Airedale Infant School
'Ambition, Bravery, Respect'
Maths Calculation Policy

Adopting a common calculation policy within our pyramid ensures that children will be taught in the same way in both key stage one and two, thus developing their understanding of the subject as they move up through school, transition between key stages and onto to key stage three. Consequently, teaching time will be spent in promoting mathematical procedures that are flexible, accurate, consistent, efficient and appropriate methods of calculation in all key stages using the same methods.

Within the pyramid, it is essential to be consistent in our approach to different calculation methods; using a common calculation policy is the means by which we will strive to address this.

Although the main focus of this policy is on effective written compact methods, it is important to recognise that the ability to calculate mentally lies at the heart of mathematics. Mental calculations are not at the exclusion of written recordings and should be seen as complementary to, and not as separate from it. In every written method, there is an element of mental processing. Written recordings both help children to clarify their thinking and support and extend the development of more fluent and sophisticated mental strategies.

Key Elements

Discussion will play a key part in maths lessons, Children will be encouraged to talk about the processes they have used to reach their answers. Teachers will encourage and promote the use of correct mathematical vocabulary.

Children will be taught to partition in different ways, use number bonds and times table facts wherever possible to aid calculations. Children will be encouraged to show their working out, and will be taught how to record their work methodically.

As children move up through school, the calculation methods will show progression and the numbers used will be more age/stage appropriate.

Children should be encouraged to check their work by estimation to see if their answer is reasonable and sensible as well as perform the inverse relationship to check for answer accuracy.

Where possible, mathematics will be used in other curriculum areas to enrich the curriculum and develop cross-curricular links.

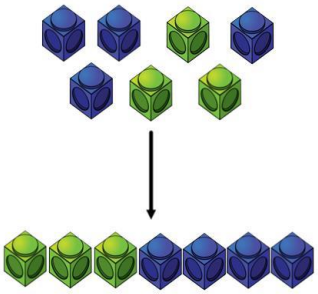
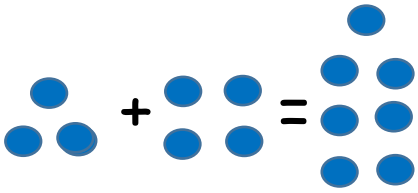
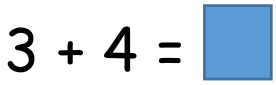
Addition

EYFS Objectives

- Using quantities and objects, they add two single-digit numbers and count on or back to find the answer.

Vocabulary

add, more, and, make, sum, total, altogether, score, double, one more, two more, ten more…, how many more to make… ?, how many more is… than…?

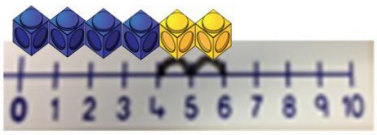
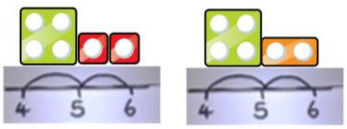
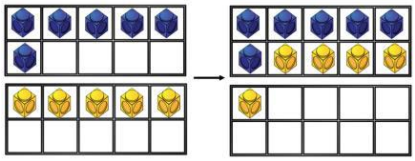
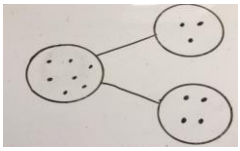
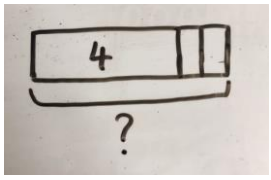
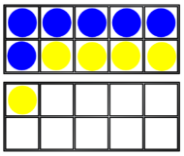
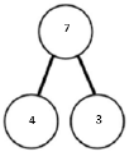
Concrete	Pictorial	Abstract
Use resources e.g. cars, dinosaurs, shells, bears 	Draw objects 	Write numbers onto a part whole model 

Year 1 Objectives

- To read, write and interpret mathematical statements involving addition (+)
- To add one-digit and two-digit numbers to 20, including zero
- To solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems

Vocabulary

number bonds, add, more, plus, make, sum, total, altogether, inverse double, near double, equals, is the same as (including equals sign), score, one more, two more… ten more, how many more to make…?, how many more is… than…?, how much more is…?

