part.	Move to using numbers within the part whole model. 12 - 5 = 7 12 - 7 = 5 7 = 12 - 5 5 = 12 - 7
Subtract by making ten	Make 15 on the tens frame. Take 5 away to make ten, then take 4 more away so that you have taken 9. 15 - 9 5 4 15 - 5 = 10 10 - 4 = 6 15 - 9 = 6	Jump back 5 first, then another 4. Use ten as the stopping point. 15—9 -4 -4 -5 -5 -6 7 8 9 10 11 12 13 14 15	How many do we take off first to get to 10? How many are left to take off? 16-9 16 9 11 ? 6
Compare numbers by finding the difference.	There are 2 more pencils than erasers. S Pencils S Pencils There are 2 more red cars than blue cars. There are 2 more red cars than blue cars.	Use a number line to count on	Erin has 12 sweets and her sister has 5. How many more does Erin have than her sister?

		Year 1 - Subtraction	
Objective & Strategy & Key Vocabulary	Concrete	Pictorial	Abstract
Counting on to next ten Progression should be crossing one ten, crossing more than one ten, crossing the hundreds.	Use a bead bar or bead strings to model counting to next ten and the rest. 34-28 28 to 30 is 2, 30 to 34 is 4. So, 34 - 28 = 6	Use a number line to count on to next ten and then the rest. Begin with bead line, move to landmarked line then to ENL. <del>100000000000000000000000000000000</del>	$93-76 = 17$ $76 \longrightarrow 80 = 4$ $80 \longrightarrow 93 = 13$ $13 + 4 = 17$
Subtractions as difference	Ben is ten years old. Charlotte is three years old. What is the difference? Ben is ten years old 10 years old 3 years old difference of 7 years	$ \begin{array}{c} 7 \\ 4 \\ 3 \\ 0 \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \end{array} $	The difference between 24 and 16 is 8.

		Year 2 - Subtraction	
Objective & Strategy & Key Vocabulary	Concrete	Pictorial	Abstract
Subtracting a multiple of 10	Children use dienes, PV counters or Numicon.	Children draw rods and cubes and cross off multiples of ten.	64 - 10 = 🗆
	They remove the correct number of tens.	σ σ σ	64 - 20 = □ 64 - 30 = □ 64 - □= 24
	32 - 10 = 22		□- 50 = 14
Subtract a single digit from a two-digit number No regrouping	Explore that $9 - 3 = 6$ so $29 - 3 = 26$ 9 $29$ $3$ $6$ $3$ $26$	-3 $9 - 3 = 6$ $0  1  2  3  4  5  6  7  8  9  10$ $9 - 3 = 16$ $10  11  12  13  14  15  (f6)  17  18  (f9)  20$ $19 - 3 = 16$	9 - 3 = 6 19 - 6 = 13 29 - 6 = 23 etc
Regroup a ten into ten ones	Use a place value chart to show how to change a ten into ten ones, use the term 'take and make'.	20 - 4 = 16	20—4 =16
Partitioning to sub- tract without re- grouping. 'Friendly numbers'	Use base 10 to show how to partition the number when subtracting without regrouping. 34-13 = 21	Children draw representations of Dienes and cross off. 43 - 21 = 22	43—21 = 22



	Y	ear 1 - Multiplication
Objective & Strategy & Key Vocabulary	Concrete	Pictorial
Understand and use arrays	Use objects laid out in arrays to find the answers to 2 lots of 5, 3 lots of 2 etc.	Make and draw representations of arrays to show understanding
Equal/non equal groups	Use real life objects and contexts to examine equal and non-equal groups.	Children make/match representations of real-life problems to show equal groups and find the total.







Year 2 - Multiplication						
Objective & Strategy & Key Vocabulary	Concrete	Pictorial	Abstract			
Multiplication is commutative	Create arrays using counters and cubes and Numicon.	Use representations of arrays to show different calculations and explore commutativity.	$12 = 3 \times 4$ $12 = 4 \times 3$ Use an array to write multiplication sentences and reinforce repeated addition. $000000$ $5 + 5 + 5 = 15$ $3 + 3 + 3 + 3 = 15$ $5 \times 3 = 15$ $3 \times 5 = 15$			



Year 2 - Division					
Objective & Strategy & Key Vocabulary	Concrete	Pictorial	Abstract		
Division as sharing (partitive)	There are 20 conkers shared equally be- tween 5 children. Each child gets 4 conkers.	Children use pictures or shapes to share quantities. They may use bar modelling to show and support understanding. 20 Number lines are used to show skip counting (counting forwards) and repeated subtraction (counting backwards). 4 fives -5 -5 -5 -5 -5 -5 -5 -5 -5 -5 -5 -5 -5 -	20÷5=4		
Division as grouping (quotitive)	Use cubes, counters or real objects or to aid understanding. There are 15 biscuits, there are 5 in each bag. How many bags?	3  fives +5 +5 +5 +5 +5 +5 +5 +5 +5 +5 = 15 +5 = 15 +5 = 3 $3  fives$ -5 -5 -5 = 0 +5 +5 = 0 +5 +5 = 0 +5 +5 = 3 +5 +5 = 15 +5 = 3 +5 +5 = 15 +5 = 3 +5 +5 = 15 +5 = 3 +5 +5 = 15 +5 +5 = 15 +5 +5 = 15 +5 +5 = 15 +5 +5 = 15 +5 +5 = 15 +5 +5 = 15 +5 +5 +5 = 15 +5 +5 +5 +5 +5 +5 +5 +5 +5 +5 +5 +5 +5	15 divided into groups of 5 is 3. 15 ÷ 5 = 3		

Year 2 - Division					
Objective & Strategy	Concrete	Pictorial	Abstract		
Understanding the Inverse			$3 \times 4 = 12$ $12 \div 4 = 3$ $4 \times 3 = 12$ $12 \div 3 = 4$ $2 \times 4 = 8$ $8 \div 2 = 4$ $8 \div 4 = 2$ $8 = 2 \times 4$ $8 = 4 \times 2$ $2 = 8 \div 4$ $4 = 8 \div 2$ Show all 8 related fact family sentences.		