Calculation Progression Year 1

How shall I add?

- 4 + 1, 6 + 3, 10 + 4
  Number facts
  Single digit numbers
  Doubles
  Ten and single digits
  - I just knew it!
- 3 + 7
  Use known addition facts
  - If I know 3 + 7 = 10 then I know 3 + 8 = 11 because it is 1 more
- 7 + 8
  Use near doubles
  - If I know 7 + 7 = 14 then I know 7 + 8 = 15 because it is 1 more
- 7 = 3 + 4
  Secure addition bonds of single digits and ten
- 7 + 10
  Add ten
- Notice the relationships
  24 + 1
  Find one more
  - 1 more than 4 is 5
    1 more than 14 is 15
    1 more than 24 is 25
- 12 + 4
  Counting on in 1s
- 7 + 4
  Count all

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How shall I subtract?

- 5 - 1, 7 - 3, 10 - 6
  Number facts
  Single digit numbers
  Teens subtract single digits
  - I just knew it!
- 3 + 7
  Use known addition facts to derive subtraction facts
  - If I know 3 + 7 = 10 then I know 10 - 3 = 7
- 9 - 7
  Find the difference between two numbers
  - 9 is 2 more than 7
    7 is 2 less than 9 so the difference between 7 and 9 is 2
- 7 - 3 = 4
  Secure subtraction facts of single digits and ten
- 9 - 3
  Take away
- Notice the relationships
  23 - 1
  Find one less
  - 1 less than 4 is 3
    1 less than 14 is 13
    1 less than 24 is 23
- 16 - 4
  Counting back in 1s
- 17 - 10
  Take away ten

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How shall I multiply?

- Equal groups
  - 3 people each have 4 cats. How many cats are there in total?
  - There are 3 groups with 4 cats in each group
  - Count in ones
    1,2,3,4,5,6,7,8,9,10,11,12
- Arrays
- Repeated addition
  - 4 + 4 + 4 = 12

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How shall I divide?

- Sharing
  - 12 shared into 3 equal groups
  - There are 12 cats.
    Three people each have the same number of cats.
    How many do they have each?
  - 1 for you, 1 for you, 1 for you...
- 12 ÷ 3 = 4
  - 12 can be described as 3 columns of 4 or 4 rows of three
- Grouping
  - How many groups of 3 are there in 12?
  - There are 12 cats.
    Each person owns 3 cats.
    How many people are there?
  - Grab a group of 3, grab a group of 3...
- Bar model
  - 12

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Calculation Progression Year 2

How shall I add?

- 8 + 7, 9 + 9, 14 + 3 — Number facts, Single digit numbers, Doubles, Teens and single digits — I just knew it!
- 13 + 17 — Use known facts 30 + 70 — If I know 3 + 7 = 10 then I know 3 tens + 7 tens = 10 tens — If I know 3 + 7 = 10 then I know 13 + 17 is 2 tens more
- 35 + 20 — Add multiples of ten — If I know 3 + 2 = 5 then I know 3 tens + 2 tens = 5 tens so 30 + 20 = 50
- 5 + 18 — Greatest number first then bridge
- 25 + 43 — Partition and recombine
- 37 + 19 — Round then adjust — Add 20 then subtract 1
- 35 + 27 — Count on in tens then ones

How shall I subtract?

- 9 - 4, 13 - 5, 18 - 9 — Number facts, Single digit numbers, Halves, Teens and single digits — I just knew it!
- 30 - 7 — Use known facts 100 - 70 — If I know 10 - 7 = 3 then I know 30 - 7 is 2 tens and 3
- 46 - 20 — Count back: multiples of ten — If I know 4 - 2 = 2 then I know 4 tens - 2 tens = 2 tens so 40 - 20 = 20
- 23 - 5 — Count back: bridge through a multiple of ten
- 47 - 19 — Round then adjust — Take away 20 then add 1
- 42 - 37 — Find the difference between two numbers — 42 is 5 more than 37, 37 is 5 less than 42 so the difference between 37 and 42 is 5
- 55 - 24 — Count back in tens then ones

How shall I multiply?

- Equal groups — There are 3 groups with 4 cats in each group — Four cats, multiplied by 3 — 4 x 3 = 12
- 3 people each have 4 cats. How many cats are there in total? — One to many correspondence — If each person has 4 cats, there are 4 times as many cats as people
- Recall of 2x, 5x and 10x tables

People	Cats
1	4
2	8
3	12

- Arrays — 4 x 3 = 12 — 3 x 4 = 4 x 3
- Repeated addition — 4 + 4 + 4 = 12
- Count in ones — 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
- Count in twos — 2, 4, 6, 8, 10, 12
- Use a known fact — If 2 x 3 is 6, then 4 x 3 is double 6.

