ABGS MIDDLE SCHOOL Unit Planner

Teacher(s)		**Subject group and discipline**	**Math – Grade 7**		DRAFT
Unit title	Probability and Statistics	**MYP year**	**Year 2 (Grade 7)**	**Unit duration**	**5 weeks**

INQUIRY: Establishing the purpose of the unit

Key concept	**Related concept(s)**	**Global context**
Logic	Representation Systems Justification	Personal and cultural expression: Games and Play

Statement of inquiry
A logical system of representation can help explore and analyze games that humans play.
Inquiry questions
Factual: What makes something logical? How is probability calculated? Conceptual: How can logic be used with different representations? How can you represent the likelihood of an event happening? Debatable: Can winning be calculated or is it just luck?

Objectives	**Summative assessment**	

CCLS/NYS Standards

NY-7.SP.1 Construct and interpret box-plots, find the interquartile range, and determine if a data point is an outlier.

NY-7.SP.3 Informally assess the degree of visual overlap of two quantitative data distributions.

NY-7.SP.4 Use measures of center and measures of variability for quantitative data from random samples or populations to draw informal comparative inferences about the populations.

NY-7.SP.8 Find probabilities of compound events using organized list, sample space tables, tree diagrams, and simulation.

NY-7.SP.8a Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.

IB Objectives

MYP.MA.I.D.3 apply the selected mathematical strategies successfully to reach a solution

Outline of summative assessment task(s) including assessment criteria:

Students will participate in the following performance task design:

Assessment Criteria A and D

Task

Students will create a game for a School Carnival event. Students will work in pairs and create a game that they will construct so that others may play. Each pair will analyze their game in terms of the sample space and the theoretical probability of winning. During the Carnival, students will play each other's games and collect information in two ways: the experimental probability of winning the game they created based on their own experiences. Individually, students will create a report that summarizes this information and calculates the theoretical probability of the games they played.

Goal

The goal is for students to create a game for the School Carnival event.

Role

You are creating a game for others to play.

Audience

Your friends are hoping to win when they play your game.

Situation

Relationship between summative assessment task(s) and statement of inquiry:

Relationship to Inquiry

Students will acquire the following conceptual understanding

- Students will use probability's systems of representation to analyze games that they create and play.
- Students will represent the sample space for each game and calculate both the experimental and theoretical probability.
- Students will determine the difference between a game being fair and luck.
- They will be able to experience probability as the game designer and the player.

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.	You will have to decide the amount of points it takes to play your game and the point distribution for the winners. **Product** Students will create a game. **Success** You create a game that is enjoyable and fair.	

Approaches to learning (ATL)
IX. Creative Thinking Skills – Make guesses and predictions of possible outcomes • Practice observing and comparing theoretical and compound events
IV. Affective Skills – Manage the state of Resilience. • Students will need to obtain patience and practice “bouncing back” when faced with opposition, failure, risks, and adversity.
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**	
This module consolidates and expands upon students understanding of the relationship between part to whole, fractions, decimals and percent. They make conclusions about the likelihood of an event. They use sample space to draw inferences of probability. Students compare theoretical and experimental probability. Make predictions based on probability events.	**Learning experiences and teaching strategies** Learning Experiences: Use sample space to determine the theoretical probability for events. 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	**Relationship between summative assessment task(s) and statement of inquiry:** • Use sample space to find theoretical probability. • Collect data for experimental probability. • Compare theoretical and experimental probability. • Make predictions based on probability events.

	math problem. CPA is a gradual systematic approach. Each stage builds on to the previous stage and therefore must be taught in sequence.	
	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 Spiral Review of fraction, decimal, percent and proportional relationships. Anchor Charts/interactive word wall Differentiated Rotation Stations

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?	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	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?

Could we develop authentic opportunities for service learning? How can we use my students' multilingualism as a resource for learning?	rejected? (DP Theory of knowledge skills development)	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?