Addition and Subtraction

Year 1

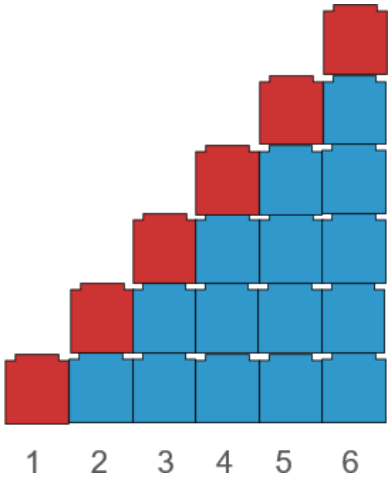
Compose and Partition Numbers to 10 (1)

Vocabulary:

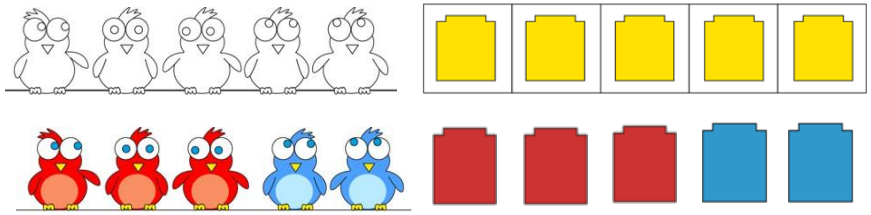
Part Whole One Two Three Four Five Six Seven Eight Nine Ten
Represents Compose Combine Partition Numberblocks Part-Part-Whole
(Cherry) model Tens Frame Fingers Five and-a-bit Systematic Subitise
One more One less

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

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



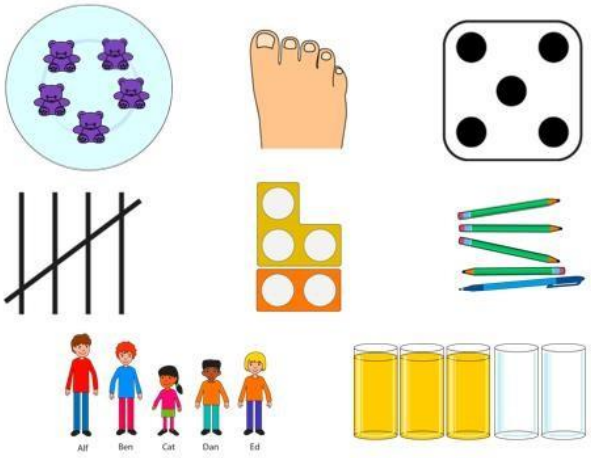
Each number is composed of the previous number and one more.

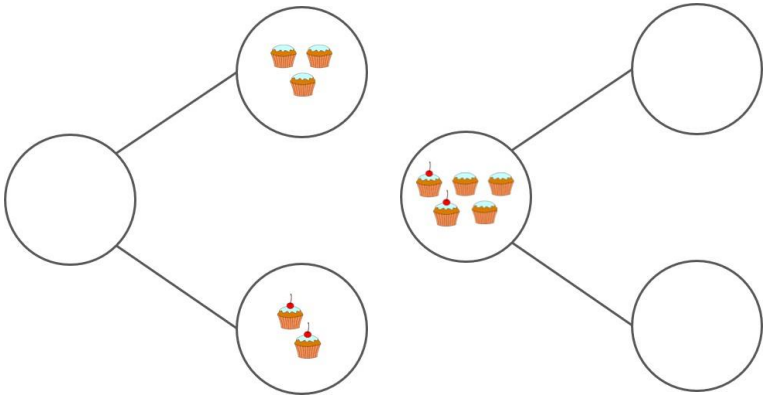


Each number can be partitioned into two smaller numbers

There are 5 ____. 3 are ____. 2 are ____.

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

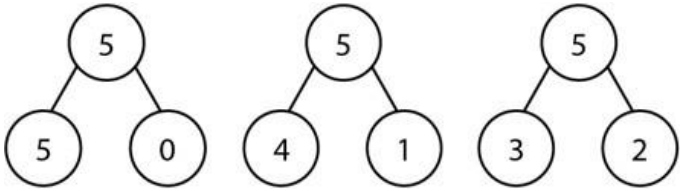




A number can be partitioned in different ways.

There are 5 ____. 3 are ____. 2 are ____.

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



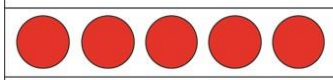
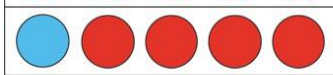
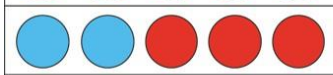
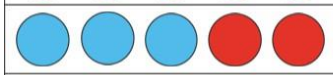
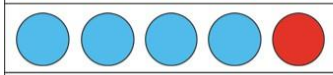
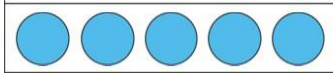
Addition and Subtraction

Year 1

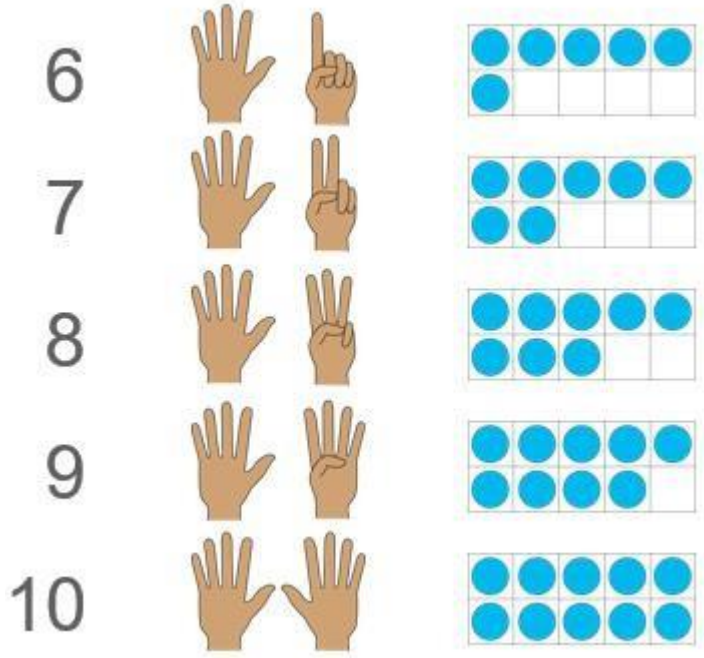
Compose and Partition Numbers to 10 (2)

Vocabulary:

Part Whole One Two Three Four Five Six Seven Eight Nine Ten Represents Compose Combine Partition Numberblocks Part-Part-Whole (Cherry) model Tens Frame Fingers Five and-a-bit Systematic Subitise One more One less

	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

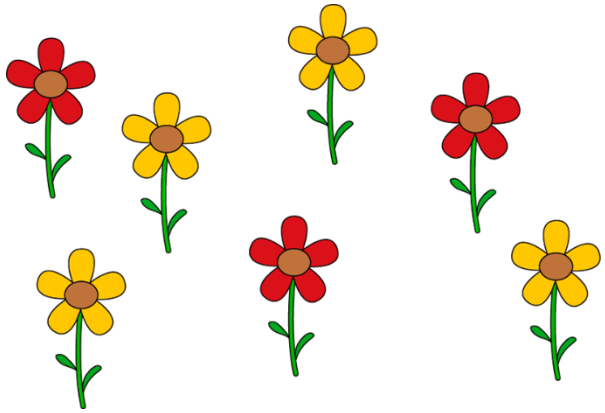
Year 1

Read, Write and Interpret Additive Equations (1)

