Reception

Arithmetic

Workbook

by Richard Brown

Contents Page

Key Language and Representations

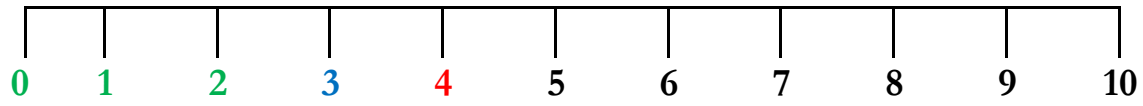
Word Problems are the arithmetic number sentences written in a real-life reasoning and problem solving scenario. e.g. 2 + 1 = 3

Strategy Applied refers to when a formal written method is used to calculate a number sentence e.g. 20 - 5 = 15 . Explained using appropriate mathematical language, proven using concrete objects that can be handled, shown with pictorial representations visualising the calculations, to ensure a greater understanding of a mathematical concept.

Concrete Objects are manipulated or handled to calculate and represent a number sentence i.e. multilink cubes, numicon, counters, number line.

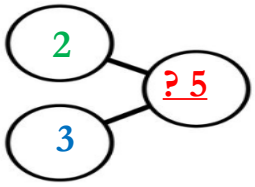
e.g. 2 + 3 = 5

Number Lines are used to count forwards e.g. 0, 1, 2, 3, 4, 5 and also to count backwards e.g. 10, 9, 8, 7, 6, 5.

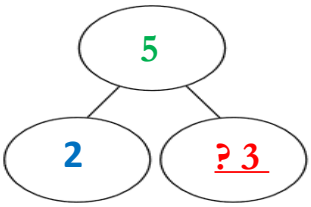


Part Whole Models are pictorial mathematical images to represent varied calculations and number sentences.

e.g. 2 + 3 = ? 5

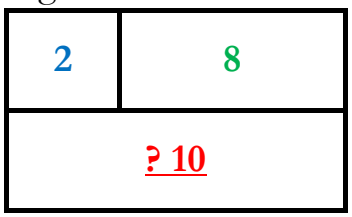


e.g. 5 - 2 = ? 3

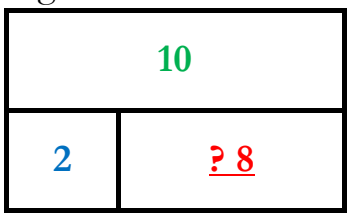


Bar Models are an image, that pictorially represents a number sentence.

e.g. 2 + 8 = ? 10



e.g. 10 - 2 = ? 8



Number Grid

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99
100	101	102	103	104	105	106	107	108	109
110	111	112	113	114	115	116	117	118	119
120	121	122	123	124	125	126	127	128	129
130	131	132	133	134	135	136	137	138	139
140	141	142	143	144	145	146	147	148	149
150	151	152	153	154	155	156	157	158	159

Multiplication Square

x	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0
1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100
11	22	33	44	55	66	77	88	99	110
12	24	36	48	60	72	84	96	108	120

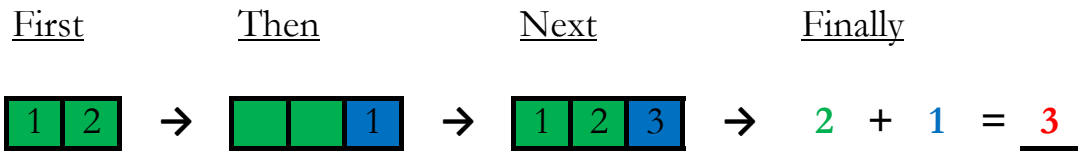
1 More Than

1) 2 + 1 = ?

Word Problem

Aamilah has two **green** blocks and Ameera has one **blue** block.
They **put together** all their blocks .
How many blocks do they have **altogether?**

Concrete Object



Strategy Applied

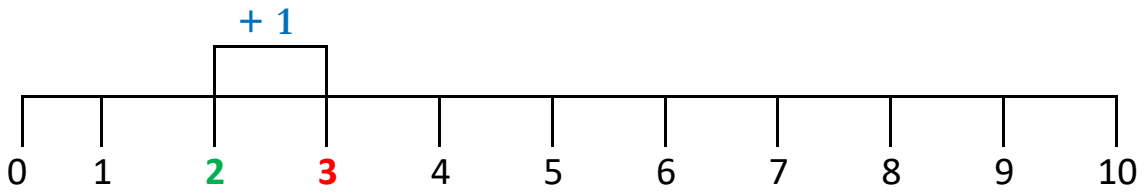
First, pick up **two** objects and place them together.
Now count aloud to check there are only **two** objects; **one**, **two**.

Then, pick up **one** more object and place it next to the **two** objects.

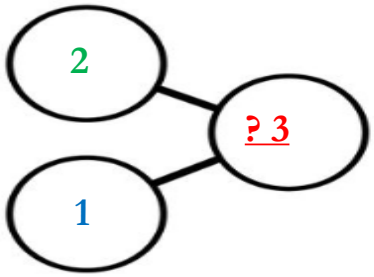
Next, count how many objects there are **altogether**.
Whilst touching each object **count forwards** aloud in number order,
saying one number name per object; **one**, **two**, **three**.

Finally, **two** add **one** equals **three**.

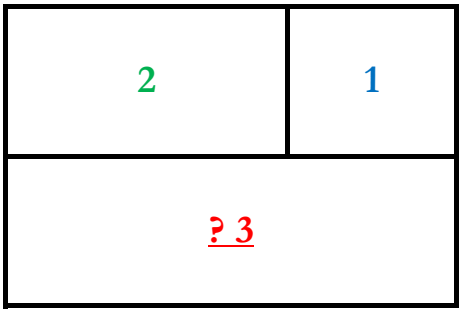
Number Line



Part Whole Model



Bar Model



Test Questions

1) 2 + 1 = ___

2) 0 + 1 = ___

3) 4 + 1 = ___

4) 6 + 1 = ___

5) 8 + 1 = ___

6) 1 + 1 = ___

7) 3 + 1 = ___

8) 5 + 1 = ___

9) 7 + 1 = ___

10) 9 + 1 = ___

11) 12 + 1 = ___

12) 14 + 1 = ___

13) 17 + 1 = ___

14) 19 + 1 = ___

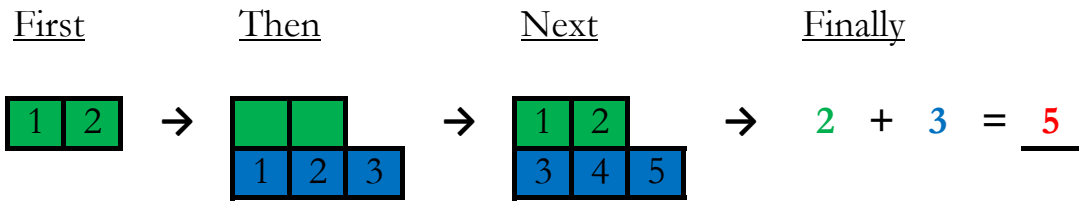
To 5

1) 2 + 3 = ?

Word Problem

Jaylon is playing with **two** toys and Nia is playing with **three** toys.
They **put together** all the toys.
How many toys do they have **altogether?**

Concrete Object



Strategy Applied

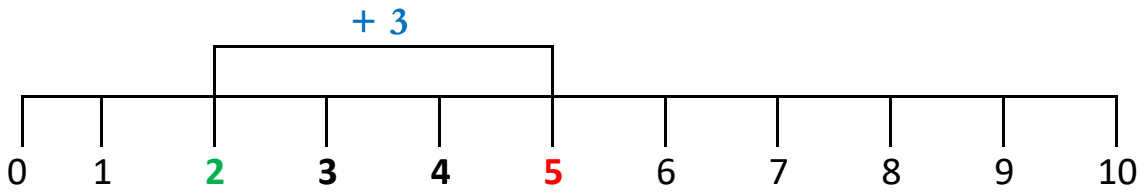
First, pick up **two** objects and place them together.
Now count aloud to check there are only **two** objects; **one**, **two**.

Then, pick up **three** more objects and place it next to the **two** objects.

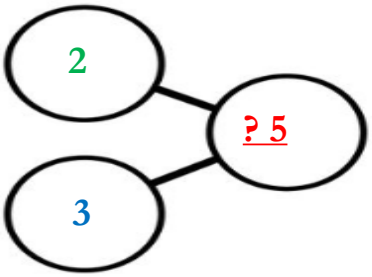
Next, count how many objects there are **altogether**.
Whilst touching each object **count forwards** aloud in number order,
saying one number name per object; **one**, **two**, **three**, **four**, **five**.

Finally, **two** add **three** equals **five**.

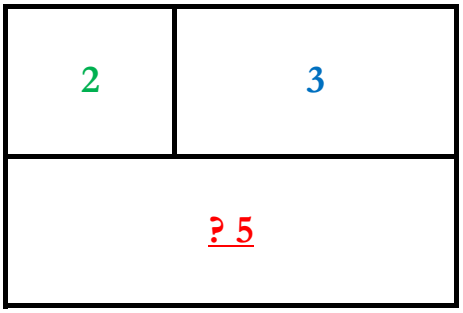
Number Line



Part Whole Model



Bar Model



Test Questions

1) 2 + 3 = ___

2) 0 + 5 = ___

3) 4 + 1 = ___

4) 5 + 0 = ___

5) 3 + 2 = ___

6) 1 + 4 = ___

7) ___ = 0 + 5

8) ___ = 2 + 3

9) ___ = 4 + 1

10) ___ = 5 + 0

11) ___ = 3 + 2

12) ___ = 1 + 4

13) ___ = 2 + 3

14) ___ = 5 + 0

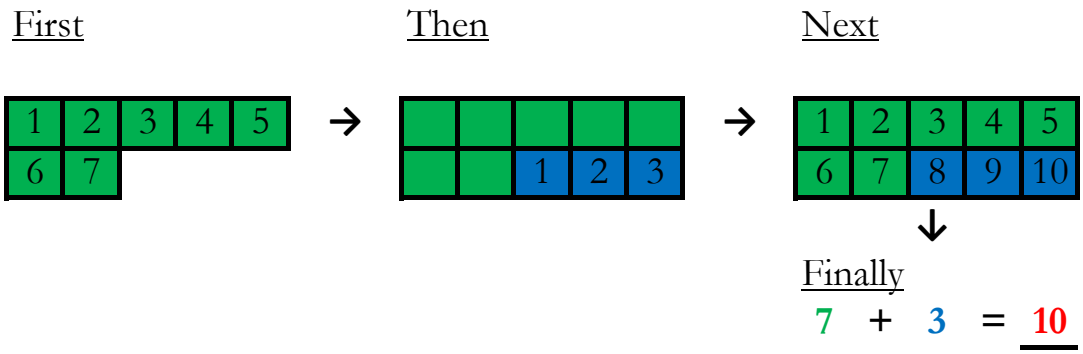
To 10

1) 7 + 3 = ?

