Connect the Vernier spectrometer to your lap top computer and power the spectrometer if necessary. Start LoggerPro on your computer.

The screen shown in Fig. 1 may be displayed. If status line displays the message "No device connected," as it does in Fig. 1, you will need to connect the spectrometer. Do this by selecting *Experiment* from the menu bar and then select *Connect Interface*, *Spectrometer* and *Scan for Spectrometer*.
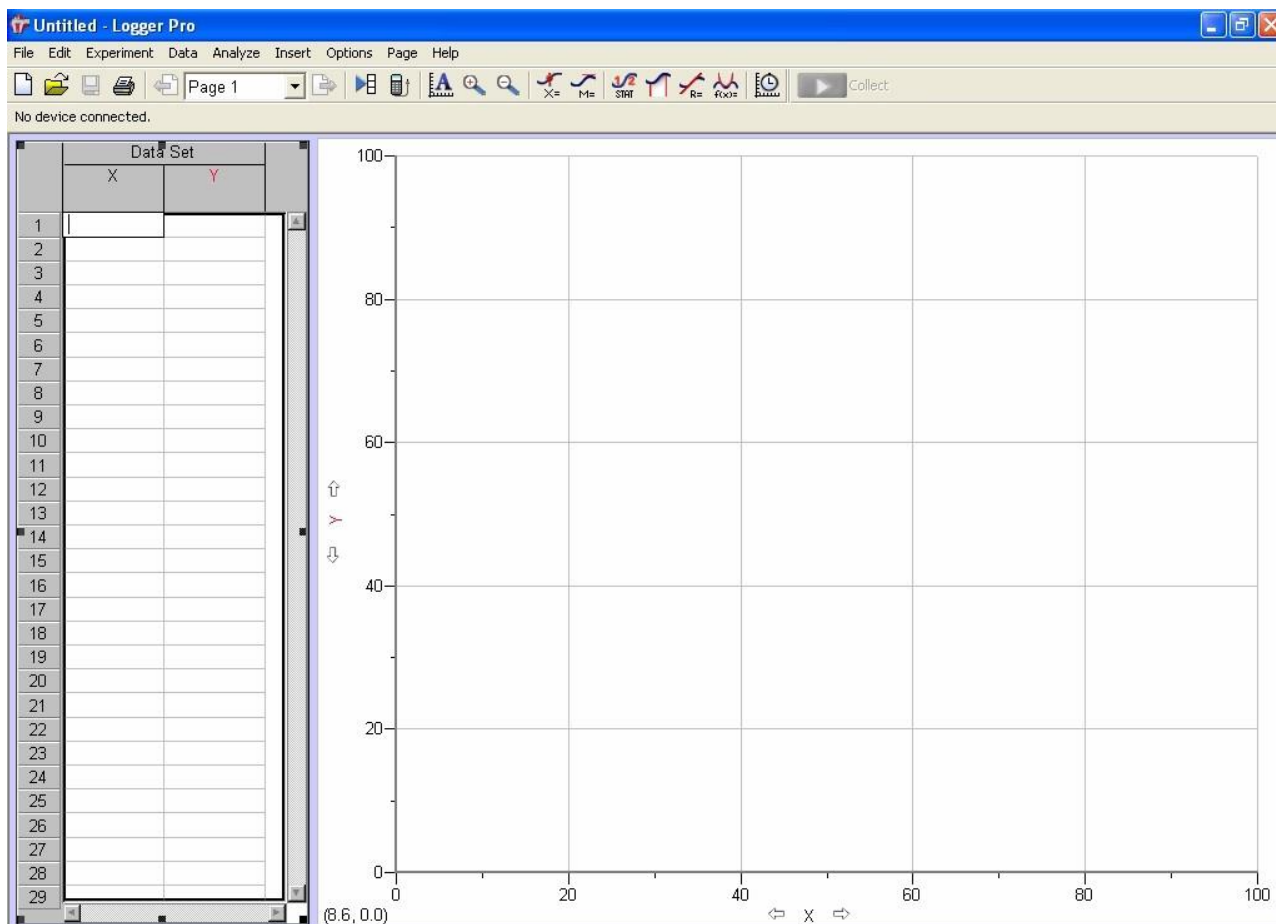

Figure 1. Starting screen for LoggerPro.

