Progression in Informal calculation strategies - Addition and subtraction

Addition	Year 2	Year 3	Year 4	Year 5	Year 6
Counting on	By counting on in 10s 37 + 20 = 37 + 10 + 10 = 47 + 10 = 57	Counting on in 10s/100s 137 + 20 = 137 + 10 + 10 = 147 + 10 = 157	By partitioning the 2nd number 137 + 320 = 320 + 137 320 + 100 + 30 + 7 = 420 + 30 + 7 = 457	By partitioning the 2nd number 3.7 + 2.1 = 3.7 + 2.0 + 0.1 = 5.7 + 0.1 = 5.8	By partitioning the 2nd number 1.37 + 3.2 = 3.2 + 1.37 3.2 + 1.0 + 0.3 + 0.07 = 4.2 + 0.3 + 0.07 = 4.5 + 0.07 = 4.57
Partitioning **Re-sort** **Re-combine**	23 + 12 20 + 10 = 30, 3 + 2 = 5 then 30 + 5 = 35	263 + 33 = 200 + 60 + 3 + 30 + 3 = 200 + 60 + 30 + 3 + 3 = 200 + 90 + 6 = 296	263 + 43 = 200 + 60 + 3 + 40 + 3 = 200 + 60 + 40 + 3 + 3 = 200 + 100 + 6 = 306	2.3 + 1.2 = 2.0 + 0.3 + 1.0 + 0.2 = 2.0 + 1.0 + 0.3 + 0.2 = 3.0 + 0.5 = 3.5	2.63 + 4.3 = 2.0 + 0.6 + 0.03 + 4.0 + 0.3 = 2.0 + 4.0 + 0.6 + 0.3 + 0.03 = 6.0 + 0.9 + 0.03 = 6.93
Adjusting **Develop into adding 7/8 etc using number bond knowledge.**	34 + 9 add 10 then subtract 1 34 + 10 - 1 = 44 – 1 = 43	134 + 99 = add 100 and subtract 1 134 + 100 – 1 = 234 – 1 = 233	2134 + 199 = add 200 and subtract 1 2134 + 200 – 1 = 2334 – 1 = 2333	3.4 + 0.9 = add 1 and subtract 0.1 3.4 + 1.0 – 0.1 = 4.4 – 0.1 = 4.3	1.34 + 0.99 by add 1 and subtract 0.01 1.34 + 1.0 – 0.01 = 2.34 – 0.01 = 2.33
Adjusting **Using near doubles**	19 + 21 = (19 + 1 + 21 – 1) 20 + 20 = 40	49 + 51 = (50 – 1 + 50 + 1) 50 + 50 = 100	248 + 252 = (248 + 2 + 252 - 2) 250 + 250 = 500	1.9 + 2.1 = (1.9 + 0.1 + 2.1 – 0.1) 2.0 + 2.0 = 4	2.48 + 2.52 = (2.48 + 0.02 + 2.52 – 0.02) 2.50 + 2.50 = 5.00
Using known facts and place value **Patterning**	23 +4 20 + 3 + 4 = 20 + 7 = 67 also 3 + 4 = 7 13 + 4 = 17 23 + 4 = 27	123 + 7 120 + 3 + 7 = 120 + 10 = 130 also 3 + 7 = 10 23 + 7 = 30 123 + 7 = 130	1123 + 84 = 1100 + 20 + 80 + 3 + 4 = 1100 + 100 + 7 = 1200 + 7 = 1207 also 3 + 4 = 7 23 + 4 = 27 23 + 84 = 107	2.3 + 0.4 = using: 3 + 4 = 7 2.0 + 0.3 + 0.4 = 2.0 + 0.7 = 2.7 model – using 10s frame.	1.23 + 0.07 = using: 3 + 7 = 10 We know 0.03 + 0.07 = 0.1 1.2 + 0.03 + 0.07 = 1.2 + 0.1 = 1.3 Model using 100 square.
