

Unit Framework - PGCPs

SUBJECT: Mathematics

GRADE LEVEL: 7

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| <p>Unit 2:</p> <p>What's the Point?...<i>Price Point</i>, that is!</p> | <p><u>Unit Summary</u></p> <p><b>Thematic Focus:</b> Setting Price Points is tricky business! You're certainly entitled to make a fair profit on your product, and even a substantial one if you create value for your customers, but remember, something is ultimately worth only what someone is willing to pay for it. This unit will take an in-depth look at the setting price points, from buyer psychology to accurately knowing your true costs... all important influences to setting Price Points and, ultimately, earning profits!</p> <p><b>Content Focus:</b> This unit focuses on using proportional reasoning and expressions and equations in the context of profiting from real life fundraising activities. Students will accurately calculate costs per item sold and understand the usage of equations to efficiently calculate outcomes of various scenarios in analyzing potential profits when setting different price points and package pricing options. Students will expand understandings of Unit Rate developed in Grade 6, delve into proportional reasoning through multi-step ratio and percent problems and explore efficient and appropriate mathematical equations and models to predict profits based on forecasting of sales.</p> <p><b>Performance Task:</b> <i>Two performance tasks will be used in this unit.</i><br/> <i>Performance Task #1 (Formative Assessment used to <u>drive instruction</u>):</i></p> <p>The first Performance Task, which will span the length of the unit, will be used as a vehicle for learning the “nuts and bolts” of the mathematics so that students will be motivated to acquire mathematical skills needed to perform the task. For this Performance Task, students will be charged with selling desirable items to students and/or parents in order to raise funds for both a class event (ie: a class trip) AND a charity event (ie: hurricane sandy relief). Students will determine products, analyze costs of products using Unit Rates, and use the profit formula to determine projected profits. Students will utilize percent increase and decrease to project profit margins. Higher Level KIAs will come into play when students consider various factors in creating a Price Points and/or package deals for each of the product to be sold. A further analysis of Behavioral Economics and marketing methodologies will be presented to students to consider when setting Price Points. Students will be required to forecast units sold to project Net Profits. Lastly, student will need to skillfully utilize percent of the whole to determine the amount of profits to allocate toward their class event vs. their charity event.</p> <p><i>Performance Task #2 or Transfer Task (Summative Assessment given at the end of the unit to <u>evidence transfer</u>)</i></p> <p>In general, a much shorter but focused task presented at the conclusion of the unit. Students will be given a target Net Profit and will be need to work backwards to analyze costs and set a price point for their own business venture. Students will TRANSFER their understandings of proportionality and efficient usage of equations to determine costs. Further students will set price point for their sale item and determine how many units must be sold to reach the given target Net Profit.</p> |
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Unit Framework - PGCPs

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|                      | <p><b>Rationale:</b><br/>           This unit elicits student engagement and enthusiasm for learning from the onset. Because students are involved in a <i>real application</i> (as opposed to a <i>real-world application</i> or <i>synthesized life-like application</i>) the need for learning how to maximize profit to be used for a class activity and a charitable event will be heightened. Students will understand the need for accuracy in determining operating costs, however, the research and richness of dialogue needed to set the best price points will convey the need to utilize mathematical understandings of profit through efficient usage of equations symbolically and with models. Students will consider various scenarios of forecasted sales figures (projected units sold) to assist in the analysis needed to set the prices for each item. Scaffolding on Grade 6 standards where Unit Rates are introduced, students will now expand their usage by identifying such in graphs and equations used to forecast sales. Also central to the unit, in standard 7.EE.3, students will consistently be asked to persevere in multi-step real-life and mathematical problems using strategic tools. Students will fluently transition between decimal, fraction and percent within problem solving, understanding the optimally efficient usage of each in context.</p> |
| <p>KIAs TARGETED</p> | <p><i>Transfer</i></p>  |

Unit Framework - PGCPS

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| <ul style="list-style-type: none"> <li>⊗ QUESTION</li> <li>⊗ DISCERN</li> <li>⊗ INFER</li> <li>⊗ PLAN</li> <li>⊗ ANALYZE</li> <li>⊗ JUSTIFY</li> <li>⊗ CREATE</li> <li>⊗ COMMUNICATE</li> <li>⊗ GENERALIZE</li> <li>⊗ EVALUATE</li> </ul> | <p><i>Students will be able to independently use their learning in new situations to...</i></p> <ul style="list-style-type: none"> <li>• Solve problems using numeric, graphic, and algebraic or approximation methods.</li> <li>• Think critically about quantitative situations, to make maximum sense of what is known, to be found, and the relationship between those.</li> <li>• Move fluently among multiple representations of information.</li> <li>• Use mathematics to make decisions.</li> <li>• Devise critical arguments and express them in precise language, using a logical sequence.</li> <li>• Model real-world situations through mathematical methods and representations.</li> </ul>   |
| <p><b>STANDARDS TARGETED</b></p> <p>Common Core:</p> <p>7.RP.1<br/>7.RP.2b, c, d<br/>7.RP.3<br/>7.EE.1<br/>7.EE.2<br/>7.EE.3<br/>7.EE.4</p> <p>Maryland:</p>  | <p style="text-align: center;"><b><i>Meaning</i></b></p> <p><i>Students will explore &amp; address these key recurring ideas &amp; questions:</i></p> <ul style="list-style-type: none"> <li>❖ <b>EQ1: What makes a computational strategy both effective and efficient?</b> <ul style="list-style-type: none"> <li>• EU1.The form of a number dictates the rules I use to operate or model with it.</li> </ul> </li> <li>❖ EQ2; How can change be represented mathematically?           <ul style="list-style-type: none"> <li>• EU2.Proportional Reasoning involves retaining the multiplicative relationship of a ratio although the numbers have changed.</li> </ul> </li> <li>❖ EQ3: How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?           <ul style="list-style-type: none"> <li>• EU3.Mathematical situations can be represented verbally, numerically through tables, symbolically, or graphically. Which one I choose depends on the context.</li> </ul> </li> <li>❖ <b>EQ4: How can you represent the same number in different ways?</b> <ul style="list-style-type: none"> <li>• EU4: Two expressions are equivalent when they refer to the same quantity.</li> </ul> </li> </ul> <p>Infer</p> <ul style="list-style-type: none"> <li>• What ideas am I deriving from the data?</li> <li>• What is the (data, author, etc) saying and NOT saying?</li> </ul> <p>Illuminate</p> <ul style="list-style-type: none"> <li>• How might I model this in simple but powerful way?</li> </ul> |

