Lesson Title:	**Charley Chocolates- Manufacturing with chocolate**
Subject Area:	Math
Grade Level:	7th grade
Duration:	2 weeks
Format (#students/group):	Groups of 3-4
Overview:	Students • create an object that represented our school, • used an app to capture a 3D representation of that object, • (were supposed to) send object to 3D printer, • Used 3D mold with brown sugar to create a mold • Melted chocolate • Poured chocolates into molds • Discovered formula to calculate the cost of production
Educational Standards:	Solve real-life and mathematical problems using numerical and algebraic expressions and equations. CCSS.MATH.CONTENT.7.EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation*. CCSS.MATH.CONTENT.7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

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	CCSS.MATH.CONTENT.7.EE.B.4.A 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 of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* CCSS.MATH.CONTENT.7.EE.B.4.B 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. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions*.
Unit Question:	What must a company consider when determining cost of manufacturing?
Focus Question/ Purpose:	What are fixed costs? What are variable costs? How do both affect the cost of production?
Desired Outcomes:	Students will understand the need for linear equations in the real world. Students will be able to differentiate between fixed and variable amounts.
Activity Details/ Instructions:	Students and parents (through e-mail communication) were told the purpose of the unit, what to expect and what they would need. We began with 3D image captures. We moved into 3D image editing. We gathered supplies and they watched a demonstration. Students experienced the production of chocolates. Students created equations that found the linear relationship between fixed and variable costs.
Safety:	Students (and parents) were asked about allergies.
Potential Cost:	Students supplied materials through willing parent after e-mails were sent
Supplies (sources):	2 microwaves 6 bags of chocolate chips 6 bread pans

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	6 bags of brown sugar 12 plastic spoons 20 stir sticks 1-8 3D printed objects 3D printer access
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Key Words:	STEM, manufacturing, linear equations, fixed cost, variables, Profit
Other Resources:	Brown Sugar Casted Chocolates [http://daringbakerduluth.blogspot.com/2012/08/brown-sugar-casted-chocolates.html]