

The Mathematics Core Concepts developed and used to frame the Revised Australian Curriculum: Mathematics¹

Mathematical structures

the fundamental elements of mathematical systems, objects, operations and computations and how they are defined and relate to each other. Core concepts critical to understanding mathematical structures are:

- *Foundations* – the building blocks underpinning and supporting mathematical structures
- *Abstractions* – the results of the process of identifying and purposefully paying attention to key aspects of a situation, context, problem or issue and disregarding others that are not seen as relevant to the focus
- *Mathematical systems* – those symbols, objects, operations, variables, relations and functions that provide an interpretation of a structure that can be used in context
- *Mathematical relationships* – how mathematical objects are connected to each other.

Mathematical approaches

the processes and ways of thinking and working with mathematical objects, ideas, structures to conduct experiments and simulations, carry out investigations, apply mathematics to model situations, make deductions and solve problems. Core concepts important to understanding mathematical approaches are:

Manipulating mathematical objects – skills and procedures associated with operations and transformations applied to mathematical structures to efficiently obtain answers, modify existing objects or create new ones, in order to provide a basis for insights and conclusions

- *Generalising* – enabling or providing the description of general rules that flow from operating on and with mathematical objects
- *Mathematical thinking and reasoning* – skills and processes that enable generalisation and the transfer of learning from one context to another and that support effective problem solving, inquiry and other ways of working mathematically
- *Mathematical processes* – skills and processes that require thinking and working mathematically to understand the situation, plan, choose an approach, formulate, apply the relevant mathematics, selecting appropriate and efficient computation strategies, consider results and communicate findings and reasoning; Problem-solving and inquiry approaches that involve thinking and working mathematically include experimenting, investigating, modelling and computational thinking.

Mathematising

the process of seeing the world using mathematics by recognising, interpreting and representing situations mathematically. Core concepts important to mathematising draw on the concepts related to mathematical structures and approaches and are:

- *Making choices* – recognising mathematical structures and making systematic choices about mathematical approaches
- *Pattern recognition* – identifying likeness, coherence, commonality, difference or regularity fundamental to identifying structures, relationships, generalisations and the means for mathematising a problem

¹ These Core Concepts are included in the Consultation Draft of the F-10 Mathematics Curriculum. See the 'introductory material' at the front of the document.

- *Visualising* – forming and thinking about mental images of mathematical objects and the relationships between them
- *Representing* – using words, physical and virtual materials, symbols, drawings, diagrams and graphs to represent abstract mathematical ideas and objects in order to analyse, generalise and communicate mathematically
- *Quantifying* – assigning numerical or qualitative measures to properties of objects and events that can be used to define, measure, compare or interpret the property.

Strand	Code	Content description	Structure	Approaches	Mathematising