

LabQuest Quick-Start Guide



Power button

VERNIER
LABQUEST

Built-in microphone

Record voice annotations

Color touch screen

- 320 x 240 color graphic display
- LED backlighting provides you with outstanding clarity in the classroom or in the field

Collect button

Navigation keys

Provides quick access to key features

Built-in temperature sensor

Provides reading of ambient temperature

Rechargeable batteries

High quality, lithium-ion rechargeable battery pack lets you go an entire school day before recharging

Built tough. Built to last.

Designed with students in mind, the rubber overmolding and rugged mechanical design provide protection against everyday bumps, falls, and splashes.



Stylus

Computer interface

Windows & Macintosh
USB connectivity



Six sensor ports

- Provides maximum versatility
- Compatible with your existing Vernier sensors

Audio out

Use audio out to connect
headphones or speakers



Stylus

Audio in

Power

Connect to power and
recharge LabQuest's
built-in battery

Peripherals expansion

Connect to a printer or other
devices using USB



SD/MMC Card Slot

Expand storage beyond
the built-in 40 MB

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WHAT'S INCLUDED WITH LABQUEST

- LabQuest unit
- Power adapter
- USB cable
- A CD containing: computer software, LabQuest reference guide, Flash introduction
- This Quick-Start Guide
- Stylus (2)
- Stylus tether



Overview

Welcome to LabQuest. This guide will get you started with basic data collection. More information is available in the LabQuest Reference Guide, found on the included CD, or online at www.vernier.com/labquest

LabQuest can be used in many ways

- As a stand-alone data collection and analysis device, controlled by the color touch screen and the keys on the front panel
- As a data-collection interface connected to a computer, using Logger *Pro* or Logger *Lite* software
- To run tools such as the included Periodic Table or Stopwatch applications

Inspect your LabQuest

Find the power button  in the upper left corner, and press it. If the screen does not light after a moment, connect the power adapter to the LabQuest and to a power source.

LabQuest is controlled by the screen and the navigation cluster below the screen. The button you'll use most often is the Collect button  located just below the screen. On the left side of LabQuest are the audio ports and the power port, used to recharge the battery. On the right side are two digital sensor ports, used for Motion Detectors, Drop Counters, and other digital sensors. The top edge of LabQuest has four ports, for sensors such as pH, Force, or Temperature. Also on that top edge are a stylus storage slot, a full size USB port for printers, memory sticks, and other peripherals, an SD card slot for memory expansion, and a mini USB port for connecting LabQuest to a computer. On the underside are the battery compartment and a security and stylus tether attachment point.

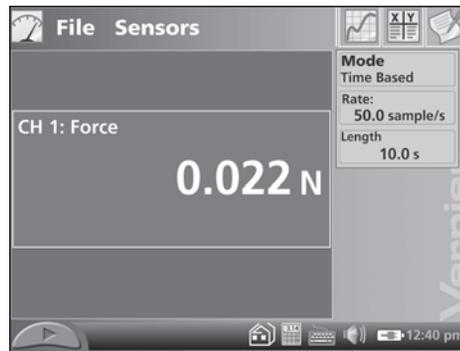
Quick Data Collection

Here's how to quickly collect some data with your new LabQuest.

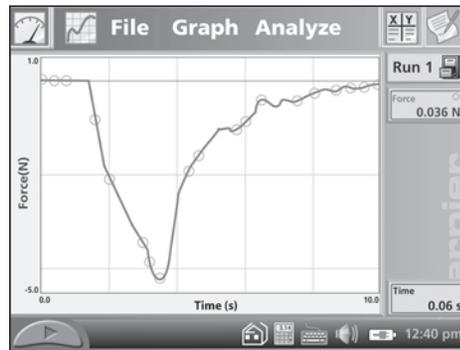
1 Wake your LabQuest by pressing the silver power button on the upper left corner.* If no File menu is visible, tap the Home icon (🏠) and tap LabQuest App. Using the stylus, choose New from the File menu, and discard any existing data.



2 Connect a sensor such as Temperature, Light or Force to one of the ports on the top of LabQuest. LabQuest will set itself for data collection with that sensor. Note the live readout on the Meter screen.



3 Press the Collect button just below the LabQuest screen. Data collection begins, and a graph shows your data being plotted in real time.



*If LabQuest does not wake, your battery may need charging. Attach the LabQuest power supply, and in several minutes your LabQuest will be ready to go.