Find the next multiple 10 Partitioning and number bonds.	26 + 7 = 20 + 6 + 4 + 3 = 20 + 10 + 3 = 33	126 + 7 = 120 + 6 + 4 + 3 = 120 + 10 + 3 = 133	126 + 83 = 100 + 20 + 80 + 6 + 3 = 100 + 100 + 9 = 209	2.6 + 0.7 = 2.0 + 0.6 + 0.4 + 0.3 = 2.0 + 1.0 + 0.3 = 3.3	1.26 + 0.07 = 1.0 + 0.2 + 0.06 + 0.04 + 0.03 1.2 + 1.0 + 0.03 = 2.2 + 0.03 = 2.23

Subtraction	Year 2	Year 3	Year 4	Year 5	Year 6
Counting back	64 – 40 64 – 10 – 10 – 10 – 10 = 54 – 10 – 10 – 10 = 44 – 10 – 10 = 34 – 10 = 24	164 - 40 = 164 – 10 – 10 – 10 – 10 = 154 – 10 – 10 – 10 = 144 – 10 – 10 = 134 – 10 = 124	564 – 140 = 564 – 100 = 464 464 – 10 – 10 – 10 – 10 = 454 – 10 – 10 – 10 = 444 – 10 – 10 = 434 – 10 = 524	6.4 – 0.4 = 6.4 – 0.1 – 0.1 – 0.1 – 0.1 = 6.3 – 0.1 – 0.1 – 0.1 = 6.2 – 0.1 – 0.1 = 6.1 – 0.1 = 6.0	5.64 – 0.14 = 5.64 – 0.1 = 5.54 5.54 – 0.01 – 0.01 – 0.01 – 0.01 = 5.53 5.53 – 0.01 – 0.01 -0.01 = 5.52 – 0.01 – 0.01 = 5.51 – 0.01 = 5.50
counting up	31 - 28 28 + 2 = 30 30 + 1 = 31 31 – 28 = 3	102 – 97 = 97 + 3 = 100 100 + 2 = 102 102 – 97 = 5	602 – 297 = 297 + 3 = 300 300 + 300 = 600 600 + 7 = 607 602 – 297 = 310	3.1 – 2.8 = 2.8 + 0.2 = 3.0 3.0 + 0.1 = 3.1 3.1 – 2.8 = 0.3	1.02 - 0.97 = 0.97 + 0.03 = 1.00 1.00 + 0.02 = 1.02 1.02 – 0.97 = 0.05
Adjusting	35 – 9 = subtract 10 and add 1 35 – 10 + 1 = 25 + 1 = 26	234 – 99 = subtract 100 and add 1 234 – 100 + 1 = 134 + 1 = 135	1234 – 199 = subtract 200 and add 1 1234 – 200 + 1 = 1034 + 1 = 1035	3.5 – 0.9 = subtract 1 and add 0.1 3.5 – 1.0 + 0.1 = 2.5 + 0.1 = 2.6	2.34 – 0.99 = subtract 1 and add 0.01 2.34 – 1.00 + 0.01 = 1.34 + 0.01 = 1.35
Using known facts and place value	57 – 4 7 – 4 = 3 so 57 – 4 = 53	268 – 5 = 8-5=3 so 268-5=263	260 - 50 = 6 - 5 = 1 so 60 - 50 = 10 so 260 - 10 =	5.7 – 0.4 = 7 – 4 = 3 so 0.7 – 0.4 = 0.3 therefore 5.7 – 0.4 = 5.3	2.68 – 0.05 = 8 – 5 = 3 so 0.08 – 0.05 = 0.03 and 2.68 – 0.05 = 2.63
Find the next multiple 10	24 – 7 = 24 – 4 – 3 = 20 – 3 = 17	84 – 7 = 84 – 4 – 3 = 80 – 3 = 77	284 – 37 = 284 – 34 – 3 = 250 – 3 = 247	2.4 – 0.7 = 2.4 – 0.4 – 0.3 = 2.0 – 0.3 = 1.7	2.84 – 0.37 = 2.84 – 0.34 – 0.03 = 2.50 – 0.03 = 2.47

