Grade 8 Mathematics

Unit title	Unit 1: Investigating Linear Expressions, Equations, and Inequalities in One Variable	MYP year	3	Unit duration (hrs)	*22.5 hours* *MMS- (4.5 hours per week)*

Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?*

GA DoE Standards
Standards **8.PAR.3:** Create and interpret expressions within relevant situations. Create, interpret, and solve linear equations and linear inequalities in one variable to model and explain real phenomena. **8.MP:** Display perseverance and patience in problem-solving. Demonstrate skills and strategies needed to succeed in mathematics, including critical thinking, reasoning, and effective collaboration and expression. Seek help and apply feedback. Set and monitor goals.

	Expectations	Evidence of Student Learning (not all inclusive; see Grade Level Overview for more details)		
8.PAR.3.1	Interpret expressions and parts of an expression, in context, by utilizing formulas or expressions with multiple terms and/or factors.	**Fundamentals** • Students should build on their prior knowledge of understanding the parts of an expression to extend their understanding to more complex expressions with multiple terms and/or factors.		**Terminology** • Parts of an expression include terms, factors, coefficients, and operations.
8.PAR.3.2	Describe and solve linear equations in one variable with one solution (x = a), infinitely many solutions (a = a), or no solutions (a = b). Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).	**Strategies and Methods** • Students should use algebraic reasoning in their descriptions of the solutions to linear equations. • Building upon skills from Grade 7, students combine like terms on the same side of the equal sign and use the distributive property to simplify the equation when solving. Emphasis in this standard is also on using rational coefficients. Solutions of certain equations may elicit infinitely many or no solutions.		
8.PAR.3.3	Create and solve linear equations and inequalities in one variable within a relevant application.	**Strategies and Methods** • Students should use algebraic reasoning in their descriptions of the solutions to linear equations. • Include linear equations and inequalities with rational number coefficients and whose solutions require expanding expressions using the distributive property and collecting like terms.		
8.PAR.3.4	Using algebraic properties and the properties of real numbers, justify the steps of a one-solution equation or inequality.	**Strategies and Methods** • Students should justify their own steps, or if given two or more steps of an equation, explain the progression from one step to the next using properties.		
8.PAR.3.5	Solve linear equations and inequalities in one variable with coefficients represented by letters and explain the solution based on the contextual, mathematical situation.	**Strategies and Methods** • Students should use algebraic reasoning to solve linear equations and inequalities in one variable.		**Example** • Given $ax + 3 = 7$, solve for x.
8.PAR.3.6	Use algebraic reasoning to fluently manipulate linear and literal equations expressed in various forms to solve relevant, mathematical problems.	**Strategies and Methods** • To achieve fluency, students should be able to choose flexibly among methods and strategies to solve mathematical problems accurately and efficiently. • Students should rearrange formulas to highlight a quantity of interest using the same reasoning as in solving equations. Interpret and explain the results.		**Example** • Find the radius given the formula $V = \pi r^2 h$ by rearranging the equation to solve for the radius, r.

Vocabulary

K12 Mathematics Glossary

Terms	Factors	Coefficient	Constant	Variable	Operation
Inverse	Solutions	One Solution	No Solution	Infinitely Many Solutions	Expression
Equations	Inequalities	Like Terms	Literal Equations		

Key concept	Related concept(s)	Global context
Patterns	Justification. Simplification	Identities and relationships

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● Algebraic		

<table>
<tr><td colspan="3" align="center">Statement of inquiry</td></tr>
<tr><td colspan="3">Interpreting real life scenarios will enhance our understanding of patterns.</td></tr>
<tr><td colspan="3" align="center">Inquiry questions</td></tr>
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- **Factual—** How can we simplify expressions? How can we use inverse operations to solve equations and inequalities?
- **Conceptual—** How are order of operations related to solving equations and equalities?
- **Debatable -** What is the best form of representing numbers and expressions?