Word Problem

Mason has **seven** cars and Kylo has **three** cars.
They **put together** all of the cars and line them up.
How many cars do they have **altogether?**

Concrete Object



Strategy Applied

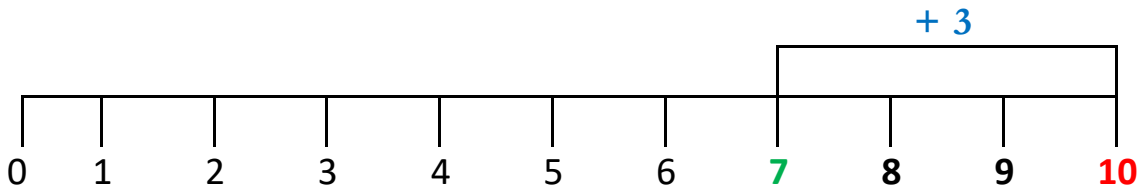
First, pick up **seven** objects and place them together.
Now count aloud to check there are only **seven** objects; **one**, **two**, **three**, **four**, **five**, **six**, **seven**.

Then, pick up **three** more objects and place it next to the **seven** objects.

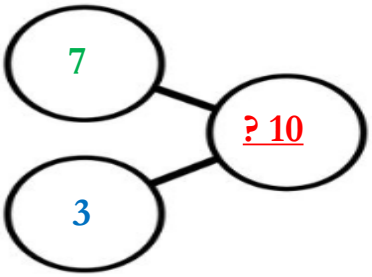
Next, count how many objects there are **altogether**.
Whilst touching each object **count forwards** aloud in number order, saying one number name per object; **one**, **two**, **three**, **four**, **five**, **six**, **seven**, **eight**, **nine**, **ten**.

Finally, **seven** add **three** equals **ten**.

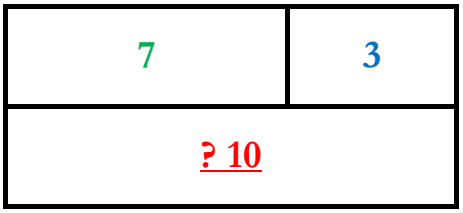
Number Line



Part Whole Model



Bar Model



Test Questions

1) 7 + 3 = ___

2) 10 + 0 = ___

3) 6 + 4 = ___

4) 4 + 6 = ___

5) 2 + 8 = ___

6) 0 + 10 = ___

7) 9 + 1 = ___

8) 8 + 2 = ___

9) 5 + 5 = ___

10) 3 + 7 = ___

11) 1 + 9 = ___

12) ___ = 2 + 8

13) ___ = 3 + 7

14) ___ = 4 + 6

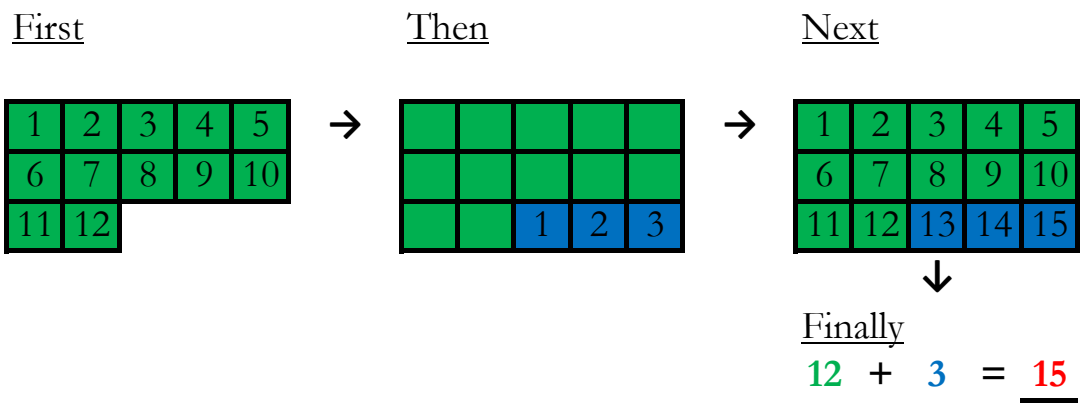
To 15

1) 12 + 3 = ?

Word Problem

Darren has **twelve** coins and his cousin Kyle gives him **three** more coins.
How many coins does he have **altogether?**

Concrete Object



Strategy Applied

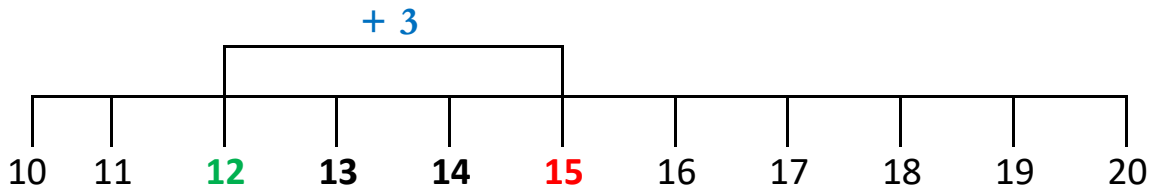
First, pick up **twelve** objects and place them together.
Now count aloud to check there are only **twelve** objects; **one**, **two**, **three**, **four**, **five**, **six**, **seven**, **eight**, **nine**, **ten**, **eleven**, **twelve**.

Then, pick up **three** more objects and place it next to the **twelve** objects.

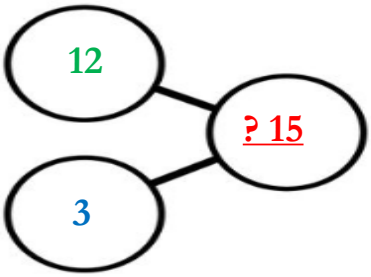
Next, count how many objects there are **altogether**.
Whilst touching each object **count forwards** aloud in number order, saying one number name per object; **one**, **two**, **three**, **four**, **five**, **six**, **seven**, **eight**, **nine**, **ten**, **eleven**, **twelve**, **thirteen**, **fourteen**, **fifteen**.

Finally, **twelve** add **three** equals **fifteen**.

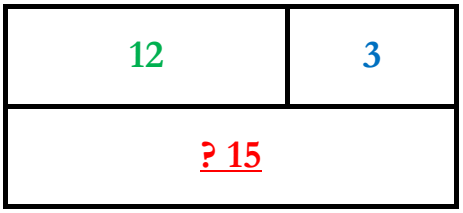
Number Line



Part Whole Model



Bar Model



Test Questions

1) 12 + 3 = ___

2) 15 + 0 = ___

3) 11 + 4 = ___

4) 9 + 6 = ___

5) 7 + 8 = ___

6) 5 + 10 = ___

7) 3 + 12 = ___

8) 1 + 14 = ___

9) 14 + 1 = ___

10) 13 + 2 = ___

11) 10 + 5 = ___

12) 8 + 7 = ___

13) 6 + 9 = ___

14) 4 + 11 = ___

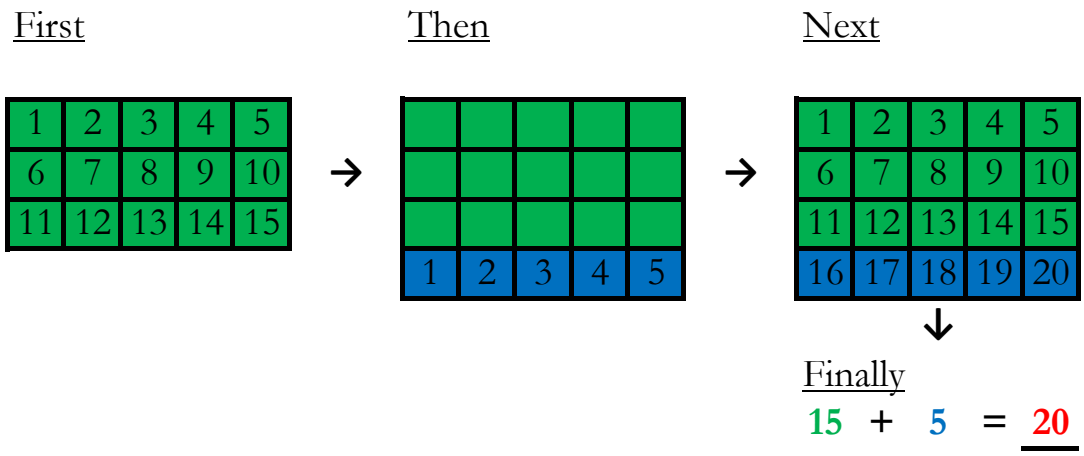
To 20

1) 15 + 5 = ?

Word Problem

Malachi has **fifteen** blocks and Tiheria has **five** blocks.
They **put together** all of the blocks.
How many blocks do they have **altogether?**

Concrete Object



Strategy Applied

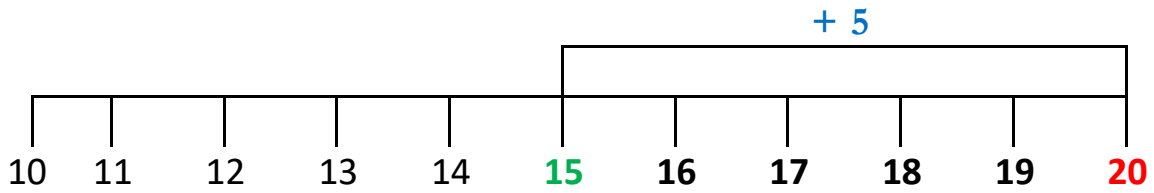
First, pick up **fifteen** objects and place them together.
Now count aloud to check there are only **fifteen** objects; **1**, **2**, **3**, **4**, **5**, **6**, **7**, **8**, **9**, **10**, **11**, **12**, **13**, **14**, **15**.

Then, pick up **five** more objects and place it next to the **fifteen** objects.

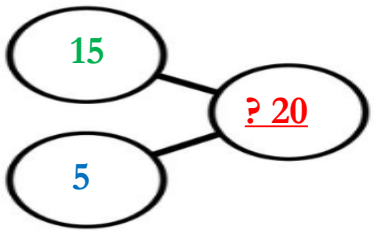
Next, count how many objects there are **altogether**.
Whilst touching each object **count forwards** aloud in number order, saying one number name per object; **one**, **two**, **three**, **four**, **five**, **six**, **seven**, **eight**, **nine**, **ten**, **eleven**, **twelve**, **thirteen**, **fourteen**, **fifteen**, **sixteen**, **seventeen**, **eighteen**, **nineteen**, **twenty**.

Finally, **fifteen** add **five** equals **twenty**.