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|  | <p>Investigate</p> <ul style="list-style-type: none"> <li>• How useful is this source (and how would I determine it)?</li> </ul> <p>Refine</p> <ul style="list-style-type: none"> <li>• How might this idea be better?</li> </ul> <p>Critique</p> <ul style="list-style-type: none"> <li>• How should we evaluate this – By whose or by what criteria and standards</li> </ul> <p>Communicate</p> <ul style="list-style-type: none"> <li>• Have I made my case in a way that this audience can follow and grasp?</li> <li>• How can I best express my thinking so others know precisely what I mean?</li> </ul> <p>Justify</p> <ul style="list-style-type: none"> <li>• Is there enough evidence to support the decision</li> </ul> <hr/> <p style="text-align: center;"><b>Acquisition</b></p> <p><i>To achieve these goals, students will need to know and know how to...</i></p> <ol style="list-style-type: none"> <li>1. Find and interpret unit rates</li> <li>2. Recognize and represent proportional relationships</li> <li>3. Find an unknown using proportional reasoning</li> <li>4. Fluently compute with fractions, decimals and percents</li> <li>5. Compute percent increase and percent decrease</li> <li>6. Compute profit</li> <li>7. Represent and solve situations using algebraic equations</li> <li>8. Represent and solve situations using algebraic inequalities</li> </ol> |
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| Stage 2 – Evidence |                                  |   |
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| Alignment Coding   | Aligned Criteria (Rubric Titles) |   |
|                    |                                  | <p>TRANSFER TASK: (Summative Assessment – as a culminating activity as evidence of student Transfer)<br/>In general, a much shorter but focused task presented at the conclusion of the unit.</p> <p>Students will TRANSFER their understandings of proportionality and efficient usage of equations to determine costs and set price point for a specific item for sale to determine how many units must be sold to reach the given target Net Profit. Students will use Percent Increase equation to determine the “markup” of the product being sold based on their projected calculations. This task allows students with the same given target Net Profit to use the same process but yield different results depending on their setting of price points and the number of units sold. Additionally, students will use percent increase to determine the “markup” for the product being sold.</p> <p><b>What’s the Point?</b><br/>Students are presented with this task:<br/>To support the young entrepreneurs in your class, your Principal has agreed to lend you \$500 to spend toward making a profit, which you will use toward a new iPad that you can use in class. To purchase the iPad, you must earn a Total Profit of \$400.</p> <p>Students will be given a target <b>Profit (\$400)</b>, the <b>Cost per Unit and Total Fixed Cost</b> and will work backwards to analyze costs and set a price point for their own business venture. Students must consider how many units must be sold (<b>Quantity</b>) and a <b>Price</b> which will earn a Total Profit of \$.</p> <p style="text-align: center;"> <math display="block">\text{Total Profit} = (\text{Price} * \text{Quantity}) - (\text{Cost per Unit} * \text{Quantity}) - \text{Total Fixed Costs}</math> <div style="display: flex; justify-content: space-around; width: 100%;"> <span><i>Revenue</i></span> <span><i>Total Variable Cost</i></span> <span><i>Total Fixed Cost</i></span> </div> </p> <p>Percent Increase Formula for Markup:<br/>Percent Markup = (Price – Cost)/Cost ... times 100 to find percent</p> |
|                    |                                  | <p><b>OTHER EVIDENCE:</b><br/><i>Disclaimer: The following Performance Tasks should be presented at the beginning of the Unit with the purpose of actively engaging students in a real application of the mathematics. Students will acquire the mathematical skills necessary to perform each activity within the unit with a “just in time” teaching approach. The task will be scaffolded as needed, but delivered with the intent to utilize it as continued Formative Assessment where students, forming and adjusting instruction based on student performance within the task. Evidence of Transfer will only occur when students can, independent from scaffolding, and on their own, “do the standard.” Students will evidence Transfer of their learning in the <u>Transfer Task</u> (above) and on carefully constructed quizzes and tests throughout the unit.</i></p>  |