How shall I divide?

- Sharing — 12 shared into 3 equal groups — There are 12 cats. Three people each have the same number of cats. How many do they have each?
- 12 ÷ 3 = 4
- Recall and use 2x, 5x and 10x tables
- Grouping — How many groups of 3 are there in 12? — There are 12 cats. Each person owns 3 cats. How many people are there?
- 1 for you, 1 for you, 1 for you...
- Grab a group of 3, grab a group of 3...
- Bar model — Link to fractions. One third of 12 is 4.
- 12 can be described as 3 columns of 4 or 4 rows of three
- If I know 3 x 4 = 12 then I know 12 ÷ 3 = 4

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Calculation Progression Year 3

How shall I add?

- 8 + 7, 9 + 9, 14 + 3 — Number facts, Single digit numbers, Doubles, Tens to make 100 — I just knew it!
- 243 + 7 — Use known facts 300 + 700 — If I know 3 + 7 = 10 then I know 3 hundreds + 7 hundreds = 10 hundreds — If I know 3 + 7 = 10 then I know 243 + 7 makes the next multiple of 10
- 325 + 200 — Add multiples of ten and hundred — If I know 3 + 2 = 5 then I know 3 hundreds + 2 hundreds = 5 hundreds
- 150 + 80 — Bridging boundaries
- 262 + 152 — Formal written method — 6 tens add 5 tens = 11 tens or 110
- 250 + 360 — Partition and recombine
- 235 + 250 — Count on in hundreds then tens
- 237 + 199 — Round then adjust — Add 200 then subtract 1

How shall I subtract?

- 15 - 8, 18 - 5 — Number facts, Single digit numbers, Teens and single digits — I just knew it!
- 240 - 7 — Use known facts 1000 - 700 — If I know 10 - 7 = 3 then I know 10 hundreds - 7 hundreds = 3 hundreds
- 10 - 7 = 3 — If I know 10 - 7 = 3 then I know any multiple of 10, take away 7 leaves 3 in the ones
- 525 - 300 — Take away multiples of ten and a hundred — If I know 5 - 3 = 2 then I know 5 hundreds - 3 hundreds = 2 hundreds
- 230 - 80 — Bridging boundaries by counting back in efficient steps
- 234 - 152 — Formal written method
- 335 - 326 — Find the difference between two numbers — 335 is 9 more than 326, 326 is 9 less than 335, so the difference between them is 9
- 435 - 199 — Round then adjust — Take away 200 then add 1

How shall I multiply?

- Rapid recall of 2x, 5x, 10x (year 2) 3x, 4x, 8x (year 3) multiplication tables
- 6 x 4 — Use known facts and place value — 40 is ten times greater than 4
- 8 x 3 — Repeated addition — 8 + 8 + 8 = 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3
- Multiply by 10
- If I know 3 x 8 then I know 8 x 3 — Arrays
- Scaling — The red tower is 3 times taller than the grey tower
- 17 x 4 — Partition and recombine
- 5 x 18 — Double and halve
- 17 x 4 — Formal written method

How shall I divide?

- Known facts: Use 2x, 5x, 10x (year 2) 3x, 4x, 8x (year 3) multiplication tables to derive division facts
- 24 ÷ 4 — Use known facts and place value — 240 is ten times greater than 24 — 24 biscuits shared between 4 people means they will get 6 biscuits each. If there are 10 times as many people and 10 times as many biscuits, how many biscuits each now?
- 240 ÷ 40 — Repeated addition — How many 40s are there in 240?
- 200 ÷ 10 — Divide by 10 — 200 ÷ 10 = 20 so 20 is ten times smaller than 200
- A tenth of is — A tenth of 1 is 1 tenth, so 1 ÷ 10 = 1/10
- 45 ÷ 3 — Sharing equally — Ten for you, ten for you, ten for you...
- 42 ÷ 6 — Double and halve — If there are half as many biscuits and half as many people...
- 52 ÷ 4 — Partition and recombine — ten lots and the rest
- Link to fractions

