ABGS MIDDLE SCHOOL Unit Planner

Teacher(s)		**Subject group and discipline**	**Math – Grade 7**		DRAFT
Unit title	Expressions and Equations	**MYP year**	**Year 2 (Grade 7)**	**Unit duration**	**7 weeks**

INQUIRY: Establishing the purpose of the unit

Key concept	**Related concept(s)**	**Global context**
Relationships	Justification Simplification	Globalization and Sustainability - Systems, models, methods

Statement of inquiry
Justify algebraic mathematical relationships using systems, models and methods to simplify.
Inquiry questions
Factual: What is the meaning of the term simplified in Math class? Conceptual: How do you justify a simplified solution? Debatable: When is simplifying necessary?

Objectives	**Summative assessment**	
CCLS/NYS Standards 7.EE.4 Use variables to represent quantities in a real-world or mathematical problem and construct	Outline of summative assessment task(s) including assessment criteria: *Students will participate in the following performance task design:*	**Relationship between summative assessment task(s) and statement of inquiry:** **Relationship to Inquiry**

simple equations and inequalities to solve problems by reasoning about the quantities. 7.EE.4a Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence o 7.EE.4b Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. 7.NS.1c Understand subtraction of rational numbers as adding the additive inverse, p - q = p + (-q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. **IB Objectives** MYP.MA.I.D.3 apply the selected mathematical strategies successfully to reach a solution	Assessment Criteria A and D **Party Planning** **Graded Assignment** **Task** Your task is to simplify expressions and solve equations using justifications to show mathematical relationships motivated by attitudes and independence. You are planning your birthday get together. You have to determine the maximum number of friends that you can invite with the budget your parents gave you. You will also have to determine how to find the cost of a soda if you know your total and the cost of a slice of pizza. **Goal** The goal is for students to maximize the number of friends at the party. **Role** You are planning your birthday gathering party. **Audience** Your friends are hoping to enjoy themselves at your party. **Situation** You are trying to invite the maximum number of friends while on a budget. **Product** Students will determine how many friends they can invite. **Success** Proper algebraic justification will be necessary for the task. **Task:**	Students will acquire the following conceptual understanding: • Students will use properties of operations to generate equivalent expressions. • Students will use inverse operations to solve one and two step equations and inequalities. • Students will work in pairs/small groups through various activities within their workbook (attached). • Students will use manipulatives (Algebra Tiles) to add, subtract, distribute, and factor linear expressions and equations. • Students will understand and use mathematical notation of inequality symbols • Students will take effective notes in class

MYP.MA.I.D.5 discuss whether a solution makes sense in the context of the authentic real-life situation. MYP.MA.III.C.4 demonstrate how to communicate complete and coherent mathematical lines of reasoning MYP.MA.III.C.5 demonstrate how to organize information using a logical structure. MYP.MA.III.D.2 select appropriate mathematical strategies when solving authentic real-life situations MYP.MA.III.D.4 explain the degree of accuracy of a solution MYP.MA.V.C.1 use appropriate mathematical language (notation, symbols and terminology) in both oral and written explanations MYP.MA.V.D.5 justify whether a solution makes sense in the context of the authentic real-life situation.	Your task is to create a children's book that has emoji's in place of unknown values. The story you create should involve adding, subtracting, and expanding expressions to write and illustrate a children's book. You will present your book to a third-grade class. **Goal:** Utilize emojis as variables to generate equivalent expressions. **Role:** Author and an illustrator of a children's book **Audience:** Presenting your children's book to a third-grade class. **Situation:** Using emojis to represent unknown values to show what you have learned about expressions. **Product:** Story should involve simplifying, factoring, adding, subtracting and expanding expressions to write and illustrate a children's book.	

Approaches to learning (ATL)

VIII. Critical thinking skills – Analyzing and evaluating issues and ideas • Practice observing carefully in order to recognize problems
X. Transfer skills – Utilize effective leaning strategies in subject groups and disciplines. • Students will need to articulate their solution to a problem using the strategies discuss in class and patterns highlighted throughout the learning process. They will also use models to demonstrate their understanding.
V. Reflection skills • Develop new skills, techniques and strategies for effective learning • Identify strengths and weaknesses of personal learning strategies (self-assessment)

ACTION: Teaching and learning through inquiry

Content	**Learning process**	
This module consolidates and expands upon students' understanding of equivalent expressions as they apply the properties of operations to write expressions in both standard form and in factored form. They use linear equations to solve the variable and other problems presented within context. Students use the number line to understand the properties of inequality and recognize when to preserve the inequality and when to reverse the inequality when solving problems leading to inequalities. They interpret solutions within the context of problems. Use properties of operations to generate equivalent expressions.	**Learning experiences and teaching strategies** **Learning Experiences:** Algebra Tiles to model operations (add, subtract, factor, expand) with linear expressions that have rational coefficients. Using the property of equality (balance) to create an algorithm for solving equations. **Teaching Strategies:** Teacher will use questioning techniques to build understanding. Concrete Pictorial Abstract (CPA) is a three-step instructional approach that has been found to be highly effective in teaching math concepts. The first step is called the concrete stage. It is known as the "doing" stage and involves	**Relationship between summative assessment task(s) and statement of inquiry:** **Relationship to Inquiry** Use properties of operations to generate equivalent expressions. • Use inverse operations to solve one and two step equations and inequalities. • Use scaffolding to reinforce prerequisite skills. • Create rotation stations for students to work in pairs/small groups.