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|  |  | <p><b>Performance Task (Formative Assessment used to <i>drive instruction</i>):</b></p> <p><b>Part 1- Setting the Stage:</b><br/>                 Students will be introduced to this task by proposing the scenario of having a fundraiser to serve two purposes: 1) for a class activity (ie: class trip, school dance, etc.) <i>and</i> 2) for a charity event (ie: Hurricane Sandy relief, Boston Marathon Victims, etc.) . A whole class brainstorming activity should ensue where students will come up with and settle on ideas for both purposes. Once determined, students will be charged to determine the method by which they would like to raise the funds to allocate toward each cause. Initially, the focus should be on the concept of the fundraising method, not the products. Some ideas may be: running a school store, selling school themed products to the public online and/or by special order, door to door fundraising, a one-time fundraising event (ie: carwash, bake sale, etc).</p>  |
|  |  | <p><b>Part 2 – Finding Best Purchase Prices</b></p> <p>In cohorts, students will brainstorm products to sell, find wholesale pricing and determine the “best price” based on lowest unit rates. Teacher should guide cohorts into targeting <i>at least one</i> product in each of the following three categories to allow for varying complexity of finding Unit Rates:</p> <p>Level1) <b>RESALE OF FINISHED PRODUCTS</b> - Calculate the unit rate based on bulk/wholesale prices of already finished products (ie: pencils, folders sold in bulk, candy, soda or other basic items usually sold in bulk.) This calculation would simply involve dividing the total cost of bulk packaging by the number of items sold. Proportion equation method should be required as well.</p> <p>Level2) <b>HAND CRAFTED PRODUCTS</b> – For this type of item, students would create an original item using purchased materials or ingredients. For example, students may decide to make a Holiday Wreath made of pinecones, glitter, small bells and Styrofoam rings. Another idea may lead to baking of cupcakes or chocolate dipped pretzels. Once determined, students will calculate the unit rate per UNIT sold based on a combination of items/ingredients used to make the finished product (ie: ingredients for baking cakes, materials used to make hand crafted holiday wreaths, etc.). This calculation would involve more detailed cost accounting procedures where the unit cost of each material or ingredient used per UNIT sold would need to be calculated in sum to determine the Unit Cost for each UNIT sold.</p> <p>Level3) <b>CUSTOMIZED FINISHED PRODUCTS</b> – Other mathematical complexities may arise based on tiered pricing structures or a fixed plus variable pricing structure that would require forecasting of units sold prior to</p> |

Unit Framework - PGCPs

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|  |  | <p>establishing the best unit rate. For example, if selling CUSTOMIZED FINISHED PRODUCTS such as screen-printed school logo t-shirts, there would likely be a tiered volume purchase price or a fixed plus variable pricing structure to account for screen-printing set-up fee plus a per shirt charge. Finding the Unit Cost in this scenario would be detailed as 'conditional' based upon the number of expected units purchased/sold.</p> <p>Determining Total Cost Per Product Purchased</p> <p>Cohorts must find a minimum of three (3) places to purchase each of materials/items/finished products and compare and find best available prices. Students must also determine the number Units to be purchased and project the total cost of each Product to be sold.</p>   |
|  |  | <p><b>Part 3 – Setting the Price Point</b></p> <p>Teacher will present interesting strategies based on Behavioral Economics.<br/>Sample informational website below:<br/><a href="http://conversionxl.com/pricing-experiments-you-might-not-know-but-can-learn-from/">http://conversionxl.com/pricing-experiments-you-might-not-know-but-can-learn-from/</a></p> <p>Cohorts of students should first be encouraged to collaborate to set tentative prices for each of their products to be sold based on what they believe their products would be worth appropriate to the setting of the venue/medium. Following this brainstorming session, students will now be presented with information based on Behavioral Economics to consider when setting the most appropriate Price Points for each Product (see resources in Stage 3). After researching the different approaches to Price Point Setting, students should incorporate one of strategies learned into the setting of the Price Points. Students will project and compare profitability of their originally conceived price point with the new price point set after doing the Behavioral Economics research.</p> <p>Simultaneous to this process, students will project projected profits using the Profit formula (Profit = Income from Sales – Cost of Goods Sold). Though the formula is quite simple on the surface, many embedded variables may affect the Income of Sales and the Cost of Goods Sold depending on the number of items purchased and the number of items sold. Students will be required to show projected profits within several different scenarios using equations and graphic representations.</p> |
|  |  | <p><b>Part 4 – Projecting Profits</b></p> <p><b>Student cohorts will identify a population, develop a survey for this population and collect sample data. This data will be extrapolated to predict profit. Students will represent their profit projections in graphs and equations. These representations will then be used to determine the sales necessary for a desired profit</b></p>  |



Unit Framework - PGCPS

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|  |  | <b>Other Evidence - Quizzes and Tests</b> |

