ABGS MIDDLE SCHOOL Unit Planner

ALGEBRA 1

UNIT 3 – Linear Functions

Teacher (s)	N. Davis T. Moran D. Topping	Subject Group and Discipline	Advanced 8 Algebra 1		
Unit Title	Unit 3 Linear Functions	MYP Year	4	Unit Duration	5 – 6 WEEKS

INQUIRY? Establishing the purpose of the unit

Key Concept	Related Concept(s)	Global Context
Change	Model	Globalization and Sustainability
	Representation	Interconnection

Statement of Inquiry
Conceptual Understanding: Representations and models of real-life situations are affected by changing patterns.
Statement of Inquiry: Using representations to model the changes for the interconnection of patterns in real-life situations.
Inquiry Questions
Factual: What is a linear relationship?
Conceptual: How are relationships related to the constant change of linear functions?
Debatable: Are real-life problems more easily solved when a model is available?

MYP OBJECTIVES			
NYS Next Generation Standards	IB Objectives		
<u>NY-8.F.1</u> : Understand that a function is a rule that assigns to	Objective A: Knowing and Understanding		
each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.	i: Students select appropriate mathematics when solving problems in both familiar and unfamiliar situations.		
<i>Notes: Function notation is not required in Grade 8.</i> The terms domain and range may be introduced at this level; however, these terms are formally introduced in Algebra I:	ii: Students apply the selected mathematics successfully when solving problems.		
(AI-F.IF.1).	iii: Students solve problems correctly in a variety of context.		
<u>NY-8.F.2</u> : Compare properties of two functions each represented in a different way (algebraically, graphically,	Objective B: Investigating Patterns		
numerically in tables, or by verbal descriptions). e.g., Given a linear function represented by a table of values and a linear function represented by an algebraic equation,	i: Students select and apply mathematical problem-solving techniques to discover complex patterns.		
determine which function has the greater rate of change.	ii: Students describe patterns as relationships and/or general rules consistent with findings		
<u>NY-8.F.3</u> : Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line.	iii: Students verify and justify relationships and/or general rules.		
<u>NY-8.F.4</u> : Construct a function to model a linear relationship between two quantities. Determine the rate of change and	Objective C: Communicating		
initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of	 Students use appropriate mathematical language (notation, symbols and terminology) in both oral and written explanations. 		
a linear function in terms of the situation it models, and in terms of its graph or a table of values. <u>NY-8.EE.5</u> : Graph proportional relationships, interpreting the	ii. Students use appropriate forms of mathematical representation to present information.		
unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. <u>NY-8.EE.6</u> : Use similar triangles to explain why the slope m is	iii. Students move between different forms of mathematical representation.		
the same between any two distinct points on a non-vertical line	v: Students organize information using a logical structure.		

in the coordinate plane; derive the equation y=mx for a line	
through the origin and the equation y=mx+b for a line	Objective D: Applying mathematics in real-life context.
intercepting the vertical axis at b.	
NY-8.EE.8: Analyze and solve pairs of simultaneous linear	II. Students select appropriate mathematical strategies when
equations.	solving real-life situations.
NY-8.EE.8a : Understand that solutions to a system of two linear	iii: Students apply the selected mathematical strategies
equations in two variables correspond to points of intersection	successfully to reach a solution
of their graphs, because points of intersection satisfy both	successfully to reach a solution.
equations simultaneously. Recognize when the system has one	iv. Students explain the degree of accuracy of a solution.
solution, no solution, or infinitely many solutions.	
NY-8.EE.8b: Solve systems of two linear equations in two	v. Students explain whether a solution makes sense in the
variables with integer coefficients: graphically, numerically	context of the authentic real-life situation.
using a table, and algebraically. Solve simple cases by	
inspection.	
NY-8.EE.8c: Solve real-world and mathematical problems	
involving systems of two linear equations in two variables with	
integer coefficients.	
AI-A.CED.2: Create equations and linear inequalities in two	
variables to represent a real-world context.	
AI-A.CED.3: Represent constraints by equations or inequalities,	
and by systems of equations and/or inequalities, and interpret	
solutions as viable or non-viable options in a modeling context.	
AI-A.REI.6a; Solve systems of linear equations in two variables	
both algebraically and graphically	
AI-A.REI.10: Understand that the graph of an equation in two	
variables is the set of all its solutions plotted in the coordinate	
plane.	
<u>AI-A.REI.11</u> : Given the equations y = f(x) and y = g(x): i)	
recognize that each x-coordinate of the intersection(s) is the	
solution to the equation f(x) = g(x); ii) find the solutions	

approximately using technology to graph the functions or make
tables of values; and iii) interpret the solution in context. \star
AI-A.REI.12: Graph the solutions to a linear inequality in two
variables as a half-plane (excluding the boundary in the case of
a strict inequality), and graph the solution set to a system of
linear inequalities in two variables as the intersection of the
corresponding half-planes.