LabQuest App Basics

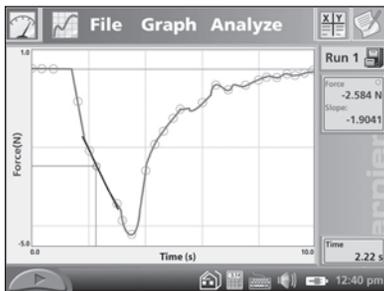
LabQuest is both hardware and software. The LabQuest Application software, or LabQuest App for short, is the primary way you will control the LabQuest hardware. When you turn on LabQuest with the silver power button  LabQuest App is ready to use.



Take some data using the steps on page 2, and then try some LabQuest analysis features.

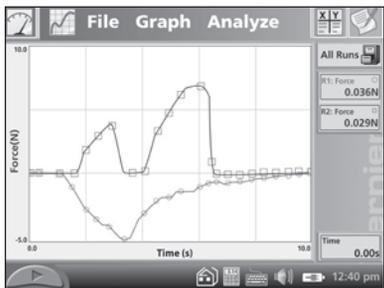
Use the stylus to analyze your data

Tap on the graph, near some feature of interest. The Examine cursor jumps to the nearest data point of the x-value you tapped. Cursor lines highlight the x- and y-axis values, and the right-side readouts display the associated numerical values of the selected point.



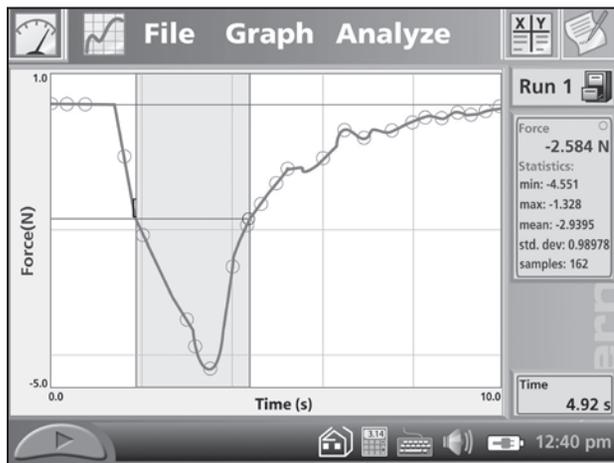
The Analyze menu

The Analyze menu enables additional ways to inspect your data. For example, tap Analyze, then tap Tangent. Now tap near an interesting point on your graph; a tangent line is drawn in addition to the Examine cursors. On the right side of the graph, the numerical value of the slope is shown. To turn off the Tangent function, choose it again from the Analyze menu.

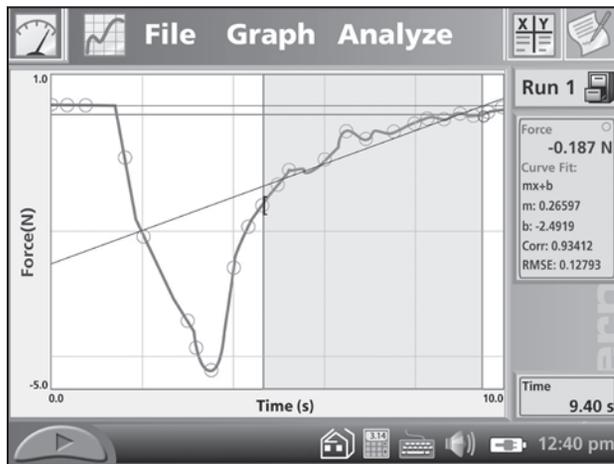


Multiple runs

You can collect several runs for comparison. Tap the File Cabinet icon ; the run will be stored, and the graph cleared. Collect another run by pressing the Collect button. Your new run is displayed on the graph. To see your first run, tap Run 2, and select either Run 1 or All Runs. In this way, you can gather multiple runs for comparison, and view just the ones you want.



Statistics on a selection



Curve fit on a selection

Select a range of data for statistics or curve fits

Some analysis functions allow you to select a range of data. To select a range, use the stylus to drag across the region of interest. Now you can perform tasks like integrals, statistics, or curve fits. Try this: Drag across a feature on your graph, and then choose Statistics from the Analyze menu, choosing the particular sensor or column, if necessary.

The graph now shows the selected region, and descriptive statistics are displayed to the right of the graph. You can remove the statistics display by choosing Statistics again from the Analyze menu.