Vocabulary:

Part Whole One Two Three Four Five Six Seven Eight Nine Ten
Represents Compose Combine Partition Total Part-Part-Whole (Cherry) model
Tens Frame Fingers Five and-a-bit Systematic Plus + Minus - Equal to =
Addition Subtraction Quantity Increase Decrease First, Then, Now
Expression Equation

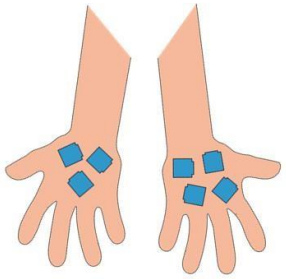
Addend + Addend = Sum Minuend – Subtrahend = Difference



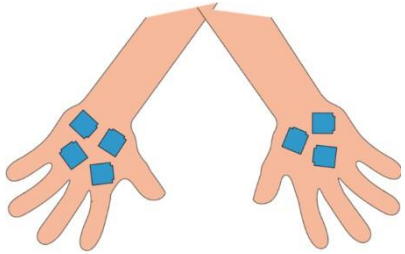
Identify what each number represents in an expression.

The 4 represents the 4 yellow flowers.

The 3 represents the 3 red flowers.



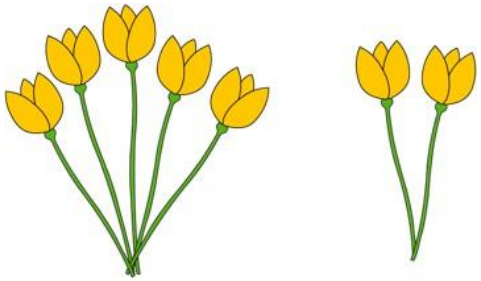
3 + 4



4 + 3

We can write the addends in either order.

(Commutative Law)



5 + 2 = 7

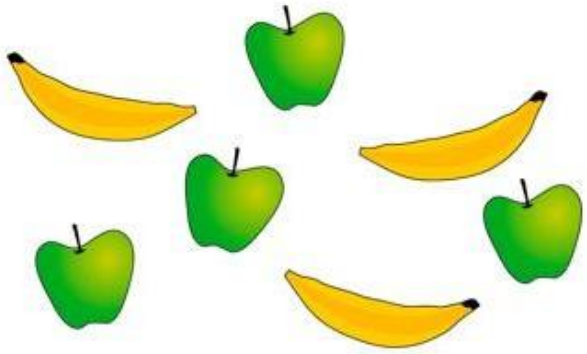
Identify what each number represents in an expression.

We can write 5 plus 2 is equal to 7.

The 5 represents ____.

The 2 represents____.

The 7 represents the total number of ____.



4 + 3 = 7

Addition and Subtraction

Year 1

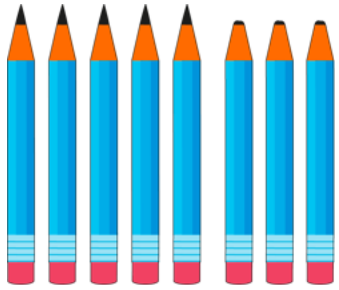
Read, Write and Interpret Additive Equations

Vocabulary:

Part Whole One Two Three Four Five Six Seven Eight Nine Ten
Represents Compose Combine Partition Total Part-Part-Whole (Cherry) model
Tens Frame Fingers Five and-a-bit Systematic Plus + Minus - Equal to =
Addition Subtraction Quantity Increase Decrease First, Then, Now
Expression Equation

Addend + Addend = Sum

Minuend – Subtrahend = Difference



Subtraction can tell us about partitioning.

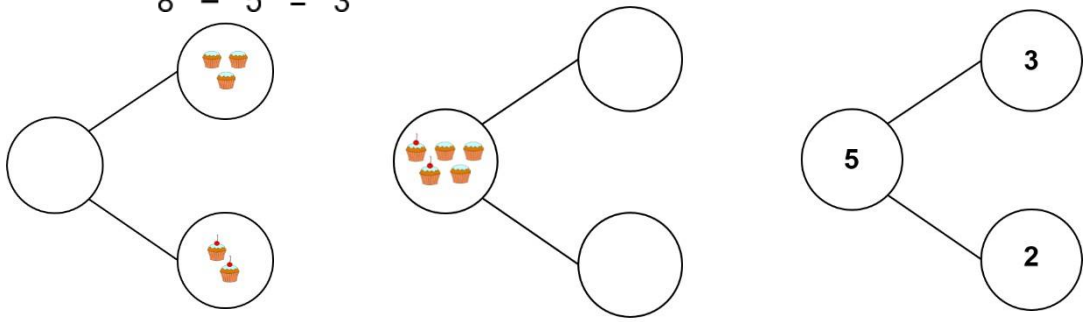
There are 8 _____altogether.

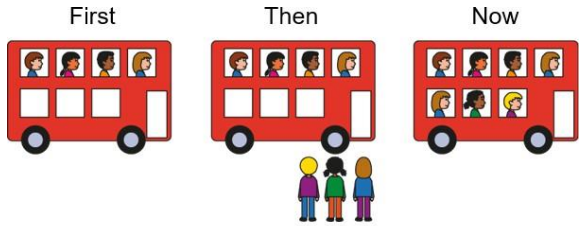
5 ____are _____.

3 ____are _____.

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

8 – 5 = 3



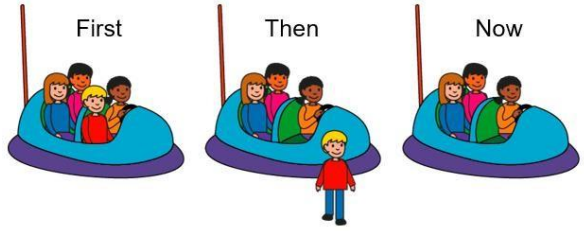


4 + 3 = 7

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.



4 – 1 = 3

Make connections between addition and subtraction using the part-part-whole model.

Addition can tell us about combining objects.

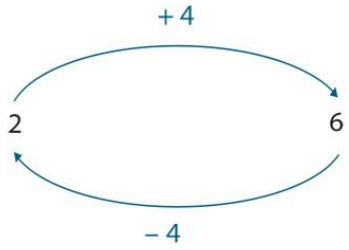
Subtraction can tell us about partitioning objects.

2 + 3 = 5

3 + 2 = 5

5 – 3 = 2

5 – 2 = 3



Addition and Subtraction undo eachother.

