Addition and Subtraction

Year 1

Compose and Partition Numbers to 10 (1)

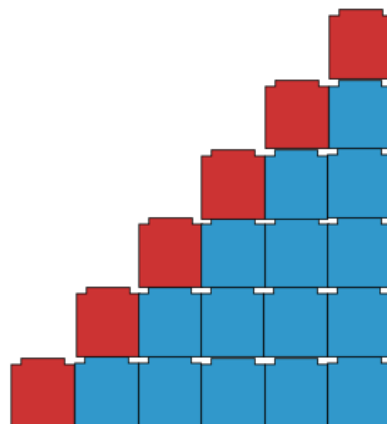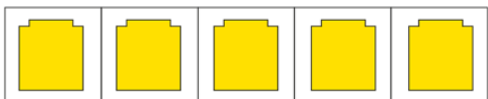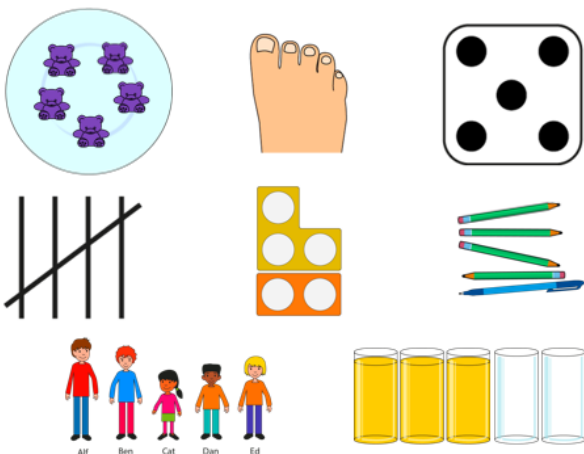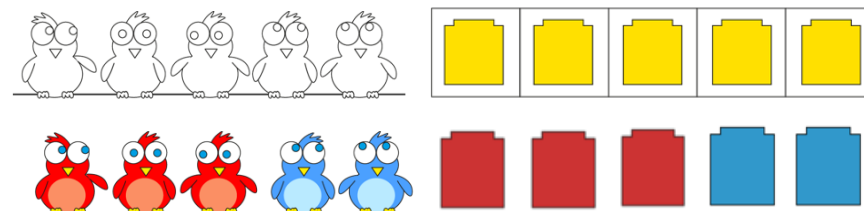**Understand that numbers to 10 can be represented in many different ways.**

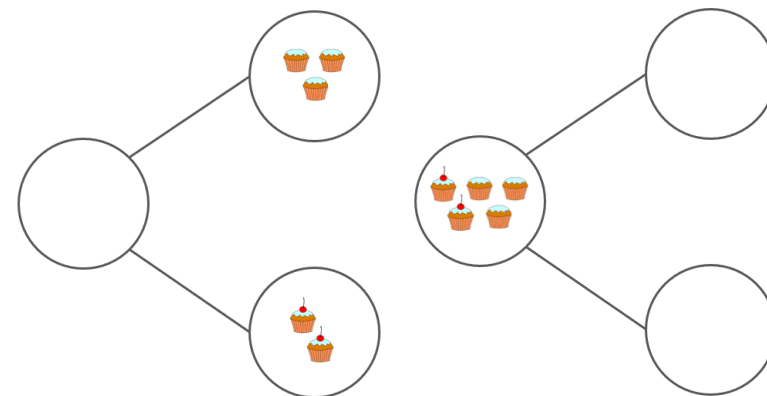**Numbers to 5 can be identified without counting (subitising).**

Each number is composed of the previous number and one more.

Each number can be partitioned into two smaller numbers

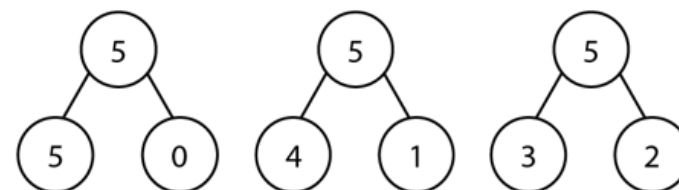There are 5 _____. 3 are _____. 2 are _____.

5 is the whole. 3 is a part. 2 is a part.

A number can be partitioned in different ways.

There are 5 _____. 3 are _____. 2 are _____.

5 is the whole. 3 is a part. 2 is a part.

Addition and Subtraction

Year 1

Compose and Partition Numbers to 10 (2)

	Blue	Red
🔴🔴🔴🔴🔴	0	5
🔵🔴🔴🔴🔴	1	4
🔵🔵🔴🔴🔴	2	3
🔵🔵🔵🔴🔴	3	2
🔵🔵🔵🔵🔴	4	1
🔵🔵🔵🔵🔵	5	0

A number can be partitioned in different ways systematically.
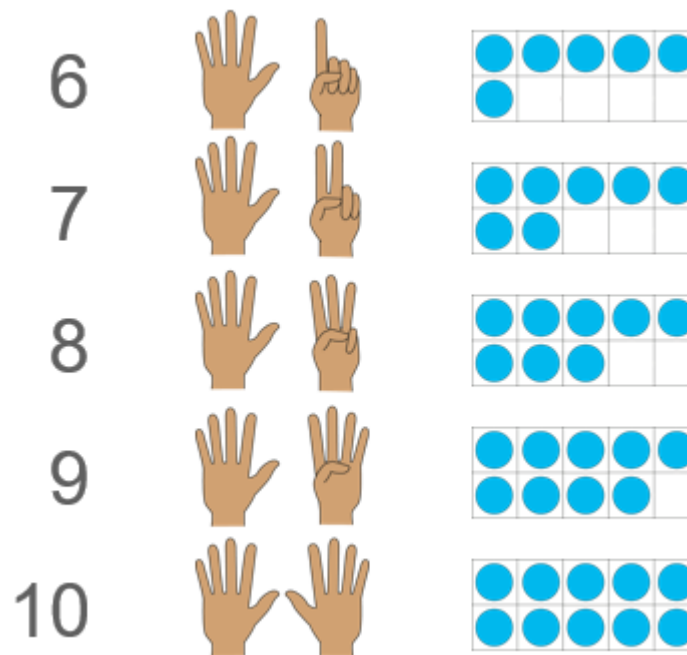
Numbers from 6 – 10 are composed of the '5 and a bit' structure.

Addition and Subtraction

Year 1

Read, Write and Interpret Additive Equations (1)
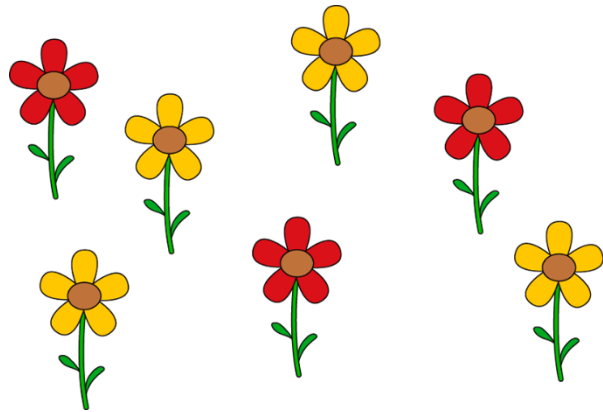
Identify what each number represents in an expression.

