

Duration	<i>7 hours</i>
Overall expectations	<p>GEOMETRY AND TRIGONOMETRY</p> <p>2. Solve problems involving trigonometry in acute triangles using the sine law and the cosine law, including problems arising from real-world applications.</p> <p>MATHEMATICAL MODELS</p> <p>1. Make connections between the numeric, graphical, and algebraic representations of quadratic relations, and use the connections to solve problems;</p> <p>DATA MANAGEMENT</p> <p>2. Determine and represent probability, and identify and interpret its applications.</p>
Specific expectations	<p>MATHEMATICAL PROCESS EXPECTATIONS</p> <ul style="list-style-type: none"> • develop, select, apply, compare, and adapt a variety of problem-solving strategies as they pose and solve problems and conduct investigations, to help deepen their mathematical understanding; • develop and apply reasoning skills (e.g., use of inductive reasoning, deductive reasoning, and counter-examples; construction of proofs) to make mathematical conjectures, assess conjectures, and justify conclusions, and plan and construct organized mathematical arguments; • select and use a variety of computational strategies to investigate mathematical ideas and to solve problems; • make connections among mathematical concepts and procedures, and relate mathematical ideas to situations or phenomena drawn from other contexts (e.g., other curriculum areas, daily life, current events, art and culture, sports); <p>GEOMETRY AND TRIGONOMETRY</p> <p>1.1 recognize and describe real-world applications of geometric shapes and figures, through investigation (e.g., by importing digital photos into dynamic geometry software), in a variety of contexts (e.g., product design, architecture, fashion), and explain these applications (e.g., one reason that sewer covers are round is to prevent them from falling into the sewer during removal and replacement)</p> <p>2.1 solve problems, including those that arise from real-world applications (e.g., surveying, navigation), by determining the measures of the sides and angles of right triangles using the primary trigonometric ratios</p> <p>2.4 solve problems that arise from real-world applications involving metric and imperial measurements and that require the use of the sine law or the cosine law in acute triangles</p> <p>MATHEMATICAL MODELS</p> <p>1.1 construct tables of values and graph quadratic relations arising from real-world applications (e.g., dropping a ball from a given height; varying the edge length of a cube and observing the effect on the surface area of the cube)</p> <p>1.2 determine and interpret meaningful values of the variables, given a graph of a quadratic relation arising from a real-world application</p> <p>1.3 determine, through investigation using technology, the roles of a, h, and k in quadratic relations of the form $y = a(x - h) + k$, and describe these roles in terms of transformations on the graph of $y = x$ (i.e., translations; reflections in the x-axis; vertical stretches and compressions to and from the x-axis)</p> <p>1.4 sketch graphs of quadratic relations represented by the equation $y = a(x - h) + k$ (e.g., using the</p>

	<p>vertex and at least one point on each side of the vertex; applying one or more transformations to the graph of $y = x$)</p> <p>1.5 expand and simplify quadratic expressions in one variable involving multiplying binomials [e.g., $(x + 1)(3x - 2)$] or squaring a binomial [e.g., $5(3x - 1)$], using a variety of tools (e.g., paper and pencil, algebra tiles, computer algebra systems)</p> <p>1.6 express the equation of a quadratic relation in the standard form $y = ax + bx + c$, given the vertex form $y = a(x - h) + k$, and verify, using graphing technology, that these forms are equivalent representations</p> <p>1.7 factor trinomials of the form $ax + bx + c$, where $a = 1$ or where a is the common factor, by various methods</p> <p>1.8 determine, through investigation, and describe the connection between the factors of a quadratic expression and the x-intercepts of the graph of the corresponding quadratic relation</p> <p>1.9 solve problems, using an appropriate strategy (i.e., factoring, graphing), given equations of quadratic relations, including those that arise from real-world applications (e.g., break-even point)</p> <p>DATA MANAGEMENT</p> <p>2.2 determine the theoretical probability of an event (i.e., the ratio of the number of favourable outcomes to the total number of possible outcomes, where all outcomes are equally likely), and represent the probability in a variety of ways (e.g., as a fraction, as a percent, as a decimal in the range 0 to 1)</p> <p>2.4 compare, through investigation, the theoretical probability of an event with the experimental probability, and explain why they might differ</p>
<p>Catholic graduate expectations (if applicable)</p>	<p>CGE2c -presents information and ideas clearly and honestly and with sensitivity to others;</p> <p>CGE3c -thinks reflectively and creatively to evaluate situations and solve problems;</p> <p>CGE3e -adopts a holistic approach to life by integrating learning from various subject areas and experience;</p> <p>CGE4b -demonstrates flexibility and adaptability;</p> <p>CGE4f -applies effective communication, decision-making, problem-solving, time and resource management skills;</p> <p>CGE5b -thinks critically about the meaning and purpose of work;</p> <p>CGE5e -respects the rights, responsibilities and contributions of self and others;</p> <p>CGE5h -applies skills for employability, self-employment and entrepreneurship relative to Christian vocation.</p>

Essential Skills and work habits	<p><i>Check off the Essential Skills and work habits that are addressed in this CLA.</i></p> <ul style="list-style-type: none"> • Reading Text • Writing • Document Use • Computer Use • Oral Communication • Numeracy <ul style="list-style-type: none"> ○ <u>Money Math:</u> ○ <u>Scheduling or Budgeting and Accounting:</u> ○ <u>Measurement and Calculation:</u> ○ <u>Data Analysis:</u> ○ <u>Numerical Estimation:</u> • Thinking Skills <ul style="list-style-type: none"> ○ <u>Job Task Planning and Organizing</u> ○ <u>Decision Making</u> ○ <u>Problem Solving .</u> ○ <u>Finding Information</u> • Working Safely • Teamwork • Reliability • Working Independently • Initiative • Self-advocacy • Customer Service • Entrepreneurship
---	---

Instructional/Assessment Strategies

Teacher's notes

These materials can be use in whole or in part. Teachers can deliver this as a review of specific concepts and the applicability to the fire fighting profession, or they can separate the modules into pieces that can be used in a unit on trigonometry/geometry and quadratics.

Context

The material contained within this CLA is designed to provide the student with an understanding of how math is used within the firefighting profession.

Strategies

Module 1 – Conversions used by fire fighters

- *Book guest speaker*
- *Outdoor exploration of measurement and conversions*
- *Student practice throughout*

Module 2 – How fire spreads

- *Teacher instruction covering terminology and concepts including rate of spread (ROS), slope of terrain & flame, and other factors effecting ROS.*
- *Student practice throughout.*

Module 3 -- Stopping fire in its track

- *Review of quadratic concepts*
- *Student application of concepts to fire fighting*

Teacher may need to adjust speed and delivery method based on success of students on worksheets.

Assessment and Evaluation of Student Achievement

(List all assessment and evaluation strategies and tasks and attach handouts, tests, assignments, exercises, etc.)

Strategies/Tasks <i>(add rows as required)</i>	Purpose <i>Assessment for Learning (diagnostic, formative) Assessment of Learning (summative, evaluation)</i>
1. Teacher observation	Diagnostic
2. Student/Teacher dialogue	Diagnostic & Formative
3. Student Worksheets	Fomative/Summative
Assessment tools <i>See rubric included</i>	

Additional Notes/Comments/Explanations

Use business education partnership to book speaker

Break CLA into piece and incorporate into units taught by the teacher. (ie Module 3 completed after quadratics unit has been taught.)

Teacher resource material is attached – can be used to familiarise the teacher with terminology, can be used to create overheads, or can be used by the teacher to generate their own ideas

Resources**Authentic workplace materials**

Tape measure

Pen pencil

Calculators

Human resources**Firefighter (guest speaker)****Print***Resources attached*

- *Teacher lesson plans*
- *Teacher resource package*
- *Student worksheets*

Websites**Slope pictures courtesy of...**

http://www.dudh.gov.bt/Thimphustructural/images/slope_view.jpg&imgrefurl

<http://www.bbc.co.uk/derby/content/images/2006/07/18/>

<http://www.kidsgeo.com/images/landform-slope.jpg&imgrefurl>

<http://montanarvcampgrounds.com/gallatin-national-forest>

http://learnline.cdu.edu.au/units/sbi263/fundamentals/regime.html&usg=__gsAnHfzIHMEsTqYdDmgiaPcrI7U=&h=266&w=400&sz=86&hl=en&start=29&ei=BMh3TPnCM8emngerj4z4AQ&oei=o8d3TJG0Co3QsAOChlGtBQ&esq=3&page=3&ndsp=16&ved=1t:429,r:11,s:29&biw=1004&bih=566

<http://www.fmglobal.com/assets/images/library/download/Fireslope.jpg&imgrefurl>

<http://www.meted.ucar.edu/fire/s290/unit12/media/graphics/P6040018.jpg&imgrefurl>

Firefighting images courtesy of ...

http://www.niedner.com/uploads/niedner_product.image1/Japon%25202009_0513.JPG&imgrefurl

<http://cache3.assetcache.net/xc/2474314.jpg%3Fv%3D1%26c%3DIWSAsset%26k%3D2%26d%3D77BFBA49EF878921F7C3FC3F69D929FD3D6E8E2>

http://blog.mlive.com/news_impact/2008/11/large_20081117-ap-california-wildfire-firefighter-fire-water-hose.jpg&imgrefurl

Accommodations

(List instructional, environmental, and assessment accommodations.)

Use pairs or groups to help chunk material and make it more attainable for struggling students.

List of Attachments

- *Teacher lesson plans*
- *Teacher resource package*
- *Student worksheets*