

Using Data Matrix

Data Matrix is one of the data-collection modes in LabQuest (version 1.5 and newer) and LabQuest 2. It was created to improve data collection in the field by addressing several key issues. These include:

1. Collecting data at multiple locations and over multiple days, all in one file.
2. Collecting data from more sensors than there are ports available.
3. Collecting data from certain combinations of water quality sensors that previously could not be used together due to electrical interference.

Others may find the new features of the Data Matrix useful, as well. This document is written with environmental field work in mind.

Getting Started

1. There are two general scenarios for environmental sampling. Before proceeding, choose which of these scenarios best matches your needs:
 - Scenario 1 – Compare locations. In this scenario, you might sample along a stretch of river to study how water quality changes at different locations along its path, as shown in Figure 1. Data may be collected on multiple days, but the primary focus is to compare sites or locations.

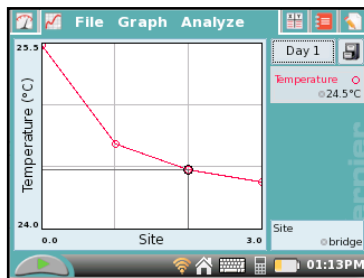


Figure 1 Temperature at different sites on the same day

- Scenario 2 – Compare dates. In this scenario, you might sample at a site once a month for a year, as shown in Figure 2. Data may be gathered from more than one site, but the primary focus is the change over time at a particular site.

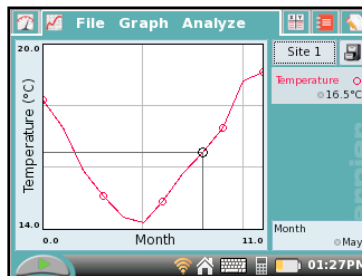


Figure 2 Temperature over time at one site

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2. Connect your sensors to LabQuest and choose New from the File menu. Note that more sensors can be added at any time during data collection.
 3. On the Meter screen, tap Mode. Change the mode to Data Matrix.
 4. Enter the names for your rows and runs of data.
 - Scenario 1 users will want the name of their rows to correspond to the sites and the name of their runs to correspond to the dates. You can either accept the default names of Site and Day, as shown in Figure 3, or enter your own. The default is for LabQuest to automatically increment the Site and Day names, e.g., Site 1, Site 2. If you do not want this behavior, uncheck the box at the bottom of the screen.

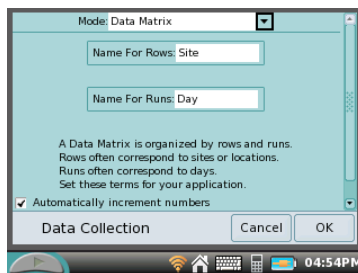


Figure 3 Data Matrix setup page with default settings

- Scenario 2 users will want the name of their rows to correspond to the dates and the name of the runs to correspond to the sites. Enter **Day** or choose your own name as the Name For Row, as shown in Figure 4. Enter **Site** or choose your own name as the Name for Run. The default is for LabQuest to automatically increment these names, e.g., Site 1, Site 2. If you do not want this behavior, uncheck the box at the bottom of the screen.

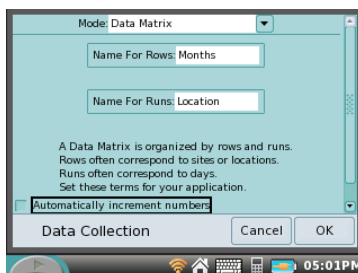


Figure 4 Data Matrix setup page with custom labels

5. Select OK.
6. Save the file with a unique name to preserve your settings.

Collect Data

7. Start data collection.
8. The Change screen will launch, as shown in Figure 5, allowing you to change or add sites and days. **Note:** You may have changed the words site and day to something else, but these instructions will use the original terms.
 - a. If the Automatically increment numbers box was checked during setup, the first set of names will be filled in. If the Automatically increment numbers box was not checked, you will need to add at least one of each site and day.

- b. You may add all of the anticipated sites and days at this time, or they can be added later.
- c. Tap Continue.

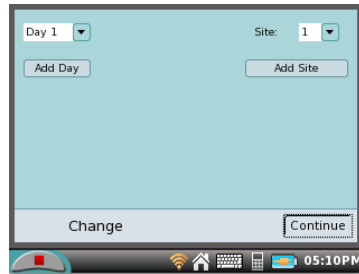


Figure 5 Data Matrix Change page with first day and site added

- 9. Each connected sensor will now display a live reading on the screen as shown in Figure 6. If there is not enough room to display them all, a scroll bar will be available to scroll to the right. Notice the current site and day are displayed across the top of the screen.