The 4 represents the 4 yellow flowers.

The 3 represents the 3 red flowers.
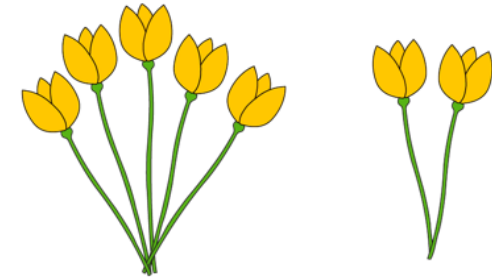
$$5 + 2 = 7$$

Identify what each number represents in an expression.

We can write 5 plus 2 is equal to 7.

The 5 represents _____.

The 2 represents____.

The 7 represents the total number of ____.

3   +   4

4   +   3

We can write the addends in either order.

(Commutative Law)

$$4 + 3 = 7$$

Addition and Subtraction

Year 1

Read, Write and Interpret Additive Equations

Subtraction can tell us about partitioning.

There are 8 _____ altogether.

5 ___ are ____.

3 ___ are ____.

We can write this as 8 minus 5 is equal to 3.

$$8 - 5 = 3$$

First   Then   Now

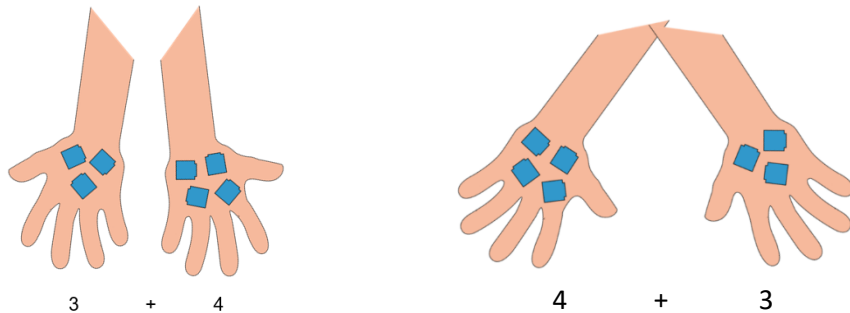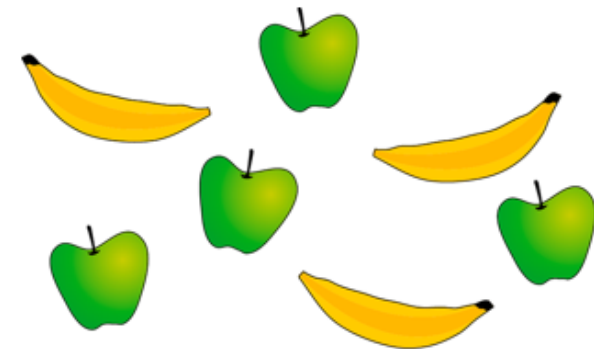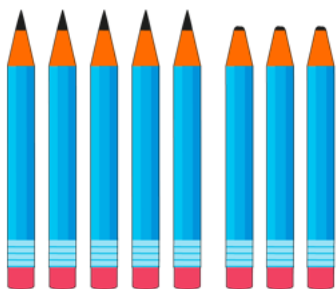$$4 \qquad + 3 \qquad 7$$

$$4 + 3 = 7$$

Understand the First, Then, Now structure of addition and subtraction.

Addition can tell us about a quantity increasing.

Subtraction can tell us about a quantity decreasing.

First   Then   Now

$$4 \qquad - 1 \qquad 3$$

$$4 - 1 = 3$$
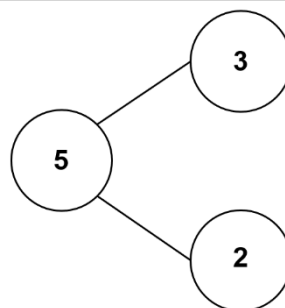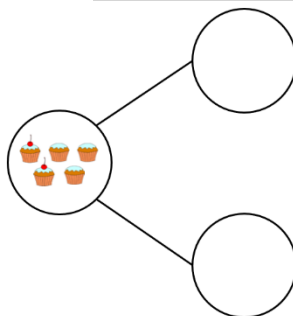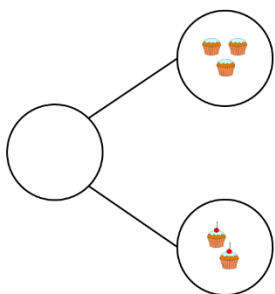
Make connections between addition and subtraction using the part-part-whole model.

Addition can tell us about combining objects.

Subtraction can tell us about partitioning objects.

$$2 + 3 = 5$$

$$3 + 2 = 5$$

$$5 - 3 = 2$$

$$5 - 2 = 3$$

$$+ 4$$

$$2 \qquad 6$$

$$- 4$$
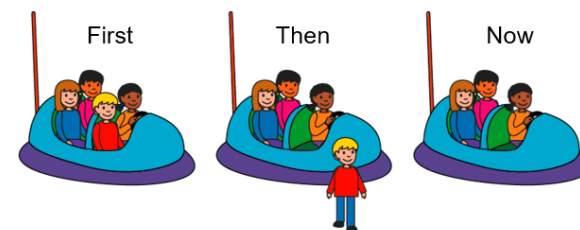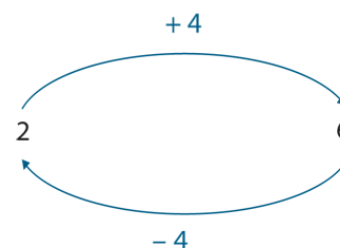
Addition and Subtraction undo eachother.

Addition and Subtraction	Vocabulary:

Addition and Subtraction

Year 2

Add and Subtract across 10 (1)
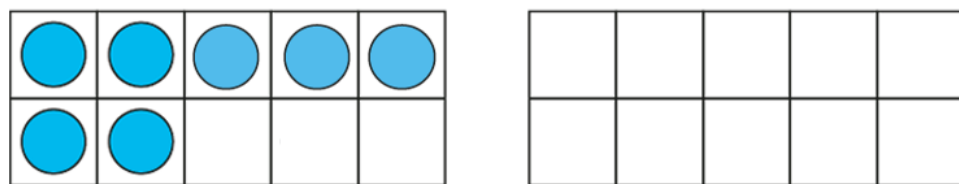
7 + 5
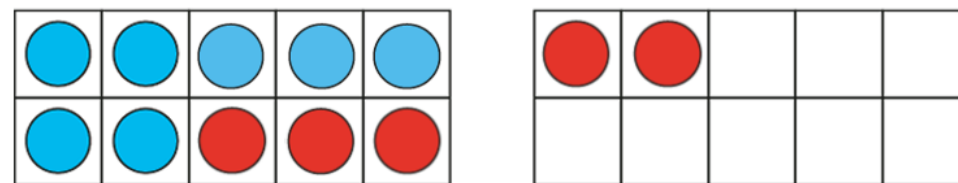
7 + 5 = 7 + 3 + 2 = 10 + 2

Use knowledge of known facts to bridge 10 using a 'make 10' strategy.
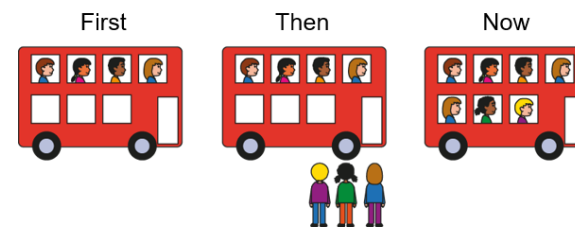
First, I partition the __ into ___ and ___.

