NAME _____ DATE _____

Scenario

A dart launcher fires a dart so fast that the speed cannot be measured by any direct method. Angela wishes to determine the speed with which the dart is fired. After being fired, the dart will embed itself into a wooden block. She already knows the mass m *of the dart.*

Experimental Design

PART A: Angela has access to the equipment listed below. Mark the space next to each piece of equipment that she could use in an experiment to determine the dart's speed.

_____ Meterstick _____ Stopwatch _____ String _____ Electronic balance

_____ Cart with frictionless bearings and light wheels (that the wood block can be attached to)

_____ Track (that allows the cart to travel in a straight line with no noticeable friction)

_____ Hooks (that can be connected to the ceiling of the classroom or the block)

_____ Camera (that can take video that can be replayed frame by frame with time codes indicated on each frame)

PART B: Outline a procedure that Angela could follow to use the equipment that you marked above to make measurements that could be used to calculate the firing speed of the dart. Give each measurement a meaningful algebraic symbol. Draw a labeled diagram of the experimental setup.

What Needs to Be Measured and Algebraic Symbols	Procedure:
Labeled Diagram of the Setup	

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Data Analysis

PART C: Explain how the measurements can be used to calculate the speed with which the dart is fired from the gun. As part of your explanation, show symbolic equations that measurements must be plugged into and solved to arrive at your conclusion.

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