Curve fits can also start with a selection. To perform a curve fit, drag across a region of the graph. Then choose Curve Fit from the Analyze menu. In the new screen, you'll see your graph, as well as a menu of fit equations. Display the equations by tapping the down-arrow to the right of the list. Tap Linear to perform a linear fit to your data. The fit coefficients are shown. To place the fit on your main graph, tap OK. The fit and its statistics are shown on the main screen.

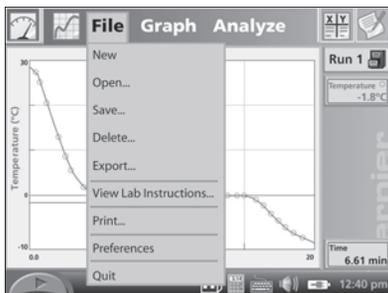
The LabQuest App Screen



There are four tabs across the top of the LabQuest screen: the Meter, Graph, Table, and Notes tabs. The tabs are part of LabQuest App. Tap a tab to display its screen.



Across the bottom of the screen are icons for Collect, Home, Calculator, Keyboard, Sounds, Battery, and the current time.

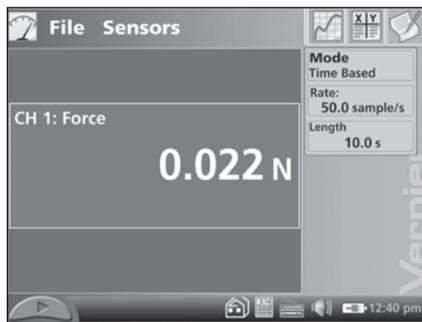


All tabs share a common File menu.

Some of the functions are:

- **New** resets the data-collection mode and calibrations to defaults, and clears any existing data.
- **Open, Save, and Delete** are used to manage LabQuest experiment files.
 - **Saving Files from LabQuest App**
When you choose Save from the File menu, LabQuest App defaults to a location on the LabQuest. Give the file a name, and tap Save.
 - **If an SD card or a USB flash drive is connected**, an additional icon for that space is displayed beside the LabQuest directory icon. Tap the desired location, then provide a name and tap Save.
 - **Saving Files onto a SD Card or USB Flash Drive**
You can save files from LabQuest App to an SD card or a USB Flash drive, move the card or drive to a computer, and open the file from there using Open from the File menu on Logger Lite or Logger Pro.
- **View Lab Instructions** opens one of the more than 50 lab activities provided on LabQuest.
- **Print** prints to most HP printers.

The Meter Screen

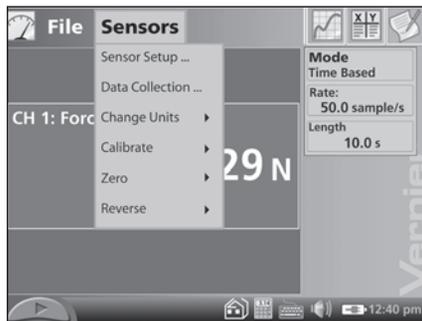


The Meter screen displays a digital meter for each sensor, the current mode, and data-collection parameters.

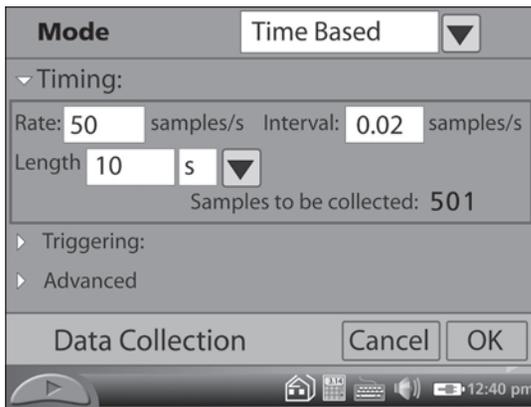
Several shortcuts are available on the Meter screen. Tap on a meter to zero, calibrate, reverse, or change units on its sensor. Tap the Mode field to adjust data-collection details.

The Sensors menu gives access to detailed setup controls.

- **Sensor Setup.** Use this to configure the internal temperature sensor, as well as to set up legacy non-auto ID sensors.
- **Data Collection.** Choose between time-based, events with entry, and other data-collection modes. For time-based experiments, set the experiment length and data rate. You can get to the same settings by tapping the Mode field on the Sensor screen.



