Number Talk Strategies Year 6

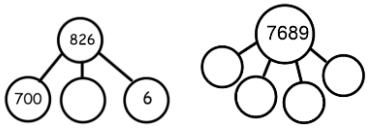
Addition Strategies

Place Value and Known Facts

Adding 1s, 10s, 100s, 1000s, 10,000s, 100,000s, 0.1s, 0.01s and 0.001s to larger/smaller numbers. Use of part whole models and place value charts to show addition where no boundaries are crossed:

435 + 30 =__
40 + 1000 =
___= 6000 + 90
789 + 100 =
0.7 + 3.014 = ___

Part Whole Model
Partition numbers in as many ways as you can, or give part whole with one of the parts missing.
3,050020 = 3,000,000 + ___ ***+ 20***
826 = 700 + ___ ***+ 6***



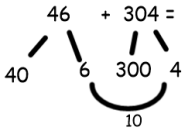
Place Value Chart with Counters or Digits
e.g ***2.001 + 3.12***

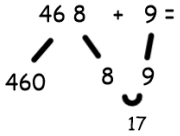
o	0.1	0.01	0.001
●●			●
●● ●	●	● ●	

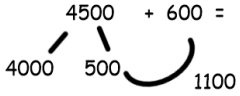
Complements
Include revision of complements to 100 and how these relate to complements to powers of 10.
E.g. 56+___= 100
56<u>0</u>+___=100<u>0</u>.
(56 tens +__tens = 100 tens).

Partitioning

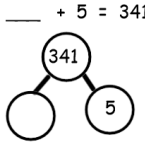
Involves number bonds, doubles, near doubles, bridging strategies



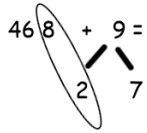


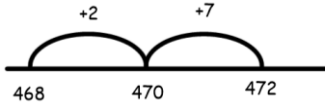


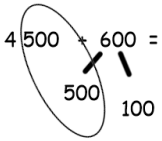
Explore Addition/Subtraction Relationships (inverse)

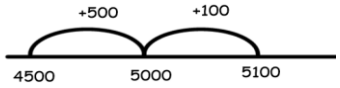


Bridging

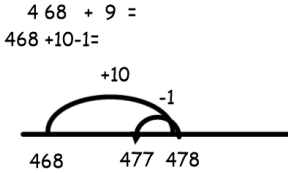








Compensations/ Adjustment (Manipulation of Numbers)



OR

468 + 9 =
Mentally move one from 468 to 9, so *467+10.*
122,456 + 11,999 =
122,456 + 12,000-1(show on number line)
Or 122,455 + 12,000 (mentally move the one).

Also include:
+199
+999
+£1.99 etc
Examples where need to ***adjust by 3,4, 5 etc (e.g. 457 + 95).***
2.7 + 3.014

Manipulation:
Mentally move one digit to calculate
39 +___=___+ 40
248 + ___ ***= 46 + 247***
2.7 + 3.014 = 2 + _____

Column Methods

___= 936 + 285

___ = 8275 + 82

707 + 1818 =

15.98 + 26.314 =__

Missing Number Problems/ What is My Mistake?'

Write inverse (column) calculation to check addition/subtraction column calculation.

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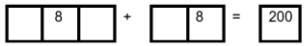
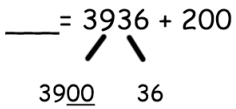
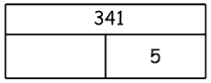
And how they relate to complements to other multiples of 100. E.g.  Link to complements to 1 with tenths, complements to 0.1 with hundredths in context of decimals). <u>Unitising</u> Unitising language when boundaries crossed:  39 hundreds + 2 hundreds +36 =41 hundreds +36 . <u>Number Sequences</u> ***4856, 4956,*** ___**,** ___ etc. Include negative numbers. E.g. -17, -12,- 7,___, ___.	 Write inverse calculation to check addition/subtraction calculation.			

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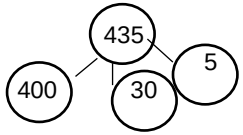
Number Talk Strategies Year 6

Subtraction Strategies

Place Value/ Known Facts

Subtracting 1s,10s, 100s,1000s, 10,000s, 100,000s, 0.1s, 0.01s and 0.001s from larger/smaller numbers. Use of part whole models and place value charts to show subtraction where no boundaries are crossed:

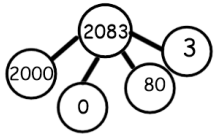
___= ***435 - 30***



Unitising

Unitising language when boundaries crossed:

2083 - 300 =



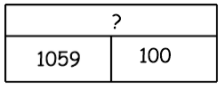
2000=300=

20 hundreds -3 hundreds.

Explore Relationships

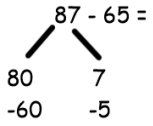
___***-10 = 298***

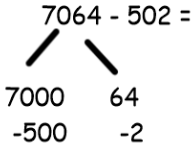
___***-100 = 1059***

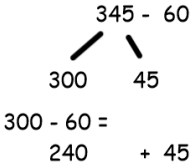


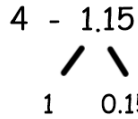
Partitioning

Including halving/near halves



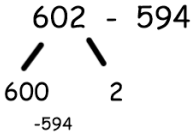






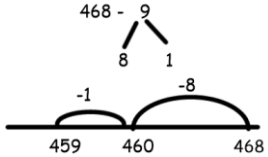
4 -1 = 3

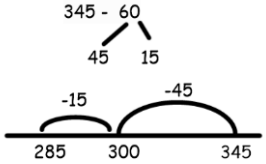
3 - 0.15 (use knowledge of complements to 100).



600 – 594 + 2

Bridging

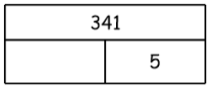


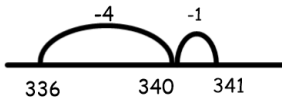


Explore Addition/Subtraction Relationships (inverse)

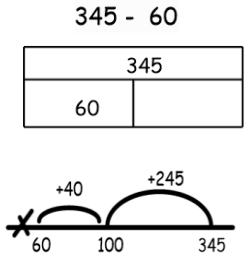
___***+5 = 341***

Explore parts and whole relationship on bar model or part whole then solve.

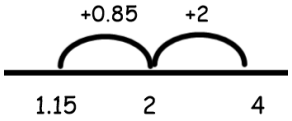




Difference/Comparison/ Counting On

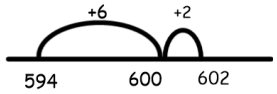


4 - 1.15 =

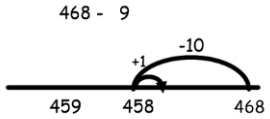


602 - ___ = 594

Explore parts and whole on bar model, then use number line or mental method to count up.



Compensations/Adjustment (Manipulation of Numbers)



9 - 1.9 = 9 – 2 + 0.1

Constant Difference

Discussion point as it works in a different way to addition. The difference between 21 and 29 is the same as the difference between 20 and 28

so 29 – 21 = 28 - 20.

5000 - 2356 as formal method can be difficult, so make equivalent calculation, 4999 – 2355 =

122,456 - 11,999 = 122,456-12,000+1

OR 122,457-12,000.

Column Methods

4912 – 824 =

7064 – 502 =

____ ***= 5776 - 855***

37.8 - 14.671

5.8 7 - 3.123

Missing Number Problems/ What is My Mistake?'

Include these questions and use part whole model and PV grid to show exchange alongside column method.

Write the addition to check the given column subtraction calculation.

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Multiplication Strategies

Place Value and Known Facts (Also see Scaling)

213 x 0

1 x 314

PV Counters
Use PV counters (tens) to show relationship between 3x40 and 30x40. Link to scaling – make 30x4 ten times greater.

30 x 4
30 x 40
5 x 70
50 x 70

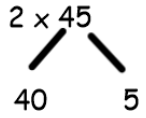
Include decimals

0.3x4
0.03 x4

6^2 + 10
3^3 + 10
Revise regularly known facts within 100 and links to larger powers of 10 and also decimals.
Show links (e.g. halving 25 to find 12.5) on bar models.

_x2=100.	___x2=1
_x4=100.	___x4=1
_x5=100	___x5=1
_x8=100.	___x8=1

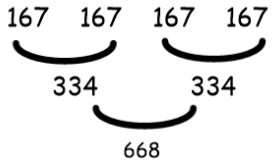
Doubling//Halving/Tripling



16 x 8 = double 8x8.

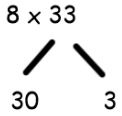
x4 - By doubling and doubling again
x8 - x2, x2, x2

167 x 4



Or partition and x all parts by 4).

Tripling

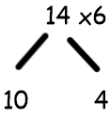


Triple 8 by doubling then adding one more (or use known facts).
8 x 3 = 24
80 x 3 = 240, so 264.

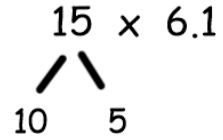
OR 33 x 2 x 2 x 2 (associative law) – doubling, doubling, doubling again.

Partitioning (Distributive Law)

14 x 6=



14 x 6 = __x 6 +__x 6



10 x 6.1 = 61
5 x 6.1 = 30.5

Compensation
9 x 41=
Use counting stick or draw number line and show 10x41 then subtract (1x41).

Scaling and Associated Language

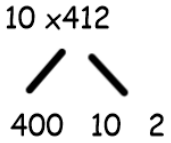
Across tables, use language of scaling.

3x10 means 10 lots of 3 or 3 ten times. Show both on part whole and bar models and number lines (See Times table Programme of Study).

Make 45 twice as big
Make 45 four times larger.
Make 41 ten times greater.
Make 45 eight times larger.

41 x 10
41 x 100
2345 x 1000
25.34 x 10

PV Counters
Use PV chart and counters to show making each counter ten times its value (x100=x10, then x10).



Associative Law

5 x 4 x 10
See Times Table Programme of study for examples of visuals

30 x 40
50 x 70

Explore visually how 3x40=3x10x4 then scale up to 30 x 40= 30 x 4 x 10.

0.9 x 200 = 0.9 x100 x.2. (Show on place value grid).

0.5 x 28

3.9 x 30 = 3.9 x 3 x10

Written Methods

879 x 3

418 x 6

541 x 8

3468 x 6

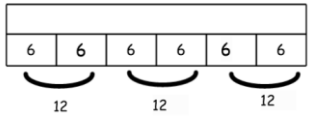
836 x 7

71 x 46

785 x 23

5413 x 86

Include missing numbers in column methods.

	71 x 8 Find 71 x 4 and double it (show relationship between x4 and x8 on bar model). Find x 20 by doubling x10 X 5 by halving x 10. <u>Explore Relationships</u> E.g. ***x4, x8/ x6, x12/ x3, x 6*** E.g. ***6 x 6***  ***14 x 3*** = __ x 6 etc. (See Scaling for halving examples - cover halves of multiples of 10, 100, 1000 etc.) Cover decimals facts. ***Double 0.7, 0.9 etc.***				

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Division Strategies

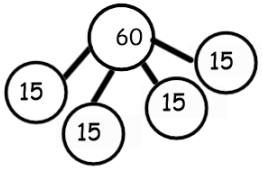
Place Value and Known Facts

326 ÷ 1
838 ÷ 1
505 ÷ 1

99 ÷ 11
120 ÷ 12

Unitising
Use of unitising language
180 ÷ 3
(18 tens ÷ 3 = 6 tens). Use tens counters to share).
270 ÷3
72 ÷ 9
720 ÷ 9
5400 ÷ 9
1210 ÷ 11 =
121 tens ÷11 = 11 tens (known facts)

Grouping/Sharing
Make decision about whether to share or group.
60 ÷ 15 = (by grouping)



100 ÷ 25
200 ÷ 25

Halving/Halving Again

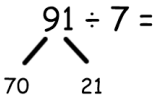
Divide by 4 by halving and halving again:
96 ÷ 4 =
96 ÷2 ÷2 (half and half again).

328			
164		164	
82	82	82	82

Include decimals facts.

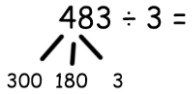
Find half of 0.3
Find half of 0.5
Find half of 0.7

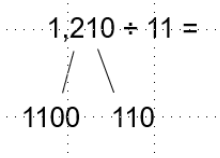
Partitioning



70 ÷ 7 = 10
21 ÷ 7 = 3

95 ÷ 5
96 ÷ 8
96 ÷ 4





Compensation
95 ÷ 5 =
100 ÷ 5 = 20 - (1x5), so 19 lots of 5 in 95.

Scaling and Associated Language

Divide by 10 or 100 etc, make 10 times smaller/10 times as small.

60 ÷ 10

486 ÷ 10

Divide by 100 by dividing by 10 and 10 again. Show on place value chart (once covered decimals)

58 ÷ 10
58 ÷ 100
0.9 ÷ 10
0.04 ÷ 10
0.1 ÷ 100

Link to decimals
0.5 x 48
(Half of 48)
1.5 x 48
(1 x 28 + half of 48)

Associative Law

Divide by 5 by dividing by 10 and doubling.

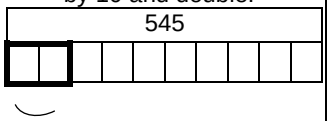
Divide by 8 by dividing by 4 and halving.

Divide by 6 by diving by 3 and halving.

Divide by 20 by dividing by 10 and halving

Show on number lines, arrays and bar models.

545 ÷ 5
Show on bar model, divide by 10 and double.



Written Methods

486 ÷ 3

1320 ÷ 12

725 ÷ 29

2242 ÷ 59

Use alongside partitioning methods to develop conceptual understanding.

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Fraction Strategies

Known Facts and Complements to 1

Revise known facts:
$\frac{1}{2}, \frac{1}{4}, \frac{3}{4}, \frac{1}{5}, \frac{1}{8}$ of 100 with links to 1000 and 1 (decimals).

