HOLY TRINITY

C.E. PRIMARY ACADEMY (HANDSWORTH)

Calculation Policy
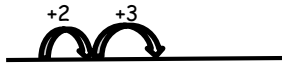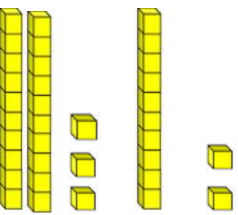
Addition
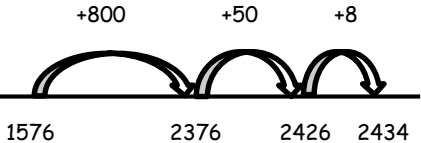
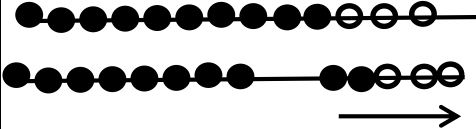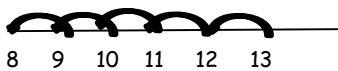|	Age –Related Expectations	Recording				
R	Addition as combining 2 groups.	**Pictures/objects** I buy 2 cakes and my friend buys 3 cakes. How many cakes do we have altogether? *This might be recorded as 2 +3= 5*		**Symbols** 8 people are on the bus. 5 more get on at the next stop. How many people are on the bus now? llllllll lllll *This might be recorded as 8 + 5 = 13*		
Y1	Represent and use number bonds and related subtraction facts within 20. Add one-digit and two-digit numbers to 20, including zero.	**Practical/recorded** using ICT and apparatus and drawings	**Pictures/symbols** (see above)	**Number track/Number line – jumps of 1** (modelled using bead strings) 8 + 4 = 12 +1 +1 +1 +1 8 9 10 11 12 13	**Number line (efficient jumps)** 8 + 5 +2 +3 8 10 13	
Y2	Add 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	**Pictures/Symbols** 23 + 12 = 35	**Number line (efficient jumps)** 35 + 47 +30 +3 +2 47 77 80 82 (Also jumps can be in 10's and 1's)		**Partitioning** 35 + 47 ==Ones first== 7 + 5 = 12 40 + 30 + 70 70 + 12 = 82	**Using mental strategies and informal jottings** 35 + 47 70 + 12 = 82
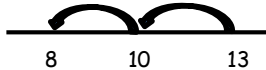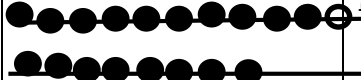
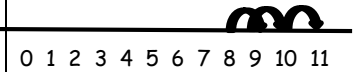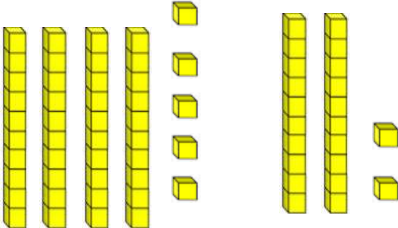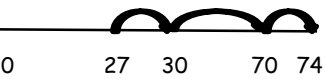|				
	numbers			

Y3	Add numbers with up to three digits, using formal written methods of columnar addition.	**Number line**
		
		57 + 285 = 342
		
		+50 +7
		
		285 335 342
			Partitioning
			<mark>Ones first</mark> and using mental methods and informal jottings
			
			5 7 + 2 8 5
			
			200 + 130 + 12
				Expanded vertical method Only to model →
				
				336 + 87 = 423
				
				H T O
				300 + 30 + 6
				     80 + 7
				―――――
				300 + 110 + 13
					Expanded vertical
					
					336
					+ 87
					―――
					  13 (6 + 7)
					110 (30 + 80)
					300 (300 + 0)
					―――
					423

Y4	Add numbers with up to 4 digits using the formal written methods of columnar addition where appropriate.	**Number line** 374 + 248 = 622 +200 +40 +8 374 574 614 622	**Expanded vertical** Only to model → <mark>Ones first</mark> 374 +248 ――― 12 (4 + 8) 110 (70 + 40) + 500 (300 + 200) ――― 622	**Compact vertical** 3 7 4 + 2 4 8 ――― 6 2 2 1 1 ← Carry underneath and cross out when added to avoid confusion.	