Progression in Informal calculation strategies – Multiplication and division

Multiplication	Year 2	Year 3	Year 4	Year 5	Year 6
Repeated addition	3 x 3 = 3 + 3 + 3 = 9	13 x 3 = 13 + 13 + 13 = 30 + 9 = 39	18 x 3 = 18 + 18 + 18 = 30 + 24 = 54	1.3 X 3 = 1.3 + 1.3 + 1.3 = 3.0 + 1.9 = 3.9	1.38 X 3 = 1.38 + 1.38 + 1.38 = 3.00 + 0.90 + 0.24 = 4.14
Partitioning **Distributive law**		14 x 3 = 10 x 3 =30 + 4 x 3 =12 30 + 12 = 42	54 x 6 50 X 6 = 300 + 4 X 6 = 24 300 + 24 = 324	1.4 X 3 = 1.0 X 3 = 3.0 + 0.4 X 3 = 1.2 3.0 + 1.2 = 4.2	1.43 x 3 = 1.00 x 3 = 3.00 + 0.40 X = 1.20 + 0.03 x 3 = 0.09 3.00 + 1.20 + 0.09 = 4.29
Partitioning **for doubles**	12 x 2 = 10 x 2 + 2 x 2 = 20 + 4 = 24	28 x 2 = 20 x 2 + 8 x 2 = 40 + 16 = 56	128 x 2 = 100 x 2 + 20 x 2 + 8 x 2 = 200 + 40 + 16 = 256	2.8 X 2 = 2.0 X 2 + 0.8 X 2 = 4.0 + 1.6 = 5.6	1.28 x 2 = 1.00 x 2 + 0.8 x 2 + 0.08 x 2 = 2.00 + 1.6 + 0.16 = 2.56
Doubling and halving	7 X 4 = 7 x 2 x 2 = 14 x 2 = 28	14 x 4 = 14 x 2 x 2 = 28 x 2 = 56	35x8 = 35 x 2 x 2 x 2 = 70 x 2 x 2 = 140 x 2 = 280	3.5 X 4 = 3.5 X 2 X 2 = 7.0 X 2 = 14.0	0.35 X 40 = 0.35 x 2 x 2 x 10 = 0.70 x 2 = 1.40 = 1.40 x 10 = 14.0
Using factors		7 x 6 = Double 7 x 3 = 7 x 6 = 7 x 3 x 2 = 21 x 2 = 42 Model using and splitting arrays	15 x 6 = 15 x 6 = 15 x 2 x 3 = 30 X 3 = 90	15 x 12= 15 x 12 = 15 x 2 x 6 = 30 x 6 = 180	45 x 24 = 5 x 9 x 12 x 2 = 5 x 12 x 9 x 2 = 60 x 9 x 2 = 540 X 2 = 1080
Using known facts and place value	6 x 5 = using 5 x 5 = 25 so 6 x 5 = 30 (5 x 5 + 5)	30 x 4 = Using: 3 x 4 = 12 so 30 x 4 = 120 (3 x 4 x 10)	34 x 9 = using 3 x 9 = 27 so 30 x 9 = 270 (3 x 9 x 10) + (4 x 9) = 270 + 36 = 306	0.3 X 4 = using 3 x 4 = 12 so 0.3 x 4 = 1.3 (3 x 4 ÷ 10)	30 x 41 = using 3 x 4 = 12 so 30 x 40 = 1200 (3 x 4 x 10 x 10) 1200 + 30 = 1230

Division	Year 2	Year 3	Year 4	Year 5	Year 6