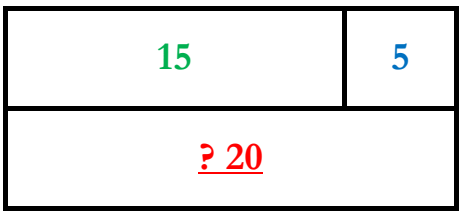
Number Line



Part Whole Model



Bar Model



Test Questions

1) 15 + 5 = ___

2) 12 + 8 = ___

3) 14 + 6 = ___

4) 16 + 4 = ___

5) 18 + 2 = ___

6) 20 + 0 = ___

7) 19 + 1 = ___

8) 17 + 3 = ___

9) 10 + 10 = ___

10) 13 + 7 = ___

11) 11 + 9 = ___

12) 9 + 11 = ___

13) 8 + 12 = ___

14) 6 + 14 = ___

Multiples of 1

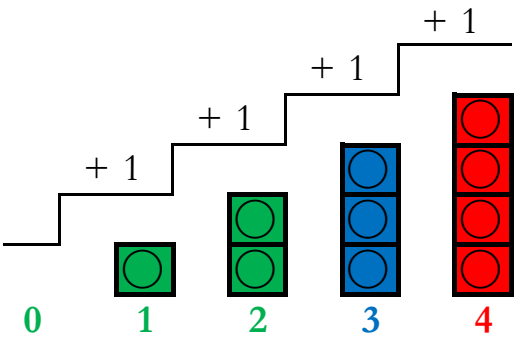
In the **number pattern** below, find the next two missing numbers.

1) **0, 1, 2, ?, ?**

Word Problem

Mya uses cubes to make the **number pattern** of **zero**, **one** and **two**.
She calculates the next two missing numbers in the number pattern.
How many cubes will she need, to make the next two numbers**?**

Concrete Object



Strategy Applied

Work out the **number pattern**, by finding out the **difference between** the **three** numbers.
The difference between each of the **three** numbers is known as the **rule**.

First, **count forwards** from **zero** to **one** equalling **one**, the rule is **+1**.

Then, count forwards from **one** to **two** equalling **one**, the rule is **+1**.

The rule is **+1**, **count on one** from each of the numbers in the number pattern,
Continue this number pattern to find the next two missing numbers.

Next, find **two** on the number line and count on **one more**, total is **three**.

Then, find **three** on the number line and count on **one more**, total is **four**.

Finally, the next two missing numbers in the number pattern are **three** and **four**.

Number Line

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Test Questions

In each **number pattern**, find the next two missing numbers.

1) 0, 1, 2, ___, ___

2) 1, 2, 3, ___, ___

3) 2, 3, 4, ___, ___

4) 3, 4, 5, ___, ___

5) 4, 5, 6, ___, ___

6) 5, 6, 7, ___, ___

7) 6, 7, 8, ___, ___

8) 7, 8, 9, ___, ___

9) 8, 9, 10, ___, ___

10) 9, 10, 11, ___, ___

11) 10, 11, 12, ___, ___

12) 11, 12, 13, ___, ___

13) 12, 13, 14, ___, ___

14) 15, 16, 17, ___, ___

Multiples of 2

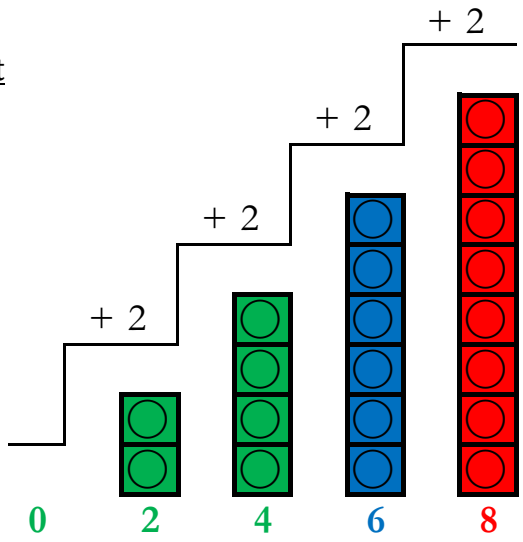
In the **number pattern** below, find the next two missing numbers.

1) **0, 2, 4, ?, ?**

Word Problem

The numbers on a number line go up by the **same amount** each time.
The **number pattern** is **zero**, **two** and **four**.
What will the next two numbers be in the number pattern**?**

Concrete Object



Strategy Applied

Work out the **number pattern**, by finding out the **difference between** the **three** numbers.
The difference between each of the **three** numbers is known as the **rule**.

First, **count forwards** from **zero** to **two** equalling **two**, the rule is **+2**.

Then, count forwards from **two** to **four** equalling **two**, the rule is **+2**.

The rule is **+2**, **count on two** from each of the numbers in the number pattern.

Continue this number pattern to find the next two missing numbers.

Next, find **four** on the number line and count on **two more**, total is **six**.

Then, find **six** on the number line and count on **two more**, total is **eight**.

Finally, the next two missing numbers in the number pattern are **six** and **eight**.

Number Line

0	1	**2**	3	**4**	5	**6**	7	**8**	9	10	11	12	13	14	15	16	17	18	19	20

Test Questions

In each **number pattern**, find the next two missing numbers.

1) 0, 2, 4, __, __

2) 2, 4, 6, __, __

3) 4, 6, 8, __, __

4) 6, 8, 10, __, __

5) 12, 14, 16, __, __

6) 1, 3, 5, __, __

7) 3, 5, 7, __, __

8) 5, 7, 9, __, __

9) 7, 9, 11, __, __

10) 9, 11, 13, __, __

11) 11, 13, 15, __, __

12) 13, 15, 17, __, __

13) 0, 2, 4, __, __

14) 10, 12, 14, __, __

Multiples of 3

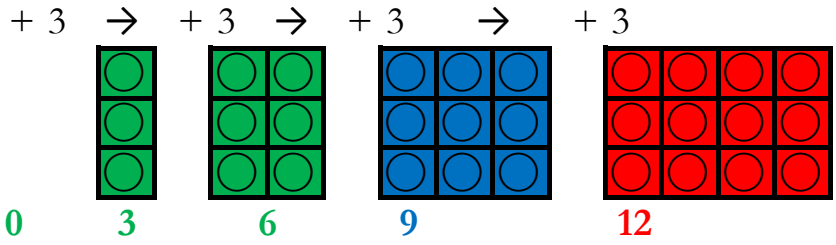
In the **number pattern** below, find the next two missing numbers.

1) **0, 3, 6, ?, ?**

Word Problem

Cameron uses counters to make the **number pattern** of **zero**, **three** and **six**
He calculates the next two missing numbers in the number pattern.
How many counters will he need, to make the next two numbers**?**

Concrete Object



Strategy Applied

Work out the **number pattern**, by finding out the **difference between** the **three** numbers.
The difference between each of the **three** numbers is known as the **rule**.

First, **count forwards** from **zero** to **three** equalling **three**, the rule is **+3**.

Then, count forwards from **three** to **six** equalling **three**, the rule is **+3**.

The rule is **+3**, **count on three** from each of the numbers in the number pattern.
Continue this number pattern to find the next two missing numbers.

Next, find **six** on the number line and count on **three more**, total is **nine**.

Then, find **nine** on the number line and count on **three more**, total is **twelve**.

Finally, the next two missing numbers in the number pattern are **nine** and **twelve**.

Number Line

0	1	2	**3**	4	5	**6**	7	8	**9**	10	11	**12**	13	14	15	16	17	18	19	20

Test Questions

In each **number pattern**, find the next two missing numbers.

1) 0, 3, 6, ___, ___

2) 3, 6, 9, ___, ___

3) 6, 9, 12, ___, ___

4) 9, 12, 15, ___, ___

5) 1, 4, 7, ___, ___

6) 2, 5, 8, ___, ___

7) 4, 7, 10, ___, ___

8) 5, 8, 11, ___, ___

9) 7, 10, 13, ___, ___

10) 8, 11, 14, ___, ___

11) 0, 3, 6, ___, ___

12) 3, 6, 9, ___, ___

13) 6, 9, 12, ___, ___

14) 9, 12, 15, ___, ___

Multiples of 4

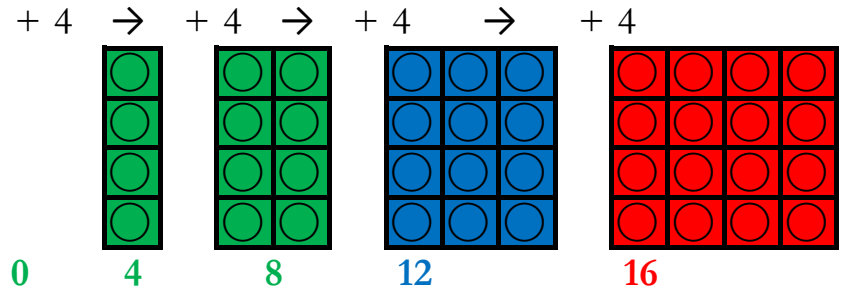
In the **number pattern** below, find the next two missing numbers.

1) **0, 4, 8, ?, ?**

Word Problem

Corey uses objects to make the **number pattern** of **zero**, **four** and **eight**.
He calculates the next two missing numbers in the number pattern.
How many counters will he need, to make the next two numbers**?**

Concrete Object



Strategy Applied

Work out the **number pattern**, by finding out the **difference between** the **three** numbers.
The difference between each of the **three** numbers is known as the **rule**.

First, **count forwards** from **zero** to **four** equalling **four**, the rule is **+4**.

Then, count forwards from **four** to **eight** equalling **four**, the rule is **+4**.

The rule is **+4**, **count on four** from each of the numbers in the number pattern.
Continue this number pattern to find the next two missing numbers.

Next, find **eight** on the number line and count on **four more**, total is **twelve**.

Then, find **twelve** on the number line and count on **four more**, total is **sixteen**.

Finally, the next two missing numbers in the number pattern are **twelve** and **sixteen**.

Number Line

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Test Questions

In each **number pattern**, find the next two missing numbers.

1) 0, 4, 8, __, __

2) 4, 8, 12, __, __

3) 8, 12, 14, __, __

4) 1, 5, 9, __, __

5) 2, 6, 10, __, __

6) 3, 7, 11, __, __

7) 5, 9, 13, __, __

8) 7, 11, 15, __, __

9) 0, 4, 8, __, __

10) 4, 8, 12, __, __

11) 8, 12, 14, __, __

12) 1, 5, 9, __, __

13) 2, 6, 10, __, __

14) 3, 7, 11, __, __

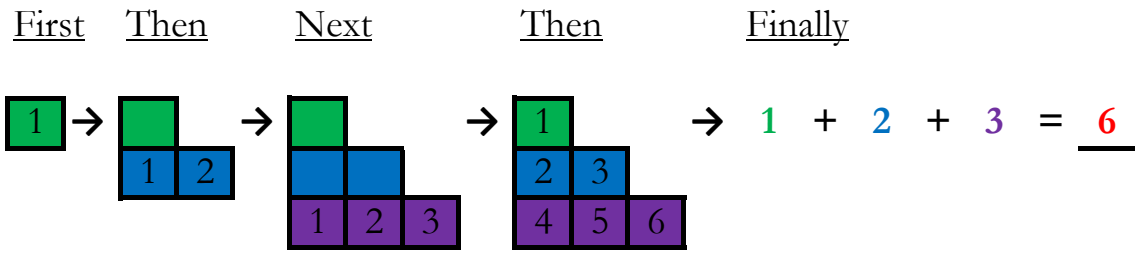
Multiple Numbers

1) 1 + 2 + 3 = ?