Y5	Add whole numbers with more than 4 digits, including using formal written methods (columnar addition). Add decimal numbers.	Number line
		
		1576 + 858 = 2434
		
		+800 +50 +8
		
		1576 2376 2426 2434
			Partitioning
			
			Only to model →
			
			1576 + 858
			
			8 + 14
			70 + 50 = 120
			500 + 800 = 1300
			1000 + 0 = 1000
				Expanded vertical
				
				    23.70 ==Ones or smallest place value first==
				+ 48.56
				――――
				  0.06 (0.00 + 0.06)
				  1.20 (0.70 + 0.50)
				 11.00 (3 + 8)
				 60.00 (20 + 40)
				――――
				   72.26
					Compact vertical
					
					    23.70
					+ 48.56
					――――
					   72.26
					――――
					
					~~1 1~~ ← carry underneath and cross out when added to avoid confusion.

Y6	As above	Number line
		
		3.243km + 18.07km =
		As above
		==Using mental methods and informal jottings==
			Partitioning
			Only to model
			
			3.243km + 18.07km
			
			3 + 18 = 21
			0.2 + 0.0 = 0.2
			0.04 + 0.07 = 0.11
			0.003 + 0 = 0.003
			==Using mental methods & informal jottings==
				Expanded vertical
				
				    3.243
				+ 18.070
				――――
				  0.003
				  0.110 ==Ones or smallest place value column first==
				  0.200
				 21.000
					Compact vertical
					
					    3.243 Carry ones
					+ 18.070 underneath.
					―――― Cross out
					  21.313 when added
					―――― to avoid
					~~1 1~~ ← confusion

Subtraction

→ Recording →

Age –Related Expectations

R	Begin to relate subtraction to 'taking away'.	**Pictures/Objects** I have five cakes. I eat two of them. How many do I have left? Might be recorded as 5 – 2 = 3			**Symbols** Mom baked 9 biscuits. I ate 5. How many were left? Might be recorded as 9 – 5 = 4
Y1	Represent and use number bonds and related subtraction facts within 20 Subtract one-digit and two-digit numbers to 20, including zero.	**Taking away – jumps of 1** (modelled using bead strings) 13 – 5 = 8 -1 -1 -1 -1 -1 8 9 10 11 12 13	**Taking away (efficient jumps)** 13 – 5 = 8 -2 -3 8 10 13 13 – 3 = 10 10 – 2 = 8	**Counting on – jumps of 1** ==Used to find the differences between numbers that are close.== (modelled using bead strings) 11 – 8 = 3	**Counting on** (efficient jumps) Number line/ no number line 11 – 8 = 3 8 + 2 = 10 10 + 1 = 11 +1 +1 +1 0 1 2 3 4 5 6 7 8 9 10 11
Y2	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	**Pictures/ Symbols** 45 -22 = 23	**Number lines – taking away** 74 – 27 = 47 -3 -4 -20 47 50 54 74 ==Also jumps can be in 10s and 1s==	**Partitioning** 74 -27 74 – 20 = 54 54 – 4 = 50 50 – 3 = 47	**Number lines – counting on** 74 – 27 = 47 To find the difference +3 +40 +4 0 27 30 70 74

	numbers • adding three one-digit numbers				

Y3	Subtract numbers with up to three digits, using formal written methods of subtraction.	Number line – counting on To find the difference
		
		141 -89 = 52
		
		+11 +41
		
		89 100 141
			Number line – taking away
			
			326 -78 = 248
			
			-8 -70
			
			248 256 326
			
			Vertical number line may be used to record calculation
				Decomposition
				Without exchanging
				
				275 – 32 = 243
				
				H T O
				200 + 70 + 5
				      30 + 2
				
				200 + 40 + 3
				
				Starting with the ones column
					Decomposition
					With exchanging
					
					272 – 48 = 224
					
					      60 1
					200 + 70 + 2
					      40 + 8
					
					200 + 20 + 4

Y4	Subtract numbers with up to 4 digits using the formal written methods of columnar subtraction where appropriate.	Number line – counting on 754 – 186 = 568 +14 +500 +54 186 200 700 754 Vertical number line may be used to record calculation	Decomposition With no exchanging 368 – 173 = 213 H T O 300 + 80 + 6 100 + 70 + 3 200 + 10 + 3	Decomposition With exchanging 723 – 458 = 265 600 110 1 700 + 20 + 3 400 + 50 + 8 200 + 60 + 5	Decomposition (compact method) 741 – 367 = 374 6 13 1 7 4 1 3 6 7 3 7 4
Y5	Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction). Subtract decimal numbers.	Number lines – counting on 72.5 – 45.7 = 26.8 +4.3 +20 +2.5 45.7 50 70 72.5	Decomposition With exchanging 2362 – 548 = 1814 1000 1 50 1 2000 + 300 + 60 + 2 500 + 40 + 8 1000 + 800 + 10 + 4		Decomposition (compact method) 72.5 – 45.7 = 26.8 6 11 1 7 2. 5 4 5. 7 2 6. 8