## Stage 3 – Overview of Unit Learning Plan

*Summary of the unit learning experiences and a list of the lessons*

*Unit learning plan summary & rationale:*

*Summary:*

*Rationale:*

The Learning Plan for this unit elicits student engagement and enthusiasm for learning from the onset. Because students are involved in a *real application* (as opposed to a *real-world application* or *synthesized life-like application*) the need for learning how to maximize profit to be used for a class activity and a charitable event will be heightened. Students will understand the need for accuracy in determining operating costs, however, the research and richness of dialogue needed to set the best price points will convey the need to utilize mathematical understandings of profit through efficient usage of equations symbolically and with models. Students will consider various scenarios of forecasted sales figures (projected units sold) to assist in the analysis needed to set the prices for each item. Scaffolding on Grade 6 standards where Unit Rates are introduced, students will now expand their usage by identifying such in graphs and equations used to forecast sales. Also central to the unit, in standard 7.EE.3, students will consistently be asked to persevere in multi-step real-life and mathematical problems using strategic tools. Students will fluently transition between decimal, fraction and percent within problem solving, understanding the optimally efficient usage of each in context.

*Lessons:*

- 1: Setting the Stage
- 2: Finding the Best Purchase Price
- 3: Setting the Price Point
4. Projecting Profits

[the lesson titles are listed in chronological order; further detail is found on the learning plan page – see below]

Unit Framework - PGCPs

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*Unit resources (available in classroom, available online, and supplied)*

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**LESSON 1 – SETTING THE STAGE – ( 2 days total for Events 1 and 2)**

**Event #1: Finding a Cause 1 day**

*Motivator/Hook:*

Introduce the concept of helping people in need. Show a short video of a natural disaster, a quick news clip of American Red Cross helping disaster victims, (suggestions: Superstorm Sandy Relief, Boston Marathon Victims, Cancer Research, etc.)

*Whole Class Brainstorming Activity Discussion:*

- Brainstorm a Cause for which to raise money.
- How to raise the money.
- Pose the question of whether or not they should keep some of the profits to themselves to use for a class trip or something similar.
- Record Responses from Brainstorming activity to be seen by all students
- Settle on a Cause for which to fundraise.
- Settle on a Class Event where some portion of profits from fundraising will be allocated.

***Small Group Activity***

Set up groups of 3-5 students. Each group will settle on one of the brainstormed methods recorded to fundraise and determine specific products or services to be used for this fundraising event(s).

***Potential Rough Spots, Look fors, and Adjustments***

**Talk for 10 Strategy**

- for whole group discussions, when questions are posed to entire group, prompt students to speaking with a partner for “10 seconds” (can extend to ~30s, but no more) to enable less confident students to respond to the question without the pressure of the entire class listening. This technique maximizes active engagement within a whole class discussion and avoids the problem of a few “stars” dominating the discussion. After students “talk for 10” have one partner report out to group with ideas shared.

Use worksheet to guide group discussion. Set area for students to list products. Set area for students to record up to 3 advertised prices found on internet or “Shop Savvy” or “Price Grabber” Apps on iPad for each product to later use for discussion on price points

**Event Resources & Text Correlation**

Video: *Sandy Relief American Red Cross*

<http://www.youtube.com/watch?v=PNkbW37NoQE&feature=share&list=PLc8i7LdqNeqev9mWEdRzjmpZewx3Gxuu>

**Differentiation**

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**EVENT #2 – How Much Can We Make? – 1 day**

**Small Group Activity**

Propose Open Ended Question - how do we make money from selling products or services? What is profit?

- Groups come to conclusion as to how money is made that they can give to cause
- Groups must derive an equation to represent how money is made from selling products or services

**Whole Class Discussion**

- Students present derived equations. Relate student equations to “textbook” Profit Equation.
- Introduce Vocabulary:
  - Profit
  - Costs
  - Sales
- Introduce Profit Equation
- Profit = Sales – Cost

Establish the idea that, mathematically, lower costs and higher sales price = more profit *per item*. Discussion re: volume of sales effects on overall profit to be introduced later.

**Potential Rough Spots, Look fors, and Adjustments**

Students have difficulty distinguishing between profit, sales, and cost. It is helpful to give examples such as a store. The income to the store is the sales- money in the register from purchases; the cost is money need to operate the store (rent, employees, merchandise to sell, etc.), the profit is the income money left over after all the costs are paid.

