

Scope and sequence identifies what should be taught and what is important for students to have opportunities to learn. It describes the *knowledge* that students need for ongoing learning in Mathematics. This knowledge is presented as *Concepts and facts* and *Procedures*.

The scope and sequence:

- is provided for each year of schooling
- should be used together with the *Essential Learnings*
- provides additional detail in each Organiser
- informs the focus of Mathematics in assessment
- is a key document for school curriculum planning.

Prep	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
<p>Concepts and facts</p> <ul style="list-style-type: none"> • Chance experiences in familiar situations • Student-generated questions, issues to be resolved, e.g. who can tie their shoelaces? 	<p>Concepts and facts</p> <ul style="list-style-type: none"> • Randomness (a lack of predictable order and pattern in an event) • Observation to collect data to resolve question, issues of interest 	<p>Concepts and facts</p> <ul style="list-style-type: none"> • Uncertainty of occurrence of chance events • Refinement of questions for data collection • Data collection: <ul style="list-style-type: none"> – how, when, how much and conditions • Sources of variation and error • Data displays 	<p>Concepts and facts</p> <ul style="list-style-type: none"> • Predictions about chance events (a selected outcome or subset of all possible outcomes) • Data collection: <ul style="list-style-type: none"> – surveys and observations responding to questions to be explored • Variation in data • Adequacy of data 	<p>Concepts and facts</p> <ul style="list-style-type: none"> • Experimental probability is the number of successful trials (one action in an experiment) divided by the total number of trials, e.g. 5 tails in 20 flips of a coin, 5 divided by 20 • Data collection: <ul style="list-style-type: none"> – experiments exploring chance events – collection methods: tally marks, lists, tables • Effects of variation on conclusions and predictions • Adequacy of data 	<p>Concepts and facts</p> <ul style="list-style-type: none"> • Predictions of the range of possible outcomes (all possible results from a chance experiment) • Data collection: <ul style="list-style-type: none"> – experiments and observations responding to questions about the likelihood of occurrence • Expected and unexpected variation in data sets • Additional data: reasons for, amount required, impact on statements related to data 	<p>Concepts and facts</p> <ul style="list-style-type: none"> • Theoretical probability (the number of outcomes in an event divided by the total number of possible outcomes, e.g. $\frac{1}{2}$ for obtaining a head when tossing a coin) • Probability using experimental data • Sample spaces, e.g. all possible outcomes within an activity or experiment • Frequency: the count of occurrences of an event occurring, e.g. rolling an even number on a die • Predictions based on experimental data • Discrete data: <ul style="list-style-type: none"> – numerical – categorical – count 	<p>Concepts and facts</p> <ul style="list-style-type: none"> • Theoretical probability • Estimation of theoretical probability • Continuous data • Sample data drawn from given populations • Measures of location: mean, median, mode (for discrete data) • Variation • Bias 	<p>Concepts and facts</p> <ul style="list-style-type: none"> • Estimation of probability with equally or unequally likely outcomes • Randomness (lack of predictable order and pattern in an event) • Law of large numbers (as the number of trials increases the experimental probability gets closer to the theoretical probability) • Ways to calculate probability: <ul style="list-style-type: none"> – counting – measuring – symmetry • Sample space: tables, tree diagrams, organised lists • Single events: individual events measuring the likelihood of one thing occurring, e.g. rolling a 5 on a die • Effect of replacement and non-replacement on probability • Data collection: population, sample • Data accuracy • Sources of variation and error <ul style="list-style-type: none"> – explained and unexplained – bias – effects on mean of adding or deleting data 	<p>Concepts and facts</p> <ul style="list-style-type: none"> • Theoretical probability • Experimental probability is the proportion of the number of times an event occurs in an experiment • Inferences and generalisations • Data collection: <ul style="list-style-type: none"> – samples, surveys, experiments, computer simulations, from published data and databases • Compound probability experiment: a chance procedure with more than one stage, e.g. in rolling two dice, the event of getting a four on one die and a six on the other • Simple measures of spread and centre, distribution of responses, outliers • Bins identify the intervals in which the continuous data are grouped (histograms) • Errors in data • Bias
