ABGS MIDDLE SCHOOL Unit Planner

Teacher(s)		**Subject group and discipline**	**Math – Grade 7**		DRAFT
Unit title	Making Sense of Percents	**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 Model	Globalization and Sustainability - Markets

Statement of inquiry
Justify the better buy within global markets using modeling of percent relationships.
Inquiry questions
Factual: What is a relationship between two things? Conceptual: How can I solve mark up and mark down in more than one way? Debatable: When there is more than one way to solve a problem, how do I know which is best?

Objectives	**Summative assessment**	
CCLS/NYS Standards 7.RP.01 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.	Outline of summative assessment task(s) including assessment criteria: *Students will participate in the following performance task design:* Assessment Criteria A and D	**Relationship between summative assessment task(s) and statement of inquiry:** **Relationship to Inquiry**

7.RP.02 Recognize and represent proportional relationships between quantities. 7.RP.02a Decide whether two quantities are in a proportional relationship. 7.RP.02b Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. 7.RP.02c Represent proportional relationships by equations. 7.RP.02d Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate. 7.RP.03 Use proportional relationships to solve multistep ratio and percent problems. **IB Objectives** MYP.MA.I.A.1 demonstrate knowledge and understanding of some of the principles from the four branches of mathematics (number, algebra, geometry and trigonometry, statistics and probability) MYP.MA.I.A.2 select appropriate mathematical strategies when solving problems MYP.MA.I.A.3 apply the selected mathematical strategies successfully when solving problems	**Making Sense of Percents** **Graded Assignment** **Task** Ratio, Proportion, Percent Unit Test AUTHENTIC ASSESSMENT: GRASPS Oultine of summative assessment task(s) including assessment criteria. Unit Assessment (Pre and Post Unit Assessment) **Goal** The goal is for students to have an opportunity to solve real life problems involving percent and choose the method of solution. **Role** You are a consumer. **Audience** You are learning how sales, tax, tip, commission, simple interest can affect your money. **Situation** Through various real life questions, you will use the different types of solution methods to correctly answer questions about how percent can affect money. **Product** Students will determine the best way to use coupons to save the most money. **Success** Students will have shown work indicating which method they have chosen and the evidence of why that method is cost saving.	• Students will use the appropriate form of an equation or proportion to determine the percentage of a quantity • Students will use real-life scenarios as a model and justify the solutions by explaining the relationships between the numbers. • Students will apply their knowledge of percent to real-life situations.

MYP.MA.I.A.4 solve problems correctly in both familiar and unfamiliar situations in a variety of contexts. MYP.MA.I.D.1 identify relevant elements of authentic real-life situations MYP.MA.I.D.2 select appropriate mathematical strategies when solving authentic real-life situations MYP.MA.I.D.3 apply the selected mathematical strategies successfully to reach a solution MYP.MA.I.D.4 explain the degree of accuracy of a solution		

Approaches to learning (ATL)
VIII. Critical thinking skills – Practice observing carefully in order to recognize problems. • Students will consider each problem and determine what process is necessary to find a solution. Each problem will have different values and operations, students will have to determine what strategy they will use to successfully solve the problem. Each problem may be unique, but they will have to apply their knowledge and understanding in unfamiliar situations.
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.
VI. Information literacy skills – Collect and analyze data to identify solutions and make informed decisions. • Students will consider the information within a problem to determine the strategy best necessary to find a solution.

ACTION: Teaching and learning through inquiry

Content	**Learning process**	
Topic A builds on students conceptual understanding of percent from Grade 6 (6.RP.3c), and relates 100% to the whole. Students represent percent as decimals and fractions and extend their understanding from Grade 6	**Learning experiences and teaching strategies** Learning Experiences:	**Relationship between summative assessment task(s) and statement of inquiry:**

to include percent greater than 100%, such as 225%, and percent less than 1%, such as 1/2% or 0.5%. They understand that, for instance, 225% means 225/100 , or equivalently, 2.25/1 = 2.25 (7.RP.A.1). Students use complex fractions to represent non-whole number percent. Module 3`s focus on algebra prepares students to move from the visual models used for percent in Grade 6 to algebraic equations in Grade 7. They write equations to solve multi-step percent problems and relate their conceptual understanding to the representation: Quantity = Percent x Whole (7.RP.A.2c). Students solve percent increase and decrease problems with and without equations (7.RP.A.3). For instance, given a multi-step word problem where there is an increase of 20% and the whole equals $200, students recognize that $200 can be multiplied by 120% or 1.2 to get an answer of $240. They use visual models, such as a double number line diagram, to justify their answers. In this case, 100% aligns to $200 in the diagram and intervals of fifths are used (since 20% = 1/5) to partition both number line segments to create a scale indicating that 120% aligns to $240. Topic A concludes with students representing 1% of a quantity using a ratio, and then using that ratio to find the amounts of other percent. While representing 1% of a quantity and using it to find the amount of other percent is a strategy that will always work when solving a problem, students recognize that when the percent is a factor of 100, they can use mental math and proportional reasoning to find the amount of other percents.	Students will use real world connections to determine percentage problems. 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 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.	• Use benchmark percent problems to determine reasonableness of answers. • Understanding the relationship between percent change and percent increase/decrease. • Identify formulas to use to solve real world percent problems.
	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 Use of benchmark percent problems. Relationship between part whole and percent

Resources
Engage NY Modules Connected Math 2 Go Math Workbooks (created by math 7 department team of teachers - attached above), teacher created Powerpont, 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 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 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 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? 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 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 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)	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? 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?