*Event Resources & Text Correlation*

*Differentiation*

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**LESSON #2 – FINDING THE BEST PURCHASE PRICE** 4-6 Days total for Events 1-3

**Event #1: Calculating the Unit Price** (1 day)

*Whole Class Introduction/Small Group Investigation:*

- Present bulk pricing for several possible products to be sold at the school store or other fundraising event. Have students work in groups to determine the best price for identical items from three different stores, catalogues or online resource.
- Present 3 different scenarios similar to the one below:
  - Example:
    - Item #1: (24) 12 oz. cans Pepsi for \$11.99
    - Item #2: (12) 12 oz. cans of Pepsi for \$6.99
    - Item #3: (30) 12 oz. cans of Pepsi for \$14.95

*Potential Rough Spots, Look fors, and Adjustments*

- Some students will have difficulty understanding the difference between the price for Item #1 and Item #3. Though the calculated “answer” is different, these two packages yield the same price per can after rounding.
- Try to create as many situations like this as possible so that they can interpret the calculated answer and make sense of it in a real world context.
- It is possible to examine this pricing by setting up proportions. Since all the can quantities in the above example are divisible by 6, students may compare costs by finding the cost of 6 cans instead of the unit rate cost per can.

*Event Resources & Text Correlation*

Text: Big Ideas Math, Larsen, R and Boswell, L., Big Ideas Learning 2012. Chapter 3, Lesson 3.1, 3.3 – 3.6

*Differentiation*

## Unit Framework - PGCPS

- **L1** – Keep all comparisons measuring the exact same product (size and type). Allow students to calculate all problems with a calculator, as the mechanics of division are not the goal in this portion of the unit. Understanding how to make sense of the calculated answer will take some understanding here, particularly comparing Items #1 & 3.
- **L2/L3** – Add a 4<sup>th</sup> Item to the problem set which would compare 20 oz. soda bottles. Find a “per bottle” price that is more expensive per bottle but less expensive per ounce.
  - Example Item #4: (12) 20 oz. bottles of Pepsi for \$7.99. (unit cost is \$0.67/bottle)
    - Prompt students to discuss the following:
      - If you were buying the case of soda for yourself, which is the better deal, Item #1 or Item #4?
        - (Students may need prompting to look for the ‘per oz.’ rate.)
      - If you were buying the case of soda to sell at the school store, which is the better deal? (*look for discussion that will lead to the concept of profit margin and price point setting*)

### EVENT #2 – Determining Unit Price for Items Chosen (2-3 days)

In cohorts, students will brainstorm products to sell, find wholesale pricing and determine the “best price” based on lowest unit rates. Teacher should guide cohorts into targeting *at least one* product in each of the following three categories to allow for varying complexity of finding Unit Rates:

L1) **RESALE OF FINISHED PRODUCTS** - Calculate the unit rate based on bulk/wholesale prices of already finished products (ie: pencils, folders sold in bulk, candy, soda or other basic items usually sold in bulk.) This calculation would simply involve dividing the total cost of bulk packaging by the number of items sold. Proportion equation method should be required as well.

- Have students look for pricing on internet or provide pricing for students
- Examples of Resale of Finished Products

L2) **HAND CRAFTED PRODUCTS** – For this type of item, students would create an original item using purchased materials or ingredients. For example, students may decide to make a Holiday Wreath made of pinecones, glitter, small bells and Styrofoam rings. Another idea may lead to baking of cupcakes or chocolate dipped pretzels. Once determined, students will calculate the unit rate per UNIT sold based on a combination of items/ingredients used to make the finished product (ie: ingredients for baking cakes, materials used to make hand crafted holiday wreaths, etc.). This calculation would involve more detailed cost accounting procedures where the unit cost of each material or ingredient used per UNIT sold would need to be calculated in sum to determine the Unit Cost for each UNIT sold. Students should express the unit cost calculation in terms of an equation.