If program finds spectrometer, the "No device connected" message will be replaced by the spectrometer icon and the message "Absorbance = x.xxx" where "x.xxx" is some number, as shown in Fig. 2.
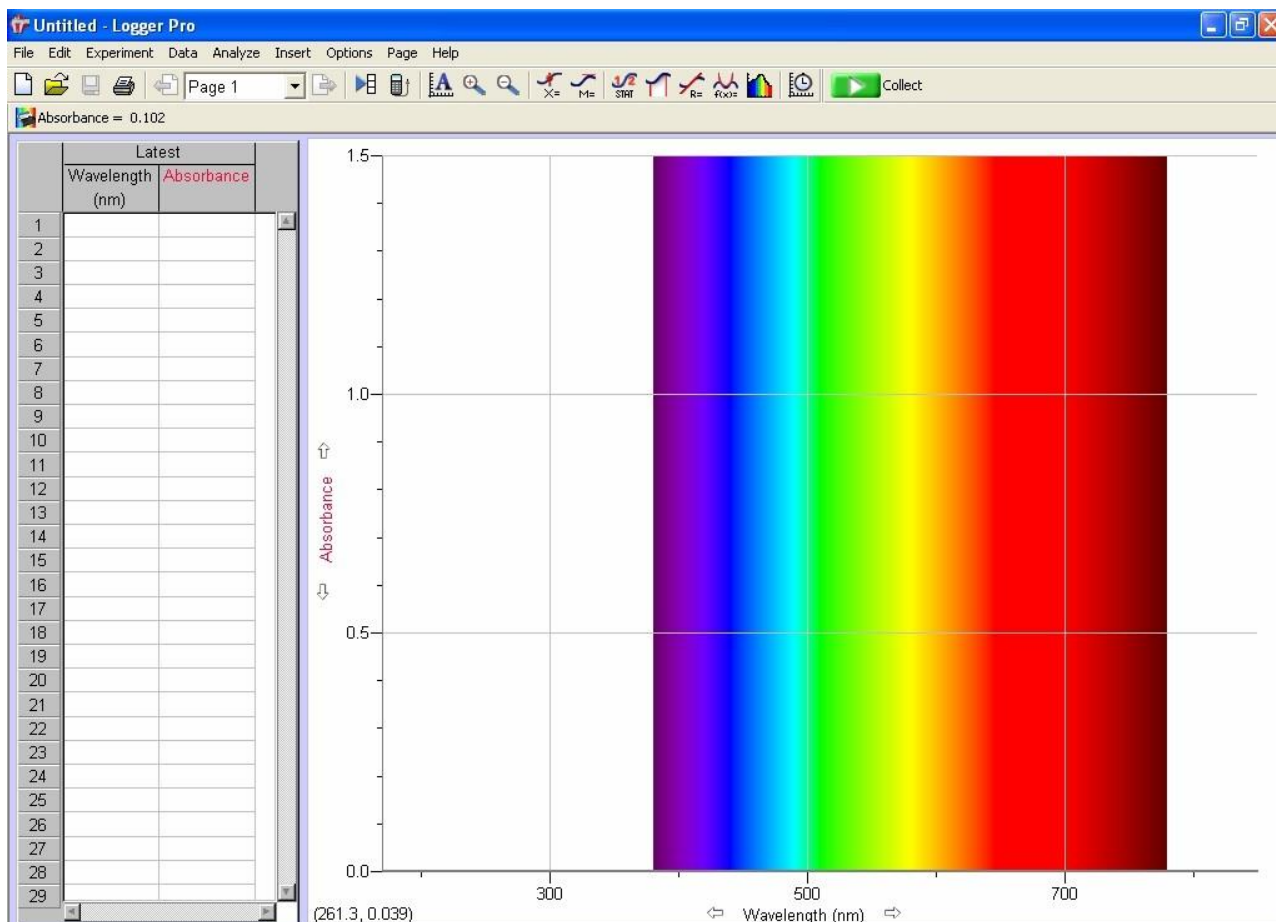
Figure 2. LoggerPro screen that is displayed once the spectrometer has been found by the software.