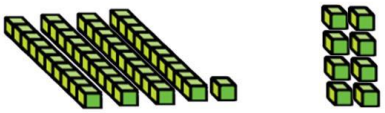
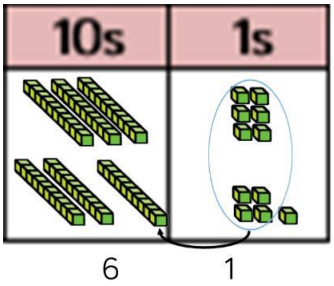
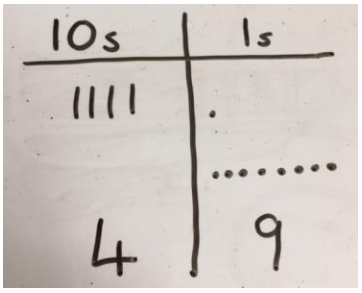
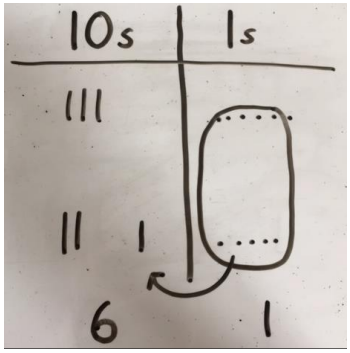
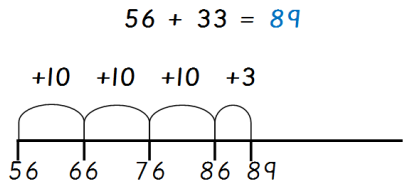
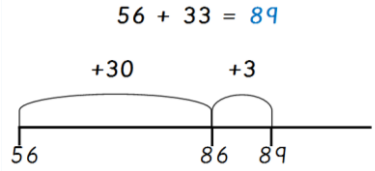
Concrete	Pictorial	Abstract
Counting on using a number line and practical resources   Use 10 Frames 	Draw objects onto a part whole model  Use bar model  Use a 10 Frame 	Write numbers onto a part whole model  Use Number Lines  Written Method $6 + \square = 11$ $6 + 5 = 5 + \square$ $6 + 5 = \square + 4$

Year 2 Objectives

- To add numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones, a two-digit number and tens, two two-digit numbers and adding three one-digit numbers
- To solve problems with addition using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- To show that addition of two numbers can be done in any order
- To recognise and use the inverse relationship and use this to check calculations and solve missing number problems.

Vocabulary

add, addition, more, plus, make, sum, total, altogether, score, double, near double, one more, two more… ten more… one hundred more, how many more to make…?, how many more is… than…?, how much more is…?, tens boundary

Concrete	Pictorial	Abstract
Base 10  Base 10 and Partitioning 	Place Value Chart/Whiteboard  Place Value Chart/Whiteboard including carrying 	Number Line Counting on in tens and ones  Number Line Adding the tens and then units  Column Method 23 + 16 = 39 20 + 10 = 30 3 + 6 = 9 39

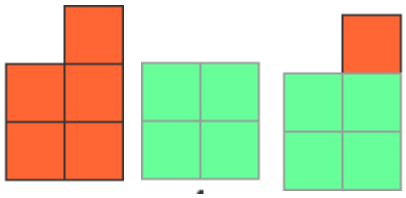
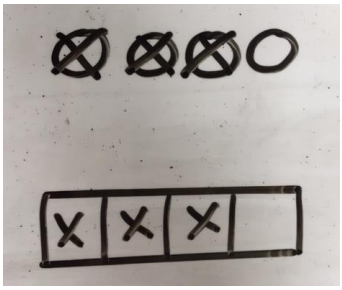
Subtraction

EYFS Objectives

- Using quantities and objects, they subtract two single-digit numbers and count on or back to find the answer.

Vocabulary

take (away), leave, how many are left/left over?, how many have gone?, one less, two less… ten less…,how many fewer is… than…?, difference between, is the same as

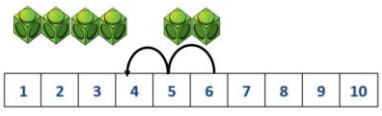
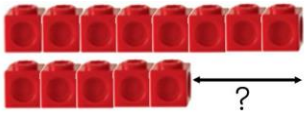
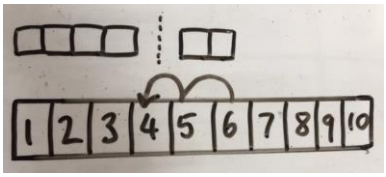
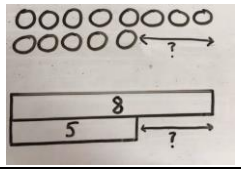
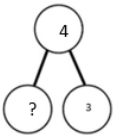
Concrete	Pictorial	Abstract
Use resources e.g. ten frames, Numicon, cubes, bean bags  Find the difference using cubes, Numicon, Cuisenaire robs 	Draw objects they are using and then cross out the correct amount. 4 – 3 = 1 	Write numbers onto a part whole model 4 – 3 = ☐