Then, I add ___ and ___ to make 10.

Then, I add the remaining ___ to make ___.

+3   +2

7   10   12

7   +   5
         3   2

7 + 3 = 10

10 + 2 = 12

$15 - 9$

$15 - 9$ partitioned into 5 and ___

$15 - 9$ partitioned into 5 and 4
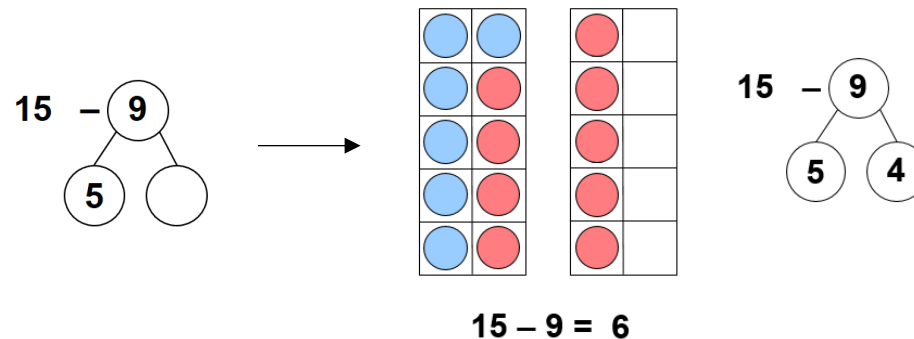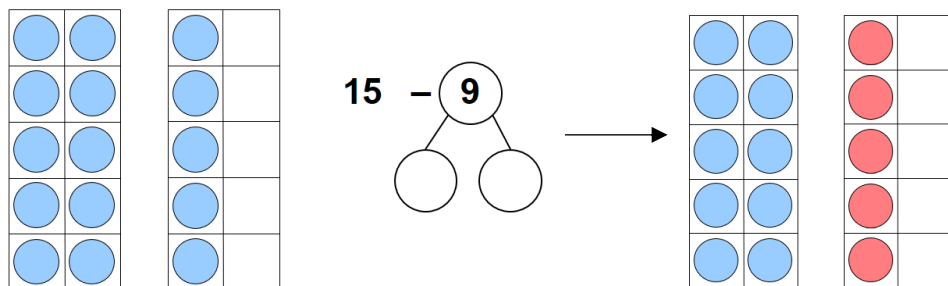
$15 - 9 = 6$
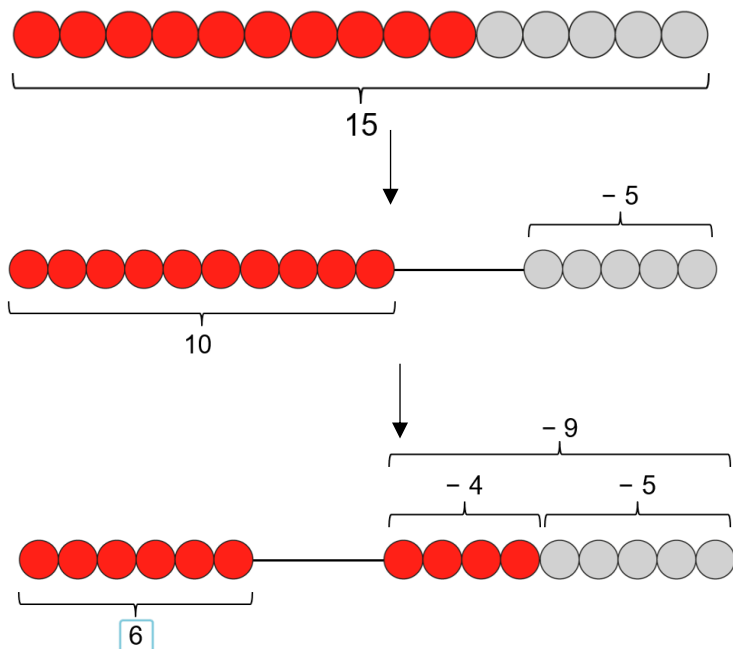
Use knowledge of known facts to subtract *through 10*. We can partition the subtrahend to help us subtract.

First, I partition the ___ into ___ and ___.

Then, I subtract ___ and ___ to get to 10.

Then, I subtract the remaining ___ to make ___.

15

10

− 5

− 9

− 4   − 5

6

− 4   − 5

6   7   8   9   10   11   12   13   14   15

Use knowledge of known facts to subtract *from 10*. We can partition the subtrahend to help us subtract.

First, I partition the __ into ___ and ___.

Then, I subtract ___ from 10 to make ___.

Then, I add the remaining ___ to make ___.

$15 - 9$

$15 - 9$

$15 - 9$
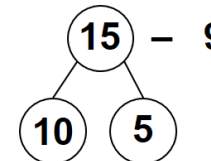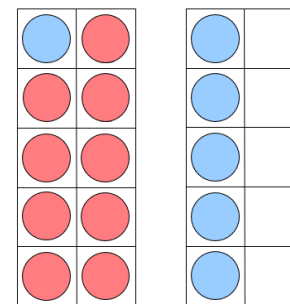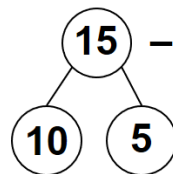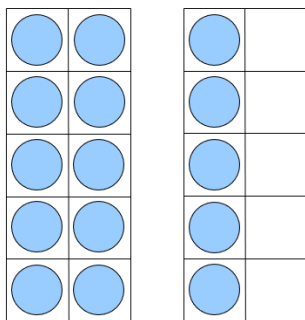
$$10 - 9 = 1$$

$$1 + 5 = 6$$

$$15 - 9 = 6$$

Addition and Subtraction

Year 2

Solve Comparative Addition and Difference Problems
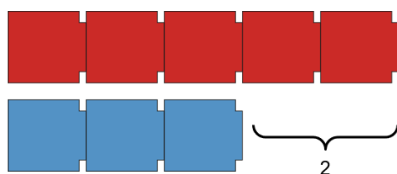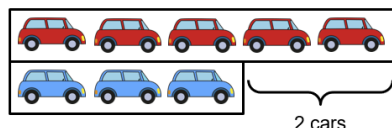
Line up sets of objects in a bar model structure to support comparison.

There are 2 fewer blue cars than red cars.

There are 2 more red cars that blue cars.

