A. Lesson Context

BIG PICTURE of this UNIT:	• How & why do we build NEW knowledge in Mathematics? • What NEW IDEAS & NEW CONCEPTS can we now explore with specific references to QUADRATIC FUNCTIONS? • How can we extend our knowledge of FUNCTIONS, given our BASIC understanding of Functions?		
CONTEXT of this LESSON:	Where we've been In Lessons 5 & 6, you worked with quadratic MODELS in word problems in the form of $y = \boldsymbol{a}(x - \boldsymbol{h})^2 + \boldsymbol{k}$	Where we are HOW do we connect the standard & vertex form of quadratic models?	Where we are heading How do we extend our knowledge & skills of quadratic functions, given the new ideas & concepts we now know about functions.

B. Lesson Objectives

a. Understand various strategies that can be applied to quadratic equations in standard (and other) forms in order to convert them to vertex form
b. Apply these strategies to quadratic models in variety of contexts

C. Fast Five (Skills Review Focus)

Find the axis of symmetry of the parabola $y = 2x^2 - 8x + 1$

Factor the expression $x^2 + 6x - 7$

A parabola with the equation of $y = a(x - 1)^2 + k$ goes through the points (-1,-9) and (1,1). Find the values of a and k.

AP/HL A parabola with the equation of $y = a(x - h)^2 - 2$ goes through the points (1,2) and (-5,-1). Find the values of a and h.

D. Algebraic Strategies & Skills To Find a Vertex/Optimal Value

(a) factoring ➔ example $y = x^2 – 2x - 15$

(b) axis of symmetry ➔ example $y = x^2 – 2x + 11$

(c) partial factoring

➔ example $f(x) = 2x^2 – 5x + 1 = x(2x – 5) + 1$

Evaluate f(0) as well as f(2.5) …..

➔ example $y = 3x^2 + 15x + 3$

(d) AP/HL ➔ symmetry ➔ a parabola goes through (3,-4) and (9,-4) and has a y-intercept of -5. Find the optimal value of the function

PRACTICE: Nelson 10 Chap 5.6, p301, Q1,2,3,4,5ab,7ac

E. Applications of Quadratic Relations

Many places hold a fireworks display on Canada Day. Clayton, a member of the local fire department, launches a series of rockets from a barge that is floating in the middle of the lake. Each rocket is choreographed to explode at the correct time. The equation $h = -5t^2 + 40t + 2$ can be used to model the height, h, of each rocket in metres above the water at t seconds after its launch. A certain rocket is scheduled to explode 3 min 21 s into the program.

? Assuming that the rocket will explode at its highest point, when should Clayton launch it from the barge so it will explode at the correct time?

PRACTICE: Nelson 10 Chap 5.6, p302, Q11,12,13,14