Repeated subtraction	70 ÷ 10 = 7 70 – 10 = 60 60 – 10 = 50 50 – 10 40 40 – 10 = 30 30 – 10 = 20 20 – 10 = 10 10 – 10 = 10 (I have subtracted 7 lots of 10 and 7 x 10 = 70)	20 ÷ 5 = 20 – 5 - 15 15 – 5 = 10 10 – 5 = 5 5 – 5 = 0 20 ÷ 5 = 4 (I have subtracted 4 lots of 5 and 4 x 5 = 20)	80 ÷ 5 = 80 – 5 = 75 75 – 5 = 70 70 – 5 = 65 65 – 5 = 60 60 – (12 x 5) = 0	180 ÷ 5 = 12 x 5 = 60 180 – 60 = 120 12 x 5 = 60 120 – 60 = 60 12 x 5 = 60 60 – 60 = 0 12 + 12 + 12= 36	280 ÷5 = 20 x 5 = 100 280 – 100 = 180 20 x 5 = 100 180 – 100 = 80 10 x 5 = 50 80 – 50 = 30 6 x 5 = 30 30 – 30 = 0 20 + 20 + 10 + 6 = 56
Repeated addition (Counting up)	70 ÷ 10 = 7 10, 20, 30, 40, 50, 60, 70 (I have counted up 7 lots of 10)	20 ÷ 5 = 5,10,15,20 (I have counted up four lots of 5)	80 ÷ 5 = 60, 65, 70, 75, 80. (I know that 12 lots of 5 are 60 so I can count on in 5s from here.	2.0 ÷ 5 = 0.5, 1.0. 1.5. 2.0 (I have counted up four lots of 0.5)	
Grouping & Sharing	10 ÷ 5 = Means how many groups of 5 are there 10? Also means 10 shared by 5. How many in each group?	20 ÷ 5 = Means how many groups of 5 are there 20? Also means 20 shared by 5. How many in each group?			
Partitioning **Distributive law**	15 ÷ 5 = 10 ÷ 5 = 2 5 ÷ 5 = 1 2 + 1 = 3	69 ÷ 3 = 60 ÷ 3 = 20 9 ÷ 3 = 3 20 + 3 = 23	78 ÷ 3 = 60 ÷ 3 = 20 18 ÷ 3 = 6 20 + 6 = 26	444 ÷ 3 300 ÷ 3 = 100 120 ÷ 3 = 40 24 ÷ 3 = 8 100 + 40 + 8 = 148	4.44 ÷ 3 = 3.00 ÷ 3 = 1 1.20 ÷ 3 = 0.4 0.24 ÷ 3 = 0.08 1 + 0.4 + 0.08 = 1.48
Doubling and halving	14 ÷ 2 = 7 by recalling the doubles first	84 ÷ 2 = 42 half of 84 = 42 (42 x 2 = 84) (80 ÷ 2 = 40) (4 ÷ 2 = 2)	84 ÷ 4= Half of 84 = 42 (42 x 2 = 84) Half of 42 = 21 (21 x 2 = 42) (80 ÷ 2 ÷ 2 = 20) (4 ÷ 2 ÷ 2 = 1)	8.4 ÷ 2 = half of 8.4 = 4.2 (4.2 x 2 = 8.4) (8.0 ÷ 2 = 4.0) (0.4 ÷ 2 =0.2)	8.4 ÷ 20 = half of 8.4 = 4.2 (4.2 x 2 = 8.4) (8.0 ÷ 2 = 4.0) (0.4 ÷ 2 =0.2) 4.2 ÷ 10 = 0.42 Half of 9.6 = 4.8; half of 4.8 = 2.4; 2.4 ÷ 10 = 0.21
Using factors & fact families		3 x 4 = 12 4 x 3 = 12 so 12 ÷ 4 = 3 12 ÷ 3 = 4	30 x 4 = 120 4 x 30 = 120 so 120 ÷ 40 = 3 120 ÷ 3 = 40	300 ÷ 40 = 300 ÷ 4÷ 10 = 75 ÷ 10 = 7.5	
Using known facts and place value	If 4 ÷ 2 = 2 then 40 ÷ 2 = 20	6 ÷ 3 = 2 then 60 ÷ 3 = 20	6 ÷ 3 = 2 then 600 ÷ 3 = 200	6 ÷ 3 = 2 then 600 ÷ 30 = 20	6 ÷ 3 = 2 then 0.6 ÷ 3 = 0.2