NAME _____ DATE _____

Scenario

Angela is given a spring, meterstick, stopwatch, and set of objects of known mass, that can be connected to the spring. She also has a stand with a clamp from which the spring can be connected to and hang vertically.

Experimental Design

PART A: Briefly explain how Angela can obtain a value for the spring constant of the spring using this equipment.

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

Angela is then shown to an elevator that is currently on the ground floor. She needs to use this equipment to analyze the motion of the elevator between the time that the doors close and the time that the elevator reaches its maximum upward speed. Specifically, Angela is to determine the elevator's maximum upward speed v_{max} and the upward acceleration a that the elevator has as its speed increases to maximum.

The elevator has no windows, so there is no way for her to make measurements relative to anything outside the elevator.

PART B: Outline a brief procedure that explains how measurements are to be made that can be used to calculate v_{max} and a.

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

Analyze Data

PART C: Explain how the measurements made in the procedure outlined in Part B can be used to determine the values of v_{max} and a.

Argumentation

PART D: An object connected to the spring causes the spring to be 10-cm long before the elevator begins to move. When the elevator has reached half its maximum speed, the spring is 12 cm long.

i. How long is the spring when the elevator has finished accelerating and reached its maximum speed? Explain your reasoning.

ii. How long is the spring when the elevator is moving upward but slowing down with the same magnitude acceleration a that it had while speeding up?

_____ Longer than 10 cm _____ Equal to 10 cm _____ Shorter than 10 cm

Explain your reasoning.