National Curriculum Links

Links to the National Curriculum in England

# Chapters 19–20: Algebraic reasoning, coordinates and linear relationships

Pupils should be taught to:

## Year 4

* describe positions on a 2-D grid as coordinates in the first quadrant

## Year 6

* use simple formulae
* generate and describe linear number sequences
* express missing number problems algebraically
* find pairs of numbers that satisfy an equation with two unknowns
* enumerate possibilities of combinations of two variables

Links to Curriculum for Excellence in Numeracy and Mathematics in Scotland

# Chapters 19–20: Algebraic reasoning, coordinates and linear relationships

## Early

***Experiences and outcomes:*** *I have spotted and explored patterns in my own and the wider environment and can copy and continue these and create my own patterns.* ***MTH 0-13a***

***Benchmark:***

* copies, continues and creates simple patterns involving objects, shapes and numbers
* explores, recognizes and continues simple number patterns
* finds missing numbers on a number line within the range 0–20

## First

***Experiences and outcomes:*** *I can compare, describe and show number relationships, using appropriate vocabulary and the symbols for equals, not equal to, less than and greater than.* ***MTH 1-15a***

*When a picture or symbol is used to replace a number in a number statement, I can find its value using my knowledge of number facts and explain my thinking to others.* ***MTH 1-15b***

***Benchmark:***

* understands and accurately uses the terms ‘equal to’, ‘not equal to’, ‘less than’, ‘greater than’, and the related symbols (=, ≠ , <, >) when comparing quantities
* applies understanding of the equals sign as a balance, and knowledge of number facts, to solve simple algebraic problems where a picture or symbol is used to represent a number, for example, ♦ + 17 = 30 and ♦ × 6 = 30

## Second

***Experiences and outcomes:*** *Having explored more complex number sequences, including well-known named number patterns, I can explain the rule used to generate the sequence, and apply it to extend the pattern.* ***MTH 2-13a***

*I can apply my knowledge of number facts to solve problems where an unknown value is represented by a symbol or letter.* ***MTH 2-15a***

***Benchmark:***

* applies knowledge of multiples, square numbers and triangular numbers to generate number patterns
* solves simple algebraic equations with one variable, for example, *a* – 30 = 40 and 4*b* = 20

Links to Curriculum for Wales: Programme of Study for Mathematics, Key Stages 2–4

# Chapters 19–20: Algebraic reasoning, coordinates and linear relationships

Learners should be taught to:

## Year 1

* demonstrate an understanding of repeating patterns, including shape and number, by describing, reproducing and extending

## Year 3

* use one and two step function machines to generate input and output involving addition and subtraction within 100; express, in words, the operations of function machines
* find an ‘unknown’ in one step equations and use this to derive other facts, e.g. 37 + ? = 100 therefore 100 – 37 = ?

## Year 4

* use one and two step function machines to generate input and output using all four operations; express, in words, the operations of function machines
* find an ‘unknown’ in two step equations, e.g. 4 × ? + 1 = 25

## Year 5

* use multistep function machines to generate input and output using all four operations; express, in words, the operations of function machines
* read, plot and write coordinates in one quadrant, e.g. (2, 4)
* solve one step equations using letters to present ‘unknowns’ with integer solutions, e.g. 6 + a = 10 and b + b = 8
* use coordinates to specify location

## Year 6

* explore general statements through practical activities, e.g. that a + a + a = 3a, 3 × a = 3a and a + a + a + b + b = 3a + 2b
* simplify expressions involving the addition of one variable, e.g. 5t + 3t = 8t
* express output generated from one step function machines using algebra v • identify the coordinates of a missing point from a regular shape
* refer to the x axis and the y axis
* construct and solve one step equations with whole number solutions
* use grid references to specify location

Australian Curriculum for Mathematics

This maps entries in the **Australian Mathematics Curriculum (from Foundation Stage to Year 7)** to the content of chapters of Haylock, *Mathematics Explained for Primary Teachers*, 6th edition.

# Chapters 19–20: Algebraic reasoning, coordinates and linear relationships

## Foundation Year

* Sort and classify familiar objects and explain the basis for these classifications
* Copy, continue and create patterns with objects and drawings

## Year 1

* Investigate and describe number patterns formed by skip counting and patterns with objects

## Year 2

* Describe patterns with numbers and identify missing elements
* Solve problems by using number sentences for addition or subtraction

## Year 3

* Describe, continue, and create number patterns resulting from performing addition or subtraction

## Year 4

* Explore and describe number patterns resulting from performing multiplication
* Solve word problems by using number sentences involving multiplication or division where there is no remainder
* Find unknown quantities in number sentences involving addition and subtraction and identify equivalent number sentences involving addition and subtraction

## Year 5

* Describe, continue and create patterns with fractions, decimals and whole numbers resulting from addition and subtraction
* Find unknown quantities in number sentences involving multiplication and division and identify equivalent number sentences involving multiplication and division

## Year 6

* Continue and create sequences involving whole numbers, fractions and decimals
* Describe the rule used to create the sequence
* Explore the use of brackets and order of operations to write number sentences

## Year 7

* Introduce the concept of variables as a way of representing numbers using letters
* Create algebraic expressions and evaluate them by substituting a given value for each variable
* Extend and apply the laws and properties of arithmetic to algebraic terms and expressions
* Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point
* Solve simple linear equations
* Investigate, interpret and analyse graphs from authentic data