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MYP Objectives	Assessment Tasks	
What specific MYP __objectives__ will be addressed during this unit?	*__Relationship__ between summative assessment task(s) and statement of inquiry:*	*List of common formative and summative assessments.*
Criteria A: Knowledge and Understanding Criteria B: Investigating Patterns	Students will interpret real-life scenarios to enhance their understanding of solving equations, inequalities, and patterns.	**Formative Assessment(s):** ● Unit 1 CFA **Summative Assessment(s):** ● Unit 1 Summative Assessment ● Unit 1 Retest ● MYP Assessment: Writing in Math - Design a Math App - Solving Equations and Inequalities

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<tr><td colspan="3" align="center">Approaches to learning (ATL)</td></tr>
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Category: Thinking
Cluster: Critical Thinking, Creative Thinking
Need: Give and receive meaningful feedback
Skill Indicator: Analyzing and evaluating issues and ideas, and utilizing skills and knowledge in multiple contexts

Design Cycle Transdisciplinary: Inquiring and Analyzing, Developing Ideas, Creating a Solution, Evaluation

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<tr><td align="center"><u>Learning Experiences</u>
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Objective or Content	Learning Experiences	Personalized Learning and Differentiation
8.PAR.3: Create and interpret expressions within relevant situations. Create, interpret and solve linear equations and linear inequalities in one variable to model and explain real phenomena. ● 8.PAR.3.1 Interpret and utilize formulas or expressions. ● 8.PAR.3.3 Create and solve linear equations and ~~inequalities~~ for application.	**Geology Rocks** Brief Description: In this learning plan, students explore linear equations with manipulatives and discover various steps used in solving equation problems. Students use blocks and counters as tactile representations to help them solve for unknown values of x. Students should work in groups or pairs. This will encourage discussion during the lesson, which will help with understanding the manipulative representation. Learning Goals: 1. I can use algebraic reasoning in describing the solutions to linear equations. 2. I can interpret expressions and linear equations to model real world situations. 3. I can justify the steps to a linear equation.	In this learning plan, students explore linear equations with manipulatives and discover various steps used in solving equation problems. Students use blocks and counters as tactile representations to help them solve for unknown values of x. Students should work in groups or pairs. This will encourage discussion during the lesson, which will help with understanding the manipulative representation.
8.PAR.3: Create and interpret expressions within relevant situations. Create, interpret, and solve linear equations and linear inequalities in one variable to model and explain real phenomena. ● 8.PAR.3.2 Describe and solve linear equations in one variable with one solution (x = a), infinitely many solutions (a = a), or no solutions (a = b). Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers). ● 8.PAR.3.3 Create and solve linear equations and inequalities in one variable within a relevant, real-life application.	**Classification of Solutions** Brief Description: In this learning plan, students will solve linear equations in one variable with rational number coefficients and simplify expressions through combining like terms and the distributive property. Students will also get an opportunity to categorize linear equations in one variable as having one, none, or infinitely many solutions. Learning Goals: 1. I can solve linear equations in one variable with rational number coefficients. 2. I can simplify expressions through combining like terms and the distributive property. 3. I can categorize linear equations in one variable as having one, none, or infinitely many solutions.	Students will solve linear equations in one variable with rational number coefficients and simplify expressions through combining like terms and the distributive property. Students will also get an opportunity to categorize linear equations in one variable as having one, none, or infinitely many solutions.
Content Resources		

[Savvas Math 8 Correlation Document](#) (see pgs. 8 - 12)

Savvas Lessons

- Lesson 2-1 (Combine Like Terms to Solve Equations)
- Lesson 2-2 (Solve Equations with Variables on Both Sides)
- Lesson 2-3 (Solve Multi-Step Equations)
- Lesson 2-4 (Equations with No Solutions and Infinitely Many Solutions)

Intervention Resources

[Balancing Act](#) - Form and solve simple linear equations. Interpret expressions

Additional Resources: