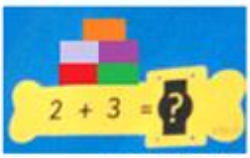
# Addition

Addition is the process of calculating the total of two or more numbers or amounts.
Addition is the inverse operation of subtraction.

## Early exploration

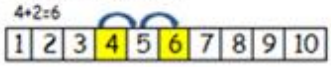
Jack has 3 gingerbread and Jill has 2. How many gingerbread are there altogether?

## Concrete



Using a number track





## Mental strategies to develop problem solving, reasoning and fluency

- Counting forwards and backwards
- Understanding addition is commutative
- Partitioning
- Recalling number bonds
- Using subtraction as the inverse of addition
- Using near doubles

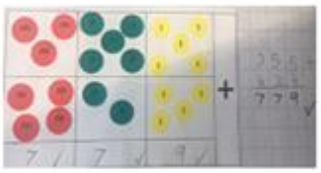
Encouraging children to work systematically and logically

* Developing mathematical reasoning
* Making connections
* Recognising patterns

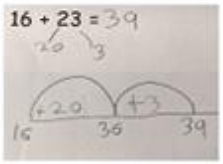
Systematic: how can you be sure?

Logical: can you explain or make sense of your thinking?

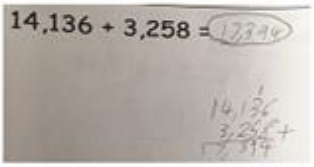
## Pictorial

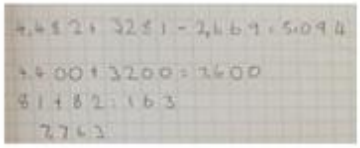



## Abstract







## Key vocabulary

Plus
Total
Add
Make
Count on
And
Combine
Sum
Most
Increase
Put together
More than
Altogether

## Examples of representations


Children should be exposed to a variety of representations and encouraged to use these frequently to develop their reasoning, fluency, problem solving and deepen mathematical understanding.

# Subtraction

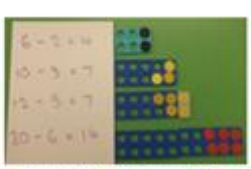
Subtraction is the process of taking one number, or amount, away from another or finding the difference between two or more numbers. Subtraction is the inverse operation of addition.

## Early exploration

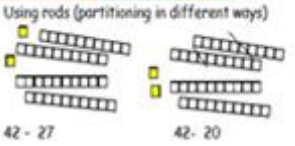

There are 3 birds. 1 flies away.
How many are left?

3-1=2

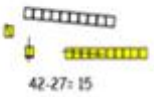
## Concrete




Using rods (partitioning in different ways)




subtract 7 by exchanging a ten rod for 10 units




## Mental strategies to develop problem solving, reasoning and fluency

- Counting forwards and backwards
- Reordering
- Counting on or back
- Bridging through multiples of 10
- Compensating
- Bridging through 60 to calculate a time interval
- Use addition as the inverse of subtraction.

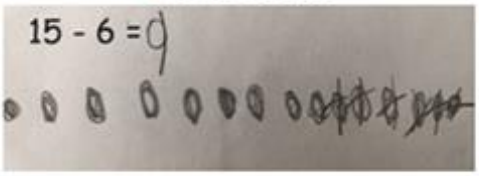
Encouraging children to work systematically and logically

* Developing mathematical reasoning
* Making connections
* Recognising patterns

Systematic: how can you be sure?

Logical: can you explain or make sense of your thinking?

## Pictorial

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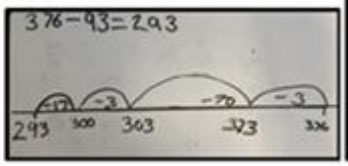
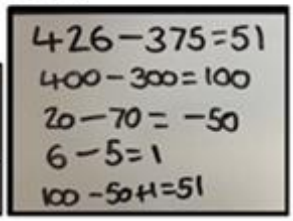



## Key vocabulary

Subtract

Minus

Count back

Less than

Take away

Fewer than

Difference between

Least

## Examples of representations

Children should be exposed to a variety of representations and encouraged to use these frequently to develop their reasoning, fluency, problem solving and deepen mathematical understanding.

