HIGH SCHOOL ALGEBRA: THE CYCLE SHOP

UNIT OVERVIEW
This packet contains a curriculum-embedded CCLS aligned task and instructional supports. The task is embedded in a 4-5 week unit on Reasoning with Equations and Inequalities.

TASK DETAILS
Task Name: The Cycle Shop
Grade: High School Algebra (Algebra 1)
Subject: Mathematics
Depth of Knowledge: 3

Task Description: The tasks in the unit access the full range of Depth of Knowledge including Recalling and Recognizing, Using Procedures, Explaining and Concluding and Making Connections, Extensions and Justifying.

Standards Assessed:
A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
A-CED.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. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.
A-REI.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 the solution method.
A-REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
A-REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

Standards for Mathematical Practice:
MP.1 Make sense of problems and persevere in solving them.
MP.3 Construct viable arguments and critique the reasoning of others.
MP.4 Model with mathematics.
MP.7 Look for and make use of structure.
Performance Task
The Cycle Shop

You work for a small business that sells bicycles, tricycles, and tandem bikes. Bicycles have one seat, two pedals and two wheels. Tricycles have one seat, two pedals, and three wheels. Tandem bikes have two seats, four pedals and two wheels.

1. On Monday you counted 48 tricycle wheels.

   How many tricycles were in the shop? __________________.

   Write an algebraic equation that shows the relationship between the number of wheels (w) and the number of tricycles (t).

2. On Wednesday there were no tandem bikes in the shop. There were only bicycles and tricycles. There are a total of 24 seats and 61 wheels in the shop. How many bicycles and how many triangles are in the shop?

   ________________________________

   Show how you figured it out using algebra.
3. A month later, there are a different number of bicycles, tricycles tandem bikes in the shop. There are a total of 144 front steering handlebars, 378 pedals, and 320 wheels.

How many bicycles, tricycles and tandem bikes are in the shop?

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Explain your solution.