

Conceptual understandings

Mathematics Reception to year 10

Version 1.0



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Terminology

The South Australian Department for Education uses the term ‘Aboriginal’ to refer to people who identify as Aboriginal, Torres Strait Islander, or both Aboriginal and Torres Strait Islander. This term is preferred by Aboriginal South Australians and the department.

Knowledge

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Number	Collections and proportions can be quantified through understanding how the “Number” system works (Base-10). Collections and proportions can be quantified using counting strategies. Collections and proportions can be quantified using calculating strategies. Financial literacy understandings and behaviours are used to make financial and consumer decisions.	Collections and proportions can be quantified through understanding how the “Number” system works (Base-10). Collections and proportions can be quantified using counting strategies. Collections and proportions can be quantified using calculating strategies. The “mathematical modelling process” is used to solve practical problems. Financial literacy understandings and behaviours are used to make financial and consumer decisions.	Collections and proportions can be quantified through understanding how the “Number” system works (Base-10). Collections and proportions can be quantified using calculating strategies. The “mathematical modelling process” is used to solve practical problems. Financial literacy understandings and behaviours are used to make financial and consumer decisions.	Collections and proportions can be quantified through understanding how the “Number” system works (Base-10). Collections and proportions can be quantified using estimating and approximating. Collections and proportions can be quantified using calculating strategies. The “computational thinking process” can be used to explore and investigate the properties of numbers. The “mathematical modelling process” is used to solve practical problems. Financial literacy understandings and behaviours are used to make financial and consumer decisions.	Collections and proportions can be quantified through understanding how the “Number” system works (Base-10). Collections and proportions can be quantified using estimating and approximating. Collections and proportions can be quantified using counting strategies. Collections and proportions can be quantified using calculating strategies. The properties of number families, and the relationships between them, can be explored, used and described. The “computational thinking process” can be used to explore and investigate the properties of numbers. The “mathematical modelling process” is used to solve practical problems. Financial literacy understandings and behaviours are used to make financial and consumer decisions.	Collections and proportions can be quantified through understanding how the “Number” system works (Base-10). Collections and proportions can be quantified using estimating and approximating. Collections and proportions can be quantified using calculating strategies. The properties of number families, and the relationships between them, can be explored, used and described. The “computational thinking process” can be used to explore and investigate the properties of numbers. The “mathematical modelling process” is used to solve practical problems. Financial literacy understandings and behaviours are used to make financial and consumer decisions.	Collections and proportions can be quantified through understanding how the “Number” system works (Base-10). Collections and proportions can be quantified using estimating and approximating. Collections and proportions can be quantified using calculating strategies. The properties of number families, and the relationships between them, can be explored, used and described. The “mathematical modelling process” is used to solve practical problems. Financial literacy understandings and behaviours are used to make financial and consumer decisions.

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Algebra	Patterns can be identified, described, represented, generalised and classified.	Patterns can be identified, described, represented, generalised and classified.	Patterns can be identified, described, represented, generalised and classified.	Relationships can be used to solve unknowns.	Relationships can be used to solve unknowns.	Relationships can be used to solve unknowns.	Relationships can be used to solve unknowns. Algebraic techniques can be used to describe and analyse relationships for the purposes of resolving situations.
Measurement	Direct and indirect comparison can be used to describe the size of objects and events. Direct measurement that uses either informal units, formal units or standard measurement systems, can be used to quantify the size of shapes, objects and events.	Direct and indirect comparison can be used to describe the size of objects and events. Direct measurement that uses either informal units, formal units or standard measurement systems, can be used to quantify the size of shapes, objects and events.	Direct measurement that uses either informal units, formal units or standard measurement systems, can be used to quantify the size of shapes, objects and events.	Direct measurement that uses either informal units, formal units or standard measurement systems, can be used to quantify the size of shapes, objects and events.	Direct measurement that uses either informal units, formal units or standard measurement systems, can be used to quantify the size of shapes, objects and events. Indirect measurement strategies can be used to quantify the size of objects using the relationships between measurable attributes to solve problems.	Direct measurement that uses either informal units, formal units or standard measurement systems, can be used to quantify the size of shapes, objects and events. Indirect measurement strategies can be used to quantify the size of objects using the relationships between measurable attributes to solve problems.	Direct measurement that uses either informal units, formal units or standard measurement systems, can be used to quantify the size of shapes, objects and events. Indirect measurement strategies can be used to quantify the size of objects using the relationships between measurable attributes to solve problems.