2 cars

2

Ben is 10 years old   Charlotte is 3 years old

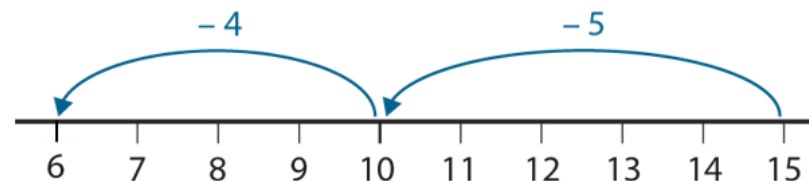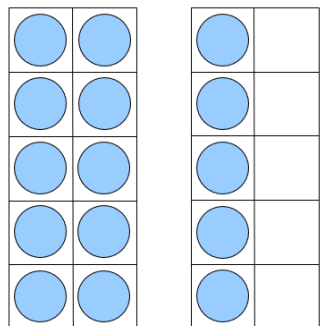10 years old

3 years old

difference of 7 years
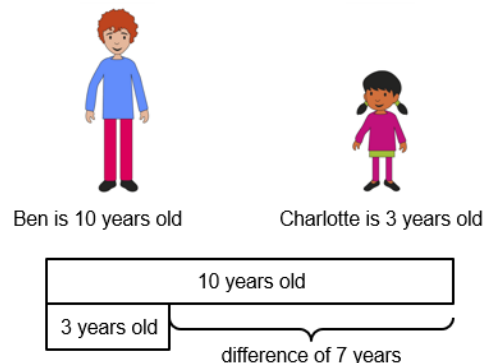
Represent a range of comparison contexts.

Ben is 7 years older than Charlotte.

Charlotte is 7 years younger than Ben.

8

3

8

3

5
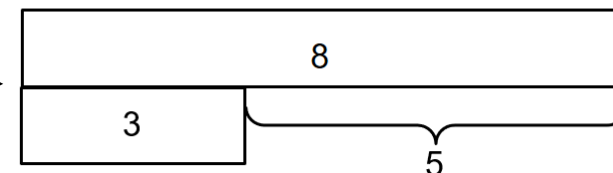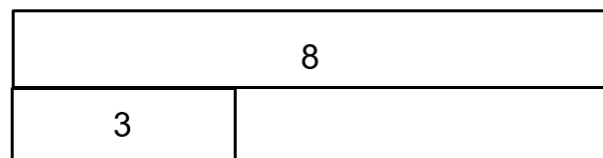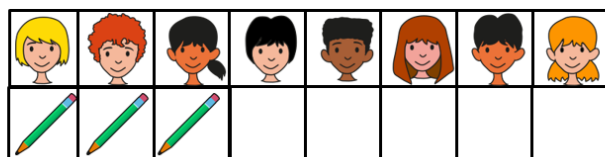
We can use subtraction to help solve difference problems / missing addend problems about 'how many more?' and 'how many fewer?'

3 + __ = 8

8 – 3 = 5

Create contexts for recognising the difference/comparative addition structure with all representations below.

10 + ☐ = 16   16 – 10 = ☐

16

10

6

6

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Number of sweets

10 9 8 7 6 5 4 3 2 1

Jayesh Tom Sam Imran Sara Alison
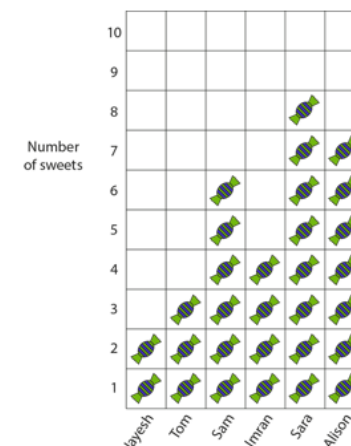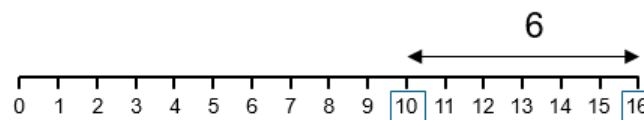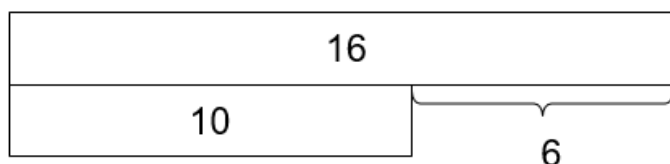
Addition and Subtraction

Year 2

Add and Subtract within 100 (1).
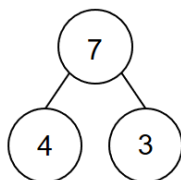
Use known facts within 10 to add/subtract multiples of 10.

I know that 4 plus 3 is equal to 7.

So, 4 tens plus 3 tens is equal to 7 tens.

40 + 30 = 70.

70 – 40 = 30

$4 + 3 = 7$
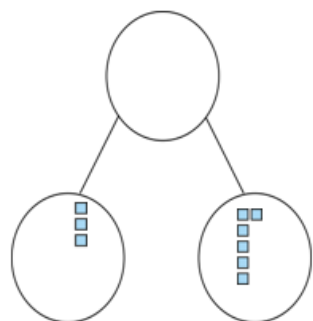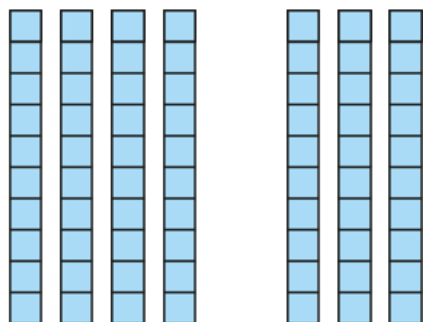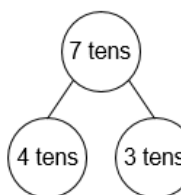
$14 + 3 = 17$

$24 + 3 = 27$

$34 + 3 = 37$

$3 + 6 = 9$
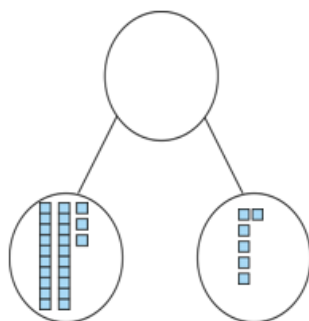
$23 + 6 = 29$

Use known facts within 10 to add/subtract ones to/from a 2 digit number.

I know that 3 plus 6 is equal to 9.

So, 2 tens and 3 ones plus 6 ones is equal to 2 tens and 9 ones.

23 + 6 = 29.
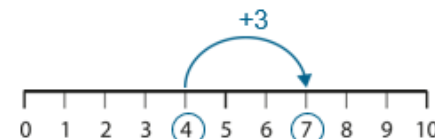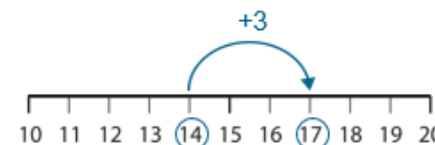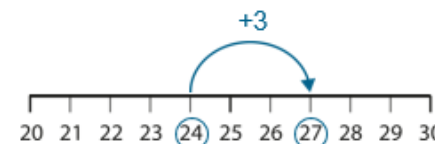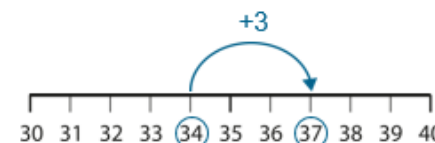
Generalise that adding/subtracting within 10 can be applied to adding a 2 digit number with a 1 digit number – not crossing the tens boundary.

I know that 4 plus 3 is equal to 7.

So, 1 ten and 4 ones plus 3 ones is equal to 1 tens and 7 ones.

