

Service Learning Lesson Plan

Project Title: City Renovation Project **Grade Level:** HS Algebra **Duration:** 4 weeks
Main Subject Area: Math **Theme:** Construction

Objective/Description

This project gauges the student's ability to build relationships between patterns, models, word problems, tables and graphs in real world situation. Students model a real world situation with algebraic expressions in a multiplicity of representations (concrete, pictorial, symbolic, and verbal). Students create a proposal to give to the City Planner which lays out a design that renovates a plot of city-owned land that includes a border of green space with retail, parking, and living space.

Common Core State Standards

- **CCSS.Math.Content.HSA.CED.A.3** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.
- **CCSS.Math.Content.HSA.REI.A.1** Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
- **CCSS.Math.Content.HSA.REI.B.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Driving Question

How can we use expressions, equations, and inequalities to model and solve real-world problems?

Investigation

Research, class instruction, interviewing civic leaders and/or professionals, surveying neighbors or peers

- Students meet with city officials to determine the needs and wants for the plot of land being renovated as well as the size of the land.
- Students investigate the various options for the renovation based on the given perimeters in which they must create their proposal.
- Students interview local businesses and community members to understand their space preferences.
- Students meet with an architect and/or engineer for mentorship throughout the project.
- Students investigate the pros & cons of the various size allotments of green space, retail, parking and living space.

Preparation

Collaborative problem solving, planning, and task assignment by & with the students

- Students make predictions for the width & length of the green border.
- Calculate the area of the rectangle inside the border for the renovation based on each chosen width.

- Make a table with the area of renovation as the y value and the width as the x value. Graph each ordered pair.
- Gather demonstration materials/technology needed for presentation.
- Students determine which renovation scenario is the most feasible contingent upon the algebraic calculations performed.
- Students assign tasks/roles for the presentation.

Action

Service activities or methods used to address a social issue or community need

- The students produce a pictorial representation of the final decision on a poster, PowerPoint, or Prezi. The representation is made to scale using the proper measurements with a key representing plants, trees, gardens, walkways, buildings, parking lots, retail space etc.
- Students present the proposal to City officials.

Reflection

Frequent assessment of students' growing knowledge and developing skills; refer to driving question

- Students complete an exit slip asking, "What do you understand better now about solving equations and inequalities, order of operations, substitution, and writing expressions because of your involvement in this service learning project?"
- Students discuss the various suggested proposals and explain in writing why the class picked the optimum scenario.
- Students explore alternate options based on the feedback they received from City Officials. Students create a picture board to display the options at school after participating in pair/share and large group discussions.
- Students identify all careers that use math concepts within this unit.

Demonstration of Knowledge

Assessment of students' knowledge/skills and project outcomes

- Students present their project to community members after making revisions to their proposal based on the the feedback from the presentation they made to City Officials .
- Picture Board/Prezi are exhibited at City Building or architect/city planner's office.

Community Partners

Includes anyone who offers expertise to the project or who benefits from the project

City Officials, City Administrator, Local Businesses, Community Members, Architect/Engineer

Outcome

Funds or goods generated, direct or indirect service provided, advocacy or education done

Proposal that displays renovation plans for green space, retail space, as well as parking and living space in empty plot of land.

Secondary Subject Areas (All that apply are in bold)

- **English, Reading, Language Arts**
- World Languages
- Arts
- Mathematics
- Science
- **Economics**
- Geography
- History
- **Government and Civics**
- Global Awareness
- Financial, Economic, Business, and
- Entrepreneurial Literacy
- Civic Literacy
- Health Literacy
- Environmental Literacy

21st Century Skills (All that apply are in bold)

- Career Readiness
- **Creativity and Innovation**
- **Communication and Collaboration**
- **Critical Thinking and Problem Solving**
- Physical Education
- **Initiative and Self-direction**
- **Flexibility and Adaptability**
- Consumerism
- **Information Literacy**
- Media Literacy
- Technology Literacy
- Productivity and Accountability
- **Leadership and Responsibility**
- Social and Cross-cultural Skills

Project adapted from ACPS (Alexandria City Public Schools)

Algebra 1: Unit Two

www.acps.k12.va.us/curriculum/design

Based on “Backwards Design”