In any dialog that requires the entry of either text or numbers, a keyboard pops up as needed. Tap the field into which you want to place text or numbers, and tap the needed keys.



The Graph Screen

LabQuest App automatically switches to the Graph screen when data collection begins.

There are several important shortcuts on the Graph screen. After collecting data, tap on the graph to read values from the Examine cursors. Read values in the readouts to the right. Store a run by tapping the File Cabinet Icon ; choose between stored runs with the menu to the left of the icon. Tap the axis labels to change what is graphed on that axis.

In the **Graph** menu, you can choose what is plotted and how the graph is scaled, choose point protectors (markers identifying a sensor or run) or connecting lines, and choose data to ignore by striking through the values. You can choose to display two graphs at once.

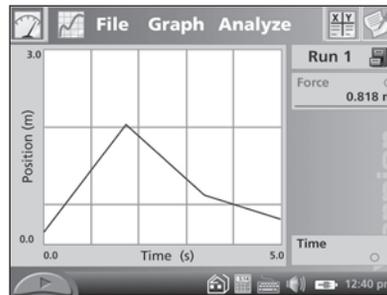
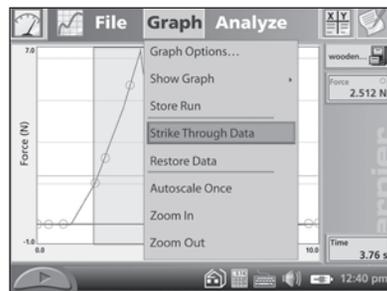
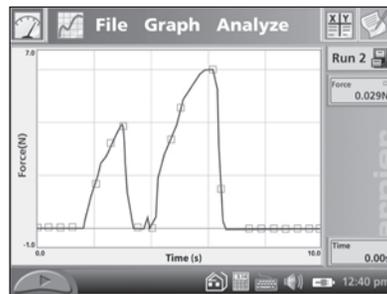
The **Analyze** menu gives access to additional tools, such as tangent lines, statistics, and curve fits.

The next four choices in the Analyze menu, **Integral**, **Statistics**, **Curve Fit**, and **Model**, operate on either the whole graph or just a portion of the data, as selected by dragging the stylus across the graph. To use any of them, select a region if needed, and then choose the function.

Curve Fit allows you to automatically fit a chosen function to your data. **Model** allows you to manually fit a chosen function to your data.

The **Draw Prediction** choice allows you to sketch a prediction of how a graph will appear once data are collected.

The **Motion Match** function generates a target graph for Motion Detector-based graph-match exercises.



The Table Screen

The Table screen shows a data table view of your experiment. There are several shortcuts on this screen.

- Tap the run name field, initially called Run 1, Run 2, and so forth, to edit the name of the run.
- Tap a column header to change the column name, displayed precision, or units.

The Table menu allows you to create, modify, or delete columns of data.

- **New Manual Column** creates an empty column into which you can enter values directly.
- **New Calculated Column** creates a new column whose values are based on other columns by a mathematical formula. For example, you might define a calculated column as the inverse square of another column. A calculated column can be used in graphs or in other calculated columns.
- **Delete Column, Run** and **Clear All Data** will remove columns, runs, or all of your data.
- **Strike Through** and **Restore Data** non-destructively ignore and restore data. Select a row or rows in the data table, or drag across a region on a graph, and then use these commands. Curve fits and other calculations do not use ignored data.
- The **Edit** item allows you to copy and paste values from one place to another. In particular, you might copy a range of values and paste them into the Notes screen.

Run 1	
Time (s)	Force (N)
0.00	0.014
0.02	0.014
0.04	0.043
0.06	0.014
0.08	0.007
0.10	0.007
0.12	-0.007

Name: Force Units: N

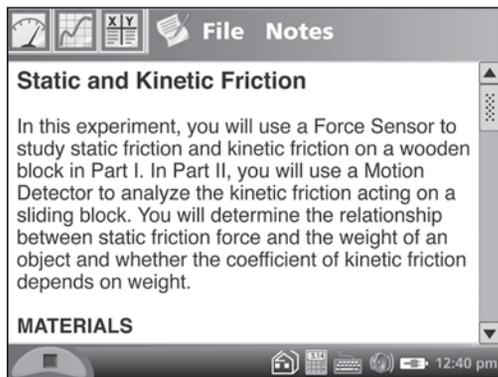
Displayed Precision: 3

Decimal Places
 Significant Figures

Column Options Cancel OK

wooden block	
Time (s)	Force (N)
2.58	3.725
2.60	3.819
2.62	3.926
2.64	4.120
2.66	4.170
2.68	4.414
2.70	4.493

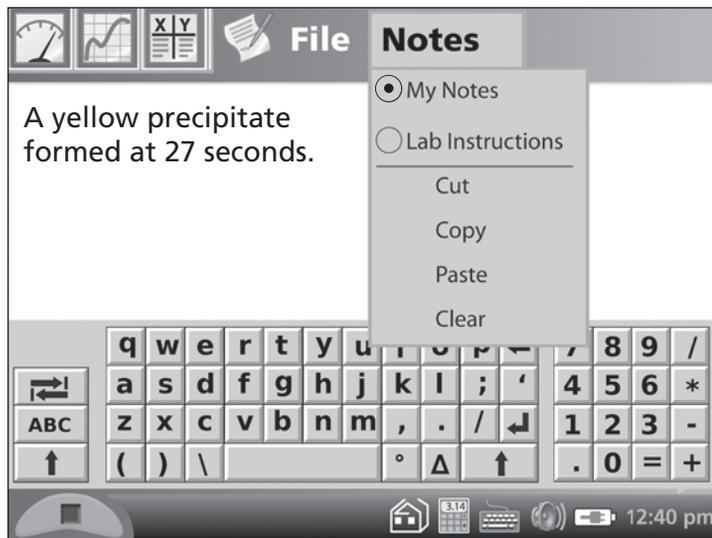
The Notes Screen



The Notes screen is a place to enter and view text and images. LabQuest includes over 50 prepared activities for use by students, and you can enter your own notes as you perform an experiment.

To open a prepared activity, choose View Lab Instructions from the File menu, and select the desired file.

The Notes menu allows you to toggle between the Lab Instructions and your own notes, called My Notes. The menu also gives access to standard edit commands of Cut, Copy, Paste, and Clear All. To enter text in My Notes, tap the Keyboard icon on the bottom row of the screen. You can also attach a standard USB keyboard to the USB port for text entry.



Additional LabQuest App Features

Hardware Keys on LabQuest

The front panel of LabQuest contains keys that allow you to perform many tasks without a stylus. The Collect button duplicates the on-screen collect button. The remaining buttons are:



Escape. Dismisses a menu or dialog and takes no action.



Home. Displays the Home menu.



Screens. Cycles through the screens of LabQuest App, or fields of dialog boxes.



OK. Executes the selected action.



Menu. Pulls down the first menu available; to see additional menus use the right arrow key.



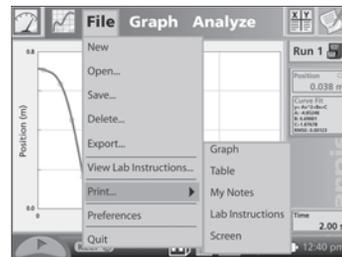
Cursor keys. Use these arrow keys to move through a menu or between menus, or to move the Examine cursor.

Printing from LabQuest

LabQuest prints to many Hewlett-Packard printers.

See www.vernier.com/labqprinters for an up-to-date list of compatible models.

Connect a compatible printer to the full-size USB port on LabQuest, and turn on the printer. The Print menu item is located in the File menu. From Print, you can choose to print just the graph, the data table, your own notes, the lab instructions, or the screen as it is currently displayed.



Power Button Behavior

If you have unsaved data when you press the LabQuest power button, LabQuest App will prompt you to either save or discard the data before turning off. Or, if you press and hold the power button for more than five seconds, LabQuest will turn off, discarding any unsaved data.

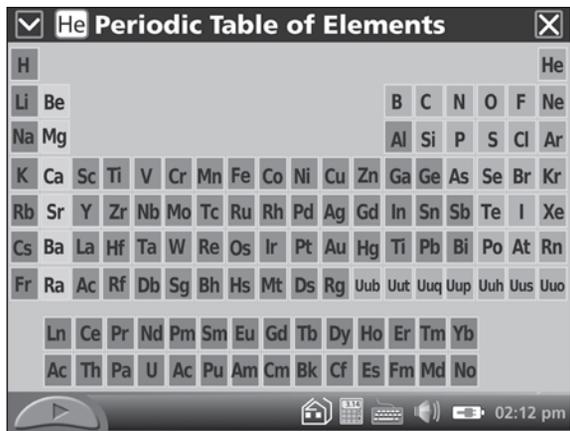
LabQuest ignores the power button during data collection. If you want to turn LabQuest off, stop collection first.

LabQuest protects your data in low-battery situations. Shortly before the battery lacks sufficient charge to power LabQuest, LabQuest App will end data collection if in progress, and save data to a temporary file. Later, when LabQuest is recharged and LabQuest App restarts, you'll be prompted to either open or discard the temporary file.

When LabQuest turns on, LabQuest App will be running, cleared of any previous data or sensor setup.

Additional LabQuest Tools

Tapping the Home icon  displays a menu for starting applications. LabQuest App can be restarted here. The Periodic Table and Stopwatch applications are also available. You do not need to quit LabQuest App to launch another application.



The **Periodic Table** displays the full table of elements at first; to see data on any element, tap its symbol. Tap the close button in the upper right corner to dismiss screens.



The **Stopwatch** application has buttons to start and stop timing, reset, and copy the time to the clipboard.

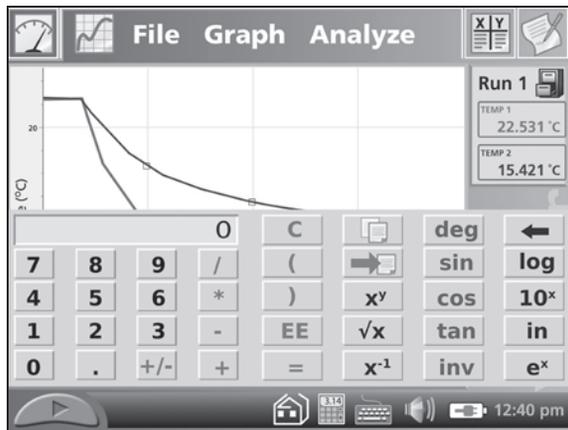
Additional LabQuest Tools

The **Speaker** icon allows you to adjust the volume of sounds produced by LabQuest.

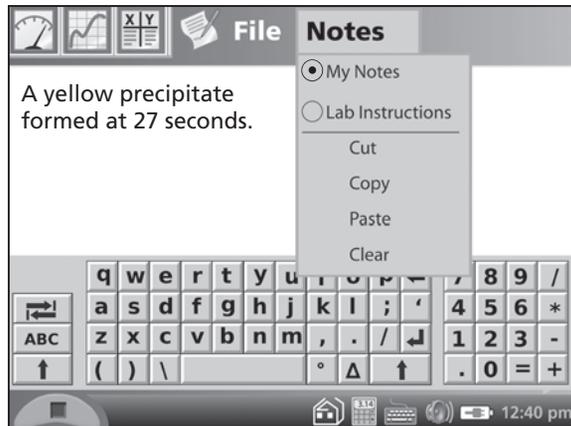


Tap the **Battery** icon to see status of battery power.

Set the time and date by tapping the time display at the lower right.



A **standard scientific calculator** is called by tapping the Calculator icon. The calculator uses algebraic notation. You can use this calculator at any time; to dismiss it, tap the Calculator icon again.



A **QWERTY keyboard** is called and hidden by tapping the Keyboard icon. You will not need to summon the keyboard very often, as it will be displayed whenever alphanumeric input is required.

Use LabQuest with a Computer

Software Requirements

LabQuest comes with Logger Lite computer software. You can use Logger Lite 1.4 (or newer) or Logger *Pro* 3.6 (or newer) with LabQuest. Install the software from the included CD if you have not already done so. Logger Lite and Logger *Pro* include tutorials in how to collect and analyze data. Choose Open from the File menu, and open the Tutorials folder to see a list of topics.



Connect LabQuest to your computer using the included USB cable. The mini end connects to LabQuest, and the full-size end connects to an available USB port on your computer.



When LabQuest is connected to a computer, and Logger Lite or Logger *Pro* is running, LabQuest will display a double-arrow screen icon indicating that communication is in progress. The LabQuest touch screen and the navigation keys are disabled.

Once you have installed Logger Lite or Logger *Pro*, LabQuest can be used in several ways.

- You can use LabQuest as a high-performance computer-based data-collection interface, feeding data directly to the computer.
- If you have just collected data on LabQuest App, they will be detected by the computer software, and you'll be prompted for automatic retrieval.
- You can open LabQuest App data files in Logger Lite or Logger *Pro*.
- You can copy most Logger *Pro* or Logger Lite data files to LabQuest and open the files in LabQuest App.
- You can import data from a LabQuest file into an existing Logger Lite or Logger *Pro* file, allowing data from multiple files or LabQuests to be combined in a single computer file.

Use LabQuest with a Computer

Collect data Using Logger Lite or Logger Pro

Connect a sensor, such as Force or Temperature, to LabQuest. Launch Logger Pro or Logger Lite. The computer will detect LabQuest and the attached sensor, and display a graph ready for data collection. Click the Collect button  to gather data.

Logger Lite is a simplified version of Logger Pro. Logger Lite collects and graphs data, but does not contain advanced analysis features. Additional usage information on Logger Lite is in the Logger Lite Quick Reference Manual, installed with the software. If you need these additional features, consider purchasing Logger Pro.

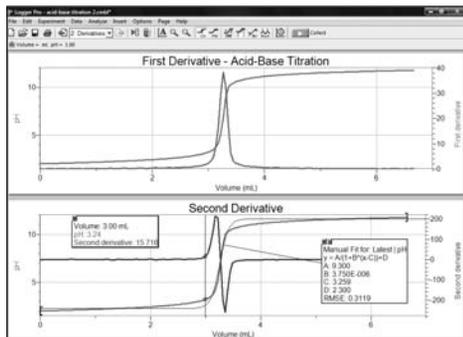
Logger Pro is Vernier's full-featured data collection, analysis, video capture and analysis software package. Additional usage information on Logger Pro is in the Logger Pro Quick Reference Manual, supplied with the software.

Transfer data from LabQuest to a Computer

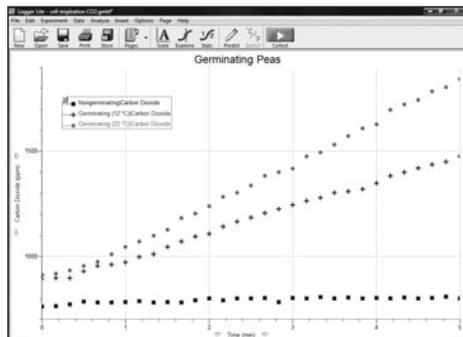
If you collect data in LabQuest App, and you then connect LabQuest to a computer, Logger Lite or Logger Pro automatically detects the presence of the remote data and offers to retrieve them. Collect some data using LabQuest App so you can try this. Then, connect LabQuest to your computer and launch Logger Lite or Logger Pro. The computer application will detect LabQuest and its data, and display a dialog indicating that remote data are available. Follow on-screen instructions to download data to the computer.

Open Files Saved on LabQuest

You can also save multiple files on LabQuest, and then later retrieve the files using the LabQuest Browser feature in Logger Lite or Logger Pro. The Browser allows you to Open, Save, Delete, and Import files on LabQuest. The examples that follow use Logger Pro, but Logger Lite will work the same way.



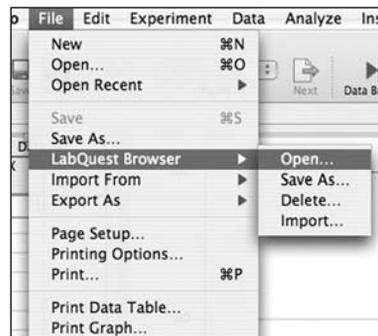
Logger Pro



Logger Lite

Use LabQuest with a Computer

- Choose **Open** in LabQuest Browser to open a file, located on LabQuest, in Logger *Pro*. If there are unsaved data in Logger *Pro*, you will be prompted to save the data before the LabQuest file is opened.
- Choose **Save** in LabQuest Browser to save a Logger *Pro* file located on the computer to LabQuest. LabQuest App can open Logger *Pro* files, ignoring any Logger *Pro* features not supported in LabQuest.
- Choose **Delete** in LabQuest Browser to delete files from LabQuest.
- Choose **Import** in LabQuest Browser to import the data only from a LabQuest file into the current Logger *Pro* session. This is different from Open in that the data in the LabQuest file are added as new data sets to Logger *Pro*, without closing the current Logger *Pro* file. Import allows you to gather data from multiple files into a single Logger *Pro* file, such as compiling class results into a single file.



Care of LabQuest

LabQuest Battery

Use only the supplied AC adapter to charge the LabQuest battery. A full charge will take eight hours. Battery life will depend on the sensors used, but typically you can expect to use a LabQuest a full school day without recharging. The battery cannot be overcharged, and can be safely recharged after a partial discharge. The LabQuest screen will dim after a few minutes of no use, even during data collection.