Addition and Subtraction

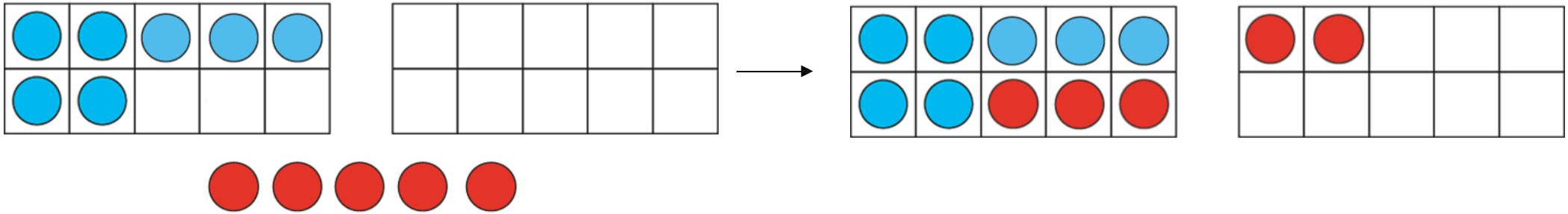
Year 2

Add and Subtract across 10 (1)

Vocabulary:

Part Whole One Two Three Four Five Six Seven Eight Nine Ten
Represents Compose Combine Partition Total Part-Part-Whole (Cherry) model
Tens Frame Fingers Five and-a-bit Systematic Plus + Minus - Equal to =
Addition Subtraction Quantity Increase Decrease First, Then, Now
Expression Equation

Addend + Addend = Sum Minuend – Subtrahend = Difference



7 + 5

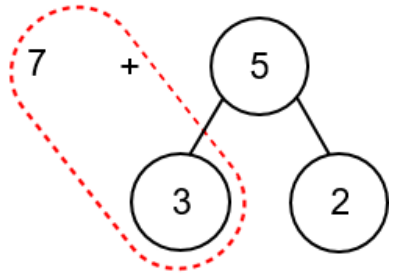
7 + 5 = 7 + 3 + 2 = 10 + 2

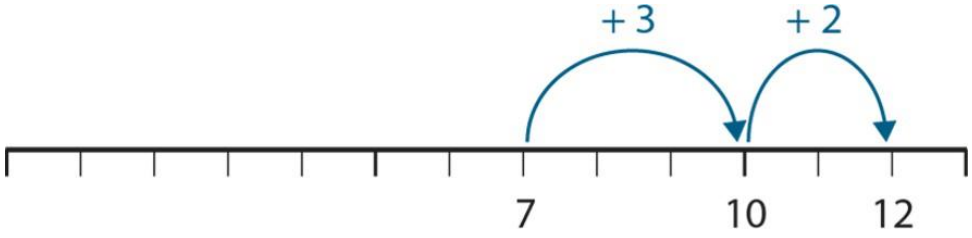
Use knowledge of known facts to bridge 10 using a 'make 10' strategy.

First, I partition the ___into ____and ____.

Then, I add ____and ____to make 10.

Then, I add the remaining ____to make ____.





7 + 3 = 10

10 + 2 = 12

Addition and Subtraction

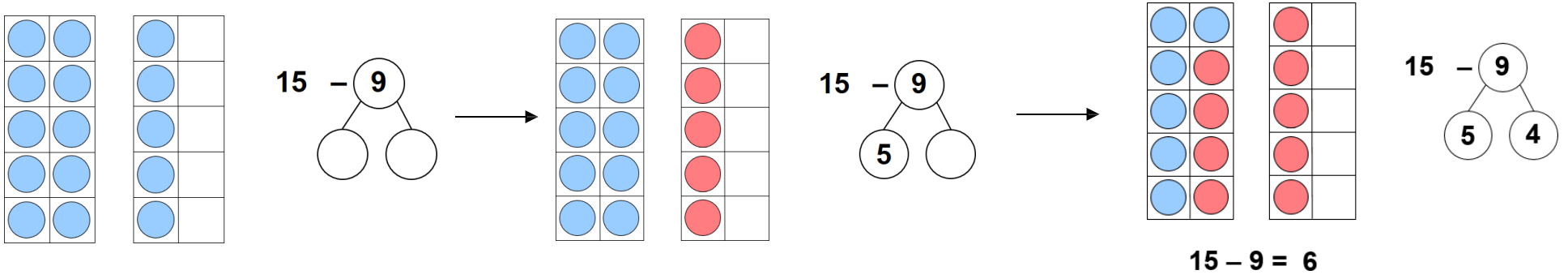
Year 2

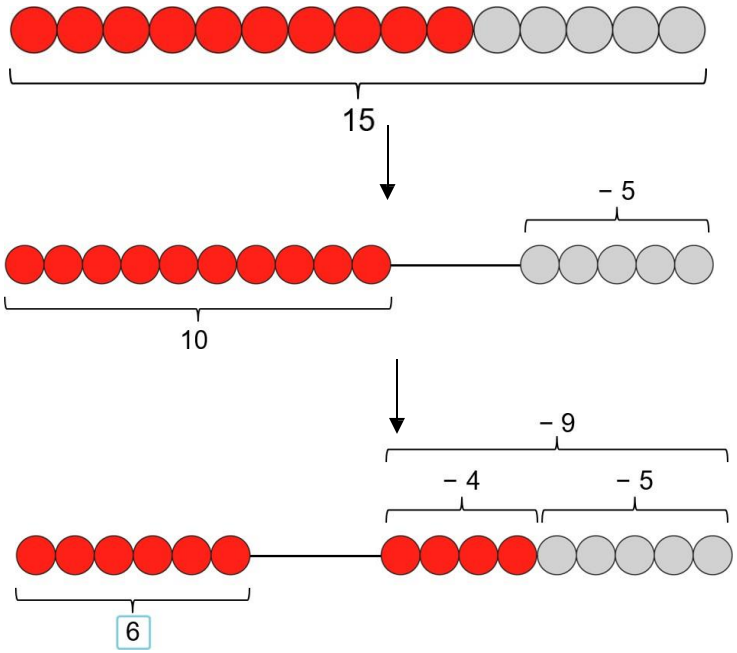
Add and Subtract across 10 (2)

Vocabulary:

Part Whole One Two Three Four Five Six Seven Eight Nine Ten
Represents Compose Combine Partition Total Part-Part-Whole (Cherry) model
Tens Frame Fingers Five and-a-bit Systematic Plus + Minus - Equal to =
Addition Subtraction Quantity Increase Decrease First, Then, Now
Expression Equation

Addend + Addend = Sum Minuend – Subtrahend = Difference



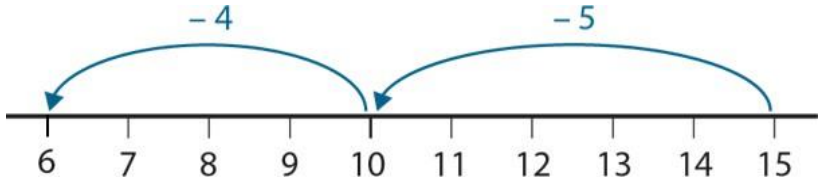


Use knowledge of known facts to subtract *through 10*. We can partition the subtrahend to help us subtract.

First, I partition the ___into ____and ___.

Then, I subtract ____and ____to get to 10.

Then, I subtract the remaining ____to make ____.



Addition and Subtraction

Year 2

Add and Subtract across 10 (3)

Vocabulary:

Part Whole One Two Three Four Five Six Seven Eight Nine Ten
Represents Compose Combine Partition Total Part-Part-Whole (Cherry) model
Tens Frame Fingers Five and-a-bit Systematic Plus + Minus - Equal to =
Addition Subtraction Quantity Increase Decrease First, Then, Now
Expression Equation

Addend + Addend = Sum

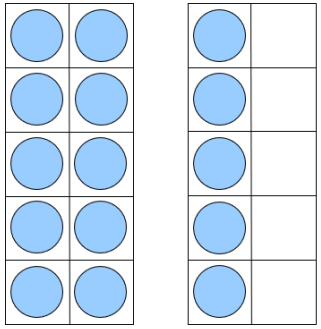
Minuend – Subtrahend = Difference

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

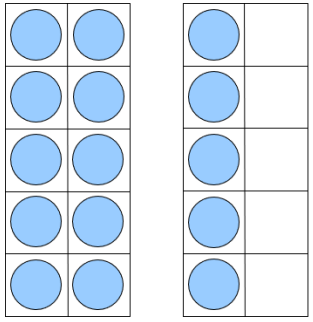
First, I partition the ___into ____and ____.

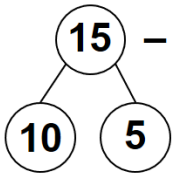
Then, I subtract ____from 10 to make ____.