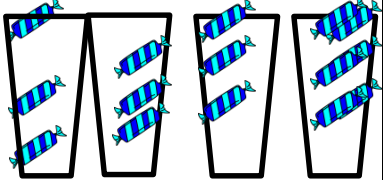| Y6	As above.	Recognise when one written method is more efficient (See Y5 methods of recording)
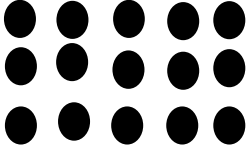
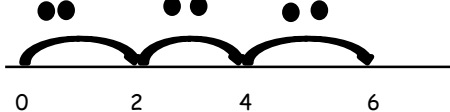# Multiplication

Age related expectations → Recording →

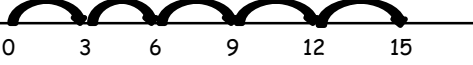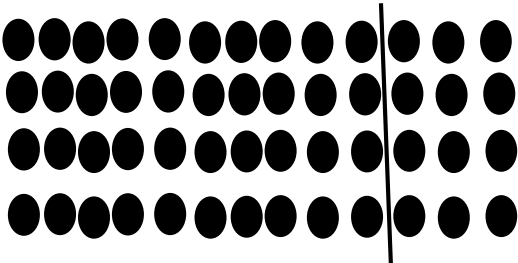|	Age related expectations		Pictures/ Objects	Symbols
R	Count repeated groups of the same size.	Practical/recorded using apparatus and drawings	**Pictures/ Objects** 3 plates, 2 cakes on each plate	**Symbols** 3 plates, 2 cakes on each plate || || ||
Y1	Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	Practical/recorded using ICT	**Pictures/Symbols** There are three sweets in one bag. How many sweets are there in five bags?	**Number line** (modelled using bead strings) 2x 3 or 3 x 2 (two, three times) or (three group of two) 0 2 4 6
Y2	Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.	**Pictures/Symbols** There are three apples in each box. How many apples in four boxes? ||| ||| ||| |||	**Repeated addition** 5 x 3 or 3 x 5 0 3 6 9 12 15 0 5 10 15	**Arrays** 5 x 3 or 3 x 5 ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● Also 14 x 2 as (10 x 2 and 4 x 2)

Y3	Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables. Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.	**Arrays** 13 x 4 10 x 4 = 40 3 x 4 =12	**Compact grid method** 13 x 4 = 52 <table><tr><td></td><td>T</td><td>O</td></tr><tr><td>X</td><td>10</td><td>3</td></tr><tr><td>4</td><td>40</td><td>12</td></tr></table> 40 + 12 = 52	**Partitioning (possible use of number line to record steps)** 13 x 4 = 52 10 x 4 = 40 3 x 4 = 12

Y4	Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.	**Compact grid method**
		
		43 x 6 = 258
		
		<table><tr><td>X</td><td>40</td><td>3</td></tr><tr><td>6</td><td>240</td><td>18</td></tr></table>
		