Word Problem

Rachel is looking at her toys, **one** ball, **two** dolls and **three** dinosaurs.
She **puts together** all of her toys.
How many toys does she have **altogether?**

Concrete Object



Strategy Applied

First, pick up **one** object and place it down.
Now count aloud to check there is only **one** object; **one**.

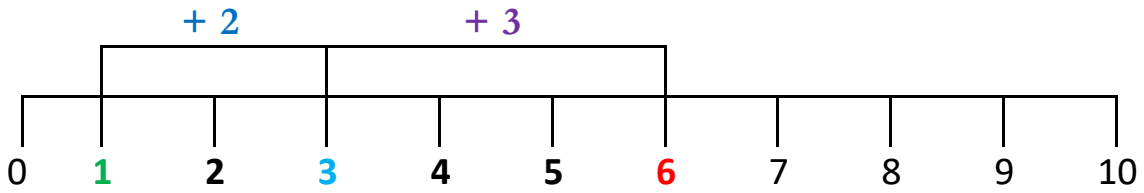
Then, pick up **two** more objects and place it next to the **one** object.

Next, pick up **three** more objects and place it next to the **one** and **two** objects.

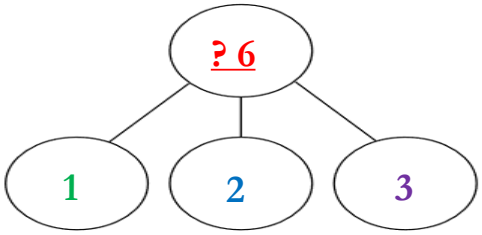
Then, count how many objects there are **altogether**.
Whilst touching each object **count forwards** aloud in number order, saying one number name per object; **one**, **two**, **three**, **four**, **five**, **six**.

Finally, **one** add **two** add **three** equals **six**.

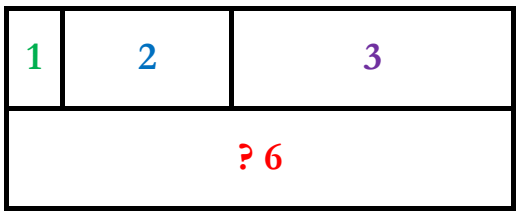
Number Line



Part Whole Model



Bar Model



Test Questions

1) 1 + 2 + 3 = ___

2) 2 + 1 + 4 = ___

3) 3 + 4 + 2 = ___

4) 4 + 1 + 0 = ___

5) 5 + 2 + 1 = ___

6) 6 + 3 + 2 = ___

7) 7 + 5 + 3 = ___

8) 8 + 1 + 4 = ___

9) 9 + 2 + 5 = ___

10) 10 + 3 + 0 = ___

11) 11 + 4 + 1 = ___

12) 12 + 5 + 2 = ___

13) 13 + 5 + 1 = ___

14) 14 + 1 + 3 = ___

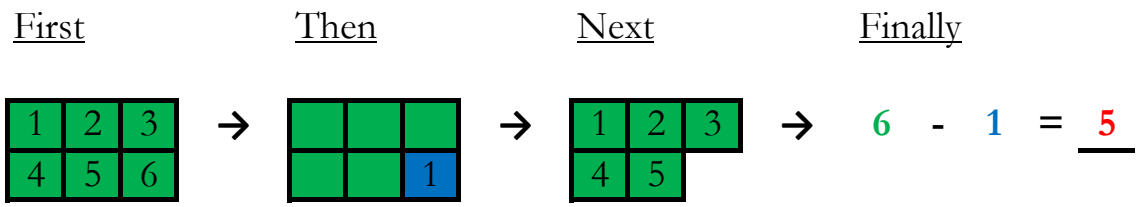
1 Less Than

1) 6 - 1 = ?

Word Problem

Loren has **six** gel pens.
Eliza has **one** gel pen **fewer than** her.
How many gel pens does Loren have in **total?**

Concrete Object



Strategy Applied

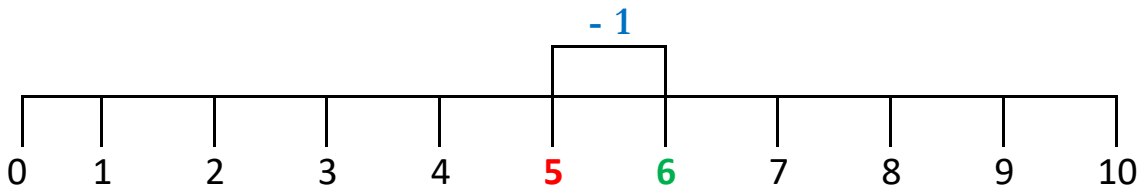
First, pick up **six** objects and place them together.
Now count aloud to check there are only **six** objects; **one, two, three, four, five, six.**

Then, pick up **one** of the objects and take it away, placing it elsewhere.

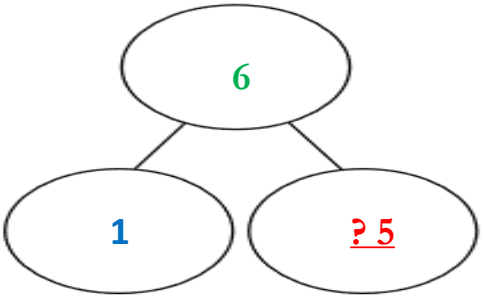
Next, count **altogether** how many objects are **left**.
Whilst touching each object **count forwards** aloud in number order, saying one number name per object; **one, two, three, four, five**.

Finally, **six** take away **one** equals **five**.

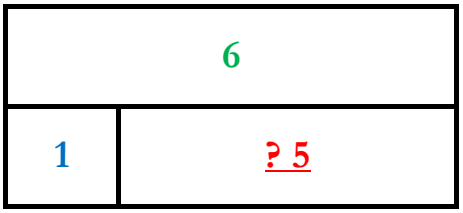
Number Line



Part Whole Model



Bar Model



Test Questions

1) 6 - 1 = ___

2) 2 - 1 = ___

3) 8 - 1 = ___

4) 4 - 1 = ___

5) 10 - 1 = ___

6) 12 - 1 = ___

7) 14 - 1 = ___

8) 16 - 1 = ___

9) 18 - 1 = ___

10) 20 - 1 = ___

11) 19 - 1 = ___

12) 17 - 1 = ___

13) 15 - 1 = ___

14) 13 - 1 = ___

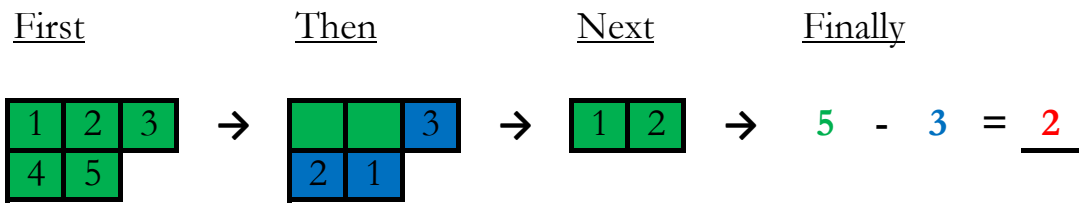
From 5

1) 5 - 3 = ?

Word Problem

James has **five** dinosaur books.
Mica has **three** books **fewer than** him.
How many books does Mica have**?**

Concrete Object



Strategy Applied

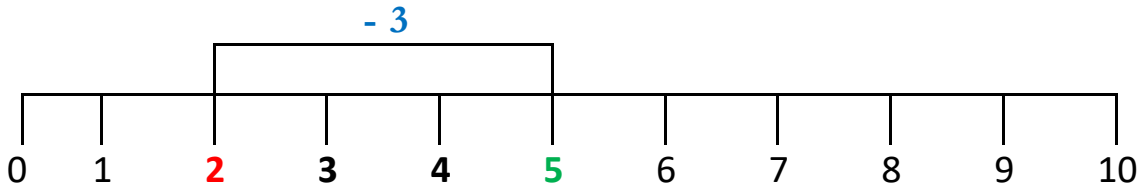
First, pick up **five** objects and place them together.
Now count aloud to check there are only **five** objects; **one**, **two, three, four, five.**

Then, pick up **three** of the objects and take them away, placing them elsewhere.

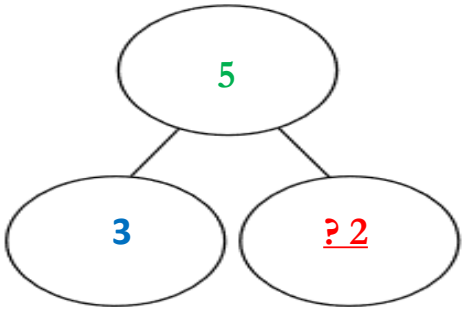
Next, count **altogether** how many objects are **left**.
Whilst touching each object **count forwards** aloud in number order, saying one number name per object; **one**, **two**.

Finally, **five** take away **three** equals **two**.

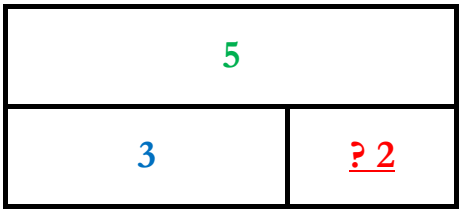
Number Line



Part Whole Model



Bar Model



Test Questions

1) 5 - 3 = ___

2) 5 - 1 = ___

3) 5 - 5 = ___

4) 5 - 0 = ___

5) 5 - 2 = ___

6) 5 - 4 = ___

7) ___ = 5 - 5

8) ___ = 5 - 3

9) ___ = 5 - 1

10) ___ = 5 - 0

11) ___ = 5 - 2

12) ___ = 5 - 4

13) ___ = 5 - 3

14) ___ = 5 - 0

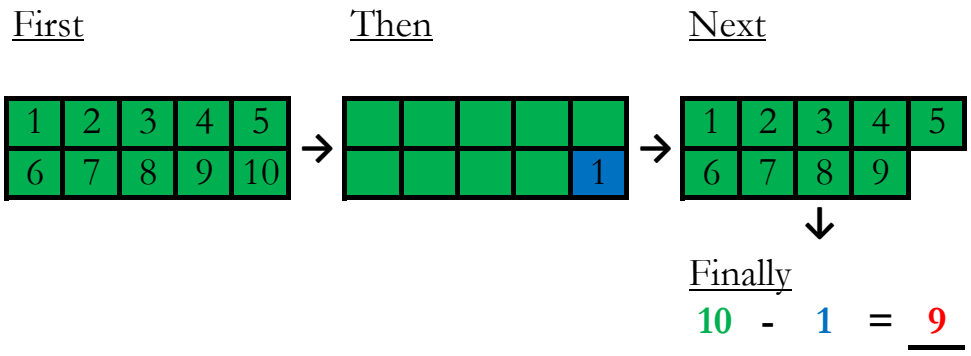
From 10

1) 10 - 1 = ?