Then, I add the remaining ____to make ____.



15 – 9 →





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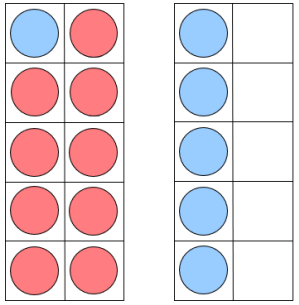
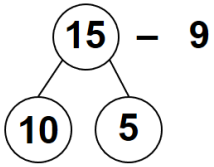




10 – 9 = 1

1 + 5 = 6

15 – 9 = 6

Addition and Subtraction

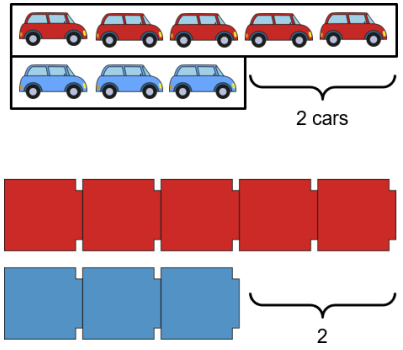
Year 2

Solve Comparative Addition and Difference Problems

Vocabulary:

Part Whole One Two Three Four Five Six Seven Eight Nine Ten
Represents Compose Combine Partition Total Part-Part-Whole (Cherry) model
Tens Frame Fingers Five and-a-bit Systematic Plus + Minus - Equal to =
Addition Subtraction Quantity Increase Decrease First, Then, Now
Expression Equation Difference Bar model

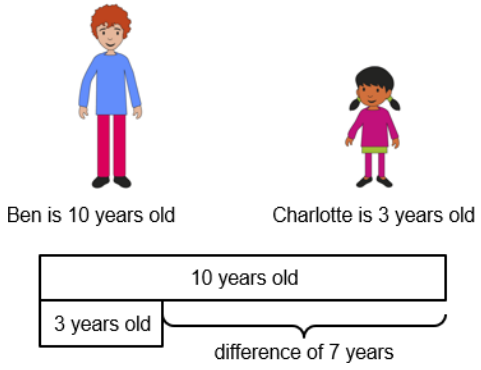
Addend + Addend = Sum Minuend – Subtrahend = Difference



Line up sets of objects in a bar model structure to support comparison.

There are 2 fewer blue cars than red cars.

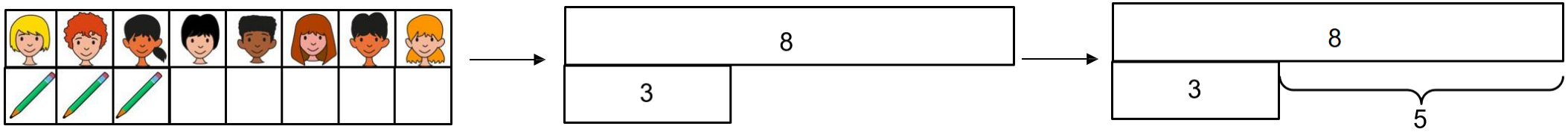
There are 2 more red cars that blue cars.



Represent a range of comparison contexts.

Ben is 7 years older than Charlotte.

Charlotte is 7 years younger than Ben.



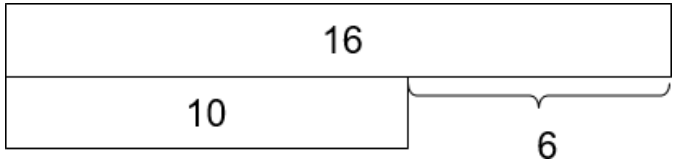
We can use subtraction to help solve difference problems / missing addend problems about 'how many more?' and 'how many fewer?'

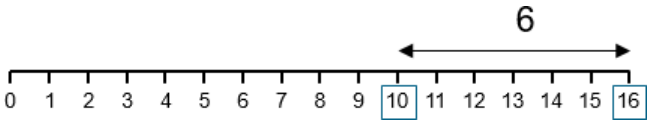
3 + ___ = 8

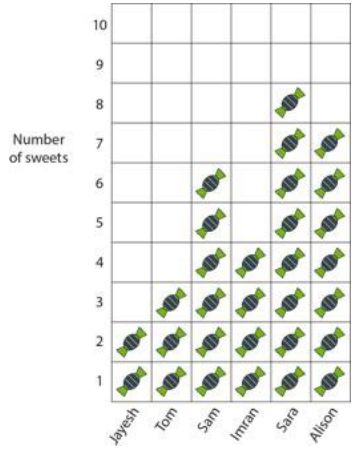
8 – 3 = 5

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

10 + ☐ = 16 **16 – 10 = ☐**







Addition and Subtraction

Year 2

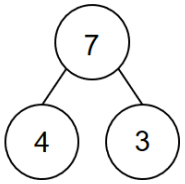
Add and Subtract within 100 (1).

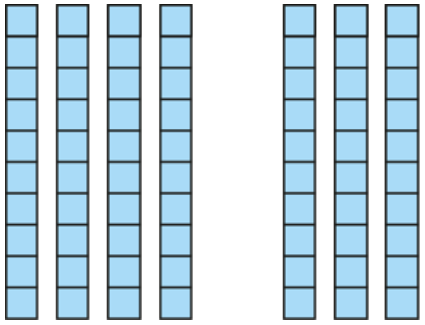
Vocabulary:

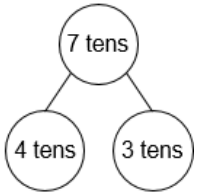
Part Whole Ones Tens Represents Compose Combine Partition Total Part-Part-Whole (Cherry) model Tens Frame Dienes Plus + Minus - Equal to = Addition Subtraction Expression Equation Exchange Count on Count back Number line Tens Boundary

Addend + Addend = Sum

Minuend – Subtrahend = Difference







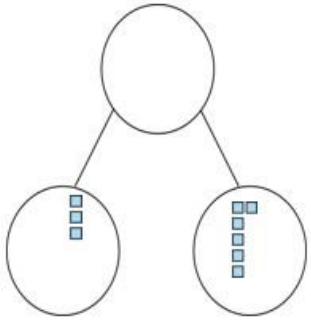
Use known facts within 10 to add/subtract multiples of 10.

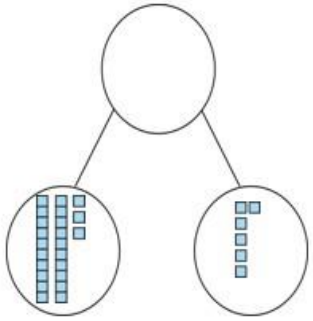
I know that 4 plus 3 is equal to 7.

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

40 + 30 = 70.

70 – 40 = 30





3 + 6 = 9

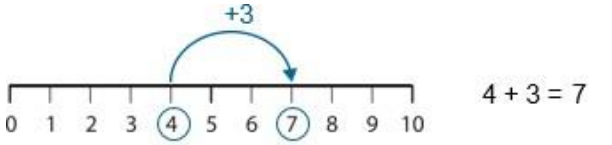
23 + 6 = 29

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.

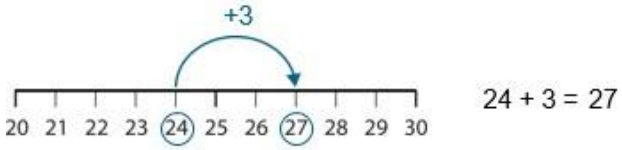
So, 2 tens and 3 ones plus 6 ones is equal to 2 tens and 9 ones.

23 + 6 = 29.