Unit Framework - PGCPs

L3) **CUSTOMIZED FINISHED PRODUCTS** – Other mathematical complexities may arise based on tiered pricing structures or a fixed plus variable pricing structure that would require forecasting of units sold prior to establishing the best unit rate. For example, if selling CUSTOMIZED FINISHED PRODUCTS such as screen-printed school logo t-shirts, there would likely be a tiered volume purchase price or a fixed plus variable pricing structure to account for screen-printing set-up fee plus a per shirt charge. Finding the Unit Cost in this scenario would be detailed as ‘conditional’ based upon the number of expected units purchased/sold. Students should express the unit cost calculation in terms of an equation.

### **Event # 3 - Determining Total Cost Per Product Purchased 1-2 days**

Cohorts must find a minimum of three (3) places to purchase each of materials/items/finished products and compare and find best available prices. Students must also determine the number units to be purchased and project the total cost of each product to be sold.

#### *Potential Rough Spots, Look fors, and Adjustments*

- Students may need to do unit conversions depending on what they are comparing. For examples, some prices may be per oz. while others may be in liters.

#### *Event Resources & Text Correlation*

Text: Big Ideas Math, Larsen, R and Boswell, L., Big Ideas Learning 2012. Chapter 3, Lesson 3.1, 3.3 – 3.6

#### *Differentiation*

### **LESSON #3 – DETERMINING PRICE POINTS and UNIT PROFIT 3-4 days total for Events 1-2**

#### **Event #1: How to set a price point 1 day**

##### *Small group activity/Jigsaw*

For each product selected in Event #2 Lesson 2, student cohorts collaborate and record a tentative price for each of their products they decided to sell/service they will offer for fund raising. It is expected the price points set will be based on students’ life experience.

Students read and discuss one of the pricing strategies presented in <http://conversionxl.com/pricing-experiments-you-might-not-know-but-can-learn-from/>



[Groups are then rearranged to share what they learned about the particular pricing strategy in their new group. After sharing ideas, students cohorts will re-examine their product pricing and make adjustments to their selling price based on the discussions and new information about pricing strategies.](#)

#### *Potential Rough Spots, Look fors, and Adjustments*

When students record price points at the start of this event they made think it is important to price high to make a large profit. This is an opportunity to discuss the economics of high prices resulting in lower unit sales and lower unit prices possibly increasing sales, so where *is* the balance to get the most units sales?

#### *Event Resources & Text Correlation*

Text: [Big Ideas Math](#), Larsen, R and Boswell, L., Big Ideas Learning 2012. Chapter 4, Lesson 4.1-4.4

#### *Differentiation*

A prepared summary of the pricing strategies discussed in the article should be available for reference.

### **Event #2: Determining profit 2-3 days**

#### *Small group activity*

Using their price determined in Lesson #3 Event #1, students will determine the profit of each item sold. The profit equation **Profit = Selling price of item – Cost to produce** item be should written in its expanded form so if there is a change in production cost, change in profit could easily be computed. This expanded form includes all the variables considered in Lesson #2 computation of unit cost. (This equation can later be used to set up a spreadsheet to compute profits based on ‘n’ units sold.)

Students determine which products are the most profitable by computing the percent markup of items.

#### *Potential Rough Spots, Look fors, and Adjustments*

#### *Event Resources & Text Correlation*

Text: [Big Ideas Math](#), Larsen, R and Boswell, L., Big Ideas Learning 2012. Chapter 4, Lesson 4.1-4.4

\*Any lessons not covered from Chapter 4 should be taught at this time before moving onto Lesson #4.

#### *Differentiation*

Students will have profit equations with complexity depending on the types of products decided upon in Lesson #2 Event 1

**LESSON #4 – PROJECTING PROFITS** 6-8 days total for Events 1-5

**Event #1: Whole class discussion** 1 day

**Pose the following question for discussion:** Is it possible to predict profit?

This discussion should be teacher facilitated with the students exploring the idea of using a survey to get sample data that can help make projections for a larger population. Discussion must include what is a reasonable sample, and the types of questions that would provide the necessary data.