Word Problem

Kavalli has ten pieces of fruit in a bowl.
He hands out one of them.
How many pieces of fruit remain in the bowl?

Concrete Object



Strategy Applied

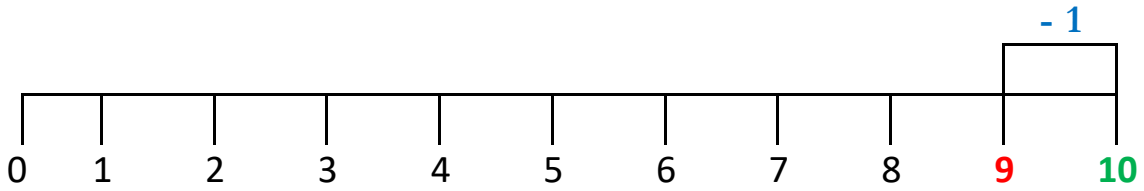
First, pick up ten objects and place them together.
Now count aloud to check there are only ten objects; 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

Then, pick up one of the objects and take it away, placing it elsewhere.

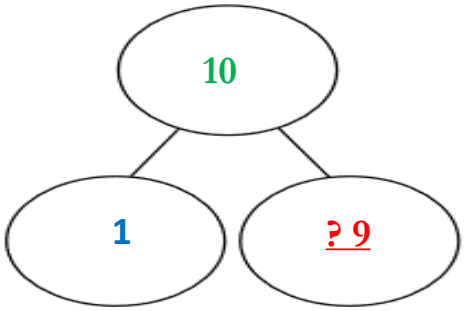
Next, count **altogether** how many objects are **left**.
Whilst touching each object **count forwards** aloud in number order, saying one number name per object; one, two, three, four, five, six, seven, eight, nine.

Finally, ten take away one equals nine.

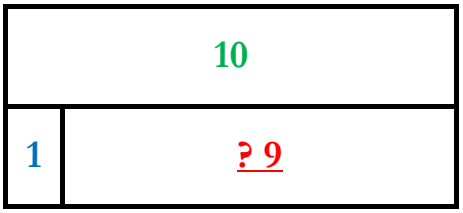
Number Line



Part Whole Model



Bar Model



Test Questions

1) 10 - 1 = ___

2) 10 - 3 = ___

3) 10 - 5 = ___

4) 10 - 7 = ___

5) 10 - 9 = ___

6) 10 - 0 = ___

7) 10 - 2 = ___

8) 10 - 4 = ___

9) 10 - 6 = ___

10) 10 - 8 = ___

11) 10 - 10 = ___

12) ___ = 10 - 0

13) ___ = 10 - 8

14) ___ = 10 - 2

From 15

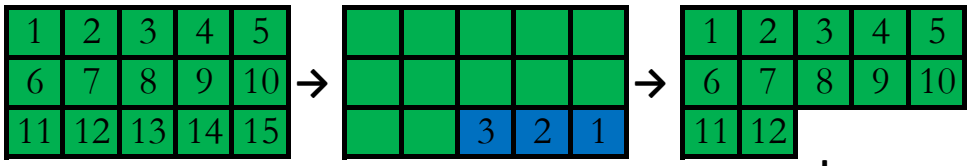
1) 15 - 3 = ?

Word Problem

Arron is thinking of a number that is **three** **less than** **fifteen**.
What number is he thinking of?

Concrete Object

First Then Next



Finally
15 - 3 = 12

Strategy Applied

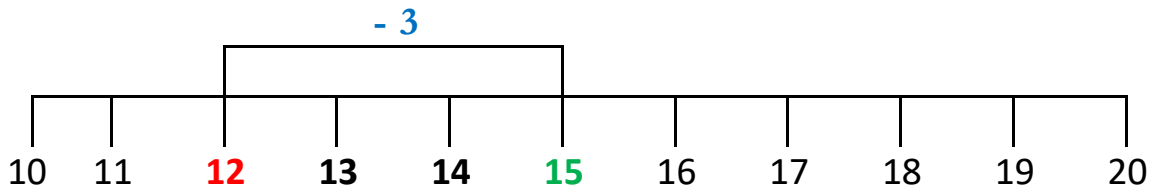
First, pick up **fifteen** objects and place them together.
Now count aloud to check there are only **fifteen** objects; **1**, **2**, **3**, **4**, **5**, **6**, **7**, **8**, **9**, **10**, **11**, **12**, **13**, **14**, **15**.

Then, pick up **three** of the objects and take them away, placing elsewhere.

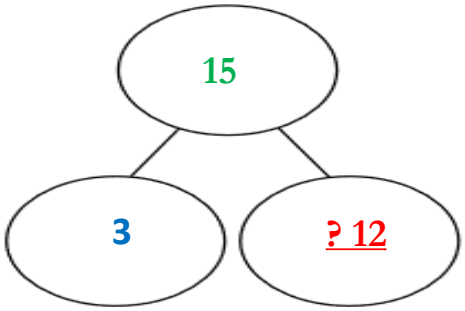
Next, count **altogether** how many objects are **left**.
Whilst touching each object **count forwards** aloud in number order, saying one number name per object; **one**, **two**, **three**, **four**, **five**, **six**, **seven**, **eight**, **nine**, **ten**, **eleven**, **twelve**.

Finally, **fifteen** take away **three** equals **twelve**.

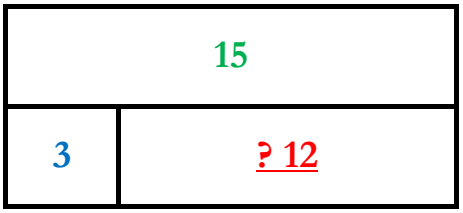
Number Line



Part Whole Model



Bar Model



Test Questions

1) 15 - 3 = ___

2) 15 - 5 = ___

3) 15 - 1 = ___

4) 15 - 7 = ___

5) 15 - 9 = ___

6) 15 - 0 = ___

7) 15 - 2 = ___

8) 15 - 4 = ___

9) 15 - 6 = ___

10) 15 - 8 = ___

11) 15 - 10 = ___

12) 15 - 11 = ___

13) 15 - 13 = ___

14) 15 - 15 = ___

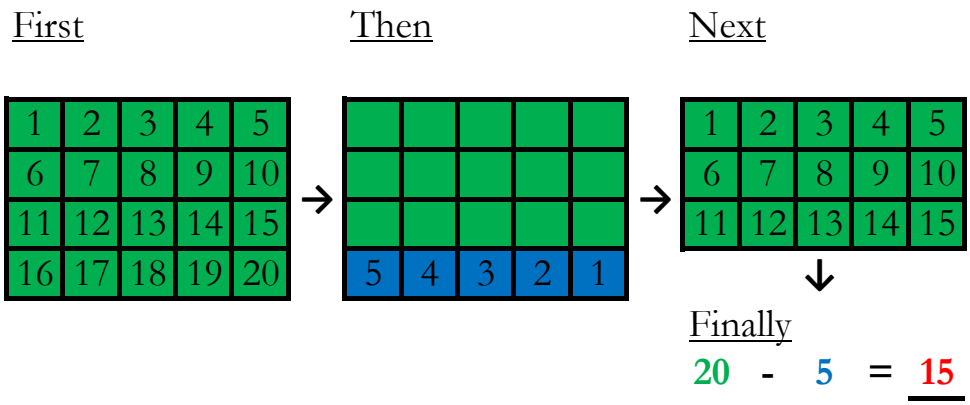
From 20

1) 20 - 5 = ?

Word Problem

Twenty children are sat down on the carpet in class.
Five children go out for guided reading.
How many children are **left**, sat down on the carpet?

Concrete Object



Strategy Applied

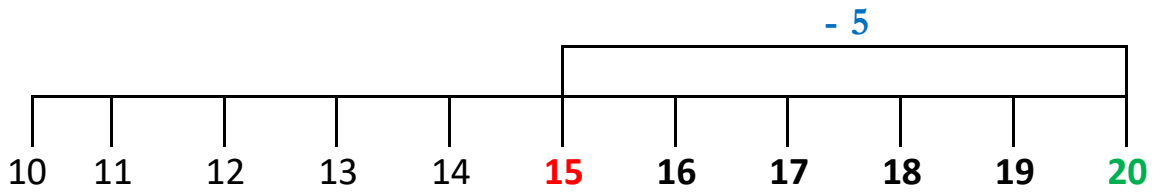
First, pick up **twenty** objects and place them together.
Now count aloud to check there are only **twenty** objects; **1**, **2**, **3**, **4**, **5**, **6**, **7**, **8**, **9**, **10**, **11**, **12**, **13**, **14**, **15**, **16**, **17**, **18**, **19**, **20**.

Then, pick up **five** of the objects and take them away, placing elsewhere.

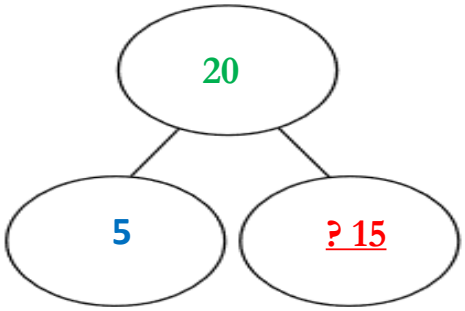
Next, count **altogether** how many objects are **left**.
Whilst touching each object **count forwards** aloud in number order, saying one number name per object; **one**, **two**, **three**, **four**, **five**, **six**, **seven**, **eight**, **nine**, **ten**, **eleven**, **twelve**, **thirteen**, **fourteen**, **fifteen**.

Finally, **twenty** take away **five** equals **fifteen**.

Number Line



Part Whole Model



Bar Model

Test Questions

1) 20 - 5 = ___

2) 20 - 1 = ___

3) 20 - 7 = ___

4) 20 - 3 = ___

5) 20 - 9 = ___

6) 20 - 0 = ___

7) 20 - 2 = ___

8) 20 - 4 = ___

9) 20 - 6 = ___

10) 20 - 8 = ___

11) 20 - 10 = ___

12) 20 - 12 = ___

13) 20 - 15 = ___

14) 20 - 19 = ___

Multiples of 1

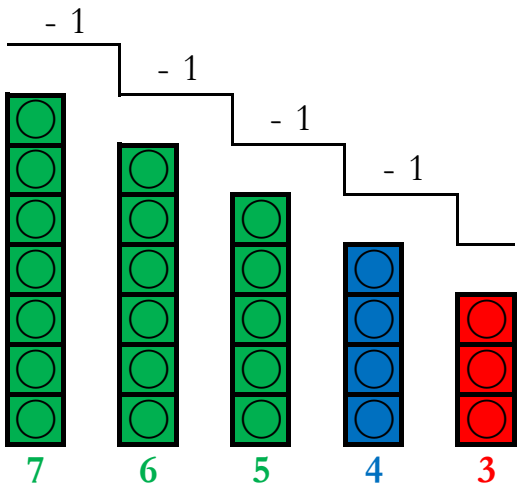
In the **number pattern** below, find the next two missing numbers.