Year 1 Objectives

- To read, write and interpret mathematical statements involving subtraction (-)
- To subtract one-digit and two-digit numbers to 20, including zero
- To solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems

Vocabulary

subtract, take away, minus, leave, how many fewer is…than..?, how much less is..? half, halve, how many are left/left over?, how many are gone?, one less, two less, ten less…, how many fewer is… than…?, how much less is…? =, equals, sign, is the same as, count on, count back, difference between. how many more is…than..?, how much more is..?

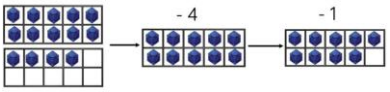
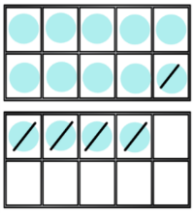
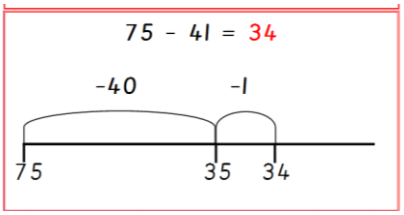
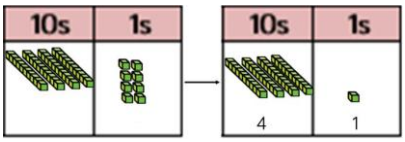
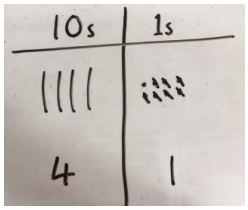
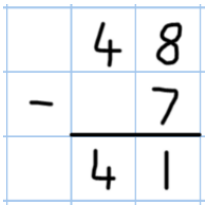
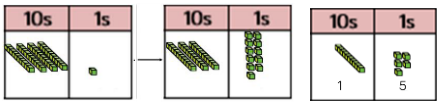
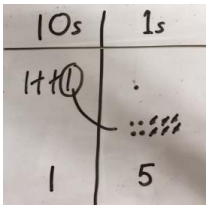
Concrete	Pictorial	Abstract
Counting back using a number line and practical resources  Find the difference using cubes, Numicon, Cuisenaire robs 	Use pictorial methods  Draw the objects or use bar modelling 	Write numbers onto a part whole model  Use Number Lines  Written Method 8 – 5, the difference is ☐

Year 2 Objectives

- To subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones, a two-digit number and tens, two two-digit numbers
- To solve problems with subtraction using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- To show that addition of two numbers can be done in any order and subtraction of one number from another cannot
- To recognise and use the inverse relationship and use this to check calculations and solve missing number problems.

Vocabulary

subtract, minus, leave, how many are left/left over?, how many less is… than…?, how much fewer is…?, difference between, half, halve, equals, sign, is the same as, partition, inverse, count on , count back, one less, ten less… one hundred less.

Concrete	Pictorial	Abstract
Use a 10 Frame 	Use a 10 Frame 	Number Line Counting back in tens and ones 
Base 10 	Place Value Chart/Whiteboard 	Column Method 
Base 10 and exchange 	Place Value Chart/Whiteboard including exchange 	

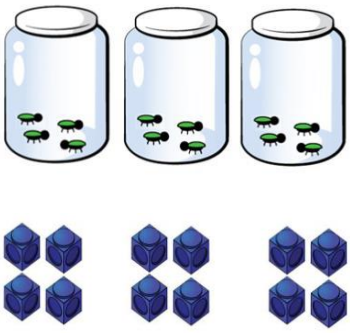
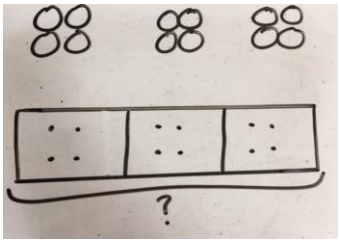
Multiplication

