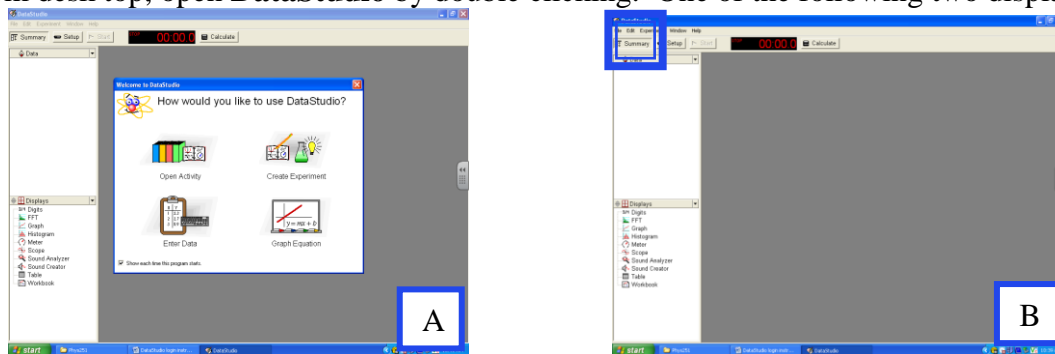


PHYS 251 Introduction to Data Collection with a PC

Names (first and last) _____ Date _____ Section _____

Getting started Log-in to computer as Visitor Winthrop WIN

From desk top, open **DataStudio** by double clicking. One of the following two displays will appear.



If **figure B** appears, select **File** from the tool bar.

From the drop down menu, select **new activity** and a display like **figure A** should appear.

A. Basics:

1. There are five activities/uses that can be done with DataStudio.
 - a) **open activity**
 - b) **create experiment**
 - c) **enter data**
 - d) **graph equation (model data)**
 - e) **create reports**
2. Move the cursor over each one of the three high-lighted areas and write down what they represent.
Exp set-up (choose set-up), Displays Toolbar (representation of the data-digital, graph, FFT), data collection (type, # runs)
3. Click each one of the three high-lighted areas and answer the following questions:
 - a. What is a Display list? **List of data display options**
 - b. How to turn the **list** of available sensors on or off? **Click set-up, select sensor, choose desired sensor**
 - c. How to begin and end data collection? **Select the start/stop button, top left/middle**
4. Write down the three basic steps necessary for creating any experiment.

a) **choose sensor** - When adding a sensor or instrument, use the pull down menu to select digital or analog devices and the corresponding data collection desired.

b) **select desired data displays**

c) **collect data**

To better view the data, it is sometimes necessary to optimize (change scale) or annotate it. Use the option buttons on the tool bar to select the desired function. The smart tool at the top of the tool bar, far left automatically maximizes the graph to the space.

5. Answer the following ‘How To?’ questions:

a. How you will create a graph display. **Select graph display from options available**

b. How to create a digits display. **Select digits display from options available**

c. How to resize the axes? _____

d. How to scale the axes? _____

e. How to annotate a graph display? _____

f. How to move the note to a new location? _____

g. How to get a digital position reading from a data point? _____

B. An experiment to measure temperature:

Apparatus: PC, interface, and temperature sensor.

1. Make sure that the power for the interface is turned on.

2. Plug in the temperature sensor to analog Channel A, white arrow on top.

3. Double-click the DataStudio icon on the desktop.

4. Click Create Experiment.

5. Scroll down the sensors and click on Temperature Sensor.

6. Double-click the graph display.

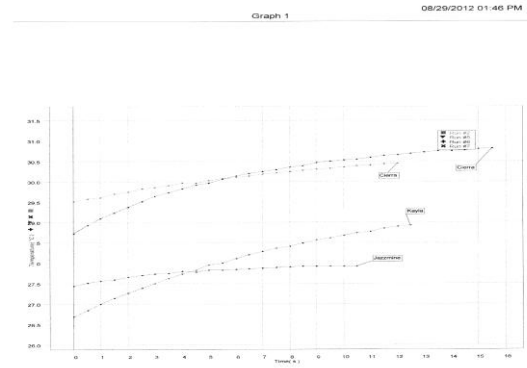
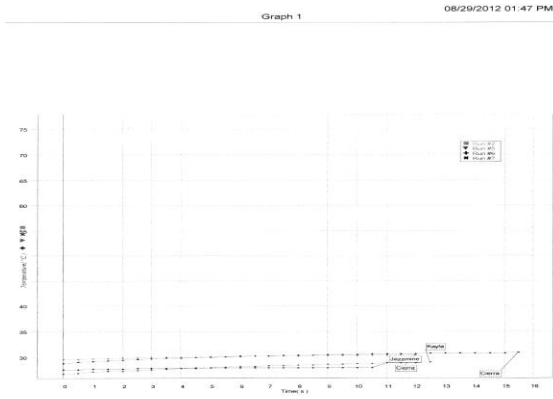
7. Double-click the digit display.

