



Honors Algebra 2 UNIT PLANNER



Unit title	Mathematical Modeling (DOE unit 6)	Unit duration	2 weeks
Essential Questions (OR GUIDING QUESTIONS?)			
<ul style="list-style-type: none">• How can an appropriate equation be built by looking at a mathematical pattern?• How can prior knowledge of functions be used to build precise and efficient models?• How do the multiple representation of functions aid in building more efficient and more accurate models?• How can technology be employed to help build mathematical models, and how can it be used to assess the appropriateness of a specific model?• How can we derive and apply the formula for the sum of a finite geometric series?• How can both algebraic and geometric models optimize particular important values?• How can systems of equations and inequalities be used to define feasible regions of solutions to solve problems?• What is the purpose of building constraints for a model, including using constraints to define feasible solutions and using domain restrictions when analyzing graphs to ensure validity of a function?• Why is revision necessary in model building?• Why is a deep knowledge of the various types of basic mathematical functions absolutely necessary in order to build models for real-world phenomena?• Why is building functions, including combining and composing functions, important in the process of mathematical modeling?			
Assessments			
Common Task			
Content Standards			
<p><u>Write expressions in equivalent forms to solve problems.</u> MGSE9-12.A.SSE.4 Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. <i>For example, calculate mortgage payments.</i></p> <p><u>Create equations that describe numbers or relationships</u> MGSE9-12.A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear, quadratic, simple rational, and exponential functions (integer inputs only).</p>			

MGSE9-12.A.CED.2 Create linear, quadratic, and exponential equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. (The phrase “in two or more variables” refers to formulas like the compound interest formula, in which $A = P(1 + r/n)^{nt}$ has multiple variables.)

MGSE9-12.A.CED.3 Represent constraints by equations or inequalities, and by systems of equation and/or inequalities, and interpret data points as possible (i.e. a solution) or not possible (i.e. a non-solution) under the established constraints.

MGSE9-12.A.CED.4 Rearrange formulas to highlight a quantity of interest using the same reasoning as in solving equations. *Examples: Rearrange Ohm’s law $V = IR$ to highlight resistance R ; Rearrange area of a circle formula $A = \pi r^2$ to highlight the radius r .*

Represent and solve equations and inequalities graphically

MGSE9-12.A.REI.11 Using graphs, tables, or successive approximations, show that the solution to the equation $f(x) = g(x)$ is the x-value where the y-values of $f(x)$ and $g(x)$ are the same.

Interpret functions that arise in applications in terms of the context

MGSE9-12.F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

MGSE9-12.F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one function and an algebraic expression for another, say which has the larger maximum.*

Build new functions from existing functions

MGSE9-12.F.BF.3 Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

Learning Activities and Experiences

Topic	Resources	Content Covered	Standards
Systems of equations in 3 Variables	https://drive.google.com/file/d/1tnUucpo0nu6JJQiCUq7Z1-wcix9ftW6f/view?usp=sharing	<ul style="list-style-type: none"> Solving systems of equations in 3 variables Creating a system of equations in 3 variable given a word problem and solving 	<p>MGSE9-12.A.CED.2</p> <p>MGSE9-12.A.CED.2</p>

Banking	● Banking - linear	MGSE9-12.A.CED.1 MGSE9-12.A.CED.2 MGSE9-12.F.IF.7 MGSE9-12.F.IF.7e
	● Banking - exponential	
	● Banking - compound interest	
	● Banking - compounded continuously	
	Graphing Quadratics	
Quadratics	Rewriting Quadratics/Identifying different forms of Quadratics	MGSE9-12.A.CED.2 MGSE9-12.F.IF.7 MGSE9-12.F.IF.7e MGSE9-12.F.IF.8 MGSE9-12.F.IF.8a
Literal Equations	Writing Quadratics	
Sales Tax	Solving Quadratics	

Personalized Learning and Differentiation

Teachers differentiate by providing examples (work samples or task-specific clarifications of assessment criteria); structuring support (advance organizers, flexible grouping, peer relationships); establishing flexible deadlines, and adjusting the pace.

- SWD/504- Accommodations provided
- ELL- Five Principle ELL Curriculum Framework and Vocabulary Supports
- Intervention Support- Re-teaching Activities in Small Groups with Progress Monitoring
- Extensions- Enrichment Tasks and Projects

Resources

Pearson enVision Textbook and Pearson Realize Online Resources
DOE Framework Tasks