EYFS Objectives

- Using quantities and objects to solve problems, including doubling

Vocabulary

group, lots of, double

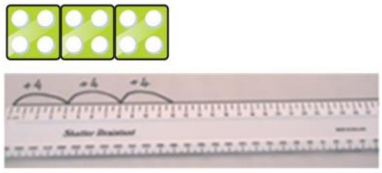
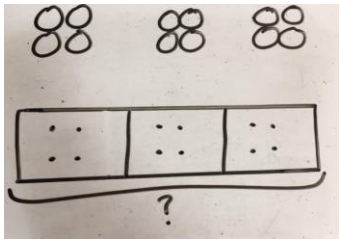
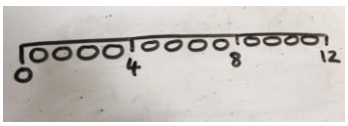
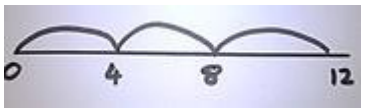
Concrete	Pictorial	Abstract
Repeated grouping/repeated addition 	Use pictorial methods 	Write numbers 4 + 4 + 4 = 12

Year 1 Objectives

- To solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Vocabulary

odd, even, count in twos, fives, count in tens (forwards from/backwards from), how many times? lots of, groups of, once, twice, five times, ten times , multiple of, times, multiply, multiply by, array, row, column, double.

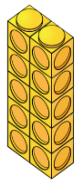
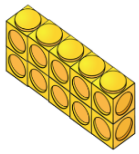
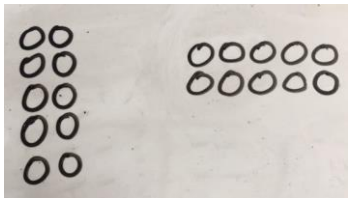
Concrete	Pictorial	Abstract
Use Number Lines and/or Cuisenaire rods to show repeated addition 	Use pictorial method  	Use Number Lines 

Year 2 Objectives

- To recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- To calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×) and equals (=) signs
- To show that multiplication of two numbers can be done in any order (commutative)
- To solve problems involving multiplication, using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in contexts.

Vocabulary

odd, even, twos, fives, tens, threes, lots of, groups of, once, twice, three times, five times, ten times, multiple of, times, multiply, multiply by, repeated addition, array, row, column, double.

Concrete	**Pictorial**	**Abstract**
Use arrays to illustrate  2 lots of 5  5 lots of 2	Pictorial arrays 	Use arrays to write calculations 10 = 2 × 5 5 × 2 = 10 2 + 2 + 2 + 2 + 2 = 10 10 = 5 + 5

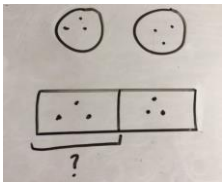
Division

EYFS Objectives

- Using quantities and objects to solve problems, including halving and sharing.

Vocabulary

halve, half, share, share equally, groups

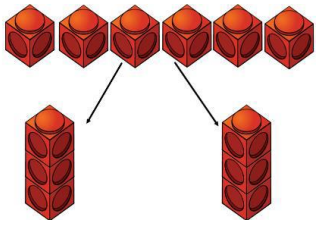
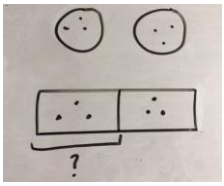
Concrete	Pictorial	Abstract
Use resources 	Sharing pictorially 	Write numbers 6 shared by 2 = 3 3 | 3

Year 1 Objectives

- To solve one-step problems involving division, by calculating the answer using concrete objects and pictorial representations with the support of the teacher.

Vocabulary

halve, share, share equally, groups, equal groups of, divide, divided by, left, left over

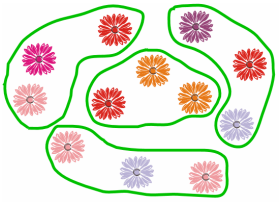
Concrete	Pictorial	Abstract
Use resources 	Sharing pictorially 	Write numbers 6 shared by 2 = 3 3 | 3

Year 2 Objectives

- To recall and use division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- To calculate mathematical statements for division within the multiplication tables and write them using the division (÷) and equals (=) signs
- To show division of one number by another cannot
- To solve problems involving division, using materials, mental methods, and division facts, including problems in contexts.

Vocabulary

groups of, equal groups of, halve, share, share equally, divide, divided by, divided into, repeated subtraction, inverse.

Concrete	Pictorial	Abstract
Grouping 	Bar Modelling ? | | 24 24 ÷ 3 = ?	Using a Number Line