		240 + 18 = 258
			Expanded vertical
			
			  43
			X 6 <mark>ones first</mark>
			―――
			  18 (3 x 6)
			240 (40 x 6)
			―――
			258
				Compact vertical
				
				  43
				X 6
				―――
				258
				――
				  1

13 x 4

10 x 4 = 40
3 x 4 =12

Y5	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.	**Grid method** 47 x 36 	X	40	7
30	1200	210
6	240	42	 (estimate 50 x 40 = 2000)	**Recombine** → 1410 + 282 1692	**Expanded vertical** 237 x 4 (estimate: 250 x 4 = 1000) 237 X 4 28 120 800 948	**Compact vertical** 4.7 X 8 (estimate: 5 x 8 = 40) 4.7 X 8 37.6 5
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Y6	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.	**Grid method** 5.65 x 9 (estimate: 6 x 9 = 54) 	X	5	0.6	0.05
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9	45	5.4	0.45 | 45 5.4 + 0.45 50.85		**Expanded vertical** 2327 x 8 (estimate: 2300 x 10 = 23, 000) 2327 X 8 56 ones first 160 2400 + 16000 18616 1	**Compact vertical** 256 x 18 (estimate: 250 x 20 = 5000) 256 X 18 2048 (8 x 256) + 2560 (10 x 256) 4608 1
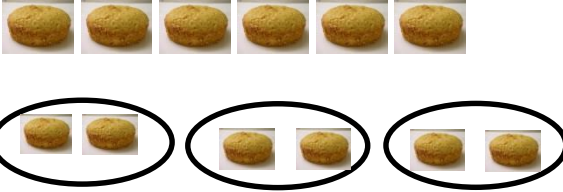
Division
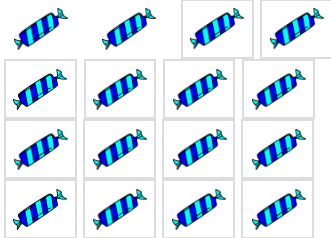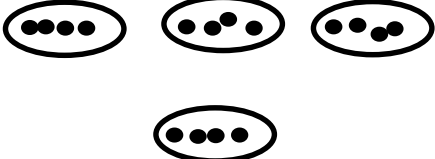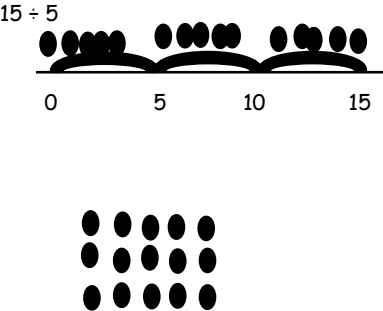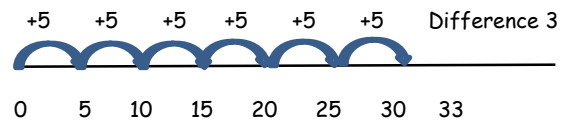
Age related expectations
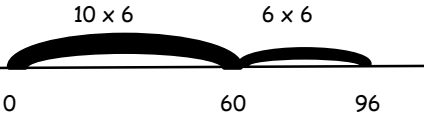
Recording →

| R | Share objects into equal sets and count how many are in each group. | Practical/recorded using apparatus and drawings | Pictures/ Objects

6 cakes shared between 2

6 cakes put into groups of 2 | Symbols

6 cakes shared between 2

6 cakes put into groups of 2 |
| Y1 | 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. | Practical/ recorded using ICT | Pictures/ Symbols

How many apples in each bowl if I share 12 apples between 3 bowls? | Number line

6 ÷ 2 = 3

0   2   4   6

Modelled using bead strings |

Y2	Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.	Pictures/ Symbols Four sweets fit in a box. How many boxes would you need to pack 16 sweets? 	Number lines / Arrays $15 \div 5$ 	Partitioning $28 \div 2$ $20 \div 2 = 10$ $8 \div 2 = 4$
Y3	Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables. Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.	Number lines/ Array (Count back from number) As for Y2 with no remainders	Number lines (count on from zero) $33 \div 5 = 6 \ r3$ ==Examples with remainders==	

Y4	Divide numbers up to 3 digits by a one-digit number and interpret remainders appropriately for the context.	Number line (start from zero)
		
		$96 \div 6 = 16$
		
		10 × 6 6 × 6
		
		0 60 96
			Partitioning (multiples of the divisor)
			
			$64 \div 4 = 16$
			
			10 × 4 = 40
			6 × 4 = 24
			
			40 + 24 = 64 Use as a mental method with no remainders
				Grouping (vertical layout)
				
				$96 \div 7 =$
				
				  96
				- 70 (10 × 7)
				
				  26
				- 21 (3 × 7)
				   5
				
				Answer = 13 r5

Y5	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.	Grouping (expanded)
		
		$196 \div 6$
		
		6 ⟌ 196
		  - 60 (10 × 6)
		  136
		  - 60 (10 × 6)
		   76
		  - 60 (10 × 6)
		   16
		  - 12 (2 × 6)
		    4
		
		Answer = 32 r4
			Grouping (efficient)
			
			$196 \div 6$
			
			6 ⟌ 196
			  -180 (30 × 6)
			   16
			  -12 (2 × 6)
			   4
			
			Answer = 32 r4
				Long division
				
				$195 \div 15 =$
				
				   13
				15 ⟌ 195
				  -150
				  45
				  -45
				   0
					Short division
					
					$291 \div 3$
					
					   9 7
					3 ⟌ 2 9 ₂1
					
					Using with whole numbers only

| Y6 | 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. | Grouping (efficient)

25.6 ÷ 8
(estimate: 24 ÷ 8 = 3)

8 ⟌ 25.6
  -24.0 (3.0 × 8)
    1.6
   -1.6 (0.2 × 8)
     0

3.0 + 0.2 = 3.2

25.6 ÷ 8 = 3.2 | Long division

560 ÷ 24
(estimate: 550 ÷ 25 = 22)

     23 r 8
24 ⟌ 560
   -480
     80
    -72
      8 | Short division

43.4 ÷ 7
(estimate 42 ÷ 7 = 6)

    6. 2
7 ⟌ 4 3 .₁4 |