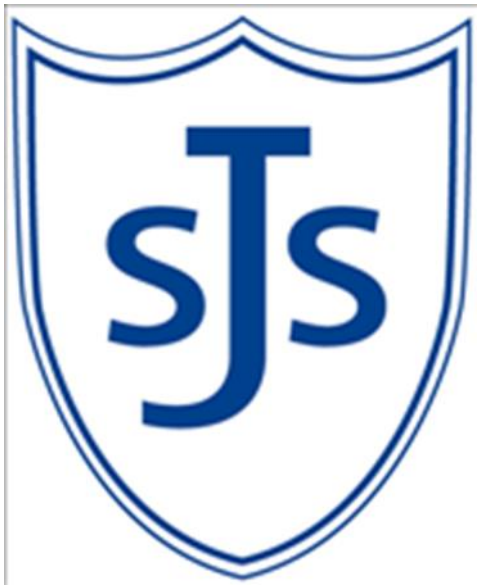
St John's Catholic Primary School



Mental Calculation at a Glance

October2015

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Year	Rapid Recall and Counting	Children should be able to use the following Mental Strategies, as appropriate for mental calculations
1	• Count from 1 and from any other number forwards and backwards in 1's 2's 5's 10's • Distinguish between ordinal and cardinal numbers • Know by heart all number bonds to 20 in 3 forms…6+8 = 14, 14-8=6, 14-6=8 • Begin to recognise two-digit multiples of 2,5,10 • Know odd and even numbers	• Re-order numbers in a calculation e.g. • 2 + 8 to 8 + 2 noticing that this does not change the answer • Begin to bridge through 10, and later 20, when adding a single digit number • Use known number facts and place value to add or subtract pairs of single-digit numbers • Add 9 to single-digit numbers by adding 10 and then subtracting 1 • Identifying near doubles, using doubles already known i.e. 8 + 7 is 7 + 7 + 1, or 8 + 8 - 1 • Use patterns of similar calculations i.e. 9 + 1 = 10, 9 + 2 = 11, 9 + 3 = 12 • Begin to partition to add numbers close to a multiple of 10 e.g. 5 + 9 = 5 + 10 – 1 (using a number line)
2	• Count in steps of 2,3,5 and 10 from any given number • Count in fractions up to 10, using ½ and 2/4 equivalence • Know by heart all number bonds that total 20 • Know by heart all addition and subtraction facts for each number up to 20 • Know by heart doubles of all number to 20 • Know by heart all halves of numbers to 20 • Know by heart all multiplication facts for 2, 5 and 10 tables • Know division facts for multiples of 2,5,10 • Know by heart all bonds of multiples of 10 up to 100 e.g. 30 + 70	• Find 10 more and less than numbers to 100 • Find a difference by calculating from the smaller to the larger number. • Reorder numbers in a calculation. • E.g. 2 + 36 = 36 +2, 5 + 7 + 5 = 5 + 5 + 7 • Add three small numbers by putting the largest number first and/or finding a pair totalling 10. i.e. 2 + 6 + 9 becomes 9 + 6 + 2 • 8 + 3 + 2 becomes (8 + 2) + 3 = • Respond to questions such as 'Tell me three numbers that add to 20?' • Work out 1 + __ + 5 = 17 • Partition addition into 10s and units and then recombine mentally with 2 digit numbers that total less than 100 i.e. 24 + 12 = 20 + 10 + 4 + 2 = 30 + 6 = 36 • Partitioning bridging through multiples of 10 • 6 + 7 = 6 + 4 + 3 or 23 - 9 = 23 – 3 - 6 • Use known number facts and place value to add or subtract pairs of numbers • Understanding place value to multiply and divide by 10, moving digits to right to multiply by 10 and to the left to divide by 10 i.e. 17 x 10 = 170, 30 ÷ 10 = 3. • Add or subtract 9, or 11 by rounding and compensating. i.e. 37 +9 = 37 + 10 – 1 = 46 • Using near doubles e.g. 13 + 14 is double 14 and subtract 1 or double 13 and add 1. understanding halving as the inverse of doubling • Use the relationship between addition and subtraction i.e. 8 + 7 = 15 therefore 15 – 8 = 7 and 15 – 7 = 8 • Use knowledge of number facts and place value to multiply and divide by 2, 5, and 10 • Uses patterns of similar calculations., e.g. 12 + 7 = 19 , 120 + 70 = 190