14 + 3 = 17.

$$6 + 2 = 8$$
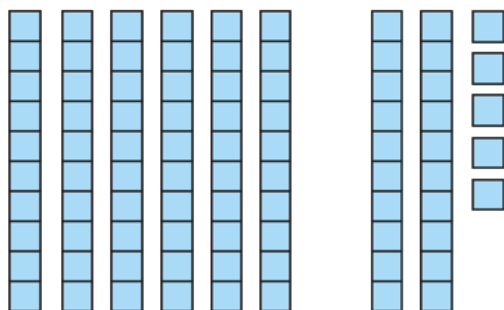
$$60 + 25 = ?$$

Use known facts within 10 to add/subtract multiples of 10 to a 2 digit number.

I know that 6 plus 2 is equal to 8.

So, 6 tens plus 2 tens is equal to 8 tens. Then add the additional 5 ones.

60 + 25 = 85.

Use knowledge of subtracting from 10 to subtract a single-digit number from a multiple of 10.

I know that 10 minus 3 is equal to 7.

So, 3 tens minus 3 ones is equal to 2 tens and 7 ones.

30 - 3 = 27.

$10 - 3$

$30 - 3$

45   +   23
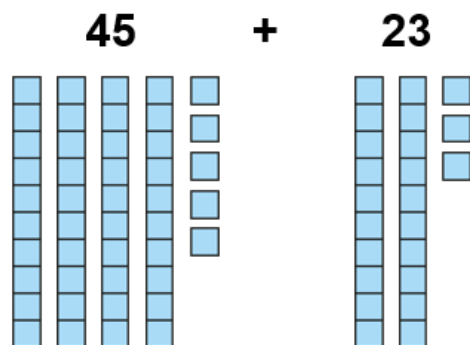
Partition both addends to add efficiently without crossing the tens boundary.

40 + 20 = 60

5 + 3 = 8

60 + 8 = 68
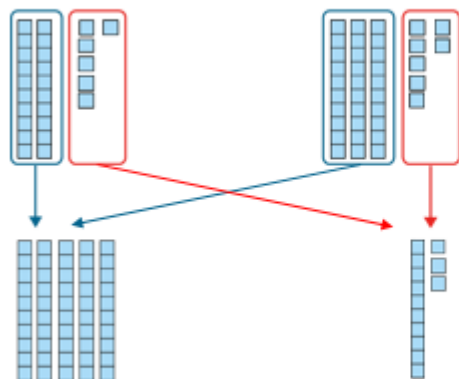
26   +   37   = 63

Partition both addends to add efficiently when the ones require an exchange.

50   +   13   = 63

26 + 37 = 63

30   7
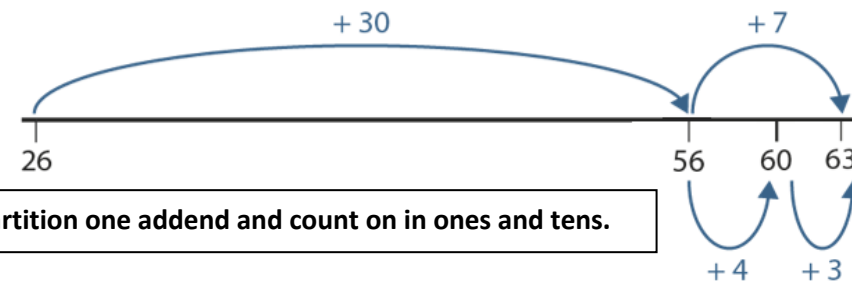
Partition one addend and count on in ones and tens.

+ 30   + 7

26   56   60   63

+ 4   + 3

45 − 20 − 3

45 − 23 = 22

45 − 20 − 3 = 22

− 3   − 20

22   25   45

45 − 3 − 20 = 22

− 20   − 3

22   42   45
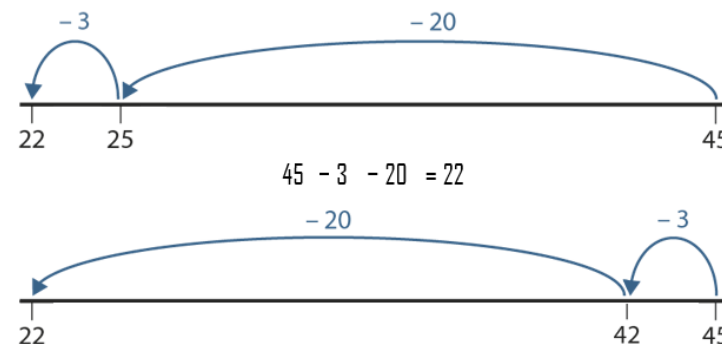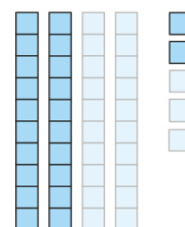
Subtract from any two-digit number by subtracting tens then ones without crossing a tens boundary.

59 − 27 = 32

20   7

− 7   − 20

32   39   59
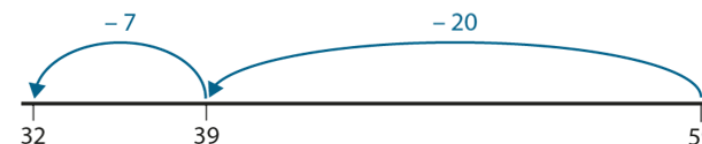
Subtract from any two-digit number by portioning the subtrahend into tens and ones and counting back.

24 + 76 = 100

20
10
70

24 + 76 = 100

20 (4   6) 70

10

Use knowledge of subtracting from 10 to subtract a single-digit number from a multiple of 10.

First we make 10 ones. The ones digits add up to make 1 ten, so we need 9 more tens to make a total of 100.

60
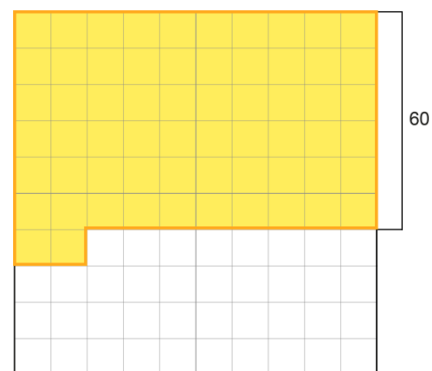
Solve missing number problems that sum to 100.

62 + ☐ = 100
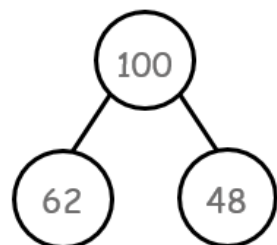
100
62   48

100
62   38
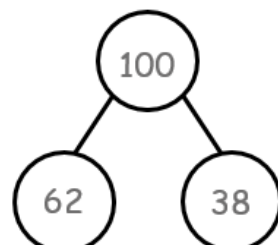
Compare equations which do and do not sum to 100.

62 + 48 = 110
60 (2   8) 40

10

62 + 38 = 100
60 (2   8) 30

10

Addition and Subtraction

Year 3

Columnar Addition and Subtraction

10s	1s
4	3
+ 2	5
6	8

Use deines to represent columnar addition *without exchange* pictorially before moving to abstract algorithm.