4 + 3 = 7

14 + 3 = 17



24 + 3 = 27

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.

Addition and Subtraction

Year 2

Add and Subtract within 100 (2).

Vocabulary:

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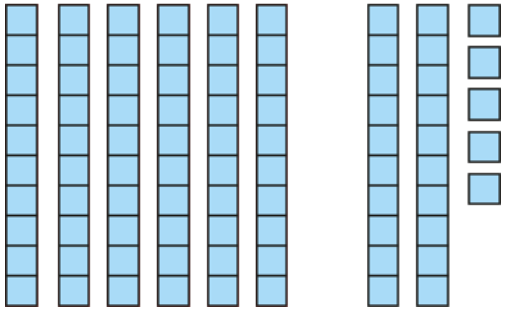
Addend + Addend = Sum

Minuend – Subtrahend = Difference

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.

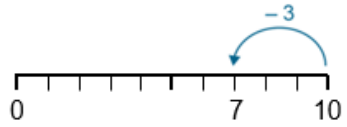
60 + 25 = 85.

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

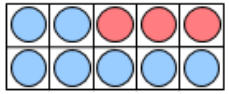
I know that 10 minus 3 is equal to 7.

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

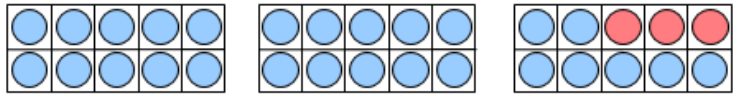
30 - 3 = 27.



10 – 3



30 – 3



Addition and Subtraction

Year 2

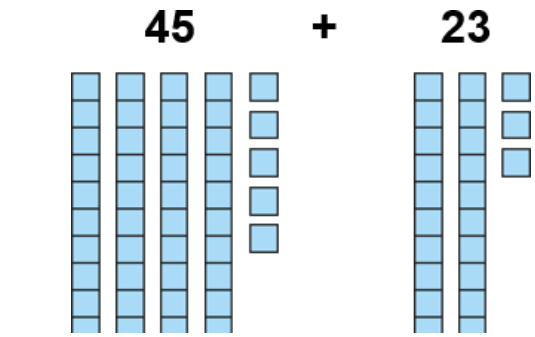
Add and Subtract within 100 (3).

Vocabulary:

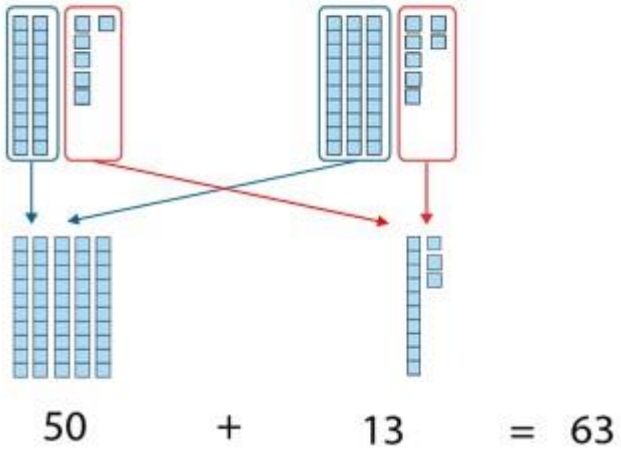
Part Whole Ones Tens Represents Compose Combine Partition Total Part-Part-Whole (Cherry) model Tens Frame Dienes Plus + Minus - Equal to = Addition Subtraction Expression Equation Exchange Count on Count back Number line Tens Boundary

Addend + Addend = Sum

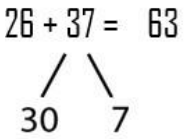
Minuend – Subtrahend = Difference

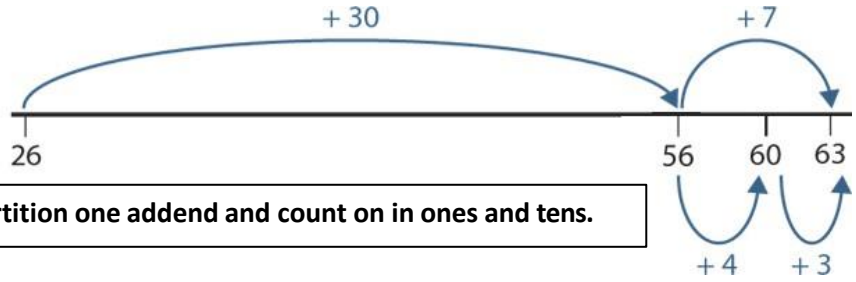


Partition both addends to add efficiently without crossing the tens boundary.

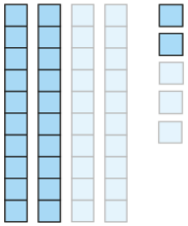


Partition both addends to add efficiently when the ones require an exchange.

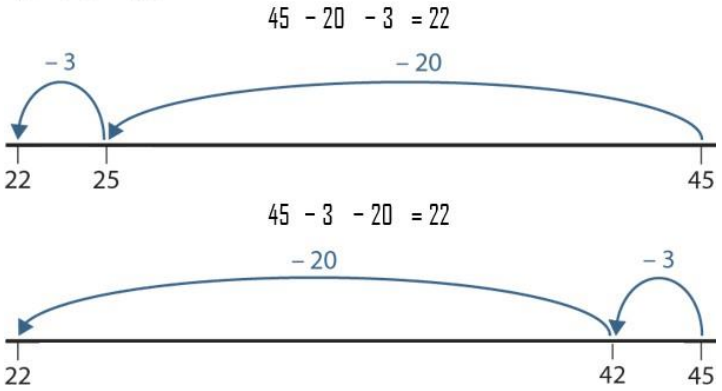




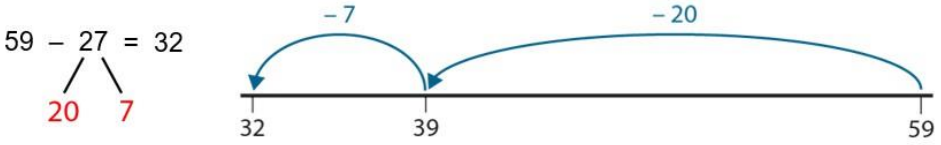
Partition one addend and count on in ones and tens.



45 – 23 = 22



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



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

Addition and Subtraction

Year 3

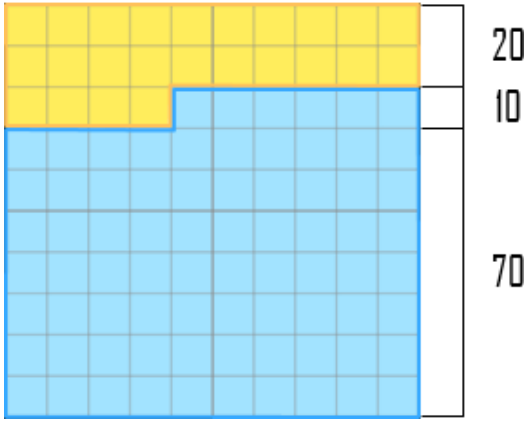
Calculate complements to 100.