**Event #2: Small group** 1 day

Students will work in their cohorts to determine who the target audience should be for their survey, what would be an appropriate sample size and survey questions.

*Potential Rough Spots, Look fors, and Adjustments*

The decisions' from each cohort must be reviewed for viability before they begin Event #3

**Event Resources & Text Correlation**

Text: Big Ideas Math, Larsen, R and Boswell, L., Big Ideas Learning 2012. Chapter 8, Lesson 4

**Differentiation**

**Event #3: Survey and projected profit** 2-3 days

**Small group activity**

Student cohorts will conduct survey or collect data from other sources.

Students will extrapolate the data to predict profit that can be made from their fund raising. The projected profit will be displayed on a graph with the number of items sold as the independent variable and profit as the dependent variable.

*Potential Rough Spots, Look fors, and Adjustments*

## Unit Framework - PGCPs

It is possible other school organizations or student groups have held similar fund raising event and students may have access to their sale data.

### **Event Resources & Text Correlation**

Text: Big Ideas Math, Larsen, R and Boswell, L., Big Ideas Learning 2012. Chapter 3, Lesson 2, 7, 8

### **Differentiation**

Cohorts that sell one item or provide a service for fundraising will produce a single linear graph. Cohorts that sell multiple items will show a profit graph with more than one linear relationship.

### **Event #4: Desired profits – 1 day**

#### **Small group activity**

Present students with “target” profit numbers. Students will work in their cohorts to determine the number of units,  $n$ , they would have to sell to raise targets profit. Students will have to use equations to solve these scenarios.

#### **Potential Rough Spots, Look fors, and Adjustments**

This will be a greater challenge for cohorts who are selling multiple items since it will be a combination of different profits that will help them reach the target profit. They will have to determine the number of units they could sell for all products but one and work backwards to determine the last number of units.

Cohorts selling two products will need to determine the number of units for one product and work backwards to determine the number of units for their second product.

### **Event Resources & Text Correlation**

Text: Big Ideas Math, Larsen, R and Boswell, L., Big Ideas Learning 2012. Chapter 3, Lesson 8

### **Differentiation**

Cohorts that sell one item or provide a service for fundraising will solve a simple two step equation and the answer can easily be verified by a graph.

Cohorts that sell two items can create a scatter plot with the number of each type of item sold on an axis. Each plot then represents the number of each unit needed to be sold to raise the target profit. This plot would be an indirect variation.

### **Event #5: Desired profits –Additional Constraints - 1 day**

***Small group activity***

Present students with “minimum target” profit numbers. Students will work in their cohorts to determine the number of units,  $n$ , they would have to sell to raise the minimum targets profit. Students will have to use inequalities to solve these scenarios.

***Potential Rough Spots, Look fors, and Adjustments***

This will be a greater challenge for cohorts who are selling multiple items since it will be a combination of different profits that will help them reach the minimum target profit. They will have to determine the number of units they could sell for all products but one and work backwards to determine the last number of units.

Cohorts selling two products will need to determine the number of units for one product and work backwards to determine the number of units for their second product. Students should realize that this situation has an infinite number of solutions.

***Event Resources & Text Correlation***

Text: Big Ideas Math, Larsen, R and Boswell, L., Big Ideas Learning 2012. Chapter 2, Lesson 6b

***Differentiation***

Cohorts that sell one item or provide a service for fundraising will solve a simple two step inequality and the answer can easily be verified by a graph

Cohorts that sell two items can create a scatter plot with the number of each type of item sold on an axis. Each plot then represents the number of each unit needed to be sold to raise the target profit. This plot would be an indirect variation with the appropriate side of the plot shaded.

This level of graphing is **not required** in the Grade 7 CCSS but is offered here as an extension activity.