Once the computer has located the spectrometer, the software must be configured to acquire the data. Click on the spectrometer icon (or select from menu bar *Experiment*, *Set Up Sensors* and select *Spectrometer:1*). The Set Up Sensors pop-up shown in Fig. 3 will appear. You probably won't have to change anything there. However, if you do change something and want to return the spectrometer to its factory-default settings, simply click on the *Restore Defaults* button. Note that if you change something in this box after you have taken a background (*vide infra*), you will need to reacquire the background.
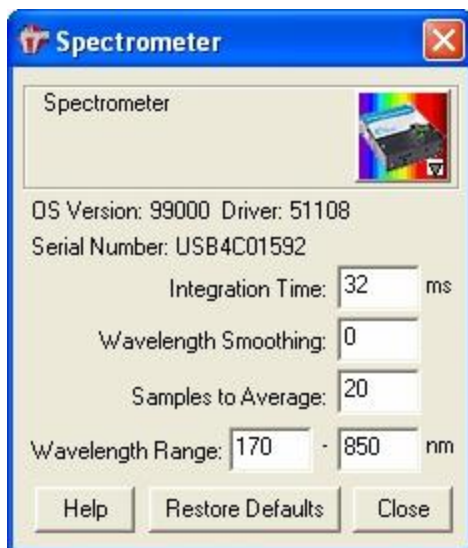
Figure 3. Set Up Sensors pop-up box for the spectrometers.

Prepare a cuvette containing your blank (distilled water).

In the Set Up Sensors pop-up click on the spectrometer icon and a new pop-up will appear. Your options here are *Calibrate*, *Configure Collection* and *Current Units* (under*Current Units*, *Absorbance* should be selected; do not change). Select *Calibrate*. If you have a one-piece spectrometer, it will click and the pop-up shown in Fig. 4 will be displayed.
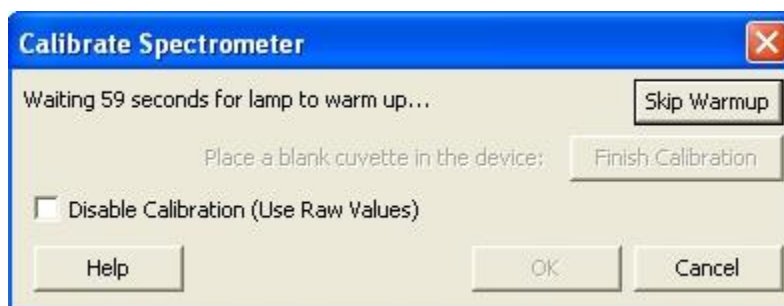

Figure 4. Calibrate Spectrometer pop-up immediately after it has been activated.

After 90 seconds the warm-up is complete and the Calibrate Spectrometer pop-up will look like that shown in Fig. 5. Insert the blank into the spectrometer's sample holder. The light travels across the spectrometer in the long direction, so make sure the cuvette is arranged so that the light travels through the unfrosted sides of the cuvette, if there

are frosted sides. (Some cuvettes have a triangle at the top, and the triangle must be placed by the triangle on the spectrometer.) Once the cuvette is in place click *Finish Calibration* to complete the spectrometer calibration. Close the pop-up by clicking *OK* when finished.
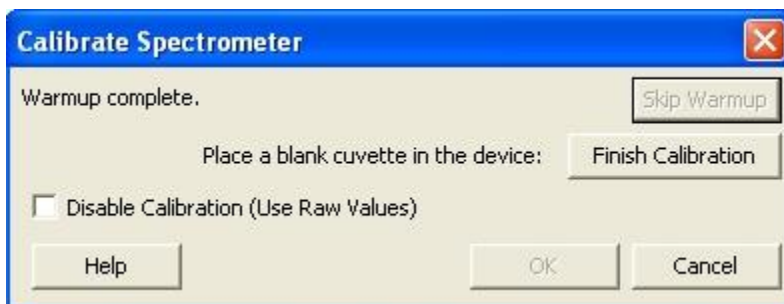

Figure 5. Calibrate Spectrometer pop-up after warm up is complete.

Simple Absorbance Measurements

If you have successfully complete all of the steps above, the *Collect button* should now be active and you are ready to acquire absorbance data as a function of wavelength (the default for the spectrometer). Just click on the *Collect button* to acquire the spectrum and *Stop button* when you are done. If wavelength is not on the x-axis, please check that the spectrometer is not in the Absorbance vs Wavelength mode, as described below.

Kinetics Measurements

Before configuring the spectrometer for a kinetics experiment, you must first calibrate the spectrometer, as described above.