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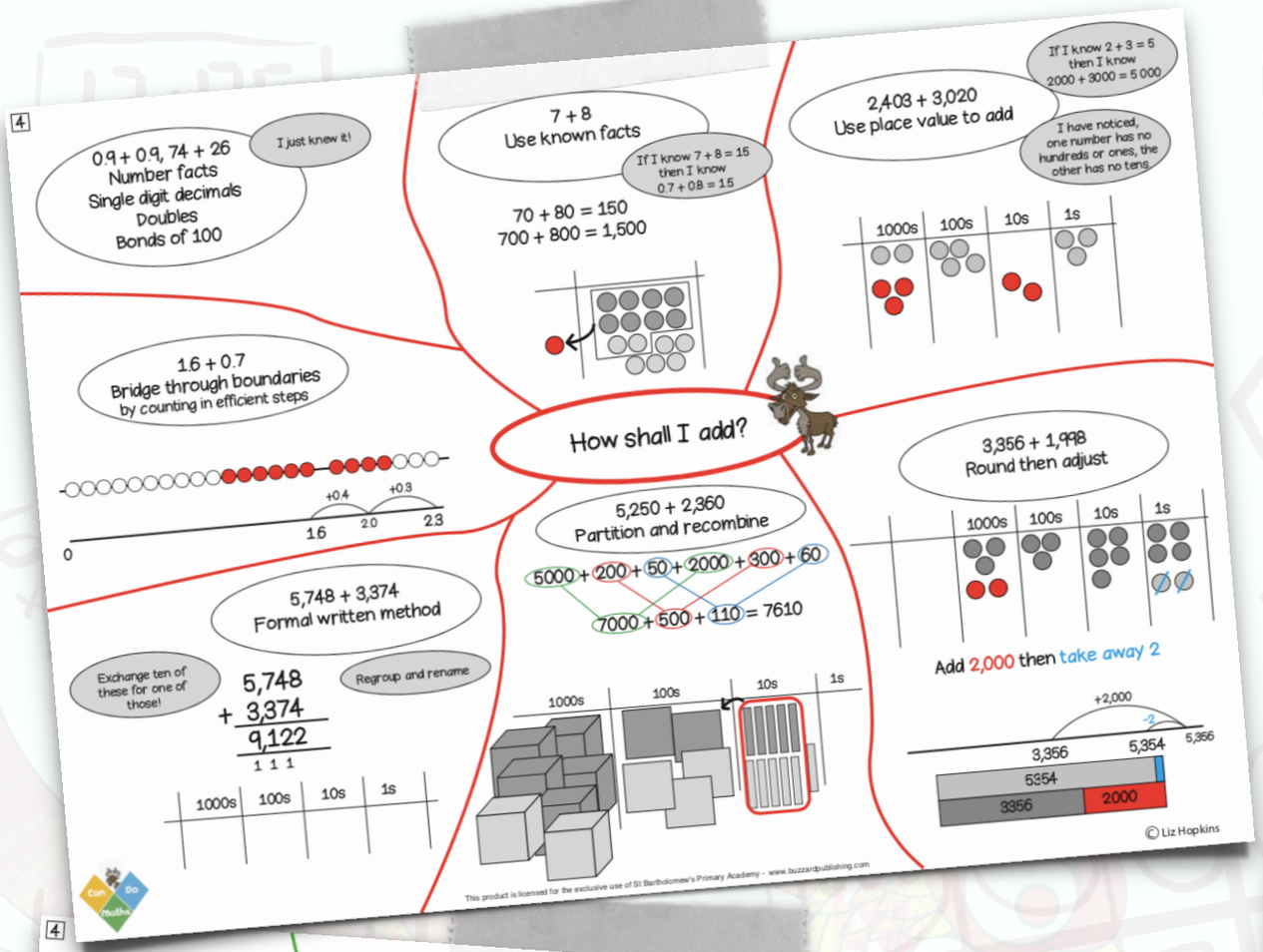
