

Competencies in

MATHEMATICS

Competencies are combinations of attitudes, skills, and knowledge that students develop and apply for successful learning, living, and working. In learning environments, competencies help students achieve learning outcomes and transfer their learning to new situations. The following are examples that describe how competencies may be expressed within the context of *Alberta's Kindergarten to Grade 12 Mathematics Programs of Study*.

CRITICAL THINKING in mathematics involves using inductive, deductive, or inferential reasoning and/or criteria to synthesize or evaluate mathematical ideas.

Students

- develop and/or verify mathematical ideas and relationships through reasoning
- use criteria to analyze or validate mathematical processes, solutions, claims, or proofs
- investigate the impact of assumptions on mathematical processes, solutions, or conclusions
- approach the study of mathematics with open-mindedness

MANAGING INFORMATION in mathematics involves selecting from a diverse set of tools to collect, organize, represent, or share mathematical information and ideas.

Students

- identify and collect pertinent information to make sense of mathematical ideas in a variety of settings
- use appropriate tools to represent, model, or share mathematical information or ideas
- organize information to purposefully and clearly represent mathematical relationships or trends
- consider accuracy, reliability, and integrity when representing mathematical information

PROBLEM SOLVING in mathematics involves selecting processes or strategies to bring mathematical problems to a conclusion.

Students

- engage prior knowledge or experience to define the parameters of mathematical problems
- select, apply, and revise mathematical strategies to solve problems in novel contexts
- recognize and accept that mathematical problems may lead to multiple solutions or no solutions
- demonstrate tenacity and perseverance to iteratively adjust and refine strategies or processes in mathematics

CREATIVITY AND INNOVATION in mathematics involves applying flexible thinking and approaches to connect or extend understandings of mathematical ideas in new ways.

Students

- take risks and think flexibly to try or create different mathematical approaches
- play with ideas to make connections between mathematical concepts to discover new relationships
- construct models to represent mathematical ideas or information
- show that mathematical proofs are a creative endeavour that evolve with new understandings and knowledge
- develop an appreciation of the inherent beauty and elegance in mathematics

COMMUNICATION in mathematics involves using a variety of means to clearly express, interpret, and share mathematical ideas and relationships with others.

Students

- consider audience and purpose when communicating mathematical ideas and relationships
- represent mathematical ideas and relationships to precisely and accurately explain, justify, or verify concepts
- use mathematical language (vocabulary, symbols, etc.) that are appropriate for the context
- demonstrate respect and responsibility when contributing to dialogue about mathematical ideas

CULTURAL AND GLOBAL CITIZENSHIP in mathematics involves appreciating how mathematics is shaped by and can be used to describe and/or influence interactions in cultural, economic, environmental, and social systems.

Students

- understand how mathematical knowledge is developed, expressed, and applied in a variety of ways across different cultures
- apply mathematical ideas and knowledge to identify, describe, and address issues relevant to local and global contexts
- consider the ethical implications of decisions made based on mathematical claims

COLLABORATION in mathematics involves contributing to a culture of inquiry and learning to develop and apply understandings about mathematics.

Students

- share mathematical strategies and thinking to effectively empower and enable peers
- accept and consider a range of ideas and approaches to respect, honour, and learn from others' perspectives and thinking
- reflect on what they have learned from others to further understandings of mathematical ideas, relationships, strategies, and approaches

PERSONAL GROWTH AND WELL-BEING in mathematics involves using mathematics to make informed decisions related to personal life experiences.

Students

- apply understandings in mathematics to make informed decisions, support personal choices, or set goals in daily living
- recognize that investigating mistakes productively leads to improving understandings in mathematics and in other areas of living and learning
- approach learning in mathematics with a positive attitude that develops confidence by building upon strengths