	physically manipulating objects to solve a math problem. The pictorial (semi-concrete) stage is the next step. It is known as the "seeing" stage and involves using images to represent objects to solve a math problem. The final step in this approach is called the abstract stage. It is known as the "symbolic" stage and involves using only numbers and symbols to solve a math problem. CPA is a gradual systematic approach. Each stage builds on to the previous stage and therefore must be taught in sequence.	• Provide students with manipulatives and tiered performance tasks.
	Formative assessment Teacher will present the problem, students will work in pairs/small groups to model the problem and then model the solution with tools (calculators, bar models etc.) teacher will walk around to see students working together with the tools reinforcing the understanding and use of sensory learning preferences. Formative feedback can be collected using student white boards, cold calling, or smart response clickers. 1. Self-Evaluation Allow students to evaluate their own work, **encouraging them to learn their own strengths and weaknesses.** Giving students time to formally review their own written assessments is an easy way of doing so. After completing the assessment, give each student access to an expanded rubric that details expectations. They should grade themselves accordingly. You can also ask them to hand	

	in their completed rubrics, letting you note concerns that students may have about their own knowledge and comprehension. 2. Think Share Pair Oversee a think-pair-share exercise to **deliver three content-processing activities in one**, easily assessing student understanding during the last stage. As the name of this differentiated instruction strategy implies, start by asking each student to *think* about a specific topic or answer a given question. Next, *pair* students together to discuss their findings. Finally, each pair should *share* their thoughts with the class and accept questions from classmates. 3. Entry/Exit Tickets **Gather information about how well students processed your most recent lesson** by giving them five minutes to write an entry or exit ticket. As a formative assessment, entry tickets should ask students to reflect on a specific class or exercise from the previous day. Exit tickets should involve students summarizing what they've just learned. Either way, you'll receive small products that let you easily see how well students processed and retained key content, indicating knowledge gaps. 4. Stop and Go **Allow students to give you real-time feedback as you teach** with "stop and go" cards. Purchasable or assignable as an art task, they're two-sided cards — one green and one red. As you deliver a lesson, students should hold the green side toward you if they understand everything. If something's unclear, encourage them to turn the red side forward. When you see red, stop and clarify — or expand upon — your points until you see green again. This should help you quickly assess if students are processing content as you deliver it.
	Differentiation Solve and check one step equations. Math rotation stations with tiered teacher created activities

	Algebra tiles Graphic organizers Anchor Charts

Resources
Engage NY Modules Connected Math 2 SAVVAS Realize i-Ready Workbooks (created by math 7 department team of teachers - attached above), teacher created Powerpoint, manipulatives, smart response clickers, Promethium board, pencils, paper, calculators.

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 selection of topics will be interesting? What do students already know, and what can they do? What have students encountered in this discipline before? What does my experience tell me about what to expect in this unit? What attributes of the learning profile does this unit offer students opportunities to develop? What potential interdisciplinary connections can we identify? What do we know about my students' preferences and patterns of interaction?	What difficulties did we encounter while completing the unit or the summative assessment task(s)? What resources are proving useful, and what other resources do we need? What student inquiries are emerging? What can we adjust or change? What skills need more practice? What is the level of student engagement? How can we scaffold learning for students who need more guidance? What is happening in the world right now with which we could connect teaching and learning in this unit? How well are the learning experiences aligned with the unit's objectives?	What were the learning outcomes of this unit? How well did the summative assessment task serve to distinguish levels of achievement? Was the task sufficiently complex to allow students to reach the highest levels? What evidence of learning can we identify? What artefacts of learning should we document? Which teaching strategies were effective? Why? What was surprising? What student-initiated action did we notice? What will we do differently next time?

Are there any possible opportunities for meaningful service learning? What in the unit might be inspiring for community or personal projects? Could we develop authentic opportunities for service learning? How can we use my students' multilingualism as a resource for learning?	What opportunities am I hearing to help students explore the interpretative nature of knowledge, including personal biases that might be retained, revised or rejected? (DP Theory of knowledge skills development)	How will we build on our experience to plan the next unit? How effectively did we differentiate learning in this unit? What can students carry forward from this unit to the unit? to the next year/ level of study? Which subject groups could we work with next time? What did we learn from standardizing the assessment?