Christ Church Infant School Maths Calculation Policy

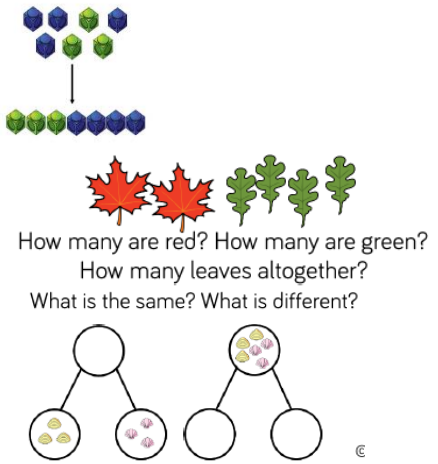
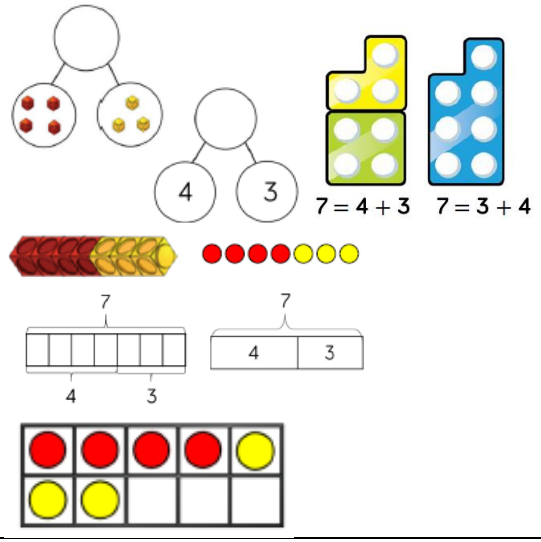
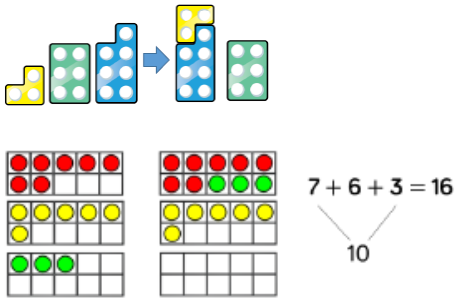
Summary

This calculation policy has been devised to support understanding of the expectations for fluency of the *2014 National Curriculum* and the progression of calculation concepts through a child's mathematical development.

Principles

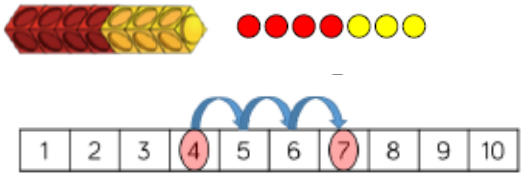
- Specific practical equipment and approaches have been suggested for each age group to support children in developing the conceptual understanding that will enable them to move more rapidly and efficiently towards the formal written methods expected in late KS1 and KS2.
- It is expected that teachers will work towards the fluency goals for each age group, but where necessary, teachers will use approaches and materials from earlier year groups to bridge any gaps in a child's understanding.
- Teachers will have an understanding of the expectations and progression for all year groups, regardless of which year they teach.
- The **'Developing Conceptual Understanding'** section illustrates how to build children's understanding of the mathematical concept by using a range of manipulatives and representations.
- The '**With Jottings… or in Your Head'** sections list the National Curriculum expectations of the year group for mental calculation.

Addition

	Reception	Year 1	Year 2
Objective	Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer	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.	Add and subtract up to two two-digit numbers using concrete objects, pictorial representations progressing to formal written methods (column method) 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
Developing Conceptual Understanding	**Combining two groups to make a whole** **Aggregation** (where parts are combined together to make whole): part whole model, numicon and tens frames  4 + 3 = 7	**Adding to 10, children explore both aggregation and augmentation.** **Aggregation (where parts are combined together to make whole): part whole model, bar model, numicon and tens frames**  	**Add three 1-digit numbers.** Look for number bonds to 10 or doubles to add the numbers more efficiently.  **Add 1-digit and 2-digit numbers to 100.** Count on from the larger number. Apply knowledge of number bonds 8+5=13 so 38 + 5= 43. 

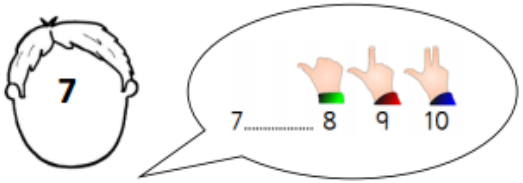
I have 4 apples and I pick 3 more, how many have I got altogether?

Counting on

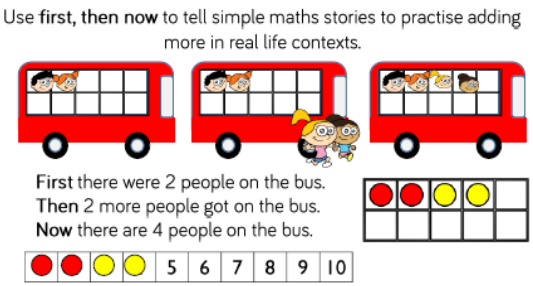


Augmentation(increasing a number): bead string, bar model, ten frame, number track

7 + 3 =

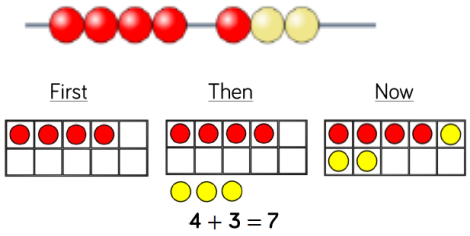


Add two single digit numbers

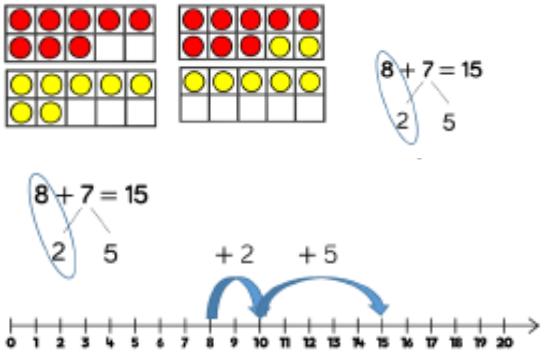


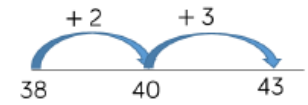
Number bonds to 10

Augmentation(increasing a number): bead string, bar model, ten frame, number track

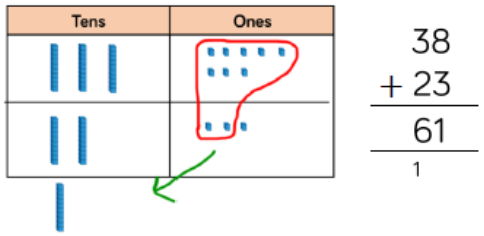


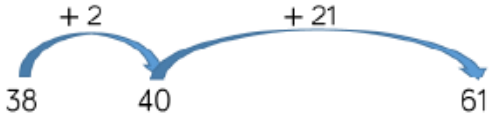
Add 1 digit and 2 digits to 20 (focus on partitioning)

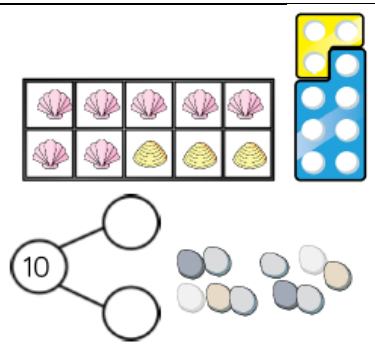




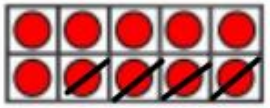
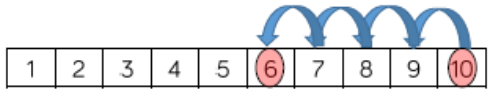
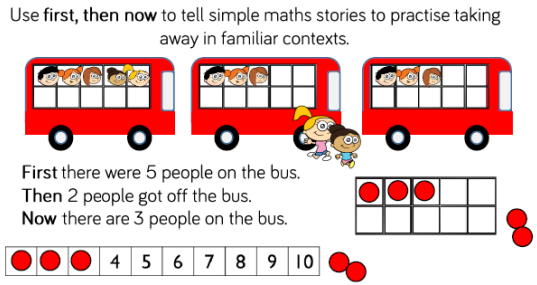
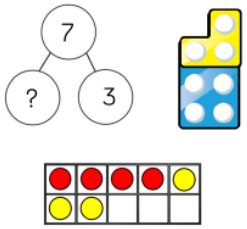
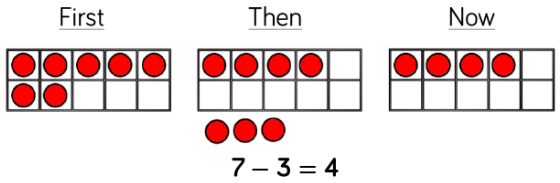
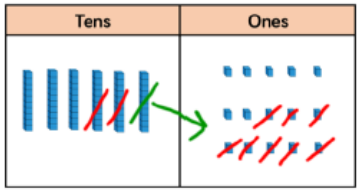
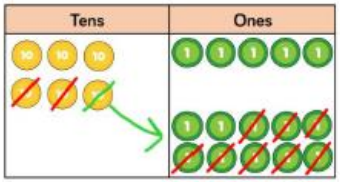
Add two 2-digit numbers to 100. Use formal column method when calculating alongside base 10 or place value counters. Use a blank number line to encourage children to jump to multiples of 10 to become more efficient.

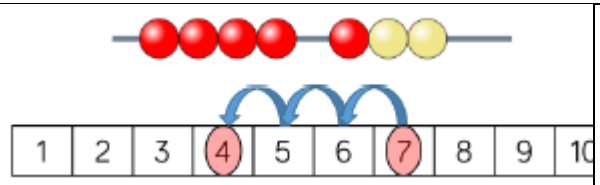
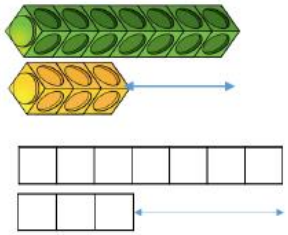
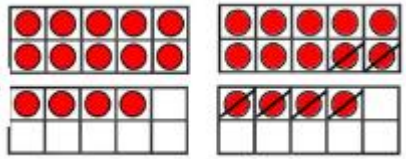




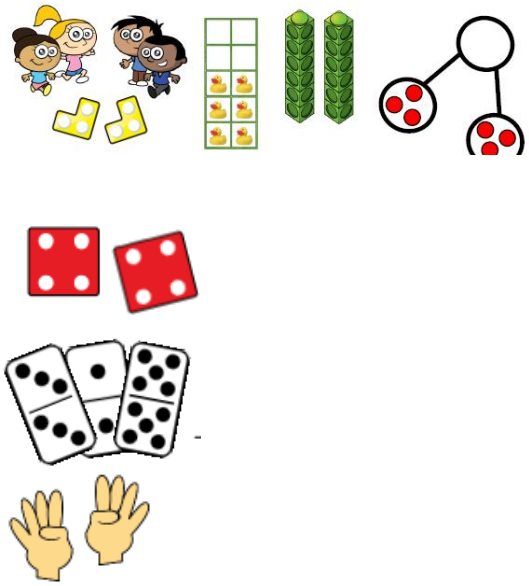
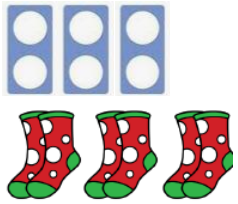
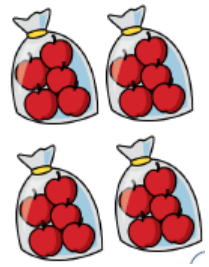
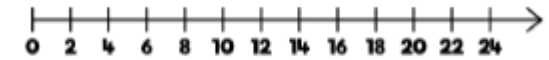
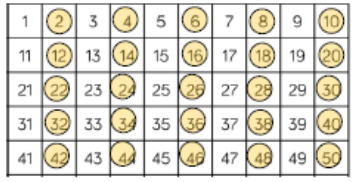
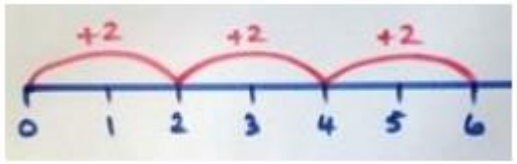
			
With Jottings… or in Your Head'	Say one more than a number within 20.	Represent and use number bonds and related subtraction facts within 20	Add and subtract numbers mentally, including: - A two-digit number and ones - A two-digit number and tens - Two two-digit numbers - Adding three one-digit numbers Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100

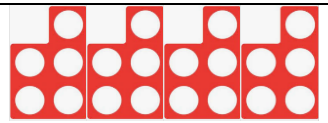
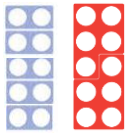
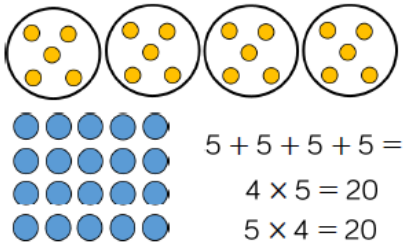
Subtraction

	Reception	Year 1	Year 2
Objective	Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer	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.	Add and subtract up to two two-digit numbers using concrete objects, pictorial representations progressing to formal written methods (column method) 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.
Developing Conceptual Understanding	**Count back to find the answer**  10 – 4 = 6  **Subtract two single-digit numbers**  	**Subtract 1-digit numbers within 10** **Partitioning**  **Reduction**  7 – 3 = 4	**Subtract 1 and 2 digit numbers to 100. Use formal column methods alongside base 10 and place value counters. Use blank number lines to count on to find the difference. Encourage them to jump in multiples of 10 to become more efficient.**  5 1 6 5 – 2 8 3 7 

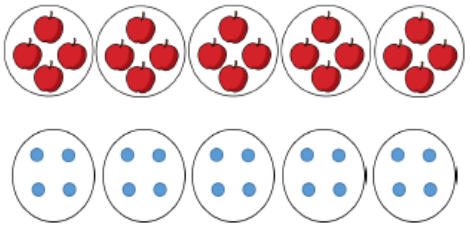
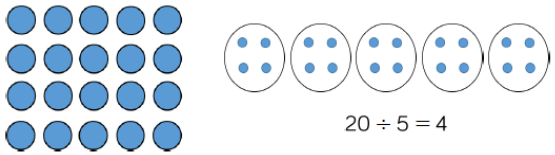
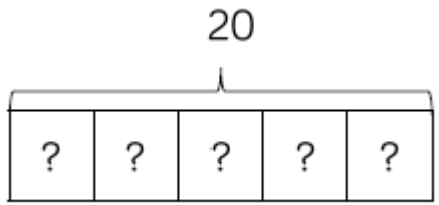
		 **Difference**  **Subtract 1 and 2-digit numbers to 20** When crossing 10, it is important to highlight that ten ones equal one ten. Children should be encouraged to find number bond to 10 when partitioning the subtracted number.   	
With Jotting…or in Your Head	Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer	Represent and use number bonds and related subtraction facts within 20	Add and subtract numbers mentally, including: - A two-digit number and ones - A two-digit number and tens - Two two-digit numbers - Adding three one-digit numbers Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100

