Solving One-Variable Equations:

Students Take Control

Grant Proposal for Connecting Mathematics to Other Subject Areas

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# Abstract

The Fuller Middle School, in Little Rock, AR is seeking a grant to enable us to connect math to other subjects. The objective is to help all of our at risk students increase their math skills and to help our students make the connection between math and other subjects. The objective is that by the end of our unit students will be able to solve one-variable equations with ease. Project-based instruction has proved to be a very effective technique of teaching and it will be used to integrate math, english, and technology. The students will learn to make real life connections and develop communication skills throughout the unit. Funding in the amount of $3,999.96 is requested to purchase required manipulatives, software, and hardware for the classroom.

# Statement of Need

Fuller Middle School has 450 students (54.2% African American, 34.8% Caucasian, 7.5% Hispanic, and 3.5% Asian) and only 193 students tested at the state standard in mathematics. Their performance in math is due to a variety of reasons, including learning disabilities and other economic and language-based difficulties. Fuller Middle School has a high population of “at-risk” students and if they are not given the opportunity to improve their math, language, and technology skills through an applicable project, they are more likely to be truant and even possibly drop out of school.

# Objectives and Activities

The students will be working in groups throughout a five-week PBI unit centered on planning the best class party within the student’s budget. The students are required to make three major decisions- food vendor, party rental, and DJ- within a specified budget while designing their best class party. The students will be doing two separate investigations that will build their knowledge of inequalities, writing and solving one-variable equations. During the five week unit, the students will be participating in interactive benchmark lessons integrated throughout the unit. Upon the completion of the algebraic equations and solutions, each group will present their decisions on each of the major decisions that need to be made and they will present evidence that support their answers. After the presentations, the students will compare their algebraic equations and solutions to other teams as they have to select the best decisions made and everyone in the classroom has to agree.

The final step of the project would be to make a professional presentation to bring before the student council to convince them that each decision is sound. For each of the problems given, the students should include the algebraic equation, step-by-step algebraic solution, and the final decision. This artifact gives the students the opportunity to discuss and learn more about one-variable equations and the operations properties with an aspect of real-life application that gives value beyond the classroom. In order to complete this assignment, the students will have to master the properties of equality and the distributive property, solving given linear equations, and translating word problems into algebraic equations. The oral presentation would demonstrate the mastery of the above mathematics subjects. The idea of these unit stems from the fact that “there are several aspects of writing and solving algebraic equations that challenge students” (Monterey Institute of Technology and Education, 2011). This relevant because the students must be able to apply these concepts in order to succeed in any algebra course. These skills are a prerequisite for any later Arkansas state core standards such as:

* Solve linear equations in one variable.
* Analyze, solve, and graph linear inequalities.
* Solve real-world and mathematical problems leading to two linear equations in two variables.

This would give the project meaning, combined with the excitement from the possibility of planning the best class party.

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# Evaluation

The students will be evaluated throughout the unit through various worksheets, journal entries, and class activities. The final project will be in the form of an oral and visual presentation. First the actual content of the project will be evaluated. The group’s project must appropriately answer each of the problems and the algebraic equations must be set up properly. The step-by-step solution to each equation is given. The group must correctly identify which vendor is the better choice for the party and justifies the decision mathematically. The group’s presentation of the project will also be evaluated. Their presentation must contain information presented in a logical and interesting sequence. The presentation must also be easy for the audience to follow. Their project must also be professional-looking with graphics and effective use of color.

# Budget

Solving One-Variable Equations Project  
Class size: 52 Students, Class 1 = 28 Students, Class 2 = 24 Students

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| Item | Item Location | Quantity | Price Per Item | Total Cost in Dollars |
| Versa Tiles | http://www.hand2mind.com/item/versatiles-algebra-1-starter-set/1721 | 11 | $49 | $539.00 |
| Algeblocks Study Group Set | http://www.hand2mind.com/item/algeblocks-study-group-set/4879 | 7 | $69.95 | $489.65 |
| Hands-on Equations  Scale equation manipulative | <http://www.eaieducation.com/Product/533599/Hands-On_Equations%C2%AE_Teacher_>  s\_Demonstration\_Scale\_Game\_Pieces.aspx | 1 | $79.95 | $79.95 |
| Set of Student Game Pieces and Laminated Scale | http://www.rainbowresource.com/proddtl.php?id=021796 | 52 | $5.50 | $286.00 |
| Algebra Pieces Student Set | http://www.rainbowresource.com/proddtl.php?id=062239 | 52 | $2.95 | $153.40 |
| Trifold Display Board | Target |  | $3.99 | $103.74 |
| Laptop:  Chromebook | BestBuy | 12 | $159 | $1,908.00 |
| Calculators:  TI-84 | http://www.calculatorti.com/ti-84-plus/?id=ti84id2&gclid=CL-9mKPJu8kCFUokgQodriULzg | 6 | $85 | $510.00 |
| Book:  “If You Made a Million” by David Schwartz | http://www.amazon.com/You-Made-Million-David-Schwartz/dp/0688136346 | 6 | $5.66 | $33.96 |
| Total Cost |  | - | - | $3,999.96 |