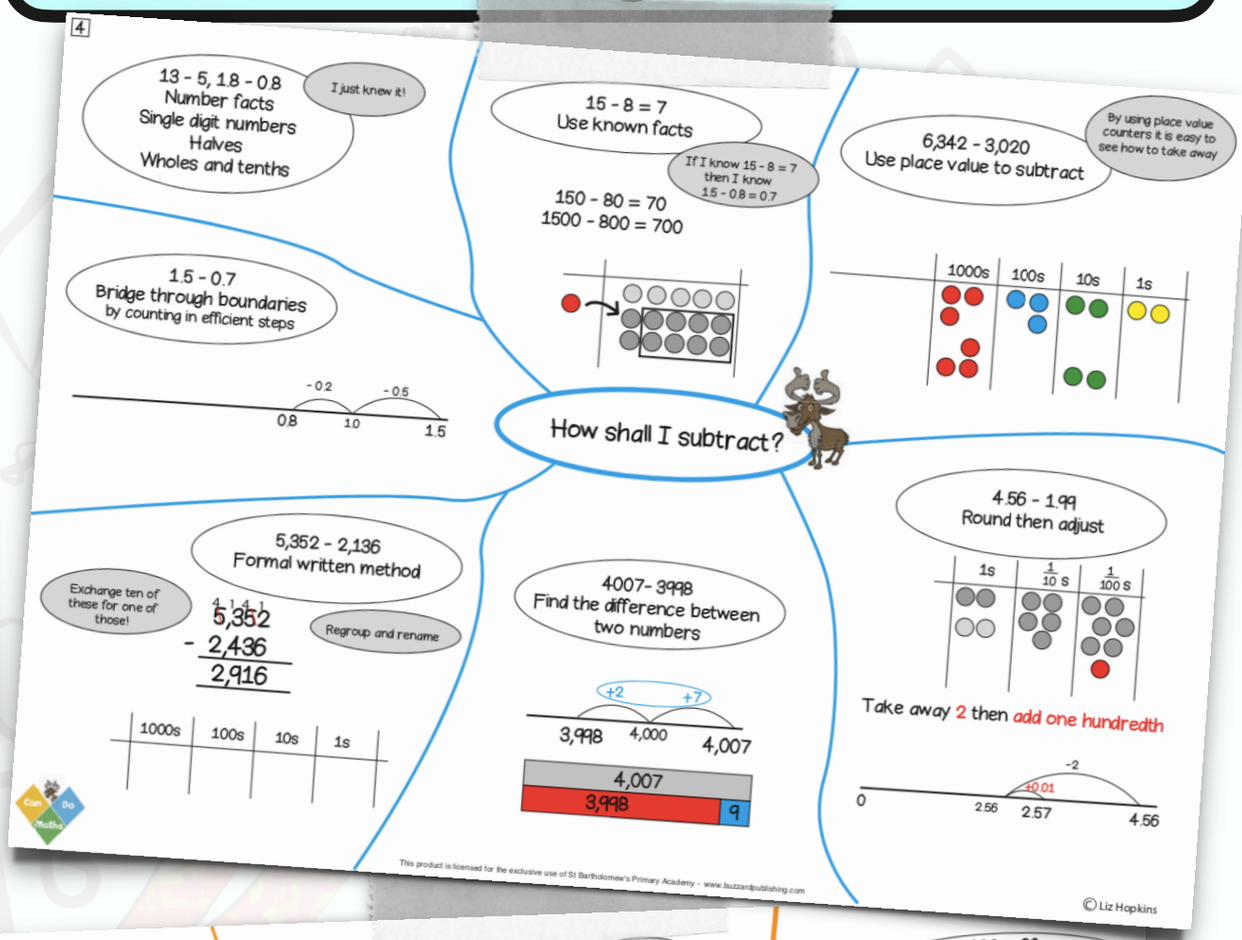
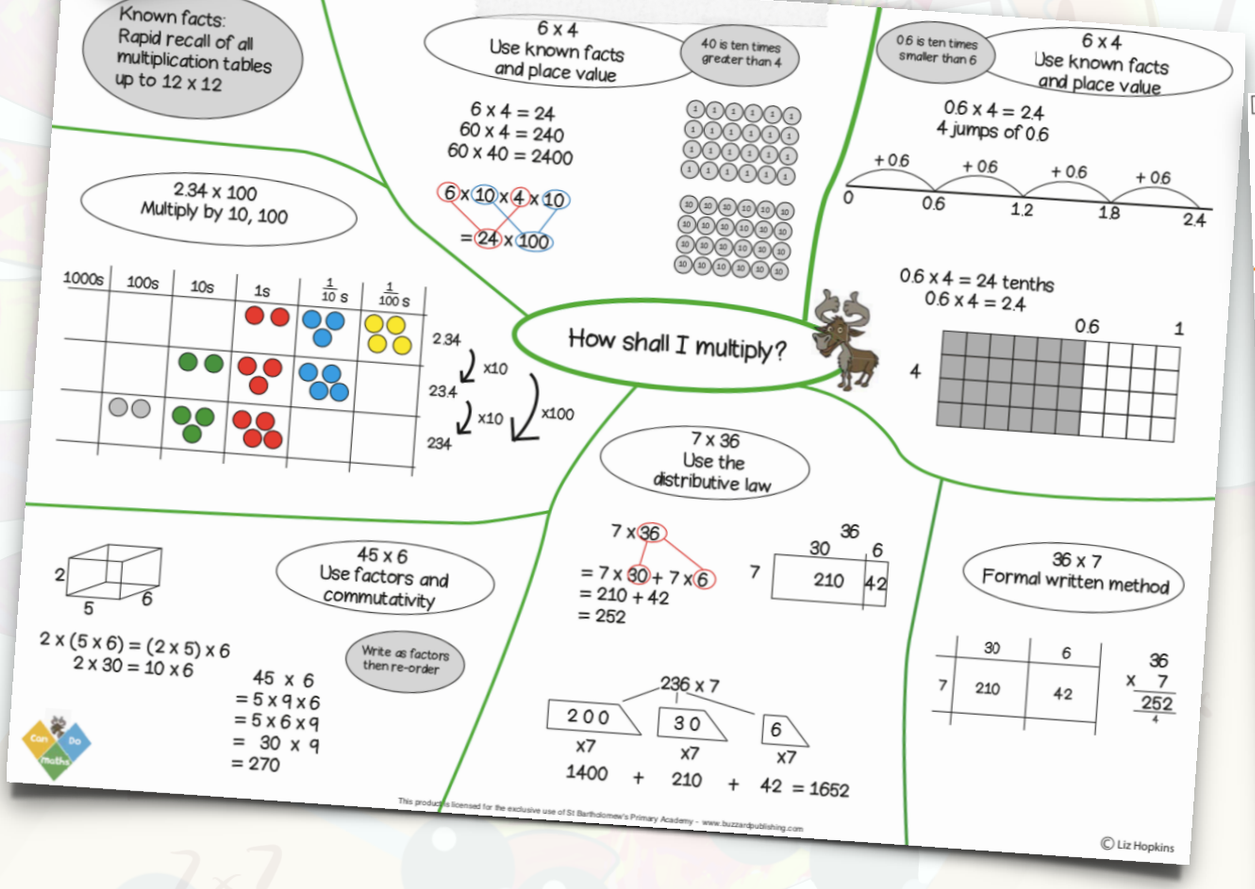