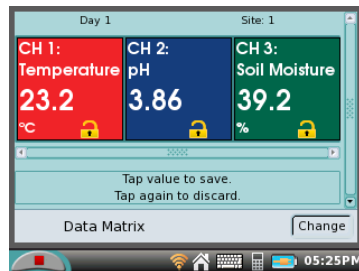


Figure 6 Data Matrix collection page prior to storing values

- 10. When ready, tap the value you wish to store. The meter for that value will turn white and the padlock will close, indicating the value has been stored in the file. If a mistake is made, tapping a second time will discard the value.

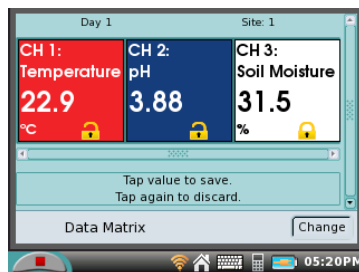


Figure 7 Data Matrix collection page after soil moisture value has been saved

- 11. Once a value has been stored, that sensor can be removed and a different sensor connected, if desired. This can be repeated as many times as needed.
- 12. Once all the values for that site and day have been stored, either stop data collection, or tap Change to return to the Change screen. Choose Change only if your next location is very close and you wish to continue collecting data immediately. Otherwise, stop data collection.
- 13. When you are finished and data collection has been stopped, save the file.

Analyze the Data

14. The raw data can be viewed by navigating to the Table screen. Use the scroll bars to navigate around the table.
15. The data can be graphed by doing the following:
 - a. Navigate to the Graph screen.
 - b. Tap on the y-axis label and select the parameter you wish to graph from the list.
 - c. Select the site or day of your choice from the chooser located at the upper right corner of the graph.
 - d. To show two graphs at once, choose Show Graph from the Graph menu, and select All Graphs.
16. If you have *Logger Pro* (v. 3.8.4 or newer) available, you could also transfer the data from LabQuest to a computer. *Logger Pro* has more graphing and analysis options than LabQuest, such as bar graphs and the ability to insert images, as shown in Figure 8. If your file includes GPS coordinates, *Logger Pro* also has the ability to export your data into Google Maps. There are several ways to transfer the data from LabQuest to *Logger Pro*:
 - Connect LabQuest to a computer running *Logger Pro* using a USB cable. If there is an active LabQuest session containing data, *Logger Pro* will prompt you to retrieve it. Click No. Retrieving remote data in this manner will not bring over your Run names. Instead, choose LabQuest Browser from the *Logger Pro* File menu and select Open. Choose from the list of saved files.
 - Save the LabQuest file to a USB thumb drive or SD card, and then transfer the file onto your computer. *Logger Pro* will be able to open the LabQuest file.

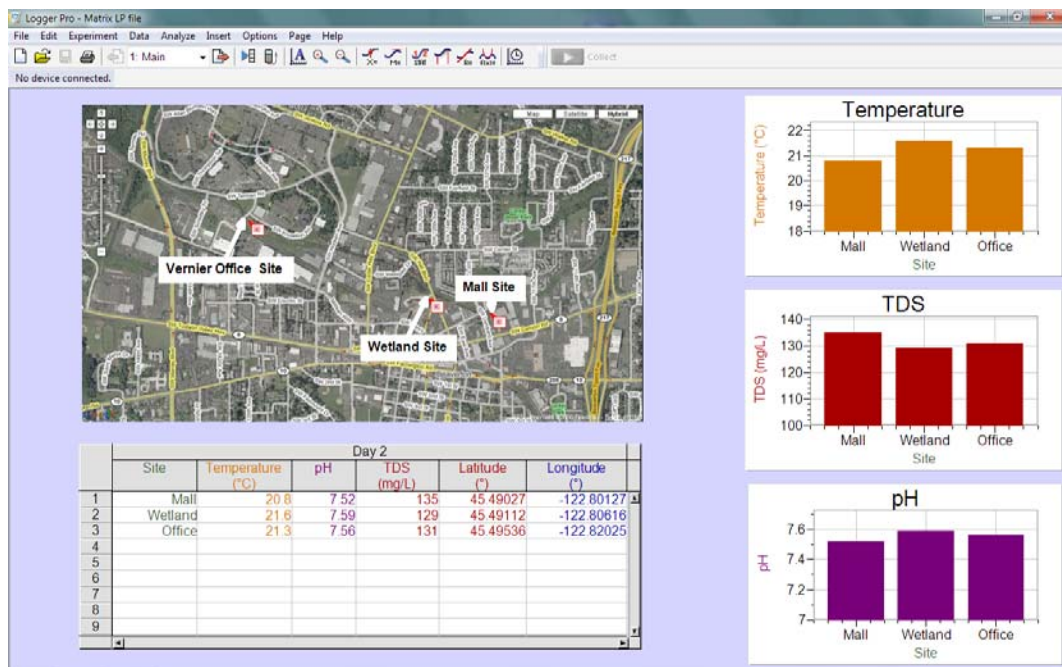


Figure 8 Water quality data graphed and mapped in Logger Pro