

Addition Strategies

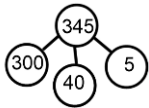
Place Value and Known Facts

Adding 1, 10, 100 or 1000 to a 3 or 4 digit number. Use of part whole models and place value charts to show addition where no boundaries crossed:

$$\begin{aligned} 826 &= 800 + \underline{\quad} + 6 \\ 435 + 30 &= \\ 40 + 100 &= \\ \underline{\quad} &= 6000 + 90 \\ 789 + 100 &= \end{aligned}$$

Part Whole Model/ PV Chart
Partition numbers to see which part will change following the calculation. Also, partition in as many ways as you can, or give part whole with one of the parts missing.

$$345 + 10 =$$



OR

h	t	o
3	4	5

Unitising

Use of unitising language where boundaries crossed:

$$\begin{array}{r} 396 + 10 = \\ \swarrow \quad \searrow \\ 390 \quad 6 \end{array}$$

(39 tens + 10 = 40 tens = 400)

Partitioning

Involves number bonds, doubles, near doubles bridging strategies.

$$\begin{array}{r} 93 + 28 = \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ 90 \quad 3 \quad 20 \quad 8 \\ \underbrace{\quad\quad} \quad \underbrace{\quad\quad} \\ 110 \quad 11 \end{array} \quad \begin{array}{r} 46 + 304 = \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ 40 \quad 6 \quad 300 \quad 4 \\ \underbrace{\quad\quad} \quad \underbrace{\quad\quad} \\ \quad \quad \quad 10 \end{array}$$

$$\begin{array}{r} 468 + 9 = \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ 460 \quad 8 \quad 9 \\ \underbrace{\quad\quad} \\ \quad \quad 17 \end{array}$$

$$\begin{array}{r} 450 + 60 = \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ 400 \quad 50 \quad 110 \end{array}$$

$$\begin{array}{r} 796 + 30 = \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ 6 \quad 790 \quad 30 \\ \underbrace{\quad\quad} \\ \quad \quad 820 \end{array}$$

$$275 + 82 =$$

Bridging

$$\begin{array}{r} 468 + 9 = \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ 460 \quad 8 \quad 9 \quad 7 \\ \underbrace{\quad\quad} \quad \underbrace{\quad\quad} \\ \quad \quad 2 \quad 7 \end{array}$$

$$\begin{array}{r} +2 \quad +7 \\ \underbrace{\quad\quad} \quad \underbrace{\quad\quad} \\ 468 \quad 470 \quad 472 \end{array}$$

$$\begin{array}{r} 450 + 60 = \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ 450 \quad 50 \quad 10 \\ \underbrace{\quad\quad} \quad \underbrace{\quad\quad} \\ 450 \quad 500 \quad 510 \end{array}$$

$$790 + 30 =$$

$$\begin{array}{r} 790 + 30 = \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ 790 \quad 10 \quad 20 \\ \underbrace{\quad\quad} \quad \underbrace{\quad\quad} \\ 790 \quad 800 \quad 820 \end{array}$$

**Compensations/Adjustment
(Manipulation of Numbers)**

$$\begin{aligned} 468 + 9 = \\ 468 + 10 - 1 = \end{aligned}$$

$$\begin{array}{r} +10 \quad -1 \\ \underbrace{\quad\quad} \quad \underbrace{\quad\quad} \\ 468 \quad 477 \quad 478 \end{array}$$

OR

$468 + 9 =$
Mentally move one from 468 to 9, so $467 + 10$.

$$\underline{\quad} = 97 + 136$$

$$\begin{array}{r} +100 \quad -3 \\ \underbrace{\quad\quad} \quad \underbrace{\quad\quad} \\ 136 \quad 236 \end{array}$$

$$39 + 673 = \underline{\quad}$$

Also include:

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

Column Methods

$$\underline{\quad} = 936 + 285$$

$$\underline{\quad} = 275 + 82$$

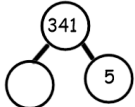
$$407 + 317 =$$

Missing Number Problems/ What is 'My Mistake?'

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

Also, write an inverse calculation (column format) to check a column method.

Number Talk Strategies Year 3

<p><u>Number Sequences</u> 887, 897, ____, ____ etc</p>	<p><u>Explore Addition/Subtraction Relationships (inverse)</u></p> $\underline{\quad} + 5 = 341$  <table border="1" data-bbox="629 376 831 448"> <tr> <td colspan="2">341</td> </tr> <tr> <td></td> <td>5</td> </tr> </table>	341			5		<p><u>Manipulation:</u> Mentally move one digit to calculate $39 + \underline{\quad} = \underline{\quad} + 40$ $248 + \underline{\quad} = 46 + 247$</p> <p>$796 + 30 =$ $800 + 30 - 4 =$ <u>OR</u> mentally move 4 to make $800 + 26 =$</p>	
341								
	5							

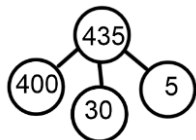
Subtraction Strategies

Place Value/ Known Facts/ Partitioning

Subtracting 1s, 10s, 100s or 1000s from a 3 or 4 digit number. Use of part whole models and place value charts to show where no boundaries crossed and also explore relationships:

Part Whole Model/ PV Chart

$435 - 30 =$

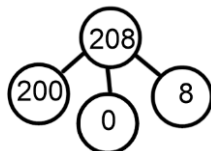


And place value chart.