We add the ones. 3 ones plus 5 ones are equal to 8 ones.

We add the tens. 4 tens plus 2 tens is equal to 6 tens.

Use deines to represent columnar addition *with exchange* pictorially before moving to abstract algorithm.

5 ones plus 7 ones is equal to 12 ones. I can regroup 12 ones. 12 ones is equal to 1 ten and 2 ones.

2 tens plus 4 tens is equal to 6 tens. We also need to add 1 ten from the regrouping. There are 7 tens altogether.

If a column group is equal to 10 or more we must regroup. 10 ones is equal to 1 ten. 10 tens is equal to 1 hundred.

Addition and Subtraction	

Addition and Subtraction

Year 3

Columnar Addition and Subtraction

475 + 25

237 + 156

349 + 84

120 + 130

$$416 + 223 + 184 = 823$$

Use column addition	Use mental strategies

Compare expressions which can be calculated using mental or written strategies.
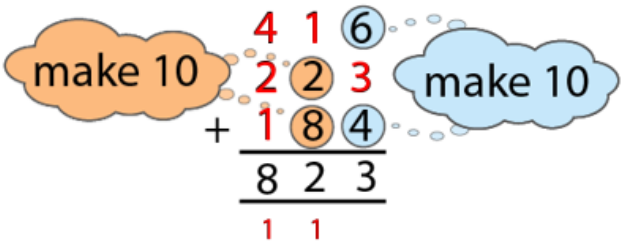
Add 3 addends using columnar addition, using a make 10 strategy to support.

Vocabulary:

Ones   Tens   Represents Compose   Combine   Total   Deines   Plus +   Minus -
Equal to =   Addition   Subtraction   Equation   Expression   Regroup   Algorithm

Addend + Addend = Sum

Minuend – Subtrahend = Difference
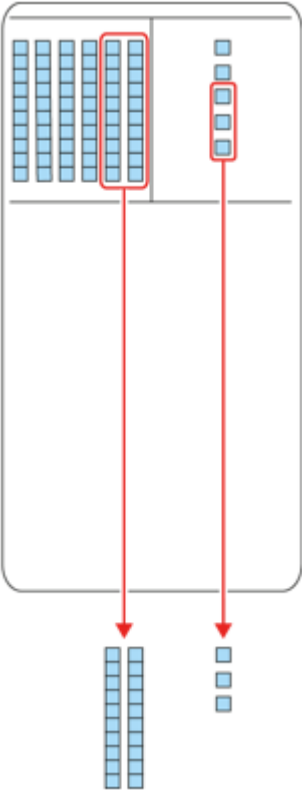
10s	1s
6	5
– 2	3
4	2

Use deines to represent columnar subtraction *without exchange* pictorially before moving to abstract algorithm.

We subtract the ones. 5 ones minus 3 ones is equal to 2 ones.

We subtract the tens. 6 tens minus 2 tens is equal to 4 tens.

2̶1	12	3
– 1	4	2
0	8	1

475 – 358   170 – 140

349 – 101   201 – 198

Use column subtraction	Use mental strategies

Compare expressions which can be calculated using mental or written strategies.
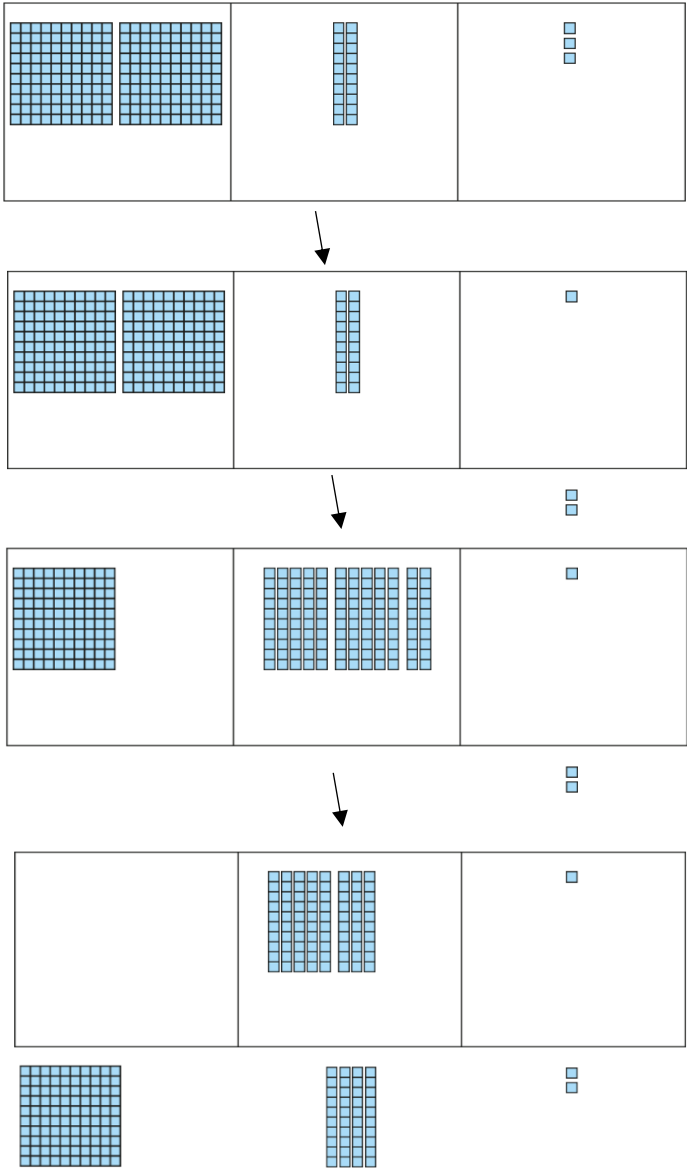
Addition and Subtraction

Year 3

Manipulate the Additive Relationship
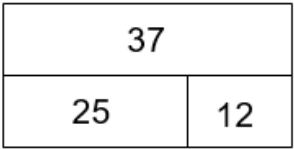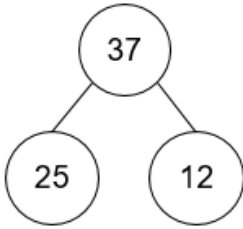
25 + 12 = 37

12 + 25 = 37

37 = 25 + 12

37 = 12 + 25

37 – 12 = 25

37 – 25 = 12

25 = 37 – 12

12 = 37 – 25

Recognise the different equations that can be recorded based on the part-whole structure.

Addend + addend = sum

Minuend – subtrahend = difference

Part → 329 + 414 = 743 ← Part ... Whole

743 – 329 = 414

Whole → 447 – 162 = 285 ← Part ... Part
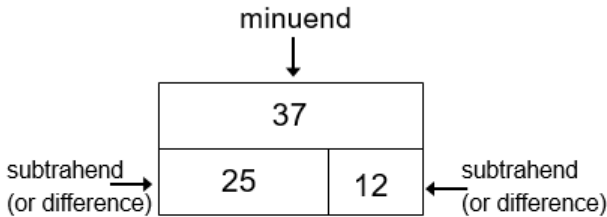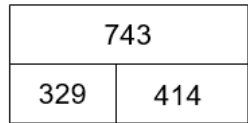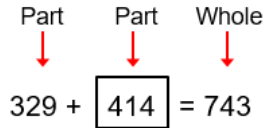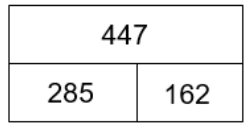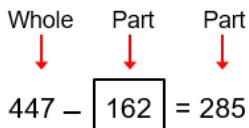
447 – 285 = 162

Use the part-whole structure to support finding a missing part.

