National Curriculum Links

Links to the National Curriculum in England

# Chapter 2: Mathematics in the primary curriculum

Mathematics is a creative and highly interconnected discipline that has been developed over centuries, providing the solution to some of history’s most intriguing problems. It is essential to everyday life; critical to science, technology and engineering; and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

Links to Curriculum for Excellence in Numeracy and Mathematics in Scotland

# Chapter 2: Mathematics in the primary curriculum

## Mathematics, principles and practice

Mathematics is important in our everyday life, allowing us to make sense of the world around us and to manage our lives. Using mathematics enables us to model real-life situations and make connections and informed predictions. It equips us with the skills we need to interpret and analyse information, simplify and solve problems, assess risk and make informed decisions.

Mathematics plays an important role in areas such as science or technologies, and is vital to research and development in fields such as engineering, computing science, medicine and finance. Learning mathematics gives children and young people access to the wider curriculum and the opportunity to pursue further studies and interests.

Because mathematics is rich and stimulating, it engages and fascinates learners of all ages, interests and abilities. Learning mathematics develops logical reasoning, analysis, problem-solving skills, creativity and the ability to think in abstract ways. It uses a universal language of numbers and symbols which allows us to communicate ideas in a concise, unambiguous and rigorous way.

Mathematics equips us with many of the skills required for life, learning and work. Understanding the part that mathematics plays in almost all aspects of life is crucial. This reinforces the need for mathematics to play an integral part in lifelong learning and be appreciated for the richness it brings.

There are many opportunities to develop mathematical concepts in all other areas of the curriculum. Patterns and symmetry are fundamental to art and music; time, money and measure regularly occur in modern languages, home economics, design technology and various aspects of health and wellbeing; graphs and charts are regularly used in science and social studies; scale and proportion can be developed within social studies; formulae are used in areas including health and wellbeing, technologies and sciences; while shape, position and movement can be developed in all areas of the curriculum.

## Numeracy and mathematics, experience and outcomes

My learning in mathematics enables me to:

* develop important new kinds of thinking
* develop a secure understanding of the concepts, principles and processes of mathematics and apply these in different contexts, including the world of work
* understand the application of mathematics, its impact on our society past and present, and its potential for the future
* develop essential numeracy skills which will allow me to participate fully in society

## First

***Experiences and outcomes:*** *I have discussed the important part that numbers play in the world and explored a variety of systems that have been used by civilizations throughout history to record numbers.* ***MTH 1-12a***

***Benchmark:***

* investigates and shares understanding of the importance of numbers in learning,
life and work
* investigates and shares understanding of a variety of number systems used throughout history

## Second

***Experiences and outcomes:*** *I have worked with others to explore, and present, our findings on how mathematics impacts on the world and the important part it has played in advances and inventions.* ***MTH 2-12a***

***Benchmark:***

* researches and presents examples of the impact mathematics has in the world
of life and work
* contributes to discussions and activities on the role of mathematics in the creation
of important inventions, now and in the past

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

# Chapter 2: Mathematics in the primary curriculum

## Foundation Phase

* use every day and mathematical language to talk about their own ideas and choices
* present work orally, pictorially and in written form, and use a variety of ways to represent collected data
* devise and refine informal, personal methods of recording, moving to using words and symbols in number sentences

## Key Stages 2–4

**Outcome 1:** Learners anticipate, follow, respond to and join in with familiar number rhymes, stories, songs, activities and games. They show an awareness of number activities, recite, sign or indicate one or more numbers to 5 and count or indicate two objects. They are beginning to compare physical properties of objects. They demonstrate interest in position and the relationship between objects. They match objects or pictures by recognizing similarities.

**Outcome 2:** Learners use mathematics in day-to-day activities and in their play, responding appropriately to key vocabulary and questions. They join in rote counting of numbers from 1 to 10. They recognize and name numbers 1 to 3, and count up to three objects reliably. They record numbers initially by making marks or drawing pictures. They begin to develop an understanding of one-to-one correspondence by matching pairs of different objects or pictures. They understand the concept of ‘one more’. In daily activities, they develop an awareness of the purpose of money. They show understanding of words, signs and symbols that describe size and positions. They sort objects using one criterion, and are aware of contrasting qualities

**Outcome 3:** Learners use familiar words in practical situations. They rote count to beyond 10, and onwards from a given small number. They carry out simple addition using numbers 1 to 5 and understand that zero means none. They recognize and try to record numerals from 1 to 9. They understand the concept of ‘one less’. They compare and order two or more objects by direct observation. They show awareness of time in terms of their daily activities. They talk about or indicate, recognize and copy simple repeating patterns and sequences. When sorting, they recognize when an object is different and does not belong to a familiar category.

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.

# Chapter 2: Mathematics in the primary curriculum

## Aims

The *Australian Curriculum: Mathematics* aims to ensure that students:

* are confident, creative users and communicators of mathematics, able to investigate, represent and interpret situations in their personal and work lives and as active citizens
* develop an increasingly sophisticated understanding of mathematical concepts and fluency with processes, and are able to pose and solve problems and reason in number and algebra, measurement and geometry, and statistics and probability
* recognize connections between the areas of mathematics and other disciplines and appreciate mathematics as an accessible and enjoyable discipline to study

## Rationale

Learning mathematics creates opportunities for and enriches the lives of all Australians. The *Australian Curriculum: Mathematics* provides students with essential mathematical skills and knowledge in number and algebra, measurement and geometry, and statistics and probability. It develops the numerical capabilities that all students need in their personal, work and civic life, and provides the fundamentals on which mathematical specialties and professional applications of mathematics are built.

Mathematics has its own value and beauty, and the *Australian Curriculum: Mathematics* aims to instil in students an appreciation of the elegance and power of mathematical reasoning. Mathematical ideas have evolved across all cultures over thousands of years and are constantly developing. Digital technologies are facilitating this expansion of ideas and providing access to new tools for continuing mathematical exploration and invention. The curriculum focuses on developing increasingly sophisticated and refined mathematical understanding, fluency, reasoning and problem-solving skills. These proficiencies enable students to respond to familiar and unfamiliar situations by employing mathematical strategies to make informed decisions and solve problems efficiently.

The *Australian Curriculum: Mathematics* ensures that the links between the various components of mathematics, as well as the relationship between mathematics and other disciplines, are made clear. Mathematics is composed of multiple but interrelated and interdependent concepts and systems which students apply beyond the mathematics classroom. In science, for example, understanding sources of error and their impact on the confidence of conclusions is vital, as is the use of mathematical models in other disciplines. In geography, interpretation of data underpins the study of human populations and their physical environments; in history, students need to be able to imagine timelines and time frames to reconcile related events; and in English, deriving quantitative and spatial information is an important aspect of making meaning of texts.

The curriculum anticipates that schools will ensure all students benefit from access to the power of mathematical reasoning and learn to apply their mathematical understanding creatively and efficiently. The mathematics curriculum provides students with carefully paced, in-depth study of critical skills and concepts. It encourages teachers to help students become self-motivated, confident learners through inquiry and active participation in challenging and engaging experiences.

## Content structure: proficiency strands

The proficiency strands are *Understanding*, *Fluency*, *Problem Solving* and *Reasoning*. They describe how content is explored or developed, that is, the thinking and doing of mathematics. They provide the language to build in the developmental aspects of the learning of mathematics and have been incorporated into the content descriptions of the three content strands described above. This approach has been adopted to ensure students’ proficiency in mathematical skills develops throughout the curriculum and becomes increasingly sophisticated over the years of schooling.