Vocabulary:

Part Whole Ones Tens Represents Compose Combine Partition Total
Part-Part-Whole (Cherry) model Dienes 100 square Plus + Minus - Equal to =
Addition Subtraction Expression Equation Exchange Complements

Addend + Addend = Sum

24 + 76 = 100



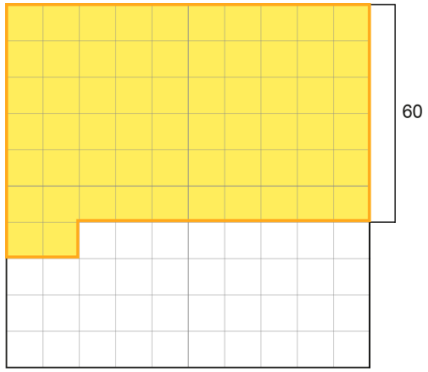
24 + 76 = 100

20 4 6 70

10

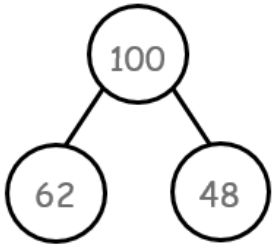
Use knowledge of subtracting from 10 to subtract a single-digit number from a multiple of 10.

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.



62 + ☐ = 100

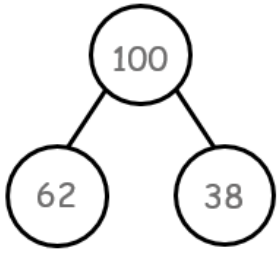
Solve missing number problems that sum to 100.



62 + 48 = 110

60 2 8 40

10



62 + 38 = 100

60 2 8 30

10

Compare equations which do and do not sum to 100.

Addition and Subtraction

Year 3

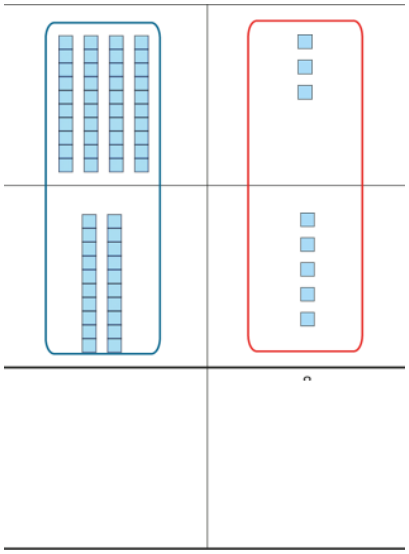
Columnar Addition and Subtraction

Vocabulary:

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

Addend + Addend = Sum

Minuend – Subtrahend = Difference



	10s	1s
	4	3
+	2	5
	6	8

Use Dienes 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.

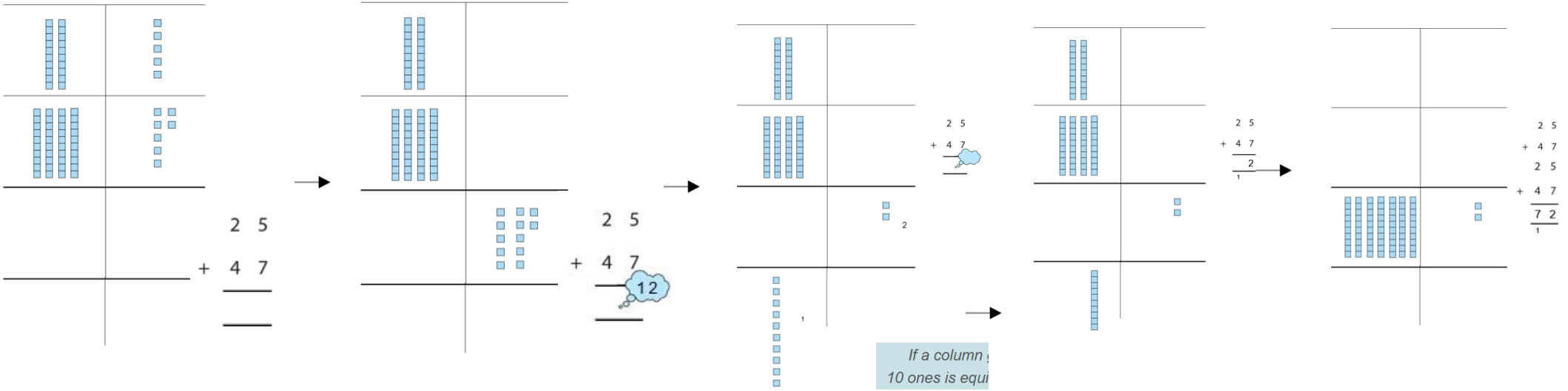
We add the tens. 4 tens plus 2 tens is equal to 6 tens.

Use Dienes 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

Year 3

Columnar Addition and Subtraction

Vocabulary:

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

Addend + Addend = Sum

Minuend – Subtrahend = Difference

475 + 25

237 + 156

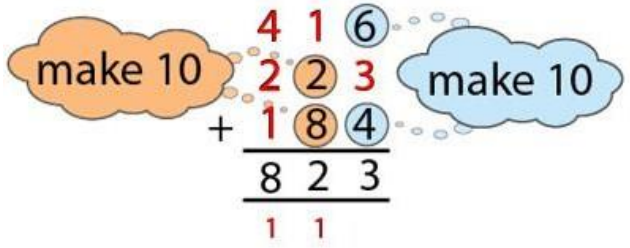
349 + 84

120 + 130

Use column addition	Use mental strategies

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

416 + 223 + 184 = 823



Add 3 addends using columnar addition, using a make 10 strategy to support.

Addition and Subtraction

Year 3

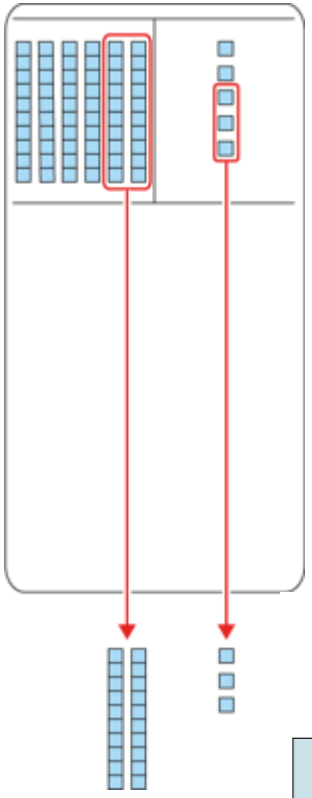
Columnar Addition and Subtraction

Vocabulary:

Ones Tens Represents Compose Combine Total Dienes 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 Dienes 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.