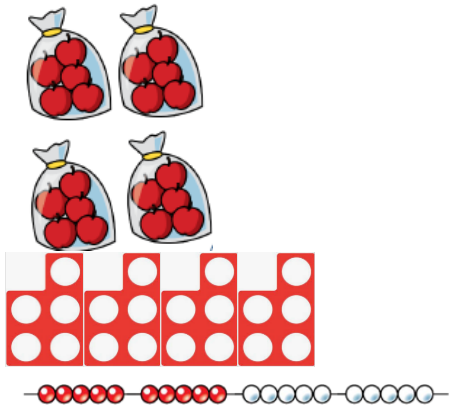
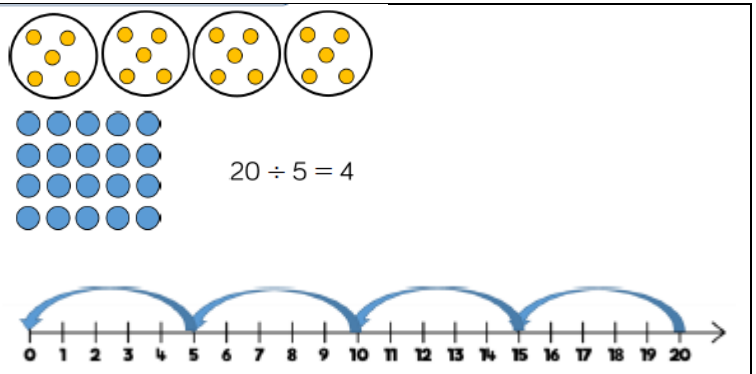
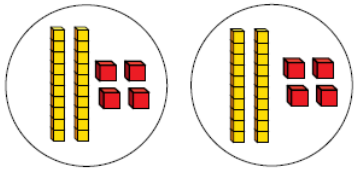
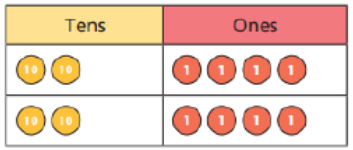
Multiplication

	Reception	Year 1	Year 2
Objective	They solve problems, including doubling, halving and sharing	Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher	Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts
Developing Conceptual Understanding	**Doubling** Use language of ***four add four equals 8*** 	**Count in 2, 5 and 10**  **Solve one-step problems using concrete and pictorial representation.** One bag holds 5 apples. How many apples do 4 bags hold? 	**Count in multiples forwards and backwards.**    **Repeated addition** 

			5 x 2 = 2 x 5  One bag holds 5 apples. How many apples do 4 bags hold?  5 + 5 + 5 + 5 = 20 4 x 5 = 20 5 x 4 = 20
With Jotting…or in Your Head		Count in multiples of twos, fives and tens	Recall and use x and ÷ facts for the 2, 5 and 10 x tables, including recognising odd and even numbers.

Division

	Reception	Year 1	Year 2
Objective	They solve problems, including doubling, halving and sharing.	Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher	Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.
Developing Conceptual Understanding	**Sharing and use language of half**  	**Sharing** There are 20 apples altogether. They are shared equally between 5 bags. How many apples are in each bag?  **Grouping** There are 20 apples altogether. They are put in bags of 5. How many bags are there?	**Sharing** There are 20 apples altogether. They are shared equally between 5 bags. How many apples are in each bag?  20 ÷ 5 = 4  **Grouping** There are 20 apples altogether. They are put in bags of 5. How many bags are there?

			 **Divide 2-digits by 1-digit (sharing with no exchange)** 48 ÷ 2 = 24  
With Jotting…or in Your Head		Count in multiples of twos, fives and tens	Recall and use x and ÷ facts for the 2, 5 and 10 x tables, including recognising odd and even numbers.

Glossary

Array- An ordered collection of counters, cubes or other items in rows and columns.

Aggregation- Combing two or more quantities or measures to find a total

Augmentation- Increasing a quantity or measure by another quantity

Commutative- Number can be added in any order

Difference- The numerical difference between two numbers is found by comparing the quantity in each group.

Exchange- Change a number or expression for another of an equal value.

Partitioning- Splitting a number into its component parts

Product- The result of multiplying one number by another

Reduction- Subtraction as take away.

Subitise- Instantly recognise the number of objects in a small group without needing to count.

Sum- The result of an addition

Total- The aggregate or the sum found by addition