Open the Set Up Sensors pop-up box again, click on spectrometer icon and select*Configure Collection* or click on the *Configure Spectrometer Data Collection* icon on the tool bar. The window shown in Fig. 6 will open. Set the data collection mode to*Abs(orbance) vs Time* (for kinetics experiments) or *Abs(orbance) vs Wavelength* (used to obtain a spectrum). When *Absorbance vs Time* is selected, the check boxes under *Full Spectrum* are activated and you can choose which wavelength, or wavelengths, to follow as a function of time. When you check the *Absorbance vs*

Time box, the program will automatically select a wavelength to monitor. If you used the *Examine Data* button $\overset{\checkmark}{\times=}$, the software will default to the wavelength that the cursor was last set to, otherwise the software automatically selects the first point in the list. With *Absorbance vs Time*selected, you will be able to use the check boxes under the *Full Spectrum* heading to select the wavelength or wavelengths that you wish to monitor. Click *OK* when finished to close this window.
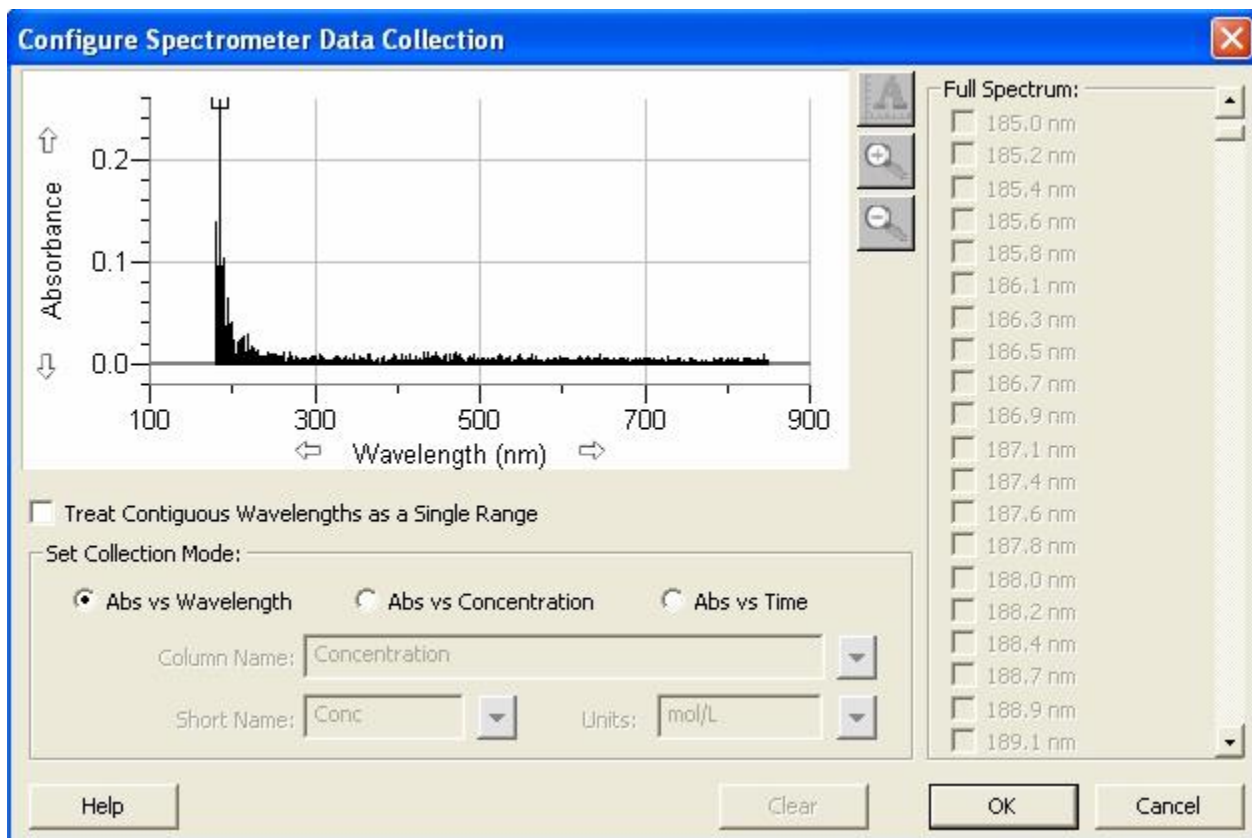

Figure 6. Configure Spectrometer Data Collection window.