1) **7, 6, 5, ?, ?**

Word Problem

The numbers **seven**, **six** and **five** are written on part of a **number line**.
Missing of the number line, are the **two** numbers written before.
What are the **two** missing numbers?

Concrete Object



Strategy Applied

Work out the **number pattern**, by finding out the **difference between** the **three** numbers.
The difference between each of the **three** numbers is known as the **rule**.

First, **count backwards** from **seven** to **six** equalling **one**, the rule is **-1**.

Then, count backwards from **six** to **five** equalling **one**, the rule is **-1**.

The rule is **-1**, **count back one** from each of the numbers in the number pattern.

Continue this number pattern to find the next two missing numbers.

Next, find **five** on the number line and count back **one less**, total is **four**.

Then, find **four** on the number line and count back **one less**, total is **three**.

Finally, the next two missing numbers in the number pattern are **four** and **three**.

Number Line

0	1	2	**3**	**4**	**5**	**6**	**7**	8	9	10	11	12	13	14	15	16	17	18	19	20

Test Questions

In each **number pattern**, find the next two missing numbers.

1) 7, 6, 5, __, __

2) 8, 7, 6, __, __

3) 9, 8, 7, __, __

4) 10, 9, 8, __, __

5) 11, 10, 9, __, __

6) 12, 11, 10, __, __

7) 13, 12, 11, __, __

8) 14, 13, 12, __, __

9) 15, 14, 13, __, __

10) 16, 15, 14, __, __

11) 17, 16, 15, __, __

12) 18, 17, 16, __, __

13) 19, 18, 17, __, __

14) 20, 19, 18, __, __

Multiples of 2

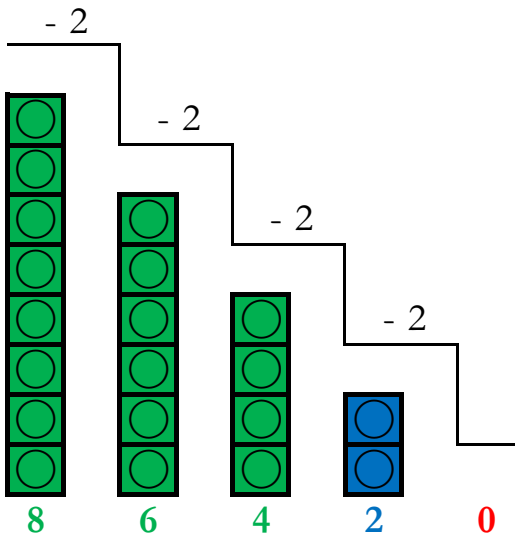
In the **number pattern** below, find the next two missing numbers.

1) **8, 6, 4, ?, ?**

Word Problem

Numbers on a number line go back by the **same amount** each time.
Eight, **six** and **four** are the numbers on the number line.
What will the **two** numbers be on the number line **before?**

Concrete Object



Strategy Applied

Work out the **number pattern**, by finding out the **difference between** the **three** numbers.
The difference between each of the **three** numbers is known as the **rule**.

First, **count backwards** from **eight** to **six** equalling **two**, the rule is **-2**.

Then, count backwards from **six** to **four** equalling **two**, the rule is **-2**.

The rule is **-2**, **count back two** from each of the numbers in the number pattern.
Continue this number pattern to find the next two missing numbers.

Next, find **four** on the number line and count back **two less**, total is **two**.

Then, find **two** on the number line and count back **two less**, total is **zero**.

Finally, the next two missing numbers in the number pattern are **two** and **zero**.

Number Line

0	1	**2**	3	**4**	5	**6**	7	**8**	9	10	11	12	13	14	15	16	17	18	19	20

Test Questions

In each **number pattern**, find the next two missing numbers.

1) 8, 6, 4, ___, ___

2) 10, 8, 6, ___, ___

3) 12, 10, 8, ___, ___

4) 14, 12, 10, ___, ___

5) 16, 14, 12, ___, ___

6) 18, 16, 14, ___, ___

7) 20, 18, 16, ___, ___

8) 19, 17, 15, ___, ___

9) 17, 15, 13, ___, ___

10) 15, 13, 11, ___, ___

11) 13, 11, 9, ___, ___

12) 11, 9, 7, ___, ___

13) 9, 7, 5, ___, ___

14) 10, 8, 6, ___, ___

Multiples of 3

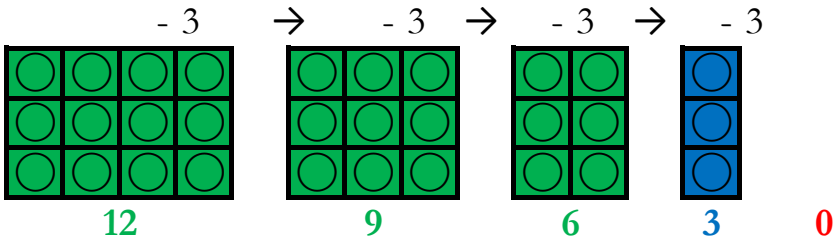
In the **number pattern** below, find the next two missing numbers.

1) **12, 9, 6, ?, ?**

Word Problem

Twelve, **nine** and **six** are numbers on labels.
The next two labels continue the **same number pattern**.
What are the next **two** numbers on the labels**?**

Concrete Object



Strategy Applied

Work out the **number pattern**, by finding out the **difference between** the **three** numbers.
The difference between each of the **three** numbers is known as the **rule**.

First, **count backwards** from **twelve** to **nine** equalling **three**, the rule is **-3**.

Then, count backwards from **nine** to **six** equalling **three**, the rule is **-3**.

The rule is **-3**, **count back three** from each of the numbers in the number pattern.
Continue this number pattern to find the next two missing numbers.

Next, find **six** on the number line and count back **three less**, total is **three**.

Then, find **three** on the number line and count back **three less**, total is **zero**

Finally, the next two missing numbers in the number pattern are **three** and **zero**.

Number Line

0	1	2	**3**	4	5	**6**	7	8	**9**	10	11	**12**	13	14	15	16	17	18	19	20

Test Questions

In each **number pattern**, find the next two missing numbers.

1) 12, 9, 6, ___, ___

2) 15, 12, 9, ___, ___

3) 18, 15, 12, ___, ___

4) 21, 18, 15, ___, ___

5) 20, 17, 14, ___, ___

6) 19, 16, 13, ___, ___

7) 17, 14, 11, ___, ___

8) 16, 13, 10, ___, ___

9) 14, 11, 8, ___, ___

10) 13, 10, 7, ___, ___

11) 21, 18, 15, ___, ___

12) 18, 15, 12, ___, ___

13) 15, 12, 9, ___, ___

14) 12, 9, 6, ___, ___

Multiples of 4

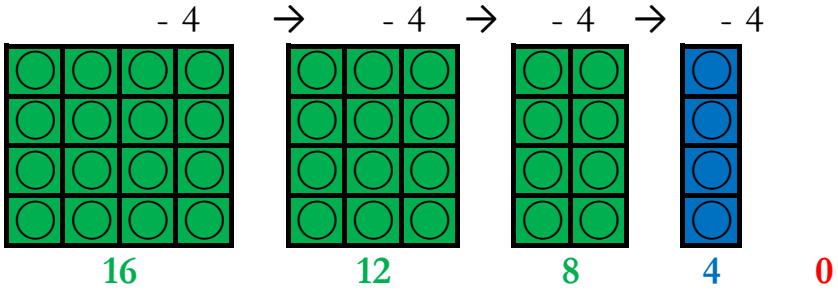
In the **number pattern** below, find the next two missing numbers.

1) **16, 12, 8, ?, ?**

Word Problem

Sixteen, **twelve** and **eight** are numbers on cards.
The next two cards continue the **same number pattern**.
What are the next **two** numbers on the cards**?**

Concrete Object



Strategy Applied

Work out the **number pattern**, by finding out the **difference between** the **three** numbers.
The difference between each of the **three** numbers is known as the **rule**.

First, **count backwards** from **sixteen** to **twelve** equalling **four**, the rule is **-4**.

Then, count backwards from **twelve** to **eight** equalling **four**, the rule is **-4**.

The rule is **-4**, **count back four** from each of the numbers in the number pattern.
Continue this number pattern to find the next two missing numbers.

Next, find **eight** on the number line and count back **four less**, total is **four**.

Then, find **four** on the number line and count back **four less**, total is **zero**.

Finally, the next two missing numbers in the number pattern are **four** and **zero**.

Number Line

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Test Questions

In each **number pattern**, find the next two missing numbers.

1) 16, 12, 8, ___, ___

2) 20, 16, 12, ___, ___

3) 24, 20, 16, ___, ___

4) 23, 19, 15, ___, ___

5) 22, 18, 14, ___, ___

6) 21, 17, 13, ___, ___

7) 19, 15, 11, ___, ___

8) 18, 14, 10, ___, ___

9) 17, 13, 9, ___, ___

10) 24, 20, 16, ___, ___

11) 20, 16, 12, ___, ___

12) 16, 12, 8, ___, ___

13) 23, 19, 15, ___, ___

14) 22, 18, 14, ___, ___

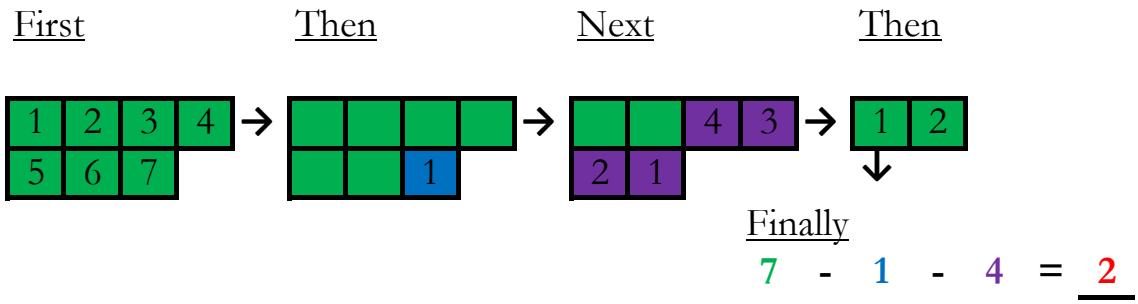
Multiple Numbers

1) 7 - 1 - 4 = ?

Word Problem

There are **seven** bananas in a fruit bowl on Sunday.
On Monday **one** banana is eaten. On Tuesday **four** **more** bananas are eaten.
How many bananas are now **left?**

Concrete Object



Strategy Applied

First, pick up **seven** objects and place them together.
Now count aloud to check there are only **seven** objects; **one**, **two, three, four, five, six**, **seven**.

