Alberta's Program of Studies (Curriculum) - Mathematics - Statistics and Probability (Strand and Sub-strands)

Note: These strands are not intended to be discrete units of instruction. The integration of outcomes across trands makes mathematical experiences meaningful. Students should make the connection between concepts both within and across strands.

PROGRESSION IS HIGHLIGHTED IN THE FOLLOWING DOCUMENT VIA **BOLDED TEXT**.

MATHEMATICAL PROCESSES

There are critical components that students must encounter in a mathematics program in order to achieve the goals of mathematics education and embrace lifelong learning in mathematics.

MATHEMATICAL PROCESS	Communication [C]	Connections [CN]	Mental Mathematics and Estimation [ME]	Problem Solving [PS]	Reasoning [R]	Technology [T]	Visualization [V]
Students are expected to	communicate in order to learn and express their understanding	connect mathematical ideas to other concepts in mathematics, to everyday experiences and to other disciplines	demonstrate fluency with mental mathematics and estimation	develop and apply new mathematical knowledge through problem solving	develop mathematical reasoning	select and use technologies as tools for learning and for solving problems	develop visualization skills to assist in processing information, making connections and solving problems

Sub-strand: Data Analysis

Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9
General Outcome: N/A						**General Outcome:** Collect, display and analyze data to solve problems.			
Specific Outcome *It is expected that students will:*	**Specific Outcome** *It is expected that students will:*	**Specific Outcome** *It is expected that students will:*	**Specific Outcome** *It is expected that students will:*	**Specific Outcome** *It is expected that students will:*	**Specific Outcome** *It is expected that students will:*	**Specific Outcome** *It is expected that students will:*	**Specific Outcome** *It is expected that students will:*	**Specific Outcome** *It is expected that students will:*	**Specific Outcome** *It is expected that students will:*
N/A	N/A	**1. Gather and record data about self and others to answer questions.** [C, CN, PS, V] [ICT: C4–1.3, C7–1.1]	1. Collect **first-hand** data and organize it using: • **tally marks** • **line plots** • **charts** • **lists** to answer questions. [C, CN, PS, V] [ICT: C4–1.3]	1. **Demonstrate an understanding of many-to-one correspondence.** [C, R, T, V] [ICT: C6–2.2, C6–2.3]	1. **Differentiate between** first-hand and **second-hand** data. [C, R, T, V] [ICT: C1–2.2, P5–2.3]	**Select, justify and use appropriate methods of** collecting data, including: • **questionnaires** • **experiments** • **databases** • **electronic media**. [C, CN, PS, R, T] [ICT: C4–2.2, C6–2.2, C7–2.1, P2–2.1, P2–2.2]	1. **Demonstrate an understanding of central tendency and range by:** • **determining the measures of central tendency (mean, median, mode) and range** • **determining the most appropriate measures of central tendency to report findings.** [C, PS, R, T] [ICT: P2–3.4]	1. **Critique ways in which** data is presented in circle graphs, line graphs, bar graphs and pictographs. [C, R, T, V] [ICT: C7–3.1, C7–3.2, F4–3.3]	1. **Describe the effect of:** • **bias** • **use of language** • **ethics** • **cost** • **time and timing** • **privacy** • **cultural sensitivity** **on** the collection of data. [C, CN, R, T] [ICT: F4–3.2, F4–3.3]
		2. Construct and interpret concrete graphs and pictographs to solve problems. [C, CN, PS, R, V] [ICT: C7–1.3]	2. Construct, **label** and interpret **bar** graphs to solve problems. [C, PS, R, V] [ICT: C4–1.3, C7–1.3, C7–1.4]	2. Construct and interpret pictographs and bar graphs **involving many-to-one correspondence** to **draw conclusions**. [C, PS, R, V]	2. Construct and interpret **double** bar graphs to draw conclusions. [C, PS, R, T, V] [ICT: C6–2.2, P5–2.3]	1. **Create**, label and interpret **line** graphs to draw conclusions. [C, CN, PS, R, V]	2. **Determine the effect on the mean, median and mode when an outlier is included in a data set**. [C, CN, PS, R]		2. **Select and defend the choice of using either a population or a sample of a population** to answer a question. [C, CN, PS, R]
						3. Graph collected data, and **analyze** the graph to solve problems. [C, CN, PS, R, T] [ICT: C6–2.5, C7–2.1, P2–2.1, P2–2.2]	3. Construct, label and interpret **circle** graphs to solve problems. [C, CN, PS, R, T, V] [ICT: P2–3.3]		3. **Develop and implement a project plan for the** collection, display and analysis of data by: • **formulating** a question **for investigation** • **choosing** a data collection method **that includes social considerations** • **selecting a population or a sample** • collecting the data • displaying the collected data **in an appropriate manner** • drawing conclusions **to** answer **the** question. [C, PS, R, T, V] [ICT: C1–3.5, C4–3.1, C6–3.1, C6–3.2, C7–3.1, C7–3.2, P1–3.4, P2–3.1]

Sub-Strand: Chance & Uncertainty

General Outcome: N/A	General Outcome: N/A				General Outcome: Use experimental or theoretical probabilities to represent and solve problems involving uncertainty.				
Specific Outcome	**Specific Outcome**	**Specific Outcome**	**Specific Outcome**	**Specific Outcome**	**Specific Outcome**	**Specific Outcome**	**Specific Outcome**	**Specific Outcome**	**Specific Outcome**
N/A	N/A	N/A	N/A	N/A	3. Describe **the likelihood of a single outcome occurring,using words such as:** • **impossible** • **possible** • **certain**. [C, CN, PS, R]	4. **Demonstrate an understanding of probability by:** • **identifying all possible outcomes of a probability experiment** • **differentiating between experimental and theoretical probability** • **determining the theoretical probability of outcomes in a probability experiment** • **determining the experimental probability of outcomes in a probability experiment** • **comparing experimental results with the theoretical probability for an experiment**. [C, ME, PS, T] [ICT: C6–2.1, C6–2.4]	4. **Express** probabilities **as ratios, fractions and percents**. [C, CN, R, T, V] [ICT: P2–3.4]	2. Solve problems involving the probability of independent events. [C, CN, PS, T] [ICT: P2–3.4]	4. Demonstrate an understanding of the **role of** probability **in society**. [C, CN, R, T] [ICT: F4–3.3]
					4. **Compare the likelihood of two possible outcomes occurring, using words such as:** • **less likely** • **equally likely** • **more likely**. [C, CN, PS, R]		5. **Identify the sample space (where the combined sample space has 36 or fewer elements) for** a probability experiment involving **two independent events**. [C, ME, PS]		
							6. **Conduct** a probability experiment **to compare** the theoretical probability **(determined using a tree diagram, table or other graphic organizer)** and experimental probability **of two independent events**. [C, PS, R, T] [ICT: C7–3.2, P2–3.4]		