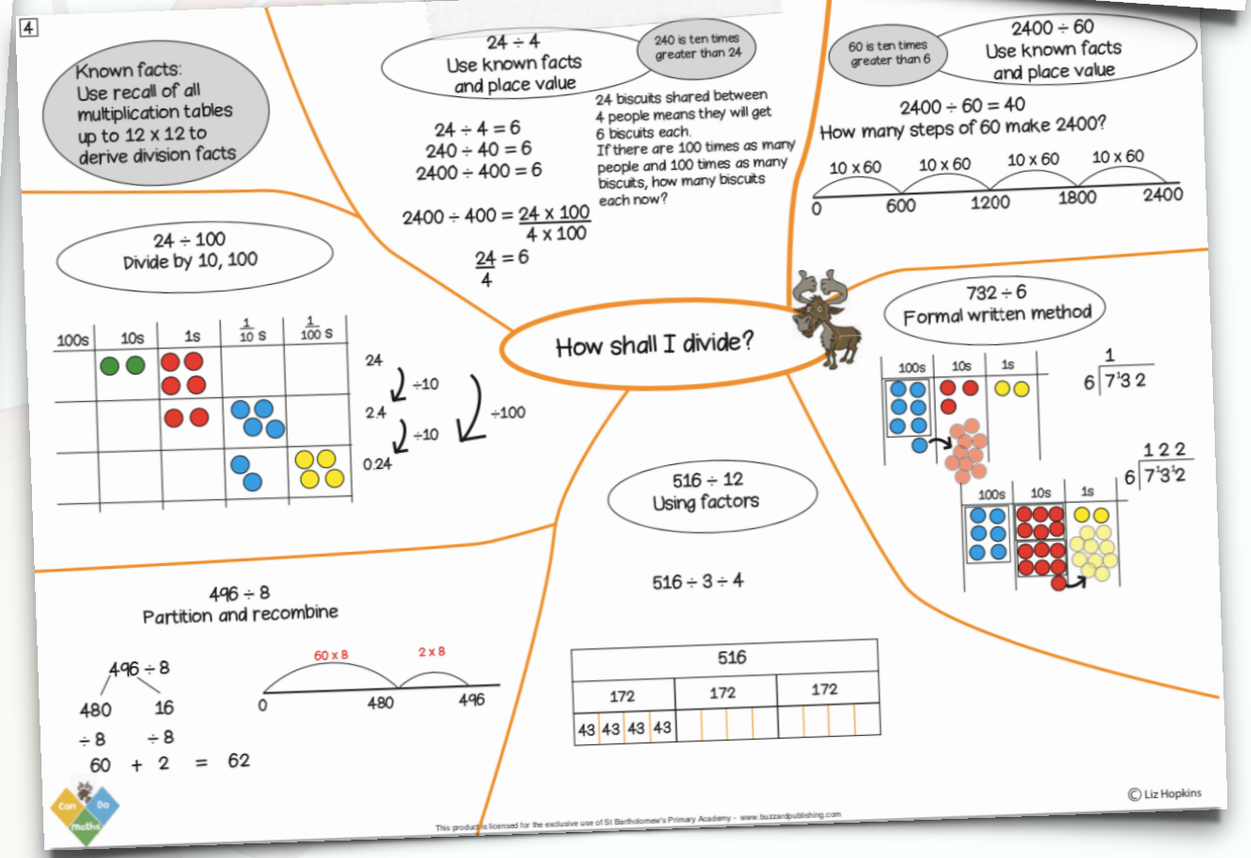
Calculation Progression Year 4









