ABGS MIDDLE SCHOOL Unit Planner

Teacher(s)		**Subject group and discipline**	**Math – Grade 7**		DRAFT
Unit title	Geometry	**MYP year**	**Year 2 (Grade 7)**	**Unit duration**	**4 weeks**

INQUIRY: Establishing the purpose of the unit

Key concept	**Related concept(s)**	**Global context**
Relationships	Generalization Measurement	Orientation in space and time: Human and natural landscapes

Statement of Inquiry
Generalizing relationships between measurements can help explore the formation of human and natural landscapes.
Inquiry Questions
Factual: What is measurement? Conceptual: How are volume and area related? How do we generalize relationships between measurements? Debatable: When does natural or human landscapes exhibit more order? Do humans mimic nature or does nature mimic humans?

Objectives	**Summative assessment**	
CCLS/NYS Standards NY-7.G.1 Solve problems involving scale drawings of geometric figures, including computing actual lengths and	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**

areas from a scale drawing and reproducing a scale drawing at a different scale. NY-7.G.2 Draw triangles when given measures of angles and/or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. NY-7.G.3 Describe the two-dimensional shapes that result from slicing three-dimensional solids parallel or perpendicular to the base. NY-7.G.4 Apply the formulas for the area and circumference of a circle to solve problems. NY-7.G.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure ## IB Objectives MYP.MA.I.D.3 apply the selected mathematical strategies successfully to reach a solution MYP.MA.I.D.5 discuss whether a solution makes sense in the context of the authentic real-life situation.	**Task:** Use a real pizza or a photo of a pizza, but it must be a pepperoni pizza. Find the diameter, circumference and area of the pizza. Do the same for one slice of pepperoni. Compare the circumference of the pizza to the total circumference of all the slices of pepperoni. . **Goal** The goal is to compare the total circumference of a pizza to the total circumference of all the slices of pepperoni. **Role** You are writing a report about the relationship of the pizza and the pepperoni. **Audience** Your classmates that are reading your report. **Situation** You comparing circumference of a large circle to multiple smaller circles. **Product** Students will write a report that compares the pizza circumference to the total pepperoni circumference. The report will include the similarities and differences as well as photos or illustrations and diagrams. **Success** Proper algebraic justification will be necessary for the task. **Task** **You will recognize sculpting as an art form that involves the transformation of different shapes or melting of metal. Think about the sizes and shapes of different sculptures that you have seen, and the different materials you could use to create your own sculptures.**	Students will acquire the following conceptual understanding: • Students will use scale drawings to calculate measurements and reproduce proportional scale drawings. • Students will understand that drawings need a combination of the relationships between the side lengths, angles measures, and side angles of a figure. • Students will determine whether a triangle is formed and name the type of triangle was constructed. • Students will calculate the measures of angles given the angle relationships • Students will calculate the circumference, radius, and diameter of a circle. • Students will recognize the relationship between the circumference and the diameter of a circle and π. • Students solve problems involving area of a circle.

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.	**Goal** **Make a three-dimensional sculpture of a national landmark.** **Role** **You are an upcoming sculptor in the tri-state area.** **Audience** **First time tourists to New York** **Situation** **You are trying to showcase scale models of popular landmarks for a Welcome Center/Museum.** **Product** **Students will determine the surface area and volume of their sculptures.** **Success** **Proper dimensions and calculations are included in fulfilling the task.**	• Students describe cross sections of right rectangular prisms and pyramids

Approaches to learning (ATL)
VIII. Critical thinking skills – Analyzing and evaluating issues and ideas • Practice observing carefully in order to recognize problems
IX. Creative-thinking skills - Generating novel ideas and considering new perspectives • Practice visible thinking strategies and techniques
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.

ACTION: Teaching and learning through inquiry

Content	**Learning process**

This module will allow students to extend their understanding of ratio reasoning to solve multi-step problems involving scale drawings. Students will understand that the scale factor represents a constant of proportionality between the scale drawing and the actual object. They will apply their knowledge by solving area problems using scale factors and demonstrate their skills by reproducing a scale drawing using a different scale. They will be introduced to the relationship between the circumference and diameter of a circle, learning that the constant ratio between them is the irrational number, π. They will apply the circumference formula to solve problems that involve the circle's area. They will find the surface area and volume of two and three-dimensional objects. They will be able to recognize angle and side relationships. They will construct geometric figures with given conditions. They will solve problems by describing shapes and dimensions of cross sections of right rectangular prisms and right rectangular pyramids.	**Learning experiences and teaching strategies** Learning Experiences: Students will make connections using scale drawings and geometric figures. They can use rulers and protractors to create quadrilaterals and measure angles. They can use technology to create figures using geometry software programs. 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.	**Relationship between summative assessment task(s) and statement of inquiry:** • Use scale drawings to calculate measurements and reproduce proportional scale drawings. • Understand the relationships between the side lengths, angles measures, and side angles of a figure. • Determine whether a triangle is formed and name the type of triangle was constructed. • Calculate the measures of angles given the angle relationships • Calculate the circumference, radius, and diameter of a circle. • Recognize the relationship between the circumference and the diameter of a circle and π. • Solve problems involving area of a circle. • Describe cross sections of right rectangular prisms and pyramids

	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 Math rotation stations with tiered teacher created activities Graphic organizers Anchor Charts Rulers Protractors

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? 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 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 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 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? 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?