Unitising

Use of unitising language where boundaries crossed:

$208 - 30 =$



$200 = 30 =$
20 tens - 3 tens.

Explore Relationships

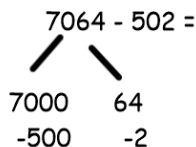
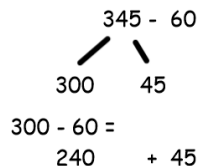
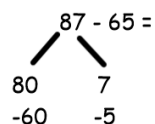
$___ - 10 = 298$

$___ - 100 = 305$

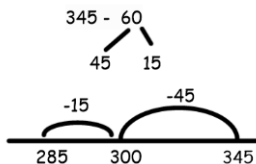
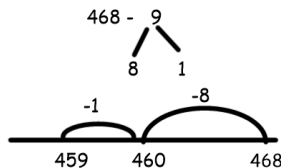
?
298 10

Partitioning

Including halving/near halves



Bridging

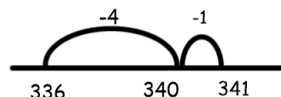


Explore Addition/Subtraction Relationships (inverse)

$___ + 5 = 341$

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

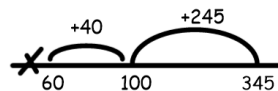
341
5



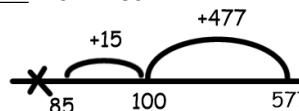
Difference/Comparison/ Counting on

$345 - 60 =$

345
60



$___ = 577 - 85$



$___ = 912 - 824$

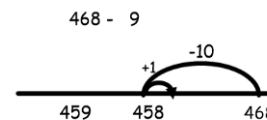
$602 - ___ = 594$

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



Compensations/ Adjustment

(Manipulation of Numbers)



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 $29 - 21 = 28 - 20$.



$500 - 235$ as formal method can be difficult, so make equivalent calculation, $499 - 234 =$

Column Methods

Use alongside other methods (particularly counting on), if appropriate.

$491 - 82 =$

$706 - 502 =$

$___ = 577 - 859$

$___ = 577 - 85$

$___ = 912 - 824$

Missing Number Problems/ What is My Mistake?'

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

Also, write an inverse calculation (column format) to check a column method.

Multiplication Strategies

Place Value and Known Facts
(Also see Scaling)

$21 \times 0 =$

$1 \times 21 =$

PV Counters

Use PV counters (tens) to show relationship between 3×40 and 30×40 . Link to scaling – make 30×4 ten times greater.

$30 \times 4 =$

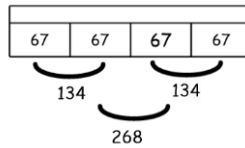
$5 \times 70 =$

Doubles/Halving/Tripling

$$\begin{array}{r} 2 \times 45 \\ \swarrow \quad \searrow \\ 40 \quad 5 \end{array}$$

$67 \times 4 =$

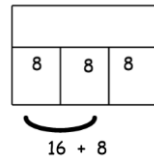
X4 by doubling and doubling again



$16 \times 8 = \text{double } 8 \times 8.$

Tripling

$8 \times 3 =$



Triple 8 by doubling, then bridging.

71×8

Find 71×4 and double it (show relationship between $\times 4$ and $\times 8$ on bar model).

Find $\times 20$ by doubling $\times 10$.

Find $\times 5$ by halving $\times 10$.

Explore Relationships

E.g. $\times 2, \times 4 / \times 4, \times 8 / \times 5, \times 10$

E.g. Explore ways to find 6×4

$3 \times 8 = \underline{\quad} \times 4$

Partitioning
(Distributive Law)

$$\begin{array}{r} 67 \times 4 \\ \swarrow \quad \searrow \\ 60 \quad 7 \end{array}$$

$60 \times 4 + 7 \times 4$

$$\begin{array}{r} 86 \times 3 \\ \swarrow \quad \searrow \\ 80 \quad 6 \end{array}$$

$80 \times 3 + 6 \times 3$

$14 \times 6 =$

$$\begin{array}{r} 14 \times 6 \\ \swarrow \quad \searrow \\ 10 \quad 4 \end{array}$$

$8 \times 4 = \underline{\quad} \times 4 + \underline{\quad} \times 4$

Compensation

$9 \times 8 =$

Use counting stick or draw number line and show 10×8 then subtract 1×8

Scaling and Associated Language

Make 45 twice as big

Make 45 four times larger

Make 45 eight times larger

$41 \times 10 =$

$91 \times 10 =$

PV Counters

Use PV chart and counters to show making each counter ten times its value

10×412

$$\begin{array}{r} 10 \times 412 \\ \swarrow \quad \searrow \\ 400 \quad 10 \quad 2 \end{array}$$

Written Methods

79×3

18×4

41×8

46×3

36×4

(Use alongside mental strategies to compare efficiency).

