ANALYSIS AND DISCUSSION

The data you have collected includes the water level (h) in the straw versus the temperature (T). As a first step in your analysis, enter this data into the Graphical Analysis Program and print the resulting graph. Describe (in about 100 words) the behavior and trend of your graph.

Since you are investigating thermal expansion, you will need to determine the volume (V) of the water inside the bottle as a function of the temperature. To do that, construct a table similar to the one below and enter your data into the first two columns. Then, calculate the change in height ($\Delta h = h - h_0$). The calculations can be done easily in the Graphical Analysis program; Click on **Data** in the menu bar then select **New Calculated Column** and enter the appropriate equation. For example, if the initial water level at room temperature is $h_0 = 8.4$ cm, then enter **"h"–8.4** to calculate Δh. Alternatively, you may do the calculations using a spread sheet program or a regular calculator. In any case you must show detailed sample calculations for each calculated column.

The change in volume (ΔV) is equal to the change in height (Δh) times the cross-sectional area of the pipette. The final volume (V) of the bottle can be calculated using the equation $\Delta V = V - V_0$.

T (°C)	h (cm)	Δh (cm)	ΔV (cm^3)	V (cm^3)
⋮	⋮	⋮	⋮	⋮

Generate a plot of the water volume versus temperature. Based on your experimental results do you support the proposed theory? Provide detailed arguments in this regard in about 400 words. In your argument you should also discuss the limitations of your experiment and the possible sources of error. For example, how significant is the expected expansion of the glass bottle, and what affect does this have on your results?