# BUYER'S guide

## Data Loggers

Using probeware for math and science exploration is a great way to engage students in inquiry-based, hands-on learning. And with manufacturers offering upwards of 70 probes for their data loggers, there have never been more ways to gather real-time information for nearly any activity, anytime, anywhere.

One advantage of the handheld data logger is that it doesn't have to be tethered to a computer to gather and analyze information. Although many units come with software that allows them to interface with a computer, users don't have to wait to view their data. Graphing and analysis capabilities make data crunching quick and easy. Some units even have a touch-sensitive color screen that lets the user view data in different ways. Onboard memory allows for the collection of multiple data sets, and many come with ports for expanded memory capacity.

Manufacturers offer a wide array of probes designed to "plug and play" directly with their data loggers. Pasco has more than 60 for its Xplorer GLX, ranging from magnetic field and accelerometer sensors to ones that sense muscle contractions and gamma radiation.

Sensors range in cost from less than $20 to several hundred dollars and beyond, depending on their use, sensitivity, and other factors. Many fall within the $50–$150 price range when puchased individually, but some manufacturers also sell probeware bundles that include a data logger and an assortment of sensors.

Some data loggers are designed to work with other equipment you may already have—good news considering the $200–$400 cost of a portable data logger. CoachLab's ULAB, for example, is compatible with sensors produced by Vernier, Texas Instruments, and Pasco.

In addition to built-in sensors, most units come with multiple sensor ports. The TI CBL 2 has four ports (one digital and three analog), along with temperature, light, and voltage sensors built in. The CBL 2 is the most affordable unit featured here, but bear in mind that it is a calculator-based unit that must attach to a TI-series graphing calculator to display its data.

Although the primary function of the data logger is to collect information, manufacturers are adding functionality. For example, the Nova5000 comes with Windows CE, an assorted collection of applications, and WiFi capability. Data Harvest's Easy Sense Q3+ is Bluetooth capable, and Vernier's LabQuest comes with 50 embedded experiments and an onboard periodic table.

| Company | Model |
|---|---|
| **CoachLab Probeware**<br>www.cma.science.uva.nl  | ULAB Datalogger |
| **Data Harvest Inc.**<br>www.dataharvest.co.uk  | Easy Sense Q3+ |
| **Fourier Systems Inc.**<br>www.nova1to1.com  | Nova5000SX |
| **Pasco**<br>www.pasco.com  | SPARK Science Learning System |
|  | Xplorer GLX<br>PS-2002 |
| **Texas Instruments Inc.**<br>http://education.ti.com  | CBL 2 |
| **Vernier**<br>www.vernier.com  | LabQuest |

| Price | Built-in Sensors | Memory | Screen | Sensor Ports | Compatability | Notes |
|---|---|---|---|---|---|---|
| $336 | None | 512 KB | 128 x 64 pixels, 3x2" (7.62 x 5.08 cm) LCD | 4 analog, 2 digital, USB, serial port | CMA, TI, Vernier, Pasco | Compatible with multiple sensor manufacturers |
| $319 | Light level, temperature, sound level | 1 MB (8 data sets) | 4 x 20 character LCD display | 2 | Vernier DIN, 50 Smart Q sensors | 33' (10 m) radius Bluetooth range indoors |
| $399 | Microphone input | 128 MB RAM, 256 NAND Flash memory, CS and SD card slots, USB port | 7" (17.78 cm) 800 x 480 pixels, color touch screen | 4-port interface connecting up to 8 probes simultaneously | Fourier compatible | WiFi-enabled Internet access, Windows CE 5.0, assorted apps |
| $329 | Temperature, voltage | 1 GB | 640 x 480 pixels, 5.7" (14.5 cm) diagonal color touch screen | 2 Pasport sensor ports, 1 mini USB, 1 standard | 70+ Pasport sensors, USB standard, USB mini | 60+ preinstalled labs |
| $329 | 2 temperature, sound, voltage | 12 MB | 320 x 240 pixels, LCD | 4 | 60+ Pasport sensors | Built-in speaker |
| $196 | Temperature, light, voltage | 24 KB RAM, 600 KB flash ROM | 3 LED status indicators | 3 analog, 1 digital | TI & Vernier, 40+ sensors supported with built-in calibration info | Data is retrieved/analyzed by TI graphing calculators |
| $329 | Temperature, sound level | 40 MB, expandable SD/MMC card slot or external USB drive | 320 x 240 pixels, color touch screen | 6, including mic and mini USB | Works with existing Vernier sensors | 50 embedded experiments, on-board periodic table |