Foundations for College Mathematics, Grade 12 (MAP4C)
Course Description

Course Title: Foundations for College Mathematics
Course Code: MAP4C
Grade: 12
Course Type: College
Credit Value: 1.0
Prerequisite: MBF3C or MCF3M or MCR3U

- **This course builds on** your knowledge from grade 11 College mathematics
- **It leads you** on a direct path to college
- **This can lead you to many careers such as:** Baker, Practical Nursing, Personal Care Attendant, Veterinary Technician

Official Ontario Ministry of Education secondary curriculum available here:
http://www.edu.gov.on.ca/eng/curriculum/secondary/math.html

This course focuses on four main strands:

Mathematical Models

Personal Finance

Geometry and Trigonometry

Data Management

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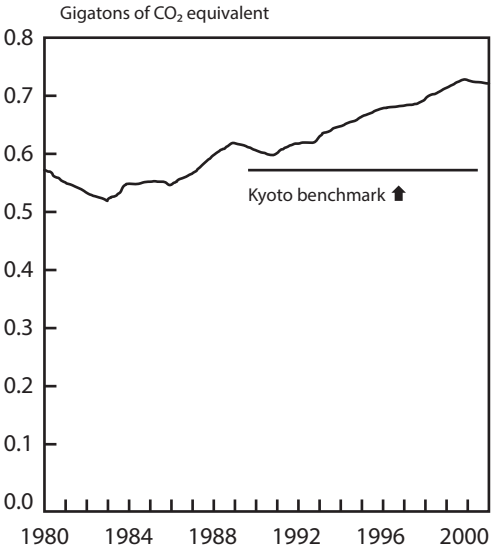
Mathematical Models:

Students will study exponent laws, solve equations with exponents and explore exponential relations with real-world applications, such as the nuclear decay of an element over time. They will also use graphing technology to analyze and interpret graphs, including lines, parabolas and exponential graphs. This will allow them to solve problems like this:

Given the following graph, describe the trend in Canadian greenhouse gas emissions over the time period shown. Describe some factors that may have influenced these emissions over time. Predict the emissions today, explain your prediction using the graph and possible factors, and verify using current data.

Canadian Greenhouse Gas Emissions



Source: Environment Canada, Greenhouse Gas Inventory 1990-2001, 2003

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Personal finance:

Students will learn about simple interest, compound interest and annuities, including mortgage calculations. They will also learn about budgeting and the different costs associated with owning and renting accommodations. Emphasis is placed on students realizing how all of these factors affect their personal finances through problems like this:

> Determine, through investigation, whether it is possible to change from renting to owning accommodation in your community in five years if you currently earn $30 000 per year, pay $900 per month in rent, and have savings of $20,000.

Yearly Rent -> 900 x 12 = $10,800

If $2,000 is saved every year then total savings after
5 years -> 20,000 + 5(2,000) = $30,000

In 5 years a house could be purchased with a downpayment
of $30,000 and a monthly mortgage of $1,000

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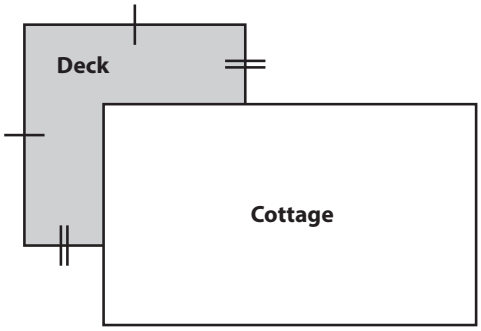
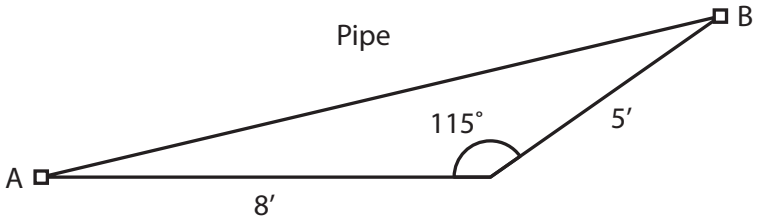
Geometry and trigonometry:

Students will use 2D and 3D measurement to solve problems like this:

> You are building a deck attached to the second floor of a cottage, as shown below. Investigate how perimeter varies with different dimensions if you build the deck using exactly 48 decking sections each measuring 1 m X 1 m, and how area varies if you use exactly 30 m of deck railing. Note: The entire outside edge of the deck will be railed.



Students will also solve problems involving triangles using trigonometric ratios in different contexts. For example a plumber must cost a pipe to fit from A to B, determine the length of the pipe.



$$AB^2 = 8^2 + 5^2 - 2(8)(5)\cos 115^\circ$$

$$AB = \sqrt{8^2 + 5^2 - 2(8)(5)\cos 115^\circ}$$

$$= 11.1'$$

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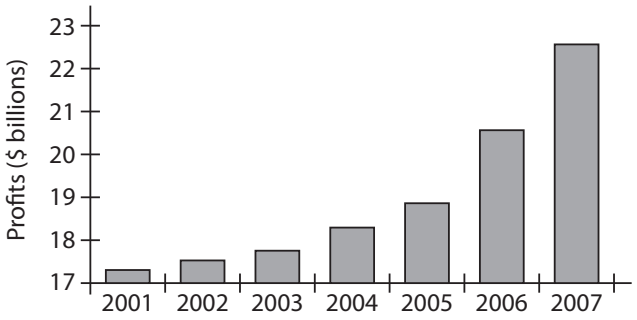
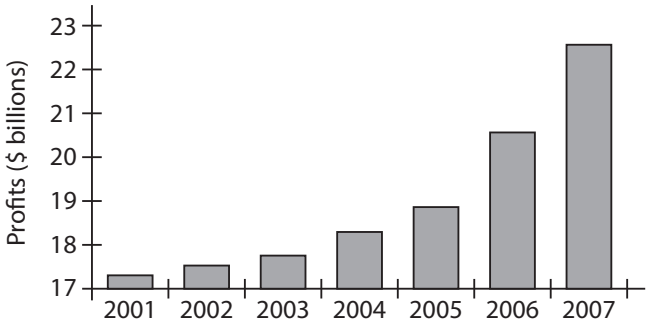
Data management:

Students will calculate such things as weighted averages, percentage changes, per capita and percentiles. They will also study the media's use of graphs and statistics and how they can be used to influence public opinion, such as polling numbers during political campaigns. Sample problems include assessing why the headline "Big Increase in Profits" that accompanies the following graph may or may not be true.



Problem: Bill stumbled across the following graph when reading a newspaper article about a company he was thinking about investing in. The article was talking about the massive growth in profits that the company has had recently and why the company will continue to grow based on the trends in the graph. What are some reasons Bill has to be skeptical about these claims?

Solution:



- Graph makes 17 billion appear to be zero

- Actual year by year growth 02 < 1 billion
  03 < 1 billion
  04 < 1 billion
  05 < 1 billion
  06 ~ 1 billion
  07 ~ 1 billion

- So while large numbers they haven't actually seen "huge growth"

- Not exactly a trend that can be extrapolated, need more data