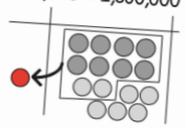
Calculation Progression Year 5

How shall I add?

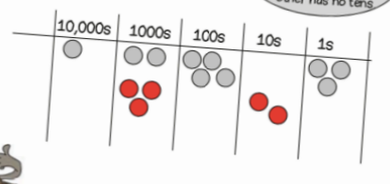
0.8 + 0.7, 45 + 45
Number facts
Single digit decimals
Doubles
Bonds of 1 and 100
- I just knew it!
- Rapid fluency of 2 digit add 2 digit numbers

7 + 8
Use known facts
- If I know 7 + 8 = 15 then I know 0.7 + 0.8 = 15

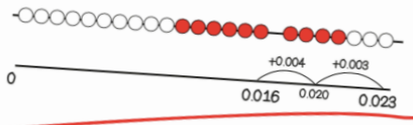
7,000 + 8,000 = 15,000
70,000 + 80,000 = 150,000
700,000 + 800,000 = 1,500,000



12,403 + 3,020
Use place value to add
- If I know 2 + 3 = 5 then I know 2000 + 3000 = 5 000
- I have noticed, one number has no hundreds or ones, the other has no tens.

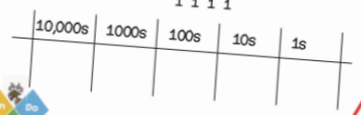


0.016 + 0.007
Bridge through boundaries
by counting in efficient steps



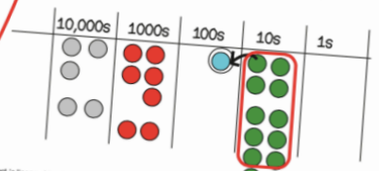
25,748 + 46,374
Formal written method
- Exchange ten of these for one of those!
- Regroup and rename

25,748
+ 46,374
72,122
1 1 1 1

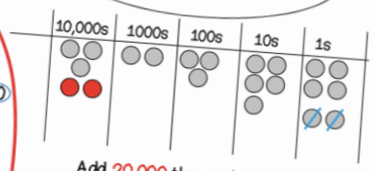


35,040 + 22,070
Partition and recombine

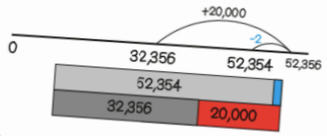
30,000 + 5,000 + 40 + 20,000 + 2,000 + 70
50,000 + 7,000 + 110 = 57,110



32,356 + 19,998
Round then adjust



Add 20,000 then subtract 2



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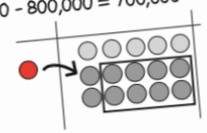
How shall I subtract?

9 - 4, 13 - 5, 18 - 9
Number facts
Single digit decimals
Halves
Subtract from 1 and 100
- I just knew it!
- Rapid fluency of 2 digit subtract 2 digit numbers

15 - 8 = 7
Use known facts
- If I know 15 - 8 = 7 then I know 15 - 0.8 = 0.7

15,000 - 8,000 = 7,000
150,000 - 80,000 = 70,000
1,500,000 - 800,000 = 700,000

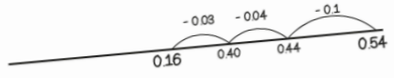


40,012 - 3,005
Use place value to subtract
- 5 less than 12 is 7 Now it is easy to take away 3000
- If I know 40 - 3 = 37 then I know that 40 thousand take away 3 thousand is 37 thousand

40,000 = 4 tens of thousands or 40 thousands
12 = 1 ten and 2 ones or 12 ones

40,012 = 40 thousands and 12 ones
take away 3 thousands and 5 ones
equals 37 thousands and 7 ones.

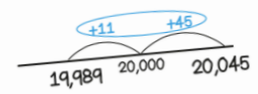
0.54 - 0.17
Bridge through boundaries
by counting in efficient steps



45,748 - 26,374
Formal written method
- Exchange ten of these for one of those!
- Regroup and rename

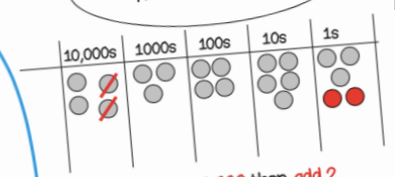
3 1 6 1
45,748
- 26,374
19,374

20,045 - 19,989
Find the difference between two numbers

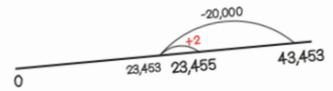


20,045
19,989
56

43,453 - 19,998
Round then adjust



Take away 20,000 then add 2



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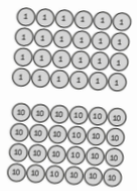
How shall I multiply?