Summative Assessment	Relationship Between Summative Assessment Task and Statement of Inquiry
Goal: Using representations to model the interconnection of	Using representations to model the changes for the
patterns in real-world situations changes.	interconnection of patterns in real-life situations.
Role: Supplier of Computers and Printers	
Audience: Homes and Businesses	
Situation: You want to maintain an inventory of a maximum of	
40 computers and printers in your store during the holiday	
season. Computers cost \$600 and printers cost \$250. You want	
to sell both computers and printers to earn at least \$5000.	
Product: Computers and Printers	
1. Write a system of linear inequalities to represent the	
constraints in the situation.	
2. Solve the system of linear inequalities.	
3. Determine the number of computers and printers you must	
sell to earn at least \$5000.	

Approaches to Learning (ATL)

Thinking: Use prioritization and order of precedence in problem solving.

Communication: Organize and interpret data using both analogue and digital tools.

ACTION: Teaching and learning through inquiry

Content	Learning Process
Understand the relationship between a linear equation and the	Learning Experiences and Teaching Strategies
function that models the equation.	
Linear equations form a straight line when graphed.	Direct Instruction
Calculate the slope of a line from an equation, a graph and/or	Partner Work for Practice
two points. Introduce average rate of change.	Group Work to Practice
Vertical lines have no slope. Horizontal lines have zero slope.	Practice Problems at the Board
Understand the difference between positive and negative	Think-Pair-Share
slopes.	
Slope is defined as the steepness of a line (rise over run).	
Calculate the slope of a line using similar triangles.	
Write the equation of a line given the slope and y-intercept.	
Write the equation of a line given slope and a point.	
Write the equation of a line given two points.	
Write the equation of a line from a graph.	
Graph a line given an equation, the slope and y-intercept, x-	
and y-intercepts and/or table of values.	
Create and solve word problems for linear functions.	
Graph systems of equations.	
Solve systems of equations by substitution.	
Create and colve word problems for systems of linear	
equations	
Granh linear inequalities	
Graph systems of linear inequalities	
Create and solve word problems for linear inequalities	

VOCABULARY	Formative Assessment
Horizontal and vertical axes, intercepts, slope,	Quizzes
slope intercept form, point slope form, standard form,	Tests
intersecting lines, average rate of change,	Homework
x-axis, y-axis, parallel lines,	Classwork
one solution, no solution, infinitely many solutions,	
substitution, elimination,	Differentiation
quadrant, origin, axis, ordered pair, coordinate pair,	Technology
coordinate plane,	Graphing calculator
greater than, less than,	Tiered worksheet
greater than or equal to, less than or equal to,	
maximum, boundary line, minimum,	
at least, at most, positive and negative slopes,	
zero slope, no slope, x- and y- intercepts.	

Resources			
Teacher Created Worksheets	Computer Based Worksheets & Activities	Algebra Teachers' Activity Book	
Math Textbook	Delta Math	IXL	
Brain-Pop	www.jmap.org	Problem-Attic	
Teachers Pay Teachers	Kahn Academy	Kendrick Krause (YouTube)	

REFLECTION: Considering the planning, process and impact of the inquiry

Prior to Teaching the Unit	During Teaching	After Teaching the Unit
Why do we think that the unit or the	Why do we think that the unit or the	What were the learning outcomes of this
selection of topics will be interesting?	selection of topics will be interesting?	unit?
What do students already know, and	What do students already know, and	How well did the summative assessment
what can they do?	what can they do?	task serve to distinguish levels of
What have students encountered in this	What have students encountered in this	achievement? Was the task sufficiently
discipline before?	discipline before?	complex to allow students to reach the
What does my experience tell me about	What does my experience tell me about	highest levels?
what to expect in this unit?	what to expect in this unit?	What evidence of learning can we
What attributes of the learning profile	What attributes of the learning profile	identify? What artefacts of learning
does this unit offer students	does this unit offer students	should we document?
opportunities to develop?	opportunities to develop?	Which teaching strategies were effective?
What potential interdisciplinary	What potential interdisciplinary	Why?
connections can we identify?	connections can we identify?	What was surprising?
What do we know about my students'	What do we know about my students'	What student-initiated action did we
preferences and patterns of interaction?	preferences and patterns of interaction?	notice?
Are there any possible opportunities for	Are there any possible opportunities for	What will we do differently next time?
meaningful service learning?	meaningful service learning?	How will we build on our experience to
What in the unit might be inspiring for	What in the unit might be inspiring for	plan the next unit?
community or personal projects?	community or personal projects?	How effectively did we differentiate
Could we develop authentic	Could we develop authentic	learning in this unit?
opportunities for service learning?	opportunities for service learning?	What can students carry forward from
How can we use my students'	How can we use my students'	this unit to the unit? to the next year/
multilingualism as a resource for	multilingualism as a resource for	level of study?
learning?	learning?	Which subject groups could we work with
		next time?
		What did we learn from standardizing the
		assessment?