Upon closing the Configure Spectrometer Data Collection window, the main LoggerPro page should now have absorbance on the y axis and time on the x axis, as shown in Fig. 7. The current absorbance at the wavelength(s) that you specified will be displayed in the lower left-hand portion of the screen.
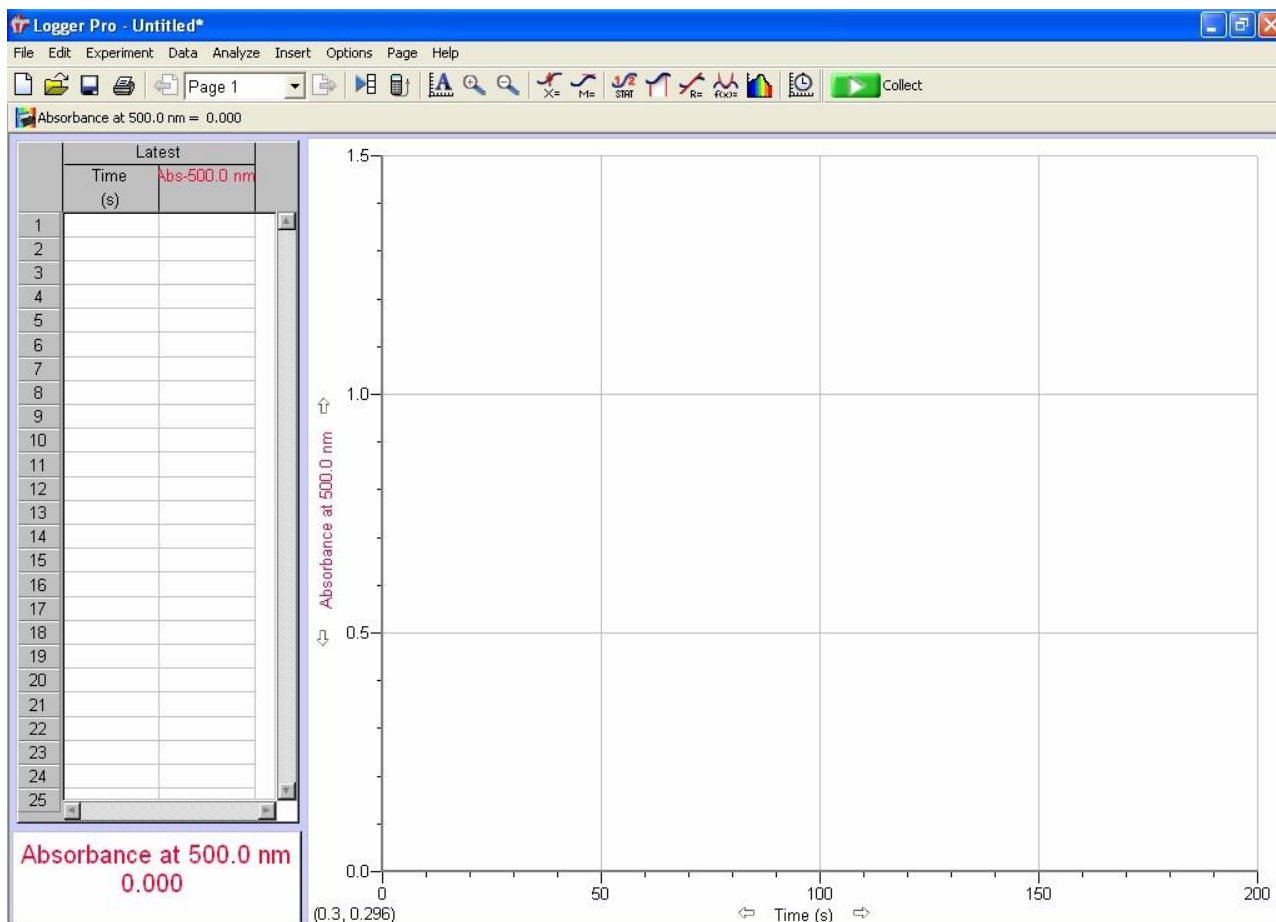
Figure 7. LoggerPro screen after the data collection mode has been set to absorbance as a function of time.