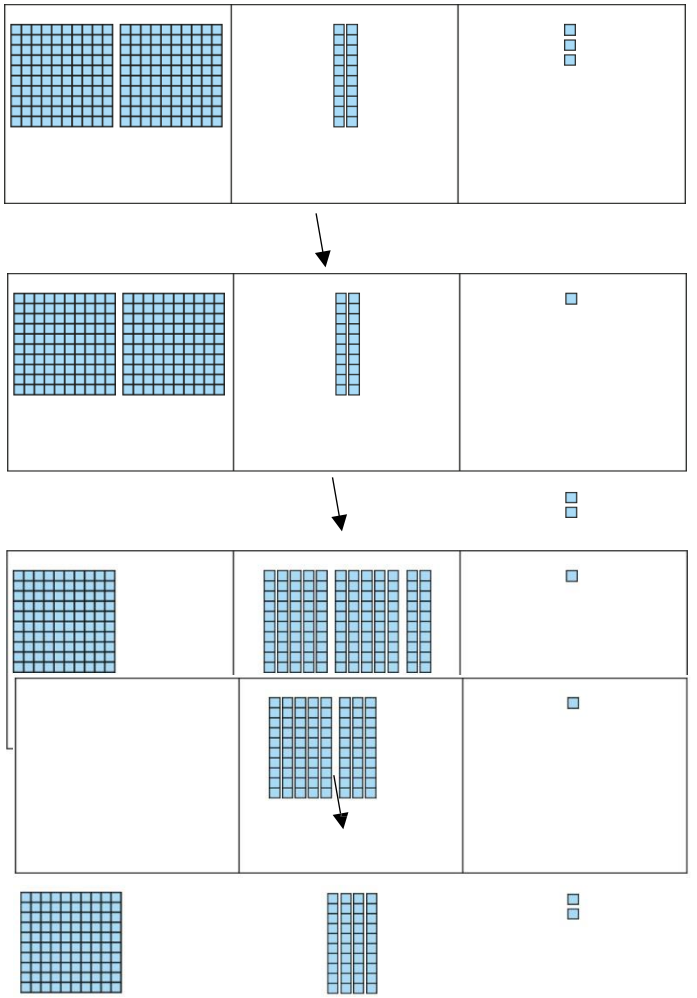
475 – 358 170 – 140

349 – 101 201 – 198

Use column subtraction	Use mental strategies

	~~2~~1	12	3
–	1	4	2
	0	8	1

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



Addition and Subtraction

Year 3

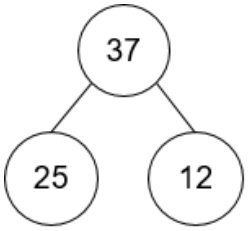
Manipulate the Additive Relationship

Vocabulary:

Represents Compose Combine Total Dienes Plus + Minus - Equal to = Addition Subtraction Equation Expression Bar Model Part-Part-Whole Model (Cherry) Whole Part

Addend + Addend = Sum

Minuend – Subtrahend = Difference



37	
25	12

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 Part Whole

329 + 414 = 743

743	
329	414

743 – 329 = 414

Whole Part Part

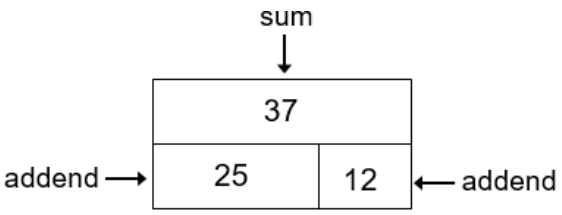
447 – 162 = 285

447	
285	162

447 – 285 = 162

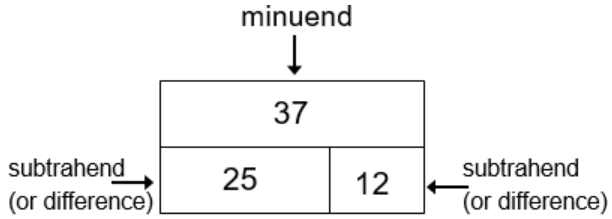
Use the part-whole structure to support finding a missing part.

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



25 + 12 = 37

12 + 25 = 37



37 – 25 = 12

37 – 12 = 25

Whole Part Part

614 – 527 = 87

614	
527	87

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

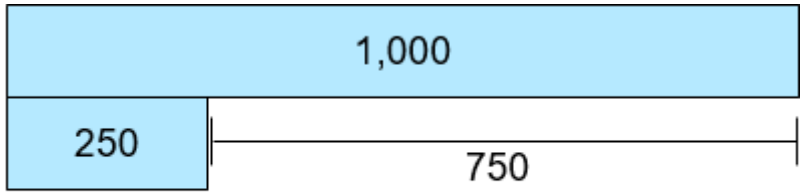
Year 6

Quantify additive and multiplicative relationships

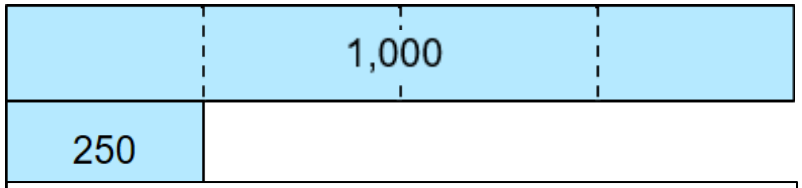
Vocabulary:

Additive Multiplicative Relationship Represents Compose Combine Total More than Less than Plus + Minus - Equal to = Addition Subtraction Divide ÷ Multiply x One-_____of Equation Expression Bar Model Whole Part Difference Multiplier Unknown Sequence

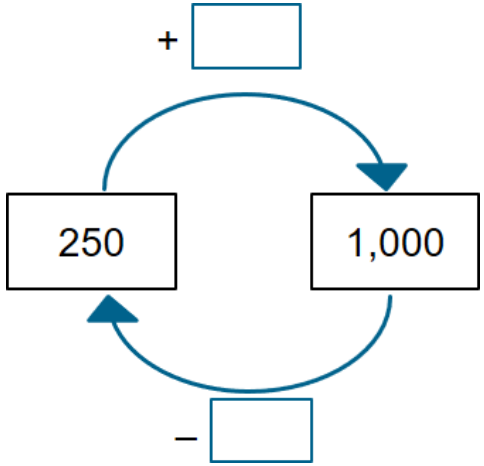
Addend + Addend = Sum



250 + 750 = 1,000 1,000 – 750 = 250

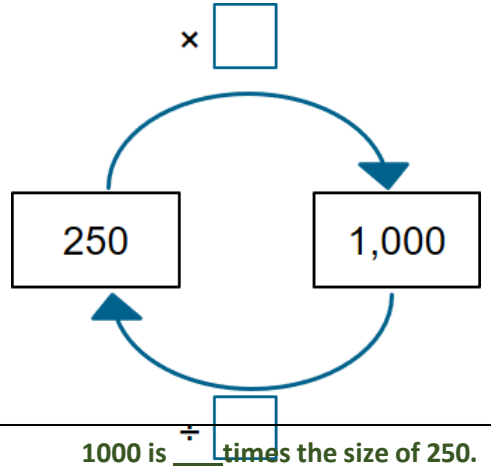


The relationship between two numbers can be expre ssed both additively and multiplicatively.



1000 is ___ more than 250.

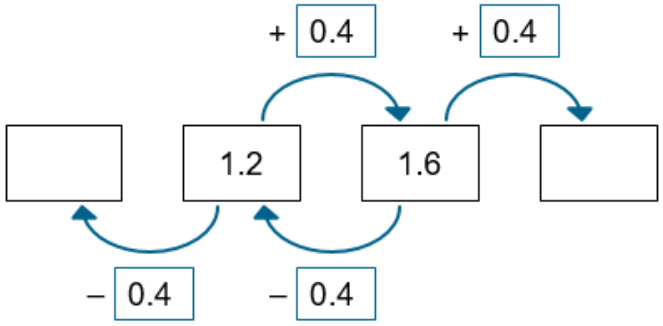
250 is ____ less than 1000.



1000 is ___times the size of 250.

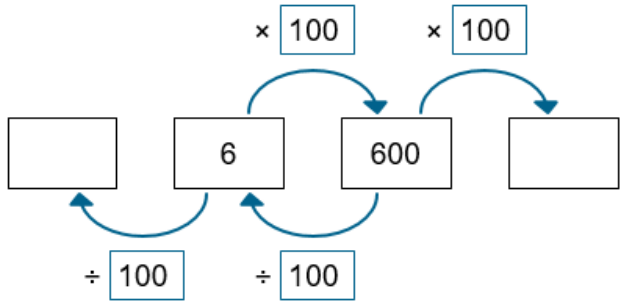
250 is one-_____of 1000.

