Name_____

Date _____ **Pd** ____

Unit 4:
Elevator Lab

In this activity you will analyze the forces acting on a person riding in an elevator.

Before you watch the video clip answer the following questions:

1. Describe the times in the elevator when you feel your "normal" weight.

2. Describe the times in the elevator when you feel heavier than your "normal" weight.

3. Describe the times in the elevator when you feel lighter than your "normal" weight.

Activity: Watch the video clip: Elevator-cues. Record the scale readings you see.

	Force (pounds)	Force (newtons) (1 pound = 4.5 Newtons)
Scale reading at rest:	_____	_____
Maximum scale reading:	_____	_____
Minimum scale reading:	_____	_____

Label the following as **equal** to, **greater** than, or **less** than the scale reading at rest.

_____ At rest at the bottom

_____ Starting to go up

_____ Going up at constant speed

_____ Slowing to stop at the top

_____ Stopped at the top

_____ Starting to go down

_____ Going down at constant speed.

_____ Slowing to stop at the bottom.

Calculate the mass of the person on the scale in kilograms: _____

Force Analysis: Draw a quantitative force diagram for the passenger in each of the following situations during the elevator ride. Label the forces in newtons. To the right of each diagram draw a **velocity** and **acceleration** vector that describes the motion of person in the elevator. Calculate the net force and the acceleration of the person.

1. At rest at the bottom Quantitative force diagram velocity vector: acceleration vector: net force = acceleration =	**2. Starting to go up** Quantitative force diagram velocity vector: acceleration vector: net force = acceleration =
3. Going up at constant speed Quantitative force diagram velocity vector: acceleration vector: net force = acceleration =	**4. Slowing to stop at the top** Quantitative force diagram velocity vector: acceleration vector: net force = acceleration =

5. Stopped at the top Quantitative force diagram velocity vector: acceleration vector: net force = acceleration =	**6. Starting to go down** Quantitative force diagram velocity vector: acceleration vector: net force = acceleration =
7. Going down at constant speed. Quantitative force diagram velocity vector: acceleration vector: net force = acceleration =	**8. Slowing to stop at the bottom.** Quantitative force diagram velocity vector: acceleration vector: net force = acceleration =

9. How do the upward accelerations compare to the downward accelerations? Explain why.

Extension:

Watch the video clips Elevator-1 and Elevator-2. From changes in the scale readings during the rides, determine whether the elevator was ascending or descending in each clip. Justify your conclusions.