Now set the data acquisition parameters by clicking the *Data Collection button* on the tool bar (or from the menu bar by selecting *Experiment*, *Data Collection*). If you have successfully switched the spectrometer to time-based measurement mode, then the window shown in Fig. 8 will open. If not, then the data collection window for an absorbance as a function of wavelength measurement will appear (Fig. 9) and you will need to reset the collection mode. Note that if you try to change between a time-based measurement and a wavelength-based measurement without changing the data collection mode as described above, then you will see an error message and things will not work properly.
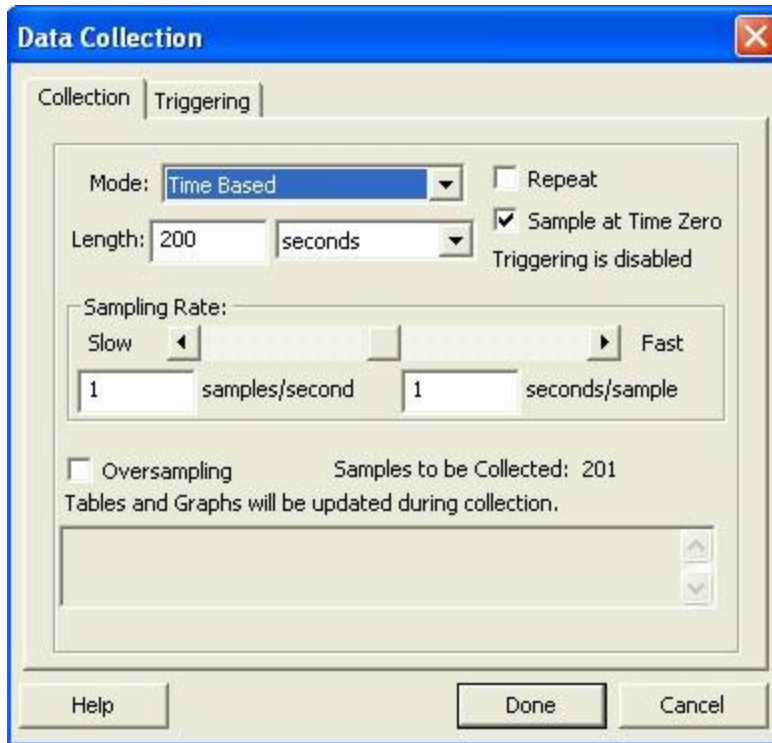
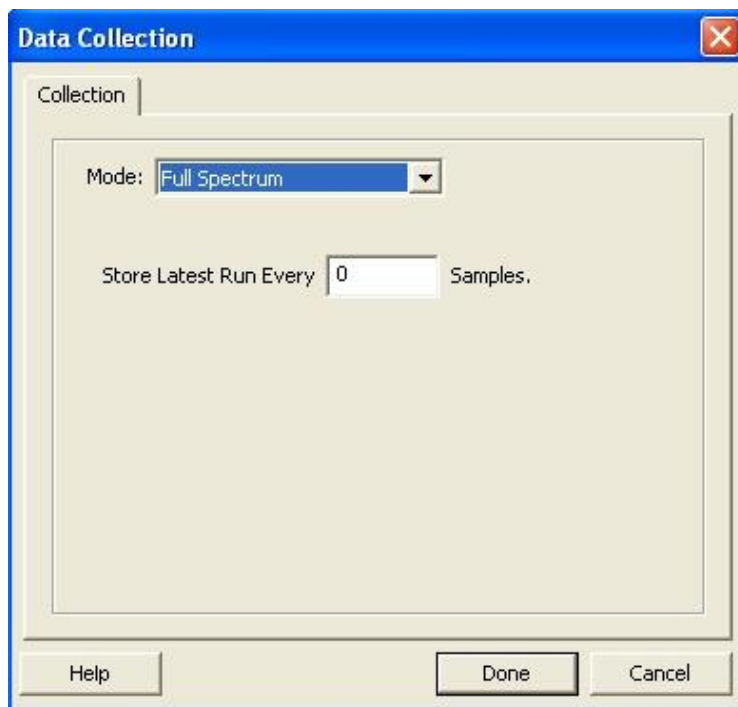**Figure 8.** Data Collection window for time-based measurements.

Figure 9. Data Collection window for wavelength-based measurements.

In the Data Collection window for a time-based measurement, you need to set four parameters. First, select the *Length* of the experiment (enter the number in the first box and the units in the second). Check the *Sample at Time Zero check box* if you want the computer to measure the absorbance immediately at the start of the experiment (a good idea in most cases). Select *Sampling Rate* either using the slide bar or by typing a number into one of the boxes below the slide bar. Some important things to know about the sampling rate: 1) the units on the sampling rate are the same as those you selected in the *Length* of the experiment, 2) when you type a value in one the sampling rate boxes, the computer automatically calculates the other and 3) if you select a sampling rate that is faster than the spectrometer can actually do, a message will be displayed and you will not be allowed to proceed.

When you finish setting up the collection parameters for your experiment, click *Done*. You should now be ready to make a run. To initiate the run, push the *Collect button* . To stop data acquisition click the *Stop button* .