There is a missing part. To find the missing part, we subtract the other part from the whole.

sum → 37

addend → 25 | 12 ← addend

25 + 12 = 37

12 + 25 = 37

minuend → 37

subtrahend (or difference) → 25 | 12 ← subtrahend (or difference)

37 – 25 = 12

37 – 12 = 25

Whole → 614 – 527 = 87 ← Part ... Part
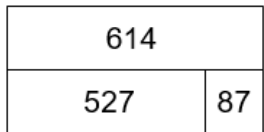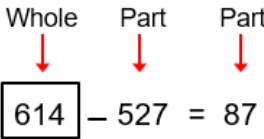
527 + 87 = 614

Use the part-whole structure to support finding a missing whole.

There is a missing whole. To find the missing whole, we add the two parts.

Addition and Subtraction

Year 6

Quantify additive and multiplicative relationships

1,000

250

750

$250 + 750 = 1,000$ $1,000 - 750 = 250$

1,000

250

$250 \times 4 = 1,000$ $1000 \div 4 = 250$

The relationship between two numbers can be expressed both additively and multiplicatively.

+ ☐

250   1,000

− ☐
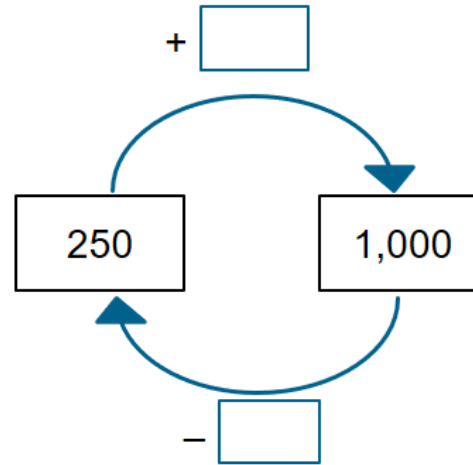
1000 is ___ more than 250.

250 is ____ less than 1000.

× ☐

250   1,000

÷ ☐
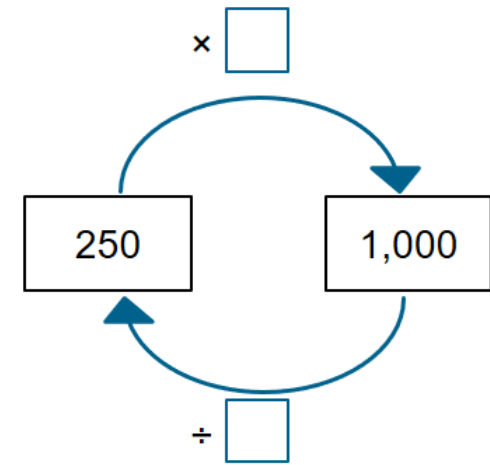
1000 is ___ times the size of 250.

250 is one-_____ of 1000.

To find one-quarter of a number, we divide by 4.

+ 0.4   + 0.4

☐   1.2   1.6   ☐

− 0.4   − 0.4
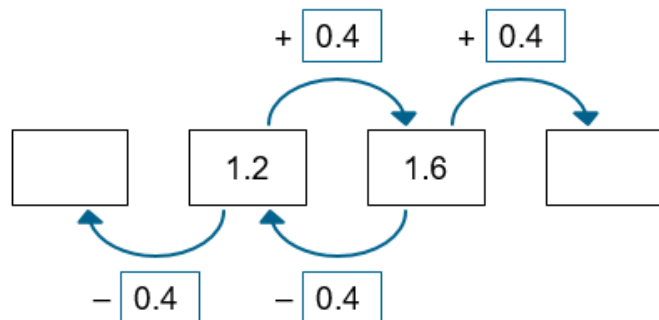
Finding the difference can help calculate the unknown terms in a sequence.

Finding the known multiplier can help calculate the unknown terms in a sequence.
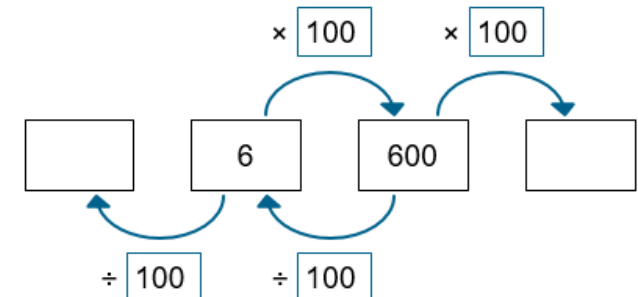
× 100   × 100

☐   6   600   ☐

÷ 100   ÷ 100

Addition and Subtraction	

Year 6

Quantify additive and multiplicative relationships

$\frac{1}{3}$ of ?= 10

10
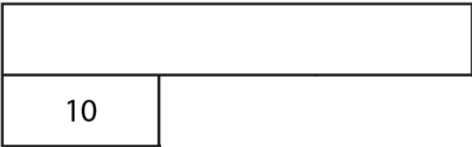
$\frac{1}{3}$ of ?= 10
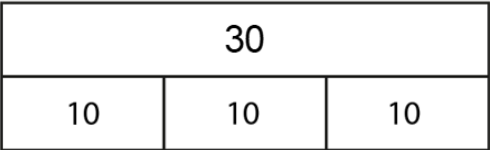
30		
10	10	10

> **Calculate the unknown whole by recognising how many parts the whole has been divided into.**

$\frac{1}{3}$ of 3☐ = 1☐

Addition and Subtraction

Year 6

Derive Related Calculations

$252 = 3 \times 84$

$252 = 3 \times 84$

$252 = 3 \times 84$

$2{,}520 = 30 \times \boxed{}$

$\boxed{} = 3 \times 85$

$252 = 3 \times 60 + 3 \times \boxed{}$

Manipulate an equation to solve another. Pupils could:

- rearrange the terms;
- rewrite using inverse operations;
- apply place value;
- use the properties of division that correspond to the commutative, associative or distributive property of multiplication;
- use the compensation property.

