

Name: \_\_\_\_\_  
Date: \_\_\_\_\_  
Class Period: \_\_\_\_\_

### Extra Credit Lab: Falling in an Elevator

#### Theory:

In this lab, you will be collecting data on how your 'weight' changes when you are riding in an elevator. Specifically, you will be observing any changes when the elevator starts and stops moving. What is happening when the elevator first begins its motion and when it comes to a stop?

Based on what we know about bathroom scales from our study on forces, the value for your weight presented on a bathroom scale is based on the force you exert on the scale or rather the normal force the scale must exert to keep you in equilibrium. (See Figure 1)

#### Materials:

Elevator in some large building  
Bathroom scale  
Pencil, paper, calculator  
Camera either digital or on a phone

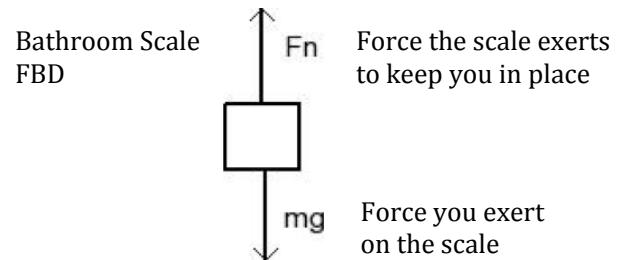


Figure 1

#### Procedure:

1. Draw three Free Body Diagrams for the situations described below in the space provided with the data table:
  - You inside an elevator that is stationary
  - You inside an elevator that is accelerating upwards
  - You inside an elevator that is accelerating downwards
2. Record your weight from the bathroom scale. Place this value in the data table provided.
3. In an elevator, place the bathroom scale on the floor and step on. Press a button to take you to a higher floor.
4. Record the value on the scale as the elevator begins its motion.
5. Record the value on the scale as the elevator is in the middle of its motion.
6. Record the value on the scale as the elevator comes to a stop.
7. Repeat this process but for the elevator going to a lower floor.
8. Record this data in the table provided. Also record any feelings or sensations during the motion of the elevator.

Free Body Diagram #1  
(Stationary)

Free Body Diagram #2  
(Accelerating Upwards)

Free Body Diagram #3  
(Accelerating Downwards)

Your Weight (lbs) = \_\_\_\_\_

Elevator	Scale reading at the beginning of elevator's motion	Scale reading during the middle of elevator's motion	Scale reading at the end of the elevator's motion	Feelings/ Sensations
Going Up				
Going Down				

**Report: For the report please include the following:**

- This sheet with the completed data table and free body diagrams.
- A picture of you in the elevator with the bathroom scale.
- A short report outlining where you went, what you felt as the elevator moved, any changes to the reading on the bathroom scale as the elevator moved, and your explanation for any changes to the scale or any sensations felt. (Your free body diagrams may help with your explanation.)