$\frac{2}{10} + \frac{5}{10} + \frac{}{10} = 1$

$\frac{9}{11} - \frac{4}{11} =$

$\frac{}{} + \frac{}{} = \frac{}{}$

$1 - \frac{}{} = \frac{}{}$

Going Over 1 Whole

$2\ \frac{1}{6} + \frac{5}{6} =$

$1\frac{1}{3} - \frac{1}{3} =$

$1\frac{1}{5} + 2\frac{1}{5} =$

$1\frac{5}{8} - \frac{2}{8} =$

$1\frac{1}{5} - \frac{2}{5}$

Ordering/Comparing

$\frac{1}{5}, \frac{1}{10}, \frac{1}{100},$

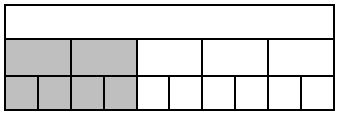
$\frac{2}{5}, \frac{2}{10}, \frac{2}{100},$

Write the fraction which is closest to 1.
$\frac{99}{100}, \frac{49}{50}, \frac{19}{20}.$

Visual Representations

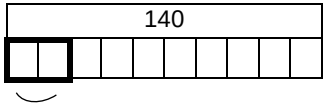
$\frac{2}{5} = \frac{}{10}$

Draw bar model to find out



$\frac{2}{5}$ *x 140*

Show on bar model, divide by 10 and double.

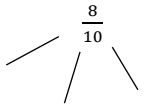


Continue fraction sequences where same fraction added each time. Use bar model to demonstrate.

$\frac{}{}, \frac{3}{5}, 1\frac{2}{10}, 1\frac{8}{100}, \frac{}{},$

Partitioning

How many ways can you partition $\frac{8}{10}$ ***?***

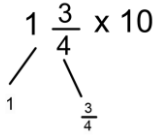


etc

Bar Model.

$\frac{4}{7} + \frac{5}{7} =$

$\frac{3}{7} + \frac{2}{7}$



1 x 10 + $\frac{3}{4}$ of 10

Scaling and Associated Language

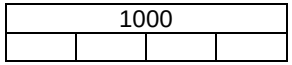
$\frac{1}{4}$ ***of 100 =***

$\frac{3}{4}$ ***of 100 =***

$\frac{1}{4}$ ***of 1000 =***

$\frac{3}{4}$ ***of 1000 =***

Relate to all powers ten and scale up to 200, 300 etc.



$\frac{1}{2}$ ***x 26 =***

$1\frac{1}{2}$ ***x 40 =***

$\frac{1}{5}$ ***x 25 =***

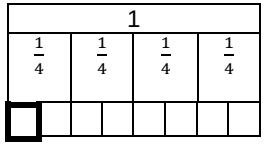
$1\frac{3}{4}$ ***x 10 =***

Written Methods

Make use of doubling, halving and visuals alongside these.

$\frac{1}{4} \div 2 = \frac{1}{4} \times \frac{1}{2}$

OR $\frac{1}{4} \div 2$ (is the same as half of $\frac{1}{4}$)



$\frac{3}{10} - \frac{1}{20}$

$\frac{3}{10} - \frac{1}{20}$

$\frac{2}{5}$ ***of 140 =***

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Percentages Strategies
(Teaching note – use x as well as 'of')

Known Facts/Scaling

Know 25%, 50%,75% are equivalent to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$.

Know 25%, 50%,75% of 100,1000 and 1 (decimal equivalents). Use of halving and halving again strategy.
Link to 10,000, 100,000 etc.

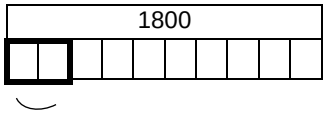
Find 5% by halving 10%.

Use 1%, 5%, 10% and 20% to find any percentage.

7% of 500
1% of 500, then x 7
7% of 100, then x 5.

Visual Representations

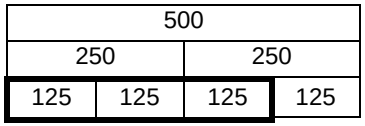
20% of 1800 =
Show on bar model, divide by 10 and double.



Partitioning

Find 25%, 50% and 75% of whole numbers (using knowledge for halving/quartering by halving and halving again etc).

75% x 500



Use of 10% to find percentages which are multiples of 10.

Use of 10% and doubling to find 20%, 40%, 80% through use of 10% and doubling or through finding $\frac{1}{5}, \frac{2}{5}, \frac{4}{5}$.

Use 10% and 5% to find 15%, 35% etc.

15% of 440 =
10% of 440 + 5% of 440

28% of 650 =
Find 20% then 8%.

Compensation/Adjustment

90% of 200
Find 10% and subtract.

99% of 200
Find 1% and subtract.

40% of 460.
Find 50% then take away 10%.

99% of 200.
Find 1% and subtract from 100%

45% of 460.
Find 50% then take away 5%.

51% x 900.
Find half (50%), then find 1% and add them together

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