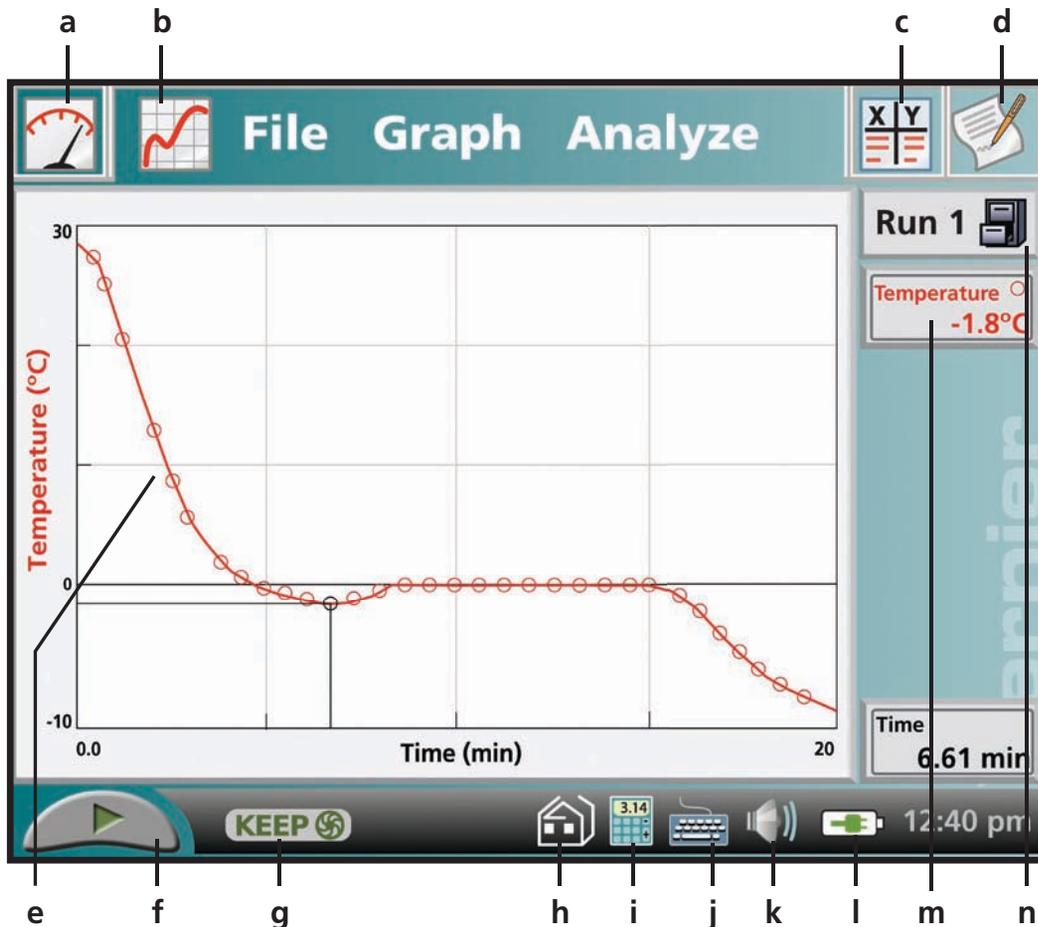
LabQuest Updates and Emulator

Software updates for LabQuest, as they are released, will be available at www.vernier.com/labquest/updates. A computer-based LabQuest emulator will be available in early 2008 at the same URL. The emulator is intended for class instruction in LabQuest use, or when a projected version of LabQuest is desired.

LabQuest Case and Screen

LabQuest is water and shock resistant. Do not submerge in liquids. Wipe clean with a slightly damp cloth. If necessary, lightly wipe the screen with a soft cotton cloth slightly dampened with ethanol. Use no other solvents.

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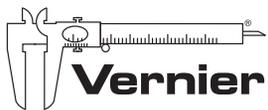
- a. Meter tab
- b. Graph tab
- c. Data tab
- d. Notes tab

- e. Tap on the graph to analyze data
- f. Start / stop collecting data
- g. Keep data in event mode

- h. Home menu
- i. Scientific calculator
- j. Keyboard
- k. Sound control

- l. Battery status
- m. Current reading
- n. Store your runs

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Measure. Analyze. Learn.™

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