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3	• Order numbers and compare to 1000 • Count in multiples of 2,3,4,5,8 and 10 forwards and backwards. • Count in 50's and 100's • Know 10 or 100 more than numbers to 1000 • Count in fractions to 10, also count forwards and backwards in tenths. Recognise equivalents • Know by heart addition and subtraction facts for each number up to 20 • Know by heart all sums and differences of multiples of 10 up to 100 • Know by heart all doubles of multiples of 5 and 10 up to 100 • Know by heart all halves of multiples of 10 up to 100 • Know by heart all multiplication facts for2, 3 , 4, 5, ,8,10 up to 12 • Know the corresponding division facts for above tables to 12 • Recognise multiples of 2, 5, 10 up to 1000 • Know all pairs of multiples of 100 with a total of 1000 e.g. 800 + 200 • Know all pairs of multiples of 5 with a total of 100 i.e. 65 + 35	• Find a difference by calculating from the smaller to the larger number, e.g. 82 – 47 = 15 • Reorder numbers in a calculation e.g. 12-7-2 = 12-2-5 • Add three or four small numbers by putting the largest number first and/or finding pairs totalling 10. • Partition into tens and units and recombine. • For calculating, answers to exceed 100 • Bridge through a multiple of ten and adjust be able to do this with 3 digit numbers e.g. 149 + 32 = 149 + 1 + 31 = 181 • Add and subtract pairs of 1 and 2 digit numbers • Add and subtract 3 digit numbers and 1 digit, 3 digit and tens, 3 digit and hundreds • Recognise fractions and pairs of fractions equivalent to one • Calculate with fractions that have same denominator within one whole eg 1/7 + 2/7 = 3/7 • Recognise inverses with + and -, multiplication and division and use in mental calculations • Partition into '5 and a bit' when adding 6, 7, 8 or 9, then recombine. i.e. 27 + 8 =27 + 3 + 5 = 35 • Add or subtract mentally a 'near multiple of 10' to or from a two digit number e.g. 53 + 71 = 58 + 70 + 1 • Identify near doubles e.g. 18 + 16 is double 18 and subtract 2 or double 16 and add 2. Understand doubling as inverse of halving • Use patterns of similar calculations. 15 + 17 = 32 therefore 150 + 170 = 320 • To multiply a number by 10/100 shift its digits one, two places to the left (NOT ADD ZERO) • Use knowledge of number facts and place value to multiply or divide by 2,3,4,5, 10 and 100 • Say or write a subtraction statement corresponding to a given addition statement. e.g. 16 + 13 = 29, 29 – 13 =16 etc • Say or write a division statement corresponding to a given multiplication statement
4	• Count in multiples of 2,3,4,5,6,7,8,9,10,25,100,1000 • Say 10,100,1000 more or less than a number • Count up through the next multiple of 10, 100 or 1000 e.g. 789, 799, 809 etc • Count in unit fractions and decimal fractions (100th) forwards and backwards. • Double any two or three digit number • Halve any 2 or 3 digit number • Know all multiplication tables to 12x12 • Know division tables up to multiple 12x12 • Know decimal equivalents to ¼, ½, ¾ and any number of tenths and hundredths	• Round any number to nearest 10 or 100 • Use place value to aide calculation • Show use of number facts in mental calculation strategies and be able to talk about them • Calculate with increasingly complex numbers eg. 12,462 – 2,400 or 12,462 + 600 • Bridge through a 100 or 1000 89 + 67 = 89 + 11 + 56 = 156 • Add or subtract mentally a 'near multiple of 10' by rounding and compensating. • Use knowledge of near doubles. • Continue to use the relationship between addition and subtraction, multiplication and division. • Use knowledge of multiplication and division facts to calculate questions such as 640 divided by 8, • Use distributive law to derive facts such as 39 x 8 = 30x8 + 9x 8 • Double two and three digit numbers • Partition to carry out multiplication 56 x 7 = (50 x 7) + (6 x 7) =350 + 42 - 392 • Use closely related facts to carry out multiplication and division e.g. 7 x 6 = 42 therefore 70 x 6 = 420 or 6 x 8 = 6 x 4 x 2 =

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5	• Count forwards and backwards in steps of 10,100,1000 or 10,000 for any given number up to 1,000,000 • Round numbers up to 1,000,000 to nearest 10,100,1000,10,000 and 100,000 • Count in decimal fractions and decimals understanding the place value of each digit • Count in fractions and recognise equivalents • Reorder numbers in a calculation • Double any number with up to 2 decimal places • Halve any number with up to 2 decimal places • Recall quickly multiplication and division facts up to 12x12 and use them to multiply and divide pairs of multiples of 10 and 100 e.g. 30 x 70, 240 ÷ 40 = 60 • Identify pairs of factors for 2 digit whole numbers • Recall prime numbers to 19 • Know connections between percentages, fractions and decimals. • Know test for divisibility for multiples of 2, 5 and 10	• Use estimation in calculating and verbalise • Calculate whether a number up to 100 is prime • Add and subtract, multiply and divide mentally with increasingly large numbers, practicing speed and fluency • Use partitioning and place value in calculation • Add or subtract the nearest multiple of 10, 100 or 1000 then adjust • Use doubling and halving • Identify near doubles and use in strategies to calculate • Use factors e.g. 15 X 6 15 X 3 = 45 45 X 2 = 90 • Work out sixths by halving thirds etc • Use closely related facts to carry out multiplication and division 11 x 15 = (8 x 15) + (2 x 15) + (1 X 15) (8 = 2 x 2 x 2) therefore 15 x 2 x 2 x 2 = 120 120 + 30 + 15 = 165 • Use the relationship between addition and subtraction, multiplication and division
6	• Be able to order to 10 million • Continue to count regularly, whole numbers, fractions, decimals, negative numbers • Generate linear number sequences including negative and decimal numbers eg. 1.4, 1.1, 0.8 • Know by heart all the squares and square roots of numbers between 12 x 12 • Recognise and recall factors of numbers up to 100 and corresponding multiples of 100 • Use knowledge of place value and x facts to 10- x 10 to derive related x / ÷ facts (e.g. 0.8 x 7 = 5.6) • Know by heart test of divisibility for multiples of 2,3,4,5,6,9 10 and 12	• Consolidate all strategies from previous years • Use known number facts and place value to add or subtract pairs of three digit multiples of 10 and two digit numbers with two decimal places • Add or subtract the nearest multiple of 10 or 100, 1000 10,000, then adjust • Continue to use the relationship between addition and subtraction, multiplication and division • Use factors e.g. 35 x 183=35 x 2 x 3 x 3=70 x 3 x 3= 210 x 3 = 630 • Use knowledge of place value and number bonds to aide calculation • Use doubling and halving • Use closely related facts to carry out multiplication and division. • Work out 17 times table by adding 7 and 10 times facts and other multiplication tables • Use the relationship between multiplication and division e.g. 0.75 x 4 = 3 buy one get three free • Calculate with unit fractions and use the knowledge of this to see inverse. ¼ of a length is 36 so the total length is 36 x 4 = 144. • Use knowledge of fractions and decimals to calculate remainders.