Teacher(s)	Mahaney , Wilcox, Moffitt	Subject group and discipline	Math		
Unit title	Volume and Surface Area	MYP year	1	Unit duration (hrs)	22.5

Inquiry: Establishing the purpose of the unit

Key concept	Related concept(s)	Global context
Form	Space and Quantity	Fairness and Development

Statement of inquiry

The form of packaging impacts profit and determines the environmental footprint.

Inquiry questions

Factual—What are the characteristics of quadrilaterals? How does area of a triangle relate to area of a rectangle? Identify the relationship between the base and height of a polygon?

Conceptual— How do you decompose a polygon to find the surface area? If you double the dimensions of a polygon what happens to the surface area?

Debatable— Is the smallest surface area always the best design for manufacturing, distribution, and retail display?

Objectives	Summative assessment	
Criterion B: Investigating Patterns I. select and apply mathematical problem-solving techniques to discover complex patterns Ii. Describe patterns as general rules consistent with findings Iii. prove, or verify and justify, general rules	Outline of summative assessment task(s) including assessment criteria Goal is to design a box to meet the criterion Your job is to develop two box designs that fit the calculated volume and draw nets and find the surface area of both boxes. Make a recommendation about which design to use based on cost. Your clients are a cereal manufacturer. The challenge involves dealing with finding which design will yield a lower cost to the manufacturer.	Relationship between summative assessment task(s) and statement of inquiry: Students use percents to find the volume of the box given the volume of granola. (Finding part of the the whole) The task calls for students to apply reasoning and computation to create two box designs that fit the calculated volume and then draw nets and find the surface area of both boxes. Finally, students determine which box would cost less to produce and make a recommendation of which design to use. The students are are to think about the impact their design has in relationship to the real-world,

Criterion D Applying Mathematics in Real-life contexts I. identify relevant elements of authentic real-life situations Ii. select appropriate mathematical strategies when solving authentic real-life situations Iii. apply the selected mathematical strategies successfully to reach a solution Iv. justify the degree of a accuracy of a solution V. justify whether a solution makes sense in the context of the authentic real-life situation	You need to develop two designs so that the cost is low and waste is kept to a minimum. Your product must meet the following standard: 2 designs Cost per design Determine the design that is the most cost effective.	ie.,manufacturing, distribution, retail, and waste disposal.
Approaches to learning (ATL)		
Thinking: Critical Thinking, Creativity and innovation, Transfer Research: Information Literacy, Media Literacy		

Action: Teaching and learning through inquiry

Content	Learning process
6.G.A2 6.G.A4 6.RP.A.3a 6.NS.b3 6.NS.b4	**Learning experiences and teaching strategies**
	Formative assessment ● Describe the connection between net model and constructed model ● Think pair share ● White boards ● Curriculum Associates end of lesson quizzes ● Mid unit assessment for Curriculum Associates
	Differentiation **Part A** ● **below grade level - read problem aloud and determine and label dimensions of box** ● **grade level - guiding question - Will the volume of the box be more or less than the volume of granola? Why?** **Part B** ● **below grade level - use factor tree to generate the desired product** ● **proficient students - have them come up with 3 factors for desired product** ● **high students - generate factors that include fractions for desired product** **Part C** ● below grade level - make the connection between the surface area of the box and the amount of material needed to construct it. ● grade level - guided discussion to make sure students make the connection between the surface area and the material used to construct box.

	• challenge students Would the dimensions ½" x 10" x 32" work for the design of the box? Would you recommend the company use such a box? Explain.

Resources
Curriculum Associates - student instruction, skills and practice, teacher manual, on-line teacher toolbox, interactive student videos, illuminations activities, teacher generated flipcharts

Reflection: Considering the planning, process and impact of the inquiry

Prior to teaching the unit	**During teaching**	**After teaching the unit**
Homework/ bell work to include rates, ratios, factors, area of polygons, volume of polyhedrons	Vocabulary- Surface Area, Polyhedron, Rectangular Prism, triangular prism, pyramid, square pyramid, nets, square units, cubic units, volume, area of the base, base, height, dimensions, and length Continue with homework and practice of ratios, rates, factors, and review of surface while teaching volume.	