Division Strategies

Place Value and Known Facts

$32 \div 1 =$

$50 \div 1 =$

See Times Table Programme of Study for details of visuals.

$130 \div 10 =$

$40 \div 4 =$

Unitising

Use of unitising language.

$320 \div 4 = 32 \text{ tens} \div 4$

Division as sharing with tens counters.

$180 \div 3 =$

(18 tens $\div 3 = 6$ tens). Use tens counters to **share**).

$120 \div 3$

$240 \div 3$

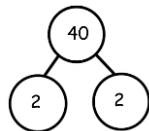
$320 \div 4$

$640 \div 8$

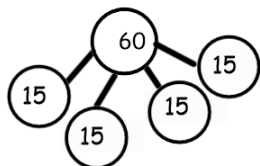
Grouping/Sharing

Make decision about whether to share or group in arithmetic situation.

$40 \div 2$, more efficient to share (halve) rather than group in twos.



$60 \div 15$. More efficient to take away groups of 15 rather than sharing between 10 people.



Also,

$100 \div 25 =$

$200 \div 25 =$

Halving/Halving Again

Divide by 4 by halving and halving again:

$96 \div 4 =$

$96 \div 2 \div 2$ (half and half again).

$320 \div 4 =$

320			
160		160	
80	80	80	80

Partitioning

$$\begin{array}{r} 42 \div 3 = \\ \swarrow \quad \searrow \\ 30 \quad 12 \end{array}$$

$$\begin{array}{r} 164 \div 4 = \\ \swarrow \quad \searrow \\ 160 \quad 4 \end{array}$$

$160 \div 4 = 40$

$4 \div 4 = 1$

Scaling and Associated Language

Divide by 10, make 10 times smaller/10 times as small.

$60 \div 10$

$400 \div 10$

Make link between division by 2 and halving clear. Also make half the size etc.

$48 \div 2$

Or

Make 48 half the size.

Written Methods

$138 \div 3 =$

$132 \div 4 =$

Show alongside partitioning if children are ready. Keep mental methods as the focus.

Fraction Strategies

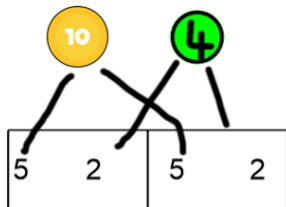
Revision from Y2.

Half of numbers to 20.

Halve the ten then halve the ones.

$\frac{1}{2}$ of 14

$\frac{1}{2}$ of 16



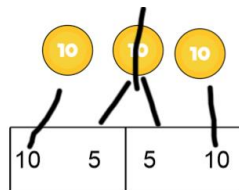
Halves of multiples of 10.

$\frac{1}{2}$ of 20

$\frac{1}{2}$ of 30

$\frac{1}{2}$ of 40

$\frac{1}{2}$ of 90



Find quarters by halving and halving again.

16			
8		8	
4	4	4	4

Use bar model to find two quarters or three quarters.

$\frac{3}{4}$ of 16;

$\frac{3}{4}$ of 20;

$\frac{2}{4}$ of 36.

16			
8		8	
4	4	4	4

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

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

$\frac{1}{3}$ of 6

$\frac{1}{3}$ of 12

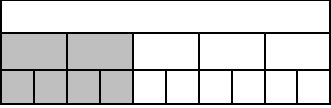
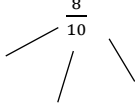
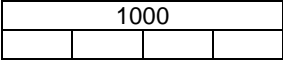
$\frac{1}{3}$ of 30

$\frac{1}{3}$ of 21

Share out 12 between 3 (count rows in threes to check).

12		
x	x	x
x	x	x
x	x	x
x	x	x

After fractions covered:

<u>Known Facts and Complements to 1</u>	<u>Doubling/Halving (to find equivalence) and Visual Representations</u>	<u>Partitioning</u>	<u>Scaling and Associated Language</u>	<u>Ordering/Comparing</u>
$\frac{2}{10} + \frac{5}{10} + \frac{3}{10} = 1$ $\frac{5}{7} - \frac{3}{7} =$ $- + - = -$ $1 - - = -$	$\frac{2}{5} = \frac{\quad}{10}$ <p>Draw bar model to find out</p> 	<p><i>How many ways can you partition $\frac{8}{10}$</i></p> 	<p>Half of numbers to 20 Halves of multiples of 10/100. Quartering by halving and halving again.</p> $\frac{1}{4} \text{ of } 100 =$ $\frac{3}{4} \text{ of } 100 =$ $\frac{1}{4} \text{ of } 1000 =$ $\frac{3}{4} \text{ of } 1000 =$  <p>After fractions covered:</p> $\frac{1}{2} \times 28 =$ $\frac{1}{4} \times 28 =$	$\frac{1}{5}, \frac{1}{10}, \frac{1}{100}$ $\frac{2}{5}, \frac{2}{10}, \frac{2}{100}$