# Multiplication

The basic idea of multiplication is the process of repeated addition. Understanding and being able to count in sets or groups of numbers should be taught from Reception moving onto complete times table knowledge by the end of Year 6.
Multiplication is the inverse operation of division.

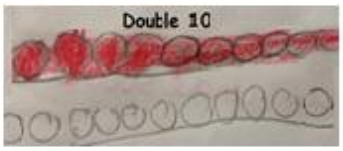
## Early exploration

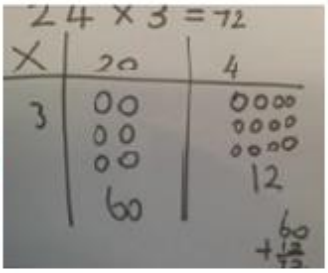

If one pair of socks= 2
Then 3 pairs = 2+2+2= 6

## Concrete



## Pictorial






## Mental strategies to develop problem solving, reasoning and fluency

- Counting forwards and backwards
- Repeated addition
- Rapid recall of facts
- Partitioning, doubling and halving
- Multiplying and dividing by 10, 100 and 1000
- Use division as the inverse of multiplication

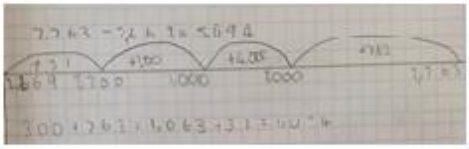
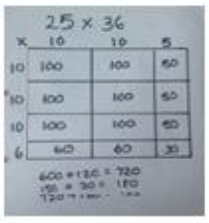
Encouraging children to work systematically and logically

* Developing mathematical reasoning
* Making connections
* Recognising patterns

Systematic: how can you be sure?

Logical: can you explain or make sense of your thinking?

## Abstract


## Key vocabulary

Repeated addition

Multiply — Times

Lots of — × — Multiply by

Groups of — Multiple of

Product of

## Examples of representations

Children should be exposed to a variety of representations and encouraged to use these frequently to develop their reasoning, fluency, problem solving and deepen mathematical understanding.

# ÷ Division ÷

Division is separating into equal parts or groups. Division is the result of equal grouping or sharing. Division is the inverse operation of multiplication.

## Early exploration

Share 12 cookies between 4 friends

I had 6 sweets and I shared them between 2 children. How many sweets did each child get?

Mental strategies to develop problem solving, reasoning and fluency

- Counting forwards and backwards in equal steps.
- Rapid recall of multiplication facts.
- Multiplying and dividing by 10, 100 and 1000.
- Doubling and halving.
- Use multiplication as the inverse of division.

Encouraging children to work systematically and logically

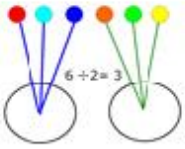
* Developing mathematical reasoning
* Making connections
* Recognising patterns

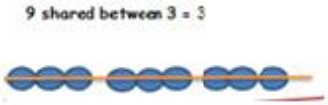
Systematic: how can you be sure?

Logical: can you explain or make sense of your thinking?

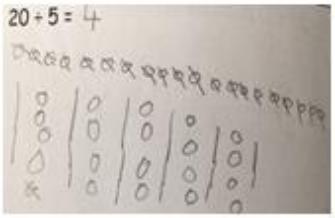
## Concrete






## Pictorial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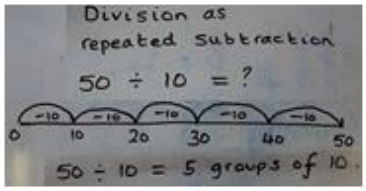


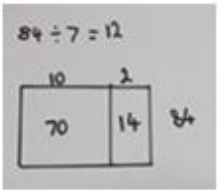


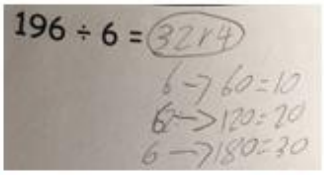


## Examples of representations

Children should be exposed to a variety of representations and encouraged to use these frequently to develop their reasoning, fluency, problem solving and deepen mathematical understanding.

## Key vocabulary

Equal groups of

Divide

Divided by

Share

÷

Divided into

Group

Shared equally

Divisor

Factor

Remainder