8. Click the start button, after 5 seconds hold the temperature sensor (black end) in your palm.

9. Collect the temperature of your palm for about 30 seconds’ write down the final value - _____

10. (a) Start a new temperature graph. Move the probe to several locations on the body while continuously recording the data on the same graph. When the data is collected, use the labeling function to annotate collection location (one person, 4 locations, one data line). (b) Add to this same graph, temperature data collected from multiple members (3 data series, start and stop between each new location, 3 data lines -see example below). Also record the group members’ names, section, and date.

Print a copy and turn it in (One graph.)



11. Close DataStudio by clicking the 'X' in the upper-right hand corner, and clicking 'NO' for the question, 'Do you want to save this activity.'

C. Distance Measurement:

Apparatus: PC, interface, motion sensor, and meter stick.

- 1) Connect the yellow plug of the motion sensor to digital channel one and the black plug to digital channel two, and set switch setting to narrow beam.
- 2) Double-click the DataStudio icon on the desktop.
- 3) Click Create Experiment, scroll down the sensors and click on Motion Sensor, and click Digits Display.
- 4) Place the Motion sensor on the lab table so that the sensor is pointed at the ceiling. Click 'Start' and record the sensor reading of the distance to ceiling. Stop the data collection.

Sensor reading of the distance to the ceiling _____

Measure this distance with a meter stick. _____

Calculate the % difference between the two measurements. _____

- 5) Point the sensor to determine the distance between 2 fixed points.

What are the points? _____

Sensor reading of the distance between the two points _____

Measured distance between the two points _____

Calculate the % difference between the two measurements. _____

$$\% \text{ Difference} = \frac{|\text{listed} - \text{value collected}|}{\text{Listed}} \times 100 \quad \% \text{ Error} = \frac{|\text{Actual-experimental}|}{\text{Actual}} \times 100$$

D. Sound and Frequency Measurement:

Apparatus: PC, interface, sound sensor.

- 1) Connect the sound sensor to analog channel A, Arrow on top.
- 2) Double-click the DataStudio on the desktop, Click Create Experiment, Scroll down the sensors and double-click on Sound Sensor.
- 3) Double-click 'FFT' under Displays and maximize the Relative Amplitude VS Frequency graph.
- 4) Click 'Start' and make different types of sound to the sound sensor. Speaking, singing, etc. and observe the difference in the sound spectrum.
- 5) Now take a tuning fork and gently strike it on the mouse-pad and hold the fork to the sound sensor. Stop collecting data after capturing the spectrum.

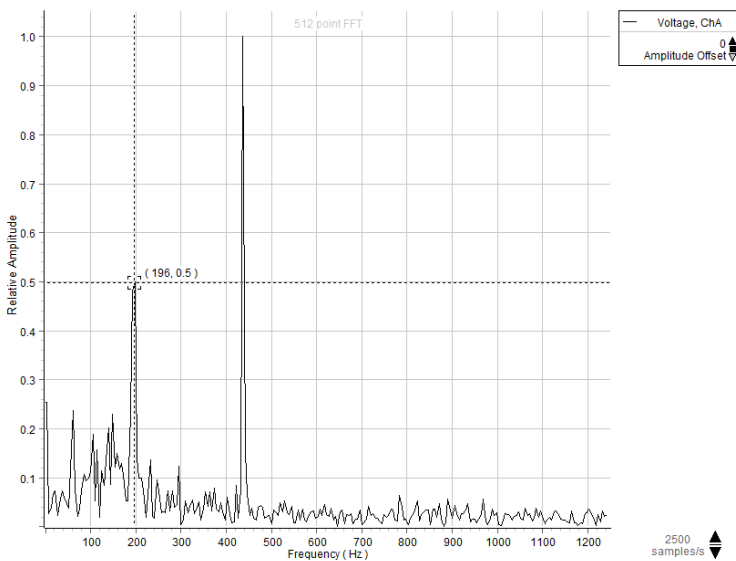


Figure 1 Tuning Fork results (384, 196)

The fork had the number 384 listed on it. This image captured and outstanding peak at 196 Hz as well as ~ 384 Hz. Calculate your % difference based on fork listing. Do not worry about the relative amplitude.

- 6) Click 'Smart Tool' and read the frequency of the tuning fork.
- 7) Repeat the procedures for a total of three different tuning forks and complete the data table below.

Frequency Values		% Difference
Listed (on fork)	Measured/Experimental/value collected	
(example) 384 Hz	389 Hz	1.30 %

$$\% \text{ Difference} = \frac{|\text{listed} - \text{value collected}|}{\text{Listed}} \times 100 \quad \% \text{ Error} = \frac{|\text{Actual} - \text{experimental}|}{\text{Actual}} \times 100$$