All homework is due at the beginning of the next session.

UNIT 1 HOMEWORK AFTER SESSION ONE
Due at the beginning of session 2.

• Read the section in the front of the Activity Guide entitled *Workshop Physics Philosophy, Policies, and Procedures* (pp. i-1 through i-12) and come to class prepared to ask any questions you might have.

• *Learn a few letters in the Greek Alphabet. Beware! There ~~may be~~ is a quiz!*
Physicists and mathematicians tend to run out of symbols to use in mathematical equations. You should memorize some of the most common letters borrowed from the Greek alphabet that are used in physics equations. These are shown below

Letter	Capital	Lower Case
Alpha	Α	α
Beta	Β	β
Gamma	Γ	γ
Delta	Δ	δ
Epsilon	Ε	ε or ϵ
Theta	Θ	θ
Lambda	Λ	λ
Pi	Π	π
Rho	Ρ	ϱ
Sigma	Σ	σ
Phi	Φ	ϕ
Omega	Ω	ω

•*Do Problem SP1-1 given below for more spreadsheet practice.*

SP1-1) Create a spreadsheet with the combined class data in Activity 1-4 in it by following the procedures outlined in pages A-4 through A-10 in Appendix A.
(a) Use the computer spreadsheet average, max, and min functions to find the average, minimum, and maximum values for the class. (**Hint**: You will need to learn to use spreadsheet functions to do this. *) Be sure to format the spreadsheet cells to give you the appropriate number of significant figures in each of your calculations.
(b) Sort the data columns so that they lie in order from the lowest to highest values.
(c) Name the file and save it on your disk.
(d) *Upload the file to Canvas.*
* You may want to check your work with hand calculations, but the idea is to let the spreadsheet do the work for you!

UNIT 1 HOMEWORK AFTER SESSION TWO
Due at the beginning of the next session.

- *Complete Unit 1 entries in the Activity Guide.*
- *Read problems SP1-2 and SP1-3 below and then read Appendix E of the Activity Guide*
- *Work Problems SP1-2 and SP1-3 by referring to Appendix E.*

SP1-2) Create a mathematical model of the bowling ball motion data you collected in Activity 1-4. The project requires you to find what you think is the best value for the slope, m, and the y-intercept, b, for the computer graph you printed out in Activity 1-6 (b). You should:

(1) Follow the instructions in Appendix E on page E-4 on *Mathematical Modelling with an Excel Spreadsheet* . By practising with a worksheet entitled *Modelling Tutorial* you can learn about the process of modelling for a linear relationship.

(2) Next, open the worksheet entitled *Modelling Worksheet* and enter a title for your graph.
(a) Set the y-label to Distance (m) and the x-label to Time (s).

(b) Refer to your data table in Activity 1-5(b)). Enter the times you measured for the bowling ball in the Time(s) column (formerly x-label).

(c) Set the y-exp column to D-exp (m) and enter the distances you measured for the bowling ball (0.00m, 2.00 m, 4.00 m, and 6.00 m.).

(d) Place the symbol m (for slope) in the cell B2 (in place of "constant 1)". Place the symbol b (for y-intercept) in cell B3 (in place of "constant 2").

(e) Put the appropriate theoretical equation for a straight line of the form Distance = m*Time + b in cells C8 through C11. Be sure to refer to cells C2 for slope and C3 for y-intercept as absolutes, i.e., use C2 and C3 when referring to them. (Reread Appendix E page 4 for details if you are confused).

(f) Change the values in cells C2 and C3 until your green theoretical line matches as closely as possible with your red experimental data points in the graph window.

Canvas

(g) Upload a copy of your modelling spreadsheet to ~~WebCT~~ with the following annotations on it:

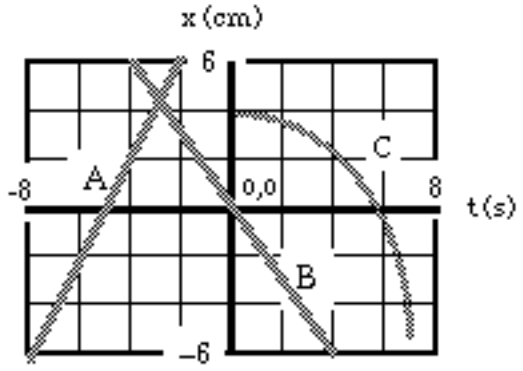
a) Your name, the date, and Problem SP1-2 on it.

b) Report the average speed of the bowling ball that you calculated in Activity 1-5c compared to the slope of the "best" fitting graph for your mathematical model.

c) The equation that provides the "best" mathematical model for the motion you studied in the form Distance (m) = (? m/s) Time(s) + (? m)

d) A brief discussion of the meaning of the slope of a graph of Distance vs. Time. What does it tell you?

S1-3) The diagram below shows the graphs of three possible relationships between the time, t, in seconds and the distance, x, in centimetres that the object has travelled.



(a) Which graphs represent distance as a linear function of time? A, B, and/or C?
(b) Which graphs, if any, show distance as proportional to time?