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



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

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



Addition and Subtraction

Year 6

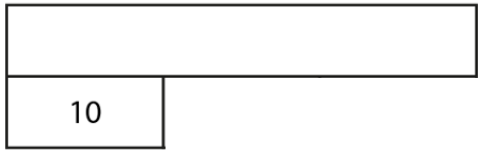
Quantify additive and multiplicative relationships

Vocabulary:

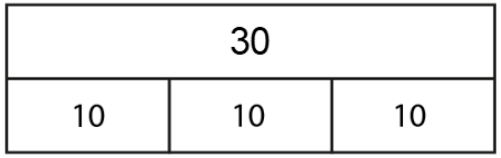
Additive Multiplicative Relationship Represents Compose Combine Total More than Less than Plus + Minus - Equal to = Addition Subtraction Divide ÷ Multiply x One-_____of Equation Expression Bar Model Whole Part Difference Multiplier Unknown Sequence

Addend + Addend = Sum

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



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



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

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

Addition and Subtraction

Year 6

Derive Related Calculations

Vocabulary:

Additive Multiplicative Relationship Represents Equation Unknown Re-arrange Inverse Place Value Properties Commutative Associative Distributive Compensation

Addend + Addend = Sum Factor x Factor = Product (Multiplicand x Multiplier = Product)

Minuend – Subtrahend = Difference Dividend ÷ Divisor = Quotient

$252 = 3 \times 84$	$252 = 3 \times 84$	$252 = 3 \times 84$
$2{,}520 = 30 \times \square$	$\square = 3 \times 85$	$252 = 3 \times 60 + 3 \times \square$

$625 - 148 = 477$	$625 - 148 = 477$	$625 - 148 = 477$
$6{,}250 - 1{,}480 = \square$	$625 - 70 - \square = 477$	$625 - 248 = \square$

$14.8 + 7.6 = 22.4$	$14.8 + 7.6 = 22.4$	$14.8 + 7.6 = 22.4$
$1{,}480 + \square = 2{,}240$	$\square - 7.6 = 14.8$	$12.8 + \square = 22.4$

$4{,}800 \div 25 = 192$	$4{,}800 \div 25 = 192$	$4{,}800 \div 25 = 192$
$25 \times 192 = \square$	$4{,}800 \div 250 = \square$	$4{,}800 \div 5 \div 5 = \square$

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

Addition and Subtraction

Year 6

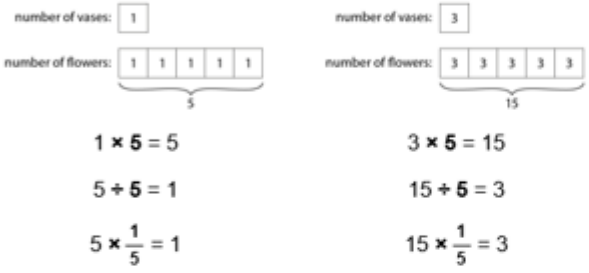
Solve Problems involving Ratio Relationship

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



Ratio table to compare sets of information.

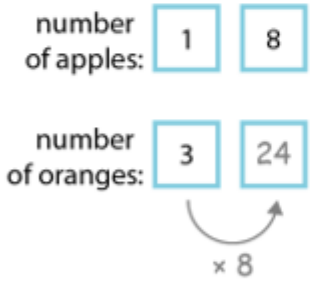
For every ___, there are ___.

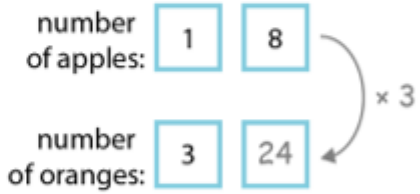
For every 1 litre of petrol, you can drive 7 miles.

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

Extend sequences using knowledge of patterns based on ratio table.

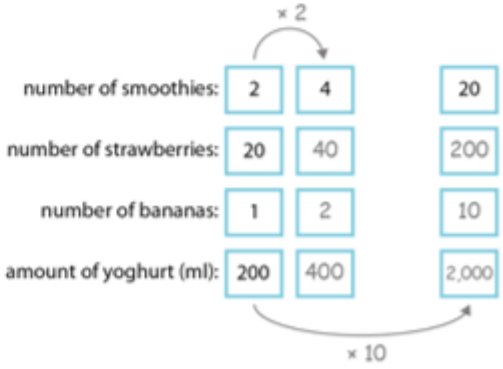
Litres of petrol	1	2	3	4	5	6	7	8	9	10
Miles driven	7	14	21	28	35	42	49	56	63	70





Explore vertical and horizontal relationship between numbers.

For every ___, there are ___.

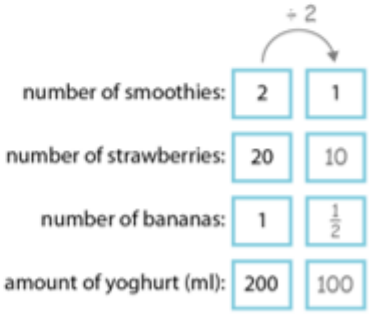


Identify the scale-factor in order to find unknown values.

___ is ___ times the size of ___.

Therefore I must multiply/divide by ___.

___ is one-__ the size of ___.



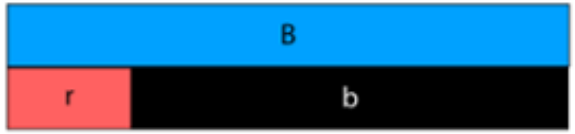
Addition and Subtraction

Year 6

Solve Problems with Two Unknowns

Vocabulary:

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



$$B = r + b$$

$$B = p + y$$

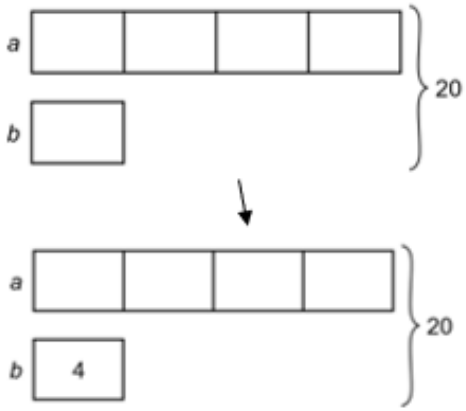
Use Cuisenaire to find 2 bars of total length that are equal to another.

There is more than one solution to the problem.

There can be infinite solutions to a problem.

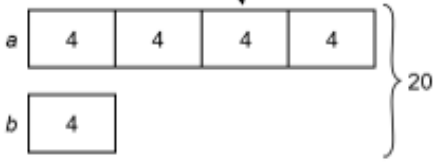
$$5 \times \square = 10 \times \square$$

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



one part = 20 ÷ 5 = 4

b = 4



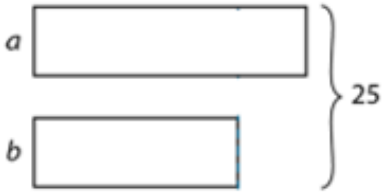
one part = 20 ÷ 5 = 4

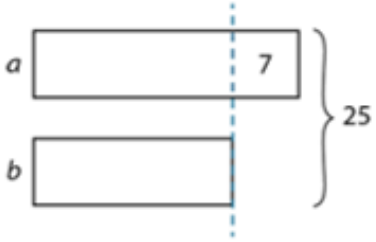
b = 4

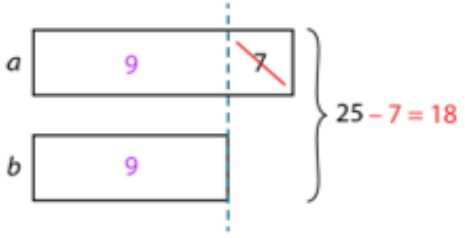
a = 4 × 4 = 16

The two numbers are 16 and 4.

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







b = 18 ÷ 2 = 9

a = 9 + 7 = 16

The two numbers are 9 and 16.