Additive examples

Multiplicative examples

$625 - 148 = 477$

$625 - 148 = 477$

$625 - 148 = 477$

$6{,}250 - 1{,}480 = \boxed{}$

$625 - 70 - \boxed{} = 477$

$625 - 248 = \boxed{}$

$14.8 + 7.6 = 22.4$

$14.8 + 7.6 = 22.4$

$14.8 + 7.6 = 22.4$

$1{,}480 + \boxed{} = 2{,}240$

$\boxed{} - 7.6 = 14.8$

$12.8 + \boxed{} = 22.4$

$4{,}800 \div 25 = 192$

$4{,}800 \div 25 = 192$

$4{,}800 \div 25 = 192$

$25 \times 192 = \boxed{}$

$4{,}800 \div 250 = \boxed{}$

$4{,}800 \div 5 \div 5 = \boxed{}$

Vocabulary:

Additive   Multiplicative   Relationship   Represents   Equation   Unknown   Scale-factor   Ratio   Ratio Table   ___ times the size   one-___ the size of   Vertical   Horizontal

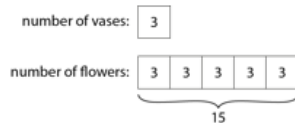Factor x Factor = Product (Multiplicand x Multiplier = Product)

Dividend ÷ Divisor = Quotient

number of vases: 1

number of flowers: 1 1 1 1 1
5

$1 \times 5 = 5$

$5 \div 5 = 1$

$5 \times \frac{1}{5} = 1$

number of vases: 3

number of flowers: 3 3 3 3 3
15
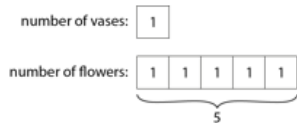
$3 \times 5 = 15$

$15 \div 5 = 3$

$15 \times \frac{1}{5} = 3$

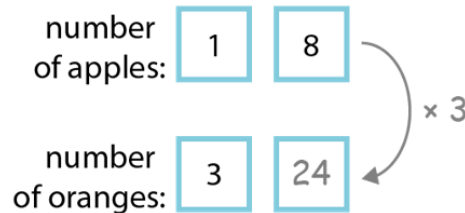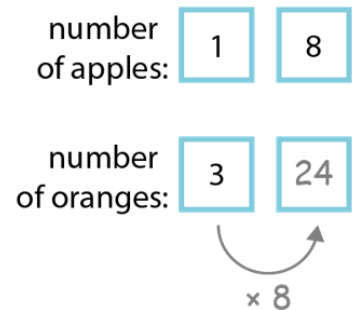**Ratio table to compare sets of information.**

For every ___, there are ___.

For every 1 litre of petrol, you can drive 7 miles.

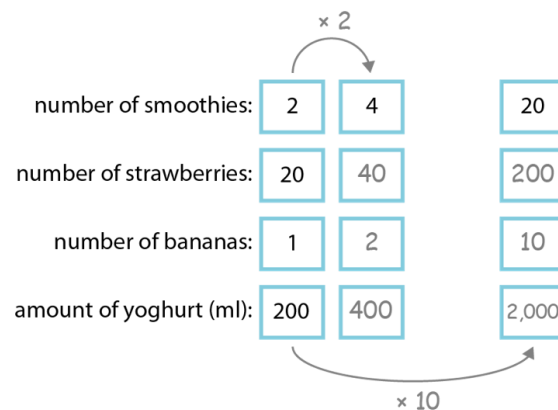**For every 7 miles you will drive, you need 1 litre of petrol.**

Extend sequences using knowledge of patterns based on ratio table.

Litres of petrol	1	2	3	4	5	6	7	8	9	10
Miles driven	7	14	21	28	35	42	49	56	63	70

number of apples: 1   8

number of oranges: 3   24

× 8

number of apples: 1   8

number of oranges: 3   24

× 3

Explore vertical and horizontal relationship between numbers.

For every ___, there are ___.

× 2

number of smoothies: 2   4   20

number of strawberries: 20   40   200

number of bananas: 1   2   10

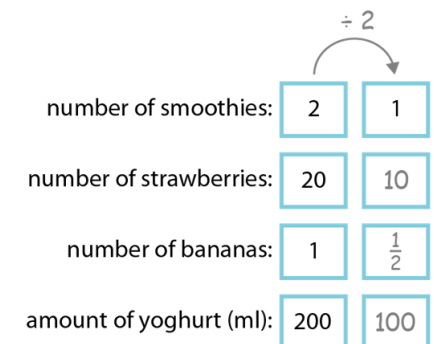amount of yoghurt (ml): 200   400   2,000

× 10

Identify the scale-factor in order to find unknown values.

___ is ___ times the size of ___.

Therefore I must multiply/divide by ___.

___ is one-__ the size of ___.

÷ 2

number of smoothies: 2   1

number of strawberries: 20   10

number of bananas: 1 $\frac{1}{2}$

amount of yoghurt (ml): 200   100

Vocabulary:

Additive   Multiplicative   Relationship   Represents   Equation   Two Unknowns
Scale-factor   Ratio   ___ times the size   one-___ the size of   Total   Bar Model
Structure

B

| r | b |

$$B = \boxed{r} + \boxed{b}$$

B

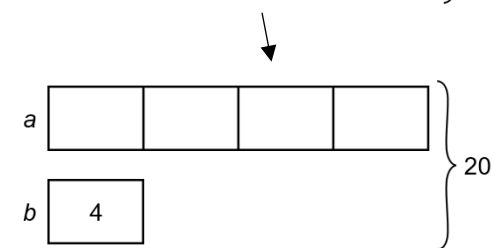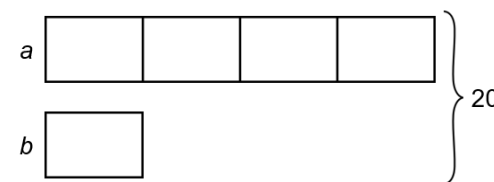| p | y |

$$B = \boxed{p} + \boxed{y}$$

Use Cuisenaire to find 2 bars of total length that are equal to another.

There is more than one solution to the problem.

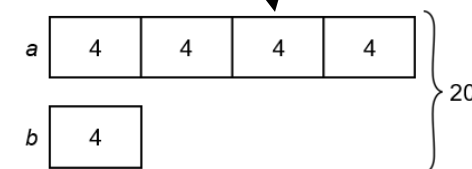**There can be infinite solutions to a problem.**

$$5 \times \boxed{} = 10 \times \boxed{}$$

Solve multiplicative problems with two unknowns when the total is known.

v

a

b

} 20

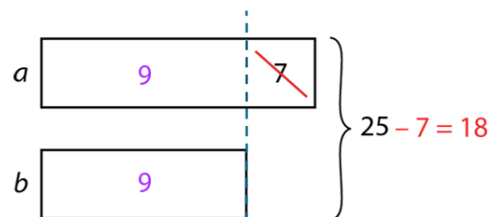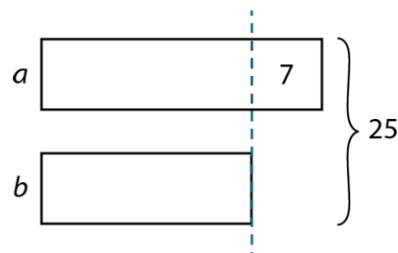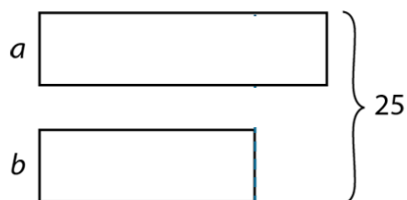a

b | 4

} 20

one part = 20 ÷ 5 = 4

b = 4

a | 4 | 4 | 4 | 4

b | 4

} 20

one part = 20 ÷ 5 = 4

b = 4

a = 4 × 4 = 16

The two numbers are 16 and 4.

Solve additive problems with two unknowns when the total is known.

a

b

} 25

a | 7

b

} 25

a | 9 | 7

b | 9

} 25 – 7 = 18

b = 18 ÷ 2 = 9

a = 9 + 7 = 16

The two numbers are 9 and 16.