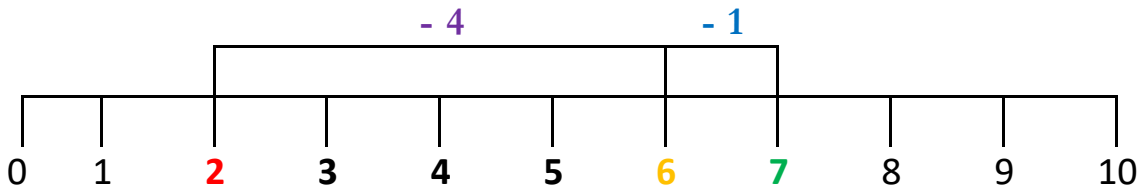
Then, pick up **one** of the objects and take it away, placing it elsewhere.

Next, pick up **four** of the objects and take it away, placing it elsewhere.

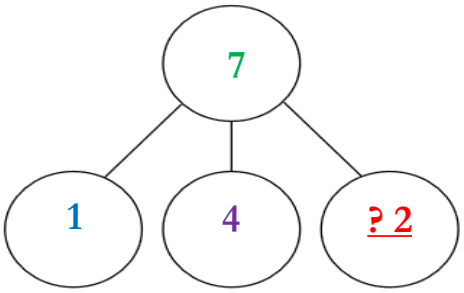
Then, count **altogether** how many objects are **left**.
Whilst touching each object **count forwards** aloud in number order, saying one number name per object; **one**, **two**.

Finally, **six** take away **one** take away **four** equals **five**.

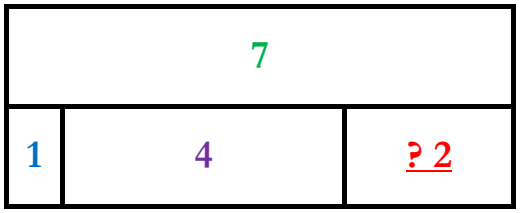
Number Line



Part Whole Model



Bar Model



Test Questions

1) 7 - 1 - 4 = ___

2) 8 - 2 - 3 = ___

3) 9 - 3 - 4 = ___

4) 10 - 4 - 0 = ___

5) 11 - 5 - 1 = ___

6) 12 - 0 - 2 = ___

7) 13 - 1 - 3 = ___

8) 14 - 2 - 4 = ___

9) 15 - 3 - 5 = ___

10) 16 - 4 - 0 = ___

11) 17 - 5 - 3 = ___

12) 18 - 0 - 2 = ___

13) 19 - 1 - 4 = ___

14) 20 - 2 - 5 = ___

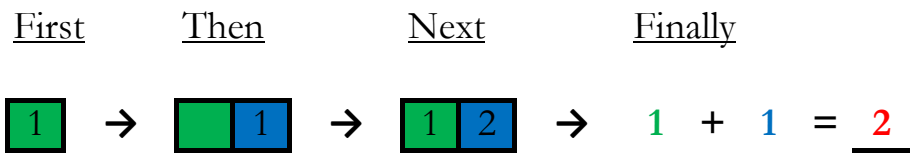
Doubling

1) 1 + 1 = ?

Word Problem

Josh and Sam **both** have the **same number** of apples, **one** each.
They count how many apples they have.
Altogether, how many apples do you think they have**?**

Concrete Object



Strategy Applied

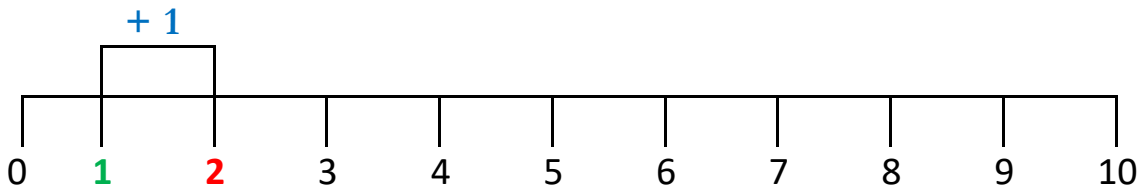
First, pick up **one** object and place it down.
Now count aloud to check there is only **one** **object**; **one**.

Then, pick up **one** more object and place it next to the **one** object.

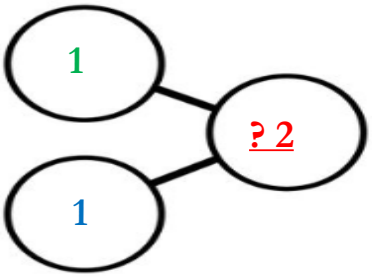
Next, count how many objects there are **altogether**.
Whilst touching each object **count forwards** aloud in number order,
saying one number name per object; **one**, **two**.

Finally, double **one** equals **two**.

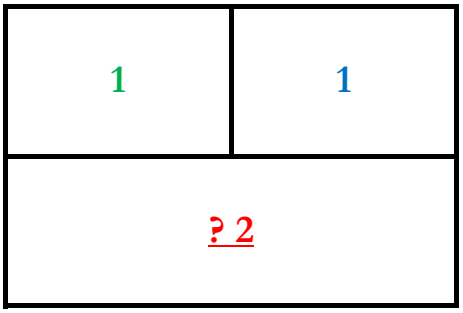
Number Line



Part Whole Model



Bar Model



Test Questions

1) 1 + 1 = ___

2) 2 + 2 = ___

3) 3 + 3 = ___

4) 4 + 4 = ___

5) 5 + 5 = ___

6) 10 + 10 = ___

7) 0 + 0 = ___

8) 9 + 9 = ___

9) 8 + 8 = ___

10) 7 + 7 = ___

11) 6 + 6 = ___

12) ___ = 2 + 2

13) ___ = 5 + 5

14) ___ = 10 + 10

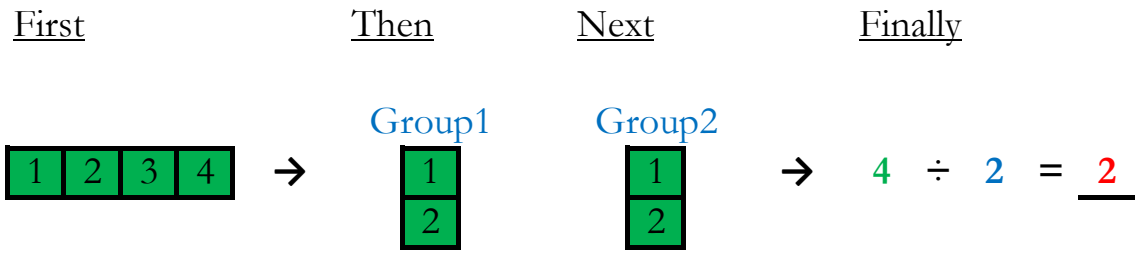
Sharing

1) 4 ÷ 2 = ?

Word Problem

Four toy cars are shared between **two** children, Laylah and Soul.
Each child will have the **same number** of toy cars.
How many toy cars does each child have**?**

Concrete Object



Strategy Applied

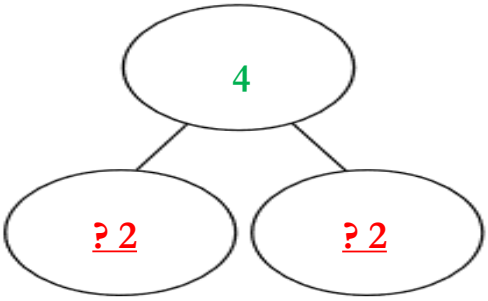
First, pick up **four** objects and place them together.
Now count them aloud to check there are only **four** objects; **one**, **two**, **three**, **four**.

Then, **share** the **four** objects one at a time **equally between two** groups.

Next, count how many objects there are **altogether** in **each group**, there should be two objects in each group; **one**, **two**.

Finally, **four** shared between **two** equals **two**.

Part Whole Model



Bar Model

4	
? 2	? 2

Test Questions

1) 4 ÷ 2 = ___

2) 6 ÷ 2 = ___

3) 8 ÷ 2 = ___

4) 10 ÷ 2 = ___

5) 12 ÷ 2 = ___

6) 14 ÷ 2 = ___

7) 16 ÷ 2 = ___

8) 18 ÷ 2 = ___

9) 20 ÷ 2 = ___

10) 2 ÷ 2 = ___

11) ___ = 20 ÷ 2

12) ___ = 10 ÷ 2

13) ___ = 8 ÷ 2

14) ___ = 4 ÷ 2

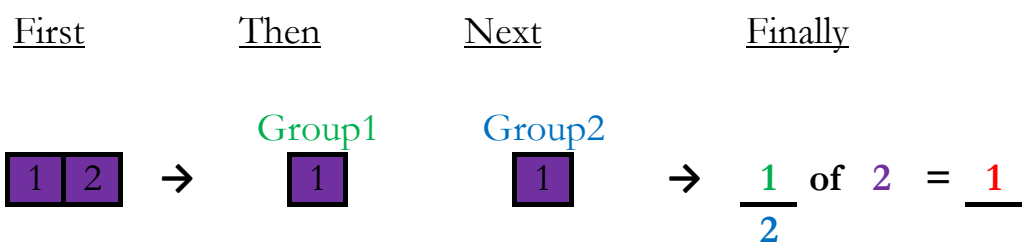
Halving

1) $\frac{1}{2}$ of 2 = ?

Word Problem

Tanisha and Kamal **equally share** two oranges **between** the two of them.
Both of them have the **same number** of oranges.
How many oranges will one of them have?

Concrete Object



Strategy Applied

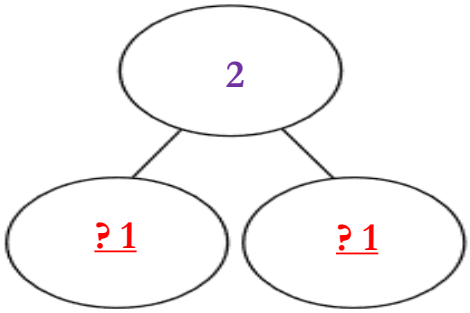
First, pick up two objects and place them together.
Now count aloud to check there are only two objects; one, two.

Then, **share** the two objects one at a time **equally between** two groups, until exactly the same quantity of objects are in each of the groups.

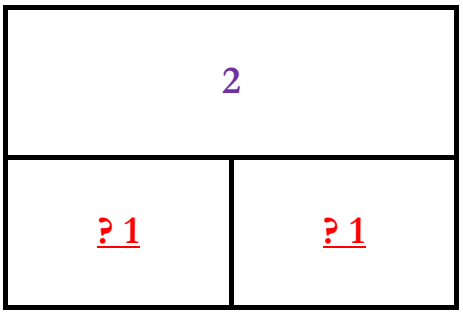
Next, count how many objects there are **altogether** in one **group**, there should be one object; one.

Finally, one half of two equals one.