Known facts:
Rapid recall of all multiplication tables up to 12 x 12

6 x 4
Use known facts and place value
- 40 is ten times greater than 4

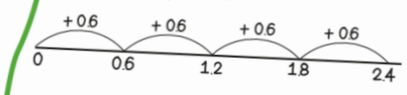
6 x 4 = 24
60 x 4 = 240
60 x 40 = 2400

6 x 10 x 4 x 10
= 24 x 100

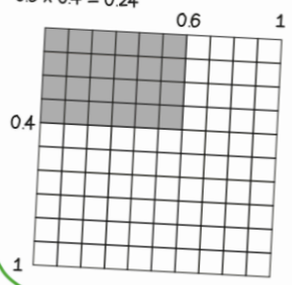


0.6 x 4
Use known facts and place value
- 0.6 is ten times smaller than 6

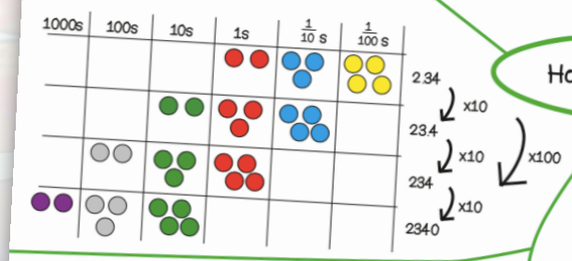
0.6 x 4 = 2.4
4 jumps of 0.6



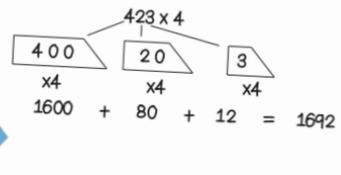
0.6 x 0.4 = 24 hundredths
0.6 x 0.4 = 0.24



2.34 x 1000
Multiply by 10, 100, 1000

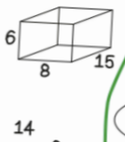


423 x 4
Partition and recombine

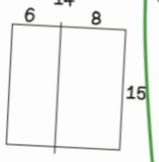


15 x 42
Using factors and distributive law

15 x 48
Factor pair
= 15 x 6 x 8
= 90 x 8
= 720



15 x 14
= 15 x 6 + 15 x 8
= 90 + 120
= 210



427 x 38
Formal written method

	400	20	7
30	12,000	600	210
8	3,200	160	56

427
x 38
3416
12810
16226

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How shall I divide?

Known facts:
Use recall of all multiplication tables up to 12 x 12 to derive division facts

- Include calculations where remainders occur

24 ÷ 4
Use known facts and place value
- 24,000 is a thousand times greater than 24

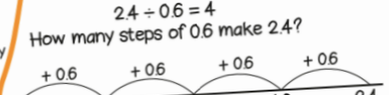
24 ÷ 4 = 6
240 ÷ 40 = 6
2400 ÷ 400 = 6
24,000 ÷ 4000 = 6

24,000 ÷ 400 = 24 x 1000 / 4 x 100
240 / 4 = 60

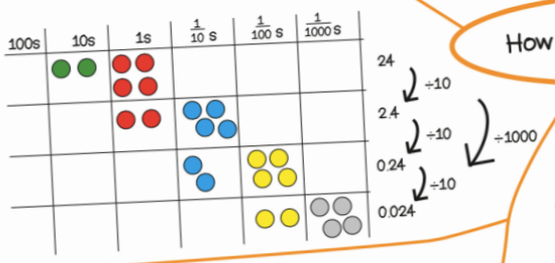
24 biscuits shared between 4 people means they will get 6 biscuits each.
If there are 1000 times as many people and 1000 times as many biscuits, how many biscuits each now?

2.4 ÷ 0.6
Use known facts and place value
- 0.6 is ten times smaller than 6

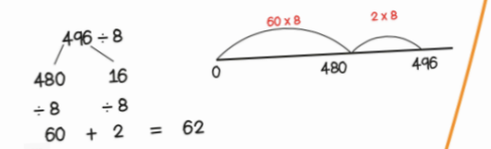
2.4 ÷ 0.6 = 4
How many steps of 0.6 make 2.4?



24 ÷ 1000
Divide by 10, 100, 1000

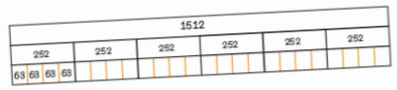


496 ÷ 8
Partition and recombine

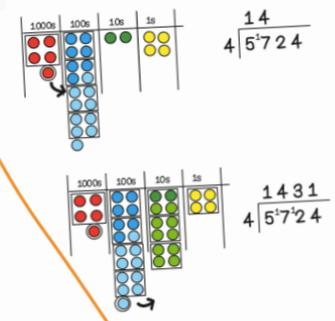


1512 ÷ 24
Using factors

1512 ÷ 6 ÷ 4



5724 ÷ 4
Formal written method



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Calculation Progression Year 6

How shall I add?

- 44 + 56, 27 + 27 — Number facts, Single digit decimals, Doubles, Bonds of 1 and 100 — I just knew it! — Rapid fluency of 2 digit add 2 digit numbers
- 17 + 17 — Use known facts — If I know 17 + 17 = 34 then I know 17 + 1.7 = 34
  - 17,000 + 17,000 = 34,000
  - 170,000 + 170,000 = 340,000
  - 1,700,000 + 1,700,000 = 3,400,000
- 1,102,403 + 50,020 — Use place value to add — I have noticed, one number has no hundreds or ones, the other has no tens
- 0.028 + 0.015 — Bridge through boundaries by counting in efficient steps
- 325,748 + 246,374 — Formal written method — Exchange ten of these for one of those! — Regroup and rename
- 307,040 + 206,070 — Partition and recombine
- 432,356 + 99,000 — Round then adjust — Add 100,000 then take away 1,000

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How shall I subtract?

- 0.9 - 0.4, 100 - 65 — Number facts, Single digit decimals, Halves, Bonds of 1 and 100 — I just knew it! — Rapid fluency of 2 digit subtract 2 digit numbers
- 36 - 18 = 18 — Use known facts — If I know 36 - 18 = 18 then I know 360 - 180 = 180
  - 36,000 - 18,000 = 18,000
  - 360,000 - 180,000 = 180,000
  - 3,600,000 - 1,800,000 = 1,800,000
- 400,032 - 30,005 — Use place value to subtract — 5 less than 32 is 27
  - 400,000 = 4 hundreds of thousands or 400 thousands
  - 400 - 30 = 370 so 400,000 - 3,000 = 370,000
  - 400,032 = 400 thousands and 32 ones take away 30 thousands and 5 ones = 370,027
- 0.054 - 0.017 — Bridge through boundaries by counting in efficient steps
- 445,748 - 126,374 — Formal written method — Exchange ten of these for one of those! — Regroup and rename
- 200,450 - 199,989 — Find the difference between two numbers
- 243,453 - 99,900 — Round then adjust — Take away 100,000 then add 100

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How shall I multiply?

- Known facts: Rapid recall of all multiplication tables up to 12 x 12
- 6 x 4 — Use known facts and place value — 40 is ten times greater than 4
  - 60 x 40 = 2400
  - 600 x 400 = 240,000
  - 6000 x 4000 = 24,000,000
  - 6 x 10 x 4 x 10 = 24 x 100
- 0.06 x 4 — Use known facts and place value — 0.6 is ten times smaller than 6
  - 0.06 x 4 = 0.24
  - 4 jumps of 0.06
  - 0.6 x 0.4 = 24 hundredths
  - 0.6 x 0.4 = 0.24
- 2.34 x 1000 — Multiply by 10, 100, 1000
- 4203 x 4 — Partition and recombine
- 15 x 42 — Using factors and distributive law
  - 15 x 48 = 15 x 6 x 8 = 90 x 8 = 720
  - 15 x 14 = 15 x 6 + 15 x 8 = 90 + 120 = 210
- 2427 x 38 — Formal written method

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How shall I divide?

- Known facts: Use recall of all multiplication tables up to 12 x 12 to derive division facts — Include calculations where remainders occur
- 24 ÷ 4 — Use known facts and place value — 240 is ten times greater than 24
  - 240 ÷ 40 = 6
  - 2400 ÷ 400 = 6
  - 24,000 ÷ 4000 = 6
  - 240,000 ÷ 40,000 = 6
  - 2,400,000 ÷ 400,000 = 6
  - 240,000 ÷ 400 = 24 x 10,000 / 4 x 100
  - 2400 / 4 = 600
  - 24 biscuits shared between 4 people means they will get 6 biscuits each. If there are 10 times as many people and 10 times as many biscuits, how many biscuits each now?
- 2.4 ÷ 0.6 — Use known facts and place value — 0.6 is ten times smaller than 6
  - 2.4 ÷ 0.6 = 4
  - How many steps of 0.6 make 2.4?
- 24 ÷ 1000 — Divide by 10, 100, 1000
- 4960 ÷ 8 — Partition and recombine
- 1512 ÷ 24 — Using factors
- 1512 ÷ 6 ÷ 4
- 7182 ÷ 21 — Formal written method

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