<p>Procedures</p> <ul style="list-style-type: none"> • Classification of the likelihood of familiar events <p>Concrete materials:</p> <ul style="list-style-type: none"> – computers – manipulative materials <p>Verbal:</p> <ul style="list-style-type: none"> – everyday language: might, might not, never happen <p>Written:</p> <ul style="list-style-type: none"> – data display as classified objects and images <p>Visual:</p> <ul style="list-style-type: none"> – photographs – pictorial of chance events 	<p>Procedures</p> <ul style="list-style-type: none"> • Classification of the likelihood of daily events <p>Concrete materials:</p> <ul style="list-style-type: none"> – computers and other electronic devices – manipulative materials – student-generated data recording sheets <p>Verbal:</p> <ul style="list-style-type: none"> – everyday language: always, sometimes, never, will, will not and might happen, maybe, fair, not fair, lucky, unlucky <p>Written:</p> <ul style="list-style-type: none"> – recorded observations as data – lists – simple data displays, e.g. object and people graph <p>Visual:</p> <ul style="list-style-type: none"> – photographs – pictorial of chance events and data collection 	<p>Procedures</p> <ul style="list-style-type: none"> • Classification of the likelihood of daily events • Connections between collected data and interpretations <p>Concrete materials:</p> <ul style="list-style-type: none"> – computers and other electronic devices – manipulative materials – student-generated data recording sheets <p>Verbal:</p> <ul style="list-style-type: none"> – personal opinions as predictions of chance events – question development – explanations of reasoning (data collection, data display, data variation) – mathematical language: likely, unlikely, impossible, variation <p>Written:</p> <ul style="list-style-type: none"> – data collection records – title and label for data display (manual or electronic) <p>Visual:</p> <ul style="list-style-type: none"> – lists – tables – picture and bar graphs 	<p>Procedures</p> <ul style="list-style-type: none"> • Connections between classifications of occurrence and predictions • Connections between collected data displayed data and interpretations <p>Concrete materials:</p> <ul style="list-style-type: none"> – computers and other electronic devices – manipulative materials – student-generated data recording sheets <p>Verbal:</p> <ul style="list-style-type: none"> – personal opinions as predictions of chance events – analytical descriptions of data and variations – explanations of reasoning (data collection, data display, data variation) – mathematical language: likely, unlikely, possible, impossible, variation <p>Written:</p> <ul style="list-style-type: none"> – simple designs for experiments – lists – tables – picture graphs (one-to-many with scale) – horizontal and vertical bar graphs – conventions for data displays: titles, axes, scale <p>Visual:</p> <ul style="list-style-type: none"> – other people's tables and graphs 	<p>Procedures</p> <ul style="list-style-type: none"> • Comparison of the likelihood of events • Classification of data for chance events • Connections between organised data, displayed data and interpretations • Comparison of different data collection methods <p>Concrete materials:</p> <ul style="list-style-type: none"> – computers and other electronic devices – manipulative materials – data record sheets <p>Verbal:</p> <ul style="list-style-type: none"> – explanation of judgments about likelihood – descriptions of efficiencies in data collection methods – descriptions of variations, justified conclusions from data – mathematical language: more likely, less likely, equally likely, most likely, least likely, certain, multiple outcomes, sample space, randomness <p>Written:</p> <ul style="list-style-type: none"> – organised lists – tables including two-way table line graphs <p>Visual:</p> <ul style="list-style-type: none"> – other people's tables and graphs 	<p>Procedures</p> <ul style="list-style-type: none"> • Data collection check • Comparison of data sets <p>Concrete materials:</p> <ul style="list-style-type: none"> – computers and other electronic devices – manipulative materials – data sets <p>Verbal:</p> <ul style="list-style-type: none"> – statements and predictions based on collected data – limitations of collected data – comparative and quantitative language – describing data displays – mathematical language: more likely, less likely, equally likely, most likely, least likely, certain, multiple outcomes, sample space, randomness <p>Written:</p> <ul style="list-style-type: none"> – scatter plots – other people's tables and graphs 	<p>Procedures</p> <ul style="list-style-type: none"> • Comparison between: <ul style="list-style-type: none"> – expected and observed numerical outcomes – experimental data with theoretical probability, e.g. data gathered after rolling a die 50 times with the theoretical probability of it landing on a 6 – data sets for accuracy • Classification of discrete data for chance events: numbered or categories • Connections between questions with data needed to answer them • Concrete materials: <ul style="list-style-type: none"> – computers and other electronic devices, e.g. random number generator for chance – manipulative materials • Verbal: <ul style="list-style-type: none"> – conclusions from data – informal inferences developed, justified and critiqued – mathematical language: impossible, certain, bias, more/less spread out, clumped, majority, "average" (colloquial use with visual estimate), maximum, minimum, frequency, relative frequency, theoretical probability, discrete data • Written: <ul style="list-style-type: none"> – spreadsheets – calculations of probability as key percentages between 0% and 100% – plans and methods for data collection – summarised and represented data – design of data record templates according to question and type of data – scatter graphs (dot plots) • Visual: <ul style="list-style-type: none"> – other people's tables and graphs 	<p>Procedures</p> <ul style="list-style-type: none"> • Comparison of: <ul style="list-style-type: none"> – how often an event occurs with the number of trials performed (relative frequency) – experimental probability with theoretical probability – experimental data and expected data • Summarisation of data <p>Concrete materials:</p> <ul style="list-style-type: none"> – computers and other electronic devices, e.g. random number generator for chance – manipulative materials <p>Verbal:</p> <ul style="list-style-type: none"> – subjective and numerical judgments – probability expressed as per cent, fraction, decimal – description of continuous data as distributions of quantities – conclusions from data, developed, justified and critiqued – sources of bias – mathematical language: equally/unequally likely, spread, range, extremes (maximum/minimum), frequency, relative frequency <p>Written:</p> <ul style="list-style-type: none"> – spreadsheets – frequency table – calculations of probability as key percentages between 0% and 100%, common fractions $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$ and decimal fractions between 0 and 1, e.g. 50%, $\frac{1}{2}$, 0.5 – data representations (two-way table, pie chart, bar or line graph) – plans and methods for data collection and recording – displays to illustrate data features and variation <p>Visual:</p> <ul style="list-style-type: none"> – other people's tables and graphs 	<p>Procedures</p> <ul style="list-style-type: none"> • Links between experimental and theoretical probability • Comparison of probabilities <p>Concrete materials:</p> <ul style="list-style-type: none"> – computers and other electronic devices, e.g. random number generator for chance – manipulative materials – published data – databases <p>Verbal:</p> <ul style="list-style-type: none"> – random – reasonableness of probability estimates – comparisons and predictions with supporting data – limitations of measures of central tendency – spread, shape, e.g. asymmetry, unusual features – conclusions from data developed, justified and critiqued – mathematical language: key properties of numerical data (centre, spread, shape, extremes), compound events, multi-outcome events, sample data <p>Written:</p> <ul style="list-style-type: none"> – spreadsheets – probability values from sample spaces – histograms (numerical data) – stem and leaf plots – tree diagrams and tables – organised lists <p>Visual:</p> <ul style="list-style-type: none"> – commercial and other people's tables and graphs 	<p>Procedures</p> <ul style="list-style-type: none"> • Comparison of theoretical and experimental probability • Data analysis <p>Concrete materials:</p> <ul style="list-style-type: none"> – computers and other electronic devices, e.g. random number generator for chance – manipulative materials <p>Verbal:</p> <ul style="list-style-type: none"> – effect of bias – biased judgments – effects of anomalous data on measures of location – limitations of findings and judgments – responses to claims and questions – mathematical language: fair, unfair, conditional probability, measures of location, categorical data, proportion, mode, census data <p>Written:</p> <ul style="list-style-type: none"> – spreadsheets – two-way table – tree diagrams – histograms – stem and leaf plots – refined questions to guide study – displays selected to highlight features <p>Visual:</p> <ul style="list-style-type: none"> – commercial and other people's tables and graphs