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Space	Spatial attributes can be used to explore, describe, visualise and classify shapes and objects. Position, locations, pathways and arrangements can be visualised, described and represented.	Spatial attributes can be used to explore, describe, visualise and classify shapes and objects. Position, locations, pathways and arrangements can be visualised, described and represented.	Spatial attributes can be used to explore, describe, visualise and classify shapes and objects. Position, locations, pathways and arrangements can be visualised, described and represented.	Spatial attributes can be used to explore, describe, visualise and classify shapes and objects. Position, locations, pathways and arrangements can be visualised, described and represented.	Spatial attributes can be used to explore, describe, visualise and classify shapes and objects. Position, locations, pathways and arrangements can be visualised, described and represented.	Spatial attributes can be used to explore, describe, visualise and classify shapes and objects. The transformation of shapes and objects can be explored, described, visualised, classified and represented. Position, locations, pathways and arrangements can be visualised, described and represented.	Spatial attributes can be used to explore, describe, visualise and classify shapes and objects. The transformation of shapes and objects can be explored, described, visualised, classified and represented. Position, locations, pathways and arrangements can be visualised, described and represented.
Statistics	Data can be collected and acquired to investigate questions of significance.	Data can be collected and acquired to investigate questions of significance. Data can be organised, interpreted and represented to inform and influence ourselves and others.	Data can be collected and acquired to investigate questions of significance. Data can be organised, interpreted and represented to inform and influence ourselves and others.	Data can be collected and acquired to investigate questions of significance. Data can be organised, interpreted and represented to inform and influence ourselves and others. The “statistical investigation process” can be used to address questions and inform future actions.	Data can be collected and acquired to investigate questions of significance. Data can be organised, interpreted and represented to inform and influence ourselves and others. The “statistical investigation process” can be used to address questions and inform future actions.	Data can be organised, interpreted and represented to inform and influence ourselves and others. The “statistical investigation process” can be used to address questions and inform future actions.	Data can be organised, interpreted and represented to inform and influence ourselves and others. The “statistical investigation process” can be used to address questions and inform future actions.

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Probability	This conceptual understanding begins at year 3.	This conceptual understanding begins at year 3.	This conceptual understanding begins at year 3.	Likelihood can be explored and described. The “probability experiments and simulations process” can be used to investigate questions about uncertainty and the likelihood to determine future actions.	Likelihood can be explored and described. The “probability experiments and simulations process” can be used to investigate questions about uncertainty and the likelihood to determine future actions.	Likelihood can be explored and described. The “probability experiments and simulations process” can be used to investigate questions about uncertainty and the likelihood to determine future actions.	Likelihood can be explored and described. The “probability experiments and simulations process” can be used to investigate questions about uncertainty and the likelihood to determine future actions.

	Year 7	Year 8	Year 9	Year 10
Number	The number system connects integers and other rational numbers through their properties and representations, including powers. Equivalent forms express the same rational quantities and proportional relationships, even when they are written differently. Magnitude, approximation and reasonableness support the interpretation and use of number.	The number system includes rational and irrational numbers that are represented, modelled and manipulated in different forms depending on context and purpose. Exponential notation and laws represent multiplicative relationships and support efficient calculation.	The real number system includes rational and irrational numbers that are represented in related forms.	Exact and approximate representations of real numbers affect the accuracy of calculations, and the choice between them depends on purpose and context.
Algebra	Patterns and relationships between quantities can be expressed in different forms that reflect how quantities depend on and vary with one another.	Equivalent algebraic forms express the same linear relationship, even when operations change how that relationship is written. Linear relationships connect changes in quantities through a constant rate of change across different representations.	Algebraic relationships have distinct patterns of change, with equivalent forms revealing different features of the same relationship.	Algebraic and graphical representations and their connections show relationships, from which patterns may be generalised. Functions and inequalities maintain relationships between quantities and allow manipulation into forms that are fit for purpose.

	Year 7	Year 8	Year 9	Year 10
Measurement	Proportional relationships between measures preserve a constant ratio as quantities vary. Geometric relationships help determine angle and other spatial measures of shapes.	Quantitative relationships between measures support comparison and modelling across contexts. Geometric relationships help determine measures in irregular and composite shapes.	Representations of measure are shaped by scale, models and measurement error. Geometric and trigonometric relationships help determine spatial measures within shapes.	Measurement error and scale can change the interpretation and reliability of measures. Geometric and trigonometric relationships connect spatial measures within and between shapes.
Space	Spatial representations and transformations describe objects, position and movement in space. Classification of shapes depends on their properties and relationships.	Geometric properties, transformations and coordinate systems describe and classify spatial relationships in 2 and 3 dimensions.	Spatial relationships can be analysed to determine what changes, what remains constant and how geometric properties are applied.	Spatial relationships form connected mathematical structures whose properties provide a basis for logical justification and refinement of solutions. Connectedness is determined by relationships and pathways between elements.
Statistics	Statistical representations and summaries highlight features of data distributions, where usefulness depends on the characteristics of the data and context.	The strength of statistical inferences about populations depends on the quality of samples and the method of data collection. Different samples from the same population produce variation in statistical measures.	The strength of statistical conclusions depends on the quality of data collection, analysis and representation. Different representations emphasise different features of data for comparison and interpretation.	The validity of statistical conclusions depends on data quality, representation, bias and the limitations of inference. Comparisons of data and their representations in context can reveal patterns, variations and limitations.
Probability	All possible outcomes of a chance event form a complete set across which probability is distributed. Theoretical probabilities predict the relative frequencies of repeated trials.	All possible combinations of outcomes from multiple events, including complementary, form a complete set across which probability is distributed.	Compound event probabilities are determined by the outcomes and probabilities of related simple events.	Conditional probabilities depend on knowledge of the outcomes of related events.