Appendix 1: Implementing Teaching Standards

Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

By implementing this project-based learning, I would have enforced the common core standards for mathematical practice with the focus on:

Make sense of problems and persevere in solving them. Students analyze given constraints to make conjectures about the form and meaning of a solution to two-variable linear equations. Students are systematically guided to understand the meaning of a linear equation in two variables with respect to proportional relationships.

Reason abstractly and quantitatively. Students decontextualize and contextualize throughout the module as they represent situations symbolically and make sense of solutions within a context. Students use facts learned about rational numbers in previous grade levels to solve linear equations and systems of linear equations.

Construct viable arguments and critique the reasoning of others. Students use assumptions, definitions, and previously established facts throughout the module as they solve linear equations. Students make conjectures about the graph of a linear equation being a line, then proceed to prove this claim. While solving linear equations, they learn that they must first assume that a solution exists, then proceed to solve the equation using properties of equality based on the assumption. Once a solution is found, students justify that it is in fact a solution to the given equation, thereby verifying their initial assumption. This process is repeated for systems of linear equations.

Model with mathematics. Throughout the module, students represent real-world situations symbolically. Students identify important quantities from a context and represent the relationship in the form of an equation, a table, and a graph. Students analyze the various representations and draw conclusions and/or make predictions. Once a solution or prediction has been made, students reflect on whether the solution makes sense in the context presented. One example of this is when students determine how many buses are needed for a field trip. Students must interpret their fractional solution and make sense of it as it applies to the real world.

Look for and make use of structure. Students use the structure of an equation to make sense of the information in the equation. For example, students write equations that represent the constant rate of motion for a person walking. In doing so, they interpret an equation such as $y = \frac{3}{5}x$ as the total distance a person walks, y, in x amount of time, at a rate of $\frac{3}{5}$. Students look for patterns or structure in tables and show that a rate is constant.