# Final Project: Data Analysis

1. Create a data table in Microsoft Excel similar to the following.
    a. Label – What is the adjustment you are making?
    b. Label – What are you measuring?

| | Adjustment 1 | Adjustment 2 | Adjustment 3 | Units |
|---|---|---|---|---|
| Trial 1 | | | | |
| Trial 2 | | | | Ex. N |
| Trial 3 | | | | Or m/s |
| Trial 4 | | | | |
| Trial 5 | | | | |
| Average | | | | |
| Adjustment – Ex. we let a ball roll down a ramp from three different heights, 15cm, 10cm and 5cm | | | | |
| Measurement – Ex. we used a force sensor to measure the force our ball hit the sensor with at the end of the ramp | | | | |

    c. To quickly calculate the average click on the excel cell you want to put the average value in. Then click on the 'formulas' tab on the menu bar. Then click on the 'insert function' button on the left side of formulas menu bar. Click on 'AVERAGE' and make sure the range of data that is listed covers all the measurements you want to take the average of. If the list is not the data you want, use your mouse to highlight the data you are interested in. Click okay. The average should show up in the box you want.

2. You should have either measured force (force sensor) or velocity (motion sensor). We now have formulas at our disposal to calculate new information. We have the formulas F=ma (force = mass x acceleration) and p=mv (momentum = mass x velocity).
    a. If you measured velocity with a motion sensor
        i. Use p=mv to calculate the momentum for each trial run (this means you'll need to use a scale to measure the mass of the object that was moving)
    b. If you measured force with a force sensor
        i. Use F=ma to calculate the acceleration of your object (this means you'll need to use a scale to measure the mass of the object that was moving).
    c. For parts 2a or 2b organize your data with a new table (on next page)
        i. You can do the calculations by hand with a calculator or use Excel to help you if you know how.

| | Adjustment 1 | Adjustment 2 | Adjustment 3 | Units |
|---|---|---|---|---|
| Calculation 1 | | | | |
| Calculation 2 | | | | Ex. m/s^2 |
| Calculation 3 | | | | Or kgm/s |
| Calculation 4 | | | | |
| Calculation 5 | | | | |
| Average | | | | |
| Measured mass of ball bearing with units: Ex. 25 kg | | | | |
| What formula did you use and how did you use it? Ex. F=ma We found the acceleration of our ball bearing by dividing our measured force by the measured mass of the ball bearing. | | | | |

3. Create one graph of your measured data with excel.
    a. Highlight the first four columns and the first six rows and click on insert graph. Pick a bar graph. Click on the graph that is created. Click on the 'Layout' menu. Click on the 'Axis Title' button and select 'Primary Vertical Axis' and then 'Horizontal Title.' Type in the unit associated with your measurements.

4. Create one graph of your calculated data with excel.
    a. Highlight the first four columns and the first six rows and click on insert graph. Pick a bar graph. Click on the graph that is created. Click on the 'Layout' menu. Click on the 'Axis Title' button and select 'Primary Vertical Axis' and then 'Horizontal Title.' Type in the unit associated with your calculations.

5. Finally, discuss your findings based on your adjustments and measurements? Did your measured and calculated values change with each adjustment? If yes, how and why? If no, why not?

6. SUMMARY OF FINAL ANALYSIS DELIVERABLES:
    a. One table for measured data as shown
    b. One table for calculated data as shown
    c. One graph for measured data
    d. One graph for calculated data.
    e. Final discussion of findings.