

## BIG IDEAS

The desire and need to learn mathematical concepts is nurtured through experiential learning.

**Visualization** is essential in making sense of contextual problems.

Contextual problems are situational, and transferring mathematical skills between problems requires conceptual understanding.

Proportional reasoning enables us to make sense of multiplicative relationships and is frequently used when analyzing contextual problems.

Measuring naturally lends itself to the use of concrete materials and of measurement skills and tools in a contextual way.

## Learning Standards

Curricular Competencies	Content
<p><i>Students are expected to be able to do the following:</i></p> <p><b>Reasoning and analyzing in a contextual environment</b></p> <ul style="list-style-type: none"> <li>Engage in <b>spatial reasoning</b></li> <li>Use <b>reasoning and logic</b> to analyze and apply mathematical ideas</li> <li><b>Estimate</b> reasonably</li> <li>Use <b>tools or technology</b> to analyze relationships and test conjectures</li> <li><b>Model</b> mathematics in contextualized experiences</li> </ul> <p><b>Understanding and solving in a contextual environment</b></p> <ul style="list-style-type: none"> <li>Develop, demonstrate, and apply <b>conceptual understanding</b> of mathematical ideas</li> <li><b>Visualize</b> to explore and illustrate mathematical concepts and relationships</li> <li>Apply <b>flexible strategies</b> to solve problems in contextualized situations</li> <li>Engage in problem-solving <b>experiences</b> that are connected to place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures</li> </ul> <p><b>Communicating and representing in a contextual environment</b></p> <ul style="list-style-type: none"> <li>Communicate mathematical thinking</li> <li>Use mathematical vocabulary and language</li> <li><b>Represent</b> mathematical ideas in a variety of ways</li> <li>Explain and justify mathematical ideas</li> </ul>	<p><i>Students are expected to know applications of the following:</i></p> <ul style="list-style-type: none"> <li><b>measuring</b>, including tools with graduated scales and conversions using metric and imperial</li> <li>similar <b>triangles</b>, including right- angle trigonometry</li> <li>Pythagorean theorem</li> <li>2D and 3D shapes, including area, surface area, volume, and nets</li> <li>model and draw <b>3D objects</b> and their views (isometric drawing, orthographic projection)</li> <li><b>relationships</b> in formulae</li> <li>math <b>research project</b></li> <li>circle geometry</li> </ul>

Learning Standards (continued)

Curricular Competencies	Content
<p><b>Connecting and reflecting in a contextual environment</b></p> <ul style="list-style-type: none"> <li>• <b>Reflect</b> on mathematical thinking</li> <li>• Use mathematics to support personal choices</li> <li>• Connect mathematical concepts to each other and to <b>other areas and personal interests</b></li> <li>• <b>Incorporate</b> First Peoples worldviews and perspectives to <b>make connections</b> to mathematical concepts</li> </ul>	

Big Ideas – Elaborations	MATHEMATICS — Apprenticeship Grade 12
<p><b>Visualization:</b></p> <ul style="list-style-type: none"> <li>• helps us process information, make connections, and solve problems.</li> </ul>	

Curricular Competencies – Elaborations

**spatial reasoning:**

- being able to think about shapes (real or imagined) and to mentally transform these shapes in order to notice relationships

**reasoning and logic:**

- inductive and deductive reasoning
- predicting, generalizing, drawing conclusions through experiences including puzzles, games, and coding

**Estimate:**

- being able to defend the reasonableness of an estimate across mathematical contexts

**tools or technology:**

- physical and digital tools, including coordinate grids
- dynamic software for architectural and/or interior design

**Model:**

- using concrete materials and dynamic interactive technology

**conceptual understanding:**

- developed through playing with ideas, inquiry, and problem solving

**Visualize:**

- includes dynamic visualizations such as graphical relationships, simulations

**flexible strategies:**

- from a repertoire of strategies, choosing an appropriate strategy to solve problems (e.g., guess and check, model, solve a simpler problem, use a chart, use diagrams, role-play)

**experiences:**

- includes context, strategies and approaches, language across cultures

**Represent:**

- concretely, pictorially, symbolically, including using models, tables, graphs, words, numbers, symbols

**Reflect:**

- sharing the mathematical thinking of self and others, including evaluating strategies and solutions, extending, posing new problems and questions

**other areas and personal interests:**

- to develop a sense of how mathematics helps us understand ourselves and the world around us (e.g., daily activities, local and traditional practices, the environment, popular media and news events, social justice, cross-curricular integration)

**Incorporate:**

- Collaborate with local First Peoples Elders and knowledge keepers.

Curricular Competencies – Elaborations

**make connections:**

- Bishop’s cultural practices: counting, measuring, locating, designing, playing, explaining ([http://www.csus.edu/indiv/o/oreyd/ACP.htm\\_files/abishop.htm](http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm))
- [www.aboriginalaeducation.ca](http://www.aboriginalaeducation.ca)
- *Teaching Mathematics in a First Nations Context*, FNESC (<http://www.fnesc.ca/resources/math-first-peoples/>)

Content – Elaborations

**measuring:**

- unit analysis
- precision and accuracy
- Units are broken down into smaller divisions to get more precise measurements.

**triangles:**

- in contextual examples such as stairs and roofs

**3D objects:**

- creating and reading various types of technical drawings

**relationships:**

- Find a formula of interest and explore the relationship between variables. When you change (e.g., double) a variable, what happens to other variables?

**research project:**

- Research and give a presentation on the math involved in a trade of your choice.
- Create a proportional reasoning example in a trade of your choice.