Part Whole Model



Bar Model



Test Questions

1) $\frac{1}{2}$ of 2 = ___

2) $\frac{1}{2}$ of 4 = ___

3) $\frac{1}{2}$ of 6 = ___

4) $\frac{1}{2}$ of 8 = ___

5) $\frac{1}{2}$ of 10 = ___

6) $\frac{1}{2}$ of 12 = ___

7) $\frac{1}{2}$ of 14 = ___

8) $\frac{1}{2}$ of 16 = ___

9) Half of 18 = ___

10) Half of 20 = ___

Answers

P. 2	P. 4	P. 6	P. 8	P. 10	P. 12
1) 3	1) 5	1) 10	1) 15	1) 20	1) 3,4
2) 1	2) 5	2) 10	2) 15	2) 20	2) 4,5
3) 5	3) 5	3) 10	3) 15	3) 20	3) 5,6
4) 7	4) 5	4) 10	4) 15	4) 20	4) 6,7
5) 9	5) 5	5) 10	5) 15	5) 20	5) 7,8
6) 2	6) 5	6) 10	6) 15	6) 20	6) 8,9
7) 4	7) 5	7) 10	7) 15	7) 20	7) 9,10
8) 6	8) 5	8) 10	8) 15	8) 20	8) 10,11
9) 8	9) 5	9) 10	9) 15	9) 20	9) 11,12
10) 10	10) 5	10) 10	10) 15	10) 20	10) 12,13
11) 13	11) 5	11) 10	11) 15	11) 20	11) 13,14
12) 15	12) 5	12) 10	12) 15	12) 20	12) 14,15
13) 18	13) 5	13) 10	13) 15	13) 20	13) 15,16
14) 20	14) 5	14) 10	14) 15	14) 20	14) 18,19

P. 14	P. 16	P. 18	P. 20	P. 22	P. 24
1) 6,8	1) 9,12	1) 12,16	1) 6	1) 5	1) 2
2) 8,10	2) 12,15	2) 16,20	2) 7	2) 1	2) 4
3) 10,12	3) 15,18	3) 18,22	3) 9	3) 7	3) 0
4) 12,14	4) 18,21	4) 13,17	4) 5	4) 3	4) 5
5) 18,20	5) 10,13	5) 14,18	5) 8	5) 9	5) 3
6) 7,9	6) 11,14	6) 15,19	6) 11	6) 11	6) 1
7) 9,11	7) 13,16	7) 17,21	7) 15	7) 13	7) 0
8) 11,13	8) 14,17	8) 19,23	8) 13	8) 15	8) 2
9) 13,15	9) 16,19	9) 12,16	9) 16	9) 17	9) 4
10) 15,17	10) 17,20	10) 16,20	10) 13	10) 19	10) 5
11) 17,19	11) 9,12	11) 18,22	11) 16	11) 18	11) 3
12) 19,21	12) 12,15	12) 13,17	12) 19	12) 16	12) 1
13) 6,8	13) 15,18	13) 14,18	13) 19	13) 14	13) 2
14) 16,18	14) 18,21	14) 15,19	14) 18	14) 12	14) 0

Answers

P. 26	P. 28	P.30	P. 32	P.34	P. 36
1) 9	1) 12	1) 15	1) 4,3	1) 2,0	1) 3,0
2) 7	2) 10	2) 19	2) 5,4	2) 4,2	2) 6,3
3) 5	3) 14	3) 13	3) 6,5	3) 6,4	3) 9,6
4) 3	4) 8	4) 17	4) 7,6	4) 8,6	4) 12,9
5) 1	5) 6	5) 11	5) 8,7	5) 10,8	5) 11,8
6) 10	6) 15	6) 20	6) 9,8	6) 12,10	6) 10,7
7) 8	7) 13	7) 18	7) 10,9	7) 14,12	7) 8,5
8) 6	8) 11	8) 16	8) 11,10	8) 13,11	8) 7,4
9) 4	9) 9	9) 14	9) 12,11	9) 11,9	9) 5,2
10) 2	10) 7	10) 12	10) 13,12	10) 9,7	10) 4,1
11) 0	11) 5	11) 10	11) 14,13	11) 7,5	11) 12,9
12) 10	12) 4	12) 8	12) 15,14	12) 5,3	12) 9,6
13) 2	13) 2	13) 5	13) 16,15	13) 3,1	13) 6,3
14) 8	14) 0	14) 1	14) 17,16	14) 4,2	14) 3,0

P. 38	P. 40	P.42	P. 44	P. 46
1) 4,0	1) 2	1) 2	1) 2	1) 1
2) 8,4	2) 3	2) 4	2) 3	2) 2
3) 12,8	3) 2	3) 6	3) 4	3) 3
4) 11,7	4) 6	4) 8	4) 5	4) 4
5) 10,6	5) 5	5) 10	5) 6	5) 5
6) 9,5	6) 10	6) 20	6) 7	6) 6
7) 7,3	7) 9	7) 0	7) 8	7) 7
8) 6,2	8) 8	8) 18	8) 9	8) 8
9) 5,1	9) 7	9) 16	9) 10	9) 9
10) 12,8	10) 12	10) 14	10) 1	10) 10
11) 8,4	11) 9	11) 12	11) 10	
12) 4,0	12) 16	12) 4	12) 5	
13) 11,7	13) 14	13) 10	13) 4	
14) 10,6	14) 13	14) 20	14) 2	

Glossary

Amount is something that has a numerical value, for e.g. 10 cubes

Bar Model is a pictorial representation of a number sentence in the form of bars or boxes used to solve number problems.

Column is a vertical arrangement for example, in a table the cells arranged vertically.

Column Place Value is the value of a digit that relates to its position or place in a number within a column.

Concrete Objects are objects that can be handled and manipulated to support understanding of the structure of a mathematical concept. Materials such as Dienes(Base 10 materials), Cuisenaire, Numicon, are all examples of concrete objects.

Denominator is the number written below the line i.e. the divisor. e.g. in the fraction ⅔ the denominator is 3.

Digit is one of the symbols of a number system most commonly the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. Examples: the number 29 is a 2-digit number; there are three digits in 2.95. The position or place of a digit in a number conveys its value.

Digit Value is the value of a digit that relates to its position or place **in a** number. e.g. in 82 the digits represent 8 tens and 2 ones.

Dividend in division, is the number that is divided. e.g. in 15 ÷ 3, 15 is the dividend.

Divisor is the number by which another is divided. e.g. In the calculation 30 ÷ 6 = 5, the divisor is 6. In this example, 30 is the dividend and 5 is the quotient.

Glossary

Efficient Methods A means of calculation (which can be mental or written) that achieves a correct answer with as few steps as possible.
In written calculations this often involves setting out calculations in a columnar layout.

Equals is the symbol: =, read as 'is equal to' or 'equals'. and meaning 'having the same value as'. e.g. 7 – 2 = 4 + 1 since both expressions, 7 – 2 and 4 + 1 have the same value, 5.

Expanded Form is a way to break up a number to show the value of each digit (Partition).

Fraction is the result of dividing one integer by a second integer, which must be non- zero. The dividend is the numerator and the non-zero divisor is the denominator. See also decimal fraction, equivalent fraction, improper fraction, proper fraction, unit fraction and vulgar fraction.

Formal Written Method is the way of setting out working in columnar form. In addition and subtraction, the formal written methods can be referred to as expanded and column addition and/or subtraction. In multiplication, the formal written methods are called short or long multiplication depending on the size of the numbers involved. Similarly in division the formal written methods are called short or long division.

Grid a lattice created with two sets of parallel lines. Lines in each set are usually equally spaced. If the sets of lines are at right angles and lines in both sets are equally spaced, a square grid is created.

Hundred Square is a 10 by 10 square grid numbered 1 to 100. A similar grid could be numbered as a 0 – 99 grid.

Inverse is the opposite or reverse operation.

Glossary

Mental Calculations refer to calculations that are largely carried out mentally, but may be supported with a few simple written jottings.

Multiple is the result of multiplying a number by an integer,
e.g. 12 is a multiple of 3 because$3 \times 4 = 12$.

Multiplicand is a number to be multiplied by another.
e.g. in 6×4, 4 is the multiplier as it is how many lots/groups of 6.

Multiplier is a number to be multiplied by another.
e.g. in 5×3, 5 is the multiplicand as it is the number to be multiplied by 3.

Number Bond is a pair of numbers with a particular total.

Number Line is a line where numbers are represented by points upon it.

Number Sentence is a mathematical sentence involving numbers.
e.g. $3 + 6 = 9$ and $9 > 3$

Numerator is the number written on the top– the dividend (the part that is divided). In the fraction ⅔, the numerator is 2.

Operations that, when they are combined, leave the entity on which they operate unchanged. Examples: addition and subtraction are inverse operations e.g. $5 + 6 – 6 = 5$. Multiplication and division are inverse operations e.g. $6 \times 10 \div 10 = 6$.

Part Whole Model is a pictorial representation of the relationship between a number or number sentence and its component parts.

Glossary

Partition 1) To separate a set into subsets. 2) To split a number into component parts. e.g. the two-digit number 38 can be partitioned into 30 + 8 or 19 + 19. 3) A model of division. e.g. 21 ÷ 7 is treated as 'how many sevens in 21?'

Pictorial Representations do enable learners to use pictures and images to represent the structure of a mathematical concept.
The pictorial representation may build on the familiarity with concrete objects. e.g. a square to represent a Dienes 'flat' (representing 100).
Pupils may interpret pictorial representations provided to them or create a pictorial representation themselves to help solve a mathematical problem.

Place Holder In decimal notation, the zero numeral is used as a place holder to denote the absence of a power of 10.

Place Value is the value of a digit that relates to its position or place in a number. e.g. in 1482 the digits represent 1 thousand, 4 hundred, 8 tens and 2 ones respectively; in 12.34 the digits represent 1 ten, 2 ones, 3 tenths and 4 hundredths respectively.

Product is the result of multiplying one number by another.
e.g. the product of 2 and 3 is 6 since 2 × 3 = 6.

Quotient is the result of a division. e.g. 46 ÷ 3 = 15⅓ and 15⅓ is the quotient of 46 by 3. Where the operation of division is applied to the set of integers, and the result expressed in integers.
e.g. 46 ÷ 3 = 15 remainder 1 then 15 is the quotient of 46 by 3 and 1 is the remainder.

Glossary

Regrouping is to exchange a number for another of equal value. The process of regrouping is used in some standard compact methods of calculation. e.g.: 'carrying figures/exchanging' in addition, multiplication or division; and 'decomposition' in subtraction.

Remainder in the context of division requiring a whole number answer (quotient), the amount remaining after the operation.
e.g. 29 divided by 7 = 4 remainder 1.

Repeated Addition is the process of repeatedly adding the same number or amount. One model for multiplication. e.g. 5 + 5 + 5 + 5 = 5 x 4.

Repeated Subtraction is The process of repeatedly subtracting the same number or amount. One model for division.
e.g. 20 -5 - 5 - 5 - 5 = 0 so 20 ÷ 4 = 5 remainder 0.

Sequence is succession of terms formed according to a rule. There is a definite relation between one term and the next and between each term and its position in the sequence. e.g. 0, 4, 8, 12, 16 etc.

Step Counting is the process of repeatedly adding the same number or amount. One model for multiplication. e.g. 5 + 10 + 15 + 20 = 5 x 4.

Total Value is the sum to a calculation.

Zero in a place value system, a place-holder. e.g. 105